

100
X200-4

**ALLISON TRANSMISSION
NEW-PRODUCT TRAINING**

STUDENT WORK BOOK

**DEPOT SUPPORT
MAINTENANCE**

FORM: 200-10
DATED: AUG. 85
REV. DATE: NOV. 85

X 4
STUDENT WORKBOOK
DEPOT SUPPORT MAINTENANCE
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X200-4
ALLISON TRANSMISSION
STUDENT WORK BOOK
NEW PRODUCT TRAINING

DEPOT SUPPORT MAINTENANCE

DETROIT DIESEL ALLISON
DIVISION OF GENERAL MOTORS
PRODUCT COURSE DEVELOPMENT
SALES & SERVICE TRAINING
WORLD HEADQUARTERS
P.O. BOX 894
INDIANAPOLIS, INDIANA 46206

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FORM: 200-10
DATED: AUG. 85
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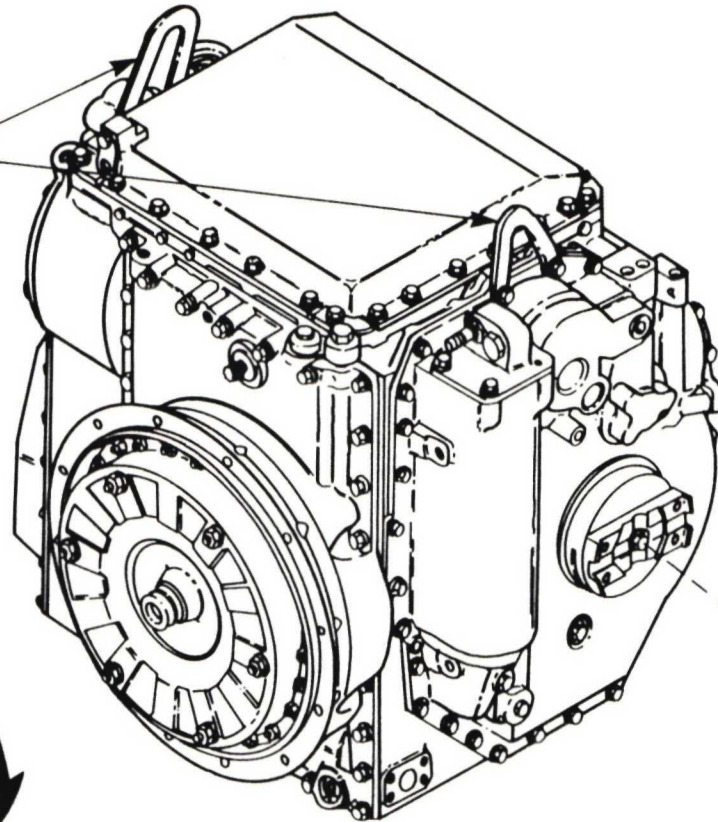
LEFT FRONT VIEW

LIFTING BRACKETS

RIGHT REAR
FRONT LEFT

TORQUE
CONVERTER
(TRANSMISSION
INPUT)
ROTATION

LEFT OUTPUT
MOUNTING FLANGE
CCW ROTATION
IN FORWARD RANGES





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— NOTES —

Depo Level - Service -

- Peter Van Chyke - Mill-Rot
- - Mill-Indi

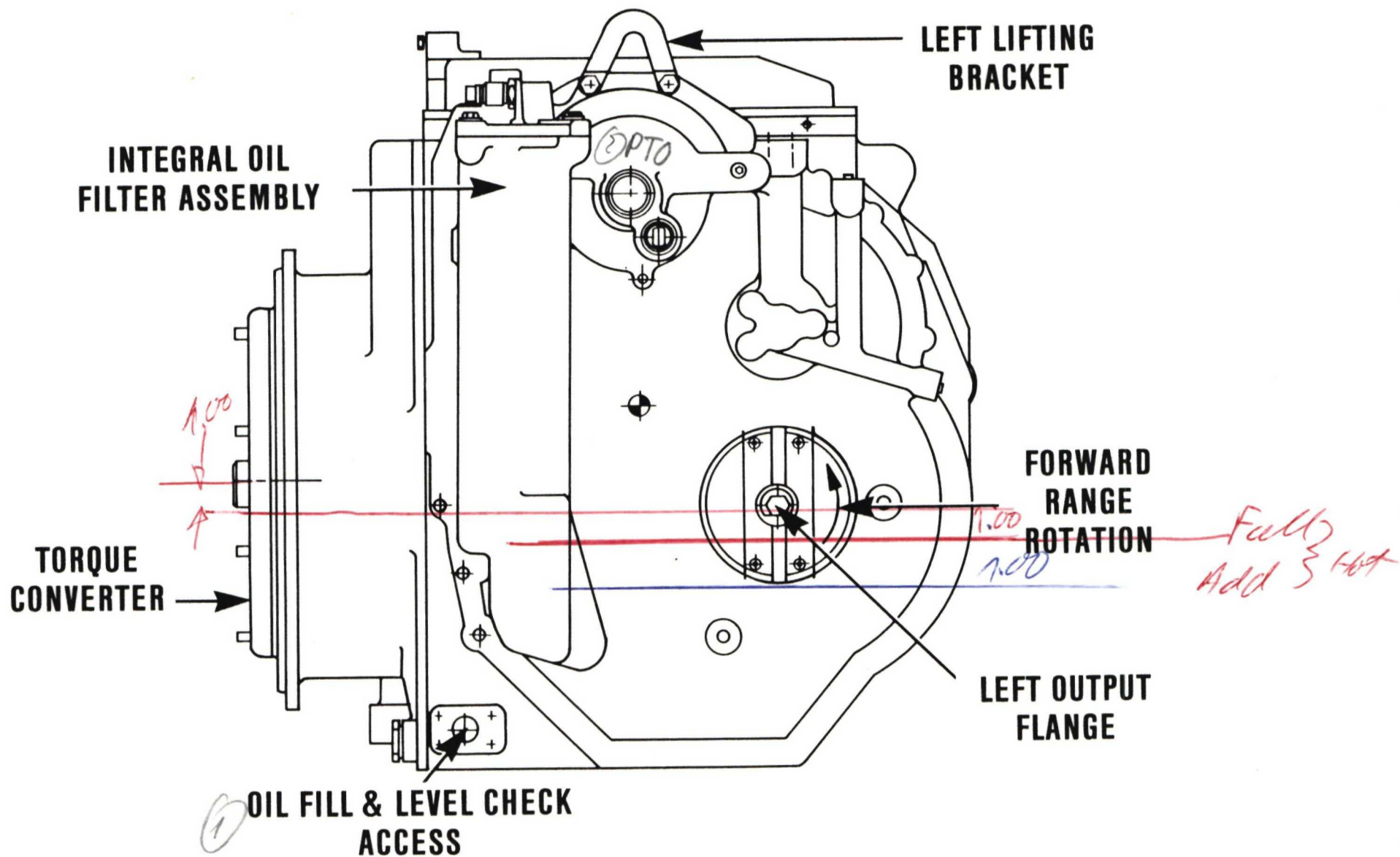
(TC380) 295-2800 RPM
3.32:1 stall Ratio

(Electronic shift selector)

stall speed?

X200-4

EXTERNAL FEATURES LEFT VIEW





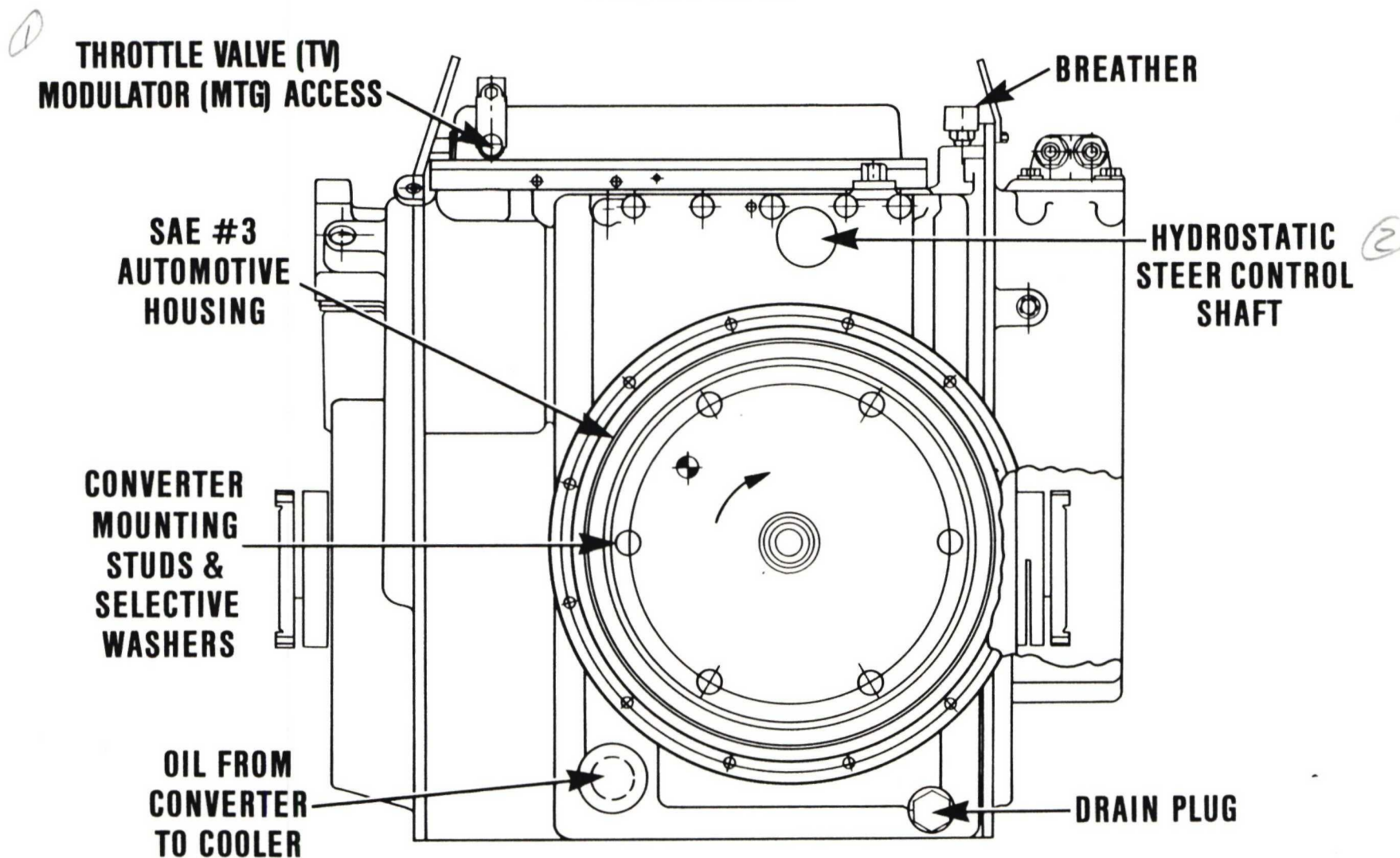
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— NOTES —

① F.I.L.C.

② P.T.O. - Hyd-Pump

X200-4
**EXTERNAL FEATURES
FRONT VIEW**



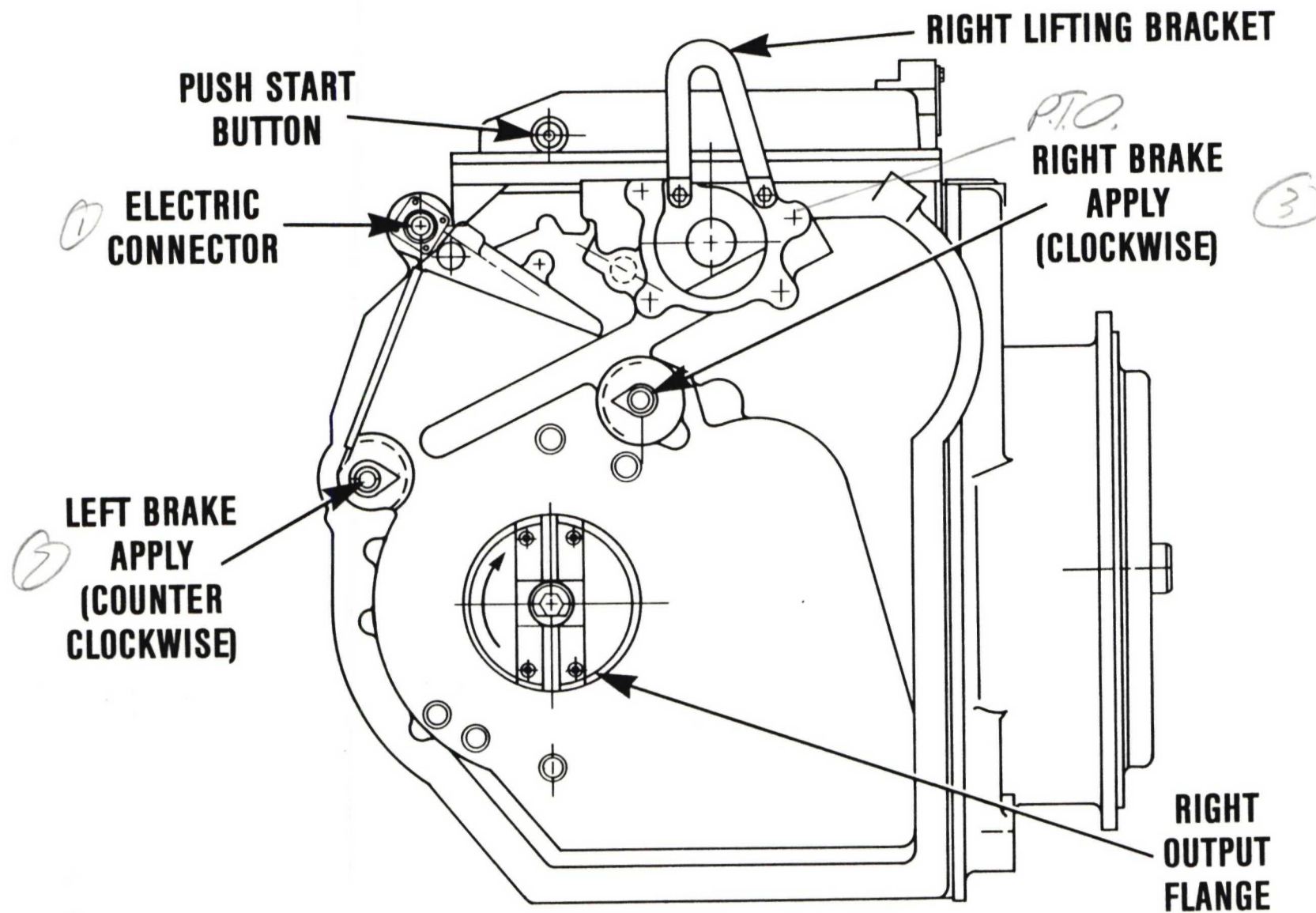


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— NOTES —

1. NTG - Mounting
2. HSCS - Steering Servo valve in Hydrotet - Left - Right

X200-4

EXTERNAL FEATURES**RIGHT VIEW**



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— NOTES —

① Horns - Soil → S.T.

2-3 - Apply - Vis degree -

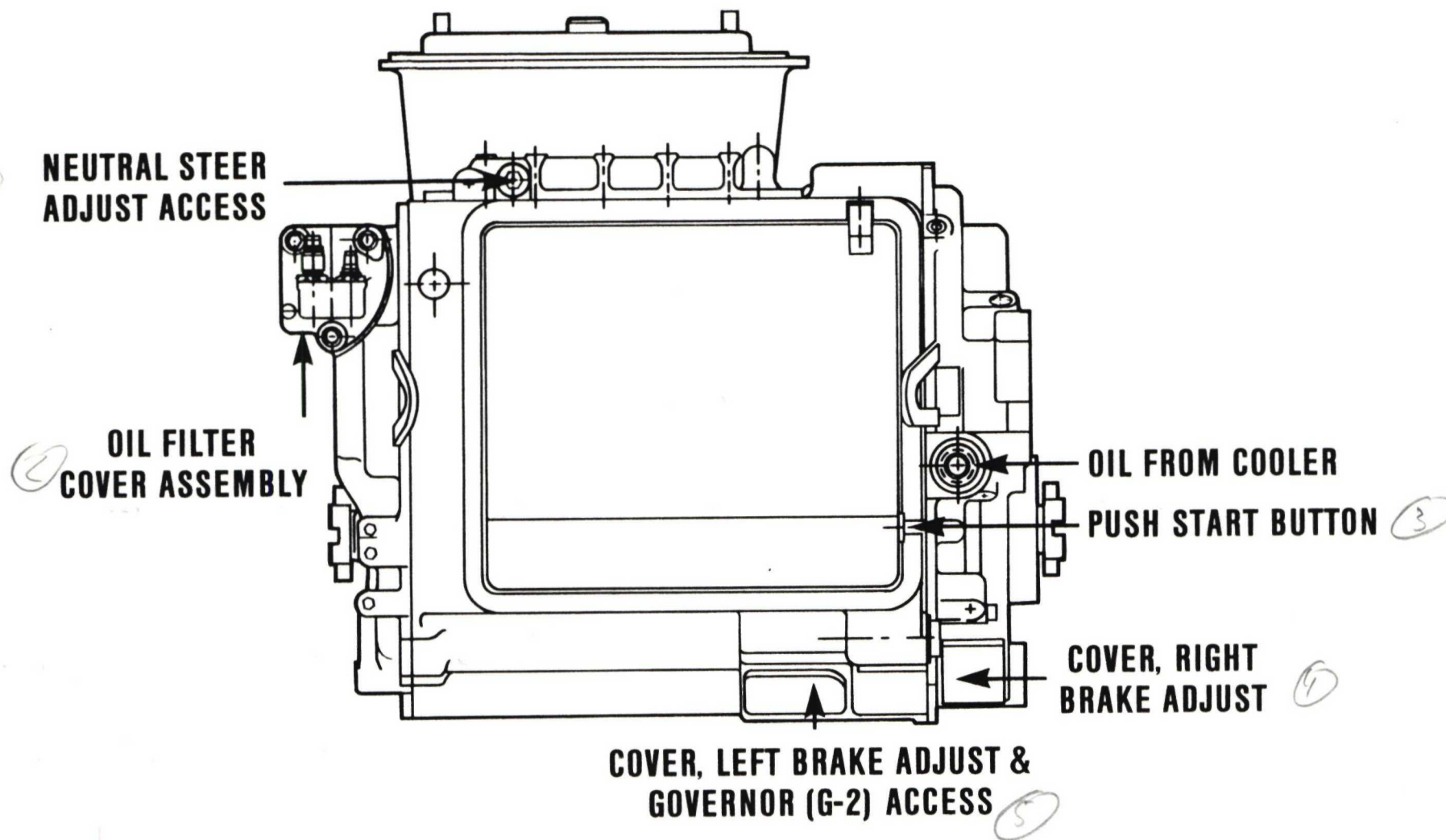
→ Byard Radi;

→ 30-40 16ft Trench - Apply Mark or over

~~60% slope~~

~~→ Mark Hold -~~

X200-4

EXTERNAL FEATURES**TOP VIEW**

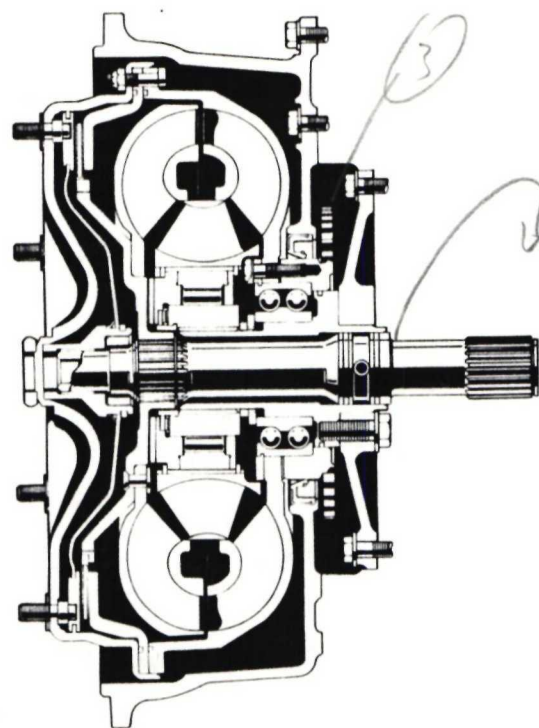


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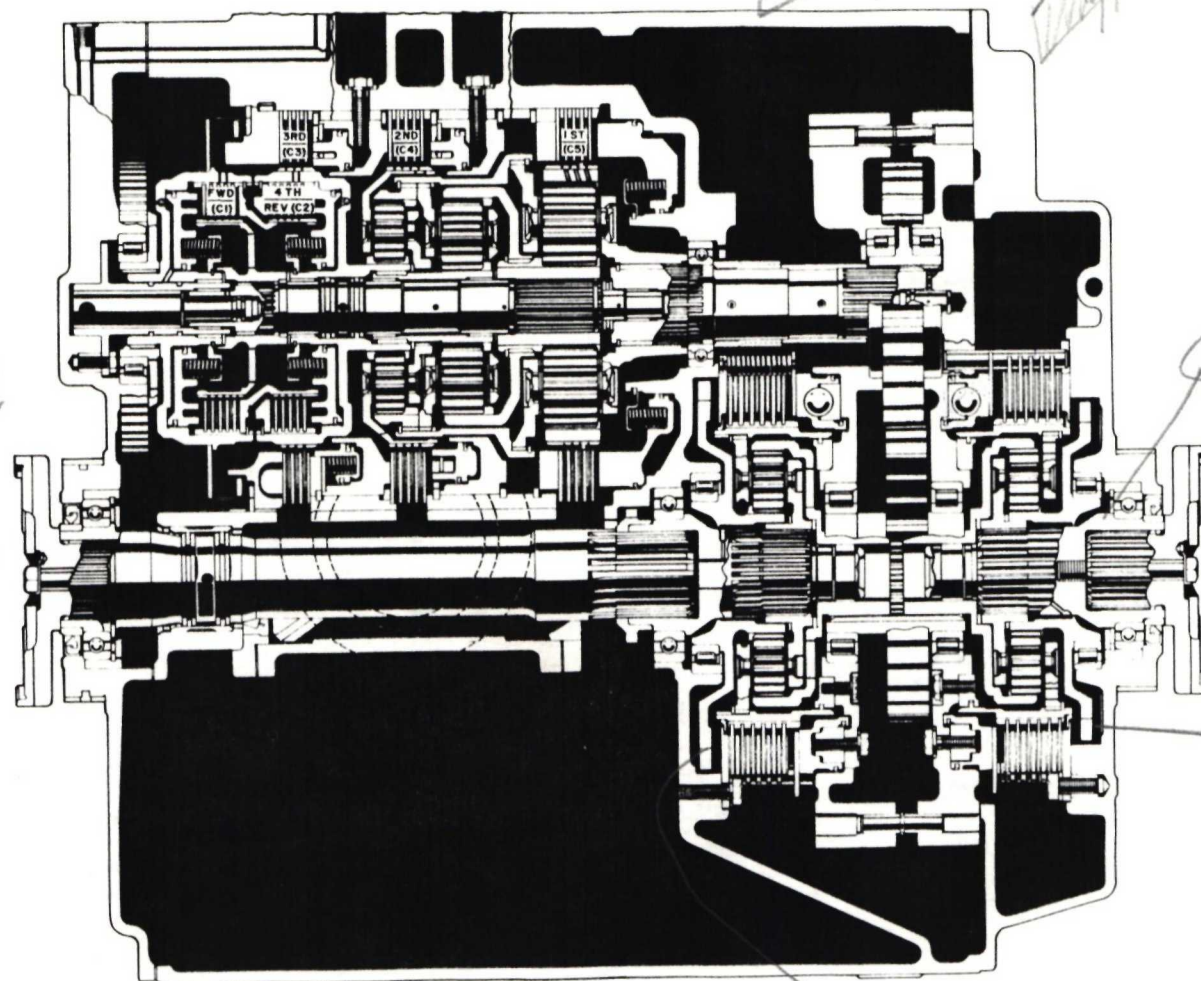
— NOTES —

- 1) NSAA - & For "A"
 - 2) - Electronic Bypass Light.
 - 3) Push Start B. - Manual - Starter - in "E" - Hydraulic Valve -
 - 4) - R. Brake - Apply
 - 5) G-2 Rear Gov - L. Brake -
- 5 min - Adj/prog

X200-4 TRANSMISSION CROSS SECTION



INPUT MODULE



CENTER MODULE

X200-4 ALLISON TRANSMISSION
CROSS SECTION
DDA GM WTC PCD AUG 1985

↑ Rear



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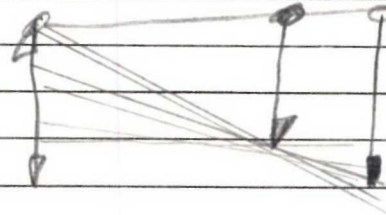
— NOTES —

- 1) Hyd. Stat Stear gear - 2g.
- 2) " " " " - 3g.

