SERVICE MANUAL

T7.175 / T7.190 / T7.210
T7.175 AutoCommand™ / T7.190 AutoCommand™
T7.210 AutoCommand™ / T7.225 AutoCommand™
Stage IV
Tractor

Part number 47936461
English
November 2015

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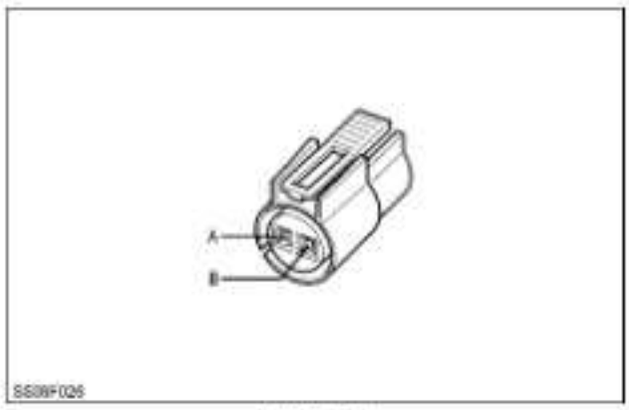
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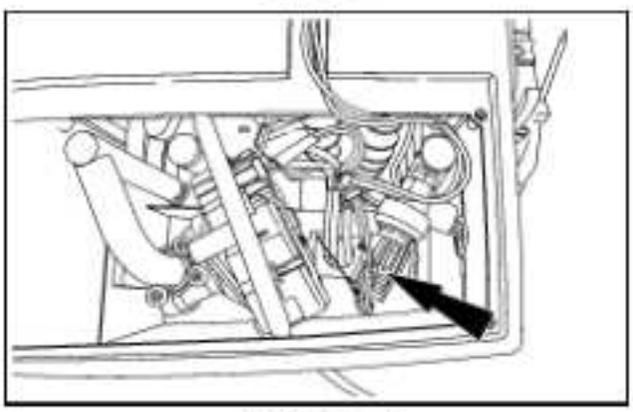
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CONNECTOR X-773			
PIN NUMBER	WIRE NUMBER	CIRCUIT REFERENCE	ELECTRICAL SCHEMATIC FRAME
A	(RD)	-	Wiring harnesses - Electrical schematic sheet 29 (55.100)
B	(BK/WH)	-	



SS08F026 6



SVIL157R01781AA 7

In cab below operator's seat

CONNECTOR X-774 - Heating control valve

T7.175, T7.190, T7.210, T7.225 AutoCommand [Standard climate control]
T7.175, T7.190, T7.210 [Standard climate control]

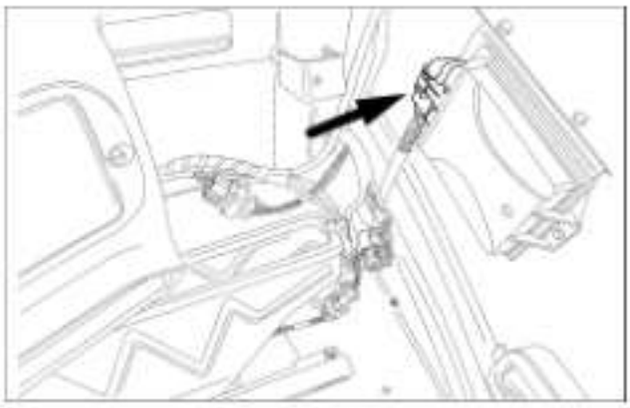
CONNECTOR X-774			
PIN NUMBER	WIRE NUMBER	CIRCUIT REFERENCE	ELECTRICAL SCHEMATIC FRAME
A	(RD)	-	Wiring harnesses - Electrical schematic sheet 29 (55.100)
C	(YE)	-	
D	(BK)	-	Wiring harnesses - Electrical schematic sheet 30 (55.100)

