



INJECTION PUMP SPECIFICATION ©

FULL LOAD RPM: 3000
 GOV. REGULATION: %
 ENGINE: 7.3L 190 HP 1993 TURBO
 APPLICATION: FORD PICKUP MANUAL

CUSTOMER PART #: 1816350C91
 CUSTOMER'S NAME:
 NAVISTAR

MODEL NO.: DB2831-5070
 SUPERSEDES:
 EDITION NO.: 10
 DATED: 11/04/2021

NOTE: THIS SPECIFICATION DEVELOPED WITH ISO LONG INLET STUDS
 ALL SPEEDS ARE IN ENGINE RPM (±5 RPM) UNLESS OTHERWISE NOTED.
 USE LATEST REVISION FOR ALL REFERENCED DOCUMENTS.

TEST STAND:

1. CALIBRATING HIGH PRESSURE PIPES...SAE J1418/ISO 4093:
 .098" (2.50mm) I.D. X 25" (635 mm) LONG.

2. CALIBRATING INJECTORS... S.A.E. J968/ISO 7440:
 0.5 mm ORIFICE PLATE NOP: 1700 PSI (116 BAR).

NOTE: INJECTORS SPECIFIED AT 1700 PSI OPENING

PRESSURE MUST USE SPRING P/N 780104 OR EQUIVALENT.

3. CALIBRATING FLUID...SAE J967/ISO 4113 (REF. S.B. 201):

a. TEMPERATURE AT INLET: **110°-115°F** (43°-46°C)

b. SUPPLY PRESSURE (S.B. 334): 5.0 ± 0.5 PSI

(34 ± 3 kPa) AT PUMP INLET.

4. ELECTRONIC ADVANCE INDICATOR: 39938.

PUMP INSTALLATION:

ROTATION-C-*

NAME PLATE-R-SIDE**

#1 CYL.-8-O'CLOCK**

THROTTLE-R-SIDE**

TIMING MARK N/A

LEVER ANGLES (REF.)

THOT MIN.(ZB) 22°-26°

THOT MAX.(ZC) 57°-67°

S.O. (Z E) N/A

S.O. (Z F) N/A

* VIEWED FROM DRIVE END ** VIEWED FROM TRANSFER PUMP END

AIR TIMED TO HOUSING (PER S.B. 177)

PUMP OPERATING SPEED...HALF...ENGINE SPEED

PUMP CALIBRATION CHECKS: AS RECEIVED FOR SERVICE

(REF. SL-222)

1. **1000 RPM (WOT):** OPERATE PUMP FOR 10 MINUTES TO BRING TO OPERATING TEMPERATURE AND CLEAR AIR FROM SYSTEM.

2. **400 RPM:** (L.I.):CHECK E.S.O. FOR PULL-IN WITH

10.0-0+0.2 VOLTS. FUEL SHOULD BE 15 mm³/STROKE,MIN.

3. **CHECK POINTS:**(SEQUENCE MUST BE FOLLOWED AS LISTED).

RPM	THROTTLE POSITION	mm ³ /STROKE	CAM MOVEMENT
a. 3000	WOT	66.0-74.0	1.75°-4.75°
b. 3000	WOT*	4 MAX.	---
c. 3000	L.I.	---	10.50°-11.50°
d. 3650	WOT	16 MAX.	---
e. 2500	WOT	---	****
f. 2000	ADJ.	13-15	4.75°-7.75°
g. 1400	WOT	65.5-76.0	---
h. 700	L.I.	8-16***	1.75°-5.75°
i. 700	L.I.	---	**
j. 150	WOT	33.5 MIN.	---

* E.S.O. DE-ENERGIZED

** READING TO BE **1.0°-2.75°** GREATER THAN READING

OBTAINED IN STEP 3H W/HPCA ENERGIZED.

*** MAY BE RESET USING LOW IDLE SCREW.

**** READING TO BE **0.25°-2.75°** LESS THAN READING

OBTAINED IN 3A.

