MDAS-5 Installation Guidebook

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1 General

MDAS installation requires wiring electric signals of vehicles. Please contact your local distributor or authorized installers to install. Movon will hold no liability of any damage occurred during installation proceeded by users, or unauthorized installers.

MDAS is developed to give only warnings to drivers. The final decision to maneuver or control shall be made by drivers themselves. Furthermore, MDAS is not capable to provide 100% detection rate of lane markings, vehicles, and MDAS recognition performance can be fluctuated due to road conditions, inclement weather, poor installation, etc. Please ensure that keep eyes forward while driving rather than only relying on MDAS.

2 Product

2.1 Specification

CPU	Cortex A7 Dual-Core				
Audio Out	Speaker				
Comovo	Front	1920 x 1080 (FHD)			
Camera	Rear	1280 x 720 (HD)			
	Input Range	DC 10V ~ 36V			
Power	Power Consumption	400mA @ 12V Max 3mA @ 12V Idle State			
Format	Video	AVI (h.264 codec : FHD / 27fps)			
FOITHAL	Audio	PCM			
Storage	4~32GB Micro SD card support				
Input / Output	accessory), USB A	vice Host (for PC Calibration, supported -type Port x 2 (For rear camera) t, GPS port, Micro SD Card			
Size	Body	111 x 57 x 51 mm			
Tomporature	Operation	-20°C ~ 70°C (-4°F ~158°F)			
Temperature	Storage	-40°C ~ 85°C (-40°F ~185°F)			

2.2 Product components

Main unit	Basic cable (6P, 4P Cable)	Micro SD card (8GB)	Technical cleaning wipe
		\$10 st 2000	The state of the s

Indicator (Optional)	Rear Camera (Optional)	Rear Camera USB cable (5M standard) (Optional)	Video Out Cable (Optional)	
RÉC Y				
Vibrator (Optional)	Micro 5PIN USB cable (Optional for installers)	Wi-Fi Dongle (Optional for installers)	GPS (Optional)	
OBD-II (Optional for installers)				

2.3 Main Unit & Main Cable

2.3.1 Main Unit



	LED Status						
			† <u>⊕</u> †				
Illuminate	Illuminate	Illuminate	Blink				
Booting	Working Mode Verify connect with GPS	Check status of Micro SD Card	Detect new firmware				
	<u></u>						
Initialization	Calibration Mode						

2.3.2 Main Cable



2.4 Technical Cleaning Wipe

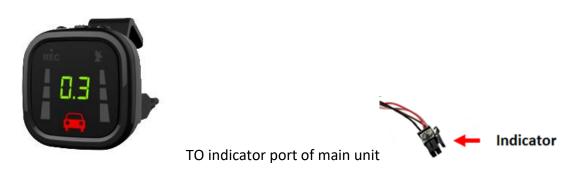
MDAS-5 provides Technical Cleaning Wipe for cleaning and removing dust, finger print on windshield.

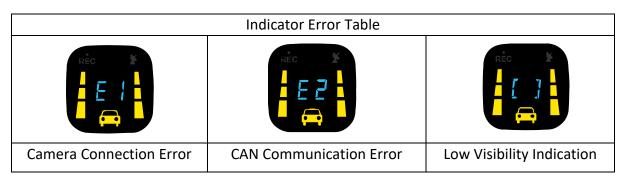


2.5 Indicator (Optional)

Read user manual to see more description and functions.







2.6 Rear Camera (Optional)



In case of using the rear camera, connect the USB cable of the rear camera into the USB port on the back of MDAS-5.



* Caution: When attaching the camera to the front, please adhere in the direction of adhesion, with the arrow visible above.

2.7 OBD-II Connector (Optional)

* <u>ONLY</u> use when vehicle support speed and turn signals via CAN-BUS and OBD-II PIN is compatible



16	15	14	13	12	11	10	9	\
8	7	6	5	4	3	2	1	\

6: CAN High (White) 4: Ground (Black) 14: CAN Low (Green) 16: BAT (Red)

2.8 Vibrator (Optional)

* NOTE: Need Vibrator gender cable to use this and need to enable in Calibration. Read details in Calibration



DTG(Digital Tachograph) & GPIO Setup 1. Driving Log 1-1. Save in video On ▼ 1-2. Save as files On ▼ 2. Transmit data via RS-232 On ▼ 3. GPIO 12V output 3-1. Lane departure warning Off ▼ 3-2. Forward collision warning Off ▼ 4. TV out NTSC ▼ 5. Break Time Alarm 1 hour ▼

2.9 GPS (Optional)

* Important, in case of use GPS for speed signal, warning timing can be inaccurate while decelerating circumstances.



