

# Continental Engine Cylinder Installation

**Please Note! – This is for reference only!**

**Only a portion of this booklet has been retained  
For Reference Only  
Uncontrolled Information**

## ***Instructional Series for Aviation Mechanics***

### **OBJECTIVE**

This Ready Reference Guide is intended to be a reference source for the aviation technician. The information provided in this guide is derived from TCM service documents; however the technician performing the work must reference the manufacturer's approved instructions for continued airworthiness as provided in the engine overhaul and / or maintenance manual.

Do not perform any maintenance, preventive maintenance or alterations on certificated aircraft and engines unless you meet the educational, experience and licensing requirements mandated by the FAA or equivalent aviation authority.

### **INTRODUCTION**

This guide details the recommended tools and equipment you will need to remove and replace cylinder assemblies on the engine. Additionally, diagrams are provided to illustrate the location for measuring cylinder bore, piston ring gap and piston to cylinder clearance. Dimensional limits are provided as tabular data.

***Always insure the data listed in the tables are current and has not been superseded!***



**TELEDYNE**  
**CONTINENTAL MOTORS**  
An Allegheny Teledyne Company

*Ready Reference Guide*

**Continental<sup>®</sup> Engine**  
**Cylinder**  
**Installation**



## **TORQUE LIMITS**

Proper torquing practices cannot be over emphasized. Torque values are provided as a convenient method of achieving correct pre-loading of highly stressed fasteners. If the fasteners are not properly plated, the fastener threads are not clean and free of deformation or are not properly lubricated, the correct fastener pre-load will not be achieved even though the specified torque value is reached. For this reason, it is critical that all fasteners be inspected for proper plating, thread form and correctly lubricated prior to torquing. Failure to verify a fasteners serviceability or to correctly lubricate the fastener prior to assembly and torquing will result in the fastener not being properly pre-loaded and subsequent failure of the fastener may occur.

The torque values provided must be used for the specific application. If an application is not listed, then the general torque must be used. **TORQUE VALUES LISTED ARE FOR USE WITH CLEAN 50 WEIGHT AVIATION ENGINE OIL APPLIED TO THE THREADS, UNLESS OTHERWISE SPECIFIED.** Refer to appropriate manufacturer's accessory overhaul manuals for specified torque on accessories.

If cotter pin holes must be aligned, set torque wrench at low limit and torque nut to first hole beyond this torque, but do not exceed the maximum torque limit specified. This torquing procedure must be followed for all applications requiring cotter pin hole alignment except for connecting rod nuts. Special instructions for connecting rods are provided in "NOTE 1."

NOTE: When you see the text notation - <sub>AR</sub> it refers to "As Required."

**WARNING**

**THE USE OF MATERIALS OTHER THAN THOSE SPECIFIED BY TCM ON MATING THREADS AND BETWEEN MATING SURFACES CAN CAUSE INCORRECT FASTENER PRE-LOAD AND SUBSEQUENT ENGINE DAMAGE OR FAILURE.**

**Table 1. General Use - Torque's**

BOLTS, NUTS & SCREWS			DRIVING STUDS	
SIZE	IN. LBS.	FT. LBS.	IN. LBS.	FT. LBS.
8 - 32	17.5 - 22.5	1.5 - 1.9	-	-
10 - 24	21.0 - 25.0	1.7 - 2.0	-	-
10 - 32	36.0 - 50.0	3.0 - 4.2	-	-
1/4 - 20	75.0 - 85.0	6.3 - 7.1	50.0 - 70.0	4.2 - 5.8
1/4 - 28	90.0 - 110	7.5 - 9.2	-	-
5/16 - 18	155 - 175	12.9 - 14.6	100 - 150	8.3 - 12.5
5/16 - 24	180 - 220	15.0 - 18.3	-	-
3/8 - 16	220 - 260	18.3 - 21.7	200 - 275	16.7 - 22.9
3/8 - 24	275 - 325	22.9 - 27.1	-	-
7/16 - 14	-	-	300 - 425	25.0 - 35.4
7/16 - 20	400 - 450	33.3 - 37.5	-	-
1/2 - 20	550 - 600	45.8 - 50.0	-	-