4. TOTAL TRAVEL FROM LOW IDLE TO WIDE OPEN SHOULD BE

57°-67°.

PUMP SETTINGS: (FOLLOWING PUMP SERVICE)

1. ROLLER-TO-ROLLER DIMENSION: **1.977" ± .001"**

(50.22 ± .025 mm)(OVERSIZE CAM RING REF. S.B. 338)

MAXIMUM ECCENTRICITY: .004" (T.I.R.)

2. LINKAGE GAP: **.145" TO .165"** (3.7 TO 4.2 mm).

(USE KIT #23093 S.B. 95).

3. GUIDE STUD BOTTOMED TO ONE TURN OUT OF HOUSING.

4. a. SET THROTTLE AT **32°** AS MEASURED BETWEEN THROTTLE

LEVER BALL STUD CENTERLINE AND VERTICAL CENTERLINE

OF THROTTLE SHAFT WITH GAGE #24135.

b. ADJUST LOW IDLE SCREW UNTIL CONTACT IS MADE WITH

IDLE STOP BOSS.

c. ADJUST MAX.TRAVEL SCREW TO OBTAIN **62°** TOTAL THROTTLE

TRAVEL.

5. **1000 RPM (WOT):**OPERATE PUMP FOR 10 MINUTES TO BRING TO

OPERATING TEMPERATURE AND CLEAR AIR FROM SYSTEM.

PUMP SETTINGS: (CONT'D.)

6. **700 RPM (L.I.):**

a. ADJUST TRANSFER PUMP PRESSURE FOR **58-60** PSI.

b. WITH GOVERNOR COVER REMOVED,ADJUST MIN.- MAX. GOV.

ASSEMBLY FOR **12-14** mm³/STROKE. (FUEL READING WITH

COVER INSTALLED.) CHECK HOUSING FOR **8-12** PSI.

c. WITH HPCA ENGERIZED, CHECK HOUSING PRESSURE FOR 1

PSI MAX.

7. **3000 RPM (WOT):**

a. SET TRANSFER PUMP PRESSURE FOR **94-96** PSI.

b. REDUCE SPEED TO **1400 RPM** ADJUST RETURN OIL TO

200-500 cc/min.

8. **400 RPM (WOT):**

a. DE-ENERGIZE E.S.O. CHECK FUEL FOR **4** mm³/STROKE MAX.

b. MOVE THROTTLE TO (L.I.). CHECK E.S.O. FOR PULL-IN

WITH **10.0-0+0.2** VOLTS. FUEL SHOULD BE 15 mm³/STROKE

MIN.

c. CHECK FOR MIN. T.P. LIFT OF 18" Hg.

NOTE: FOR REMAINDER OF THE SETTINGS AND CHECKING

PROCEDURES CONTROL FACE CAM AND THROTTLE SHAFT

END PLAY TO **.004"- .006"** AS MEASURED BETWEEN SPACER

#14408 AND THE HOUSING.

9. **3000 RPM (WOT):**(ROLLER-ROLLER SET POINT)

a. ROTATE FACE CAM TO ITS MAXIMUM LIFT POSITION IN

CONTACT WITH THE CAM ROLLER.

b. SET TRIMMER SCREW FOR **3.5°** ADVANCE.

c. SET FUEL DELIVERY TO **70.3-71.3** mm³/STROKE.

d. DE-ENERGIZE E.S.O. CHECK FUEL FOR **4** mm³/STROKE MAX.

RE-ENERGIZE E.S.O.

10. **3300 RPM (WOT):**

a. SET GUIDE STUD FOR **49.5-50.5** mm³/STROKE AND TORQUE NUT

#23585 TO **80-90** IN-LBS.

b. CHECK DIMENSION FROM TOP OF NUT TO TOP OF GUIDE STUD

FOR **.425"** MAX.

11. **2000 RPM:**

a. ADJUST THROTTLE TO **13-15** mm³/STROKE AND ROTATE FACE

CAM TO OBTAIN **6.25°** ADVANCE.

b. TORQUE SCREW #22398 TO **28-30** IN-LBS.