Input - Rings

Output - Carrier

Diff Moun - Sam



Brake Fric plates -

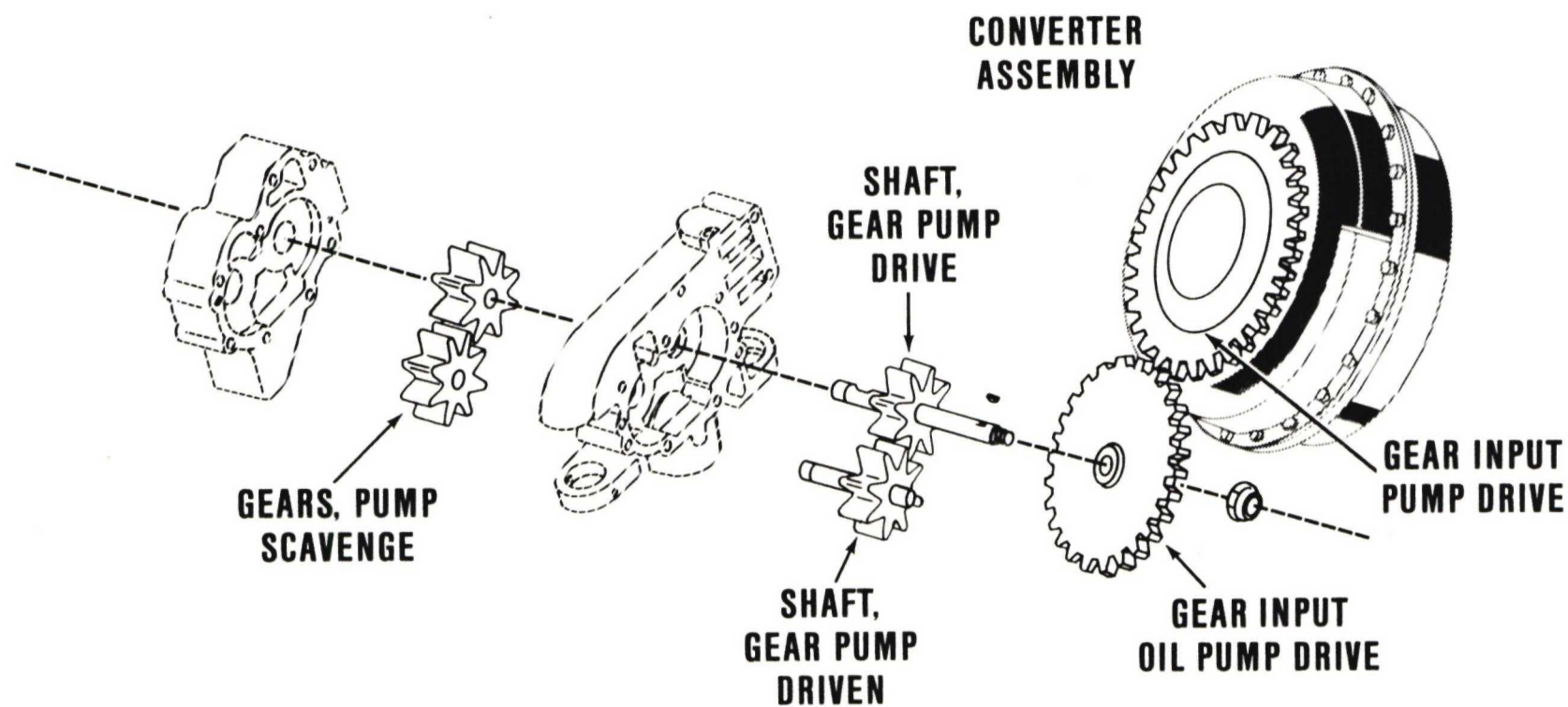
3) Input pump drive gear - (P4) Main

① P1 - P2 - P3
F C Ruc Pset.

② Out put pump - (P2) secondary - Tow pump

X200-4

INPUT GEARING ENGINE DRIVEN





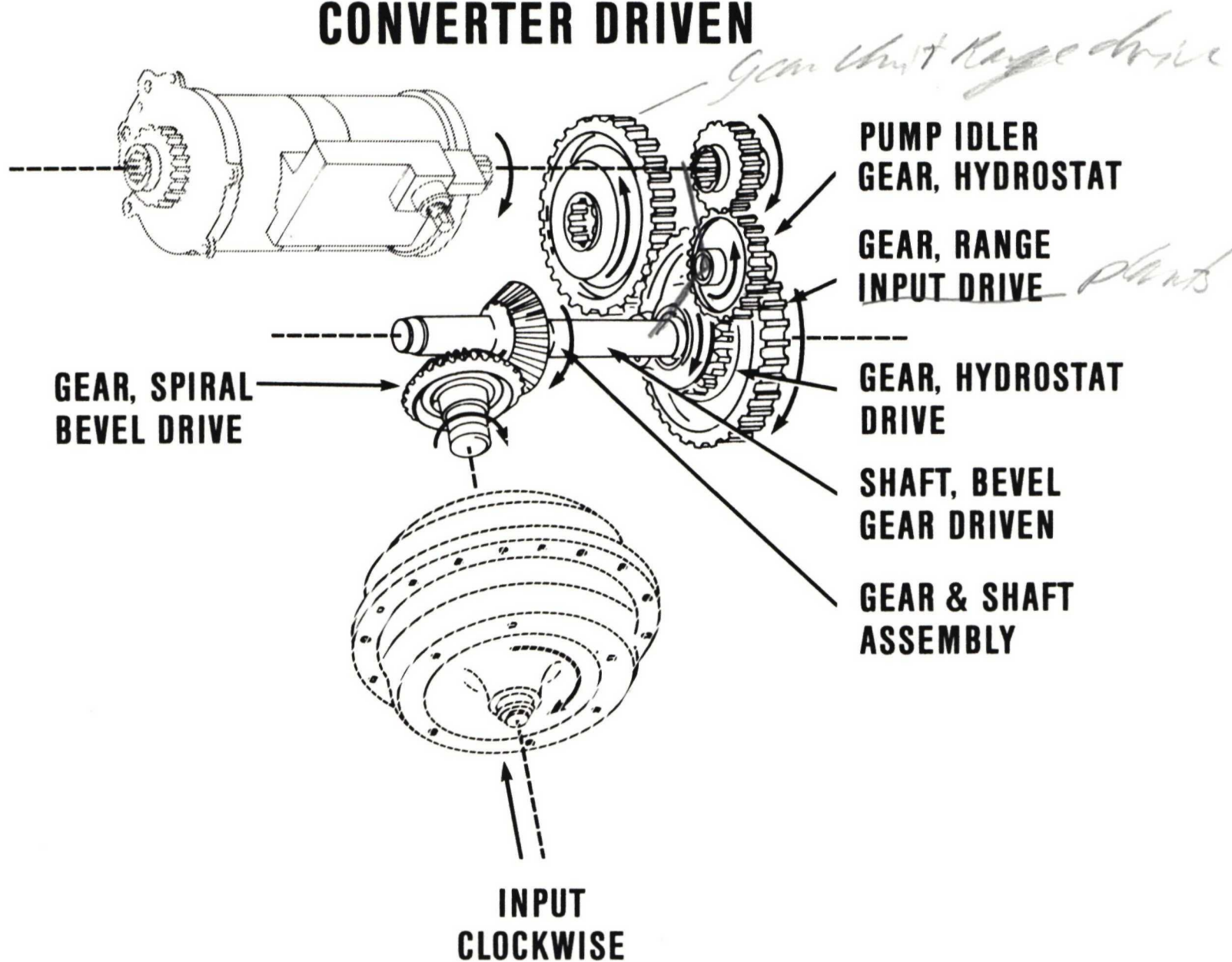
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— NOTES —

Main p. ① - int - Scar. pump.
From the input Blvd area

X200-4

INPUT GEARING CONVERTER DRIVEN



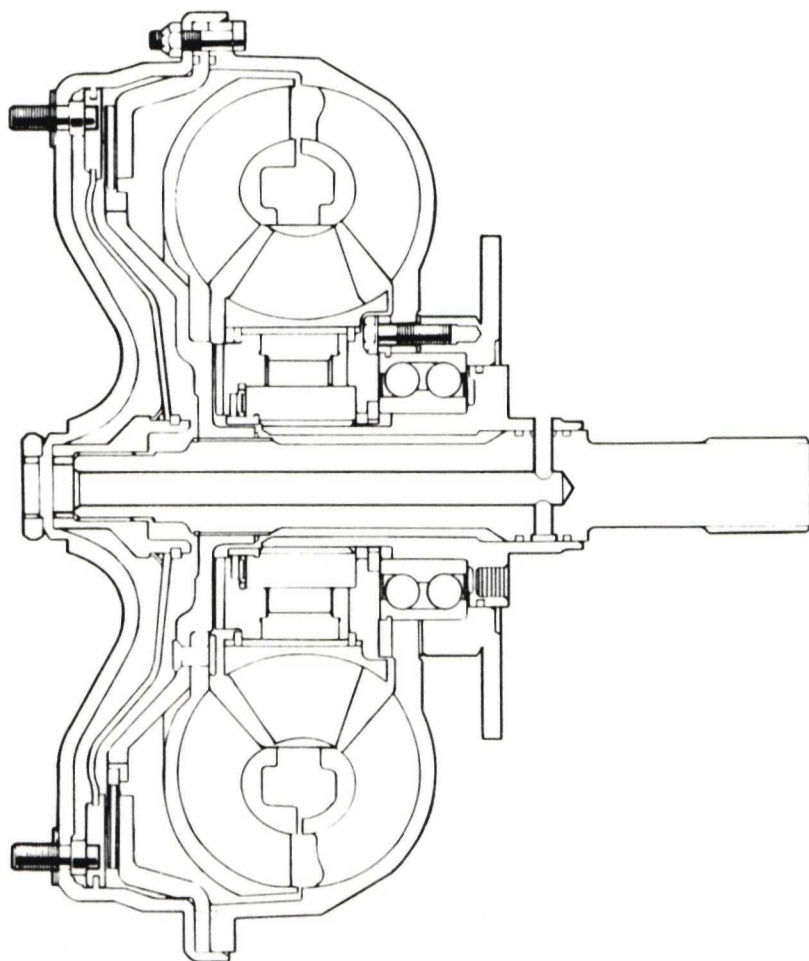


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— NOTES —

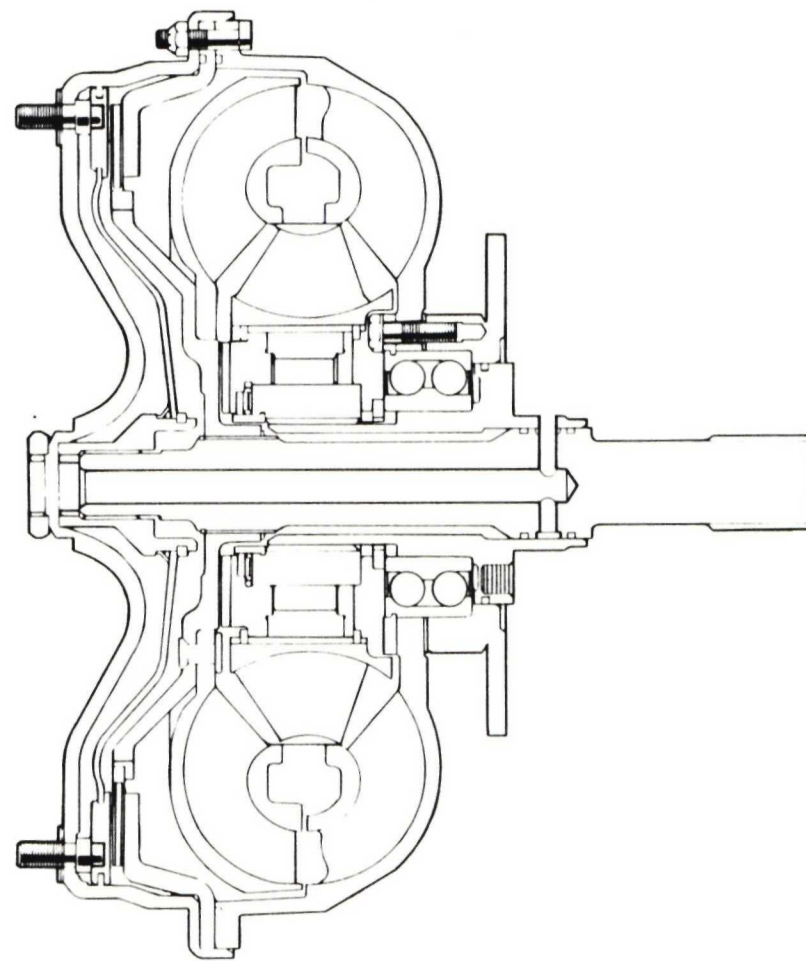
X200-4 TORQUE CONVERTER OPERATION

**CONVERTER PHASE
TORQUE MULTIPLICATION**



**STATOR — FIXED
VORTEX FLOW — HEAT**

**COUPLING PHASE
FLUID COUPLING**



**STATOR — FREEWHEELING
ROTARY FLOW — COOLING**



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— NOTES —

519.
3.321 - 1172500.0
1725 - 16605
1725 6450
66500 3321
2324700 31290
3321000 29489
003010

6642 2
13281 4
16605 5
33210 10
29989 9

!350HP! 6V53T

5713.925 L. 16ft

519.4 16ft.

-TC: 360-

Pito - L o chys control = G.1

-10psi fan Main

- Forward clutch
T. 4psi.

1-TC- stall RPR

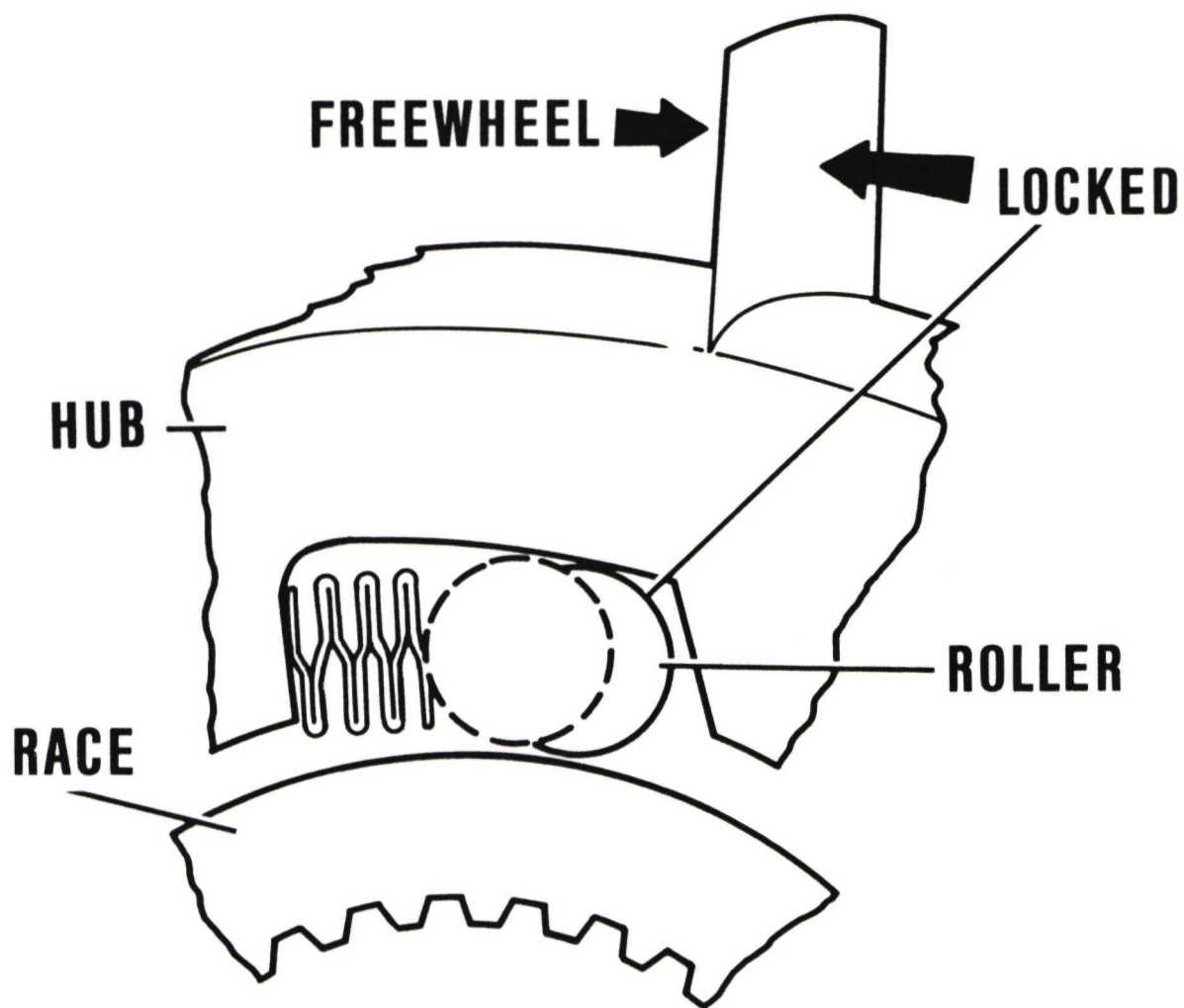
2-Hyd stall L.

3-TC+ Hyd stall does not work

300°F / 10x out T.

stall - Optimum - for each engine

X200-4
STATOR
HUB AND ROLLER SCHEMATIC

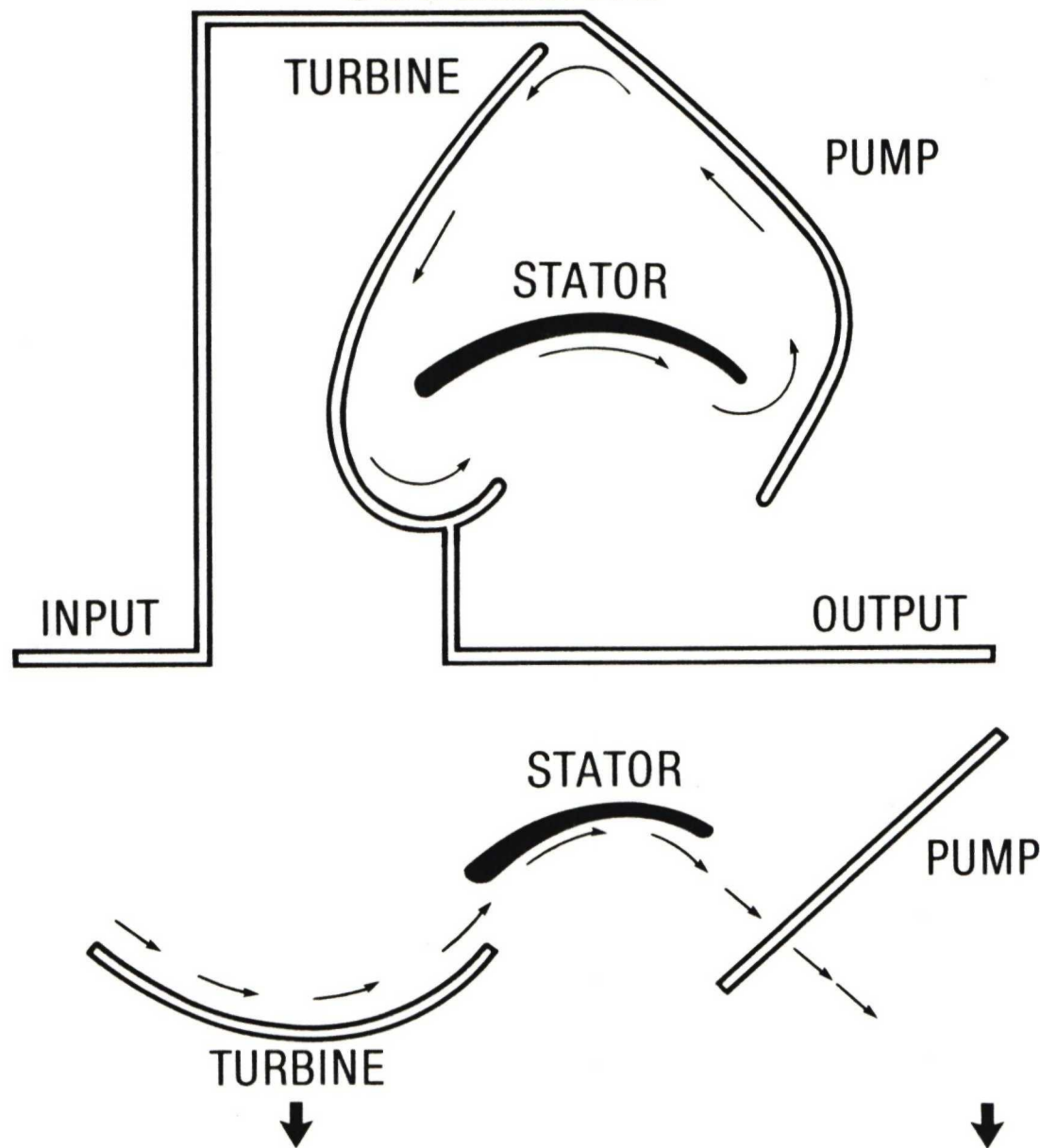


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— NOTES —

X200-4

CONVERTER BLADE SCHEMATIC





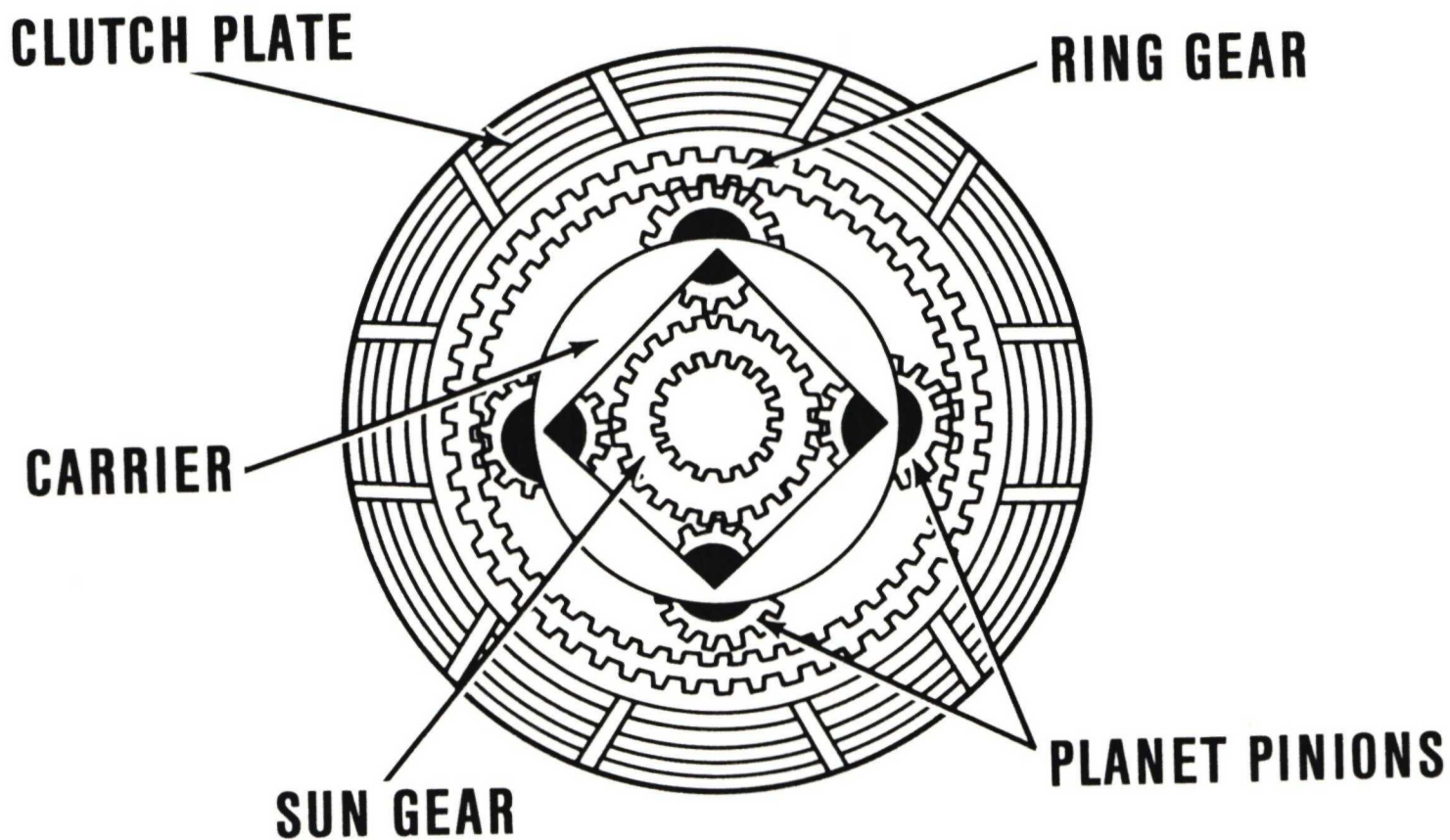
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X200-4

