



Service Instruction

FAA-PMA Replacement Parts

Title: **ECi Piston Ring Sets Applications, Fitting Instructions and Reference**

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Technical portions are FAA DER approved by Airmotive Engineering Corp.



1.0 CONTINENTAL APPLICATIONS:

Table 1

Engine Model	Piston Part Number	ECi Ring Set Number		
		Nickel+Carbide™ Barrel	Steel Barrel (Any Process)	Chrome Barrel (Any Process)
C, 200 & 300	40327, 530348, 626146, 646255, 646279, 646287, 654749, 654841, 654853, 654858	CN102	ST102	CC102
E & 470	631481, 631540, 639565, 640518, 646263, 646280, 646722, 648028, 648029, 649044, 649266, 654721, 654729, 654744, 654829, 654832, 654833, 654862, 655988	CN106	ST106	CC106
470	627738, 629185	CN108	ST108	CC108
346 520 550	630046, 631475, 632585, 633109, 641782, 641833, 642602, 642761, 646063, 646072, 646303, 646533, 648013, 648033, 648037, 648044, 648045, 648046, 649227, 649805, 654723, 654724, 654726, 654836, 654731, 654840, 654850, 654857, 654867, 656171	CN110	ST110*	CC110
360	646247, 646743, 648048, 648049, 654727, 654728, 654859, 654861	CN112	ST112	CC112

*Also available in P005, P010 and P015

2.0 LYCOMING APPLICATIONS:

Table 2

Engine Model	Piston Part Number	ECi Ring Set Number		
		Nickel+Carbide™ Barrel	Steel Barrel (Any Process)	Chrome Barrel (Any Process)
290 & 435	69841, 69958, 70396	CC201	ST201**	CC201
235 Straight BBL	73851	CC202	ST202	CC202
320, 340, 360, 480, 540, 541, 720	75089, 75413, 76966, 78762, LW10207, LW10205, LW10545, LW13396, LW14610, LW15357, LW19176	CN203	ST203**	CC203
235 Choked BBL	LW11621, LW13623, LW18725, LW18729	CN204	ST204	CC204

**Also available in P010



3.0 FITTING INSTRUCTIONS:

- 3.1 Determine the composition of the cylinder bore BEFORE selecting the ring set. The cylinder bore and the ring materials must be compatible (see Figure 1).
- 3.2 Check ring end gap per Table 4 and FAA approved data. End gap must be measured prior to installation of ring on the piston.
- 3.3 Make certain the compression rings do not close at top of ring travel in choked cylinders. A minimum of 0.0075" gap is required at top dead center of piston travel.
- 3.4 Fit rings to each piston in appropriate grooves using the correct fitting tool.
- 3.5 Oversize rings and ring sets are available and are identified by the suffix PXXX

4.0 OIL CONTROL RINGS:

- 4.1 Install the ring expander into the appropriate piston groove.
- 4.2 Fit the oil control ring into the same ring groove so that the expander engages the internal groove in the ring.
- 4.3 Space the gaps of the ring and the expander approximately 180° apart.

WARNING...

Hard bumping of the oil ring during installation can cause the formation of cracks in the oil ring that may not fail immediately; however, oil ring breakage can introduce pieces of the ring expander between the piston and bore. This can result in the formation of grinding type cracks on the bore surface, especially in chrome bores. These cracks have been known to propagate and cause complete catastrophic engine failure.

FINALLY...

- Cylinder bore cleanliness can be evaluated by using clean cellophane tape and a white sheet of paper. Wrap a length of tape (sticky side out) around two or three fingers. Pat the tape at many locations on the cylinder bore and after cutting the tape, place it sticky side down on a white sheet of paper. High particle count indicates a dirty surface and requires that the bore be recleaned.
- Ensure rings move freely in the groove after assembly.
- Check side clearance per Manufacturer's Overhaul Manual.
- Orientate ring gaps of the top (#1) and third (#3) ring the same. Orientate the ring gaps of the second (#2) and fourth (#4) ring, if applicable, 180° from the gaps of rings #1 and #3.
- Thoroughly lubricate cylinder bore and piston assembly; i.e., piston rings and pin, with clean oil.
- Insert piston assembly into cylinder bore using piston ring compressor of the appropriate size immediately after lubrication to prevent contamination.

