

Support Equipment for Diagnostic Scanning

With all the attention focused on vehicle scanning and calibrations collision shops have been considering what scan tool, or service to invest in to support this process. Remember it is more than just a scan, the codes and data are a significant part of the process, however; additional tools and procedures will be needed from time to time in addition to a capable scan tool to bring a vehicle to a known, fault free and fully calibrated status to OEM service manual standards.

You can base your equipment choices on your technician's skill sets and how far you intend to integrate vehicle scanning, diagnostics and calibrations into your shops processes. Some procedures may need to be sublet to other service providers if you are not equipped or is sublet is more effective for your operation.

The following options of what is needed in addition to a scan tool or remote service

Basics

- ***Service Information***
- ***Battery support***
- ***Battery tester***
- ***Tire pressure monitor tool***
- ***Seat Weights***

SERVICE INFORMATION; There are multiple sources available to get the information needed

- **I-CAR - Reparability technical supports (RTS);** is a great resource for information beyond what might be found in standard Service information sites for procedures that be difficult to search for and find from OEM service sites. A new feature is available here to search for ADAS calibration requirements on 2016 model year with previous years being added soon See <https://goo.gl/ZJxNYt> for more information
- **Alldata Collision;** a good source of first line information including Required repairs and inspections when a vehicle is damaged or an airbag deployment has occurred. Alldata has a library request tab with support if you cannot find what you're looking for. See <https://goo.gl/vV0VNu> for more information.
- **Mitchell Repair Center;** another good source for first line information with OEM service procedures specifications, schematics and more. See Repair Center™ TechAdvisor at www.mitchell.com for more information.
- **Factory OEM service manual procedures;** you can find links to each individual OEM at <http://oem1stop.com/>. Most OEM links here provide basic information, Position statements, recall information, and some bulletins at no charge. For full access, subscriptions for each individual OEM source will be needed.

Each shops choice is dependent on the vehicle work mix, specialization or OEM certifications, some OEM certified programs will require OEM service site access. Consider which sources will work best for you and make sure to use it! Just like the scan tool, leaving it on the shelf does not help!

Battery Support and testing equipment; Again, multiple sources and methods available. Shops must be aware of the procedures being performed and have the ability to effectively assess and maintain battery conditions for diagnostics, calibrations and programming. Failing, damaged, or discharged batteries can lead to inaccurate diagnostic results, failed calibration and reprogramming procedures, vehicles that will not start, and in worst cases can damage a module during programming or set up that will require a replacement module.

A close visual inspection of a battery is the first step in assessing the condition. Is the battery clean, securely mounted and free of any visible damage? Are the battery cables connections clean and tight? Is the battery voltage at or above 12.0 Volts? (12.2 = 60% state of charge) Is the battery 3 years or older? If any of these inspection points indicate trouble further action is needed. You should either include in an estimate (if damaged), or advise customer of battery maintenance issues that need to be addressed. Battery support is not effective with a failed or damaged battery



- **Combination Programming battery support and battery charger;** This is the best tool to ensure battery voltage is maintained at a proper voltage and includes a setting for programming which allows a voltage range with increased amperage to be set with clean consistent voltage supply. These can be expensive, but are the best option. Additionally, these types of battery support tools will also charge a dead battery to full charge from lights left on or other conditions that discharge batteries and can then be switched to maintain voltage for programming, the one shown is a Schumacher 700a available at <https://goo.gl/prs8cv>



- **Programming battery support;** This is a tool designed to maintain a battery during key on and/or programming procedures. These tools will not charge a discharged battery. If a battery is dead, it must be recharged with a standard charger before this type of programming maintainer can be used. See www.midtronics.com for more information



- **Standard Battery charger;** Most shops are already equipped with standard battery chargers. These are sufficient for recovering a good discharged battery and necessary to charge a battery for testing as needed These can be used to maintain battery voltage during a basic scanning or diagnostic procedure. Most vehicle scan procedures and diagnostics are done with key on-engine off. Even with a good fully charged battery a vehicle in this state can discharge a battery to voltage levels below desired in a short period. Later models are also available with a programming setting like the previously listed Schumacher.



- **Battery Testers;** When you have a vehicle that is requiring jump starts, lights are dim, battery is 3-4 years old or battery is dead the battery should be fully charged and tested. If the battery fails load or conductance test it should be replaced. There are a variety of load testers available as well as electronic conductance battery testers such as Midtronics PBT-100 for a shop to determine if the battery has failed or is just discharged, remember, battery terminals must be clean and tight for battery test results to be valid. See www.midtronics.com for more information, available at <https://goo.gl/anWENw>



- **Jump-Box/Jump Starters;** Most shops have at-least one of these if not several. Jump boxes can be used for battery support during scanning and calibrations if the jump-box is good condition and fully charged. For even better support with a jump box, connect the jump-box's charger to it while in use. This method can be used as an alternative clean voltage battery support source during programming on many vehicles. Battery support described above is the best option, and a requirement for most European vehicles. Take an inventory of what you have, and add to or replace aging equipment to pro-actively handle battery issues in you shop whether related to diagnostic scanning or not.



Tire Pressure Monitor (TPMS) Tools; Several tools are available to tire pressure monitor issues with Direct sensor systems. One type is used in conjunction with a scan tool and another type can connect directly to a vehicles DLC (OBD2) port in place of a scan tool to register TPMS sensor ID's. There are also several different methods and types of tire pressure monitoring depending on year make and model of car. The Basic function of these tools are used to test the sensors ability to send a signal, command a sensor to transmit a signal and to read a sensors unique ID# for registration into the TPMS module when replaced. Autell TS401 or similar is a cost-effective tool when used in conjunction with a scan tool.