**Table 2. Driving Studs**

SIZE			TORQUE	
Dec.	In.	Across Flats	IN/LBS	FT/LBS
.25 - 20	1/4	7/16	50 - 70	4.2 - 5.8
.3125 - 18	5/16-18	1/2	100 - 150	8.3 - 12.5
.375 - 16	3/8-16	9/16	200 - 275	16.7 - 22.9
.44 - 14	7/16-14	5/8	300 - 425	25.0 - 35.4

**Table 3. Pipe Plugs**

SIZE			TORQUE	
Dec.	In.	Across Flats	IN/LBS	FT/LBS
.062 - 27	1/16-27		30 - 40	2.5 - 3.3
.125 - 27	1/8-27		60 - 80	5.0 - 6.7
.250 - 18	1/4-18	7/16	130 - 150	10.8 - 12.5
.375 - 18	3/8-18	9/16	185 - 215	15.4 - 18.0
.500 - 14	1/2-14	3/4	255 - 285	21.3 - 23.8
.750 - 14	3/4-14	1 1/8	310 - 350	25.8 - 29.2

**Table 4. Cylinder Base Nut and Through Bolt Torque Values**

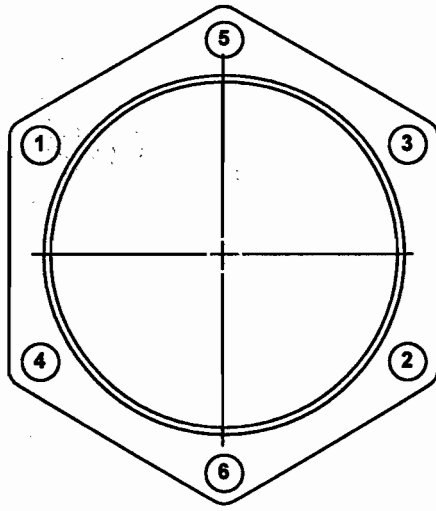
SIZE			CRANKCASE	TORQUE		MODEL
Dec.	In.	Across Flats		IN/LBS	FT/LBS	
.38 - 24	3/8-24	9/16	Nut-Cyl. to crankcase studs	410 - 430	34.2 - 35.8	O-200 O-300 GO-300 O-470
.38 - 24	3/8-24	1/2	Nut-Cylinder to crankcase studs	440 - 460	36.7 - 38.3	IO-240 IO-360 TSIO-360
.44 - 20	7/16-20	5/8	Nut-Cyl. to crankcase through studs	400 - 450	33.3 - 37.5	A & C Series
.44 - 20	7/16-20	5/8	Nut-Cyl. to crankcase studs (includes 7th stud)	490 - 510	40.8 - 42.5	All other models - (Except TSIOL-550)
.44 - 20	7/16-20	5/8	Nut-Cyl. to crankcase studs (includes 7th stud)	590 - 610	49.2 - 50.8	TSIOL-550
.44 - 20	7/16-20	9/16	Nut-through bolt at cylinder flange	590 - 610	49.2 - 50.8	IO-240 IO-360 TSIO-360
.50 - 20	1/2-20	3/4	Nut-6 point through bolt at cylinder flange (P/N 643505 .33 in. high)	690 - 710	57.5 - 59.2	IO-346, All 470, 520 & 550 (Except TSIOL-550)
.50 - 20	1/2-20	5/8	Nut-12 point through bolt at cylinder flange (P/N 652541)	790 - 810	65.8 - 67.5	IO-346, All 470, 520 & 550
.50 - 20	1/2-20	5/8	Nut-tall 6 point through bolt at cylinder flange (P/N 649496 .43 in. high)	790 - 810	65.8 - 67.5	TSIOL-550

