



|                          |                                 |                |
|--------------------------|---------------------------------|----------------|
| DO - No.<br>EASA.21J.020 | <b>Service Letter<br/>SL 78</b> | Original Issue |
|--------------------------|---------------------------------|----------------|

### **PT-6 Governor Reverse RPM-Limitation Check (P<sub>y</sub> Air-Bleed Function)**

**Affected Propeller:** MTV-16-1-E-C-F-R(P)/CFR240-55( ) on PT6-( ) engines

**Affected Aircraft Model:** Twin Otter DHC-6-100/200/300/400

**Reason:** In normal forward thrust operation the propeller speed is limited by three factors:

1. Primary governor 100% \*)
2. P<sub>y</sub> air-bleed valve (in the primary governor) approx. 106-109% \*\*)

This function is accomplished by a valve inside the primary governor, which always opens at a distinct RPM distance from the momentary selected governing RPM.

3. Overspeed governor 100% to 104%  
Separate governor mounted on the gear box.

In reverse the maximum propeller speed is only limited by the P<sub>y</sub> air-bleed function which is installed on the primary governor.

**Explanation:** In reverse operation the governor reset arm (see picture 1 on last page of this SL) is brought into the reset position (see picture 2) and the RPM limitation function of the P<sub>y</sub> air-bleed valve is brought down to approximately 91% of the momentary selected primary governor RPM.

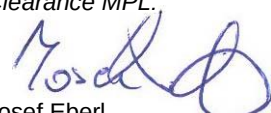
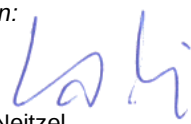
This means if the air-bleed RPM is set correctly, it is always assured that in reverse the governing RPM of either the primary governor or of the overspeed governor are **not** reached because the P<sub>y</sub> air-bleed valve opens before and limits engine power via the FCU.

This is important because both, the primary governor and the overspeed governor control overspeed in forward thrust mode by releasing servo pressure.

However, in reverse the servo pressure is controlled via the beta valve and the servo pressure is high or maximum and thus pushes the blade angle to reverse position.

Whenever servo oil pressure is released in this situation either by the primary governor or by the overspeed governor, the reverse blade angle is reduced or the propeller fully "jumps" out of reverse to forward thrust position. (What can be observed if either primary governor, air-bleed function or overspeed governor are adjusted incorrectly.)

(to be continued)

|                                                                                                                             |                                  |                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Clearance MPL:</b><br><br>Josef Eberl | Date: May 2 <sup>nd</sup> , 2022 | <b>Edition:</b><br><br>Lara Neitzel |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|

\*) All % numbers in this SL are related to 100% take off RPM propeller speed.

If take-off propeller speed RPM is defined different like 96% on the DHC-6 the % numbers must be reduced accordingly.

\*\*) When 100% are selected on the primary governor



|                          |                                 |                |
|--------------------------|---------------------------------|----------------|
| DO - No.<br>EASA.21J.020 | <b>Service Letter<br/>SL 78</b> | Original Issue |
|--------------------------|---------------------------------|----------------|

**Explanation:** (continued)

It is therefore important that in reverse the governing RPM of either the primary governor and of the overspeed governor are never reached and the  $P_y$  function reliably limits engine power.

If the above situation is encountered and the propeller sometimes jumps out of reverse, it is likely that the air-bleed RPM is set too high and the propeller speed reaches governing RPM in reverse either of the primary governor or of the overspeed governor.

(It sometimes happens that the overspeed governor RPM is set too low or the reset solenoid valve on the overspeed governor is stuck in the test position. It must therefore be assured that the overspeed governor check is performed correctly.)

**Procedure:****Air-bleed RPM Check**

- 1) To check the correct air-bleed RPM perform the following:  
Disconnect the governor reset arm from the beta linkage and tie it to the maximum reset position either with a tyrap or with safety wire (picture 2).
- 2) Perform ground run and increase power (with the propeller speed lever at maximum) until torque and  $N_g$  increase come to a stop.  
Note the achieved propeller RPM.  
The achieved propeller speed must not be higher than approximately 91% RPM.

