Editorial for December Issue (Technical Edition)

Diagnosing the Ignition System

In today's ever-evolving automotive aftermarket industry, we find ourselves continuously adapting to new technologies. The increased complexity within the vehicle's computer systems has forced many automobile owners to resort to professional mechanics, repair shops, and dealerships for what used to be, relatively easy maintenance. Even now, difficulties in diagnosing these high-tech vehicles can prove to be a challenging process for well-trained technicians.

When diagnosing vehicles, a commonly overlooked problem can be related to the ignition system and its components. The ignition system is a key function for the internal combustion engine. Without a properly functioning ignition system, you can expect the following: a reduction in power and fuel economy, rough idling, or even refusal to start and run. For a vehicle that's having symptoms of these issues, look to the ignition system to begin performing a diagnosis.

A great starting point when trouble shooting the ignition system are the spark plug wires or coil boots. Visually inspect these for any cracks, brittleness, or burn marks that would indicate a faulty component. A more in-depth test would be performing a resistance check, by using a multimeter to ensure your spark plug wires all have equivalent ohm/ft resistance readings. A multimeter can be used to identify the ohm value by touching the prongs to each end of the spark plug wire. With this, you will divide your ohm measurement by your length measurement and multiply by 12. This will give you the ohm/ft value, as shown in this example: 625mm/25.4 = 25"; (3,000Ω/25")*12 = 1,440 ohm/ft. The goal of this procedure is to ensure that all individual spark plug wires measure the same resistance. Variations in these measurements will cause inconsistent firing for each cylinder. These tests are part of the strict standards in Walker Product's ThunderCore™ Ignition Wire program to meet and exceed OE specifications.

After checking and testing the spark plug wires, the next step would be to check the spark plugs. It's not uncommon for these to be overlooked, but carbon, oil and fuel residue naturally builds up on the spark plugs over time. This will cause their efficiency to drop off significantly as they are not able to produce the necessary spark to properly ignite the air-fuel mixture. Making sure they're gapped correctly, free of oil, carbon residue, and free of any fractures in the ceramic should be your key checking points.

Lastly, it is crucial to inspect the lifeline of the ignition system – the ignition coil. This process can prove to be challenging at times, especially on applications that utilize coil-on-plug (COP) technologies. COP applications have a range of 2 to 16 individual coils. Ignition coils should be visually inspected for burns or cracks – an obvious sign of failure. A continuity test can also be performed to determine if the connectivity of internal components within the coil itself are intact. Lastly, a spark meter can be used to measure the output of the ignition coil – this would identify a weak or failed part based on the spark testing tool requirements. Should the ignition coil fail any of these tests, it is recommended to find a replacement that meets and exceeds OE specifications – just as you would find in Walker Product's ThunderSpark™ Ignition Coil program.

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