

SERVICE INFORMATION DIRECTIVE**Compliance Will Enhance Safety, Maintenance or Economy of Operation****SID97-4C****TECHNICAL PORTIONS
FAA APPROVED****SUBJECT:** CYLINDER BORE AND PISTON FIT SPECIFICATIONS**PURPOSE:** Provide dimensions and limits for TCM's cylinders and non Graphite coated and Graphite coated pistons**COMPLIANCE:** At cylinder repair, replacement or engine major overhaul.**MODELS****AFFECTED:** All engine models.**GENERAL INFORMATION**

This service bulletin provides the following information:

1. Cylinder bore dimensions - New minimum / maximum, service limits (for continuing cylinders in service between major overhauls) and Oversize Service Limits.
2. Piston to cylinder clearance specifications for graphite coated and non-graphite coated pistons.
3. Piston ring gaps and location in cylinder to measure ring gaps.
4. Piston diameters, piston skirt diameters and pin to dome height dimensions.

The "New Limits MIN & MAX" dimensions are given for **D**, **X** & **Y** diameters so the cylinder barrel can be ground to a specific configuration for standard or oversized barrels.

Only the **D** and the **X** diameters are used to determine the serviceability of the cylinder barrel. No wear limit is given for **Y** diameter because it is used as a machining reference only.

New or oversize cylinder bore dimensions must be used at engine overhaul. Oversize dimensions and service limits may be used to return cylinders to service on engines that have not reached their published TBO. Do not return to service any cylinder exceeding the limits specified in this service bulletin.

Piston ring gaps and cylinder dimensions must be maintained within the specifications provided in this bulletin.

The Piston information is presented in tabular form, (Table 1). Columns from left to right are: Engine Model, Manganese Phosphate Graphite Coated Piston P/N, Uncoated Piston P/N, Graphite Coated Piston P/N, Piston Diameter, Skirt Diameter, & Pin to Dome Height.

CAUTION

Verify that all ring, piston and cylinder part numbers are the specified part number for the installation. Installation of incorrect parts will cause engine damage and engine malfunction.

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MO	DAY	YEAR	MO	DAY	YEAR		1 of 11 SID97-4	C
03	24	97	04	01	99			

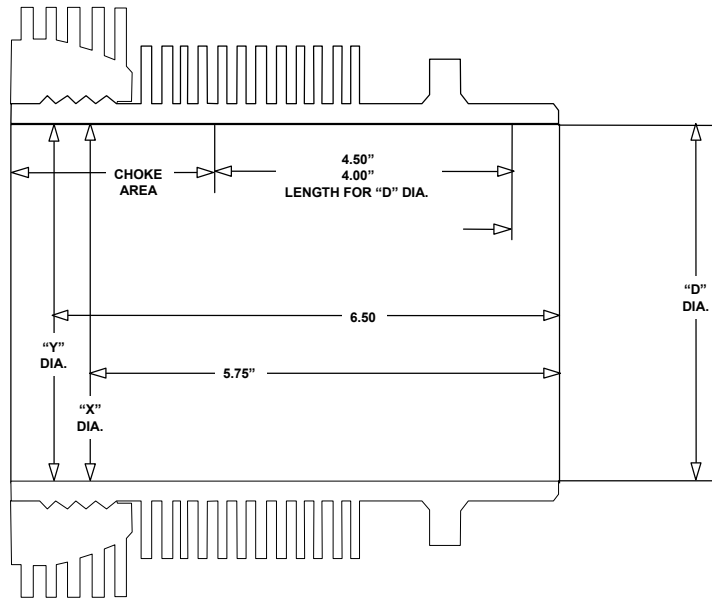



FIGURE 1. 5.25 INCH CYLINDER

**ALL IO-520, IO-550, TSIO-520 except as listed in the following.
Refer to Figure 1**

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	5.251	5.253	5.256	5.248	5.250	5.257	5.245	5.247	N/A
.005	5.256	5.258	5.261	5.253	5.255	5.262	5.250	5.252	N/A
.010	5.261	5.263	5.266	5.258	5.260	5.267	5.255	5.257	N/A
.015	5.266	5.268	5.271	5.263	5.265	5.272	5.260	5.262	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									

**IO-550-G, N, TSIO-520-BE, GTSIO-520-C, D, H, K, L, M & N
Refer to Figure 1**

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	5.251	5.253	5.256	5.248	5.250	5.257	5.245	5.247	N/A
.005	5.256	5.258	5.261	5.253	5.255	5.262	5.250	5.252	N/A
.010 ①	5.261	5.263	5.266	5.258	5.260	5.267	5.255	5.257	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									
① Applies to cylinder Part Numbers 653452, 653454 or later revisions only.									

