

TECH TIPS

Service Call:

Ford DSG-423 Engine cranks but will not start on gas, unit runs fine on propane.

Tools Needed:

8mm socket	Drain pan
5/8" spark plug socket	Full Propane tank
Ratchet	
3" extension	
6" extension	
Flathead screwdriver	
Multi-meter	
Fuel Pressure Gauge	

Model:

Z45, Z60, S40, S60



Tech Tips Safety Rules



Danger

Failure to obey the instructions and safety rules in the appropriate Operator's Manual and Service Manual for your machine will result in death or serious injury. Many of the hazards identified in the operator's manual are also safety hazards when maintenance and repair procedures are performed.

Do Not Perform Maintenance Unless:

- You are trained and qualified to perform maintenance on this machine.
- You read, understand and obey:
 - manufacturer's instructions and safety rules
 - employer's safety rules and worksite regulations
 - applicable governmental regulations
- You have the appropriate tools, lifting equipment and a suitable workshop.

The information contained in this tech tip is a supplement to the service manual. Consult the appropriate service manual of your machine for safety rules and hazards.

Step 1

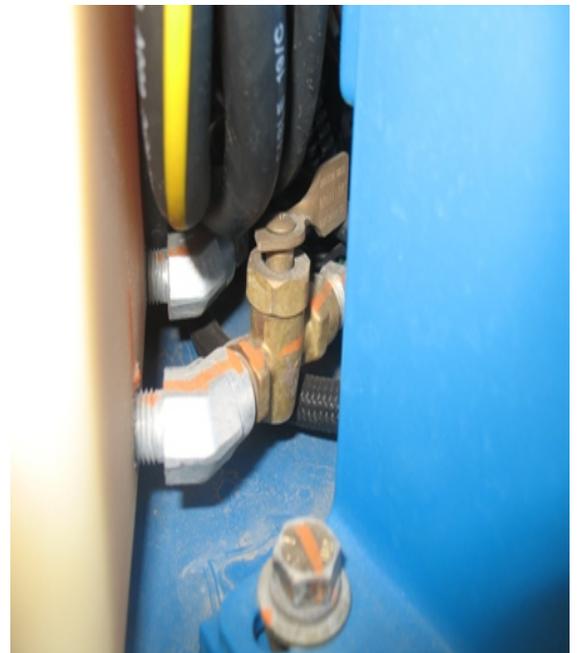
VERIFY THAT YOU ARE WORKING ON THE FORD DSG-423 ENGINE AND NOT THE FORD LRG-425 ENGINE. THE EASIEST WAY TO TELL IS BY LOOKING AT THE TOP OF THE ENGINE WHERE THE INTAKE MANIFOLD AND VALVE COVER IS LOCATED. THE FORD DSG-423 HAS A BLACK PLASTIC INTAKE MANIFOLD AS SEEN IN THIS PHOTO, WHEREAS THE FORD LRG-425 HAS AN ALL ALUMINUM INTAKE MANIFOLD.

THE OTHER WAY TO TELL IS THAT THE FORD DSG-423 IS A DUAL OVERHEAD CAM ENGINE SO YOU WILL SEE TWO VALVE COVERS, WHEREAS THE LRG-425 IS A SINGLE OVERHEAD CAM ENGINE WITH ONE VALVE COVER.



Step 2

VERIFY THAT YOUR MANUAL FUEL SHUT OFF IS OPEN. THE VALVE IS MOUNTED JUST OUTSIDE THE FUEL TANK. THIS IS A PHOTO OF THE VALVE IN THE OPEN POSITION, IF THE VALVE WAS CLOSED, THE HANDLE WOULD BE FACING ACROSS THE HOSE NOT INLINE WITH IT AS SHOWN HERE.



Step 3

VERIFY THAT THE UNIT DOES NOT RUN ON GASOLINE FROM THE GROUND CONTROLS BY PLACING THE KEYSWITCH TO GROUND CONTROL MODE AND MAKING SURE THE FUEL SELECT SWITCH IS FACING THE GAS PUMP AS IN THIS PHOTO. IF THE UNIT DOES NOT START PROCEED TO STEP 4.