See <https://goo.gl/7mHil5> for more information.

- **Indirect systems;** Simple and software based by monitoring wheel speed sensor from and ABS/Traction control system. This type of system does not use pressure sensors in the wheel or valve stem and no special tools are required. The system monitors wheel speed in relation to all. When a tire gets low the diameter decreases and wheel speed signal increases. If the system sees one or 2-wheel speed signals out of sync with the rest the system will determine tire pressure must be low and will illuminate a "Check Tire Pressure" indicator or message. These systems can set false warnings indications if a vehicle has mismatched tire sizes, one tire worn more than the others or a mini spare installed. These systems are normally reset manually on the vehicle for they system to learn normal wheel speeds. This requires setting pressures to spec, and consulting the owner's manual or service information to put the system in learn mode.
- **Direct Systems;** Tire Pressure Sensors are mounted in each wheel or most commonly the valve stem assembly. Some vehicles may have a sensor in the spare tire. The sensors transmit unique frequency signals that are "Learned" by the TPMS module on the vehicle. Some systems will learn the frequencies of the sensors by a simple on car reset and test drive if all the sensors are functional. Tire pressure sensors contain an integral battery with a functional lifespan of 5 to 7 years. These systems only indicate a tire is low and do not monitor tire positions or indicate which specific tire is low. More complex systems learn actual tire positions and will normally have a tire pressure display available (LF, RF, RR, LR,) on the driver information center in addition to a warning lamp. Each sensor frequency must be learned by position in order. If a tire rotation is done, or a sensor replaced position re-learn must be completed. These are the systems that will require a TPMS sensor activation tool, scan tool or both to relearn or diagnose a problem. Most tire pressure sensor failures are due to damage or integral battery is at end of life (5-7 years). A failed or damaged tire pressure sensor will not transmit a frequency and will result in a TPMS warning indicator and/or fault

code. This is when a TPMS tool is needed to diagnose failed sensors and register new replacement sensors to a vehicle.

Seat Weight Sets; Some manufactures Occupant detection system calibrations require the use of weights placed on the seats during calibrations. Although most are done at Zero only with the seat in the correct position (rearmost, lowest, seat back vertical and head rest down) some steps will require weight to be applied ranging from 37-110 lbs. a set of Dumbbell weights in denominations capable of applying, 37, 52,66, or 100-110 should be available. The frequency when these are needed is low depending on manufacture, but when needed, not having them available is a show stopper. Manufactures discourage the use of liquid weights in favor of solid weights. Sand bags in known weight denominations can also be used when seat weight is needed. Manufactures have seat weight kits available. Check with Each OEM special tools sources for specific weights.

Advanced Options (additional technician training and/or site preparation may be needed)

- **Object detection targets**
- **Test lamps**
- **Multi-Meter**
- **Wire slicing tools**
- **Terminal repair kits**
- **Network interface box**
- **Labscope**

Object detection targets; A one size fits all approach for forward facing, side view, radar, Lidar and various other object detections calibration support tools are not readily available now. As I-car states “Most OEMs require calibration after removing a component such as a radar or forward facing camera. Some need to be calibrated after the component that houses a camera or radar is removed, or when a part adjacent to the component is removed; a windshield replacement, bumper R&I, or side view mirror removal, for example. Some systems may need to be calibrated even after a minor collision. To determine if calibration is required, access to OEM information is required.” If you are experiencing a consistent need for these types of calibrations based on what you’re working on, visit the OEM sites for each vehicle specific targeting set up and targets needed. These procedures may be more effectively subtle as needed based on cost and area set up to achieve this. As more of these systems become commonplace technology and common approaches for calibrations may be developed. See <https://goo.gl/e8cYMn> for more information.



Test Lamps and Multi-Meters; Volt Meters and test lamps will be needed when trouble is found from scan results or inoperative conditions to test fuses, grounds etc. Test lamps are good for basic power checks on circuits. Some test lamps such as power probe contain the built-in ability to test power and ground circuits and are available with a built in voltmeter for precise results. Only a skilled electrical diagnostic technician These tools will need to be used when the performing pinpoint diagnostics beyond a scan tool. The scan tool most times can point you in the right direction and can solve a problem with close visual inspection. When you need

to know the wiring or power integrity of a system training is needed to use these tools



circuit these tools will apply. Basic electrical effectively.

Wire Splicing tools and terminal repair Kits; terminal and wire repair tools are needed when a problem has been pinpointed to a damage etc. technicians need training, information for the correct wire repair service information for requirements or safety or hybrid electrical circuits as these may require complete harness replacements as dictated by service information



connector terminal damage, harness certifications and access to service procedures and tools. Always refer to limitations on wire repairs allowed for

Labscope; Labscope needed to validate quality of sensor signals, verify actuator function, test network operation, etc. These are for technicians with pinpoint diagnostic and trouble shooting skills. If your shop has technicians with advanced diagnostic skills a labscope with some training and increase their efficiency in troubleshooting those hard to find problems



Network Diagnostic Tools: Perfect tool for scan tool "No Communication" errors and CAN network diagnostics. Again this is a tool for the advanced on vehicle pinpoint diagnostics when there is a problem with the vehicles communication network that needs repair before a scan tool can be used. See [.https://www.aeswave.com/AES-LineSPI-SMART-BOB-p8754.html](https://www.aeswave.com/AES-LineSPI-SMART-BOB-p8754.html)