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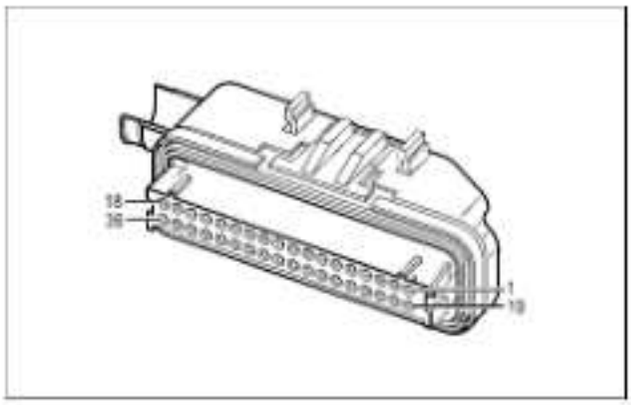
Automatic Temperature Control (ATC) module - Electrical test

T7.175 AutoCommand™	WE Cab climate control - Auto Temperature Control (ATC)
T7.175	WE Cab climate control - Auto Temperature Control (ATC)
T7.190 AutoCommand™	WE Cab climate control - Auto Temperature Control (ATC)
T7.190	WE Cab climate control - Auto Temperature Control (ATC)
T7.210 AutoCommand™	WE Cab climate control - Auto Temperature Control (ATC)
T7.210	WE Cab climate control - Auto Temperature Control (ATC)
T7.225 AutoCommand™	WE Cab climate control - Auto Temperature Control (ATC)

The Automatic Temperature Control (ATC) module is located behind the cab side covering on the left-hand side.



SGQ6F033 1



SGQ6F034 2

Pin	Description	Function		Normal Signal	Notes
1	CAN Low	Provides CAN communication to the vehicle		2,3 V	
2	CAN High			2,6 V	
3	Water Valve Signal	Provides control signal to water valve	Full Cold (LO)	11,2 V	Blower switch in position "0, A, I, II, III"
			Middle (74 °F)	4,6 V	Blower switch in position "A, I, II, III"
			Full Hot (HI)	2,1 V	
4	Actuator Power Water Valve	Provides feed back from actuator power supply		V bat	
5	Blower Signal	Output to the Blower Control Module	Speed switch "0"	11 V	constant
			Speed switch "A"	6 - 1,1 V	variable
			Speed switch "I"	5,8 V	constant
			Speed switch "II"	3,7 V	
			Speed switch "III"	1,1 V	
6	Power supply from relay	Provides feed back from actuator current power	V bat	V bat	
15	Clutch Relay	Output to drive AC Clutch relay	"ON"	V bat	
			"OFF"	0 V	
17	Battery (+)	Input Power from vehicle	V bat	V bat	
18	Ground	Input Ground from vehicle	Ground		
21	Cabin Temperature	Input from Cabin Temperature Sensor	0 °C (32.0 °F)	~ 3,87 V	9399 Ω ± 2,5 %
			15 °C (59.00 °F)	~ 3,09 V	4441 Ω ± 2,5 %
			20 °C (68.00 °F)	~ 2,81 V	3511 Ω ± 2,5 %
			30 °C (86.00 °F)	~ 2,25 V	2240 Ω ± 2,5 %
22	Outlet Temperature	Input from Outlet Temperature Sensor	0 °C (32.0 °F)	~ 3,56 V	13,06 k Ω ± 2,5 %
			15 °C (59.00 °F)	~ 2,64 V	6,28 k Ω ± 2,5 %
			20 °C (68.00 °F)	~ 2,32 V	4,99 k Ω ± 2,5 %
			30 °C (86.00 °F)	~ 1,76 V	3,22 k Ω ± 2,5 %
23	Evaporator Temperature	Input from Evaporator Temperature Sensor	0 °C (32.0 °F)	~ 3,43 V	66 k Ω ± 2,5 %
			15 °C (59.00 °F)	~ 2,51 V	30,7 k Ω ± 2,5 %
			20 °C (68.00 °F)	~ 2,20 V	23,7 k Ω ± 2,5 %
			30 °C (86.00 °F)	~ 1,72 V	15,7 k Ω ± 2,5 %