NEVER:

- Never use chromium plated or bimetallic rings in a chromium plated cylinder, (Channel type or CERMICROME™ PROCESS).
 - Never use chromium plated rings in Nickel+Carbide™ process cylinder.
 - Never lap piston rings.
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Figure 1
Recommended Piston Ring/ Bore Combinations

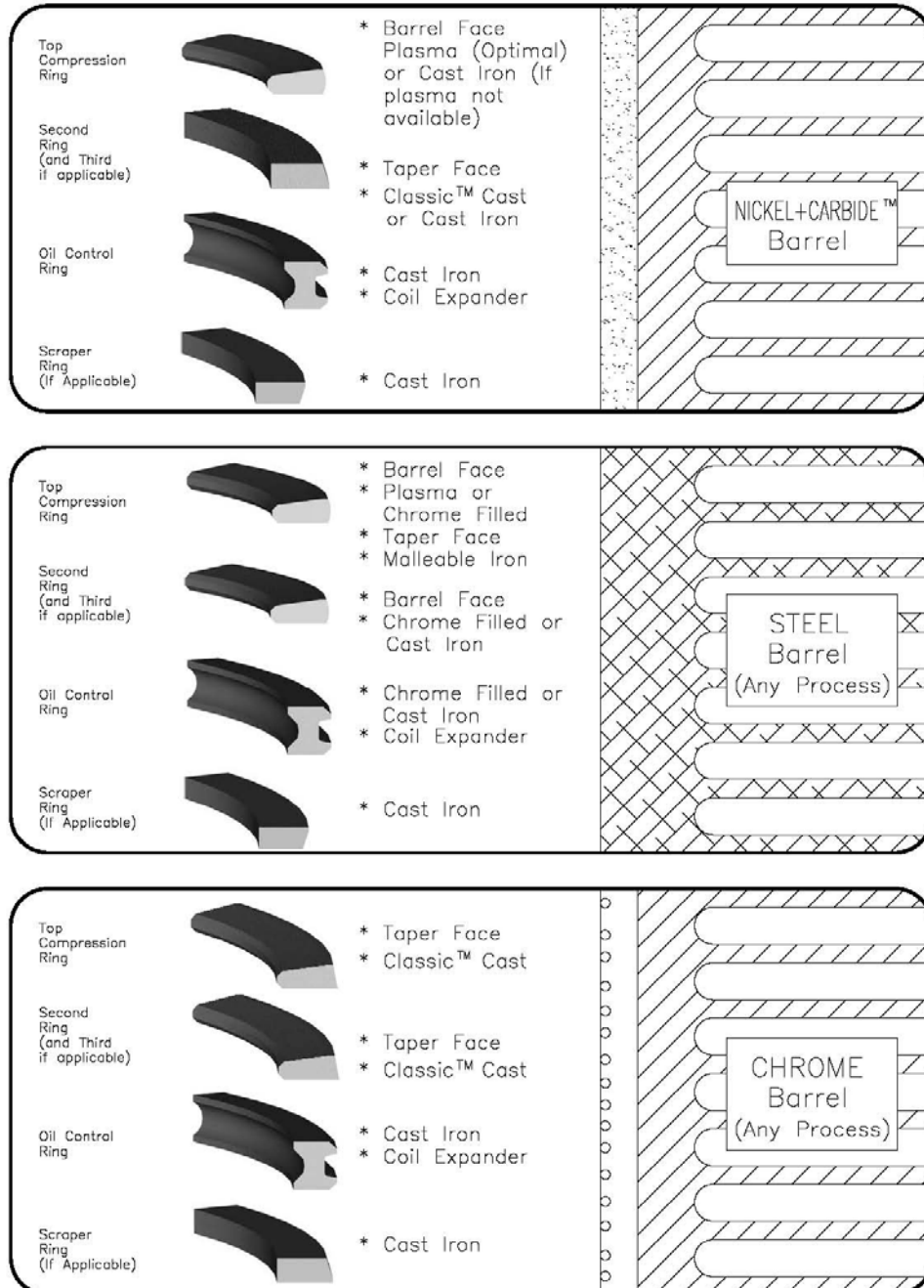




Table 3
REFERENCE DATA
Individual Piston Ring Sets* for Lycoming Engines

ECi Ring Set P/N	Barrel Surface	Top Ring	2 nd Ring	3 rd Ring	Oil Ring	Scraper	Equiv. Ring Set P/N
ST201	Steel	AEL13883ST	AEL13883ST	N/A	AEL69401ST	N/A	N/A
ST201P010	Steel	AEL13883STP010	AEL13883STP010	N/A	AEL69401STP010	N/A	N/A
CC201	Chrome or Nickel+Carbide™	AEL13883CC	AEL13883CC	N/A	AEL69401CC	N/A	N/A
ST202	Steel	AEL68196ST	AEL68196ST	N/A	AEL16867ST	AEL60072	N/A
CC202	Chrome or Nickel+Carbide™	AEL68196CC	AEL68196CC	N/A	AEL16867CC	AEL60072	N/A
ST203	Steel	AEL74241PL	252577CC	N/A	252578ST	N/A	SL3601-SC
ST203P010	Steel	252577STP010	252577STP010	N/A	252578STP010	N/A	SL3601-SCP10
CN203	Nickel+Carbide™	AEL74241PL	252577CC	N/A	252578CC	N/A	N/A
CC203	Chrome	252577CC	252577CC	N/A	252578CC	N/A	SL5401-SC
ST204	Steel	AEL78862PL	252560CC	N/A	252561ST	N/A	SL2351-SC
CN204	Nickel+Carbide™	AEL78862PL	252560CC	N/A	252561CC	N/A	N/A
CC204	Chrome	252560CC	252560CC	N/A	252561CC	N/A	SL2300-SC

Individual Piston Ring Sets* for Continental Engines

ECi Ring Set P/N	Barrel Surface	Top Ring	2 nd Ring	3 rd Ring	Oil Ring	Scraper	Equiv. Ring Set P/N
ST102	Steel	AEC649632PL	252511CC	252511CC	252531CC	N/A	SA2000-SC
CN102	Nickel+Carbide™	AEC649632PL	252511CC	252511CC	252531CC	N/A	N/A