12. **1400 RPM:**

a. WITH THROTTLE AT **27** mm³/STROKE, ALIGN **0°** ON LEVER

PROTRACTOR #22089 WITH CENTER OF RIB ON ROCKER

LEVER. RELEASE THROTTLE LEVER AND ROTATE TO **44°**

TOWARD WOT POSITION. ADJUST MAX. TRAVEL SCREW TO

44°.

b. CHECK FACE CAM TORQUE RETENTION PER S.B. 361.

NOTE: ANY CHANGES AFTER THIS POINT WILL REQUIRE RE-TESTING

OF PUMP. STARTING WITH STEP 7.

13. **CHECK POINTS:**

RPM	THROTTLE POSITION	mm ³ /STROKE	CAM MOVEMENT	T.P. PRESSURE	HOUSING PRES
a. 3000	WOT	70.3-71.3	3.25°-3.75°	---	---
b. 3000	L.I.	---	10.50°-11.50°	---	---
c. 3300	WOT	48.5-51.5	---	---	---
d. 3650	WOT	16 MAX.	---	125 MAX.	---
e. 2500	WOT	---	*	---	---
f. 2000	ADJ.	13-15	5.75°-6.75°	---	---
g. 1400	WOT	68.0-75.0	---	---	---
h. 700	L.I.	12-14(16)	2.25°-5.25°	---	8-12
i. 700	L.I.	---	**	---	0-1*
j. 150	WOT	36.0 MIN.	---	12 MIN.	---

* READING TO BE **.75°-2.75°** LESS THAN READING

OBTAINED IN STEP 13A.

** READING TO BE **1.25°-2.50°** GREATER THAN READING

OBTAINED IN STEP 13H W/HPCA ENERGIZED.

14. CHECK TOTAL TRAVEL: **57°-67°.**

15. AIR TIME PUMP USING GAGE #24205 (S.B. 375) SET TO

-6.5°

16. **NOTES:**

IF ADJUSTMENT IS REQUIRED, USE L.I. SCREW. MAX.

ADJUSTMENT IS ±1 TURN FROM POINT SET IN STEP 4a.

17. **SPECIAL NOTES:**

a. TORQUE ALL FASTENERS PER S.B. 106.

b. SEAL PUMP FASTENERS PER S.B. 365.

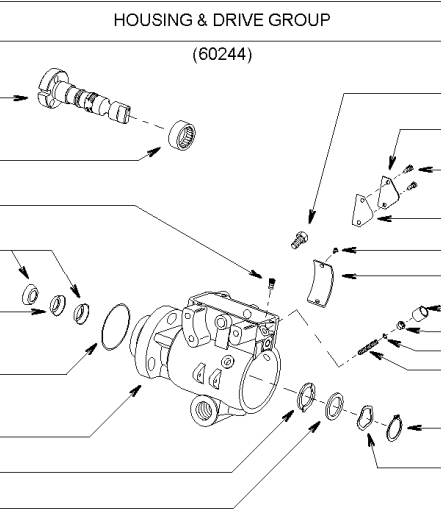
c. INSTALL GUIDE STUD TAMPER PROOFING CAP # 26961

(FIELD SERVICE P/N) ON GUIDE STUD # 26495.

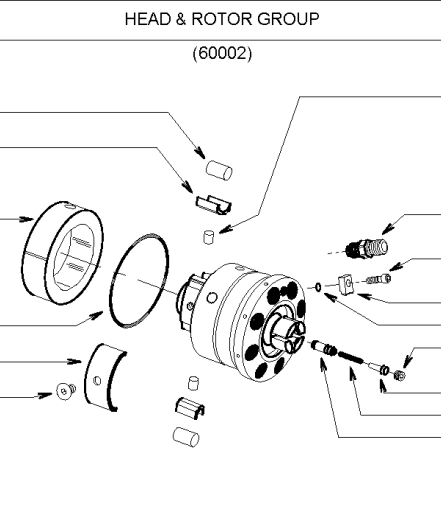
(REF. S.B. 365a).