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MO	DAY	YEAR	MO	DAY	YEAR		2 of 11 SID97-4	C
03	24	97	04	01	99			

TSIO-550-A, B, C, & E
Refer to Figure 1

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	5.252	5.254	5.257	5.249	5.251	5.258	5.246	5.248	N/A
.005	5.257	5.259	5.262	5.254	5.256	5.263	5.251	5.253	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									

ALL IO-520, IO-550, TSIO-520 & GTSIO-520

Refer to Figure 1

PISTON TO CYLINDER CLEARANCE	
5.25" PISTON	PISTON IN CYLINDER MEASURED BELOW 4 th RING GROOVE
ALL NON GRAPHITE COATED	.008 - .011 LOOSE
GRAPHITE COATED	.006 - .010 LOOSE
Measure clearance perpendicular to pin bore and at "D" Diameter.	

TSIOL-550-A, B & C

Refer to Figure 1

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	5.251	5.253	5.256	5.248	5.250	5.257	5.245	5.247	N/A
.005	5.256	5.258	5.261	5.253	5.255	5.262	5.250	5.252	N/A
.010	5.261	5.263	5.266	5.258	5.260	5.267	5.255	5.257	N/A
.015	5.266	5.268	5.271	5.263	5.265	5.272	5.260	5.262	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									

TSIOL-550- A, B & C

Refer to Figure 1

PISTON TO CYLINDER CLEARANCE	
5.25" PISTON	PISTON IN CYLINDER MEASURED BELOW 4 th RING GROOVE
ALL NON GRAPHITE COATED	.007 - .010 LOOSE
GRAPHITE COATED	.005 - .009 LOOSE
Measure clearance perpendicular to pin bore and at "D" Diameter.	

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MO	DAY	YEAR	MO	DAY	YEAR		3 of 11 SID97-4	C
03	24	97	04	01	99			