CC102	Chrome	252511CC	252511CC	252511CC	252531CC	N/A	SA1000-SC
ST106	Steel	AEC648009PL	250001CC	N/A	252532WST	252519CC	SA4000-SC2
CN106	Nickel+Carbide™	AEC648009PL	250001CC	N/A	252532WCC	252519CC	N/A
CC106	Chrome	250001CC	250001CC	N/A	252532WCC	252519CC	SA4701-SC2
ST108	Steel	AEC648009PL	250001CC	N/A	252532CC	252519CC	SA4000-SC7
CN108	Nickel+Carbide™	AEC648009PL	250001CC	N/A	252532CC	252519CC	N/A
CC108	Chrome	250001CC	250001CC	N/A	252532CC	252519CC	SA4701-SC7
ST110	Steel	AEC648005PL	252509CC	N/A	252545ST	252546CC	SA5000-SC5
ST110P005	Steel	AEC648005PLP005	252509CCP005	N/A	252545STP005	252546CCP005	SA5000-SC5P05
ST110P010	Steel	AEC648005PLP010	252509CCP010	N/A	252545STP010	252546CCP010	SA5000-SC5P10
ST110P015	Steel	AEC648005PLP015	252509CCP015	N/A	252545STP015	252546CCP015	SA5000-SCP15
CN110	Nickel+Carbide™	AEC648005PL	252509CC	N/A	252545CC	252546CC	N/A
CC110	Chrome	252501CC	252509CC	N/A	252545CC	252546CC	SA5201-SC2
ST112	Steel	AEC648039PL	252540CC	N/A	252542ST	252543CC	SA3610-SC
CN112	Nickel+Carbide™	AEC648039PL	252540CC	N/A	252542CC	252543CC	N/A
CC112	Chrome	252540CC	252540CC	N/A	252542CC	252543CC	SA3364-SC

***NOTE:** On occasion, ring sets may contain ring part numbers other than those listed in the reference data. When substitution occurs, ECi has determined that the installation eligibility of the ring set and the warranty have not been affected. The label of the ring set contains the actual part numbers of the rings in the set.



Table 3: Cont'd

NOTE: When piston ring sets do not consist of all ECi PMA rings, it is necessary to refer to the specific manufacturer for ring end gap data.