d. INSTALL TAMPER PROOF CAP NO. 29672 (FIELD SERVICE) ON

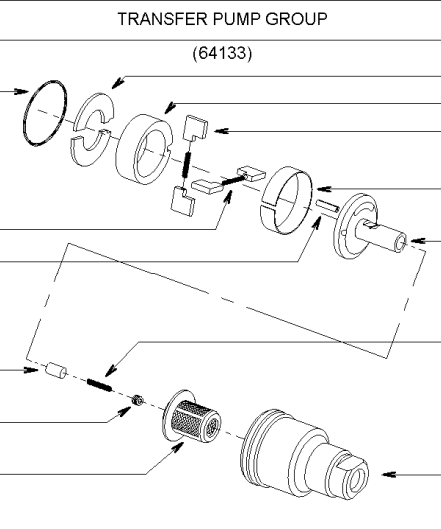
TORQUE SCREW S.B. 472.

Description	QTY	P/N	HOUSING & DRIVE GROUP (60244)	P/N	QTY	Description
DRIVESHAFT	1	26179		11331	2	SCREW, HEX HEAD
BEARING, NEEDLE	1	23101		23107	1	COVER, TIMING WINDOW
SCREW ASSY, VENT OR 21661-21665	1	21660		21194	2	SCREW, HEX HEAD
SEAL, DRIVE SHAFT	2	10453		27603	1	GASKET, TIMING WINDOW COVER
SEAL, DRIVESHAFT RED	1	21860		24419	2	SCREW, RIVET
SEAL, O-RING	1	23367		10394	1	PLATE, NAME
HOUSING ASSY, PUMP	1	29674		29677	1	CAP, TORQUE SCREW
BEARING, THRUST	1	26180		29671	1	NUT, TORQUE SCREW
WASHER, THRUST	1	21521		17438	1	SEAL, O-RING
				33922	1	SCREW, TORQUE
				10443	1	RING, RETAINING
				21522	1	WASHER, DRSFT SPRING

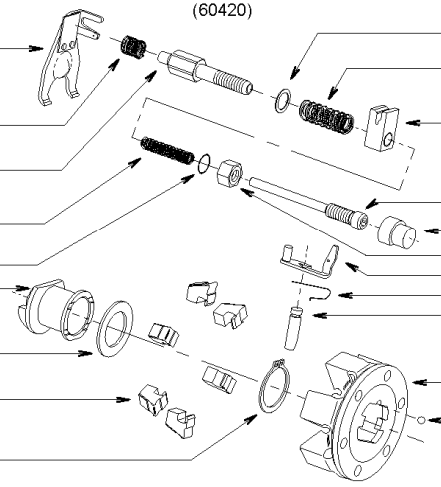
Note: APPLY SYN-KUT P/N 22204 TO DRIVE SHAFT SEALS BEFORE ASSEMBLING TO SHAFT AND SHAFT TO PUMP

Description	QTY	P/N	HEAD & ROTOR GROUP (60002)	P/N	QTY	Description
ROLLER, CAM	2	11141		28369	1	H&R ASSY, HYD 8 CYL
SHOE, CAM ROLLER	2	24569		11066	2	PLUNGER, ROTOR USE 11067-11070 (STD) OR 11072-11075 (O/S) AS IND. ON ROTOR SB 60R
RING, CAM OR 23120 O.S.:INCREASE SPECIFIED R-R BY .006 "	1	27833		12216	1	SCREW, SOCKET SET
SEAL, O-RING	1	27245		11438	1	SCREW, SET
SPRING, LEAF	1	23752		20727	8	CONNECTOR, FUEL LINE
SCREW, LEAF SPR ADJ	1	11175		29710	1	SCREW, SKT HEAD CAP
				29384	1	PLATE, SINTERED LOCK
				27601	1	SEAL, O-RING
				23124	1	SCREW, DELIVERY VALVE RET
				23125	1	STOP, DELIVERY VALVE
				23949	1	SPRING, DEL VALVE
				28947	1	VALVE, DELIVERY OR 28948 (O/S) AS REQ'D REF. S.B. 143B
				17049	2	PISTON, ACCUMULATOR
				17050	2	SCREW, ACC PSTN RET
				17188	2	SPRING, ACCUMULATOR