PLANETARY GEAR SET



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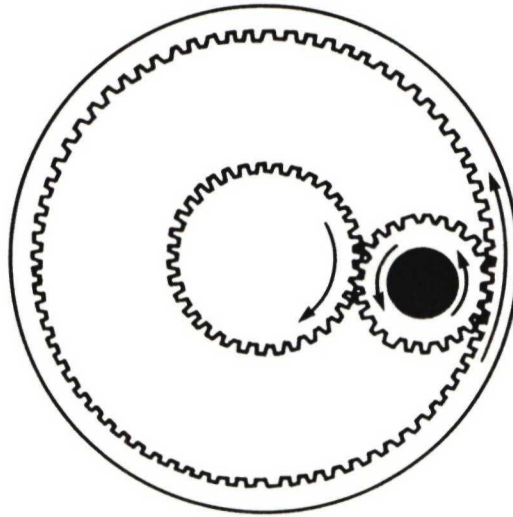
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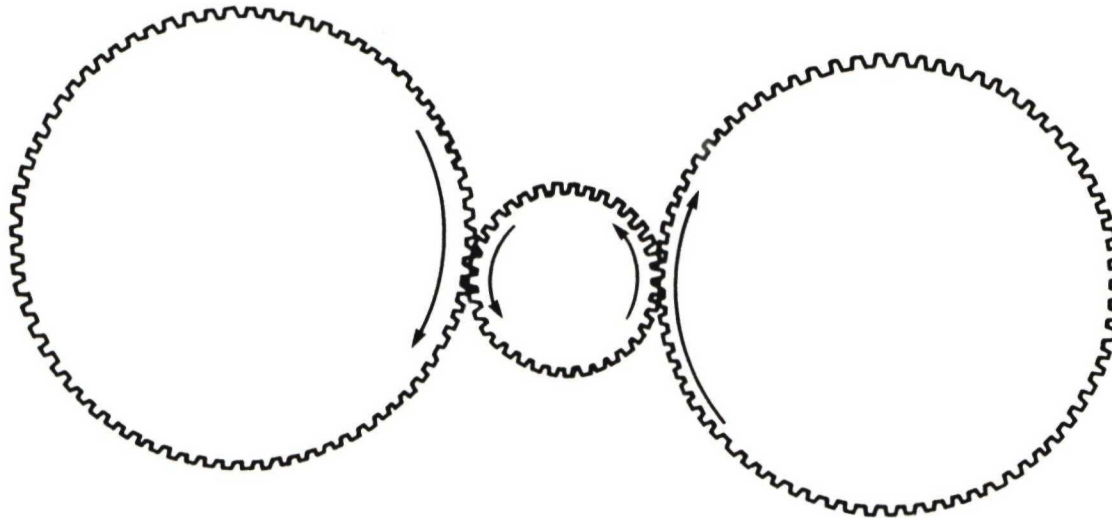
X200-4

PRINCIPLE OF GEAR ROTATION

**EXTERNAL
TO
INTERNAL**



**EXTERNAL
TO
EXTERNAL**





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BASIC LAWS OF SIMPLE PLANETARY GEARS

SUN	CARRIER	RING	SPEED	TORQUE	DIRECTION
INPUT	OUTPUT	HELD	MAXIMUM REDUCTION	INCREASE	SAME AS INPUT
HELD	OUTPUT	INPUT	MINIMUM REDUCTION	INCREASE	SAME AS INPUT
OUTPUT	INPUT	HELD	MAXIMUM INCREASE	REDUCTION	SAME AS INPUT
HELD	INPUT	OUTPUT	MINIMUM INCREASE	REDUCTION	SAME AS INPUT
INPUT	HELD	OUTPUT	REDUCTION	INCREASE	OPPOSITE OF INPUT
OUTPUT	HELD	INPUT	INCREASE	REDUCTION	OPPOSITE OF INPUT

WHEN ANY TWO MEMBERS ARE HELD TOGETHER, SPEED AND DIRECTION ARE SAME AS INPUT; RATIO 1:1.

IF THE CARRIER IS

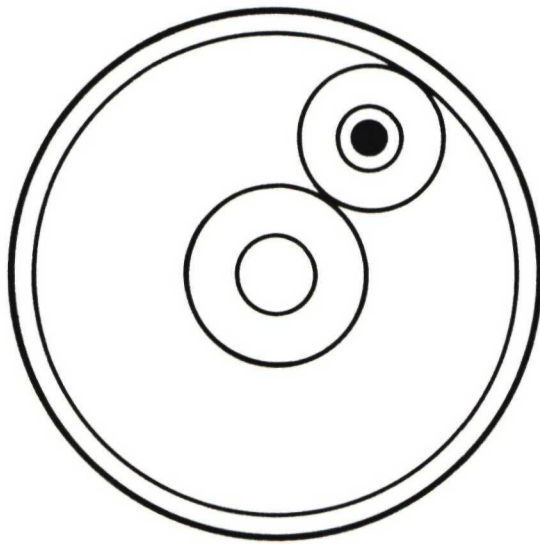
1. THE OUTPUT, UNDERDRIVE RESULTS, OR SPEED DECREASE.
2. THE INPUT, OVERDRIVE RESULTS, OR SPEED INCREASE.
3. THE HELD MEMBER, OUTPUT DIRECTION IS REVERSED.

 Allison Transmissions

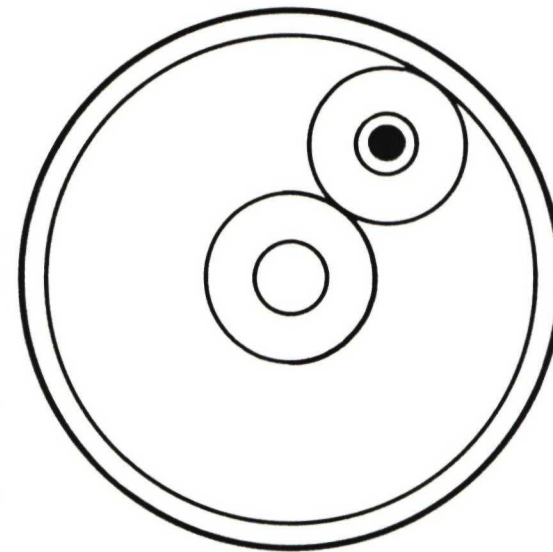
— NOTES —

X200-4

PLANETARY GEARING SCHEMATICS



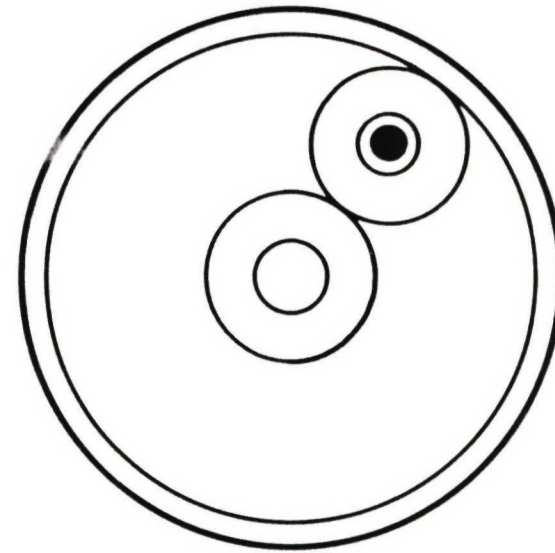
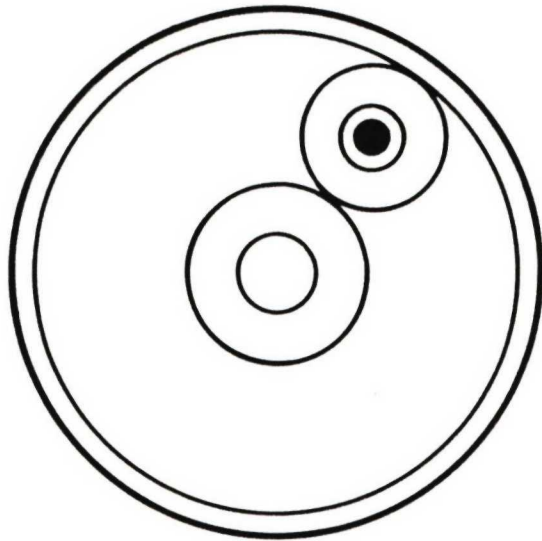
○ — S — C — R
— SPEED + TORQUE
○ DRIVE ○ DRIVEN



○ — S — C — R
+ SPEED — TORQUE
○ STATIONARY

X200-4

PLANETARY GEARING SCHEMATICS

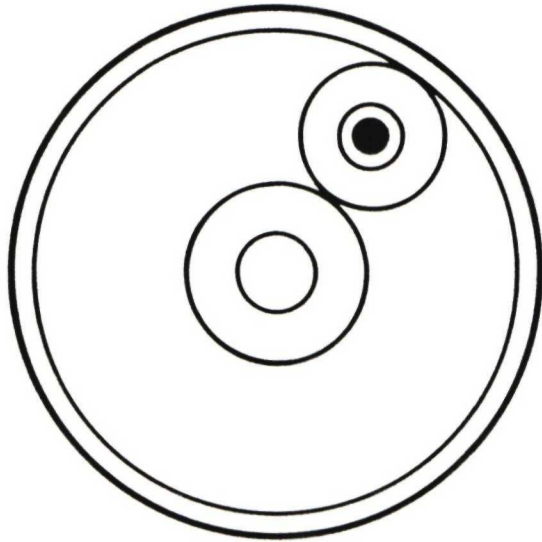


○ — S — C — R
— SPEED + TORQUE
○ DRIVE ○ DRIVEN

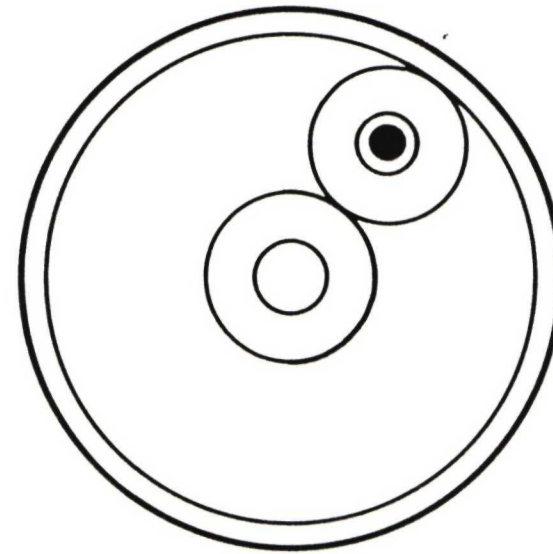
○ — S — C — R
+ SPEED — TORQUE
○ STATIONARY

X200-4

PLANETARY GEARING SCHEMATICS



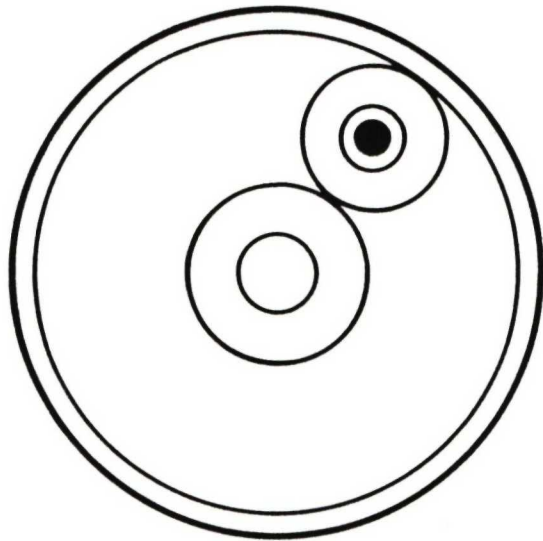
○ — S — C — R
S C R
— SPEED + TORQUE
○ DRIVE ○ DRIVEN



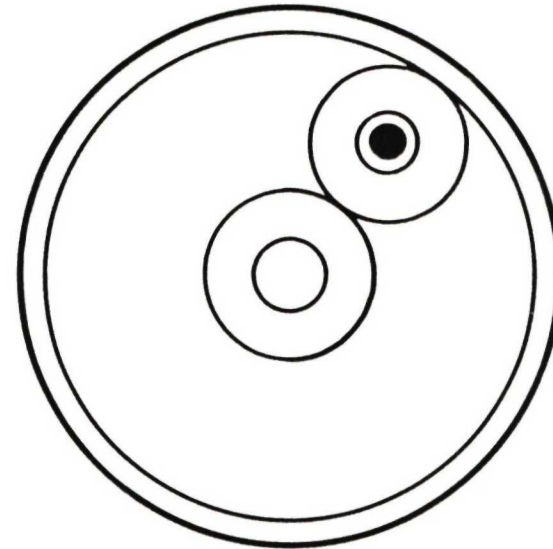
○ — S — C — R
S C R
+ SPEED — TORQUE
○ STATIONARY

X200-4

PLANETARY GEARING SCHEMATICS



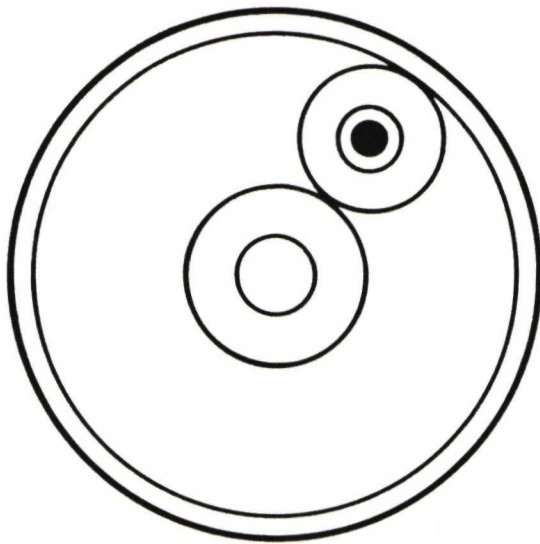
○ S ○ C ○ R
- SPEED + TORQUE
○ DRIVE ○ DRIVEN



○ S ○ C ○ R
+ SPEED - TORQUE
○ STATIONARY

X200-4

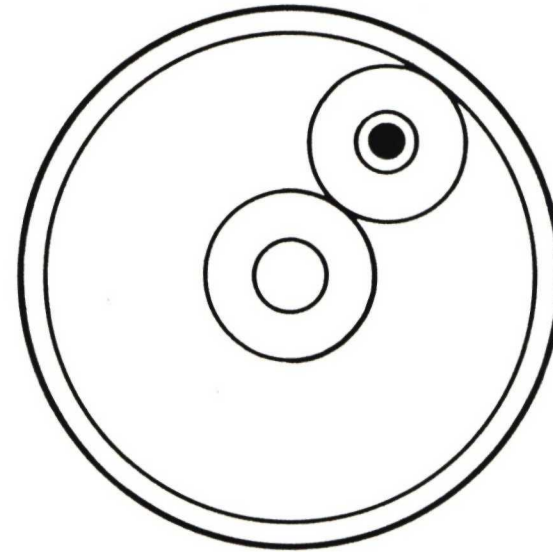
PLANETARY GEARING SCHEMATICS



○ — S — C — R

— SPEED + TORQUE

○ DRIVE ○ DRIVEN



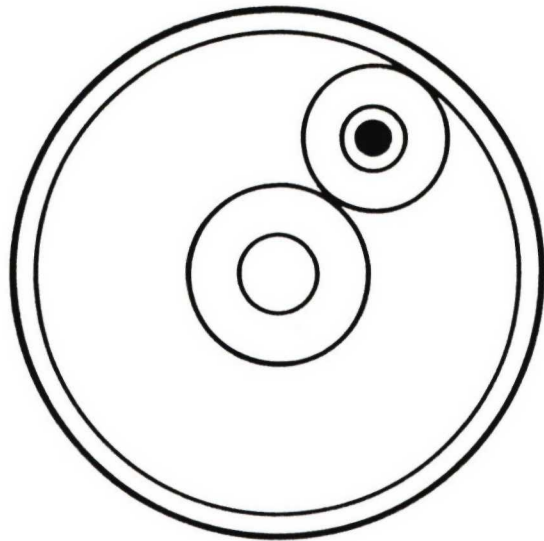
○ — S — C — R

+ SPEED — TORQUE

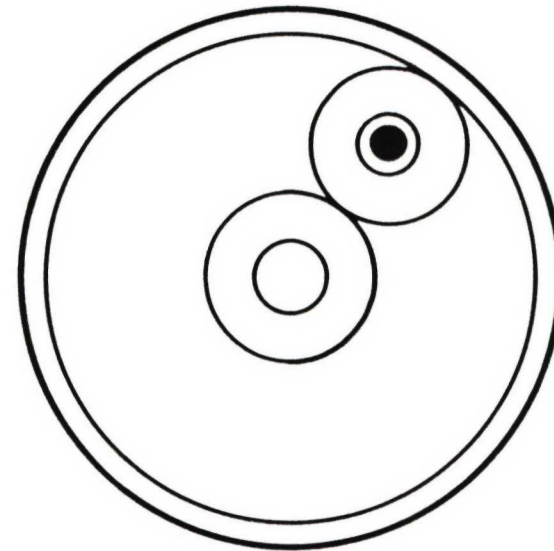
○ STATIONARY

X200-4

PLANETARY GEARING SCHEMATICS



○ ——— ○ ——— ○
S C R
— SPEED + TORQUE
○ DRIVE ○ DRIVEN



○ ——— ○ ——— ○
S C R
+ SPEED — TORQUE
○ STATIONARY

X200-4 TRANSMISSION CLUTCH APPLICATION

SPEED RANGE	CLUTCH APPLIED					CONV.	LOCK UP	RATIO* MECHANICAL
	FWD	4TH	3RD	2ND	1ST			
	C-1	C-2	C-3	C-4	C-5			
REVERSE-1		X			X	X		
NEUTRAL								
PIVOT								