2.10 Video Out Cable (Optional)

Transmit analog video to another device using RCA connector.



2.11 Micro SD Card (Expandable)

* Micro SD card is expandable, only first 3 months are guaranteed. It is recommended to format micro SD card regularly and replace it when it cannot be recognized in MDAS. ** Micro SD card speed shall be above Class 10 and it is recommended to use MLC type.



2.12 Wi-Fi Dongle (Optional for installers)Use for Calibration procedures for <u>Android Phones</u>.Application app can be downloaded in www.mdas.co.kr



2.13 Micro 5 PIN USB Cable (Optional for installers)

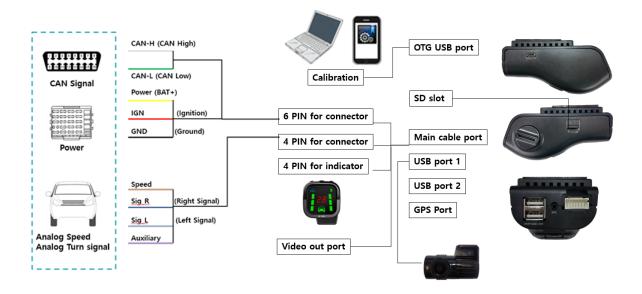
* NOTE: You can use a common USB cable that supports data transmission. Use for Calibration procedures for <u>Windows OS</u> computers.

Before use, please install RNDIS driver (see Chapter 4.1.)



3 Installation

3.1 System Connection Scheme



3.2 Installation Procedure

- 1 Check which types of signals the vehicle provides (CAN/Analog)
- (2) Connect vehicle signals (See Chapter 3.3 Wiring Combination)
- (3) Attach MDAS-5 (and indicator if needed) to the vehicle
- (4) Connect cables with MDAS-5
- (5) Access MDAS-5 using Micro 5pin USB cable or Wi-Fi dongle
- 6 Calibration (See Chapter 4. Calibration procedure)
- 7 Test drive

3.3 Wiring Combination and Description

3.3.1 6Pin Power Cable



Color	Label	Connection Description				
White	CAN H	To CAN High wire	Support CAN J1939 standard,			
Green	CAN L	To CAN Low wire	CAN 2.0 (Support Version A, B)			
Yellow	POWER	To constant power wire	Cumport 12×24 V (MAN 2CV)			
Red	ACC	To ignition (Accessory) power wire that turns off when key is at OFF	Support 12~24 V (MAX 36\			
Black	To ground source, please ensure that is connected properly ground, or it could damage the vehicle and MDAS.					

3.3.2 4Pin Signal Cable



Color Label		Connection Description
Blue	Sig R	To analog right turn signal
Blue/White	Sig L	To analog left turn signal
Brown/White	Speed	To analog speed signal, be careful about old vehicles that do not have speed sensor,
Purple/White	Auxiliary	Auxiliary wire sends out power, this can be used to activate Vibrator module (Optional) and if need to use, it has to be enabled in Calibration.

3.3.3 Wiring Combination

- * NOTE: See cable description below the combination table.
- * NOTE: You can check Vehicle Database to check CAN-BUS availability, please visit http://info.mdas.co.kr and check information before installation.

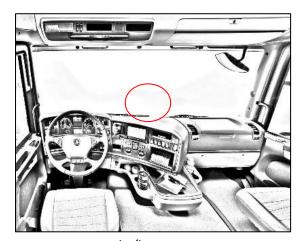
No.	Speed	Turn signal	Recommended connection
			6PIN Power Cable can connect to Power, Ignition, ground, CAN High, CAN Low
1	CAN-BUS	CAN-BUS	Or OBD-II Adapter Can connect to OBD-II connector, check compatibility before use. You do not need 6Pin power cable nor 4Pin signal cables, MDAS-5 will receive power from OBD-II and turn off and on by check CAN-BUS activities
2	CAN-BUS	Analog	6PIN Power Cable + 4PIN Analog Cable Use 6 Pin for power, and 4Pin for analog turn signals.
3	Analog	Analog	6PIN Power Cable + 4PIN Analog Cable Use 6 Pin for power, and 4Pin for analog speed signal and turn signals.
4	GPS	Analog	6PIN Power Cable + 4PIN Analog Cable + GPS

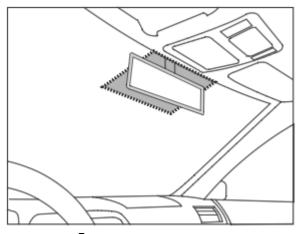
3.4 Attach MDAS-5

Before attaching MDAS-5, clean and remove dust, finger from on the desired installation area by technical cleaning wipe and mark the center of windshield.