**Adjustment:**

If the Reset RPM is found too high, it can be adjusted using the big slotted adjustment screw which is clamped tight by the two safety wired screws (picture 3).

For adjustment remove the safety wire and loosen the two clamp screws. Before making adjustments mark the original position of the point mark on the slotted screw head relative to the arrow on the clamp plate (picture 4). The reaction on adjustments is extremely sensitive. The screw acts on an eccentric shaft inside and one turn results in a full up-down change.

Therefore, play with changes around 5-10 degrees.

The following tests were done on an example original Woodward governor type 8210-025 with the original  $P_y$  RPM setting of 93%. (The governor on the DHC-6 is an 8210-004 with the same settings.)

The non-reset air-bleed RPM is at approximately to 108%.

When the reset arm is moved toward reset (aft) position, the full air-bleed reset function is already achieved with very little reset arm motion (pict. 5).

(to be continued)



|                          |                                 |                |
|--------------------------|---------------------------------|----------------|
| DO - No.<br>EASA.21J.020 | <b>Service Letter<br/>SL 78</b> | Original Issue |
|--------------------------|---------------------------------|----------------|

**Procedure:** (continued)

With only 2.5 mm gap to the forward reset arm stop the P<sub>y</sub> bleed RPM is fully reset from approximately 108% to 93% (picture 6). (RPM lever on the 100% stop.)

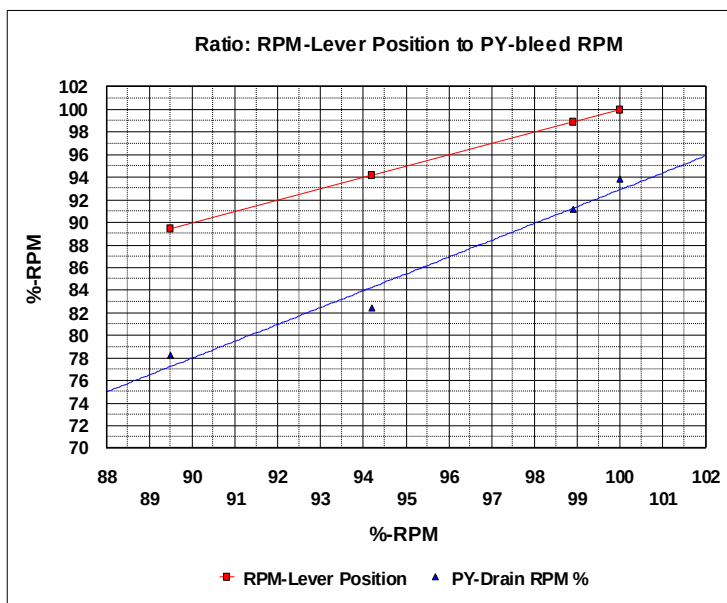
The whole rest of the reset arm motion has no effect.

The P<sub>y</sub> drain RPM has a fixed RPM margin to the momentary governor RPM arm position.

With the reset arm in the reset position the following relation is given when the RPM lever is moved to lower RPM:

**Example:**

| RPM-Lever | PY-Drain RPM % |
|-----------|----------------|
| 100,0     | 93,8           |
| 98,9      | 91,1           |
| 94,2      | 82,4           |
| 89,5      | 78,2           |



