Mazda Rotary **ACRE NL** discussion group paper - By George Lendich of Australia

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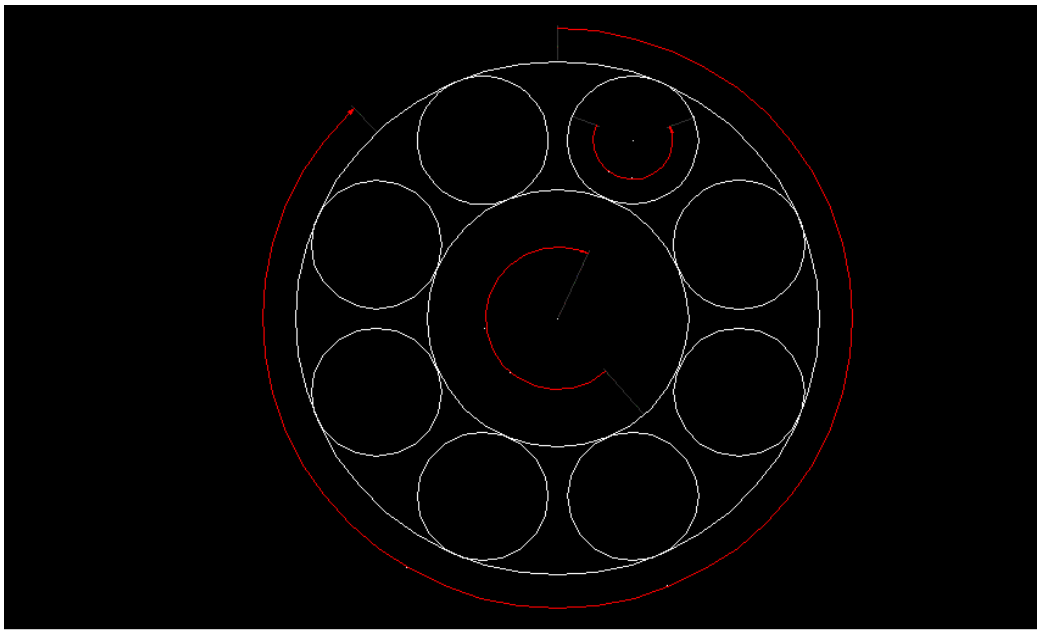
PLANETARY GEAR RATIOS

USING

STANDARD ENGINEERING CALCULATIONS
- as found on a number of sites in the Internet under
'Planetary Gear Ratio Calculations'

General description when calculating Planetary Ratios is: -

Ring Gear Diameter divided by the Sun Gear Diameter
OR
Ring Gear Teeth divided by Sun Gear Teeth



RULE.

	Input	**Output**	**Stationary**	**Calculation**	**Direction**
A.	Sun gear (S)	Planet Carrier (C)	Ring Gear (R)	1+R/S	Same +ve
B.	(C)	(R)	(S)	1/1+ S/R	Same +ve
C.	(S)	(R)	(C)	-R/S	Opposite -ve

Given that the majority of our discussions are on the Ford E4OD Planetary I will use their gear teeth numbers for simplicity.

For the FRONT planetary:-

A.	42	(C)	78	1+ 78/42	=	+ 2.85
B.	(C)	78	42	1/ (1+ 42/78)	=	+ .650
C.	42	78	(C)	- 78/42	=	- 1.85

For REAR Planetary:-

A.	34	(C)	74	1+ 74/32	=	+3.17
B.	(C)	74	34	1/ (1+34/74)	=	+ .685
C.	34	74	(C)	- 74/34	=	- 2.17

For OVERDRIVE Planetary:-

A	38	(C)	94	1+ 94/38	=	3.47
B	(C)	94	38	1/ (1+ 38/94)	=	+ .71
C	38	94	(C)	- 94/38	=	- 2.47

Another questions that can be answered by using these same figures are numbers of the Planet Teeth.

RULE.
Ring gear – Sun gear divided by 2 = Planet teeth number.

Front Planetary	(78 - 42)/ 2	= 18.
Rear Planetary	(74 - 34)/2	= 20
Overdrive Planetary	(94 - 38)/2	= 28

