SERVICE BULLETIN

DISTRIBUTION LIST #3

Continental Motors Corporation
Aircraft Engine Division

205 MARKET STREET — MUSKEGON, MICH., U. S. A. — CABLE ADDRESS: "CONTEMT"

M47-16
December 30, 1947
(Revised 7-9-52)

TO: Aircraft Manufacturers, Continental Authorized and Approved Service Stations, Parts Distributors, Dealers, Maintenance Personnel, and Engine Owners.

SUBJECT: Procedure and Instructions for Engine Model or Series Conversion.

MODELS: A50-4 to -9; A65-1 to -9; A75-8; -9, -12; C75 and C85-8, -12.

PURPOSE: To facilitate C.A.A. approval of converted engines.

Gentlemen:

We have been advised by the Civil Aeronautics Administration that some agencies are attempting to convert certain models of Continental light aircraft engines to other models or other dash numbers of the same model without having received instructions for the changes involved or approval of the conversions from either this firm or the manufacturer of the aircraft involved. This has led to difficulty in determining whether the converted engines conform to current specifications and, hence, are eligible for re-certification. In some cases the owners have suffered delays, inconvenience, and unnecessary trouble.

We wish to call to your attention the Civil Air Regulations concerning modification of approved engine types. These rules are contained in C.A.A. 18, paragraphs 18.401, 18.4102, 18.4103, 18.4110, 18.500, 18.5011, 18.5021, 18.51, 18.52, 18.530, 18.5300, 18.531, 18.5311, 18.5315, 18.5316, 18.5317, 18.5318, 18.5319.

In recent months a number of requests for new Engine Identification Plates have been received by this office from engine repair agencies who state that certain Continental light aircraft engines have been converted to models of higher power, though there is no record of their applications for approval of these conversions and no indication of their having received our conversion instructions. These irregularities are probably due to lack of knowledge of the regulations cited above.

For the foregoing reasons it seems necessary to endeavor, by means of this bulletin, to inform all light aircraft operators and repair agencies of the procedure required in order to obtain the approval of this firm prior to any engine model or series conversion work. Unless this procedure is followed, requests for Identification Plates appropriate to models other than the original cannot be fulfilled.

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C.M.C. Form No. AVS-1, entitled, "Application for Engine Model or Series Conversion," will be furnished on request to the registered owner of any Continental light aircraft engine. This application must be approved by this office before conversion work is undertaken.

Before requesting approval of an engine conversion, owners are urged to ascertain from the Civil Aeronautics Administration that the proposed engine model and power rating are covered by the Aircraft Type Specification in effect for the Aircraft in which it is proposed to install the converted engine. Some aircraft are not certificated for higher power or speed than originally provided. Others may require extensive alteration of fuel systems or other equipment to accommodate the converted model. These possibilities should all be investigated before a decision is made.

Three copies of Form No. AVS-1 are furnished to each Applicant. Copies Nos. 1 and 2 must be mailed to this office. Copy No. 3 is to be retained by the Applicant for reference. Instructions for completing the applications are stated thereon. These instructions must be followed in all details.

Form No. AVS-1 incorporates a certificate of compliance with C.M.C. requirements and conditions of approval of the conversion application. This certificate must be signed by the registered owner of the engine. If the owner is a corporation, the signer must be an officer of the firm and must identify his position.

During the execution of Form No. AVS-1, the owner will find it necessary to search the engine log book for entries relative to certain important parts repairs and/or replacements. Certain other information may have to be obtained by internal inspection of the engine.

Upon receipt of an Application for Model or Series Conversion at this office, it will be checked against production records and will be examined for completeness, accuracy, and apparent safety of the subject engine and its major parts. Some applications cannot be approved, because the subject engines cannot be made to conform with current Type Specifications or Stock Lists. Others may be disapproved because of obsolescence of the desired model. In general, the model conversions which are not approved are:

(a) Conversion of model A40 to any other model.
(b) Conversion of model A50, Series -1, -2, or -3 to any other model or series.
(c) Conversion of models A50, A65, or A75 (any series) to model A80.
(d) Conversion of model W670-9 A to any other series of model W670.
(e) ~~Conversion of model C75 or C85 to model C90.~~
(f) Conversion of model C125 to model C145.
(g) Conversion of any carburetor engine to an Injector Type.
(h) Conversion of any series 8 model to a series 12 and vice versa is not recommended as being practical due to the numerous parts changes required and the prohibitive cost involved.
(i) Conversion of E185 engines to the 205 horsepower take-off rating is restricted to factory major overhauled and remanufactured engines only.