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2412-Synchronizer did not engage previous range after error code 2403 or 2405

T7.175 Standard [ZFEN30001 -]	WE Transmission - Semi-Powershift transmission
T7.190 Standard [ZFEN30001 -]	WE Transmission - Semi-Powershift transmission
T7.210 Standard [ZFEN30001 -]	WE Transmission - Semi-Powershift transmission

Control Module : CCU

NOTE: *When the cause of the error code has been rectified, clear the error code and test the system for normal operation.*

Possible failure modes:

1. Faulty connector
2. Faulty range solenoid
3. Faulty wire harness
4. Transmission mechanical or hydraulic fault

Solution:

1. Check for other error codes being displayed.

   A. If any other error code is being displayed, continue to these tests.

   B. If no other error code is displayed, continue to Step **2**.

2. Check the medium range solenoid connector **X-642**, the reverse range solenoid connector **X-644**, the low range solenoid connector **X-641**, the high range solenoid connector **X-643** and the Central Control Unit (CCU) connectors **X-091**, **X-092** and **X-095**. Ensure the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight.

   A. If a fault is indicated, repair or replace as required.

   B. If the connectors are okay, continue to Step **3**.

3. Check the range solenoids.
   Disconnect connectors **X-641**, **X-642**, **X-643** and **X-644**. Measure the resistance between each of the solenoid terminals.

   A. If the resistance indicated is not between **7 - 8 Ω**, remove and replace the faulty solenoid.

   B. If the solenoids are okay, continue to Step **4**.

4. Check for an open circuit.
   Disconnect the connectors **X-091**, **X-092** and **X-095**. Check between connectors:
   X-641 pin 1, wire 7230 (GY) and **X-095 pin 15**, wire 7230 (GY)
   X-641 pin 2, wire 7235 (YE) and **X-095 pin 3**, wire 7235 (YE)
   X-642 pin 1, wire 7980 (PK) and **X-092 pin 13**, wire 7980 (PK)
   X-642 pin 2, wire 7982 (WH) and **X-091 pin 7**, wire 7982 (WH)
   X-643 pin 1, wire 7220 (GY) and **X-092 pin 9**, wire 7220 (GY)
   X-643 pin 2, wire 7255 (WH) and **X-091 pin 2**, wire 7255 (WH)
   X-644 pin 1, wire 7985 (GN) and **X-095 pin 7**, wire 7985 (GN)
   X-644 pin 2, wire 8045 (VT) and **X-095 pin 4**, wire 8045 (VT)

   A. If an open circuit is indicated, repair or replace the wire harness as required.

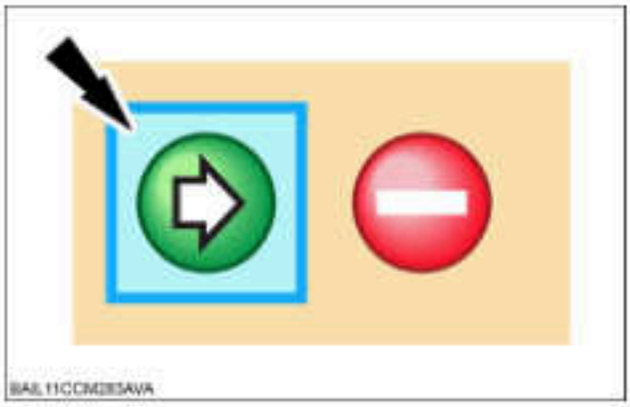
   B. If an open circuit is not indicated, possible transmission mechanical or hydraulic fault, pressure test the transmission. Refer to **Hydraulic systems - Pressure test (35.000)**.

