TECHNICAL BULLETIN

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Make: Holden

Model: Commodore VN/VP V6

Subject: Crank angle sensor

Even though V6 Commodores were introduced as early as 1988 (VN) Injectronics still receive countless phone calls regarding the operation and diagnosis of the timing case mounted crank angle sensor.

The sensor is hall-effect in operation and consists of a central magnet with two hall sensors mounted either side of the magnet. It is situated in behind the crank shaft pulley at the front of the engine. Connected to the back of the crank shaft pulley are two sets of interceptor vanes. One set consists of 18 vanes and windows (18 x Signal / Crankshaft revolution) and the other consists of 3 vanes and windows (3 x signal / crankshaft revolution). The 18 vanes and windows are all of equal size and therefore represent 10° of crankshaft rotation.

The 3 vanes and windows are NOT of equal size as each window is progressively larger. The first window represents 10° of crankshaft rotation, the second represents 20° and the third represents 30° of crankshaft rotation. The positioning of the two interceptor rings in relation to each other is critical and any damage to either set can be detrimental to engine operation.

The 3x and 18x signals (zero to 5) are produced by the crank angle sensor are used by the DFI module to determine crankshaft position for the ignition system so as to trigger the correct ignition coil. The DFI module also uses these signals to generate the crankshaft reference signal which the ECM requires before allowing injection pulses also for RPM and EST calculations.

It is important to note that the crankshaft reference signal is derived by an internal divide by six circuit within the DFI module which divided the 18x signal by six.

The divider circuit is only enabled after the DFI module receives the 3x signals. Once enabled, the 3x signal is no longer required and the engine would run without it if the signal is lost for whatever reason. If the engine was turned off however, and an attempt was made to restart the engine there would be no injection pulse until the 3x signal was restored.
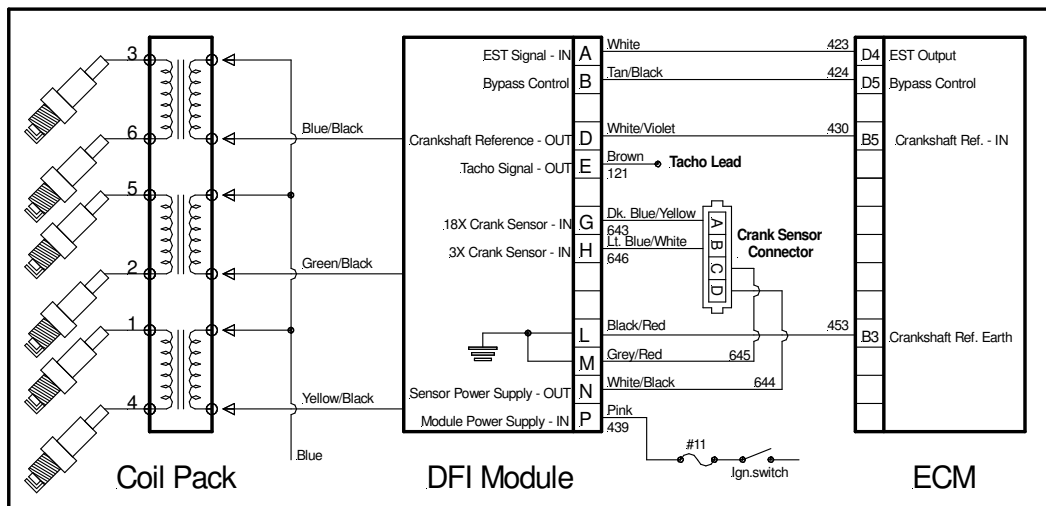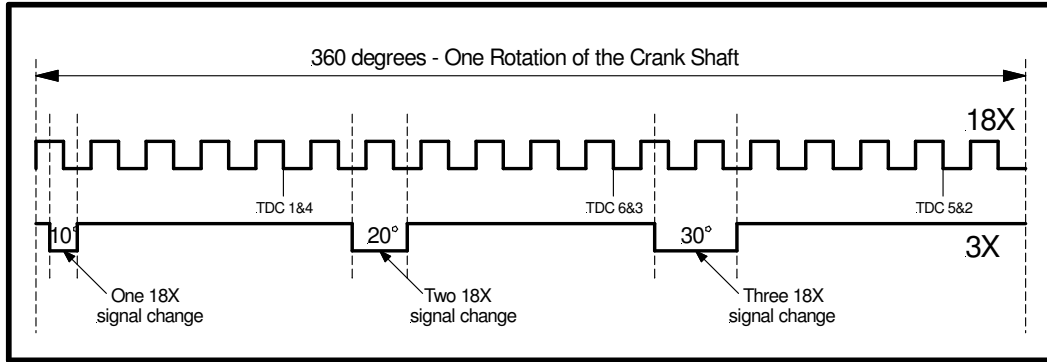
To check the 3x signal, 18x signal and crankshaft reference signal, the following patterns should be observed on an oscilloscope.

360 degrees - One Rotation of the Crank Shaft

18X

TDC 1&4   TDC 6&3   TDC 5&2

10°   20°   30°   3X

One 18X
signal change

Two 18X
signal change

Three 18X
signal change

Coil Pack   DFI Module   ECM

DFI Module pin	Signal	Wire	Code	ECM
A	EST Signal - IN	White	423	D4 EST Output
B	Bypass Control	Tan/Black	424	D5 Bypass Control
D	Crankshaft Reference - OUT	White/Violet	430	B5 Crankshaft Ref. - IN
E	Tacho Signal - OUT	Brown 121 Tacho Lead		
G	18X Crank Sensor - IN	Dk. Blue/Yellow 643		
H	3X Crank Sensor - IN	Lt. Blue/White 646		
L		Black/Red	453	B3 Crankshaft Ref. Earth
M		Grey/Red	645	
N	Sensor Power Supply - OUT	White/Black	644	
P	Module Power Supply - IN	Pink 439		

Blue/Black
Green/Black
Yellow/Black
Blue

Crank Sensor Connector
A B C D

#11 Ign.switch