5.25 CYLINDER ALL 520's & ALL 550's

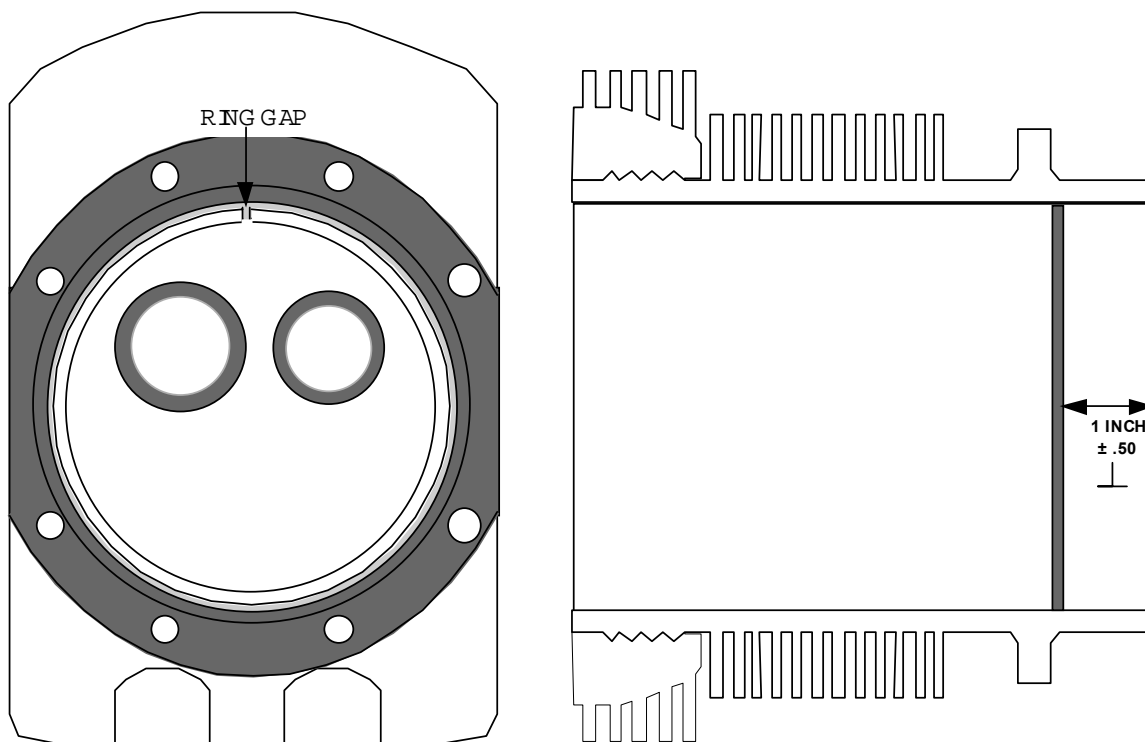


FIGURE 2. LOCATION FOR INSPECTING RING GAP

5.25 CYLINDER ALL 520's & ALL 550's

RING GAP SPECIFICATIONS

Refer to Figure 2

Measure 1.00 ± .50 in bore. ⊥		
RING	PART NUMBER	GAPS
RING SET	654716A1	N/A
Top	648005	.028 - .044
2 nd	654719	① .034 - .050
Oil Control	② 654717	.020 - .036
4 th /Skirt	648008	.015 - .031

① Gap for 2nd ring must be at least .006 larger than gap for top ring.

② P/N 654717 consists of P/N 654718 Expander and 649250-1 ring.

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MO	DAY	YEAR	MO	DAY	YEAR		4 of 11	C
03	24	97	04	01	99		SID97-4	

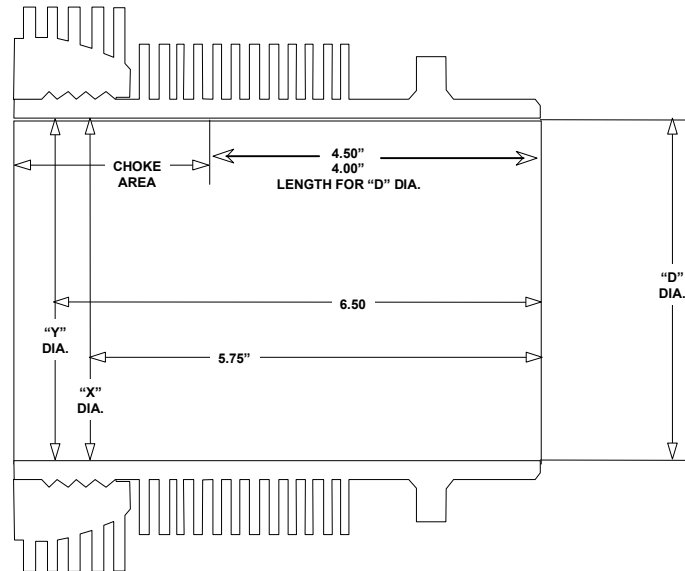


FIGURE 3. 5.00 INCH CYLINDER
E-SERIES, ALL O-470, IO-470, TSIO-470

Refer to Figure 3

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	5.001	5.003	5.006	4.998	5.000	5.007	4.995	4.997	N/A
.005	5.006	5.008	5.011	5.003	5.005	5.012	5.000	5.002	N/A
.010	5.011	5.013	5.016	5.008	5.010	5.017	5.005	5.007	N/A
.015	5.016	5.018	5.021	5.013	5.015	5.022	5.010	5.012	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									

ALL 470'S EXCEPT O-470-K, L, R, S & TSIO-470-B, C, & D

Refer to Figure 3

PISTON TO CYLINDER CLEARANCE	
5" PISTON	PISTON IN CYLINDER MEASURED AT THE BOTTOM OF THE PISTON SKIRT
ALL GRAPHITE COATED	.008 - .012 LOOSE
GRAPHITE COATED	.006 - .011 LOOSE

E-SERIES, O-470-K, L, R, S & TSIO-470-B, C, & D

Refer to Figure 3

5" PISTON	PISTON IN CYLINDER MEASURED AT THE BOTTOM OF THE PISTON SKIRT
ALL GRAPHITE COATED	.009 - .012 LOOSE
GRAPHITE COATED	.007 - .011 LOOSE
Measure clearance perpendicular to pin bore and at "D" Diameter.	