N Hold
Pivot
N-Hold

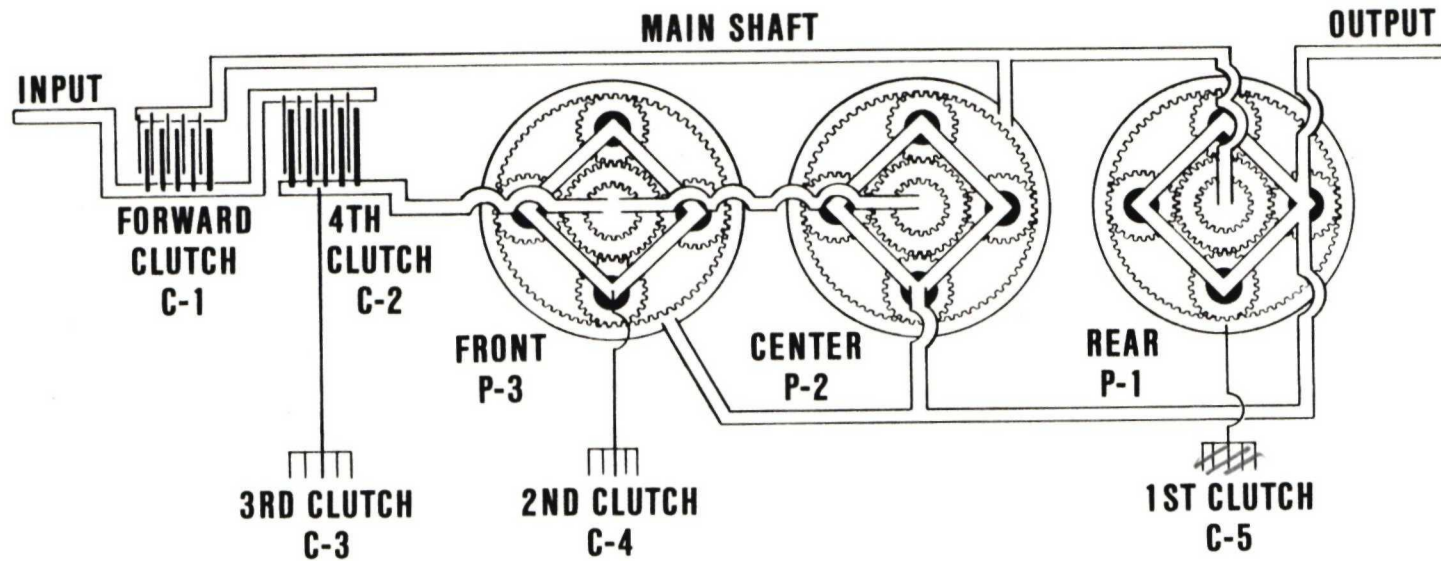
A
U
T
O
M
A
T
I
C

FIRST	X				X	X		
SECOND	X			X		X	X	
THIRD	X		X			X	X	
FOURTH	X	X				X	X	

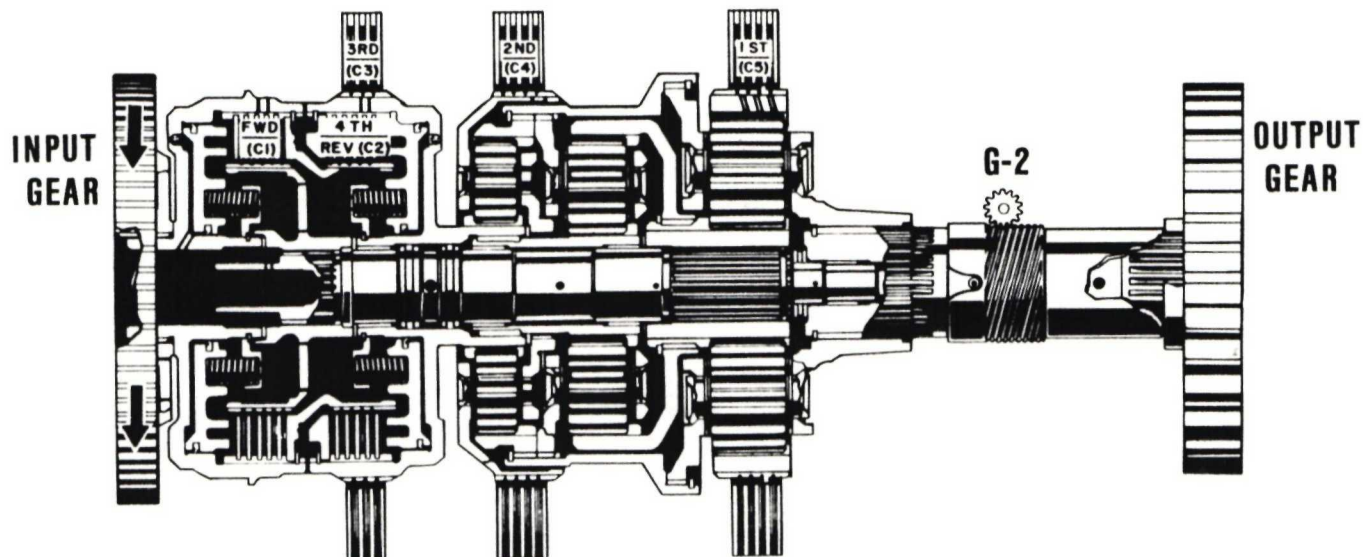
*DOES NOT INCLUDE TORQUE CONVERTER MULTIPLICATION RATIO 3.32:1



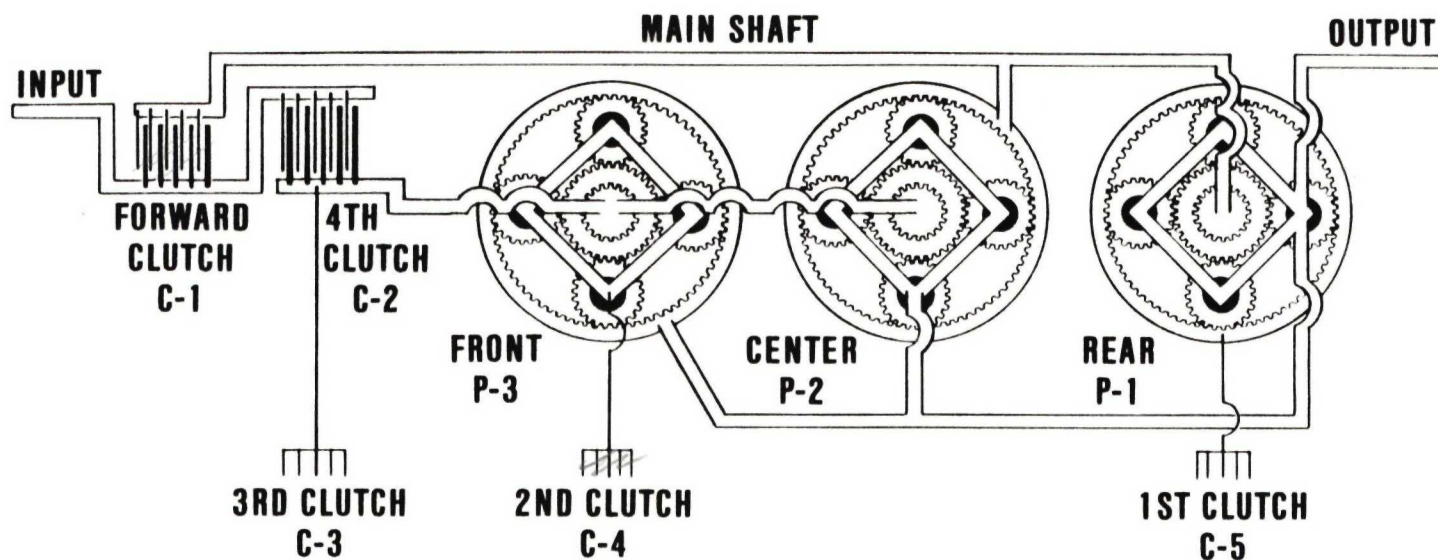
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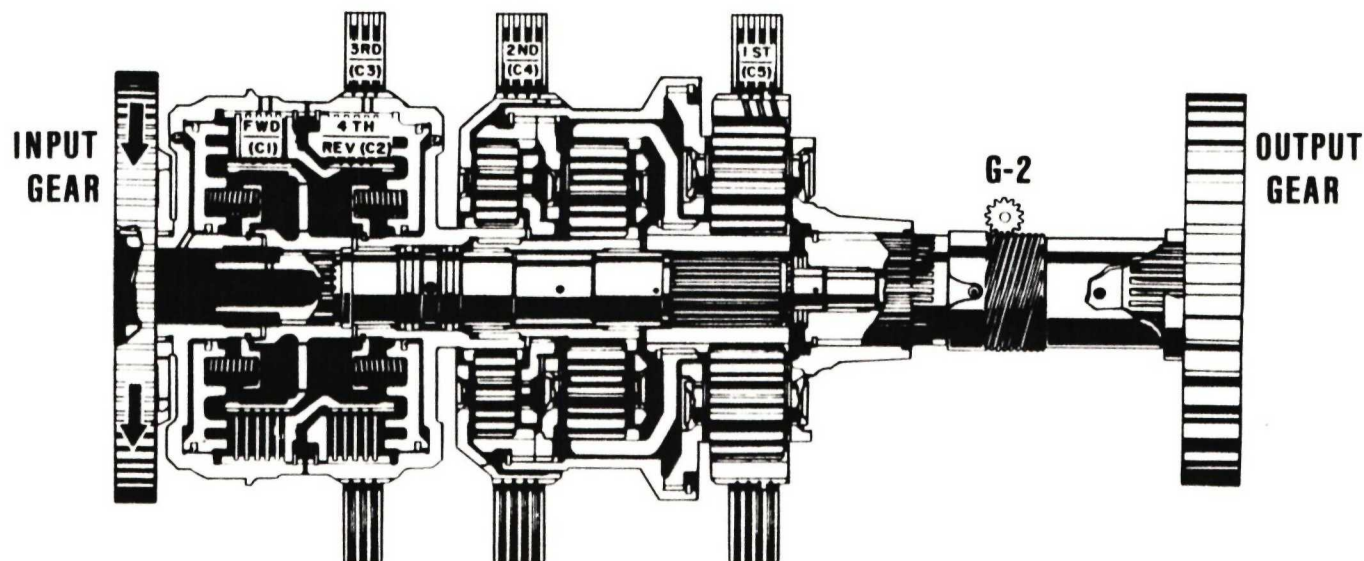
4 SPEED AUTOMATIC WITH ONE REVERSE



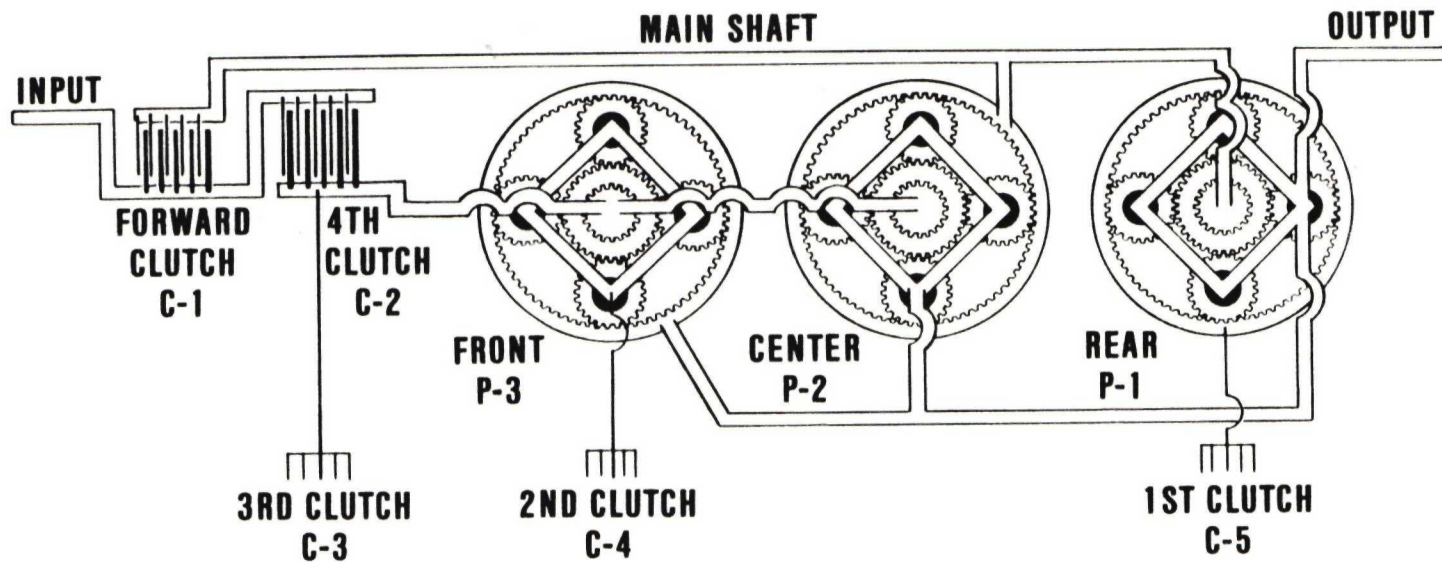
X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS



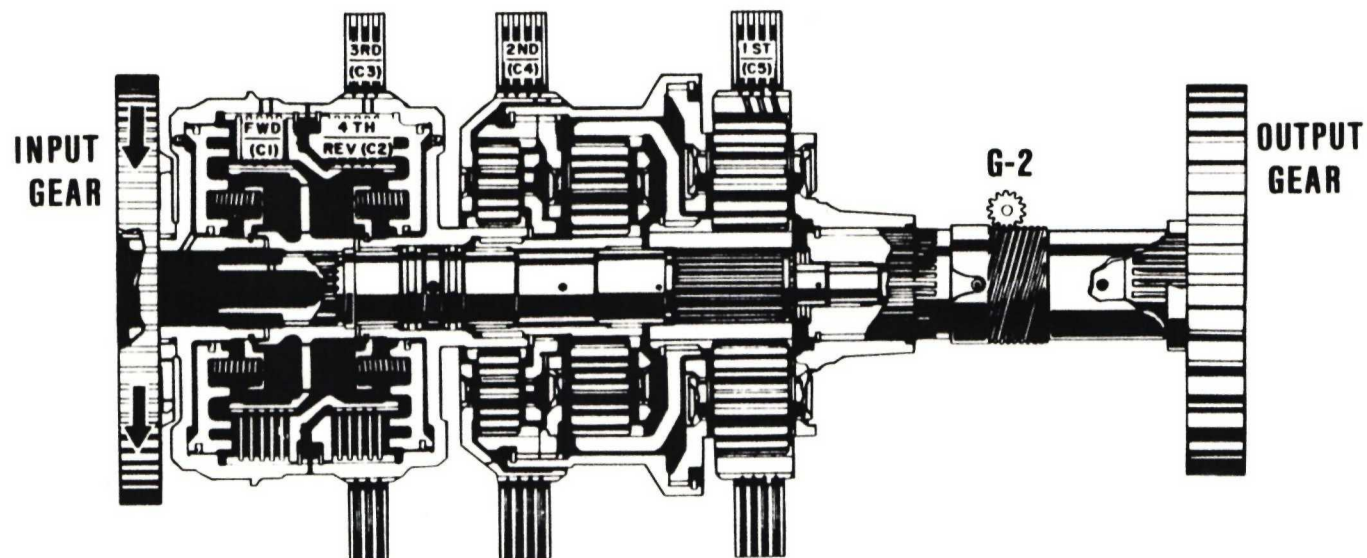
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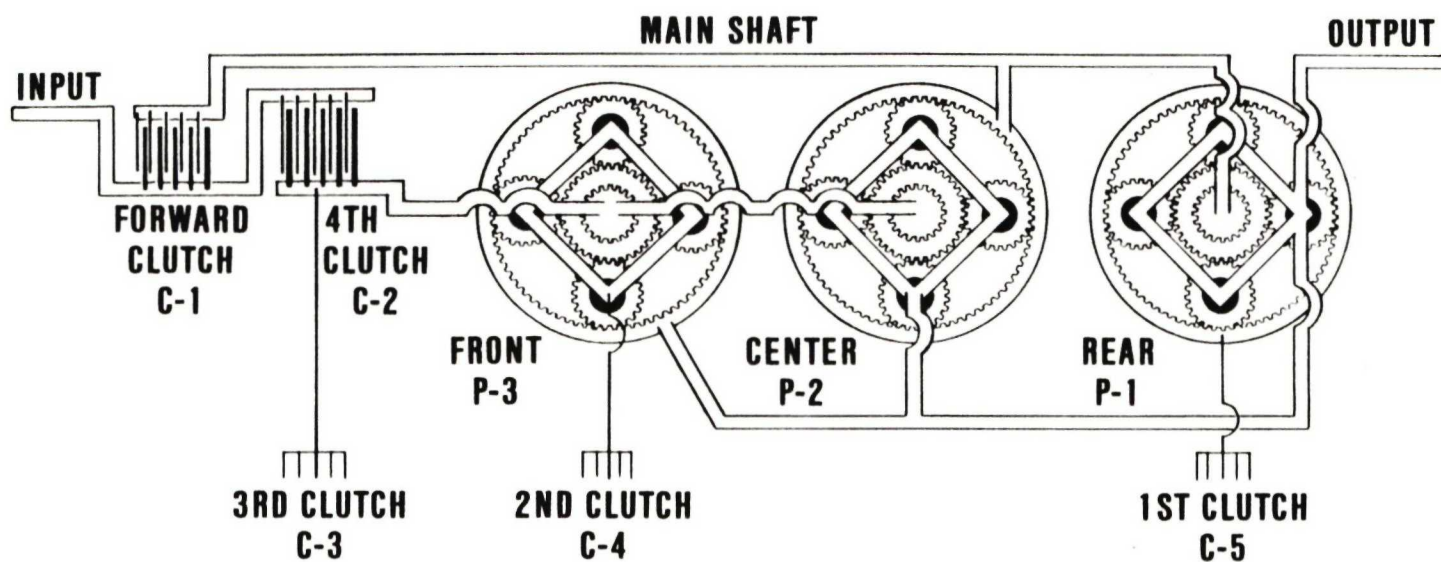
**X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS**



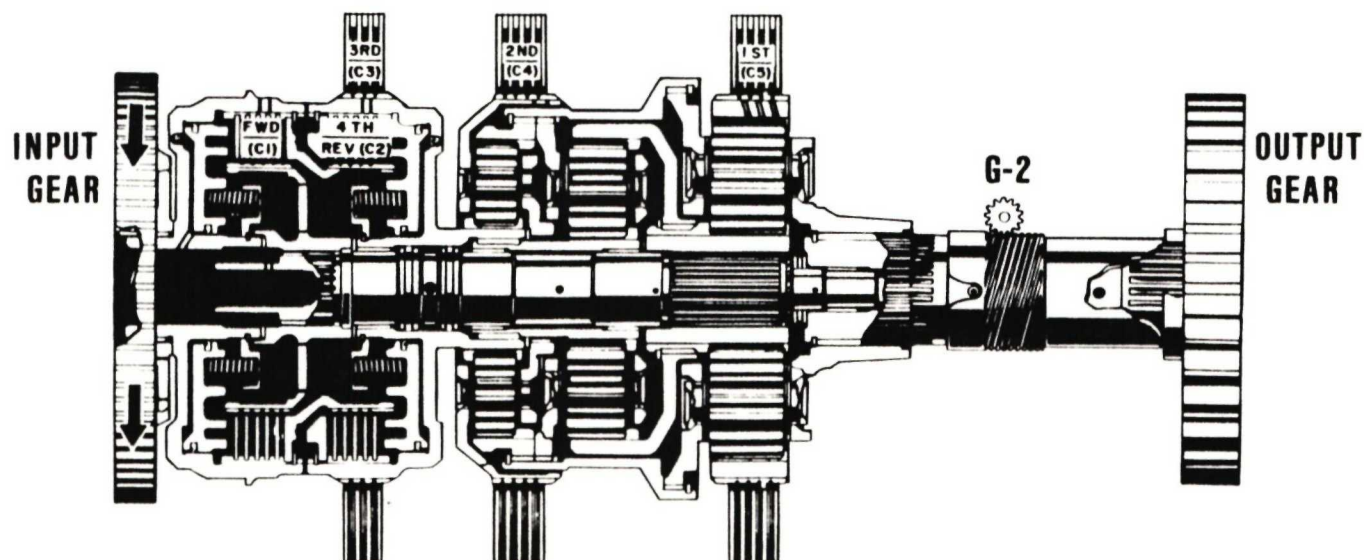
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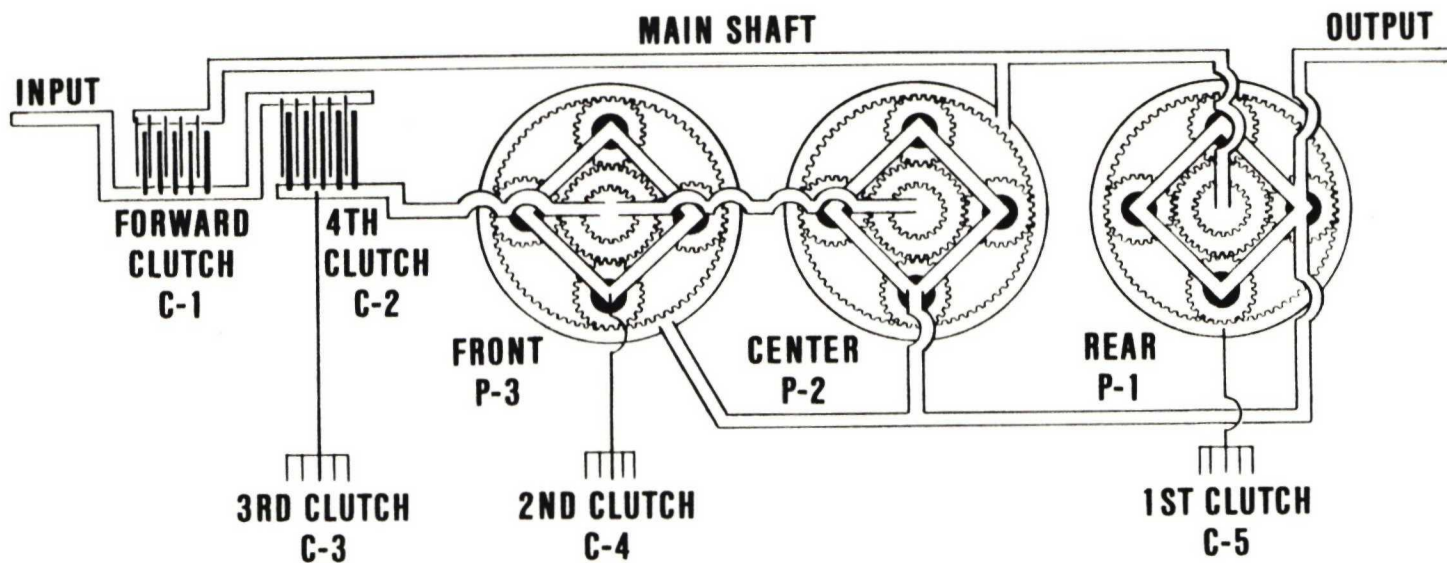
X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS



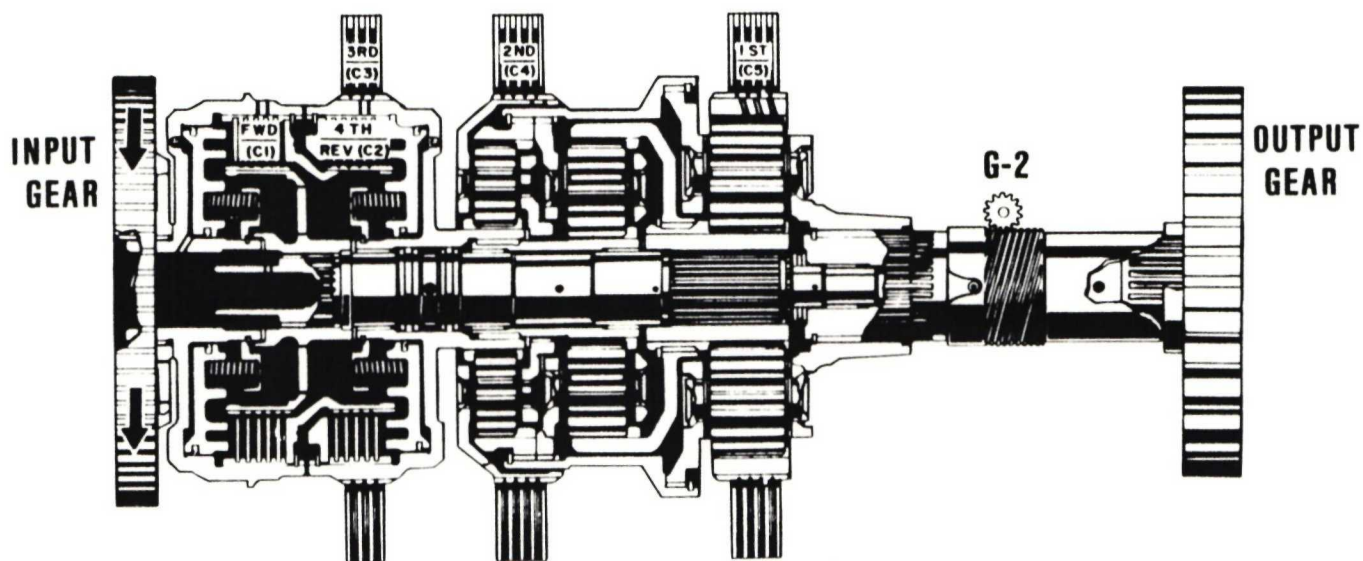
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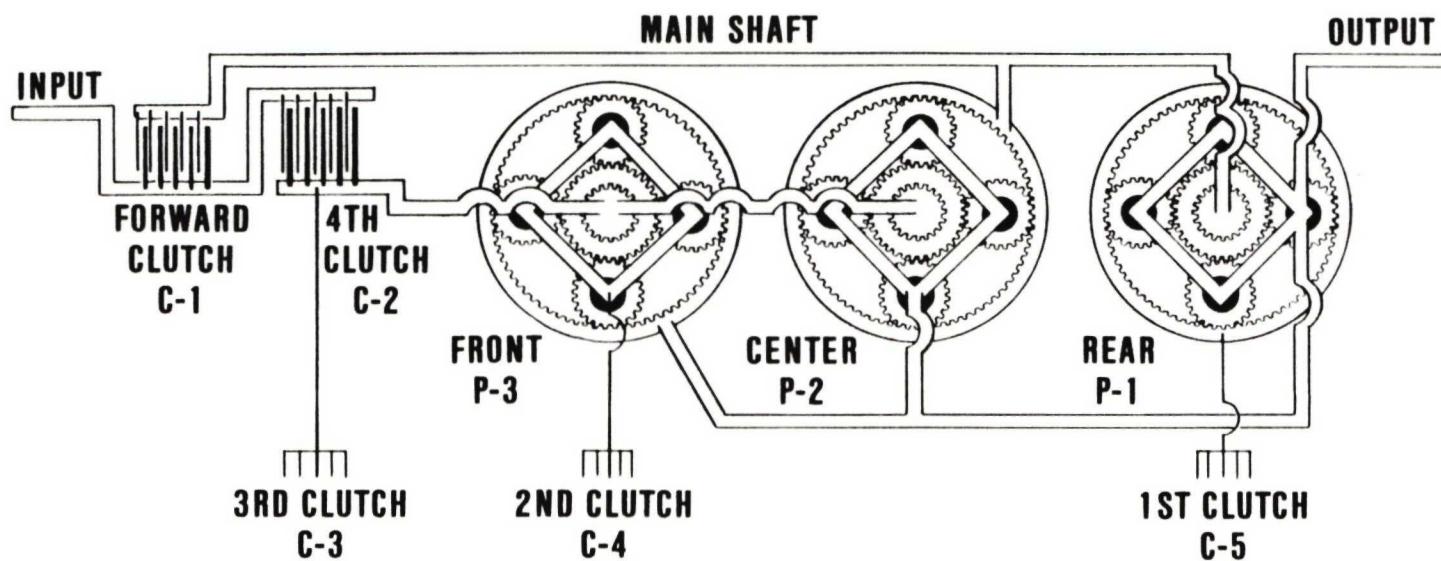
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SCHEMATIC AND CROSS SECTION
POWER FLOWS