Upon approval of the application by this office, the No. 2 copy is filed, and the No. 1 copy, bearing conditions of approval and signature, is returned to the Applicant, who must obtain conditions of approval of the installation from C.A.A. The aircraft manufacturer should be consulted for information regarding aircraft parts to be installed in conjunction with the converted engine. If desired, the Applicant may send the No. 1 copy of his application to the aircraft manufacturer with a request for his instructions and approval.

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Upon receipt of the No. 1 copy of the application bearing the approval of Continental Motors Corporation, the Applicant may proceed with conversion work in accordance with conditions of approval and instructions supplied. The Engine Identification Plate should not be altered, and it should not be removed until the work has been inspected by a designated C.A.A. inspector.

C.A.A. approval of the engine conversion will be based on conformity with regulations enumerated on page 1 of this bulletin. These require that the work be performed by one of the three types of repair agency, that certain data be submitted, that the engine manufacturer's C.A.A. approved instructions be followed, that original parts be exhibited along with conversion parts, that weight and balance data be provided, and that required test flights be performed. The data required is to be submitted, on form ACA-337. This should include a list of original parts removed (with numbers) and of conversion parts installed. The approved No. 1 copy of the conversion application should also be submitted.

In order to complete the conversion it will be necessary to order from this office and install a new Engine Identification Plate which is properly stamped according to the new model number. This plate, correctly stamped with all identifying data, will be supplied on receipt of:

(a) Purchase Order or letter order stating engine serial number and new serial and series.
(b) Original Engine Identification Plate.
(c) Copy of C.A.A. Form ACA-337 describing the conversion and signed by a C.A.A. Inspector or designee (other than the conversion agency).
(d) Check or Money Order in the amount of $1.38.

The dash number of the new model may be determined from the list accompanying this bulletin. The new serial number assigned will be the original number followed by the letter "C". Our production records will be noted accordingly.

New Identification Plates are sent complete with 6 drive screws for attachment to the crankcase. The original screws should be removed from the crankcase or ground off flush with the surface. New holes must be drilled for the new drive screws with a 1/16" drill to a depth of only 3/32", using the new plate as a template.

The general rules under which this office will approve or disapprove applications for model or series conversion are:

1. Before any application will be approved, the Applicant must have assurance of C.A.A. that the proposed model and series will be approved as a power plant for the aircraft make and model in which installation of the converted engine is intended. This rule does not apply to Service Stations who wish to convert engines for stock purposes, however such agencies must have C.A.A. approval on C.A.A. Form ACA-337 prior to sale of any converted engine. In this special case only, completion of the conversion and its approval will be hastened if the items specified in (a), (b), (c), and (d) in the third paragraph on this page are submitted with the conversion application.

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2. Conversions to models of higher power will be approved only when there appears to be no increase in the hazard of operation as a result, that is:

   (a) The engine must not have been operated more than 300 hours since the last major overhaul which included magnaflux, inspection of steel parts and careful inspection of all castings for cracks and other dangerous conditions.

   (b) The crankshaft must be one of the types currently approved for the higher power rating. Crankshafts having 1-3/16" crankpin lightening holes must be replaced if the conversion increases the engine's power rating.

   (c) All changes, modifications, and inspections of engine and accessory parts specified in currently effective C.M.C. mandatory Service Bulletins and C.A.A. Airworthiness directives must have been carried out prior to submission of the application. Numbers of Bulletins with which the owner has complied must be stated on the application in item 13.

   (d) Dual Ignition and all other essential modernization parts must be installed concurrently with the conversion, unless they are already installed. Continental Authorized and Approved Service Stations are in a position to check engines for conformity with this requirement.

3. The original model must be capable, by replacement and addition or removal of parts and accessories and by retiming of ignition, of conforming to the current specification and Production Stock List of the desired model in order to be eligible for an approved conversion.

On the attached pages will be found lists of parts to be removed and parts to be installed in making the usual engine model and series conversions. Ignition timing is included with these instructions. These processes involve only normal overhaul operations in nearly all cases, hence no special process or procedure instructions are required. In any instance where special equipment or technique is required, it will be necessary to have the work done at either this factory or any Authorized Continental Service Station.

In some cases it will be necessary to combine two or more conversions in order to modernize the engine and to bring it into conformity with the current Stock List and Specification for the desired model and series.

The attached conversion parts lists apply to unshielded Ignition systems. Radio Shielded Ignition systems are listed in existing Service Manuals. Such equipment lists may be obtained, if necessary, by request to this office.

Continental Motors Corporation cannot supply information relative to propellers, cylinder baffles, fuel system parts or other items of aircraft equipment installed by aircraft manufacturers or others. We do not stock spare parts for purchased engine accessories. These may be obtained from Authorized Dealers, Service Stations, or factory branches of the accessory manufacturer.