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile AL 36601 • 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		5 of 11	C
03	24	97	04	01	99		SID97-4	

5.00 CYLINDER ALL 470's

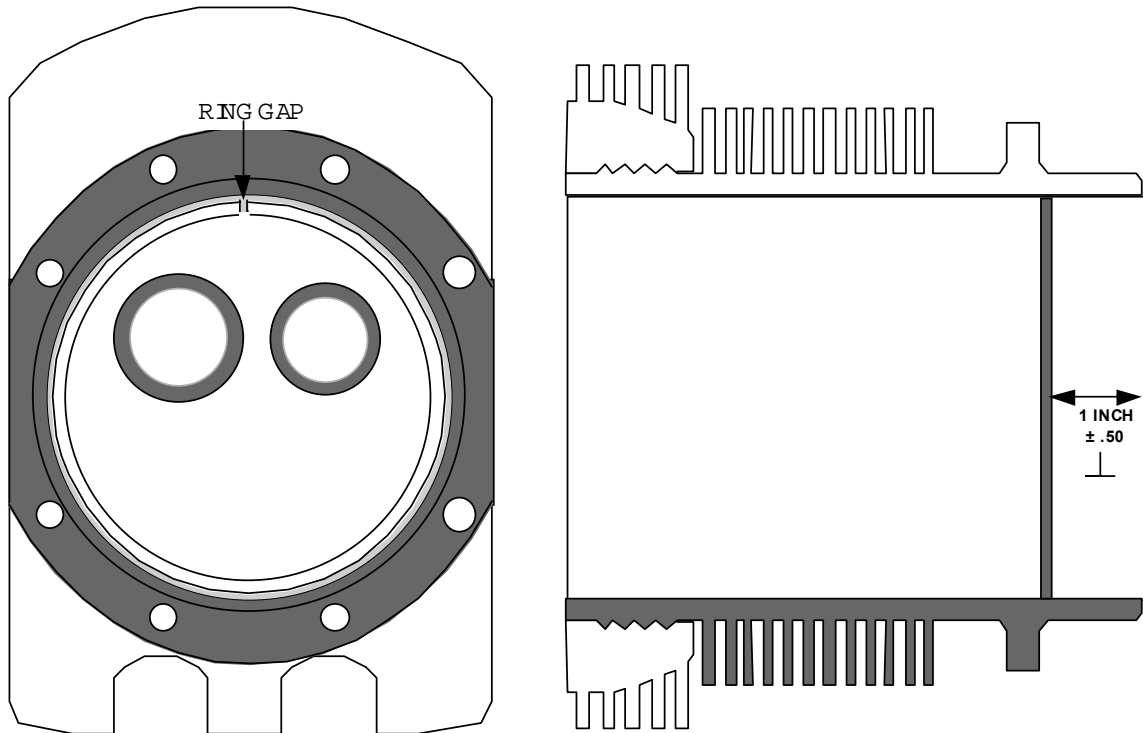


FIGURE 4. LOCATION FOR INSPECTING RING GAP

E-SERIES, O-470, IO-470, TSIO-470

RING GAP SPECIFICATIONS

Refer to Figure 4

Measure 1.00 ± .50 into bore. ⊥		
RING	PART NUMBER	GAPS
RING SET	649226A1	N/A
Top	648009	.026 - .042
2 nd	648010	① .032 - .048
Oil Control	648011	.018 - .034
4 th /Skirt	648012	.015 - .031

① Gap for 2nd ring must be at least .006 larger than gap for top ring.

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MO	DAY	YEAR	MO	DAY	YEAR		6 of 11	C
03	24	97	04	01	99		SID97-4	