It is very important to attach MDAS-5 at the center for the best performance. However, due to interior or space, if MDAS-5 cannot be attached at the center, attach MDAS-5 as close as to the center. You can adjust the difference in Chapter 4 Calibration.

*NOTE: MDAS-5 should not be attached more than 10 cm (4 inches) apart from the center.



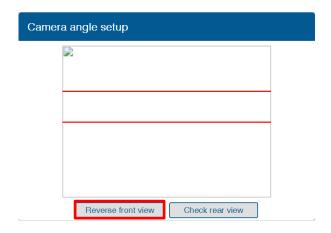


For trucks/buses

For passenger cars

In case of attaching to a heavy-duty truck, please rotate 180 degrees and attach it. In this case, please press the Reverse front view button of the calibration as below.





3.5 Parts connection

3.5.1 Indicator

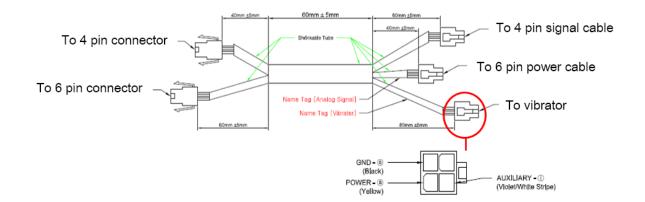
* Please connect to 4Pin connector labelled "Indicator" it could damage indicator if you plug into 4Pin Signal connector.



3.5.2 Vibrator

4 Pin split gender cable is required to connector Vibrator.





3.5.3 Video-Out Cable

Use Movon provided RCA cable and plug into Video out port. This function does not provide other UI or graphics through via video-out.



3.5.4 Rear Camera When connecting the rear camera, please use No. 1 of the USB port.



4 PC and Android Phone Calibration

- 4.1 Driver Setup (ONLY SUPPORTS WINDOWS OS)
 - * NOTE: Before you connect or start calibration, please install RNDIS driver first.
 - * For more details, see Chapter 6.

4.2 Calibration Setup

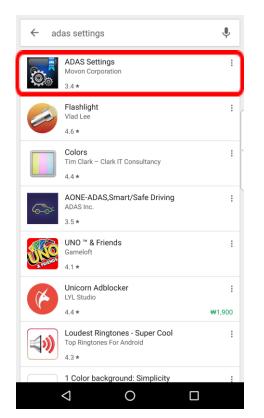
4.2.1 Access MDAS-5 Calibration page via PC

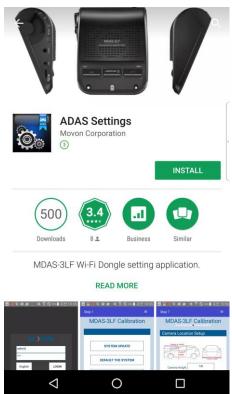
- ① Connect MDAS-5 to PC using Micro USB cable with 5 pins.
- ② Start the engine.
 If you hear repeating beep sound, this means MDAS-5 is properly connected to computer.
- ③ Type 10.0.0.1 in an internet web browser to access MDAS-5 calibration page. (Chrome, Above Explorer 9, Firefox, and Safari are recommended)
- You will see log in page below.
 Please enter your ID and password, and select language you want.



4.2.2 Access MDAS-5 Calibration page via Android Phone

Search and install the application "ADAS Settings" in Google Play Store.
 (MDAS supports only Google Android)

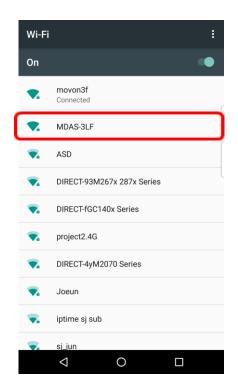




② Connect Wi-Fi Dongle to USB port on MDAS-5.



③ Find and connect to "MDAS-5" on your Wi-Fi setting page. (Password: 12345678)





4 Return to the ADAS Settings app. Select "MDAS-5" and click the "NEXT" button.





⑤ On the Log-in Page below,
Please enter your ID and Password, then select language you want.



6 If you can see the MDAS-5 Calibration page below, you are ready for the Calibration procedure now.

4.2.3 Select Vehicle Signal Types

4.2.3.1 Vehicle Data File (CAN-BUS)

In case of using CAN Data, you have to choose "Vehicle Info File" tab.