Piston Rings for Lycoming Engines

ECi Ring P/N	Type Of Ring	Ring Material	Lycoming P/N	Superior P/N
AEL60072	235 Scraper	Cast Iron	60072	N/A
AEL68196CC	235 Compression	Cast Iron	LW14233	N/A
AEL68196ST	235 Compression	Chrome Faced	68196	N/A
AEL69401CC	290 Oil Control	Cast Iron	68338	N/A
AEL69401ST*	290 Oil Control	Chrome Faced	69401	N/A
AEL74241PL	5 1/8" Compression	Bimetallic	N/A	N/A
AEL78862PL	235 Compression	Bimetallic	N/A	N/A
AEL13883CC	290 Compression	Cast Iron	LW13883	N/A
AEL13883ST*	290 Compression	Chrome Faced	62916	N/A
AEL16867CC	235 Oil Control	Cast Iron	LW18352	N/A
AEL16867ST	235 Oil Control	Chrome Faced	LW16867	N/A
252560CC	235 Compression	Cast Iron	LW14234	SL14234
252561CC	235 Oil Control	Cast Iron	LW14235	SL14235
252561ST	235 Oil Control	Chrome Faced	78864	SL78864
252577CC	5 1/8" Compression	Cast Iron	74673	SL74673
252577ST*	5 1/8" Compression	Chrome Faced	74241	SL74241
252578CC	5 1/8" Oil Control	Cast Iron	73998	SL73998
252578ST*	5 1/8" Oil Control	Chrome Faced	73857	SL73857

*ALSO AVAILABLE IN P010

Piston Rings for Continental Engines

ECi Ring P/N	Type Of Ring	Ring Material	Continental P/N	Superior P/N
AEC648005PL**	520 Compression	Bimetallic	648005	N/A
AEC648009PL	470 Compression	Bimetallic	648009	N/A
AEC648039PL	360 Compression	Bimetallic	648039	N/A
AEC649632PL	200 Compression	Bimetallic	649632	N/A
250001CC	470 Compression	Cast Iron	648010CP	SA4701
252501CC	520 Compression	Cast Iron	648005CP	SA5201
252509CC	520 2 nd Compression	Cast Iron	648006CP	SA5202
252511CC	200 Compression	Cast Iron	638110	SA1000
252519CC	470 Scraper	Cast Iron	648012	SA4709
252531CC	200 Oil Control	Cast Iron	640298	SA1007
252532CC	470 Oil Control 5/32"	Cast Iron	639768	SA4707
252532WCC	470 Oil Control 3/16"	Cast Iron	648011CP	SA4706A
252532WST	470 Oil Control 3/16"	Chrome Faced	648011	SA4705
252540CC	360 Compression	Cast Iron	648039CP	SA3364
252540CC	360 2 nd Compression	Cast Iron	648040CP	SA3364
252542CC	360 Oil Control	Cast Iron	648041CP	SA3365
252542ST	360 Oil Control	Chrome Faced	648041	SA639758
252543CC	360 Scraper	Cast Iron	648042	SA630678
252545CC	520 Oil Control	Cast Iron	648007CP	SA5205
252545ST**	520 Oil Control	Chrome Faced	648007	SA5208
252546CC**	520 Scraper	Cast Iron	648008	SA5209



Table 4

Note: End gap tolerances given are to be measured at the flange end of the bore and are for reference only. End Gap is reduced at the top of ring travel by the bore times 3.14. It is important that the End Gap be checked at top of ring travel where it must not be less than .0075" for Lycoming and Continental cylinders.