Step 4

TRY TO START THE MACHINE ON PROPANE FROM THE GROUND CONTROLS. SWITCH THE FUEL SELECT SWITCH TO PROPANE AS SEEN IN THIS PHOTO. MAKE SURE THE UNIT HAS A FULL PROPANE TANK ON IT AND THAT THE HOSE IS CONNECTED PROPERLY WITH THE TANK VALVE TURNED FULLY COUNTER CLOCKWISE. DOES THE MACHINE START AND RUN PROPERLY? IF YES, PROCEED TO STEP 5
IF NO, CONTACT TEREX AWP SERVICE @ 1-800-536-1800



Step 5

SWITCH THE FUEL SELECT SWITCH BACK TO GASOLINE MODE AT THE GROUND CONTROLS. LOCATE THE FUEL PUMP. (THIS WILL VARY DEPENDING ON THE MODEL YOU ARE WORKING ON)

Z45 FUEL PUMP IS LOCATED UNDER THE HYDRAULIC TRAY UNDER A SMALL BLUE COVER.

S40 FUEL PUMP IS MOUNTED BELOW AND BEHIND THE GROUND CONTROL BOX.

S60 FUEL PUMP IS MOUNTED BELOW THE PROPANE TANK BRACKET.

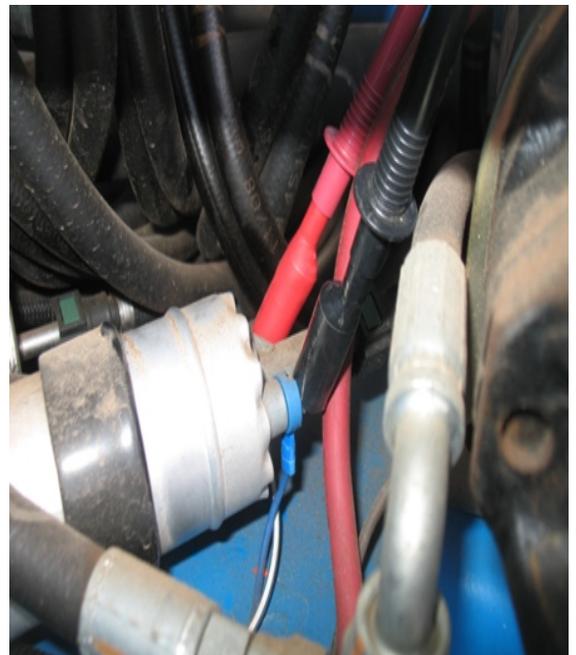
Z60 FUEL PUMP IS MOUNTED BELOW AND BEHIND THE GROUND CONTROL BOX.

NOW THAT IT IS LOCATED GET YOUR MULTI-METER AND PROCEED TO STEP 6.

Step 6

USING YOUR MULTI-METER CONNECT YOUR POSITIVE (RED) LEAD TO THE BLUE/WHITE WIRE AND CONNECT YOUR NEGATIVE (BLACK) LEAD TO THE BLUE WIRE AS IN THIS PHOTO. ONCE YOU HAVE YOUR LEADS CONNECTED TURN ON YOUR MULTI-METER AND SET IT FOR DC VOLTS. PRECEED TO STEP 7.

NOTE THE BLUE WIRE IN THIS PHOTO THAT WE HAVE THE NEGATIVE LEAD HOOKED UP TO MAY BE A BLACK WIRE DEPENDING ON THE MODEL.