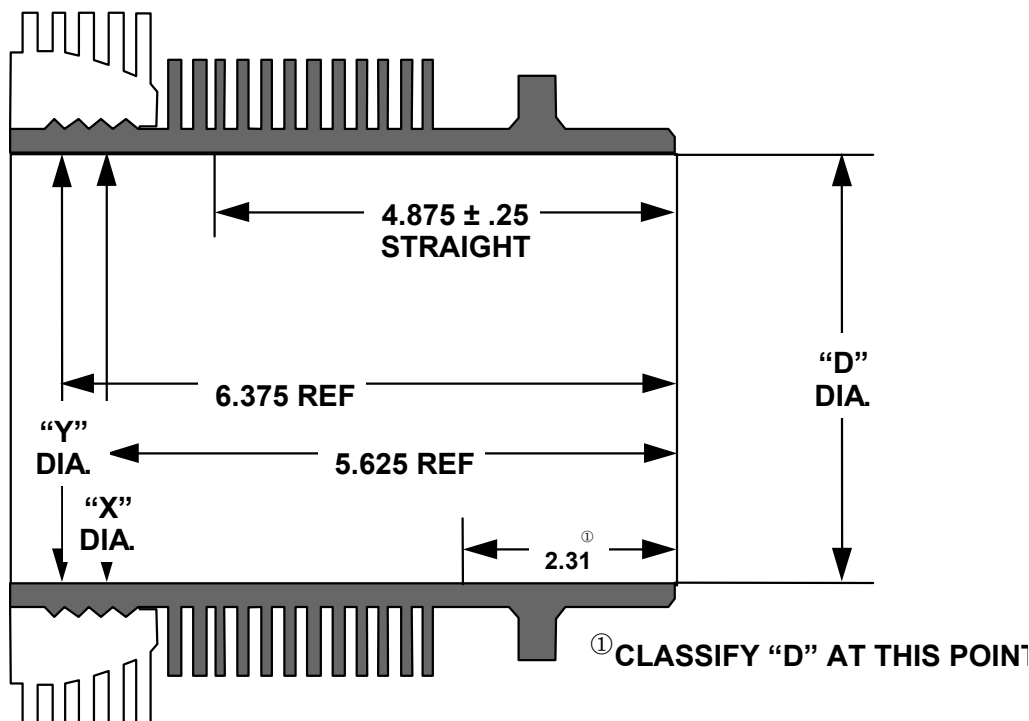


FIGURE 5. 4.44 INCH CYLINDER

ALL IO-240, IO-360, TSIO-360, LTSIO-360
Refer to Figure 5

CYLINDER DIAMETER DIMENSIONS									
SIZE	"D" DIAMETER NEW		"D" DIAMETER SERVICE LIMITS	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	"Y" DIAMETER NEW		"Y" DIAMETER SERVICE LIMITS
	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.	MIN.	MAX.	MAX.
STD.	4.437	4.439	4.442	4.434	4.436	4.443	4.431	4.433	N/A
.005	4.442	4.444	4.447	4.439	4.441	4.448	4.436	4.438	N/A
.015	4.452	4.454	4.457	4.449	4.451	4.458	4.446	4.448	N/A
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .002 AT MEASURED DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.									

ALL IO-240, IO-360, TSIO-360, LTSIO-360
Refer to Figure 5

PISTON TO CYLINDER CLEARANCE	
4.44" PISTON	PISTON BOTTOM OF SKIRT IN CYLINDER
ALL NON GRAPHITE COATED	.006 - .010 LOOSE
GRAPHITE COATED	.004 - .009 LOOSE
Measure clearance perpendicular to pin bore and at "D" Diameter.	

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile AL 36601 • 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		7 of 11 SID97-4	C
03	24	97	04	01	99			