MDAS-5 only recognizes encrypted CAN data on our Database site;

http://info.mdas.co.kr

(For further information, check Chapter 5. How to Download CAN data)

* NOTE: MDAS-5 only reads a file named "mdasinfo.dat".

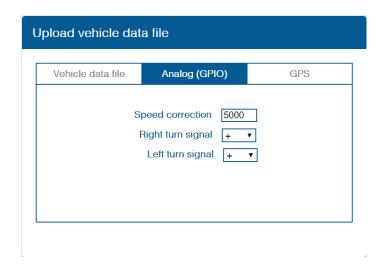
If you have downloaded multiple files and they are named like "mdasinfo(1).dat" or "mdasinfo(2).dat", they cannot be recognized in MDAS-5.



4.2.3.2 Analog (GPIO)

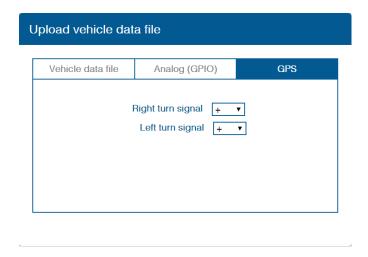
In case of using Analog signals for all vehicle data, you do not need to download Vehicle Data file.

Just click the Analog (GPIO) tab. Enter speed correction value and RPM correction value. Change polarity for turn signals and brake signal based on the vehicle.



4.2.3.3 GPS

In case of receiving speed and turn signal information from GPS, click GPS tab. Change polarity for turn signals and brake signal. Enter RPM correction value.



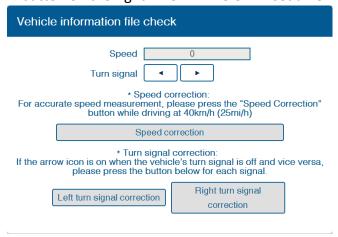
4.2.4 Vehicle Information Check

In this page, you can check whether MDAS-5 is receiving vehicle data properly.

4.2.4.1 Verify Speed Signal

Start the engine and drive slowly in a safe place to see whether speed is corresponding with the vehicle's speed gauge. If it is not, you can simply adjust it.

Drive and maintain the speed around 40km/h (24mi/h). Click the first "Correction" button on the right. Then MDAS-5 will set a new speed.



4.2.4.2 Verify Turn Signal

The arrow icon will be ON, only if you are using turn signal for left or right direction respectively. If the arrow icon is always ON, click the second or the third "Correction" button to change signal polarity.

Make sure that the arrow icon is ON only when you are using turn signals.

4.2.5 Camera Angle

Adjust the camera angle knob to locate the horizon between the red guide lines.

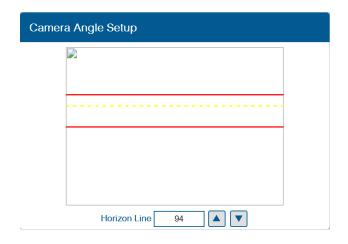


In case of indoor installation or somewhere you cannot see the horizon properly, use same data to "Camera Height". Mark the same height on the wall apart about $3 \sim 5$ meters from the vehicle.



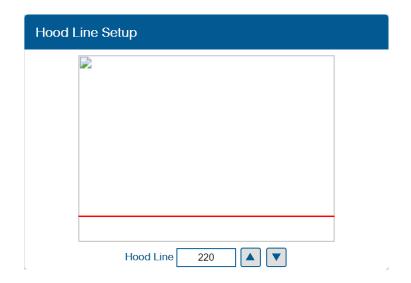
4.2.5.1 Fine Camera Angle

For better accuracy of ADAS, locate the yellow dotted line in the horizon as close as possible.



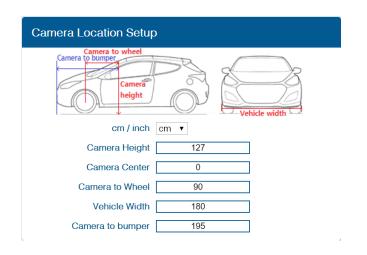
4.2.6 Hood Line

Locate the red line at the end of the vehicle's hood line to remove the useless area.



4.2.7 Camera Location and Vehicle Measurement

Camera location and vehicle measurement can affect MDAS-5's performance. It is very important put accurate data for the best performance.



