PILATUS AIRCRAFT LTD. CH-6371 STANS, SWITZERLAND

SERVICE LETTER

SUBJECT: OVERVIEW REGARDING TORQUE LIMITER, FUEL CONTROL UNIT AND OTHER ENGINE STARTING RELATED TECHNICAL INFORMATION

All PC-12 Operators: Date: May 7/1997

This service letter provides customers with an overview of technical information regarding the torque limiter, Fuel Control Unit (FCU) and other engine starting related issues.

Pratt & Whitney Canada (P&WC) issued Service Bulletins (S. B's.) for the PT6A-67B's FCU. Pilatus also issued S. B's and Temporary Revisions (TR's) to the Airplane Flight Manual and Aircraft Maintenance Manual (AMM) regarding the torque limiter, FCU, and engine starting issues. The Pilatus SB that modifies the cabin pressurization system requires a revision to overcome difficulties with engine starting. S.B. 24-004 replaces the 30 second Starter Delay Relay with a 60 second one to engage the starter for a longer time.

Since introduction of the PC-12, some customers reported slow starting and minor power surges in different flight regimes. Jointly, Pilatus and P&WC strived to find solutions to these annoying situations. Numerous service publications, (ranging from engine fuel-control modifications to power plant rigging, and airframe electrical refinements) individually failed to solve all of the perplexing conditions. Some aircraft now have a different assortment of these modifications embodied. Because of this, there could exist a conflict between aircraft configurations, without actually clearing the aforementioned troublesome situations.

The aircraft with all modifications embodied no longer have engine starting and power surging difficulties that some customers originally reported. These aircraft also have the same configuration as new production aircraft.

We recommend that customers embody the Service Bulletins necessary to bring their aircraft up to the latest aircraft-build configuration. The following table provides a list of all publications currently issued regarding the previously mentioned difficult and/or slow starting issues and power surges.

1. EXISTING AND PLANNED TECHNICAL DOCUMENTATION AND ITS EFFECTIVITY

Reference Document	Description of Contents	Effectivity up to & Including
P&WC S.B. 14230	FCU Acceleration Valve Adjustment	S/N 120
P&WC S.B. 14248	Corroded FCU CDP Guide Rod	S/N 172
P&WC S.B. 14250	Machining Chips Obstructing FCU Orifice	S/N 172
Pilatus S.B. 73-001	New Rigging for P&WC S.B. 14248	S/N 160
Temp. Revision to AFM	New Starting Procedure	All S/N's
P&WC S.B. 14242	New FCU 3D Cam	S/N 155
P&WC CSPN A97011	3D Cam and Py Orifice	see CSPN
Pilatus S.B. 21-001	Cabin Outflow Valve Modification	S/N 140
Pilatus S.B. 21-001 Rev. 1	Introduction of Diode	S/N 160

Pilatus S.B. 72-001	Increase of Torque Limiter Setting (Optional)	S/N 160
Pilatus S.B. 72-002	Reduced Torque Limiter Setting (P&WC S.B, etc.)	S/N 171
TR 71-01 (AMM)	Various settings and adjustments	
Temp. Revision to AFM	Reduced Torque Limiter Setting (Performance, etc.)	
P&WC S.B. 14254	Replacement of FCU Py-Orifice	S/N 170
P&WC CSPN A97010	Py-Orifice	see CSPN
Pilatus S.B. 24-004	60 Second Starter Delay Relay	tbd
Temp. Revision to AFM	60 Second Starter Delay Relay	tbd

2. ENGINE STARTING

A. Engine Starting Procedure -- Temporary Revision of the Airplane Flight Manual

The FCU has two engine start schedules. The normal one is with the Condition Lever (CL) set to Ground Idle (G.I.) during engine starting. With the CL set to Flight Idle (F.I.), increased fuel flow provides improved starting of a cold engine. The TR of the AFM changed the start procedure to set the CL in the F.I. position when the engine temperature is below +5°C.

A revision to the AFM will publish the above statement.

We also advise customers to use the F.I. setting of the CL if they experience slow engine acceleration during first or cold starts. This procedure applies to all FCU configurations, but principally Woodward P/N's 8063-036, 8063-040 and 8063-041.

B. Engine Starting in F.I. -- Pilatus S.B. 21-001, Revision 1

The introduction of Pilatus S.B. 21-001 introduced Electro Magnetic Interference (EMI) which sometimes stops engine starting when the CL is in the F.I. position. Revision 1 to this S.B. introduced a diode that eliminates the problem. We request that customers include revision 1 if they have already incorporated this S.B.

C. Original FCU Configuration

With the original FCU (Woodward P/N 8063-036) installed, engine starting was slower and sometimes resulted in a hung start.