4.44 CYLINDER ALL 360's & 240's

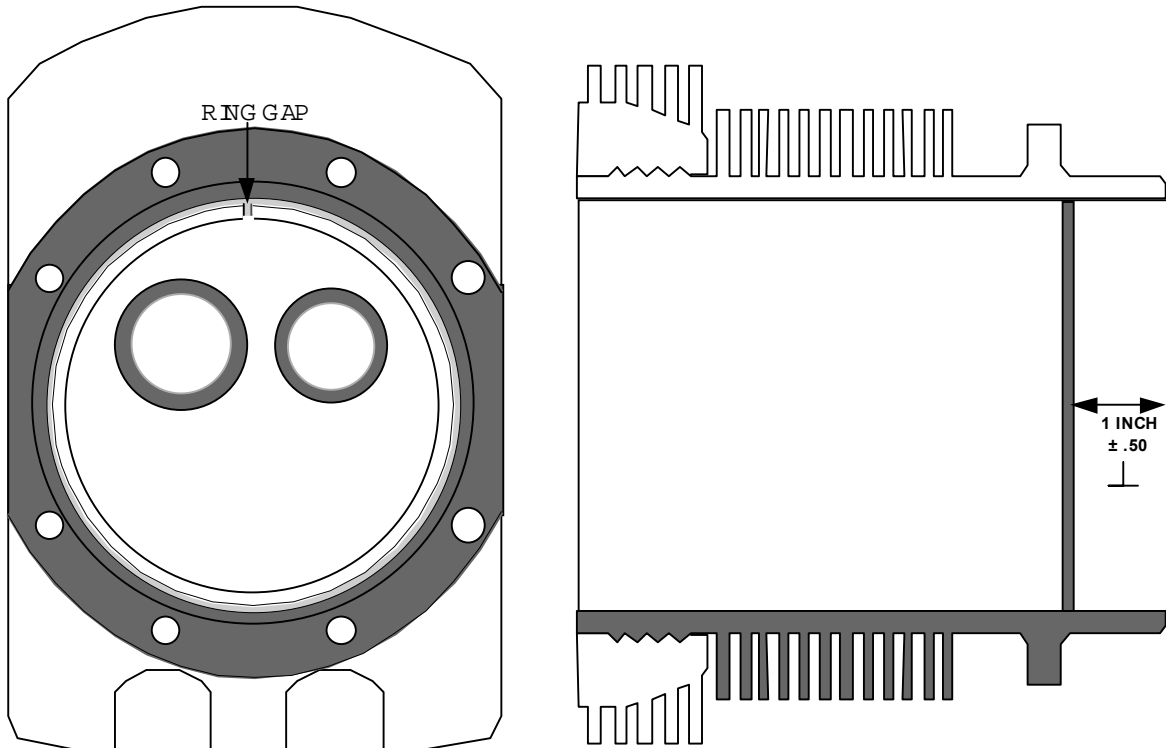


FIGURE 6. LOCATION FOR INSPECTING RING GAP

ALL IO-240, IO-360, TSIO-360, LTSIO-360

RING GAP SPECIFICATIONS

Refer to Figure 6.

Measure 1.00 ± .50 into bore. ⊥		
RING	PART NUMBER	RING GAP
RING SET	649225A2	N/A
Top	648039	.026 - .042
2 nd	648040	① .032 - .048
Oil Control	648041	.019 - .035
4 th /Skirt	648042	.015 - .031

① Gap for 2nd ring must be at least .006 larger than gap for top ring.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile AL 36601 • 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		8 of 11 SID97-4	C
03	24	97	04	01	99			

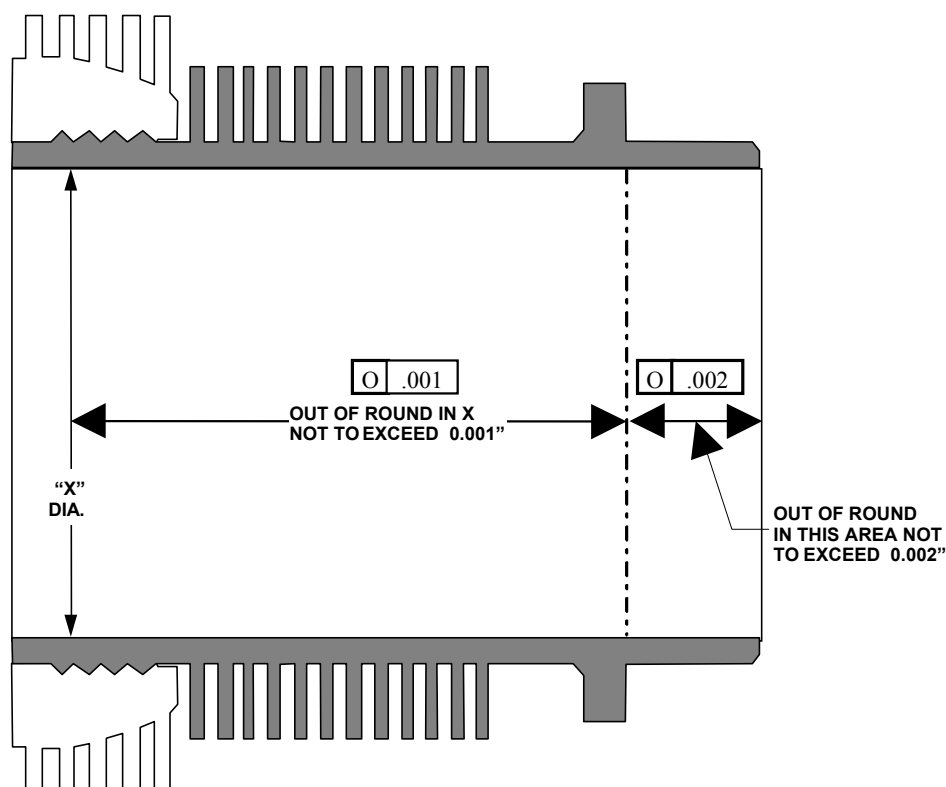


FIGURE 7. 4.06 INCH CYLINDER
C SERIES, ALL O-200, O-300, GO-300
 Refer to Figure 7