Camera Height	Distance from ground to the center of camera lens.
	Distance from the center of windshield to camera lens
Camera	"-": Left Side / "+":Right Side
Center	(If MDAS-5 is attached 5cm to the right from the center, input 5.
	If MDAS-5 is attached 5cm to the left from the center, input -5.)
Camara ta	Distance from the camera to the center of the wheel.
Camera to Wheel	For trucks or buses, some vehicles' wheels are located behind.
vvneei	In this case, please input 20cm.

Vehicle Width	Distance between the wheels. Measure distance from left outside boarder to right outside boarder of the wheels.
Camera to bumper	Distance from the camera lens to the end of the bumper.

4.2.8 Rear Camera Setup

For better angle of Rear Camera (DVR), adjust the camera module by rotating it.



4.2.9 Lane Departure Warning (LDW) Sensitivity
You can adjust the LDW Sensitivity for your convenience.

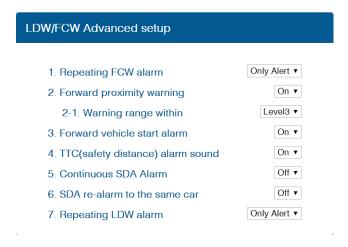


- Set the sensitivity of LDW warning on a scale of 1 to 5.
 As the level gets higher, you will hear the warning sound earlier.
- 2 Warning sound: Select preferred warning sound for LDW.
- 4.2.10 Forward Collision Warning (FCW) Sensitivity
 You can adjust the FCW Sensitivity for your convenience.



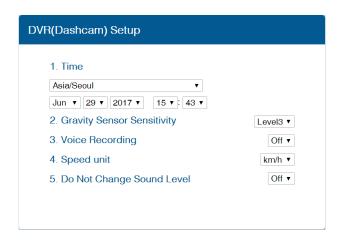
- ① Set the sensitivity of Safety distance alarm(TTC) warning on a scale of 1 to 5.
 - As the level gets higher, you will hear the warning sound earlier.
- 2 Warning sound: Select preferred warning sound for LDW.

4.2.11 LDW/FCW Advanced setup



- Set the Repeating FCW alarm. (Only Alert / Always)
- 2 Enable Forward proximity warning function (On / Off) and
- 3 Set the warning range on a scale of 1 to 3.
- 4 Enable Forward vehicle start alarm. (On / Off)
- (5) Enable TTC(safety distance) alarm sound. (On / Off)
- 6 Enable Continuous SDA Alarm (On / Off)
- Tenable SDA re-alarm to the same car (On / Off)
- Set the Repeating LDW alarm. (Only Alert / Always)

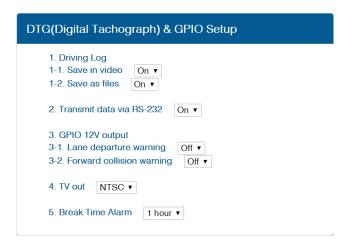
4.2.12 DVR(Dashcam) Setup



- ① Time: Set the date and time.
- Set Gravity sensory sensitivity on a scale of 1 to 5.It is for event recording.
- 3 Enable Voice recording function (On / Off).
- 4 Set Speed Unit (km/h or MPH).

5 Enable Do Not Change Sound Level (On / Off).

4.2.13 DTG(Digital Tachograph) & GPIO Setup



- 1 Driving Log
 - 1-1 Enable Save in video (On / Off).
 - 1-2 Enable Save as files (On/ Off).
- 2 Enable Transmit data via RS-232 (On / Off).
- ③ GPIO 12V output Send out voltage for LDW/FCW event. (Voltage is up to the power source of 6PIN power cable)
 - ** If use of vibrator, you have to make it ON in GPIO output option.
 - 3-1 Enable sending out voltage for Lane departure warning (On / Off).
 - 3-2 Enable sending out voltage for Forward collision warning (On / Off).
- (4) Set TV out (NTSC / PAL)
- (5) Set Break Time Alarm on a scale of 1 to 6 hours and Off.

4.2.14 MDAS Setup Complete

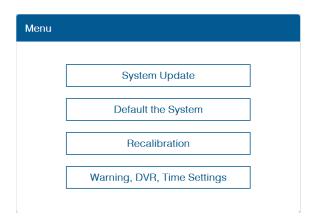
After this step, click complete then Calibration setup is finished and MDAS-5 reboots.



4.3 Setting Modification

Once MDAS-5 is calibrated, when you access to MDAS-5, you will see different menu.