Wiring harnesses - Electrical schematic sheet 15 – CONTROL UNIT (transmission 1, four-wheel drive and differential lock) (55.100.DP-C.20.E.15)
Wiring harnesses - Electrical schematic sheet 16 – CONTROL UNIT (transmission 2) (55.100.DP-C.20.E.16)

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Step 5c. Accumulator Test Procedure:

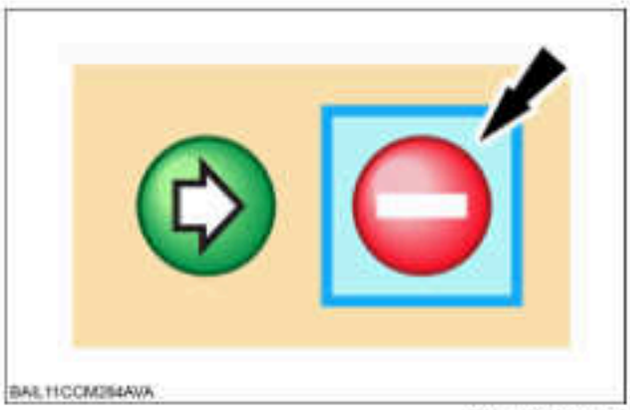
- On the DATAR Scope, in the bottom left corner, verify the capture trigger is "ready" to start capturing data. This is indicated with a green ball highlighted in blue as shown in the figure to the right. If the scope is not ready, then press the keyboard SPACE bar to change the scope trigger state to ready.
- Press and hold the DOWN SHIFT button on the transmission shift lever to run the accumulator test. The machine display will count up from 1 to 10. When the test is finished the display will show "END". This test will take about 15 seconds.



BAIL11CCM283AVA 49

NOTE: *The accumulator test can only be run if "ACC" is selected in step 3 above. Only the down shift button is used with this test.*

- On the DATAR Scope, when the test ramp is finished, then press the PC SPACE bar to capture and hold the result trace.
- Compare the DATAR measured trace with the expected result trace shown on the next Valve Test Assistant screen. (Remember ALT-TAB to switch between the programs)



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NOTE: *During the ACC test, the machine software makes five quick engagements of the L, M, H clutches.*

Step 6. Save the waveform in DATAR Scope:

- On the DATAR scope, go to the FILE menu and select one of the SAVE options to store the waveform on the PC (e.g. Save Current Waveform).