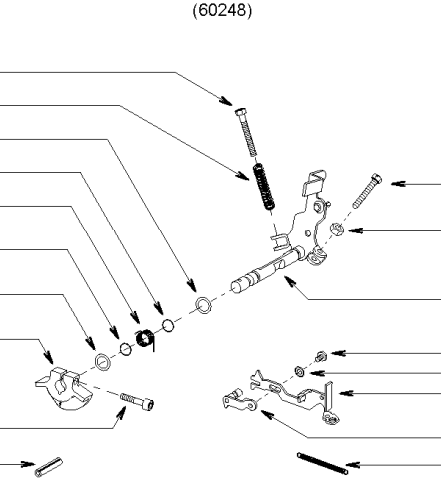
Note:

Description	QTY	P/N	TRANSFER PUMP GROUP (64133)	P/N	QTY	Description
SEAL, TRANSFER PUMP	1	27608		20530	2	RETAINER, ROTOR
SPRING, TP BLADE	2	15699		21232	1	LINER, TRANSFER PUMP
ROLL PIN	1	19837		20511	4	BLADE, TRANSFER PUMP OR 20512 REF. S.B. 304
PISTON, REGULATING	1	19895		20528	1	RING, ROTOR RETAINER
PLUG ASSY, END PL ADJ	1	15228		46771	1	REGULATOR, TRANSFER PUMP
FILTER, INLET	1	28986		24882	1	SPRING, REGULATING
				28980	1	CAP, TP END

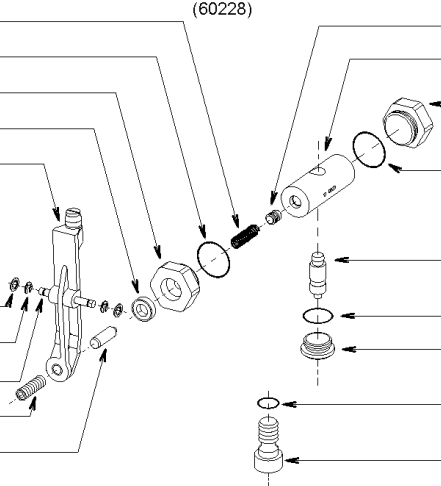
Note: REF. S.B.444

Description	QTY	P/N	GOVERNOR GROUP (60420)	P/N	QTY	Description
ARM ASSY, TEMP COMPEN	1	23461		22325	1	WASHER, MAX SPEED SPR
				30504	1	SPRING, MIN MAX GOV
SPRING, IDLE BLUE	1	22125		24880	1	BLOCK ASSY, GOVERNOR
ROD&SLV ASSY, MM GOV	1	23610		26495	1	STUD, GUIDE
SPRING, GOV INNER RED	1	23744		26923	1	CAP, TAMPER PROOF
SEAL, O-RING	1	11507		23585	1	NUT, GUIDE STUD
SLEEVE, GOV THRUST	1	21312		21895	1	ARM ASSY, MTR VALVE
				21917	1	SPRING, MTR VALVE
WASHER, THRUST	1	23272		11563	1	VALVE, METERING * SEE NOTE
WEIGHT, GOVERNOR	6	21201		28370	1	RETAINER ASSY, GOV WT
RING, RETAINING	1	12285	30251	1	BALL, PRECISION STEEL OR 11430 OR 30322 REF. S.B. 426	