## Cylinder Torque Procedures

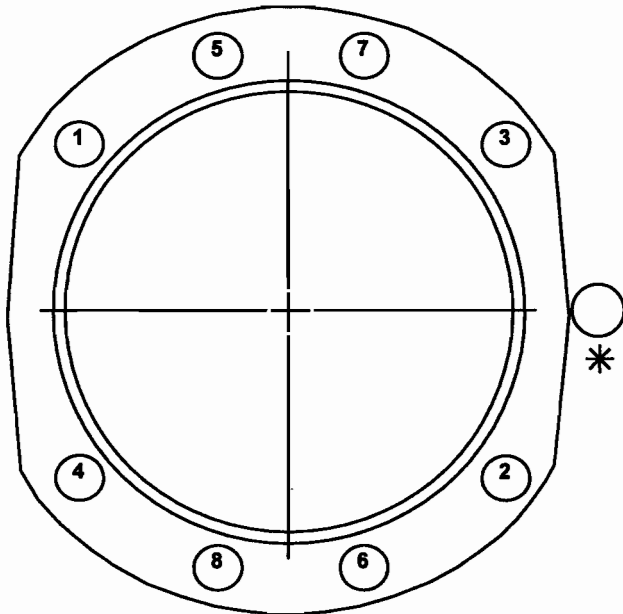
1. The proper torque sequence for all cylinder applications requires a three step torque process.
2. First, torque cylinder base nuts to 50% of the rated value using the sequence shown in the applicable engine overhaul manual. Do not torque the cylinder through bolt nuts during this initial torque sequence.
3. Second, torque the cylinder through bolt nuts *and* cylinder base nuts in the sequence shown in the applicable engine overhaul manual. Torque to the maximum value rated for the cylinder base nuts.
4. Third, torque the through bolt nuts to their maximum rated values in the applicable engine overhaul manual. Torque 7<sup>th</sup> stud nut last as applicable.
5. Always refer to the applicable engine maintenance or overhaul manual to obtain the torque values for the engine you are working on.

### **WARNING**

**LUBRICATE ALL CYLINDER DECK STUD AND THROUGH BOLT THREADS WITH CLEAN 50 WEIGHT AVIATION OIL. FAILURE TO LUBRICATE THREADS WILL RESULT IN INCORRECT FASTENER PRE-LOADING AND LOSS OF MAIN BEARING CRUSH, ENGINE DAMAGE AND POSSIBLE FAILURE.**