4.3.1 Menu Description



- System Update: The latest firmware published in the website (www.mdas.co.kr) can be updated here.
- > Default the System: It can be cleared and reset to the installation default.
- Recalibration: Change current settings from "Vehicle information file check"
- ➤ Warning, DVR, Time Settings: Change current settings from "Lane Departure Warning"

4.3.2 Update Firmware

① Go to http://www.mdas.co.kr/eng/ and download the latest firmware

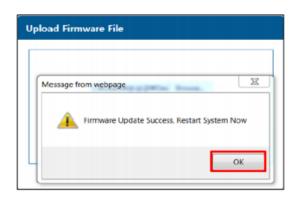


② Select "System Update" menu to upload the latest firmware.

After uploading the file, click "Update Firmware" button below.



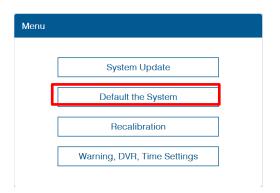
3 After updating firmware, you can see a pop up message below.

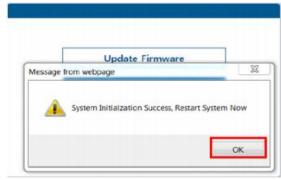


*NOTE: Do not touch or change anything whiling updating, Unless MDAS-5 might lose its data and stop working.

4.3.3 Default MDAS Settings

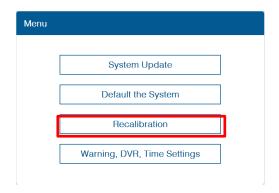
If you want to remove all data and return to a factory setting, click the "Default System" menu and wait until you see a message.





4.3.4 Recalibration

If you click this menu, you will restart from 4.2.4.1 Vehicle Information File Check.

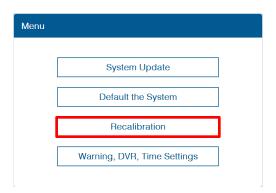


4.3.5 Warning, DVR, Time

If you click this menu, you will restart from 4.2.9 Lane Departure Warning (LDW) Sensitivity

If you only want to change settings about Warning sensitivity, DVR, Time Settings, please press this.

It will start from Lane departure warning sensitivity menu.



5 How to Download CAN Data

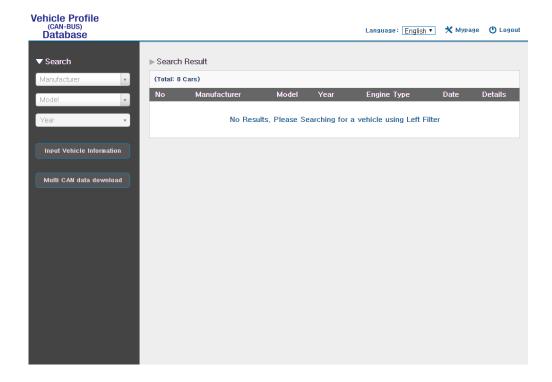
5.1 Register in Vehicle Database
Open a web browser and enter http://info.mdas.co.kr/



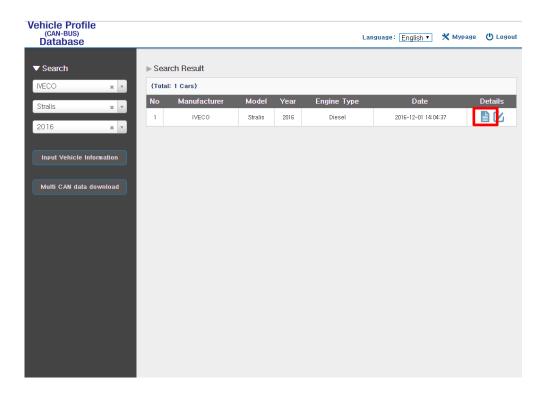


You need to register and get an approval to log in. Please contact Movon Corp. or your local distributor for the approval.

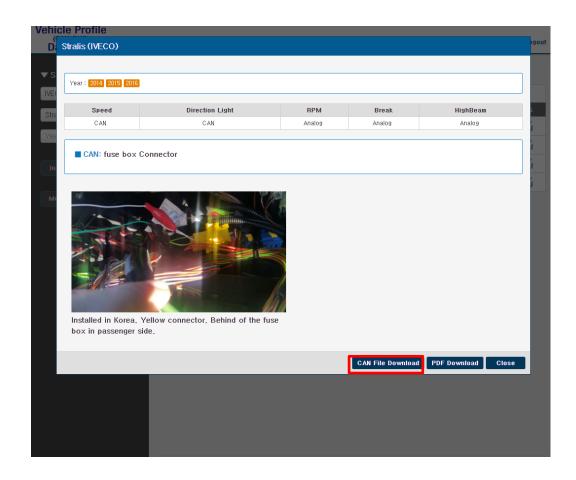
5.2 Download CAN Data file
Once you log in, you will see Vehicle profile database page.