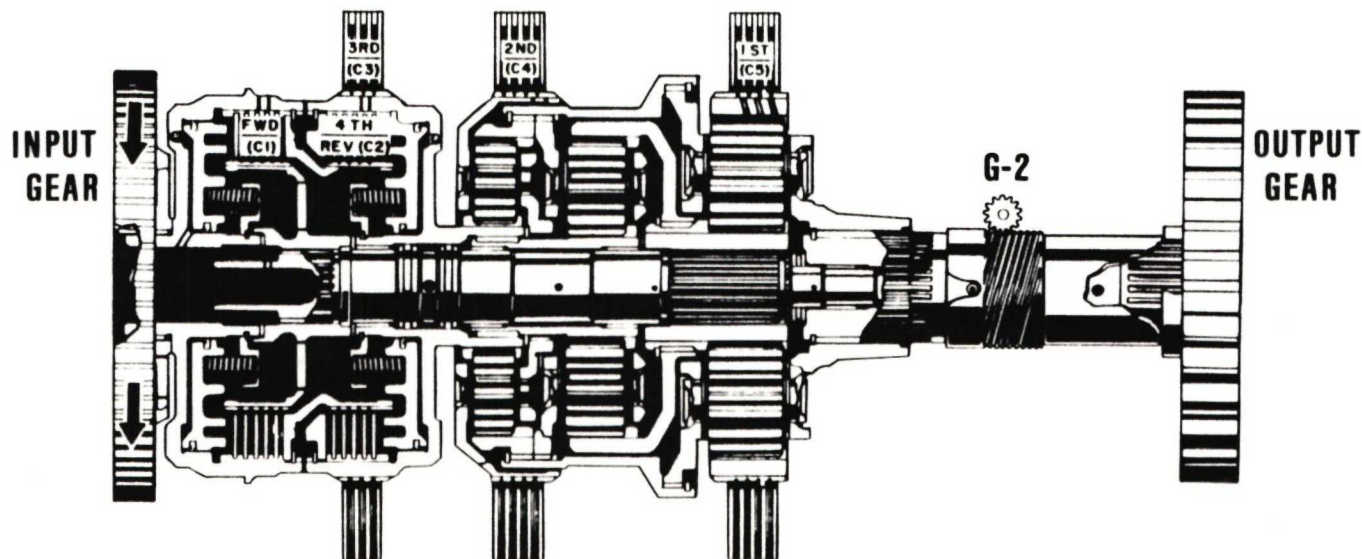
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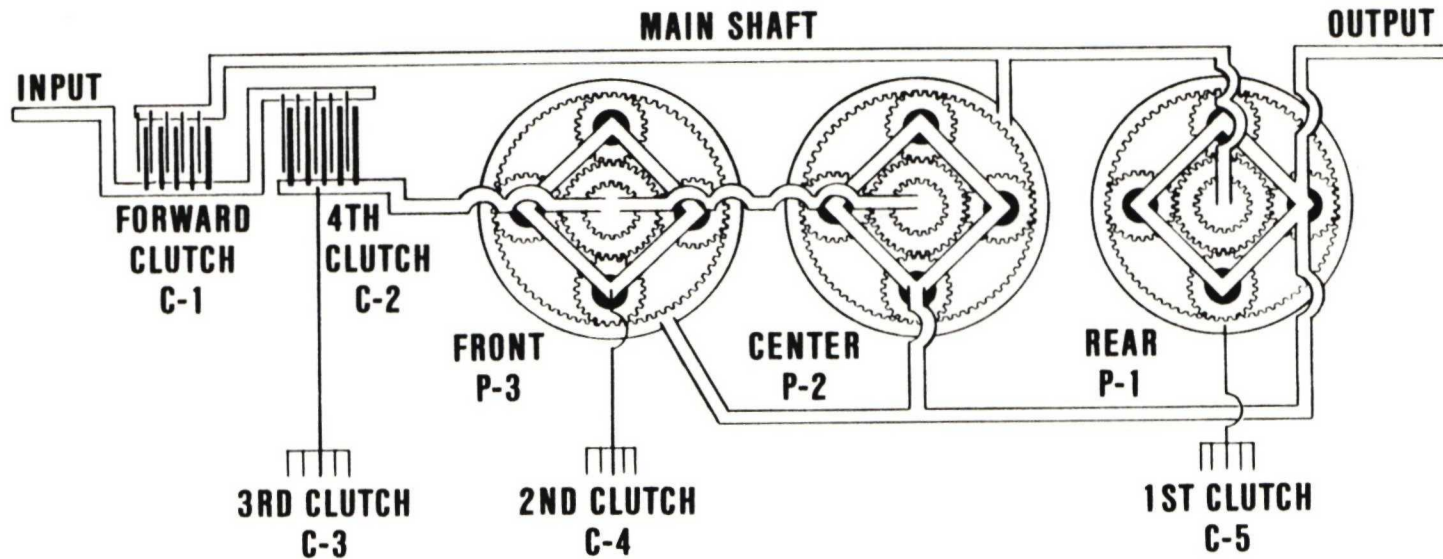
**X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS**



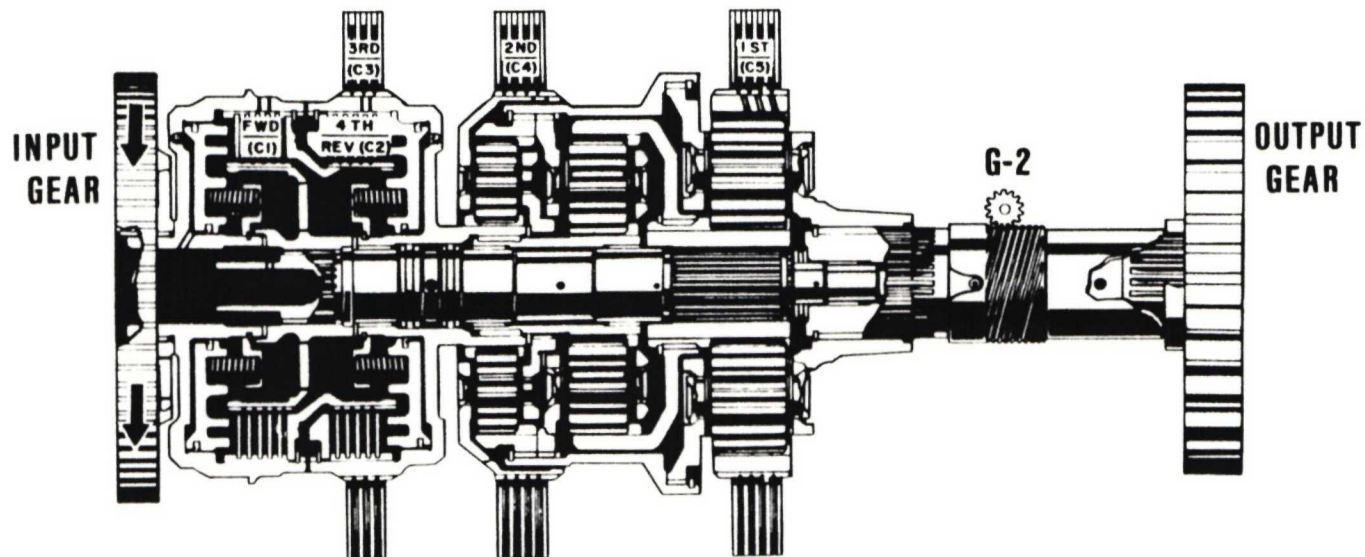
4 SPEED AUTOMATIC WITH ONE REVERSE



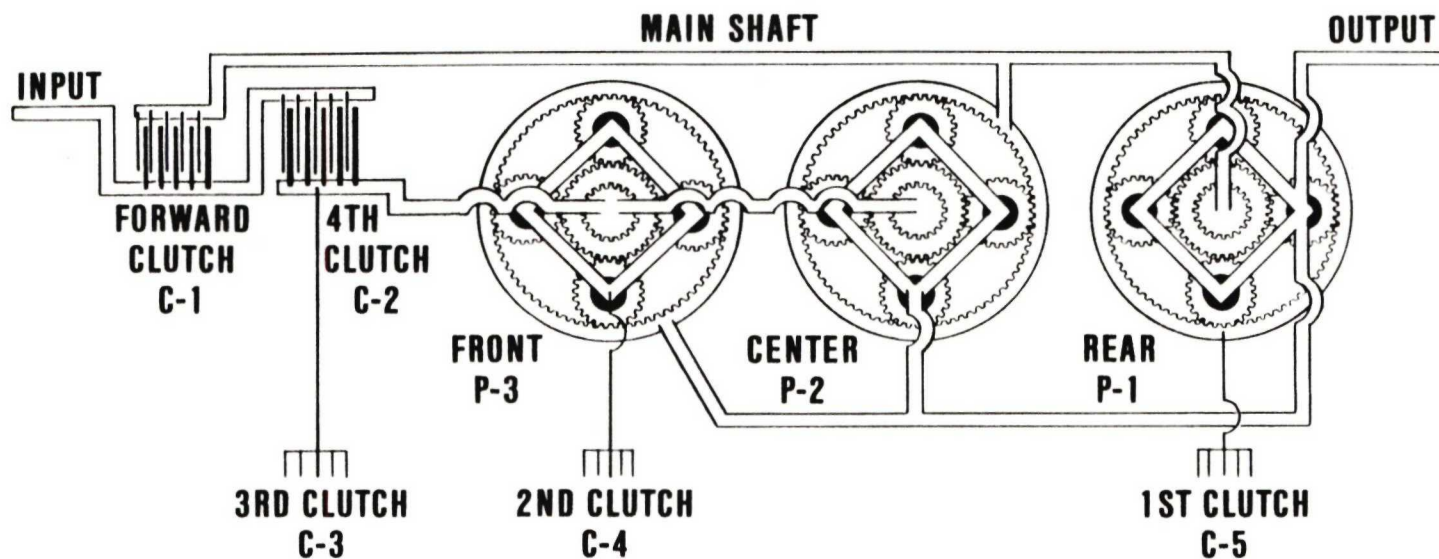
X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS



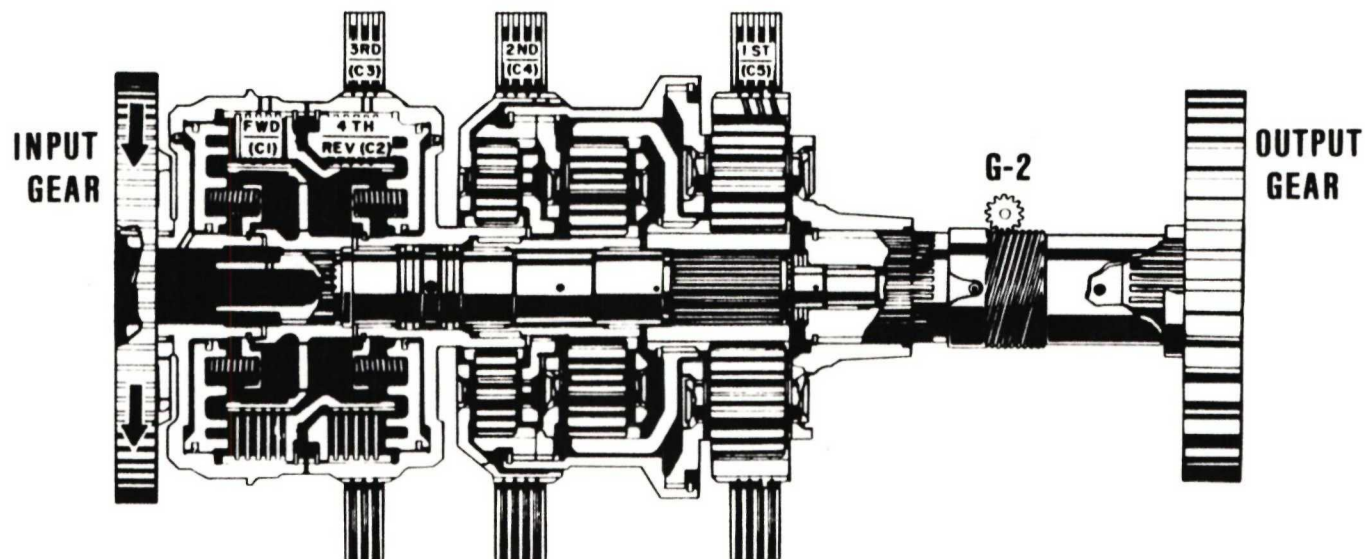
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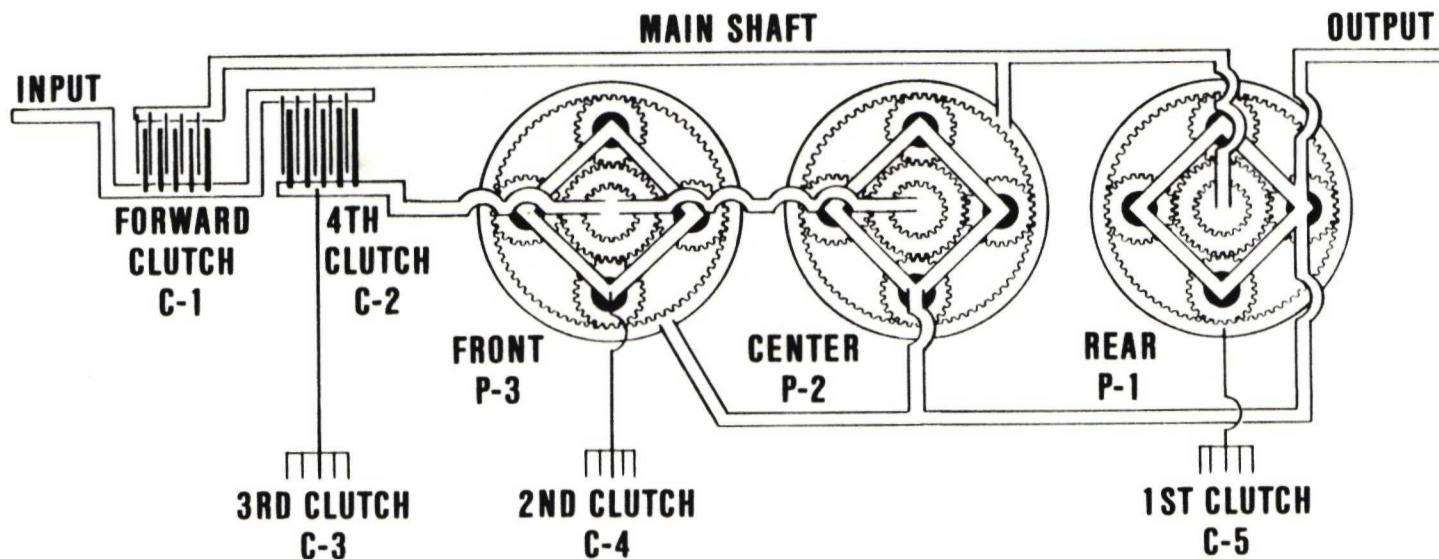
X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS



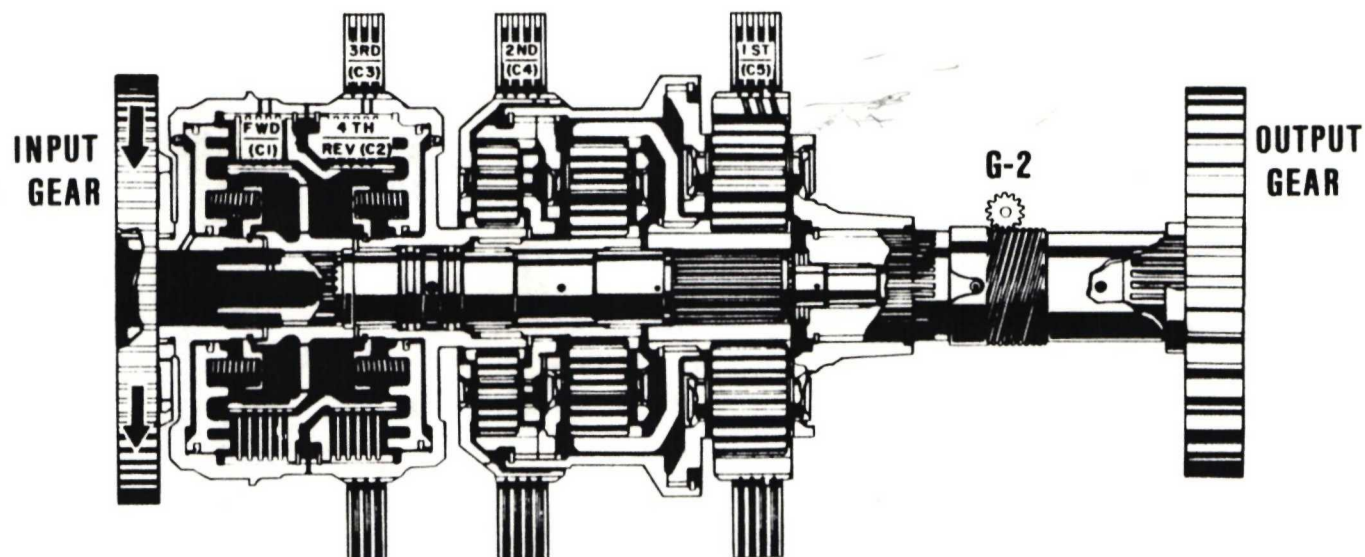
4 SPEED AUTOMATIC WITH ONE REVERSE



X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS



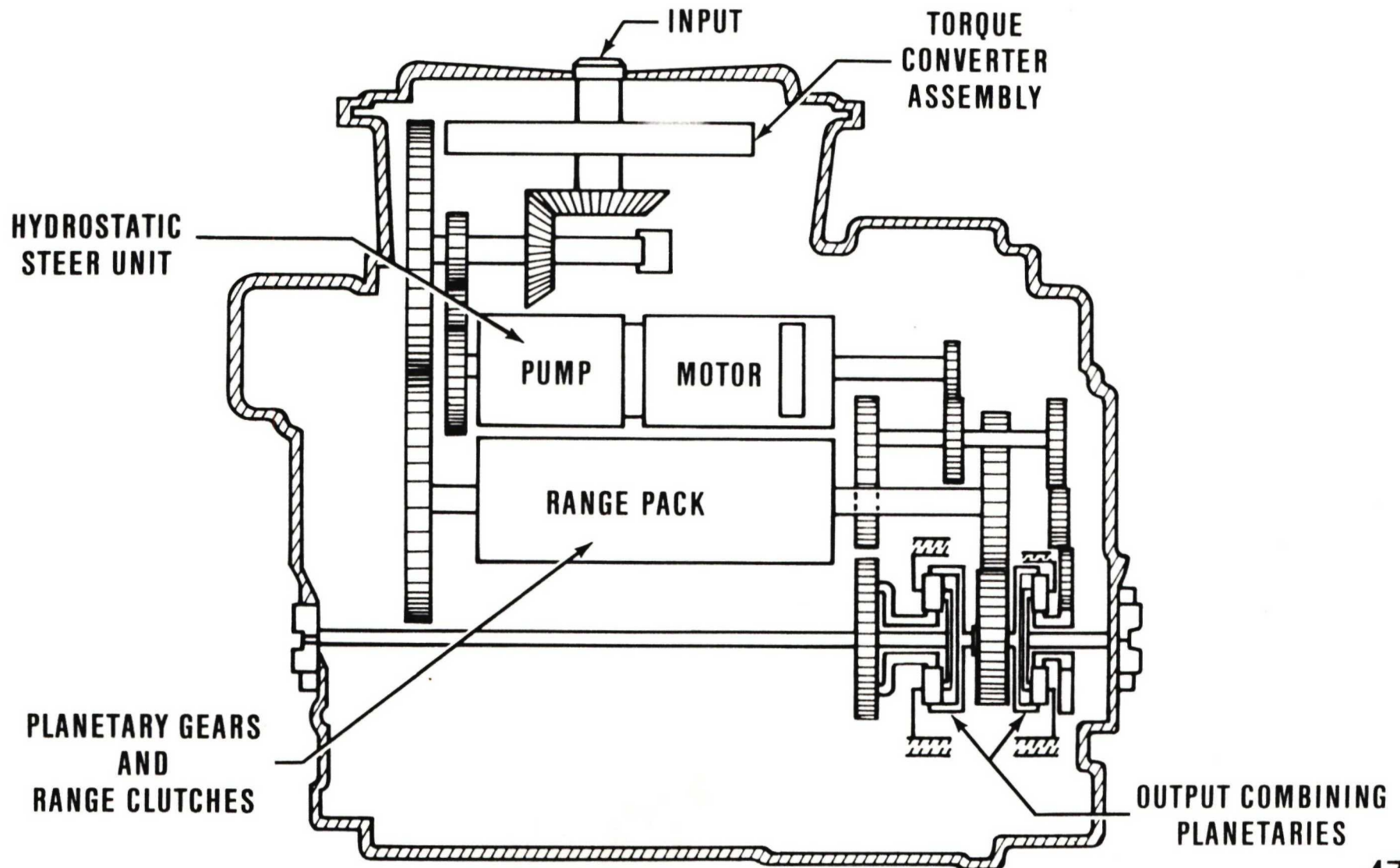
4 SPEED AUTOMATIC WITH ONE REVERSE



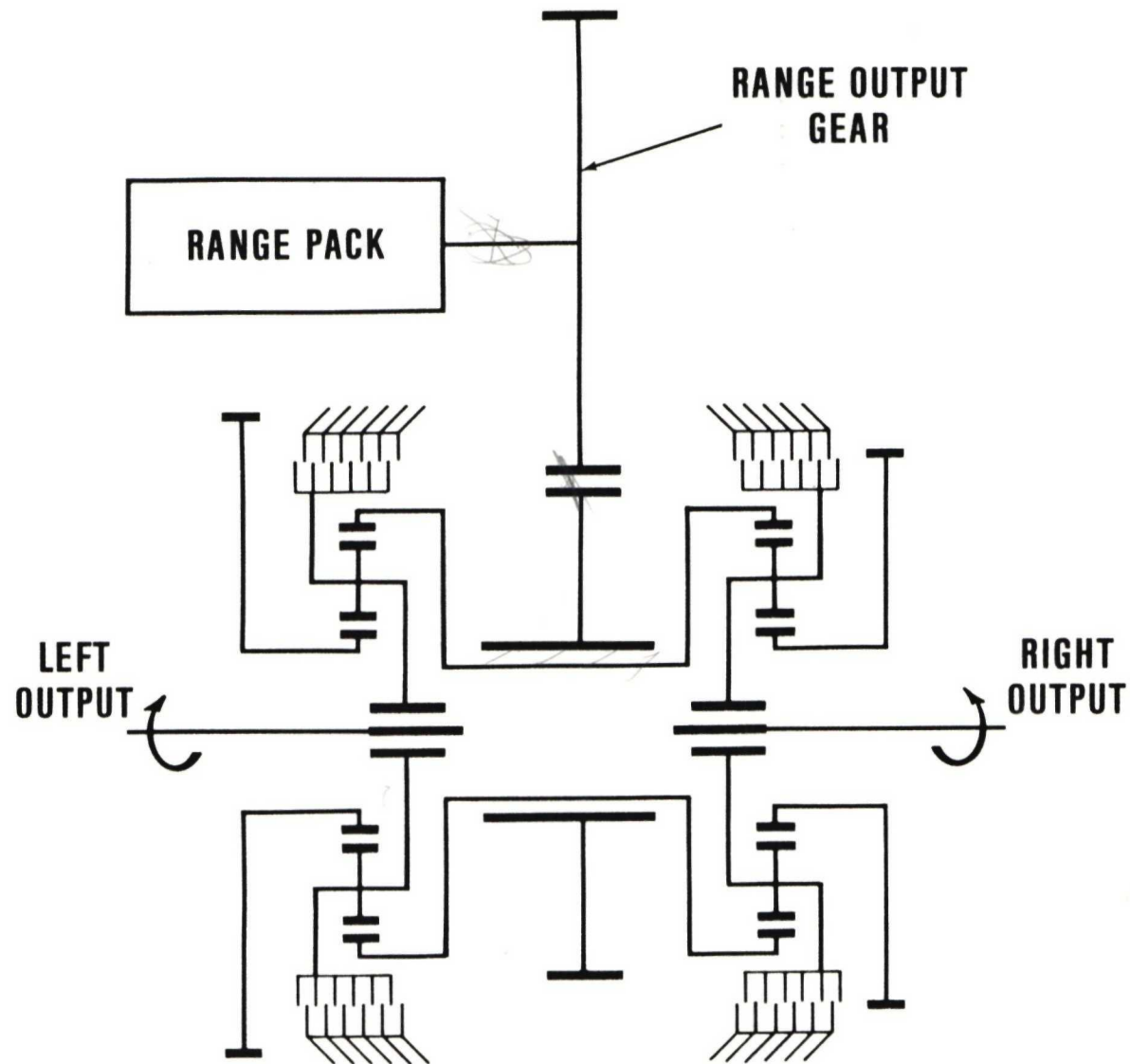
X200-4
PLANETARY RANGE PACK
SCHEMATIC AND CROSS SECTION
POWER FLOWS

X200-4

POWER FLOW DIAGRAM

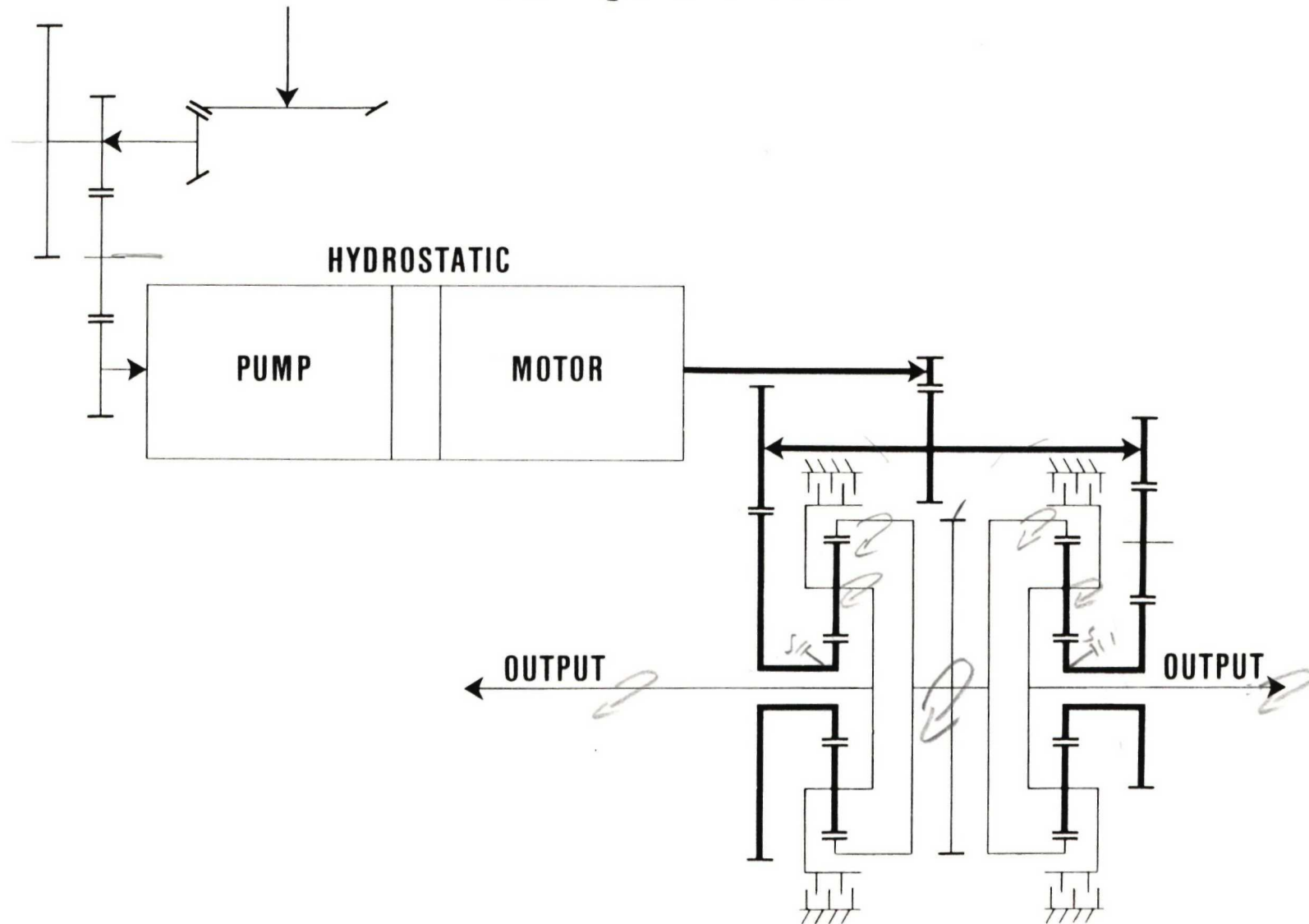


RANGE OUTPUT TORQUE PATH



X200-4

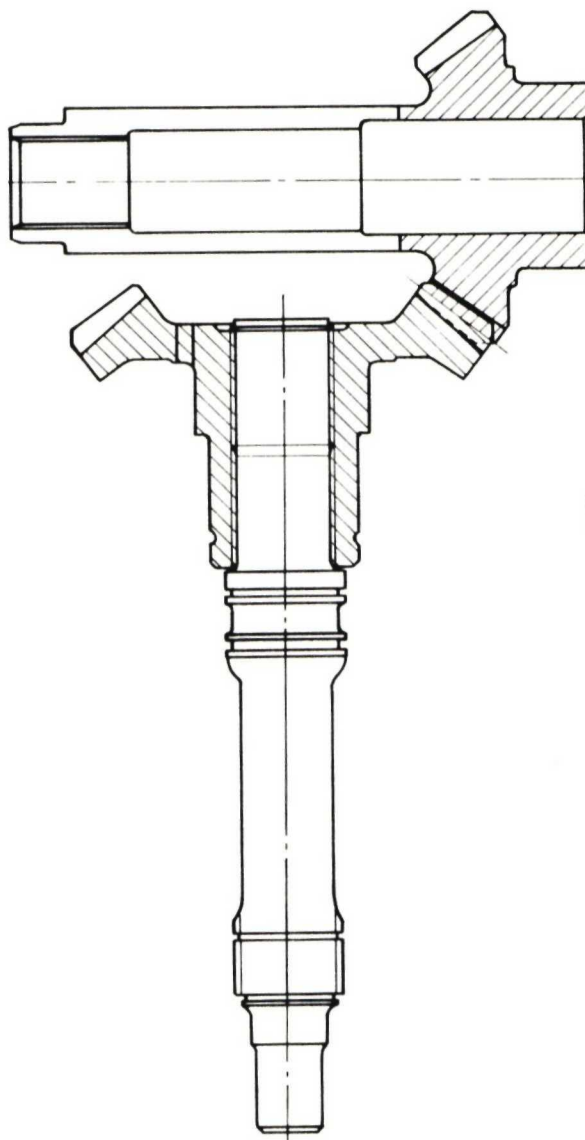
PIVOT STEER TORQUE PATH



X200-4

BEVEL GEAR ASSEMBLY "N" MATCHED GEAR SET

DRIVEN GEAR "J"



DRIVE GEAR "V"



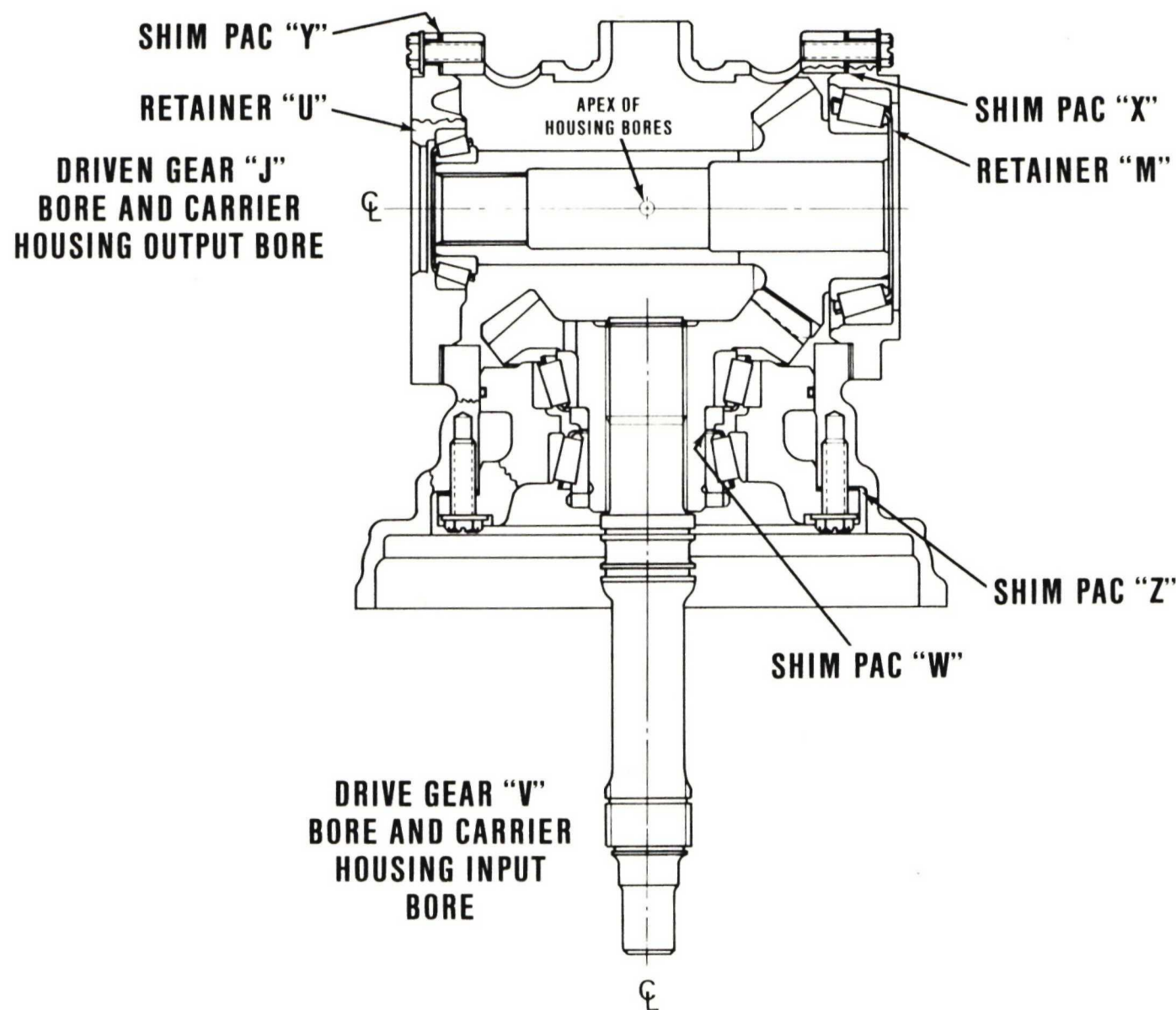
Allison Transmissions

— NOTES —

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X200-4

RELATIVE POSITION OF MATCHED BEVEL GEARS IN BEVEL GEAR CARRIER HOUSING

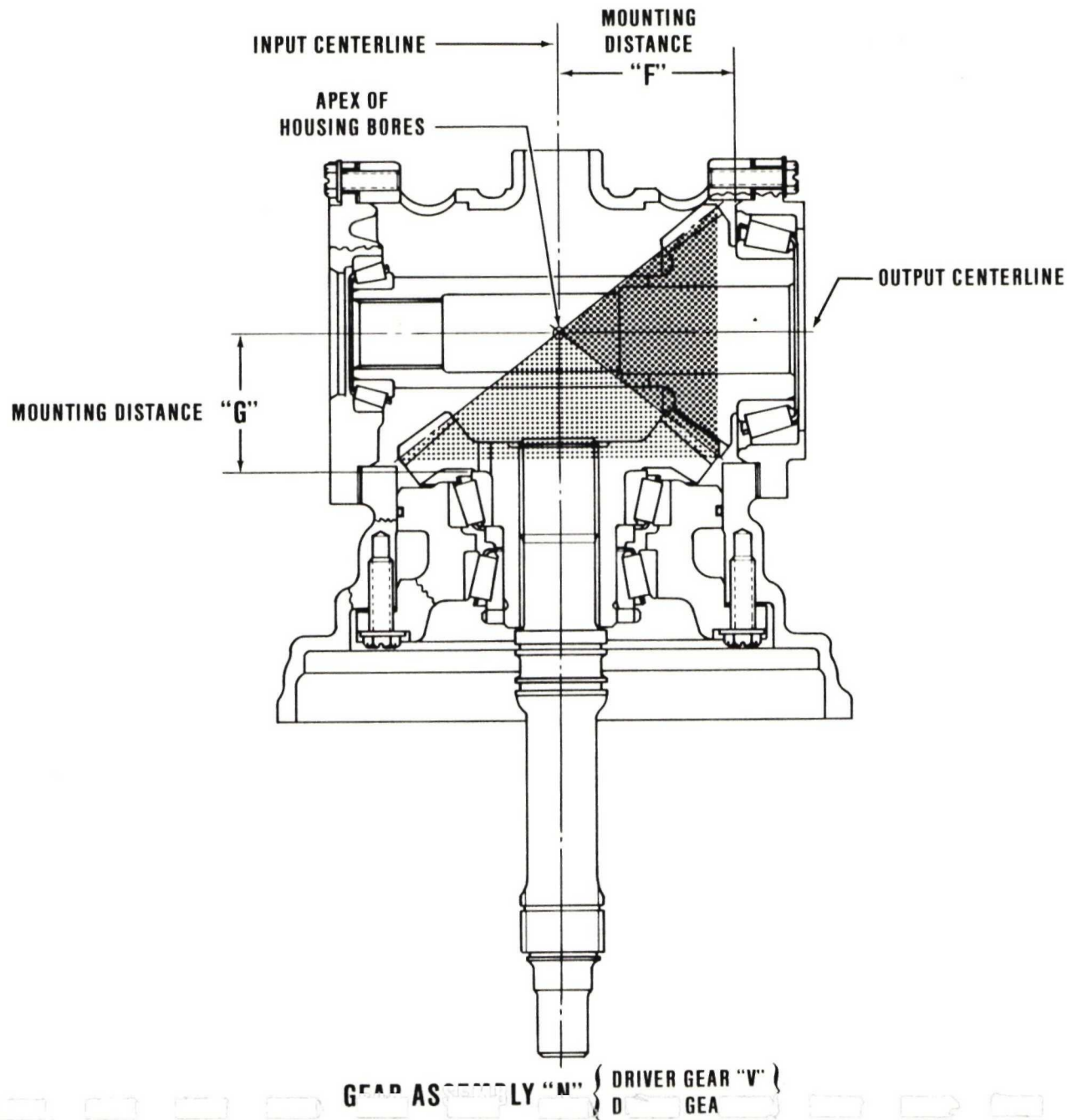




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— NOTES —

TERMINOLOGY AND LOGIC OF SHIMMING PROCEDURE PROJECTED GEAR CONE APEXES

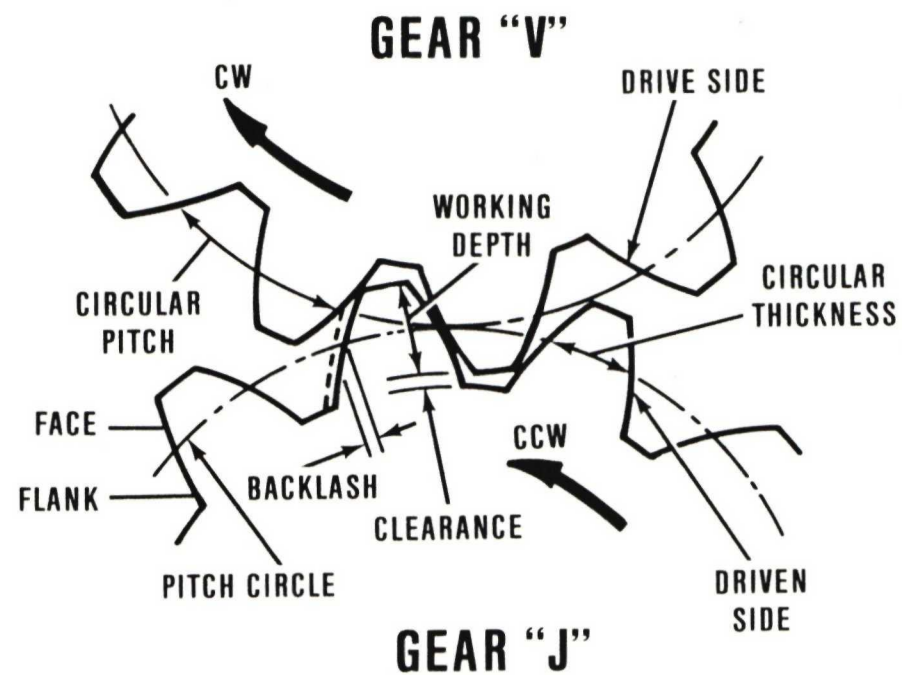
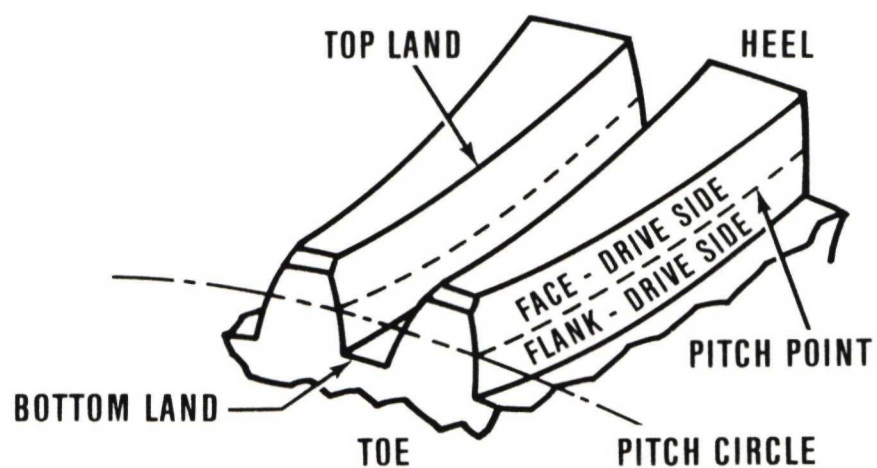


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— NOTES —

X200-4

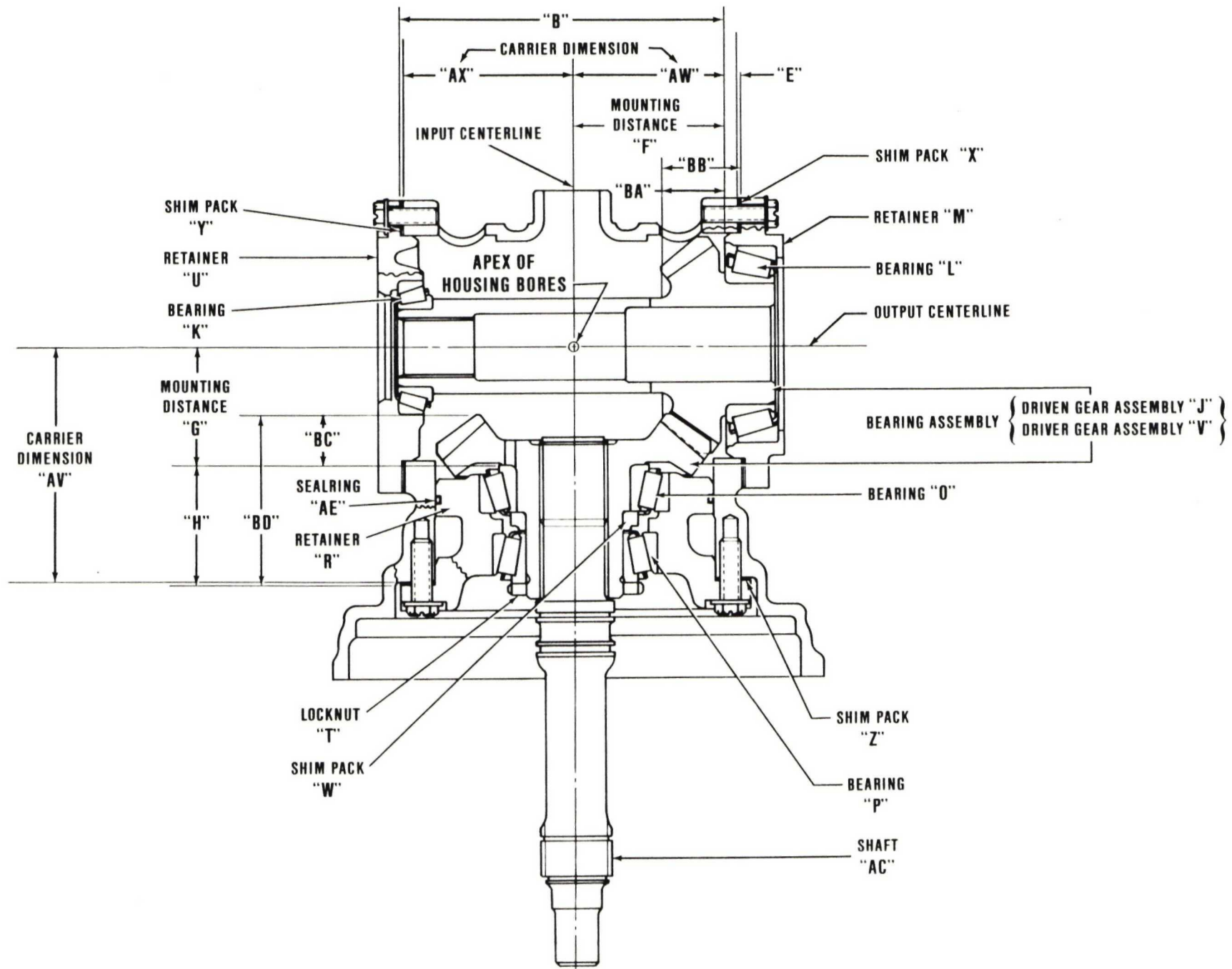
TERMINOLOGY OF GEAR TEETH





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BEVEL GEAR HOUSING ASSEMBLY





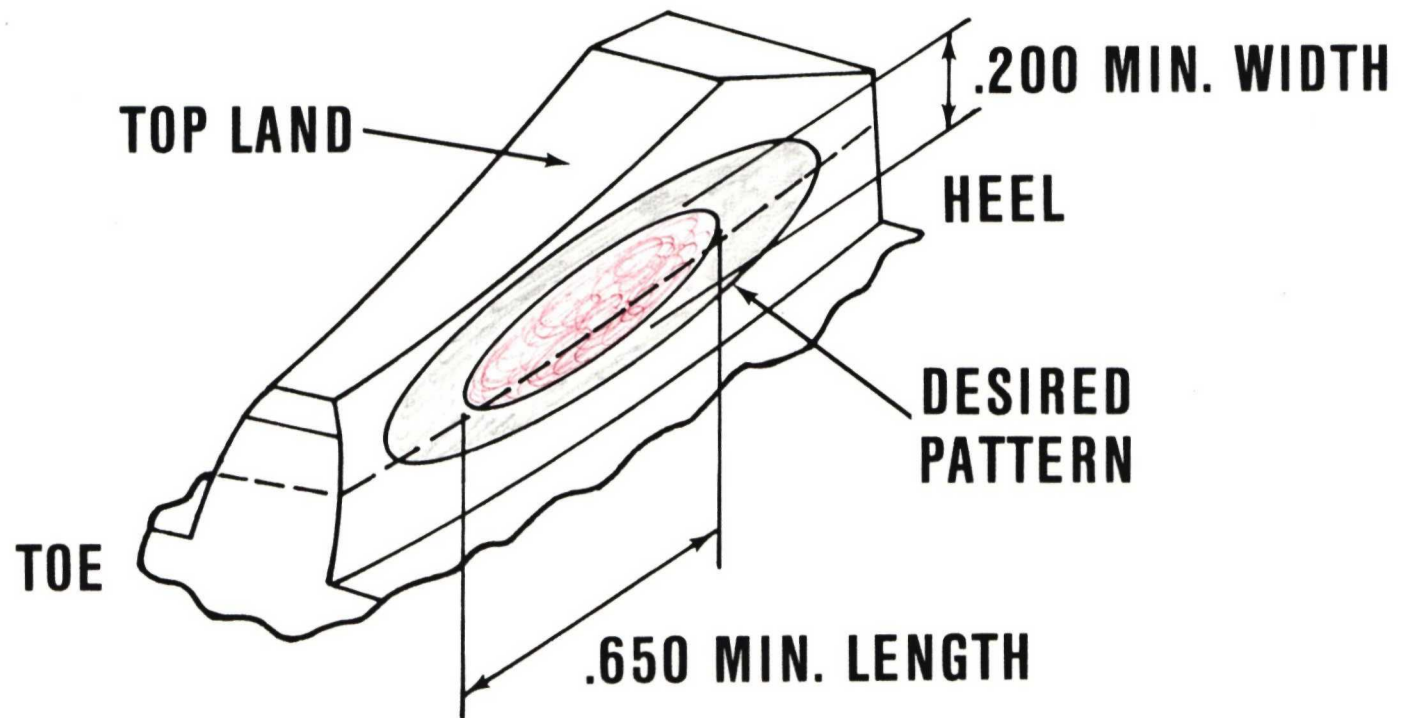
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X200-4