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To convert model C75-12 to model C85-12 the following changes are required:

REMOVE ORIGINAL PART NO.	INSTALL NEW PART NO.	PART NAME	NUMBER REQUIRED PER ASSEM.
40059	40590	Carburetor (Stromberg NA-S3A1)	1
	*384480	Plate - Carburetor Identification	2
34370	34370	Plate - Engine Identification	1
21007	21007	Screw, Drive - Identification Plate	6
A3966	A36037	Oil gauge and cap assembly	1
	**	Propeller	1
	**	Cylinder Baffles (if required)	
	**	Cowling (if required)	1
	**	Fuel System Parts (if required)	

NOTE: **These parts must conform to C.A.A. specifications for make and model of aircraft as equipped with C85-12 engine. Obtain data from aircraft manufacturer.
*Bendix Part Number. Obtain these parts from Stromberg Carburetor Distributors.

FLANGE CRANKSHAFT

Installation of the flange crankshaft (Equipment No. 5355) will produce the following changes in series designation and will require installation of a new name plate bearing the proper model and dash numbers or stamping of the letter "F" after the existing model number.

A65-8 to A65-8F
A65-8J to A65-8FJ

A75-8 to A75-8F

C85-8 to C85-8F
C85-8J to C85-8FJ
C75-12 to C75-12F
C85-12 to C85-12F

This series conversion does not require the submission of an application, even though the series number is altered, because it involves only the installation of the flange crankshaft itself, without change or modification of any other engine parts, excepting the crankshaft oil seal. This is no more than a normal overhaul operation. If a new identification plate is desired, the original plate must be sent to this office with the order and $1.38 remittance. The order must specify the series number change and should be accompanied by a copy of C.A.A. Form ACA-337 relative to the crankshaft installation.

FUEL INJECTION EQUIPMENT

Installation of fuel injection equipment on existing engines by agencies other than this factory will not be approved, because this conversion involves machining operations on the crankcase. The installation of an engine equipped with fuel injection in an aircraft not originally so equipped is not permitted by C.A.A. without alteration of the fuel system. In some cases the cowling must be altered and there might be other difficulties. Such alterations, not in conformity with the aircraft type specification require extensive engineering and testing which make the overall cost prohibitive.

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TO USE FIXED PITCH PROPELLER WITH MODEL O85-12FHJ

Model O85-12FHJ was equipped with a special crankshaft and crankcase oil feed passage to permit the installation of a hydraulic, variable pitch propeller. When it is desired to install one of these engines in an aircraft which does not permit the use of the hydraulic propeller, it becomes necessary to plug the oil feed hole, located approximately 2-5/16" to the rear of the propeller mounting flange in the right side of the crankcase, with a 1/4" pipe plug and to install a blank plug, oil seal ring, and retaining snap ring in the hollow front end of the crankshaft. The parts required are as follows:

PART NO.	PART NAME	NO. REQ'D.
25149	Plug - Flanged Crankshaft	1
25150	Ring - Retaining (Internal)	1
AN 6227-28	Seal - Oil ("O" Ring, Hydraulic)	1
2026	Plug - 1/4" Pipe	1

NOTE: Plug No. 25149 is installed in the hole bored in the front end of the crankshaft with the small central boss forward. Oil seal No. AN 6227-28 is installed in the circumferential groove of the shaft plug.

This operation does not constitute a series conversion, since the provision for hydraulic propeller remains and is only rendered inoperative. This description is included here merely to avoid the issuance of special instructions. When the above plugs are installed no application is necessary, and the Engine Identification Plate should not be altered or removed.

INSTALLATION OF PROVISIONS FOR HYDRAULIC PROPELLER

This conversion will not be approved for existing engines, since it requires a special crankcase having an oil passage to the front crankshaft bearing a special oil inlet connector boss and a special front crankshaft bearing. Also the flange crankshaft used with this equipment is specially machined to provide for oil transfer and sealing.

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MAGNETO IDENTIFICATION CHART

C.M.C. PART NO.	MAKE	MFGR'S. TYPE	MFGR'S. PART NO.	C.M.C. GEAR NO.	ROTATION	RADIO SHIELDED	IMPULSE COUPLING
5394	Scintilla	SF-4R-8	19293-1	3513	CLW	Yes	No
32550	Eisemann	AM-4	24670	35819	CLW	No	Yes
34739	Eisemann	AM-4	24680	3513	CLW	No	No
36102	Eisemann	LA-6	H27-725	352042	CCLW	Yes	Yes
40568	Eisemann	LA-4	27632	36095	CCLW	Yes	No
40569	Eisemann	LA-4		3513	CLW	Yes	No
50339	Eisemann	LA-4	27676	35929	CCLW	Yes	Yes
50350	J.I.Case	4-CAM-E		3513	CLW	No	No
50388	Eisemann	LA-4		35819	CLW	Yes	Yes
50398	J.I.Case	4-CAM-E		36023	CLW	No	Yes
50400	Scintilla	SF6LN-12	10-51392-2	35964	CCLW	Yes	Yes
50405	Eisemann	LA-4	27709	36066	CCLW	Yes	Yes
50406	Eisemann	AM-4	27706	36067	CLW	No	Yes
50407	Eisemann	LA-4	27711	36067	CLW	Yes	Yes
50483	Scintilla	S4LN-21	10-51360-1	36066	CCLW	Yes	Yes
50484	Scintilla	S6LN-21	10-51365-1	35964	CCLW	Yes	Yes
352022	Scintilla	S6LN-21	10-51365-9	352042	CCLW	Yes	Yes
530209	Scintilla	S4RN-21	10-51360-6	36066	CLW	Yes	Yes
530226	Scintilla	S4RN-20	10-51360-4	*3513	CLW	Yes	No