CYLINDER DIAMETER DIMENSIONS				
SIZE	"X" DIAMETER NEW		"X" DIAMETER SERVICE LIMITS	STRAIGHT BARREL NO CHOKE
	MIN.	MAX.	MAX.	
STD.	4.0615	4.0635	4.0665	
.005	4.0665	4.0685	4.0715	
.015	4.0765	4.0785	4.0815	
CYLINDER BORE - OUT OF ROUND: NEW NOT TO EXCEED .001 AT X DIAMETERS. SERVICE LIMIT NOT TO EXCEED .003 AT MEASURED DIAMETERS.				

C SERIES, ALL O-200, O-300, GO-300
 Refer to Figure 7.

PISTON TO CYLINDER CLEARANCE	
4.06" PISTON	PISTON IN CYLINDER MEASURED ABOVE 4 th RING GROOVE
ALL NON GRAPHITE COATED	.009 - .012 LOOSE
GRAPHITE COATED	.007 - .011 LOOSE
Measure clearance perpendicular to pin bore and at "D" Diameter.	

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MO	DAY	YEAR	MO	DAY	YEAR		9 of 11	C
03	24	97	04	01	99		SID97-4	

4.06 CYLINDER C-SERIES, O-200, O-300 & GO-300's

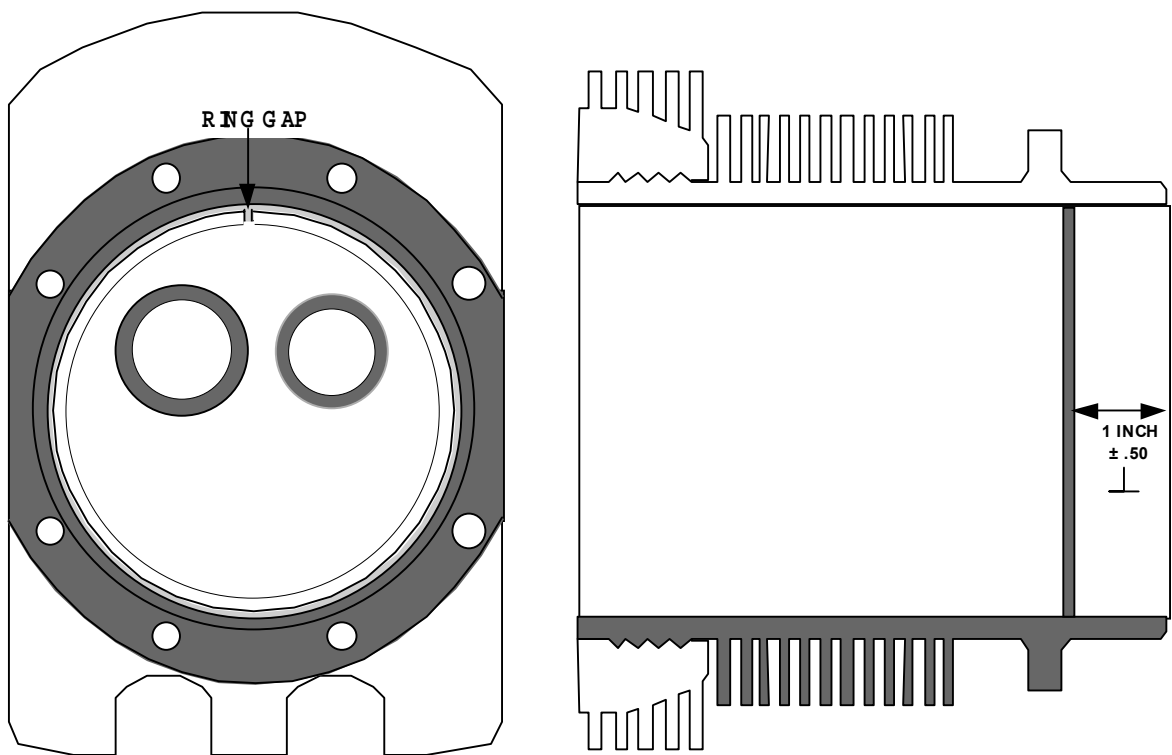


FIGURE 8. LOCATION FOR INSPECTING RING GAP

4.06 CYLINDER C-SERIES, O-200, O-300 & GO-300's

RING GAP SPECIFICATIONS
Refer to Figure 8.