DESIRED TOOTH CONTACT PATTERN





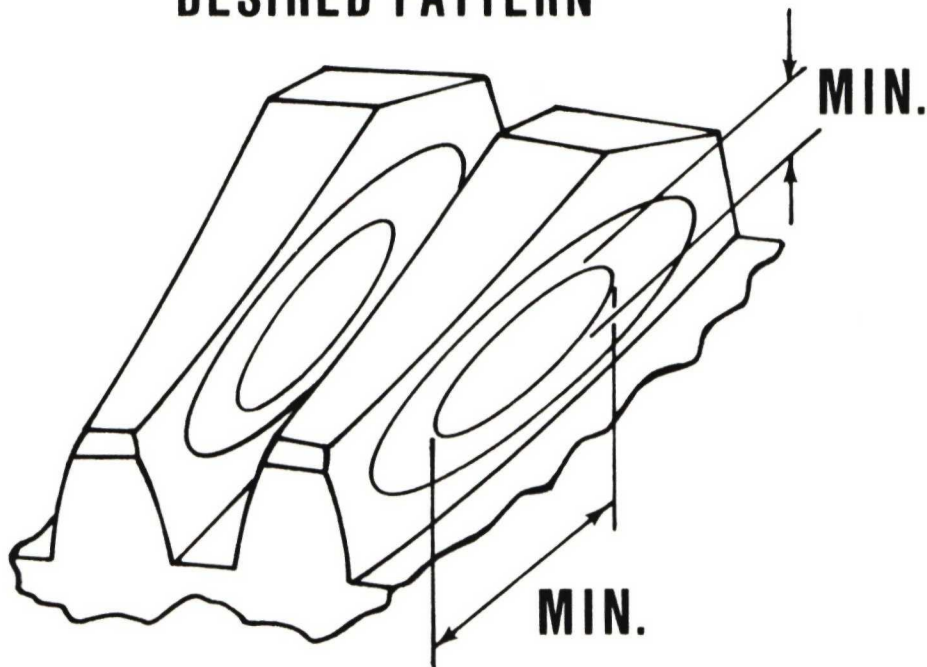
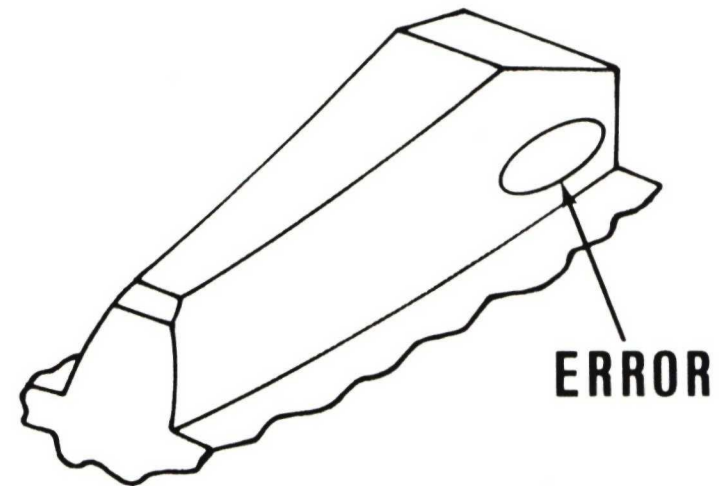
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— NOTES —

[illegible]

X200-4

CORRECTION OF PATTERN ERROR

DESIRED PATTERN**FLANK-HEEL PATTERN****TO: CORRECT FLANK-HEEL PATTERN**

1. MOVE DRIVEN GEAR "J" AWAY FROM HOUSING BORE APEX
 - INCREASE SHIM PACK "X"
 - DECREASE SHIM PACK "Y"
2. MOVE DRIVER GEAR "V" TOWARD HOUSING BORE APEX FOR CORRECT BACK LASH
 - DECREASE SHIM PACK "Z"

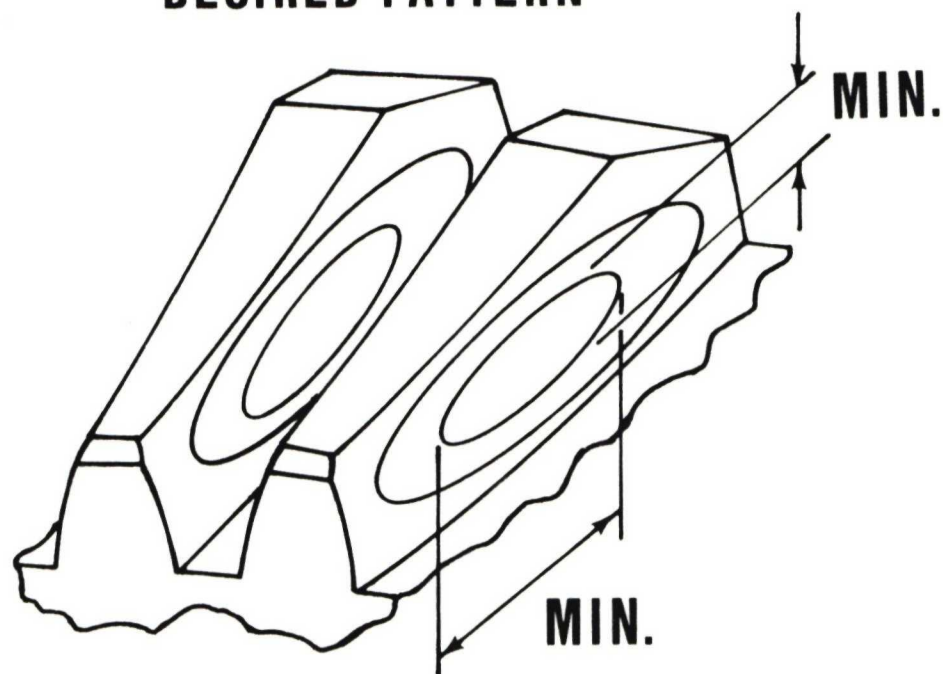
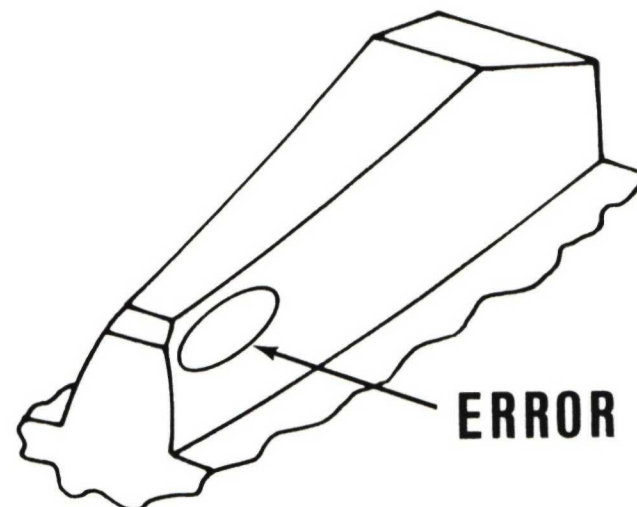
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X200-4

CORRECTION OF PATTERN ERROR

DESIRED PATTERN**TIP-TOE PATTERN****TO: CORRECT TIP-TOE PATTERN**

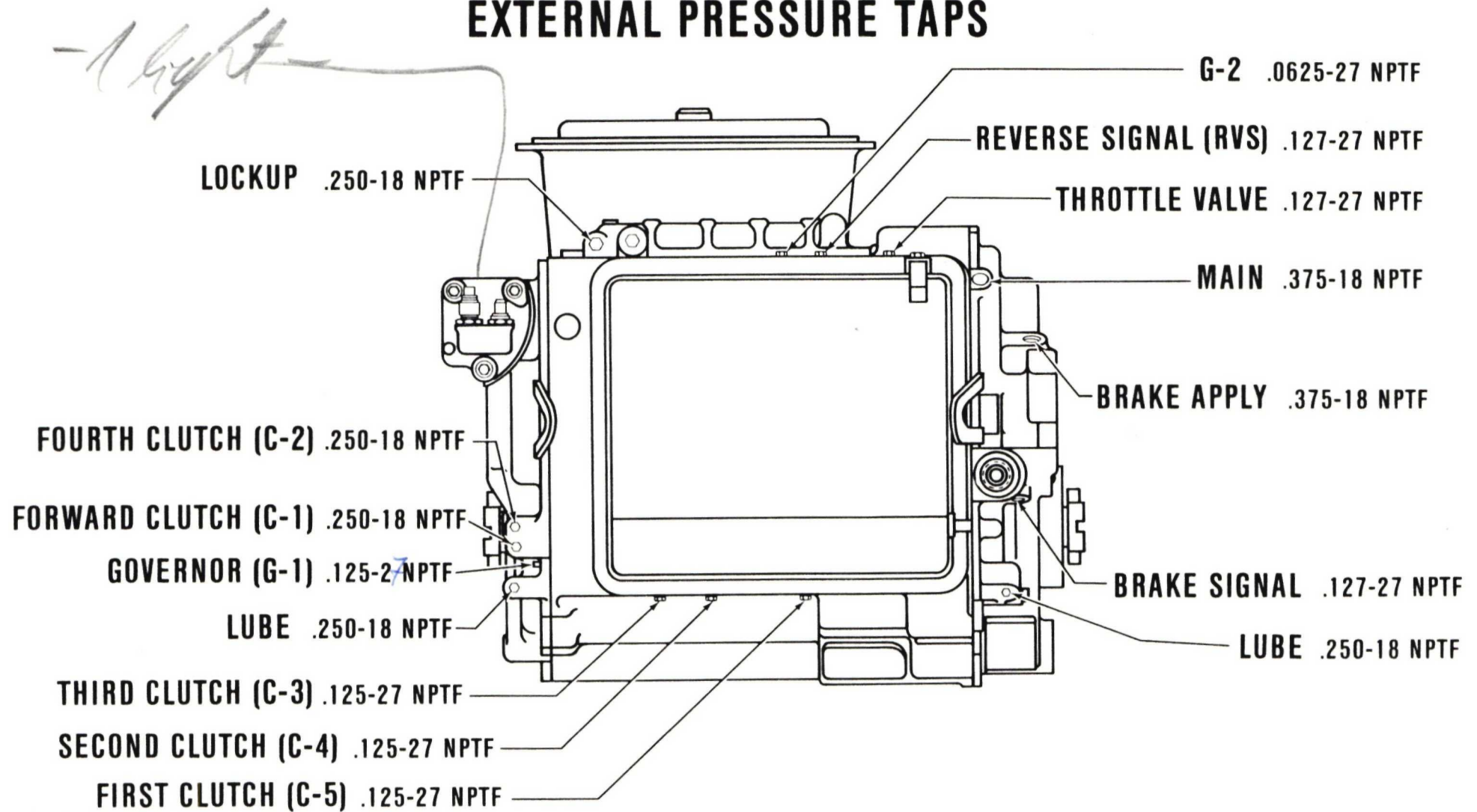
1. MOVE DRIVE GEAR "V" AWAY FROM HOUSING BORE APEX
 - INCREASE SHIM PACKS "Z"
2. MOVE DRIVEN GEAR "J" TOWARD HOUSING BORE APEX FOR CORRECT BACK LASH
 - DECREASE SHIM PACK "X"
 - INCREASE SHIM PACK "Y"



— NOTES —

X200-4

EXTERNAL PRESSURE TAPS





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— NOTES —

TV - Diff springs - Notated
Frontal lower adj

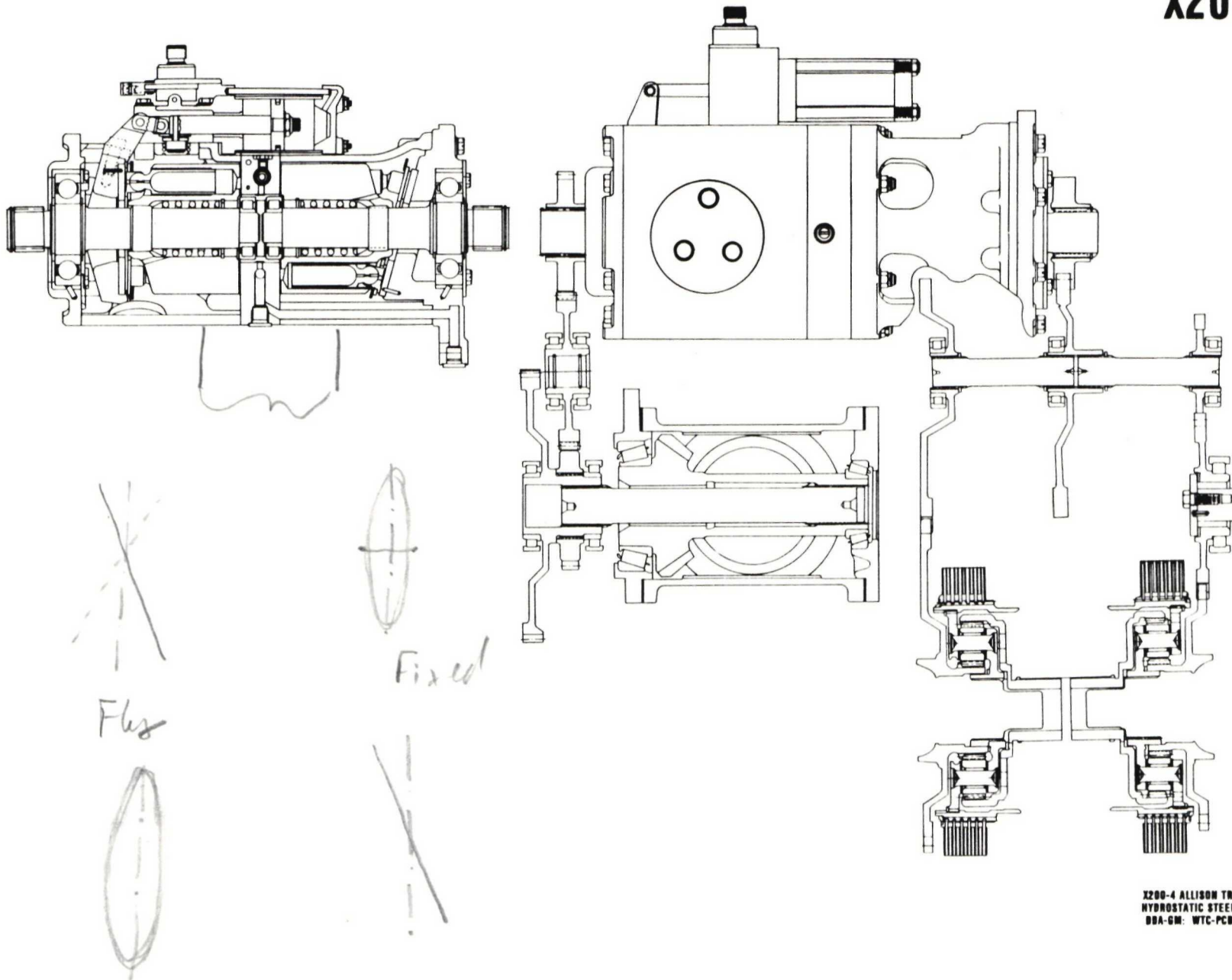
<input type="checkbox"/>	MAIN	<input type="checkbox"/>	SHIFT SIGNAL
<input type="checkbox"/>	SOLENOID FEED	<input type="checkbox"/>	CLUTCH FEED
<input type="checkbox"/>	EXHAUST	<input type="checkbox"/>	REVERSE
<input type="checkbox"/>	CONVERTER IN	<input type="checkbox"/>	FORWARD CLUTCH
<input type="checkbox"/>	CONVERTER OUT	<input type="checkbox"/>	FIRST CLUTCH
<input type="checkbox"/>	OUTPUT PUMP	<input type="checkbox"/>	SECOND CLUTCH
<input type="checkbox"/>	BYPASS	<input type="checkbox"/>	THIRD CLUTCH
<input type="checkbox"/>	TV MODULATOR	<input type="checkbox"/>	FOURTH CLUTCH
<input type="checkbox"/>	MARSHAL SHIFT	<input type="checkbox"/>	BRAKE COOLANT
<input type="checkbox"/>	S-1 PITOT	<input type="checkbox"/>	LUDE
<input type="checkbox"/>	LOCKUP	<input type="checkbox"/>	BRAKE SIGNAL
<input type="checkbox"/>	GOVERNOR (82)		



— NOTES —

① → Force multiplies 13 ± 5 %
 ② - 1st 100 + 200 1st
 - 2nd 60 PSI 1st
 ③ - 1st 100 + 200 1st
 ④ - 1st 100 + 200 1st

Manual Shift Valve
 13 1st Arm - Program Shift
 1-2 ~ 11 MPH -
 2-3 -
 3-4 -
 Load up on shift

X200-4

X200-4 ALLISON TRANSMISSION
HYDROSTATIC STEER SCHEMATIC
DBA-GM: WTC-PCD, AUG. 1985

-E164 Gov - PScadell



Allison Transmissions

✓✓

— NOTES —

7CF

in Min

Out

WOT FT	1-2	2600	2800 →	420-500	
200-735	2L-3C	-	11	1120-1200	2-2L 2700-2800 830-910
AOT	3L-4L	2700	2800	1700-1800	3-3L " " 1320-1400

N/A

Down

Min

	2L-1C	2450	2650	
WOT	3C-2L	2700	2800	2L-2C - 18 10 1450
AOT	4L-3L	1800	1900	3L-3C - 18 00-1900

18401

19 12

14.707%

-1878-

1.3

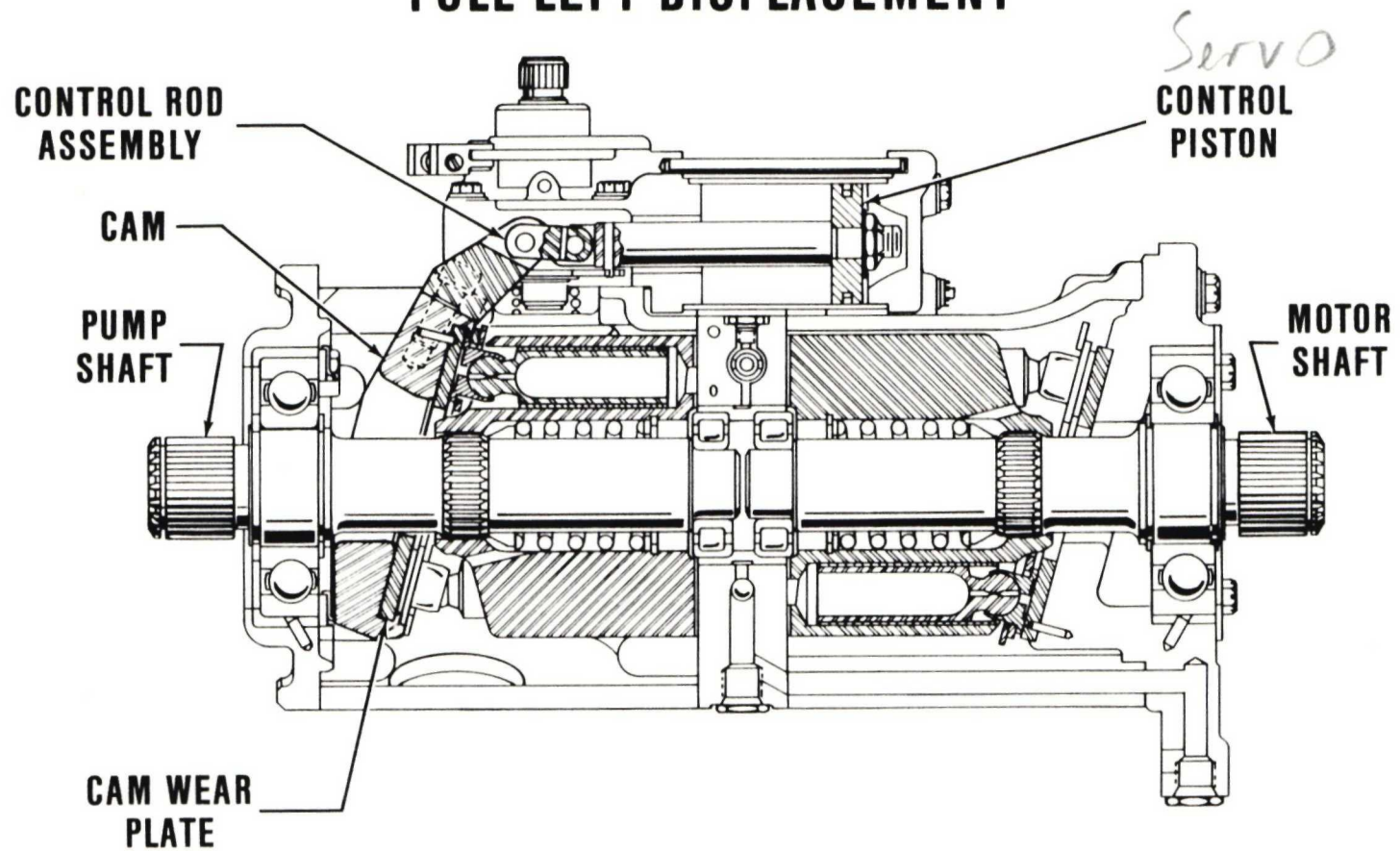
-1790-

1.098

88.4

X200-4

HYDROSTATIC STEER FULL LEFT DISPLACEMENT

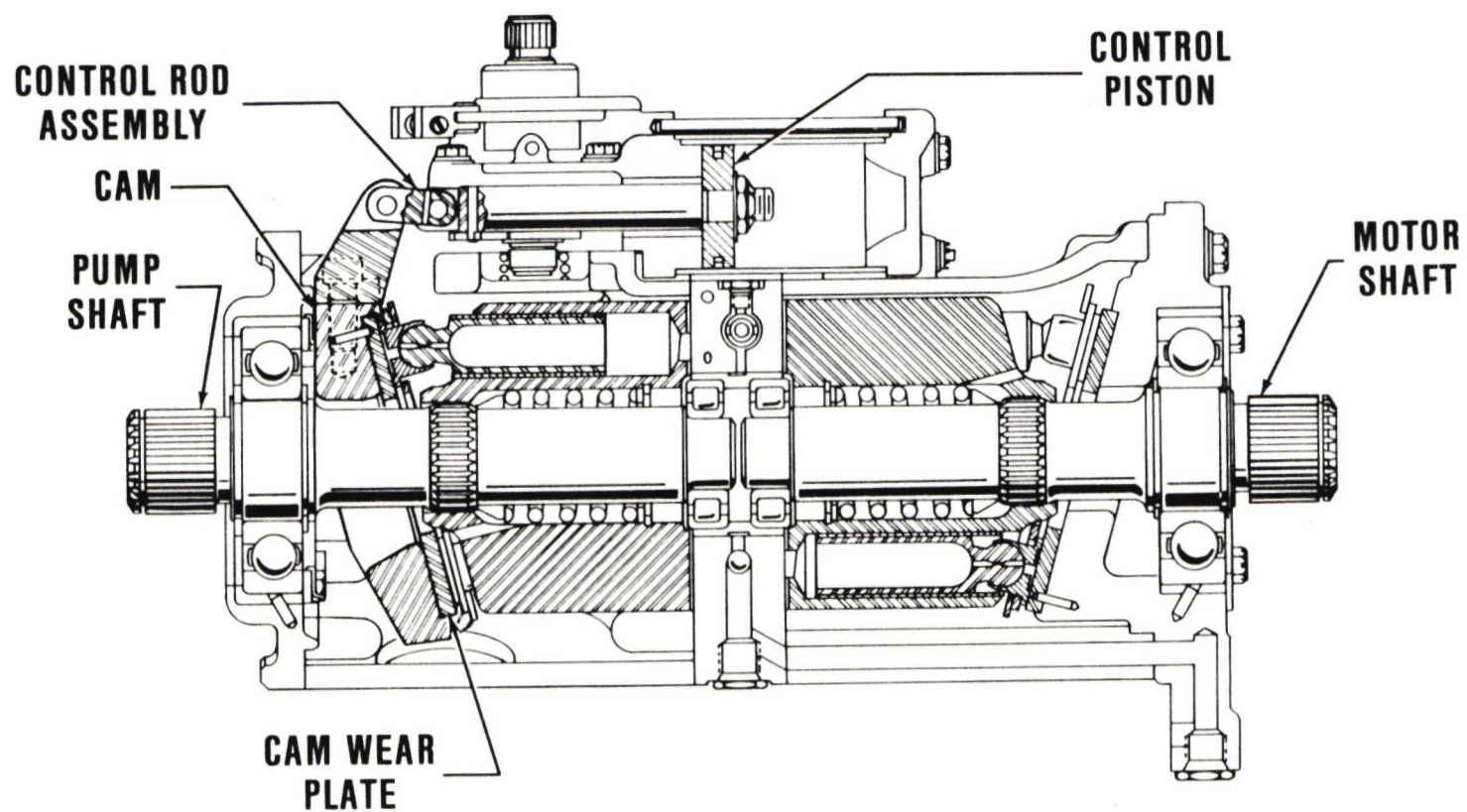


 Allison Transmissions

— NOTES —

X200-4

HYDROSTATIC STEER FULL RIGHT DISPLACEMENT





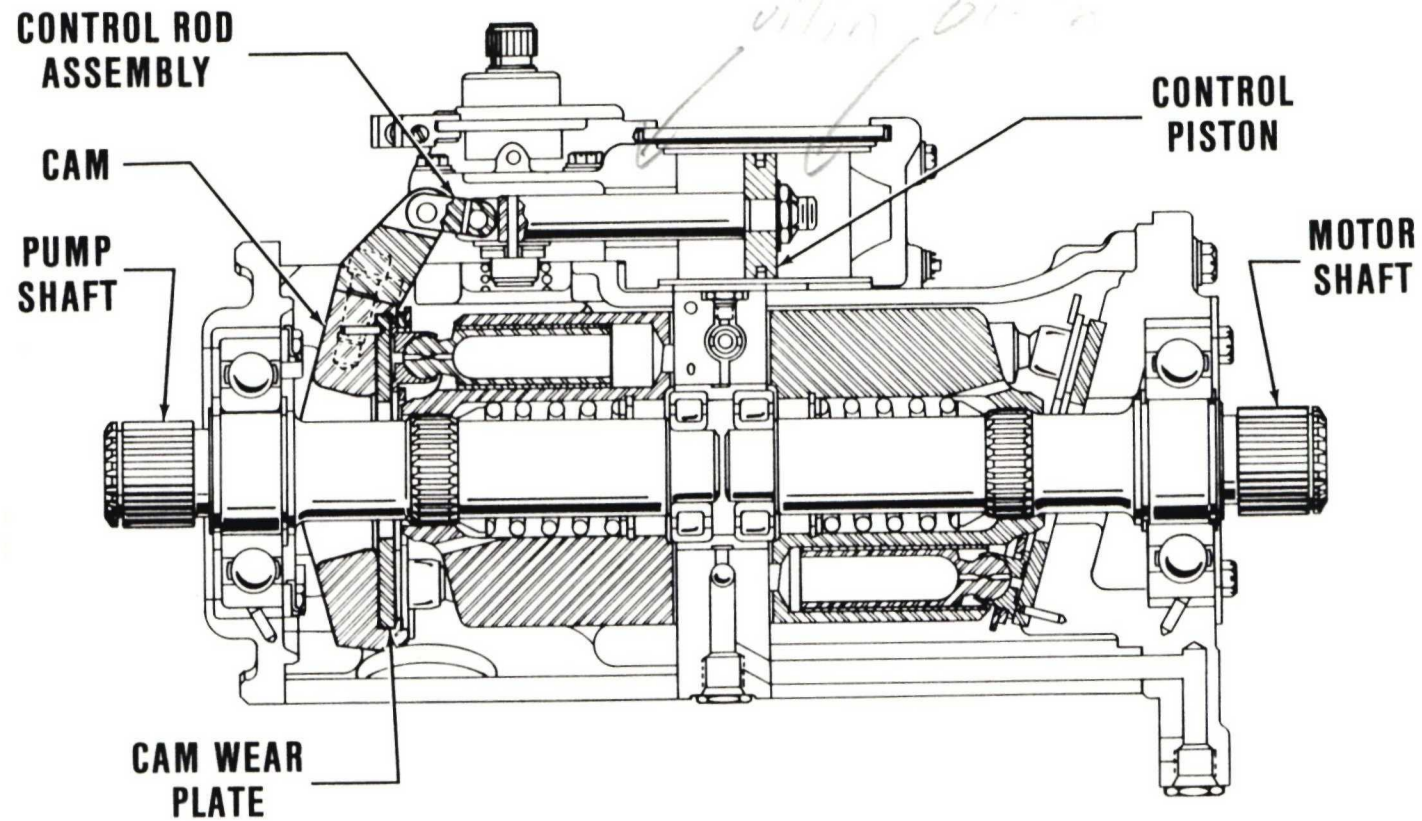
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X200-4

