



# Airworthiness Bulletin

## AWB 31-009 Issue 2 - 14 July 2021

### Horizontal Situation Indicator - Premature timing belt failure

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

#### 1. Effectivity

Approved operators and maintainers of Century Flight Systems Inc. Horizontal Situation Indicators (HSI) model number NSD360.

#### 2. Purpose

To provide awareness that drive belts fitted to HSI model NSD360 are fraying in service and to encourage other approved maintenance organisations (AMO) to report these issues to CASA.

#### 3. Criticality of failure

The criticality of these belts failing in service is considered major if the instrument is the primary source of directional information.

Failure of this instrument is considered hazardous if there is an undetected accuracy error of more 10°.

The failures are not associated with a failure flag.

Criticality of failure is assessed as per FAA TSO-C6e and the definition of criticality of failure is specified in FAA AC 23.1309-1E.

#### 4. Background

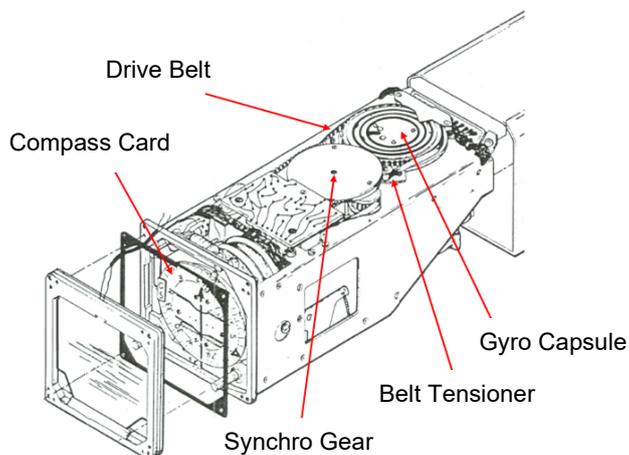
CASA has received reports from various approved maintenance organisations that drive belts fitted to HSI model NSD360 (see Figure 1) are failing prematurely in service.



Figure 1 - HSI model NSD360

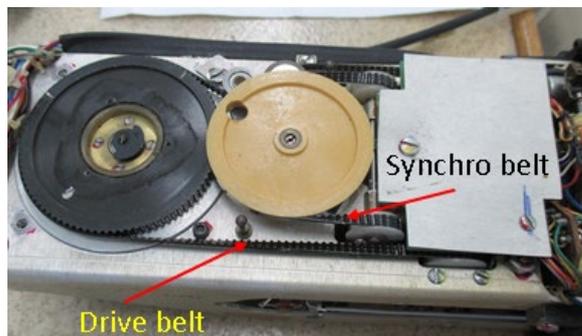


The drive belt drives the compass card on the HSI through 360° of rotation in conjunction with the drive gear motor assembly see Figure 2.



**Figure 2 - HSI drive belt related components**

The gyro drive belt is connected to the gyro assembly via a toothed gear that is mounted on top of the gyro capsule/casing see Figure 3.



**Figure 3 - Gyro and motor assembly gear**

The belt is then tensioned (see Figure 4) around the motor assembly gear and tensioned to medium tension with the belt tensioner bearing and bracket. The belt is held under tension at all times both in operation and in static/standby mode.



**Figure 4 - Belt tensioner**



Without correct function of the belt, the transfer of information from the drive motor and gyro assembly to the compass rose (front display) is compromised.

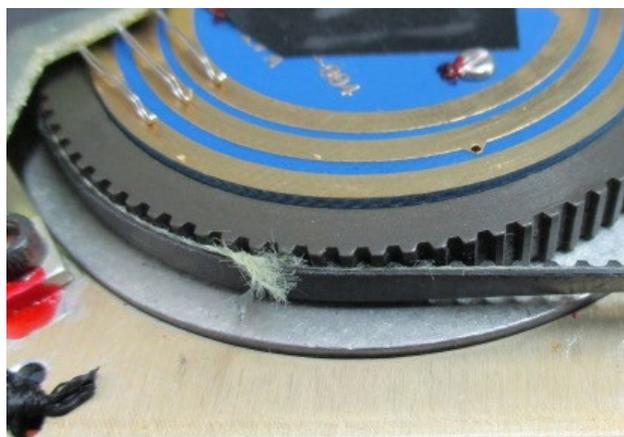
The drive belt part number: 30B437 are currently lasting between 3 to 12 months in service before failing. After approximately 60-100 hours, the belts are starting to fray and weaken, resulting in failure soon after. These issues are identified with Certificate of Conformance number 4100, 3803, 3117 and 2508; however this issue may relate to other batch numbers.

Failure of the timing belt can result in:

- Stripped teeth.
- Fraying on edges – see Figure 6
- Broken reinforcing strings
- Broken belt – see Figure 5



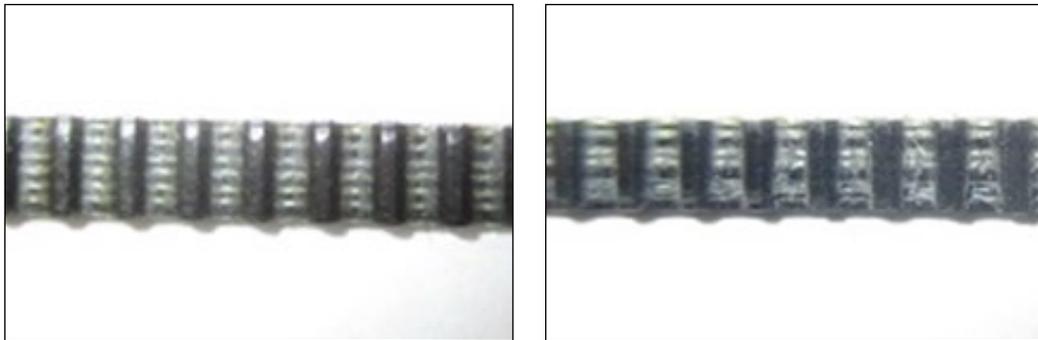
**Figure 5 - Broken belt**



**Figure 6 - Fraying belt**



The belt is comprised of a number of load carrying tensile cords. The construction of the belt has changed see Figure 7.



**Figure 7 – Left image, older timing belt with finer tensile cords shown. Right image shows changed newer belt.**

When the belts fray, the cords can get caught around the brush assembly P/N 81B340 - which is mounted on top of the gyro can - or other critical parts within the HSI.

In some instances, the individual cords can snap and become wrapped around other critical components, or the belts can stretch or break completely causing loss of indicated direction.

CASA has been in correspondence with the FAA office which oversees Century Flight Systems Inc. and will continue to provide information as the FAA requests.

## 5. Recommendations

Please quarantine any failed or damaged drive belts for further investigation.

As of June 2021, the FAA have approved an alternate means of repair via a Repair Specification document (MCIA-RS-NSD360-1). The specification allows a compliant repair to be carried out by an FAA authorised maintenance facility holding an appropriate repair specification certificate.

## 6. Reporting

CASA encourages reporting any service difficulties with drive belt failures via the Defect Reporting System.

## 7. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:

[AirworthinessBulletin@casa.gov.au](mailto:AirworthinessBulletin@casa.gov.au)

or in writing, to:

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