D. P&WC S.B. 14230 -- FCU Acceleration Valve Adjustment

P&WC introduced an FCU modification with S.B. 14230 to adjust the acceleration valve (new Woodward P/N 8063-036-01). This increases the fuel flow over the engine's entire operating range and thus provides quicker engine starting. However, this also results in a higher start ITT (particularly when the engine is warm) and reduces the compressor surge margin at altitude.

E. P&WC S.B. 14242 & Pilatus S.B. 73-001 -- New FCU 3D-Cam & Engine Rigging Procedure

P&WC developed a new 3D-cam in the FCU (new Woodward P/N 8063-040) which was introduced with P&WC S.B. 14242. They also issued a CSPN (A97011) on this S.B. (that includes S. B. 14254).

The new 3D cam increases the fuel flow (and consequently the acceleration) during engine starts with the CL set to the F.I. position. During engine starts with the CL set to G.I., the fuel

flow reduction lowers starting ITT's (with the engine warm or hot). The fuel flow during normal acceleration remains unchanged to the original FCU and therefore the compressor surge margin is retained.

Due to the new 3D-cam, the relationship between the Power Control Lever (PCL) and the engine speed Ng has changed. Because of this, Pilatus S.B. 73-001 includes a new power plant rigging procedure.

Customers that incorporated P&WC S.B. 14242 are requested to incorporate the Pilatus S.B. 73-001.

F. Pilatus SB 24-004 -- Introduction of a 60 Second Engine Start Delay Relay

Occasionally, the 30 second delay of the delay relay is too short a time during engine starts. Starting a cold engine with a stabilized Ng (before fuel ON) at 13%, can take as long as 45 seconds until it reaches 50% Ng. Pilatus S.B. 24-004 (and a planned TR to the AFM) introduces a 60 second delay relay.

3. ADDITIONAL FUEL CONTROL UNIT ISSUES

A. P&WC S.B. 14248 -- Corroded FCU CDP Guide Rod

Corrosion could cause restriction to the movement the FCU's CDP guide rod, and this could result in slow acceleration during engine starts.

Customers are requested to make sure that the S/N of their FCU is not affected.

B. P&WC S.B. 14250 -- Machining Chips Obstructing FCU Orifice

On some FCU's, machining chips (swarf) causes a restriction at the minimum fuel flow orifice. This could cause slow acceleration during engine starting, normal acceleration and possibly cause flame-outs during deceleration.

Customers are requested to make sure that the S/N of their FCU is not affected.

4. ENGINE OSCILLATIONS

Some aircraft engines experience severe power oscillations at high power settings, especially at or near the torque limiter setting.

A. Pilatus S.B. 71-001 -- Increase of Torque Limiter Setting

The torque limiter setting is increased to between 49.5 and 50.5 psi in order to eliminate engine power oscillation at high power settings.

We advise customers to incorporate this S.B. if they experience engine oscillations at high power settings. Note that this S. B. is only applicable to engines with FCU P/N's 8063-036, 8063-036-01 and 8063-40.

5. TORQUE LIMITER SETTING TO BELOW 44.3 psi

Customer requests indicate a requirement for setting the torque limiter to below 44.3 psi and thus use it as a torque controller. This entails modifying the FCU due to the engine oscillations at high power settings (see above). To comply with the requests, the modification involves the installation of a new Py-Orifice which is possible in the field (P&WC -- S.B. 14242 and CSPN A97010). This modification can only be done on pre-S.B. 73-001 including P&WC S.B. 14242. At the same time, the CSU and

OSG settings are changed to set both governors further apart in order to eliminate oscillations during torque limiter operations.

The procedures for setting T.O. power and the torque limiter/controller's description in the current AFM are changed. The maximum available torque is reduced because the torque limiter/controller has a droop versus altitude, and a 1 psi setting tolerance requires consideration.

Customers are requested to embody Pilatus S.B. 72-002 (including P&WC S.B. 14254) and the TR's for the AFM and AMM's (TR 71-01). Additionally, to make sure that P&WC S.B.'s 14248 and 14250 is not applicable to them.

6. MODIFICATIONS

Incorporation of P&WC S.B. 14242 involves returning the FCU to Woodward. Customers should contact P&WC for this modification. S.B's. 14242, 14248, 14250 and 14245 will be incorporated when customers return their FCU to Woodward.

Incorporation of P&WC S.B. 14248 involves returning the FCU to Woodward.

Incorporation of P&WC S.B. 14250 involves returning the FCU to Woodward or alternatively one of their field technicians to inspect or replace it.

Any approved service center can incorporate Pilatus S.B. 21-001 Rev. 1, 72-001(except P&WC 14242.

Any approved service center can incorporate Pilatus S.B.'s 72-002 and 73-001 (including P&WC S.B. 14254).