Measure 1.00 ± .50 into bore. ⊥		
RING	PART NUMBER	GAPS
RING SET	649632A2	N/A
Top	649632	.023 - .036
2 nd	638110	.015 - .028
3 rd	638110	.015 - .028
Oil Control	638111	.015 - .028


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MO	DAY	YEAR	MO	DAY	YEAR		10 of 11	C
03	24	97	04	01	99		SID97-4	

TABLE 1. Piston to Engine Reference

Engine Model	Manganese Phosphate, Graphite Coated	Uncoated	Graphite Coated	Piston Diameter	Skirt Diameter	Pin to Dome Height
GTSIO520C, D, H, K, L, M, N, TSIO520AF, B, BB, BE, C, CE, D, DB, E, EB, G, H, J, JB, K, KB, L, LB, M, N, NB, P, R, T, UB, VB, WB	654840	648044	654724	5.25"	5.2420-5.2430	1.835-1.839
	654840P010	648044P010	654724P010	5.26"	5.2520-5.2530	
	654840P015	648044P015	654724P015	5.265"	5.2570-5.2580	
IO520A, B, BA, BB, C, CB, D, E, F, J, K, L, M, MB, N, NB,	654850	648045		5.25	5.2420-5.2430	1.617-1.621
	654850P010	648045P010		5.26"	5.2520-5.2530	
	654850P015	648045P015		5.265"	5.2570-5.2580	
IO550A, B, C, D, E, F, G, L, N,	654857	648046	654726	5.25"	5.2420-5.2430	1.775-1.779
	654857P010	648046P010	654726P010	5.26"	5.2520-5.2530	
	654857P015	648046P015	654726P015	5.265"	5.2570-5.2580	
IO346A, TSIO550A, B, C, E, TSIOL550A, B, C	654867	649805	654731	5.25"	5.2432-5.2442	1.775-1.779
IO520P, LTSIO520AE, LIO520P, TSIO520AE	654836	648037	654723	5.25"	5.2420-5.2430	1.775-1.779
	654836P010	648037P010	654723P010	5.26"	5.2520-5.2530	
	654836P015	648037P015	654723P015	5.265"	5.2570-5.2580	
IO470C, O470G, O470GCI, O470M	654829	648028	654721	5.00"	4.9887-4.9897	2.0157-2.0197
IO470D, E, F, H, L, M, N, S, U, V, O470U	654832	648029	654722	5.00"	4.9887-4.9897	2.0665-2.0705
	654832P015	648029P015	654722P015	5.015"	5.0037-5.0047	
IO470K, J	654862	649044	654729	5.00"	4.9887-4.9897	1.7689-1.7729
	654862P015	649044P015	654729P015	5.015"	5.0037-5.0047	
O470K, L, R, S	654833	646263	654744	5.00"	4.9907-4.9922	1.977-1.981
	654833P015	646263P015	654744P015	5.015	5.0057-5.0072	
LTSIO360E, EB, KB, RB, TSIO360A, AB, C, CB, D, DB, E, EB, F, FB, GB, H, HB, JB, KB, LB, MB, RB, SB	654859	648048	654727	4.44"	4.4270-4.4280	1.598-1.602
	654859P015	648048P015	654727P015	4.455"	4.4420-4.4430	
IO240A, B, IO360A, AB, C, CB, D, DB, G, GB, H, HB, J, JB, K, KB, LB	654861	648049	654728	4.44"	4.4270-4.4280	1.591-1.595
	654861P015	648049P015	654728P015	4.455"	4.4420-4.4430	
O200A, B, O300A, C, D,	654853	646255	654749	4.06"	4.0517-4.0532	1.591-1.596
	654853P015	646255P015	654749P015	4.075"	4.0667-4.0682	
GO300	654858	646279		4.06"	4.0517-4.0532	1.611-1.616
	654858P015	646279P015		4.075"	4.0667-4.0682	
C75	654841	646287		4.06"	4.0514-4.0524	1.698-1.708
	654841P015	646287P015		4.075"	4.0664-4.0674	

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MO	DAY	YEAR	MO	DAY	YEAR		11 of 11	C
03	24	97	04	01	99		SID97-4	