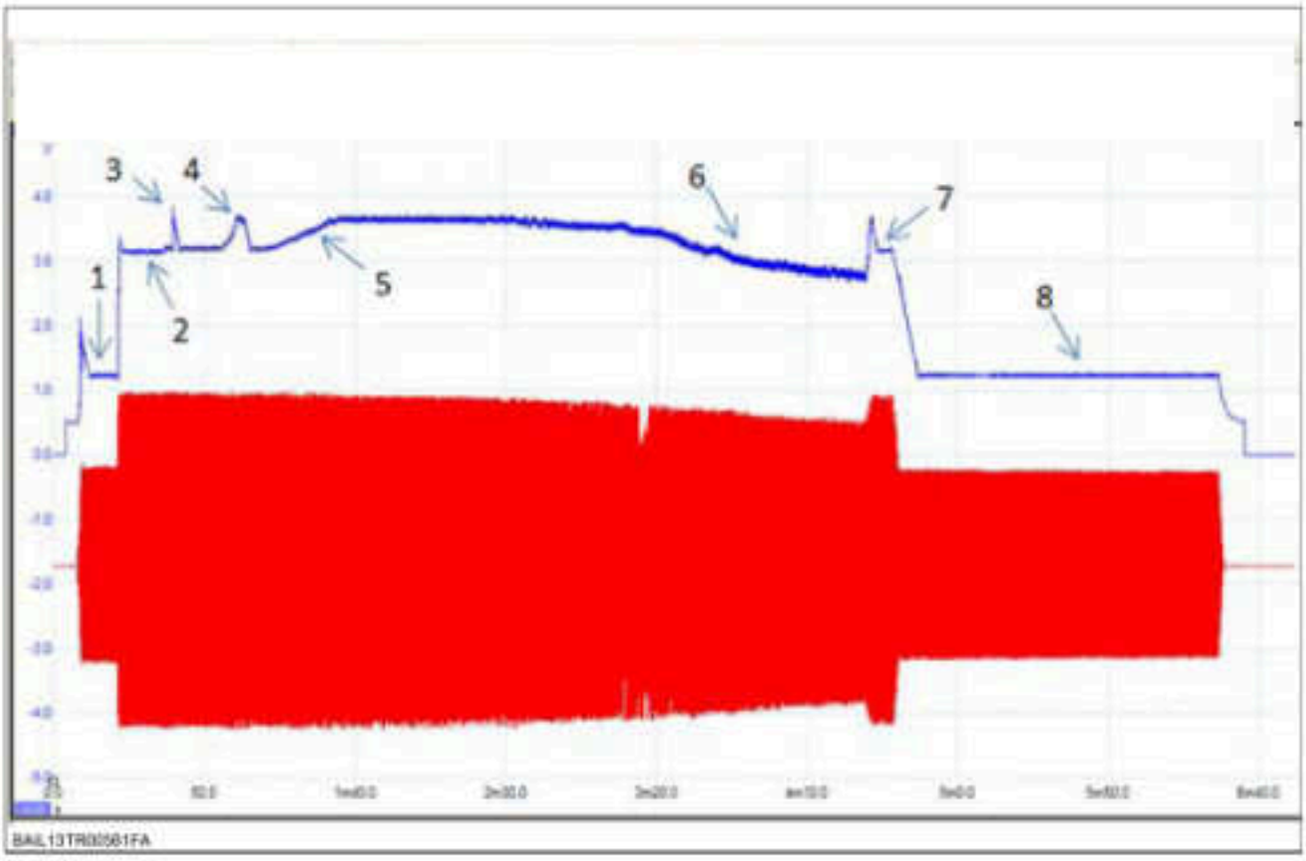
NOTE: *It is recommended that you save the waveform so that you can refer to this historical data in the future for this machine serial number.*

Unexpected Conditions

If the test conditions are not correct then the following fault codes will be displayed:

Code	Error
CL	Transmission oil temperature is below **45 °C** (**113 °F**)
CH	Transmission oil temperature is above **55 °C** (**131 °F**)
U17	Seat switch not activated (Operator not in seat)
U20	Handbrake not applied
U21	Engine speed is below **1100 RPM**
U22	Engine speed is above **1300 RPM**
U23	Shuttle lever is in neutral, shift to forward
U26	Clutch pedal is not fully up, release clutch pedal
U127	Transmission oil temperature is below **10 °C** (**50 °F**)
U128	Transmission oil temperature is above **105 °C** (**221 °F**)

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BAIL13TR00581FA 6

Waveform notes (with load applied)