Select Manufacturer, Model name and manufactured Year for the vehicle you need. You will see results on the right side of the page.



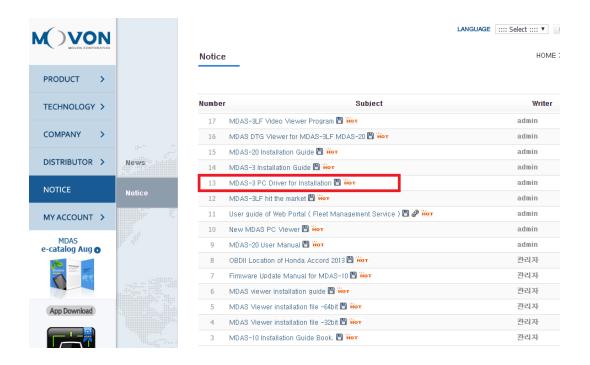
Then click " icon to see and download the vehicle information.



Click "CAN File Download" button, then it will be downloaded as "mdasinfo.dat". If you want to download photos and signal data, click "PDF download" button. They will be downloaded as a PDF file.

6 Recognize MDAS-5 in computer

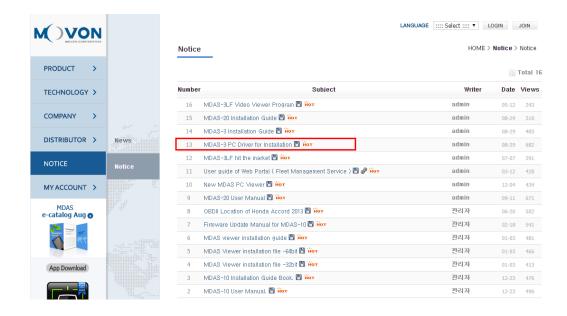
- * Please connect MDAS-5 to your laptop using Micro 5Pin USB cable before install the driver. *
- 6.1 Computer with <u>Windows XP, 7, 8, 8.1</u>
 Visit http://www.mdas.co.kr and click "Notice" tab.



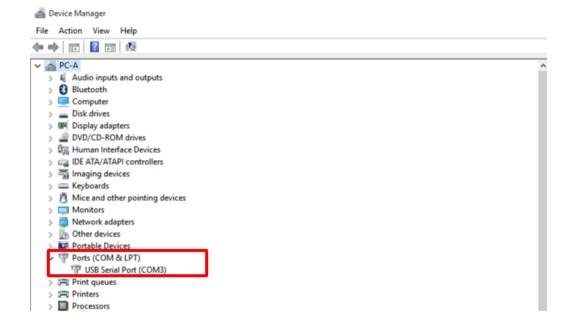
You can find MDAS-3 PC Calibration file. Please download and unzip it. When you install it, please click the right button on your mouse and select "Run as administrator".

6.2 Computer with Windows 10

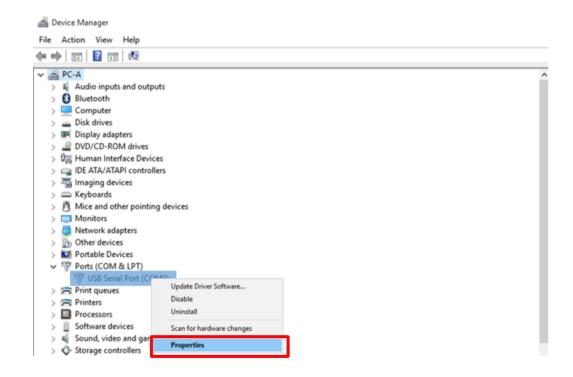
1 Visit http://www.mdas.co.kr and click "Notice" tab.



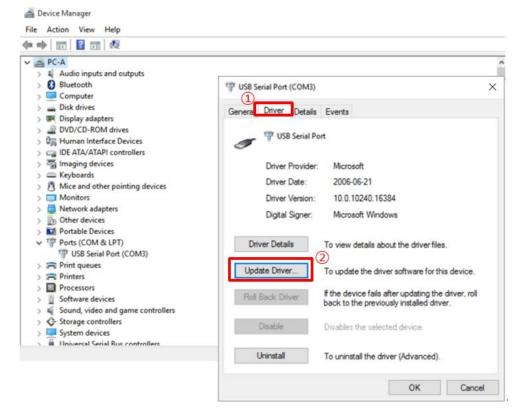
- 2 Download RNDIS driver and unzip it.
- ③ Press Window key + R. Type "devmgnt.msc".
 You will see Device manager and <u>a USB serial Port (COM x)</u> under <u>Ports (COM & LPT)</u>.