HYDROSTATIC STEER ZERO DISPLACEMENT

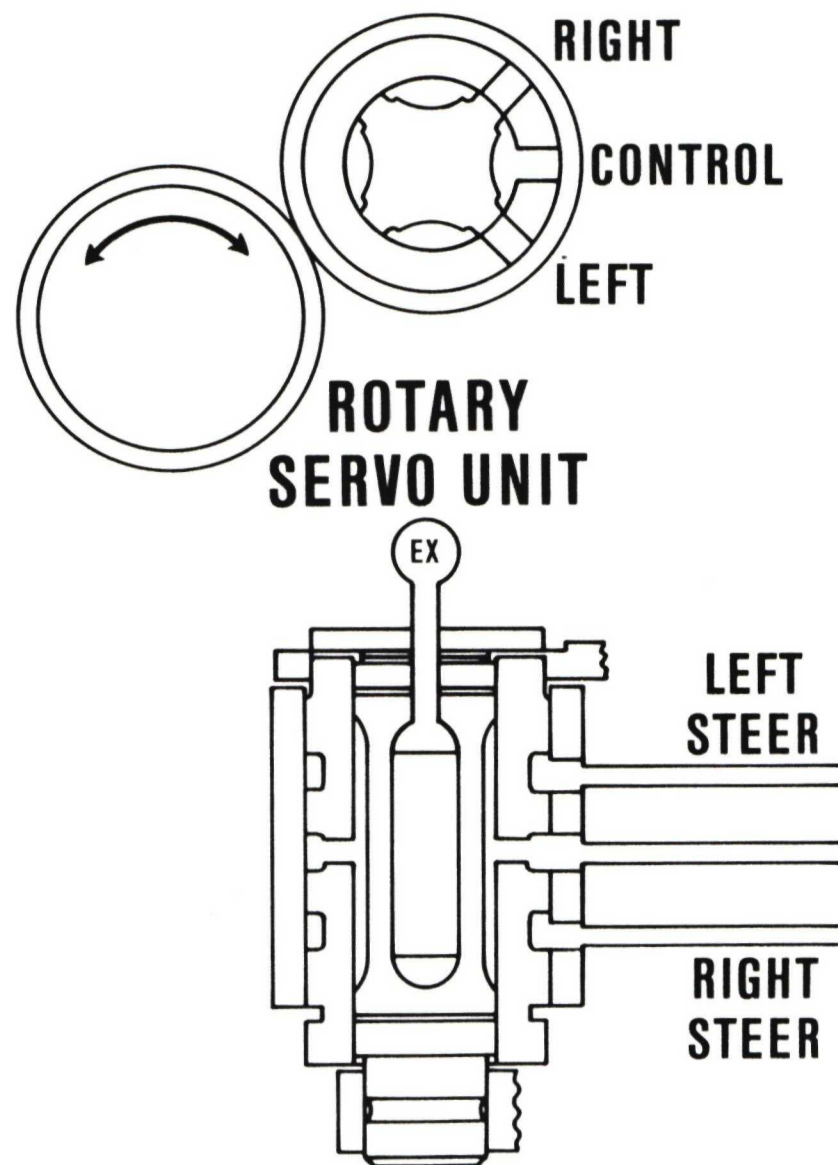


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— NOTES —

X200-4

TYPICAL ROTARY SERVO UNIT



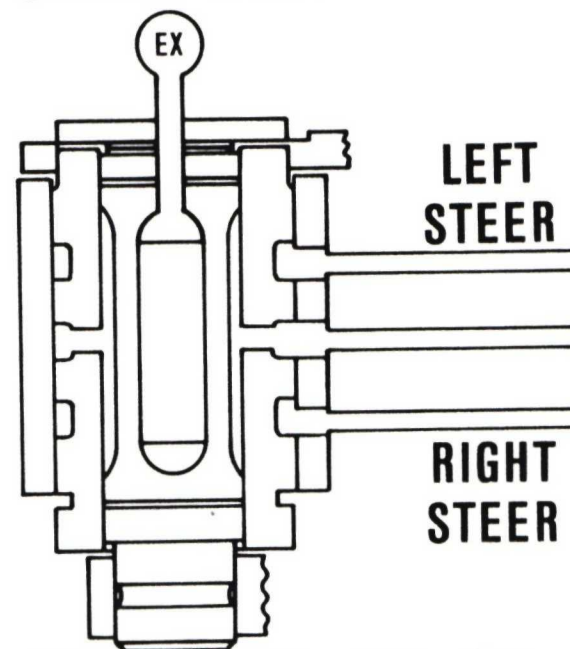
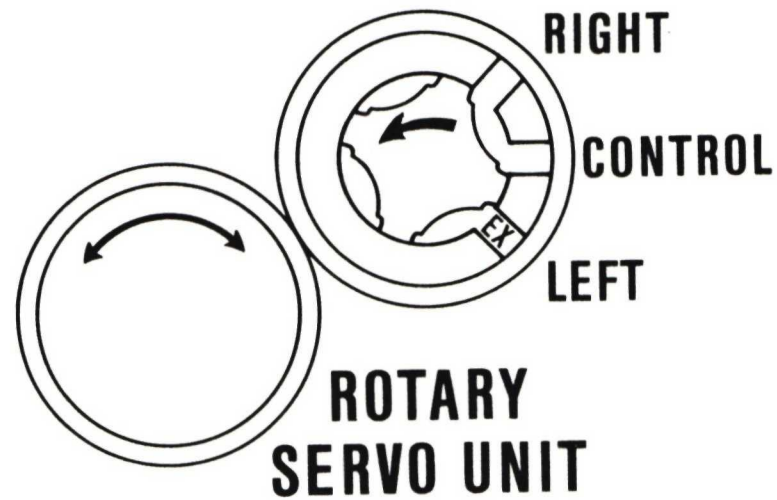


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ROTARY SERVO UNIT COUNTERCLOCKWISE ROTATION



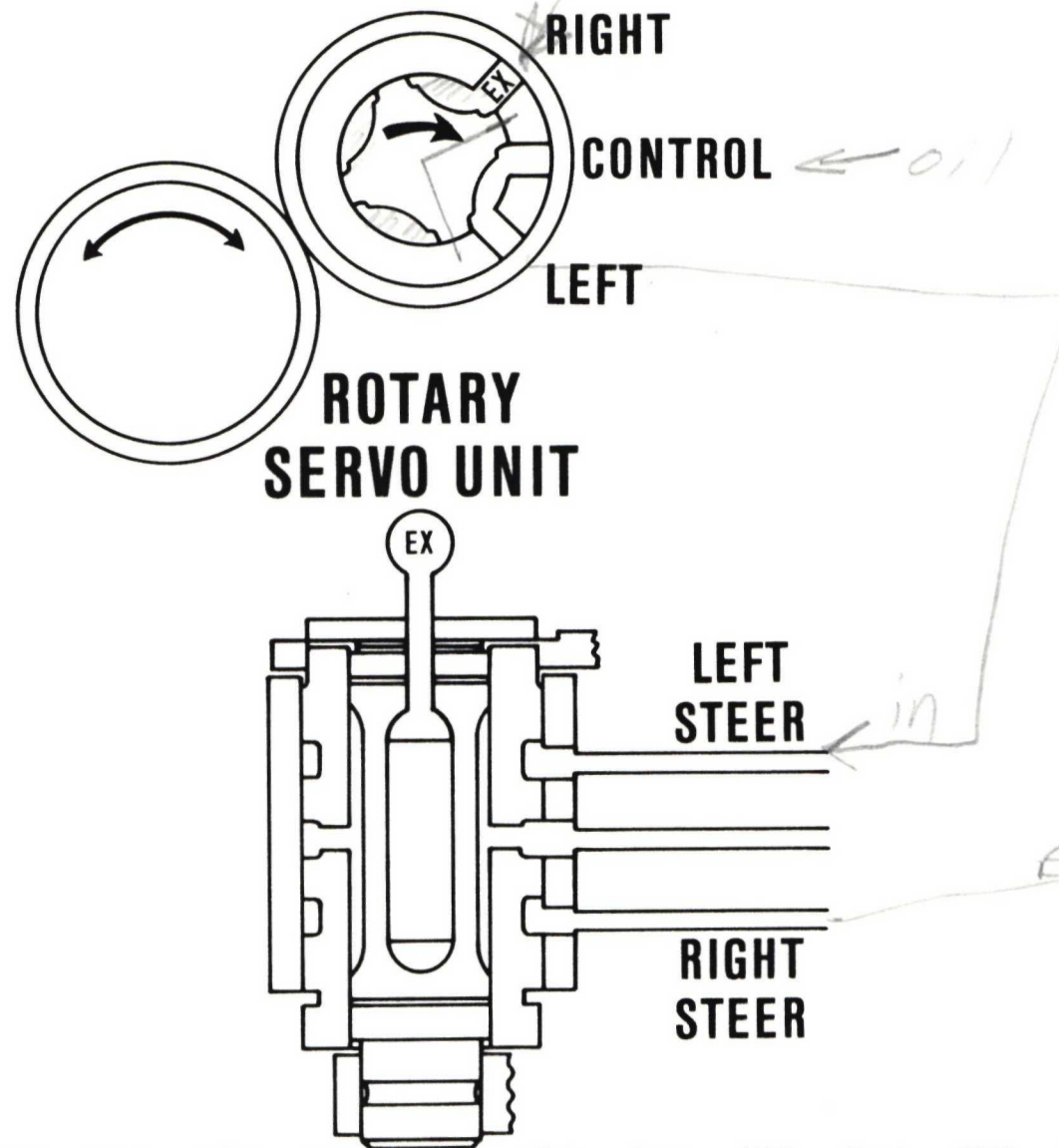


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ROTARY SERVO UNIT CLOCKWISE ROTATION



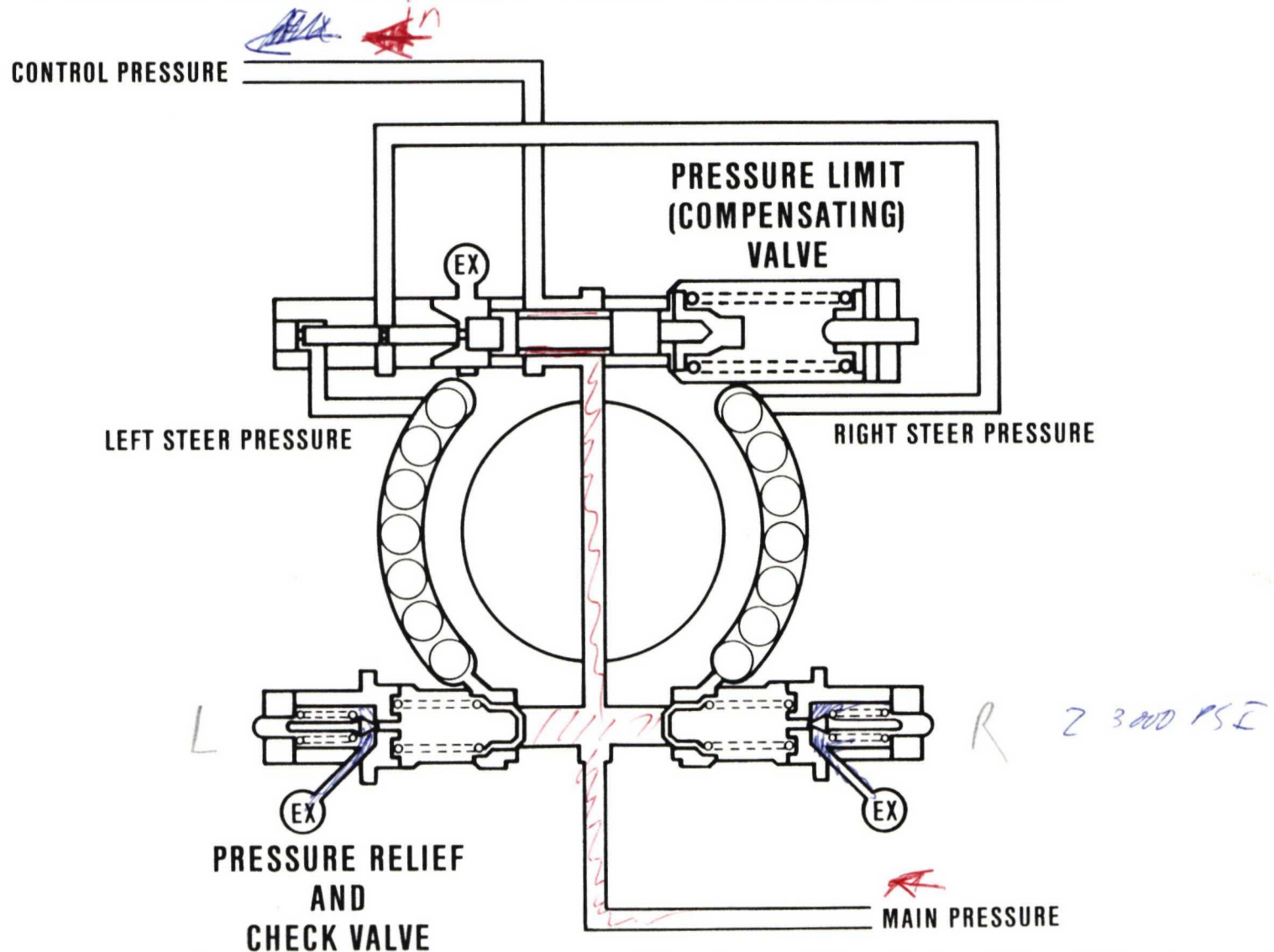


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— NOTES —

1

PRESSURE LIMIT (COMPENSATING) VALVE AND PRESSURE RELIEF AND CHECK VALVE





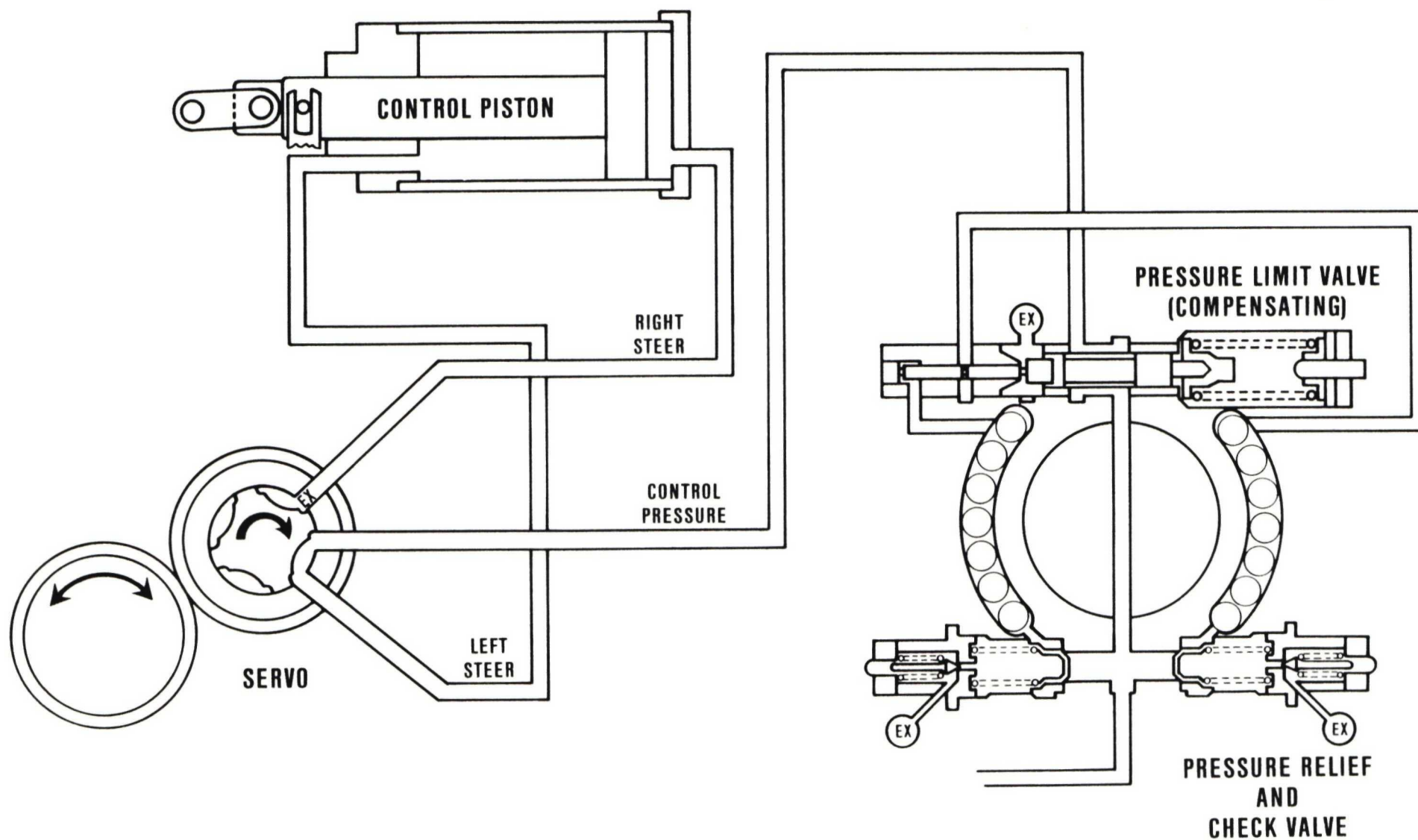
Allison Transmissions

— NOTES —

Lined area for notes, consisting of multiple horizontal lines.

X200-4

HYDROSTATIC HYDRAULIC CIRCUIT LEFT STEER





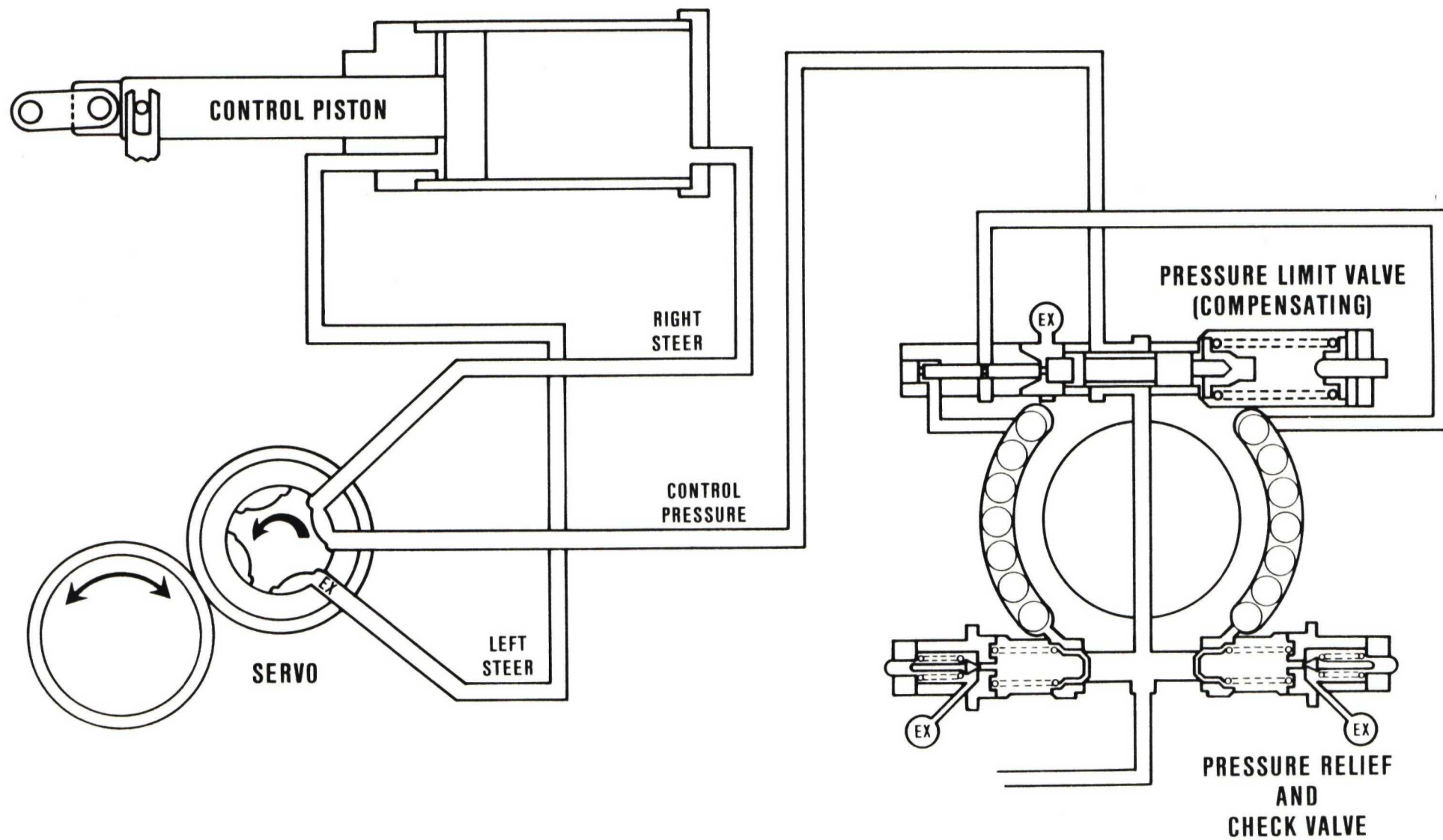
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X200-4

HYDROSTATIC HYDRAULIC CIRCUIT RIGHT STEER






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X200-4

NAME PLATE

Manufactured By	
 Detroit Diesel Allison	
Div. of General Motors Corp. Indpls, Ind.	
MODEL NO. X200-4	
SER. NO. 000000	PT. NO. 23017800
MWO OR OVERHAUL:	DATE:

P/N 6881100



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— NOTES —



Allison Transmissions

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