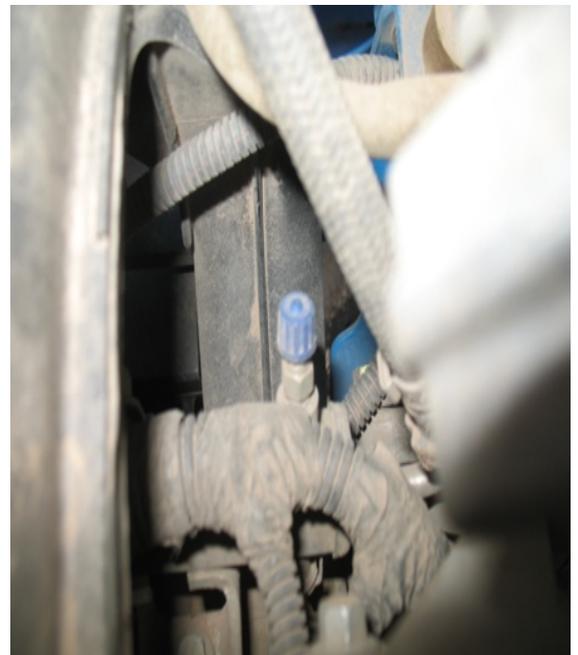
Step 7

VERIFY YOUR MULTI-METER IS ON, THE KEYSWITCH IS TURNED TO LOWER CONTROLS, LOWER CONTROLS E-STOP IS PULLED OUT TO THE ON POSITION AND FINALLY THAT THE FUEL SELECT SWITCH IS ON GASOLINE MODE. USING THE GROUND CONTROL START SWITCH CRANK THE ENGINE OVER AND VERIFY VOLTAGE AT THE FUEL PUMP AS SEEN IN THIS PHOTO. THIS PHOTO SHOWS 7.76 VOLTS WHILE CRANKING, THIS IS NORMAL. IF FOR SOME REASON YOU CONNECTED YOUR NEGATIVE LEAD TO BATTERY GROUND OR THE GROUND LUG ON THE GROUND CONTROL BOX YOU WILL SEE SYSTEM VOLTAGE (12 TO 14 VOLTS) THE REASON WE WANT TO CONNECT THE METER UP AS SHOWN IN STEP 6 IS BECAUSE THIS PUMP HAS SYSTEM VOLTAGE ON THE POSITIVE LEG WHENEVER IT IS CRANKING OR RUNNING BUT THE ENGINE ECM SUPPLIES THE GROUND AND IT IS MODULATED WHICH MEANS IT IS NOT A DIRECT GROUND BUT THE ECM CONTROLS HOW MUCH GROUND TO GIVE IT WHICH IN TURN CONTROLS HOW MUCH THE PUMP RUNS. NOW THAT WE HAVE VERIFIED THE PUMP IS GETTING VOLTAGE PROCEED TO STEP 8.



Step 8

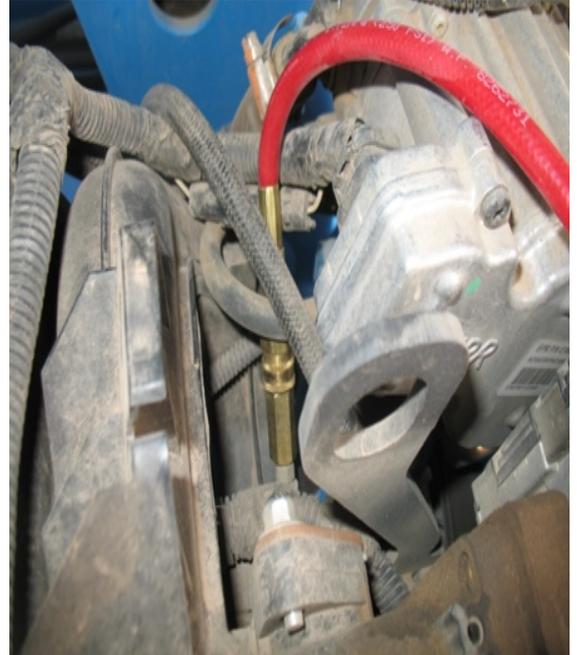
OPEN THE ENGINE TRAY COVER AND LOCATE THE FUEL INJECTOR PRESSURE RAIL. THIS WILL BE A STAINLESS STEEL SQUARE TUBE THAT SITS IN THE MIDDLE OF THE INTAKE CURVE OVER THE TOP OF THE INJECTORS. WE ARE LOOKING FOR A FUEL STEM TOWARDS THE FRONT (FAN SIDE) OF THE ENGINE. THE STEM MAY HAVE A BLUE THREAD ON CAP AS IN THIS PHOTO. PROCEED TO STEP 9.