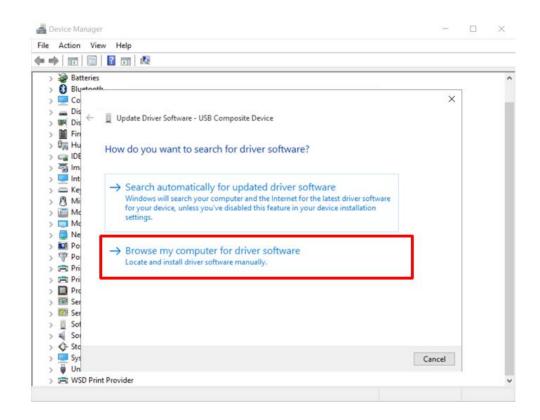
4 Click it using the right button of your mouse, then click "Properties".



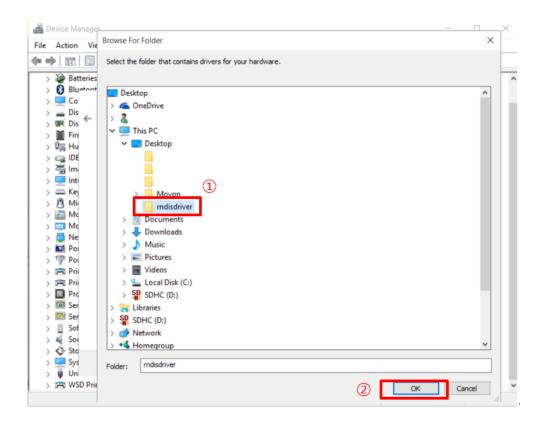
5 In the newly popped up window, Go to "Driver" tab, and click "Update Driver"



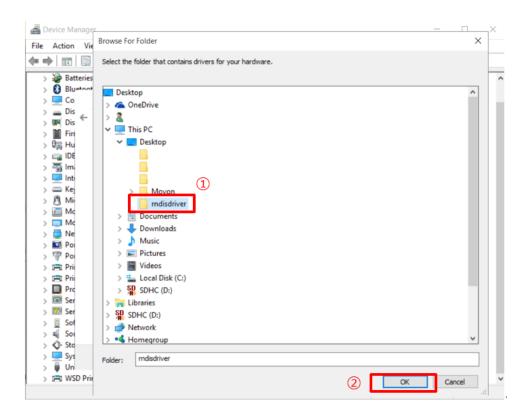
6 Select "Browse my computer for driver software".



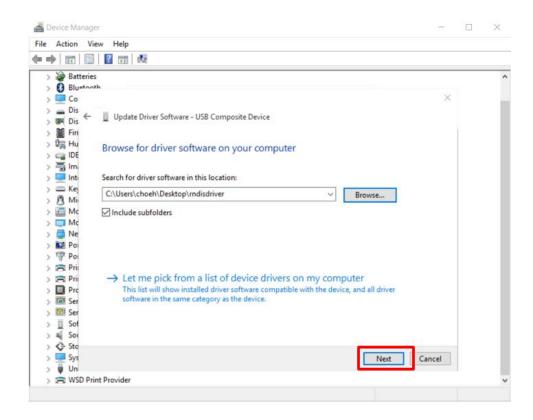
⑦ Click "Browser..." button and "Browse For Folder" window will pop up.



- (8) Choose "rndisdriver".
 - * Remember the path where you downloaded and unzipped the file *

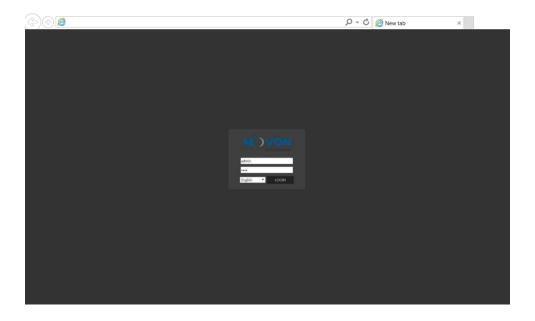


9 Press "Next" on the page below.



After installing the driver, you can close the windows.

① Open a web browser and type http://10.0.0.1



If you see MDAS-5 page like above, you have done everything perfectly.