Note: * O.S. METERING VALVE AND ARM ASSEMBLY 24441 REFERENCE S.B.336

Description	QTY	P/N	LINKAGE GROUP (60248)	P/N	QTY	Description
SCREW, HEX HEAD	1	21646		21646	1	SCREW, HEX HEAD
SPRING, IDLE SCREW	1	21358		12173	1	NUT, HEX
WASHER, THROT SHAFT	1	22900		23588	1	SHAFT ASSY, THROTTLE
SEAL, O-RING	1	17438		18021	1	HOOK ASSY, GOV LKGE
SPRING, GOV THRUST	1	26181		12360	1	SCREW, HEX HEAD
SEAL, O-RING	1	17438		12362	1	LOCK WASHER, SHPRF
WASHER, SPACER	1	14408		18020	1	HOOK, GOVERNOR LINKAGE
CAM, RKR LEVER FACE	1	28465		12358	1	LINK ASSY, ADJUSTING
SCREW, SKT HD CAP TX	1	22398		11919	1	SPRING, GOVERNOR LINK
PIN, GROOVED	1	21284				

Note: LUBRICATE PER S.B. 387

Description	QTY	P/N	AUTOMATIC ADVANCE GROUP (60228)	P/N	QTY	Description
SPRING, MECH LLA	1	24885		22367	1	VALVE, SERVO ADVANCE
SEAL, O-RING	1	27609		29043	1	PISTON, SERVO ADVANCE
PLUG ASSY, SPR SIDE	1	24931		23721	1	PLUG, POWER SIDE
SEAL, ADV PLUNGER	1	27163		27609	1	SEAL, O-RING
LEVER ASSY, ROCKER	1	28196		23925	1	PIN, ADVANCE CAM
ROLLER, ROCKER LEVER	1	22720		27610	1	SEAL, O-RING
SCREW, RCR LEVER RLR	1	22396		23056	1	PLUG, HEX SOCKET
WASHER, PLAIN	1	28197		27602	1	SEAL, O-RING
RING, RETAINING	2	30844		26787	1	SCREW ASSY, HEAD LOCATING
RING, RETAINING	2	23566				
PIN, RKR LEVER PIVOT	1	22397				
SCREW, SERVO ADV ADJ	1	26087				
PLUNGER, SERVO ADV	1	22917				

Note: LUBRICATE PER S.B. 387

Description	QTY	P/N	COVER GROUP (63847)	P/N	QTY	Description
SCREW, BUTTON HD CAP	3	22351				
STRAP, TERM GROUNDING	1	20951				
WASHER, INTERNAL TOOTH	1	18493		14760	2	NUT, HEX LOCK
INSULATOR, TERMINAL	1	21618		12049	4	WASHER, INTERNAL TOOTH
TERMINAL, BLADE	1	22985		12519	2	NUT, HEX
WASHER, PLAIN	2	18501		12500	2	WASHER, FIBER
RGLTR ASSY, HSG PRESS	1	23645				
SEAL, O-RING	1	27607		43920	1	COVER, GOVERNOR CONTROL
GASKET ASSY, GOV COVER	1	42696		39607	1	SOLENOID ASSY, COLD ADVANCE
SOLENOID, 12V ETR 2-23190 TUBE, INSULATE	1	26214		12500	1	WASHER, FIBER
				18501	1	WASHER, PLAIN
				12519	1	NUT, HEX
				12049	2	WASHER, INTERNAL TOOTH
				21518	1	TERMINAL
				14760	1	NUT, HEX LOCK
				21618	1	INSULATOR, TERMINAL

Note: INSTALL GROUNDING STRAP ON RIGHT SIDE VIEWING TRANSFER PUMP REF. S.B. 108

FOR SERVICE USE ONLY

APPLICABLE SERVICE ASSEMBLIES

Assembly	Description
15093	THROTTLE SHAFT BUSHING REPLACEMENT
24370	GASKET KIT
26431	ESO MOUNTING AND GROUNDING KIT
29042	.002 OVERSIZE ADVANCE PISTON

FOR ENGINEERING USE ONLY

DATE	ECN NO	EDITION
06/17/1992	21391	1
09/03/1992	21736	2
10/06/1992	21928-M	3
06/28/1993	22594	4
08/20/1993	22697	5
06/06/2008	31422	6
01/19/2009	31861	7
12/05/2016	39554	8
11/21/2017	39745	9
11/04/2021	20051	10