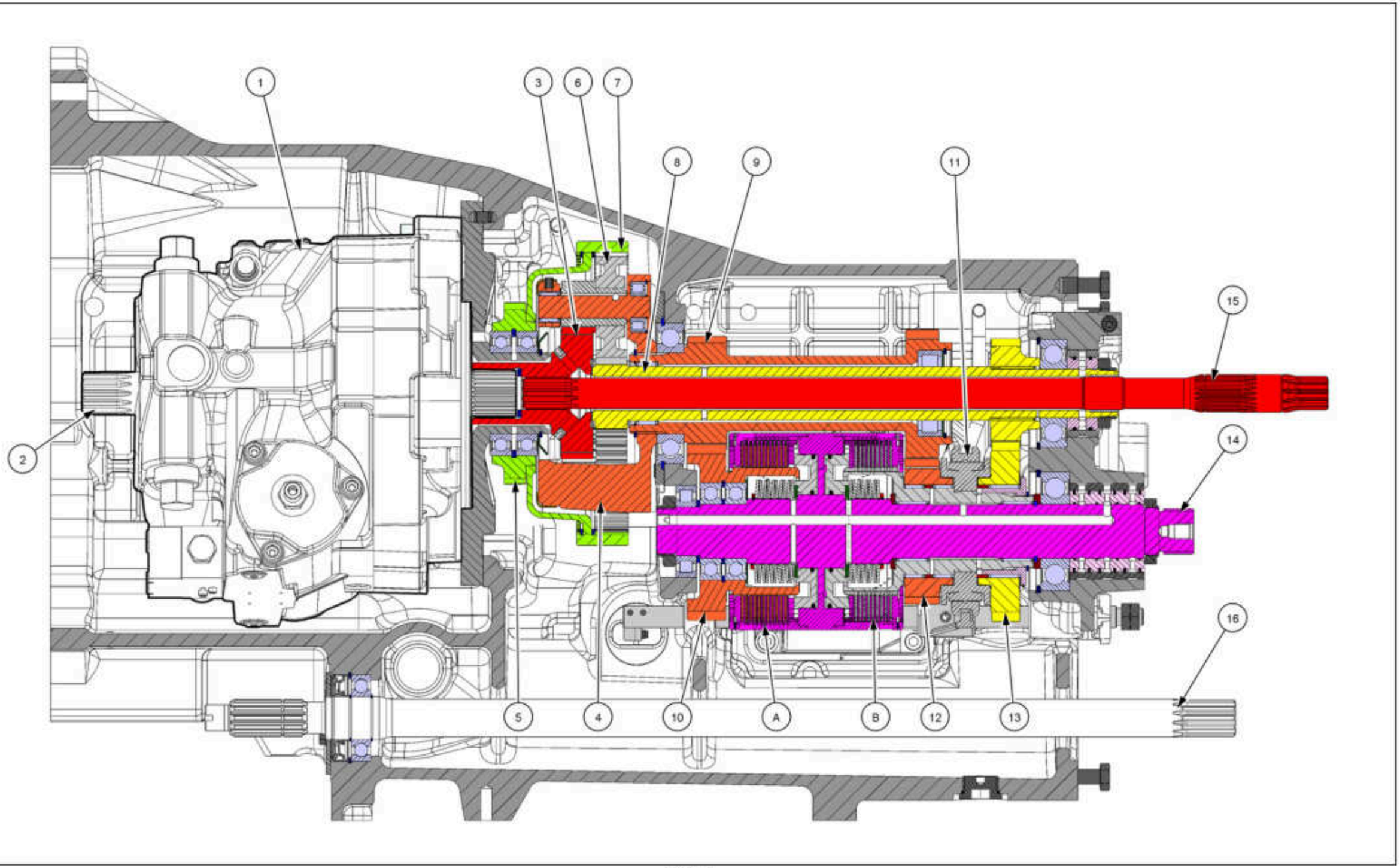
The example waveform shows the same test, but with load applied (dyno test).

During the example waveform the tractor is started and run at idle for approximately 20 seconds. It is then increased to maximum RPM and dyno tested. Once the dyno test has finished the engine RPM was increased to maximum and then returned to idle at the end of the trace.

The fuel rail pressure signal has been annotated to aid analysis

1. Engine at low idle
2. Engine at maximum RPM
3. Dyno engaged
4. Dyno auto run started
5. Fuel rail pressure gradually increases as engine load increases
6. Fuel rail pressure starts to drop off as engine rpm falls due to dyno load
7. Test finished and engine goes back to maximum RPM, rail pressure returns to high RPM pressure
8. Engine is returned to idle for cool down before being keyed off, rail pressure falls to idle pressure

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