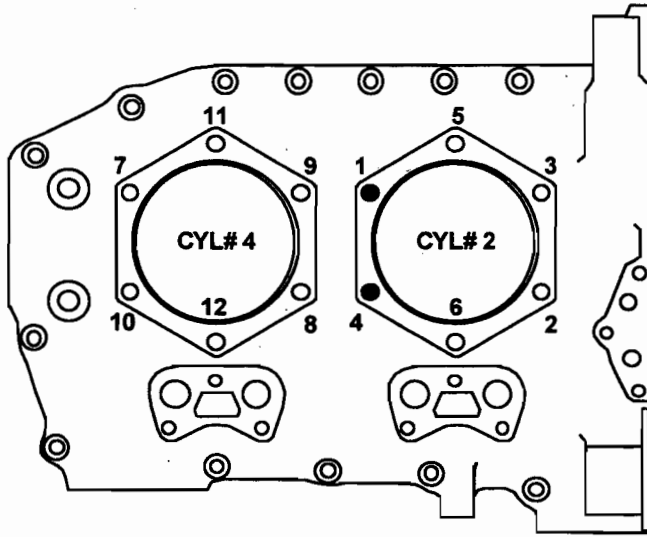


**C-75, C-85, C-90, O-200, O-300 GO-300**  
**Single Cylinder Torque Sequence**

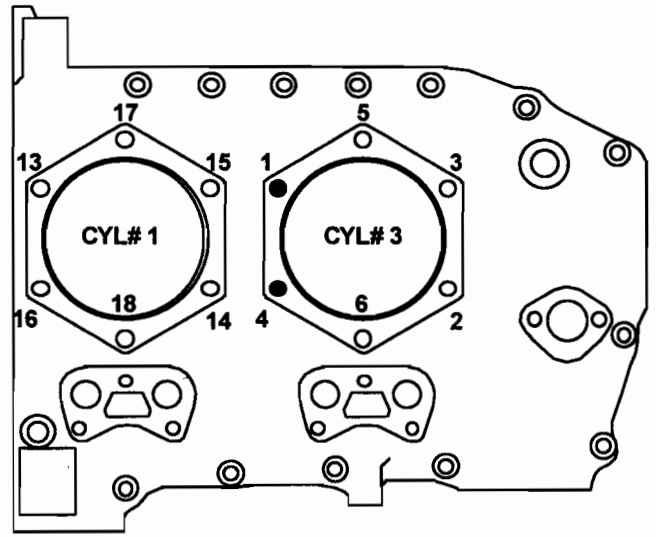


**\* TORQUE 7<sup>TH</sup> STUD NUT  
 LAST AS APPLICABLE**

**240/360 & 470/520/550 Series**  
**Single Cylinder Torque Sequence**



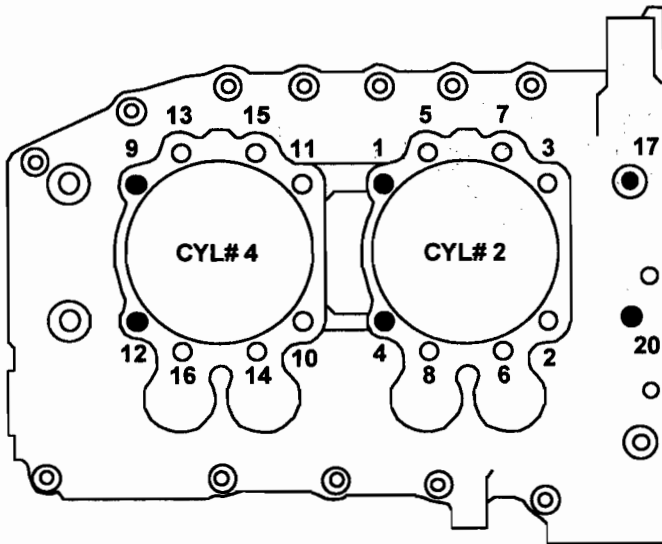
O-200 LEFT CRANKCASE



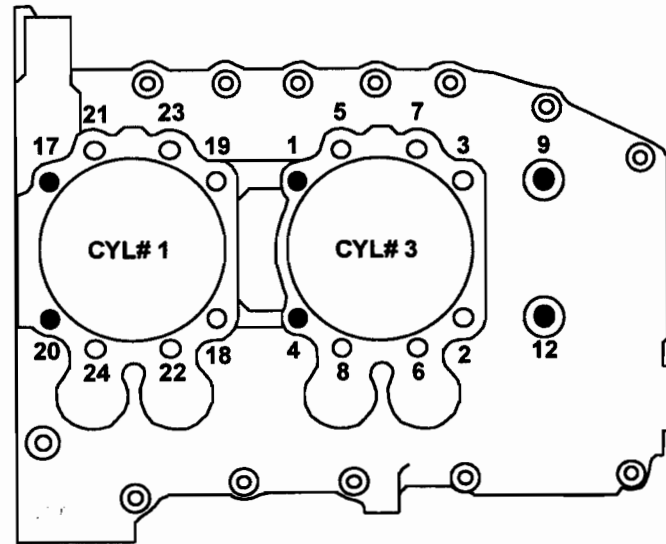
O-200 RIGHT CRANKCASE

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY

**O-200 SERIES CYLINDER TORQUE SEQUENCE**



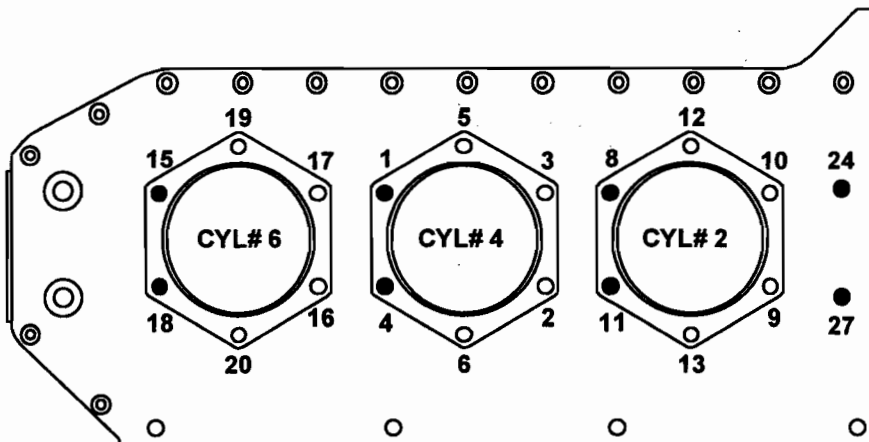
IO-240 LEFT CRANKCASE



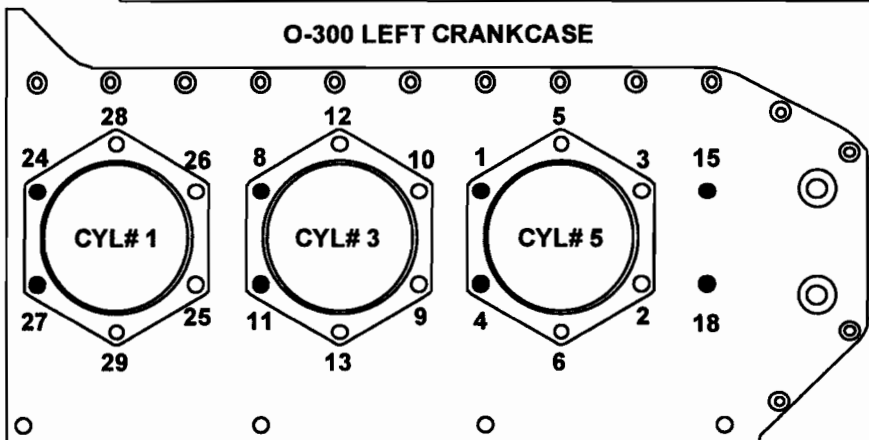
IO-240 RIGHT CRANKCASE

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY

**IO-240 SERIES CYLINDER TORQUE SEQUENCE**



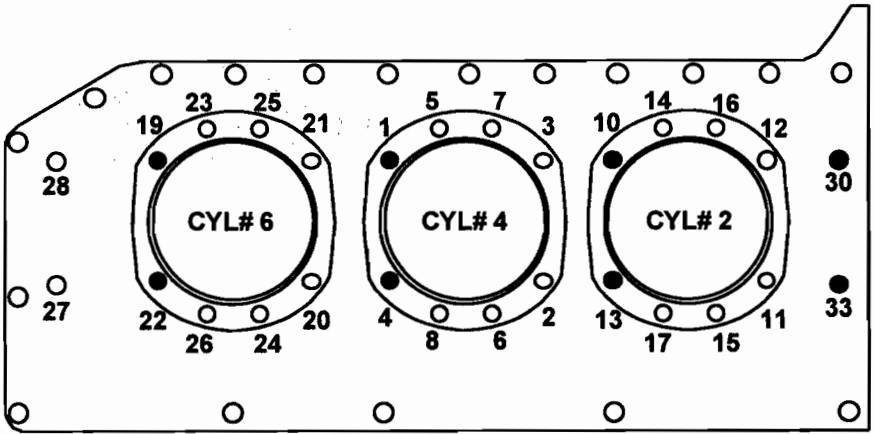
**O-300 LEFT CRANKCASE**



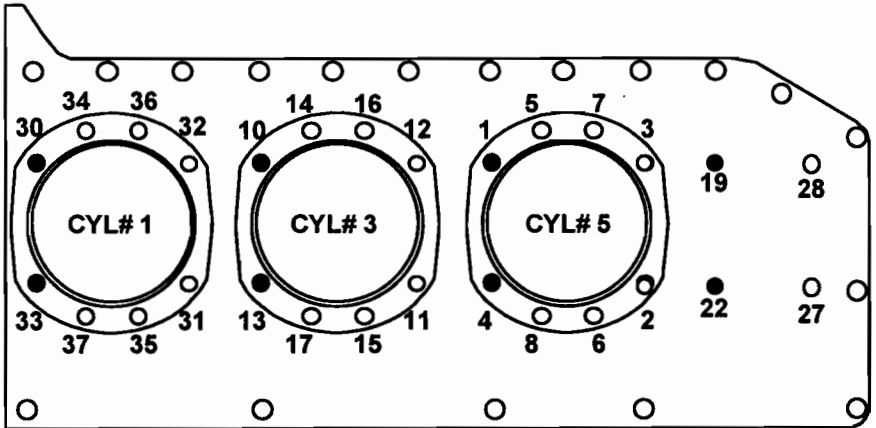
**O-300 RIGHT CRANKCASE**

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY

**O-300 & GO-300 SERIES CYLINDER TORQUE SEQUENCE**



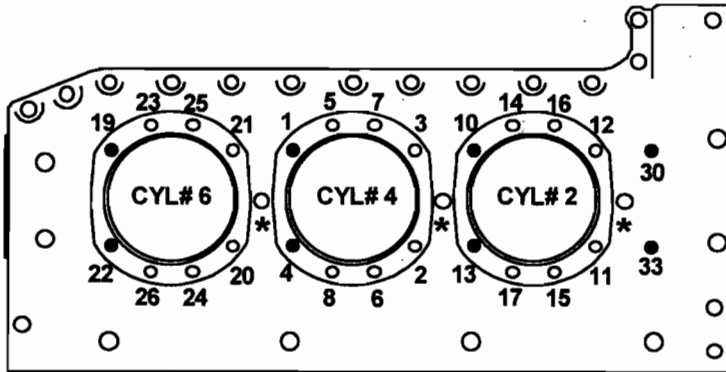