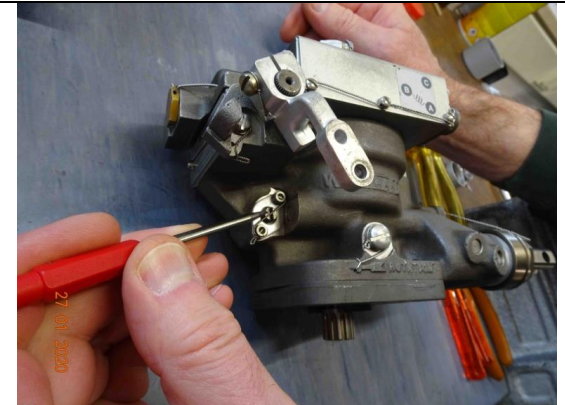
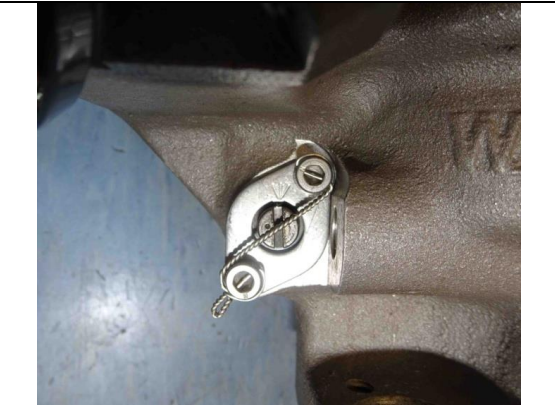
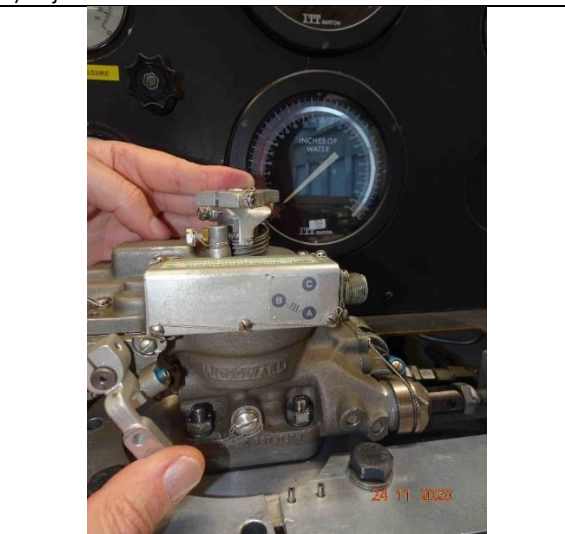
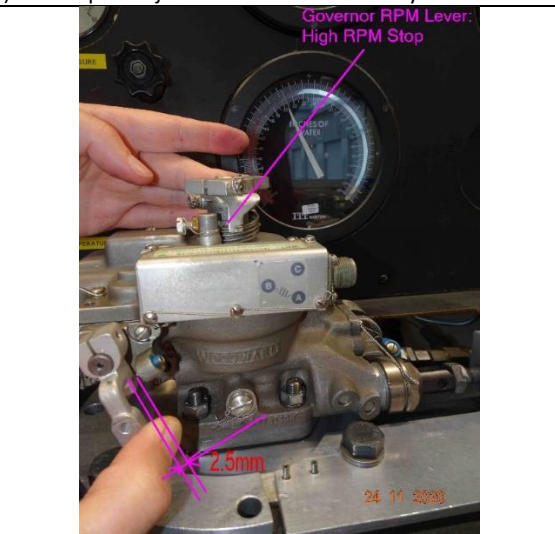
(Pictures see last page of this SL)

**Contact:**

MT-Propeller Entwicklung GmbH  
 Flugplatzstrasse 1  
 94348 Atting  
 Germany  
 e-mail: techsupport@mt-propeller.com

|                          |                         |                |
|--------------------------|-------------------------|----------------|
| DO - No.<br>EASA.21J.020 | Service Letter<br>SL 78 | Original Issue |
|--------------------------|-------------------------|----------------|

## Pictures:

|                                                                                                                      |                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Reset Arm</p> <p>27.01.2020</p> |  <p>27.01.2020</p>                                                         |
| 1) Reset arm in normal position                                                                                      | 2) Reset arm position when maximum reverse is selected.                                                                                                      |
|  <p>27.01.2020</p>                 |                                                                           |
| 3) Adjustment screw                                                                                                  | 4) Close-up of adjustment screw with safety wire.                                                                                                            |
|  <p>24.11.2020</p>                |  <p>Governor RPM Lever: High RPM Stop</p> <p>2.5mm</p> <p>24.11.2020</p> |
| 5) Reset arm forward to the stop                                                                                     | 6) Reset arm moved 2.5 mm (0.1 in) aft                                                                                                                       |