Step 9

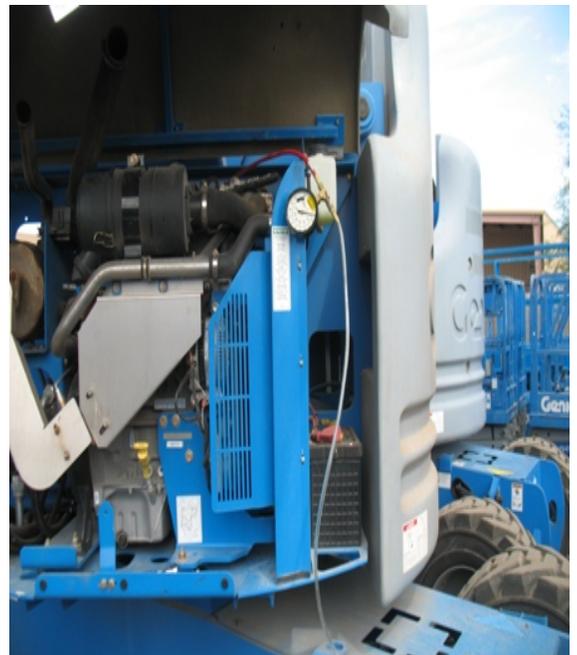
TAKE OFF THE BLUE CAP AND SET IT IN A SAFE PLACE. NOW USING YOUR FUEL PRESSURE GAUGE THREAD IT ON TO THE FUEL STEM AND MAKE SURE IT SEALS AND YOUR HOSES ARE TIGHT TO THE GAUGE. PROCEED TO STEP 10.

*NOTE IT IS BEST TO USE A LIQUID FILLED GAUGE, SINCE THE FUEL PRESSURE IS MODULATED THE LIQUID WILL KEEP THE NEEDLE FROM BOUNCING AROUND TOO MUCH.



Step 10

MOST FUEL PRESSURE GAUGES HAVE AN OUTLET TO RELIEVE THE PRESSURE IN THE GAUGE AND HOSE BEFORE DISCONNECTING THEM. OPEN THIS VALVE AND STICK THE DRAIN HOSE INTO A CLEAN PAN. DO NOT CRANK THE ENGINE BUT TURN IT ON AT THE KEYSWITCH FOR APPROX 7 SECONDS AND THEN TURN IT OFF FOR APPROX 2 SECONDS. REPEAT THIS PROCESS 4 OR 5 TIMES. THIS WILL ALLOW SOME FUEL INTO THE GAUGE AND ALSO GET YOU A SAMPLE OF THE FUEL RIGHT FROM THE INJECTOR RAIL INTO THE PAN WITH NO MESS. CLOSE YOUR FUEL PRESSURE GAUGE RELIEF VALVE. PROCEED TO STEP 11.



Step 11

VERIFY THAT THE FUEL PRESSURE GAUGE HOSES ARE ROUTED AWAY FROM THE PULLEYS, BELT AND FAN. HAVE SOMEONE CRANK THE ENGINE FROM THE GROUND CONTROLS SO THAT YOU CAN VERIFY THE FUEL PRESSURE ON THE INJECTOR RACK WHILE THE UNIT IS CRANKING. THE PRESSURE IN THIS PHOTO IS 61PSI. THE FORD SPEC IS 60 TO 65PSI WHILE CRANKING / RUNNING.

IF YOU ARE SEEING THE CORRECT PRESSURE PROCEED TO STEP 12.