ECi RING SETS

ECi Ring Set P/N	Top Ring	End Gap	Side Clearance	2nd Ring	End Gap	Side Clearance	3rd Ring	End Gap	Side Clearance	Oil Ring	End Gap	Side Clearance	Scraper Ring	End Gap	Side Clearance
ST201**	AEL13883ST	.020/.030*	.0005L/.005L	AEL13883ST	.020/.030*	.0005L/.005L	N/A	N/A	N/A	AEL69401ST	.015/.035	.002L/.004L	N/A	N/A	N/A
CC201	AEL13883CC	.020/.030*	.0005L/.005L	AEL13883CC	.020/.030*	.0005L/.005L	N/A	N/A	N/A	AEL69401CC	.015/.035	.002L/.004L	N/A	N/A	N/A
ST202	AEL68196ST	.020/.030*	.0005L/.005L	AEL68196ST	.020/.030*	.0005L/.005L	N/A	N/A	N/A	AEL16867ST	.015/.035	.002L/.004	AEL60072	.015/.040	.003L/.0055L
CC202	AEL68196CC	.020/.030*	.0005L/.005L	AEL68196CC	.020/.030*	.0005L/.005L	N/A	N/A	N/A	AEL16867CC	.015/.035	.002L/.004	AEL60072	.015/.040	.003L/.0055L
ST203**	AEL74241PL	.030/.050	.0015L/.005L	252577CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252578ST	.015/.035	.002L/.004L	N/A	N/A	N/A
CN203	AEL74241PL	.030/.050	.0015L/.005L	252577CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252578CC	.015/.035	.002L/.004L	N/A	N/A	N/A
CC203	252577CC	.030/.050	.0015L/.005L	252577CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252578CC	.015/.035	.002L/.004L	N/A	N/A	N/A
ST204	AEL78862PL	.030/.050	.0015L/.005L	252560CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252561ST	.015/.035	.002L/.004L	N/A	N/A	N/A
CN204	AEL78862PL	.030/.050	.0015L/.005L	252560CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252561CC	.015/.035	.002L/.004L	N/A	N/A	N/A
CC204	252560CC	.030/.050	.0015L/.005L	252560CC	.030/.050	.0015L/.005L	N/A	N/A	N/A	252561CC	.015/.035	.002L/.004L	N/A	N/A	N/A
ST102	AEC649632PL	.025/.035	.006L/.008L	252511CC	.020/.035	.003L/.007L	252511CC	.015/.035	.003L/.007L	252531CC	.015L/.030	.002L/.004L	N/A	N/A	N/A
CN102	AEC649632PL	.025/.035	.006L/.008L	252511CC	.020/.035	.003L/.007L	252511CC	.015/.035	.003L/.007L	252531CC	.015L/.030	.002L/.004L	N/A	N/A	N/A
CC102	252511CC	.025/.035	.006L/.008L	252511CC	.020/.035	.003L/.007L	252511CC	.015/.035	.003L/.007L	252531CC	.015L/.030	.002L/.004L	N/A	N/A	N/A
ST106	AEC648009PL	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532WST	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
CN106	AEC648009PL	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532WCC	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
CC106	250001CC	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532WCC	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
ST108	AEC648009PL	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532CC	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
CN108	AEC648009PL	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532CC	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
CC108	250001CC	.035/.050	.0015L/.004L	250001CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252532CC	.025/.045	.002L/.005L	252519CC	.030/.050	.006L/.008L
ST110**	AEC648005PL	.035/.050	.0015L/.004L	252509CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252545ST	.025/.045	.003L/.005L	252546CC	.030/.050	.006L/.008L
CN110	AEC648005PL	.035/.050	.0015L/.004L	252509CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252545CC	.025/.045	.003L/.005L	252546CC	.030/.050	.006L/.008L
CC110	252501CC	.035/.050	.0015L/.004L	252509CC	.035/.050	.0015L/.004L	N/A	N/A	N/A	252545CC	.025/.045	.003L/.005L	252546CC	.030/.050	.006L/.008L
ST112	AEC648039PL	.035/.050	.001L/.003L	252540CC	.030/.045	.001L/.003L	N/A	N/A	N/A	252542ST	.025/.045	.003L/.005L	252543CC	.025/.045	.003L/.005L
CN112	AEC648039PL	.035/.050	.001L/.003L	252540CC	.030/.045	.001L/.003L	N/A	N/A	N/A	252542CC	.025/.045	.003L/.005L	252543CC	.025/.045	.003L/.005L
CC112	252540CC	.035/.050	.001L/.003L	252540CC	.030/.045	.001L/.003L	N/A	N/A	N/A	252542CC	.025/.045	.003L/.005L	252543CC	.025/.045	.003L/.005L

*End gaps for Straight Bores. For Choked Bores, see note above.

**Oversize rings have the same end gap and clearance requirements as the similar standard ring.