NOTES: * On Series 9 engines, use 3700 Gear.
CLW Indicates clockwise rotation (Magneto Viewed drom Drive End).
CCLW Indicates counter clockwise rotation.

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MAGNETO APPLICATION TABLE

MAGNETO C.M.C. PART NO.	C.M.C. ENGINE MODEL & SERIES						
	A50-8 A65-8 A75-8 A80-8	A50-9 A65-9 A75-9 A80-9	C85-8 C90-8	A65-12 C75-12 C85-12 C90-12	A100-1, -2 C115-1, -2 C125-1, -2	C145-2	E165 & E185
5394	B	B	B				
*22550	L		B				
24739	R		R				
36102							B
***40568				B			
40569	B		B				
***50339				B			
50350	R						
**50388	L		B				
50398	L						
50400					B	B	
50405				B			
50406	L		B				
50407	L		B				
50483				B			
*)50484					B	B	
352022							B
530209			B				
530225	B	B	R				

In the above table:

B indicates: Mounted on Both Sides of Engine.
L indicates: Mounted on Left Side of Engine.
R indicates: Mounted on Right Side of Engine.
* indicates: Superseded by C.M.C. Part No. 50406.
** indicates: Superseded by C.M.C. Part No. 50407.
*** indicates: Superseded by C.M.C. Part No. 50405.
*) indicates: To be supplied after present stock of Part No. 50400 is exhausted.

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CARBURETOR SPECIFICATIONS

ENGINE MODEL	A50-8	A65-8	A65-8	A65-8	ƒC75-12	ƒC75-12	C75-12	C85-12	C85-12
CMC NO.	3691	36109	3628	35885	40059	24716	36019	40636	40590
CARB. MODEL DESIGNATION	MA-S3	MA-S3B	MA-S3A1	MA-S3B	MA-S3A1	MA-S3A1	MA-S3A1	MA-S3A1	MA-S3A
STROMBERG'S PART NO.	A30150-2	380306	A18033B	380155	380162	380174	380171	380172	380167
VENTURI	1-1/4	1-1/4	1-1/4	1-1/4	1-5/16	1-5/16	1-5/16	1-3/8	1-3/8
MAIN DISCH'GE JET	#33	#22	#22	#22	#22	#22	#22	#22	#22
MAIN AIR BLEED	#65	#65	#65	#65	#60	#60	#60	#60	#60
MAIN METER'G JET	#50	#49	#49	#49	#46	#46	#46	#45	#45
MIX. CONTROL SUCTION HOLE	____	#48	#50	#48	#50	#50	#50	#50	#50
IDLE DISCH'GE HOLES UP-LOW	#58-56	#58-56	#58-56	#58-56	#58-56	#58-56	#58-56	#58-56	#58-56
IDLE TUBE FEED HOLE	#68	#68	#68	#68	#68	#68	#68	#68	#68
IDLE AIR BLEED M.B.	#60	#60	#60	#60	#60	#60	#60	#60	#60
FLOAT LEVEL	13/32 @½psi	13/32 @3 psi	13/32 @½psi	13/32 @½psi	13/32 @½psi	13/32 @½psi	13/32 @3psi	13/32 @3psi	13/32 @½psi
FLOAT NEEDLE VALVE SEAT	P-17247	*384585	**383911	**383911	**383911	**383911	*384585	*384585	*383911
HOLE IN THROTTLE VALVE	#50	#50	#50	#50	#50	#50	#50	#50	#50

NOTE: * Seat No. 384585 has a .113 dia. Seat to accomodate 2 to 4 p.s.i. pressure at Carburetor.

** Seat No. 383911 has a .187 dia. Seat for 1/2 p.s.i. or gravity pressure at Carburetor.

ƒC75-12 Carburetor No. 40059 has swivel in throttle lever.
ƒC75-12 Carburetor No. 24716 has throttle lever with swivel removed.

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9/26/58