IF YOU ARE NOT SEEING THE CORRECT PRESSURE CONTACT TEREX AWP SERVICE @ 1-800-536-1800

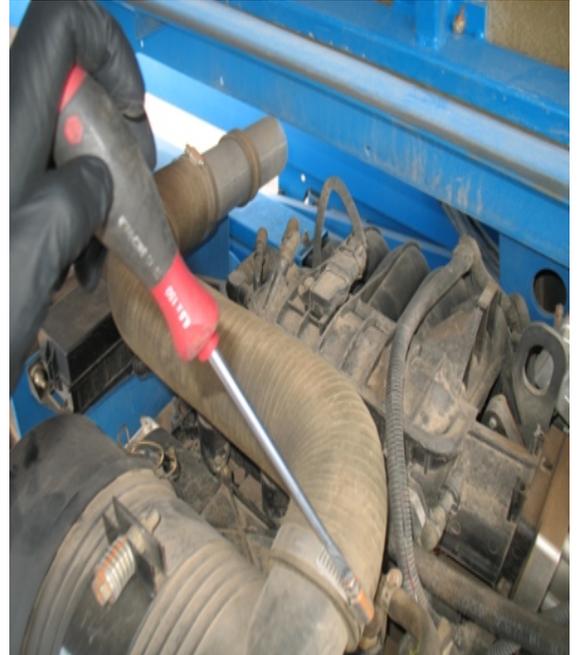


Step 12

NOW THAT WE KNOW WE HAVE GOOD VOLTAGE AND GOOD PRESSURE LOOK AT THE FUEL THAT CAME OUT OF THE INJECTOR RACK AND INTO THE DRIP PAN. SMELL IT AND SEE IF IT SMELLS LIKE GOOD GAS. PUT YOUR HAND IN THE DRIP PAN AND GET SOME GAS ON IT. LET IT SIT IN THE AIR FOR A FEW MOMENTS. IF THE GAS IS GOOD IT SHOULD DRY OFF YOUR HAND FAIRLY QUICK BUT IF THERE IS ANYTHING IN THE GASOLINE LIKE DIESEL THERE WILL BE A SLIPPERY, OILY RESIDUE LEFT ON YOUR HAND. THIS ENGINE CANNOT HANDLE ANY FUEL CONTAMINATION EVEN IF IT IS JUST A GALLON OF DIESEL AND THE CUSTOMER TRIES TO DILLUTE IT WITH 20 GALLONS OF GAS IT WILL STOP RUNNING ON GASOLINE AND ONLY RUN ON PROPANE. THE ONLY WAY TO KNOW FOR SURE IS TO REMOVE A SPARK PLUG. PROCEED TO STEP 13.

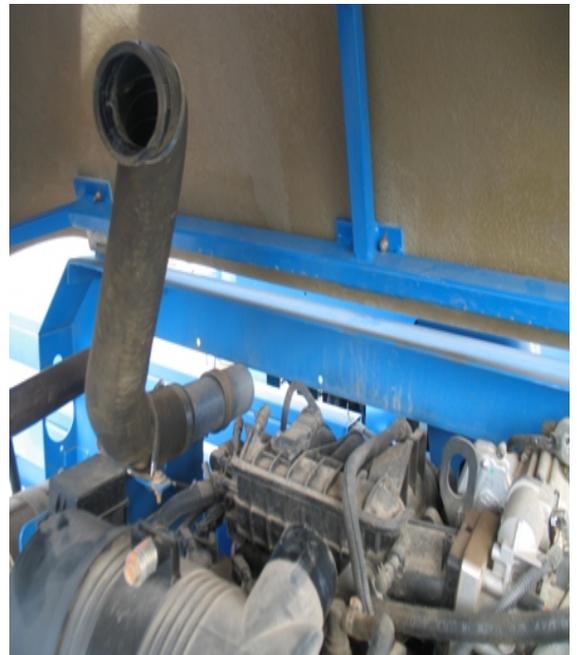
Step 13

STANDING ABOVE THE ENGINE THE SPARK PLUGS ARE BETWEEN THE TWO VALVE COVERS. FIRST WE NEED TO REMOVE THE INTAKE HOSE SO THAT WE HAVE ROOM TO GET TO THE COILS AND SPARK PLUGS. START BY LOOSENING THE CLAMP AND SLIDING OFF THE AIR INTAKE HOSE FROM THE FILTER ASSEMBLY AS SEEN IN THIS PHOTO. PROCEED TO STEP 14.



Step 14

SPIN THE INTAKE HOSE UP AND OUT OF THE WAY AS SEEN IN THIS PHOTO. PROCEED TO STEP 15



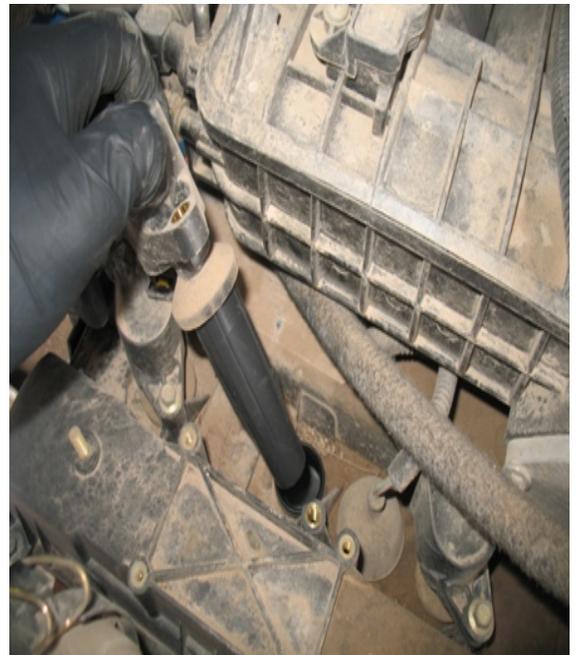
Step 15

THE SPARK PLUGS THAT ARE THE EASIEST TO GET TO ARE THE #3 AND #4 PLUGS AT THE REAR OF THE ENGINE AS SEEN IN THIS PHOTO. USING YOUR RATCHET, 3" EXTENSION AND 8MM SOCKET REMOVE THE COIL HOLD DOWN BOLT. DISCONNECT THE COIL PLUG AND PROCEED TO STEP 16.