**IO-360 LEFT CRANKCASE**



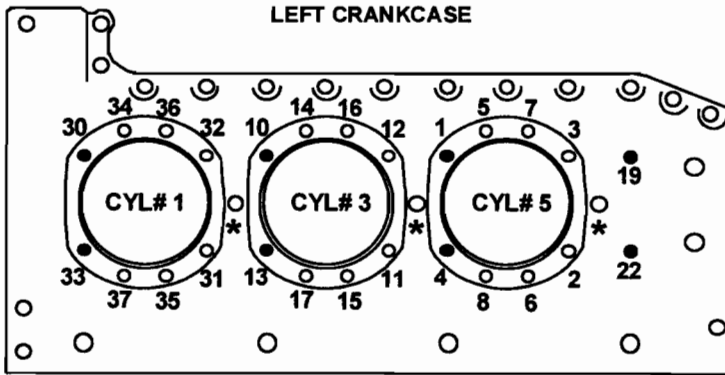
**IO-360 RIGHT CRANKCASE**

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY

**IO-360 SERIES CYLINDER TORQUE SEQUENCE**



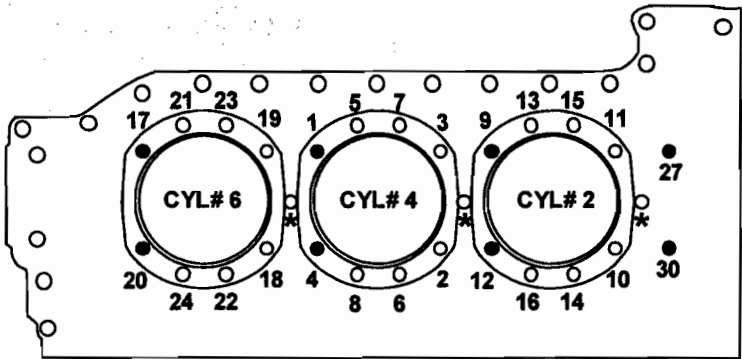
LEFT CRANKCASE



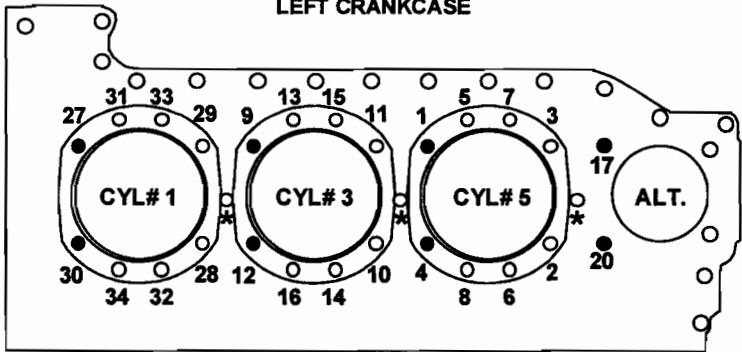
RIGHT CRANKCASE

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY
- \* TORQUE 7TH STUD NUT LAST

**470, 520 & 550 SANDCAST SERIES CYLINDER TORQUE SEQUENCE**



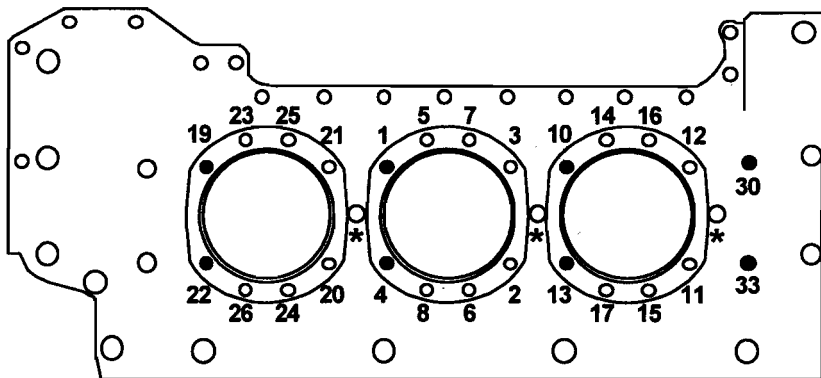