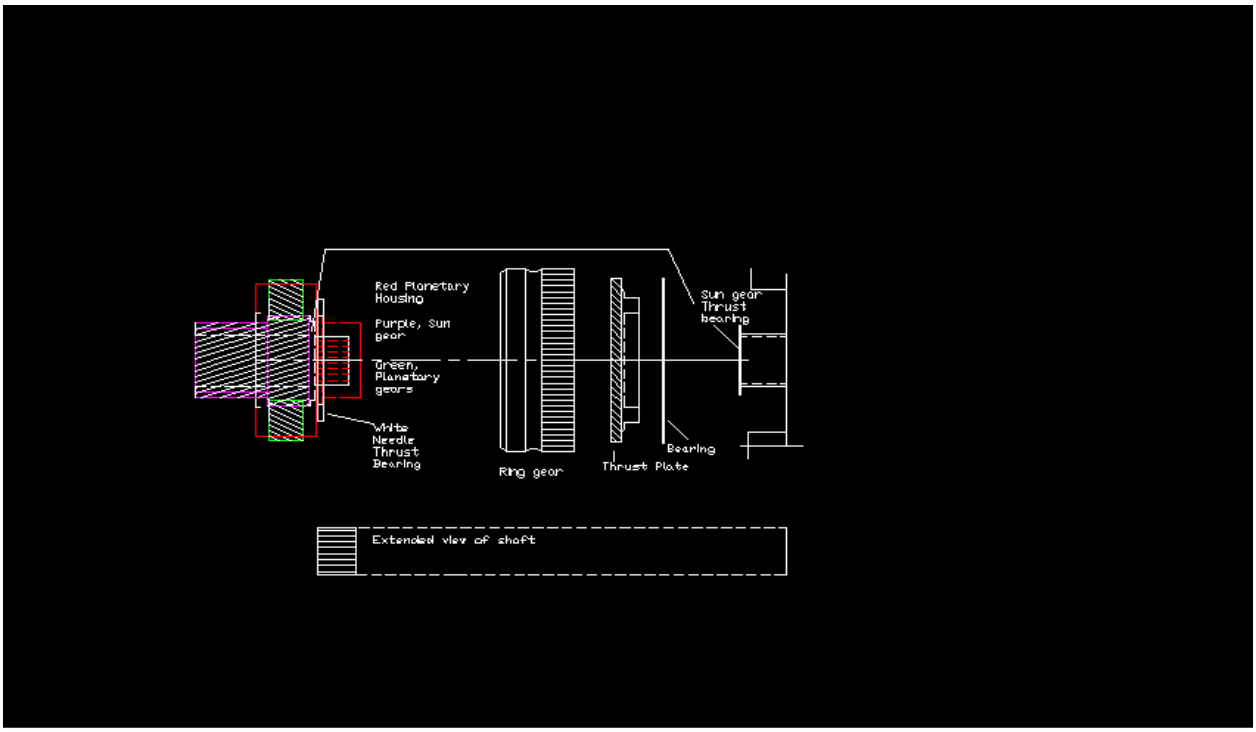
The numbers of teeth implies the Planet diameter size.
The Planet Diameter size implies the Planet PIN (or axel) diameter size.

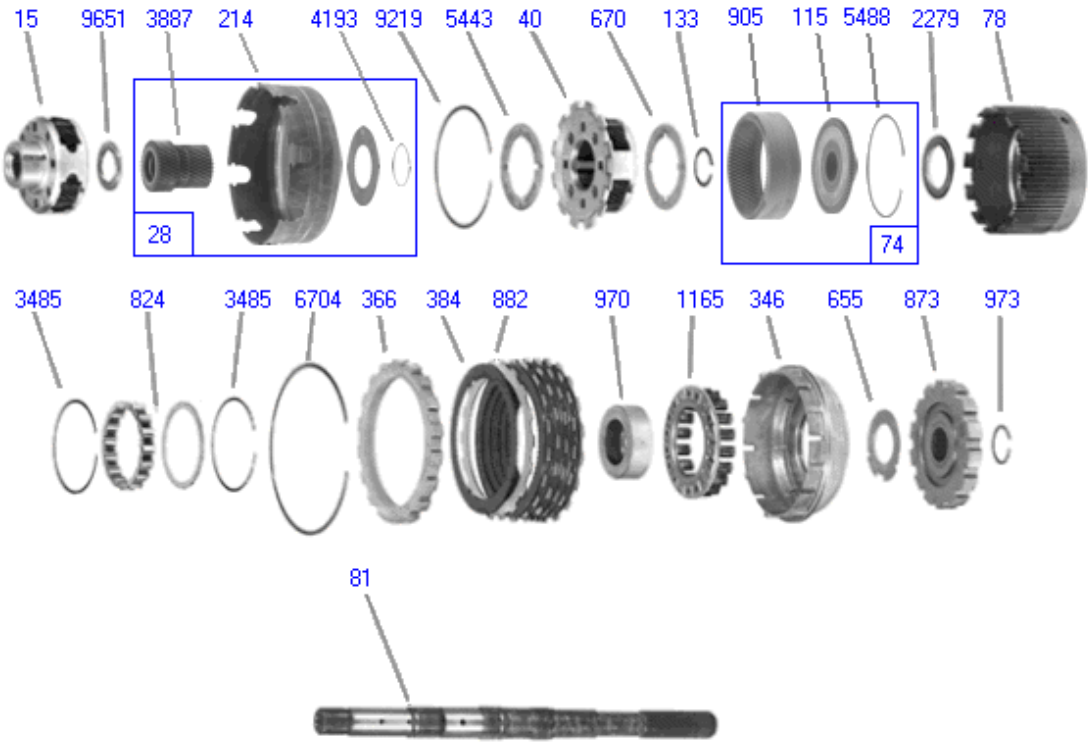
For instance the 2.85 planet diameter is 1, 1/8” and PIN diameter is 3/8”

2.17	1, ¼”	½”
3.47	?	?

Additional Information

When the Ford E4OD Planetary is used in conjunction with a Mazda Rotary- the same direction (+ve) implies a clockwise direction as seen by the Pilot in the Cockpit; opposite indicates (-ve) or opposite direction.
A CAD Drawing of the Planetary parts below.
As well as an extract of Slausons Catalogue with Part numbers.


Red Planetary Housing
Purple, Sun gear
Green, Planetary gears
White Needle Thrust Bearing
Ring gear
Thrust Plate
Bearing
Sun gear Thrust bearing
Extended view of shaft


15
9651
3887
214
4193
9219
5443
40
670
133
905
115
5488
2279
78
28
74
3485
824
3485
6704
366
384
882
970
1165
346
655
873
973
81