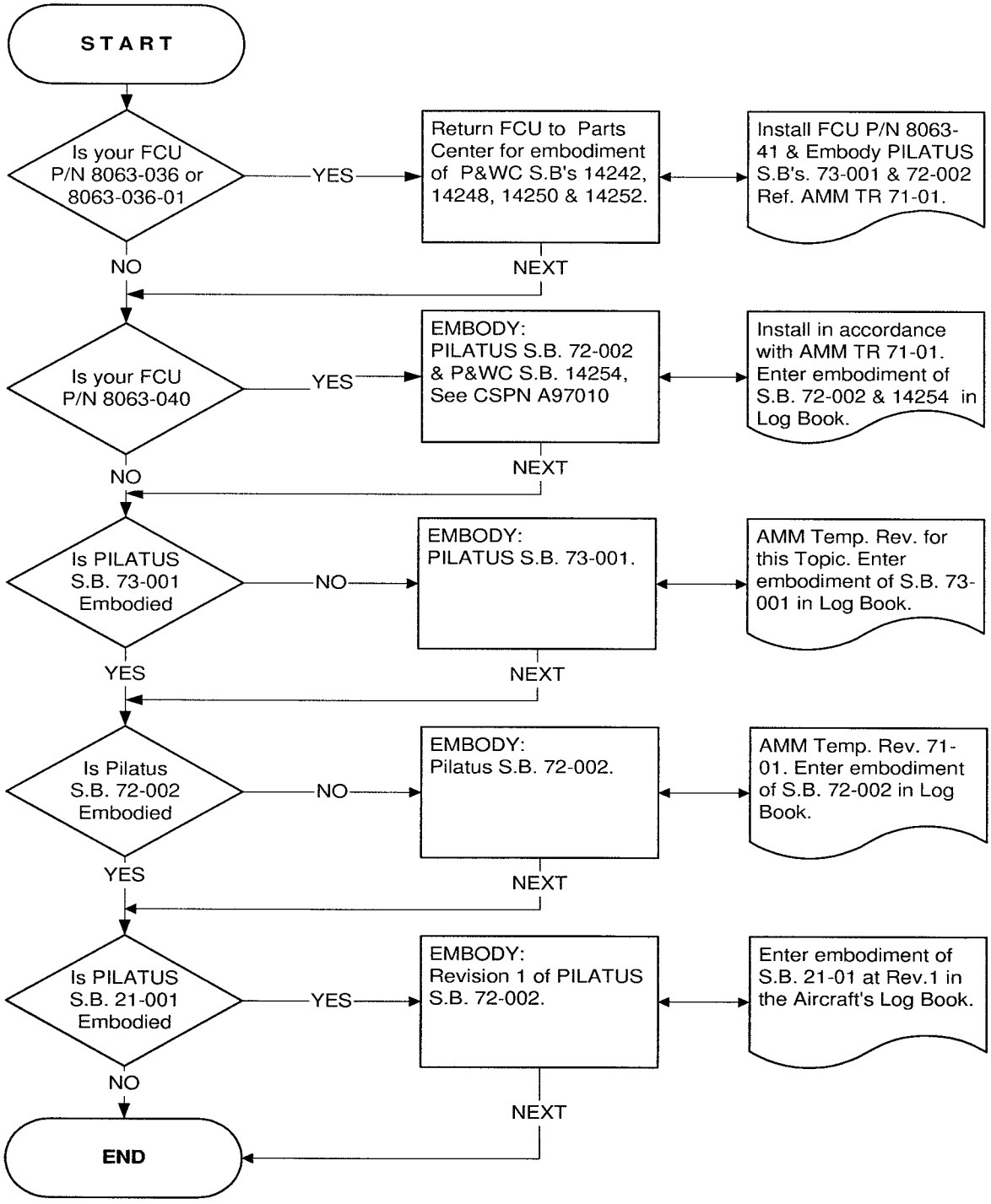
7. ACTIONS -- SEE FLOW CHART

Customers that embodied Pilatus SB 21-001 should incorporate revision 1 of SB 21-001 as soon as possible.

Customers starting engines in accordance with the AMM procedure should use F. I. when the oil temperature is below +5ºC.

Customers with an FCU P/N 8063-036 or 8063-036-01 should return it to PWC for incorporation of PWC SB's 14242, 14254, 14248, and 14250 (see CSPN A97011). In return, they will receive an exchange FCU P/N 8063-041. You should then install this FCU and simultaneously embody Pilatus SB 73-001 and 72-002 in accordance with TR 71-01 in the AMM. Operation of the engine will thereafter follow the latest AFM revision and TR for the torque limiter.

Customers with FCU P/N 8063-040 should embody Pilatus SB 72-002 (including PWC SB 14254, see CSPN A97010) in accordance with the AMM's TR 71-01. . Operation of the engine will thereafter follow the latest AFM revision and TR for the torque limiter.



Any specific inquires, concerning these subjects, should be addressed in the first instance directly to the vendor.

Should any difficulty be encountered, inquires should be made to your authorized PC-12 service Center or to the following address:

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