LEFT CRANKCASE



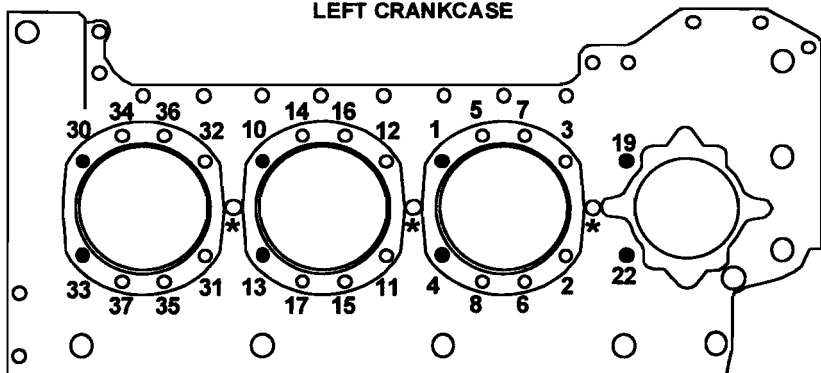
RIGHT CRANKCASE

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY
- \* TORQUE 7TH STUD NUT LAST

**520/550 PERMOLD & LIQUID COOLED CYLINDER TORQUE SEQUENCE**



LEFT CRANKCASE



RIGHT CRANKCASE

- DESIGNATES CRANKCASE THROUGH BOLTS - CRANKCASE THROUGH BOLT THREADS & NUTS MUST BE LUBRICATED WITH CLEAN 50 WT AVIATION OIL AND TORQUED SIMULTANEOUSLY
- \* TORQUE 7TH STUD NUT LAST

**GTSIO-520 SERIES CYLINDER TORQUE SEQUENCE**