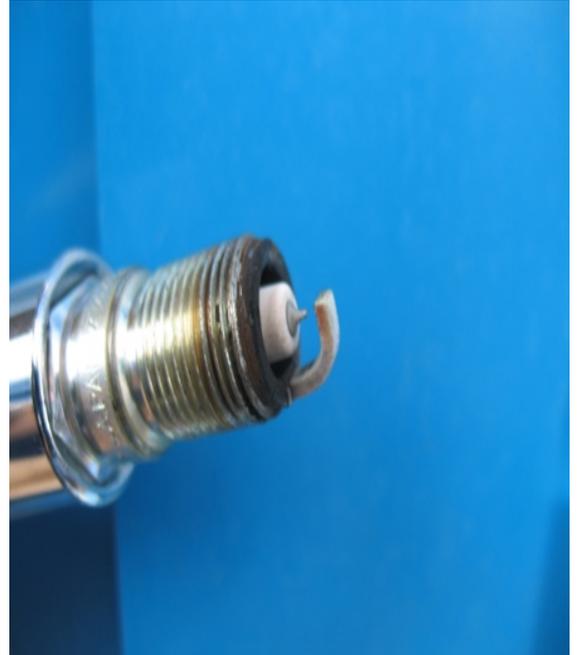
Step 16

GENTLY REMOVE THE COIL USING A TWISTING MOTION SO THAT THE COIL BOOT COMES OUT WITH IT AS SEEN IN THIS PHOTO. SOMETIMES THERE MAY BE A SPRING THAT IS HANGING OUT OF THE BOOT THIS IS NORMAL AND SHOULD BE SLID BACK INTO THE COIL BOOT. PROCEED TO STEP 17.



Step 17

USING YOUR RACHET, 6" EXTENSION AND 5/8" SPARK PLUG SOCKET REMOVE THE PLUG FROM ITS CYLINDER AND INSPECT THE PLUG. THE PLUG IN THIS PHOTO IS FROM A MACHINE WITH 1500 HOURS ON IT NOTE THE COLOR OF THE PORCELAIN IT IS A VERY MILKY BROWN COLOR AND IT SHOULD BE DUE TO HOW LEAN THIS ENGINE RUNS. THIS IS A PHOTO OF A GOOD PLUG. PROCEED TO STEP 19.



Step 18

THIS IS A PHOTO OF A BAD FOULED PLUG, IF YOU LOOK CLOSELY YOU CAN SEE THAT IT IS WET AND OILY LOOKING. IF YOUR PLUGS COME OUT LIKE THIS OR WORSE YOU NEED TO REPLACE ALL FOUR PLUGS BECAUSE THEY ARE TOO FOULED TO RUN ON GASOLINE. THE REASON THE UNIT WILL STILL RUN ON PROPANE IS DUE TO THE HIGHER OCTANE RATING. ONCE YOU HAVE REPLACED THE PLUGS, YOU WILL NEED TO COMPLETELY DRAIN AND FLUSH YOUR FUEL SYSTEM. ONCE YOUR TANK HAS NEW FUEL IN IT OPEN THE VALVE ON YOUR FUEL PRESSURE GAUGE AND TURN THE KEY ON AND OFF AS MENTIONED IN STEP 10 UNTIL YOU HAVE APPROX 1/2 GALLON OF FUEL IN THE DRAIN PAN THIS WILL MAKE SURE THAT THE FUEL LINE ALL THE WAY TO THE INJECTORS IS NOW CLEAN. REMOVE THE FUEL PRESSURE GAUGE AND RE-INSTALL THE BLUE VALVE CAP. VERIFY THAT ALL PARTS THAT WERE REMOVED DURING TROUBLESHOOTING ARE NOW BACK WHERE THEY SHOULD BE AND TIGHT. START UNIT FROM THE GROUND CONTROLS. IF PROBLEM PERSISTS CALL TEREX AWP SERVICE AT 1-800-536-1800.

