

Application Guidance Notes: Technical Information from Cummins Generator Technologies

## AGN 089 – Deutz Engine Fitting

### **OVERVIEW**

Deutz V12 and V16 engines are designed with turbo pipes that obstruct the alternator adaptor and fan housing. These engines are fitted with one of two types of flywheel. The subject single bearing alternators are from the S6 range.

### **CONSIDERING ENGINE FLYWHEEL HOUSING**

#### **Considering Point 1**

For these V12 and V16 engines, Deutz will supply a 25mm axial spacer ring to fit to the flywheel housing. This will effectively move the alternator marginally [25mm] away from the engine, but insufficient to clear the turbo pipes. To achieve a working clearance between adaptor and turbo, metal needs to be removed from the upper corner of the Standard HC634 adaptor - upper corner, on the side opposite to customer's terminal box cable entry. It should be noted that metal also needs to be removed from the "twelve o'clock" region of the alternator's adaptor to clear an engine rib.

This Deutz 25mm. spacer also introduces a further complication, as it changes the Flywheel / Adaptor mating face 'AN' dimension to a non-standard SAE arrangement.

#### **Considering Point 2**

The Generating Set manufacturer must ensure the engine flywheel arrangement is known and that an engineered coupling arrangement is available. There are two engine flywheel options:

- **Deutz drawing 1227 6567** shows a flywheel with both SAE 14 and 18 location spigots, with disc face location dimensions from housing / adaptor register face to flywheel location face.
  - The SAE 14 requiring the alternator to have 'AN' of 24.9mm.
  - The SAE 18 requiring the alternator to have 'AN' of 15.2mm.

These are [almost] recognised/standard SAE 'AN' offset dimensions.

- **Deutz drawing 1227 7555** shows a flywheel for SAE 18 and housing that has the disc face 0.5mm inside the housing register face.

Now consider the situation when the Deutz 25mm spacer is fitted to the engine flywheel housing. The **1227 6567** option offers a flywheel with recess locations for both SAE 18 and 14. This flywheel, when used in conjunction with the Deutz 25mm spacer ring, results in the following 'AN' dimensional requirements:

- SAE 14 = 49.9mm.
- SAE 18 = 40.2mm.

The **1227 7555** option just suits the SAE18 discs and this with the Deutz 25mm adaptor spacer ring, calls for the alternator to have an 'AN' of 25.5mm. For Reference, the standard SAE 14 'AN' is 25.4mm and the standard SAE 18 'AN' is 15.9mm.

## **HC6 (S6) ALTERNATOR COUPLING DISCS**

The standard single bearing shaft is manufactured with a shaft length that allows for:

- SAE 21 and 24 coupling disc arrangements to be fitted direct to the standard shaft where a Zero mm. 'AN' dimension is required.
- Then to achieve the standard 'AN' dimensions for other SAE coupling disc arrangements, a selection of shaft spacers are fitted to push forward the coupling disc assembly.
- For SAE 18, the 'AN' of 15.87mm is achieved by fitting a 15.87mm length of shaft spacer.
- For SAE 14, the 'AN' of 25.4mm is achieved by fitting a 25.4mm length of shaft spacer.

For information, the typical disc pack is 7.2mm thick, based on 6 discs each 1.2mm thick.

## **THE GENERATING SET SOLUTION**

The Generating Set manufacturer must ensure that, when ordering one of these engines the flywheel arrangement is known and fully understood. It must be accepted that, any of the currently available HC634 Drive End adaptors will foul on the engine's turbo pipes and the vertical centre-line rib, both with and without the Deutz 'ring'.

The alternator adaptor needs to have a large section of material cut out from the adaptor top corner - in the form of a pyramid shape. The actual 'axial depth' of the cut will depend on whether the Deutz ring is being used, but roughly the pyramid has sides of 100mm if no Deutz ring is used and some 75mm sides when D-ring is used. Similarly, the adaptor cut out on the vertical centre line is of an axial depth controlled by the use of the Deutz ring.

### **WARNING**

If large cut-outs are to be made to the adaptor supplied with the HCI634 alternator, then the originally designed strength and stiffness of this adaptor will be considerably reduced. Therefore, such extreme modifications should never be considered on a Generating Set design that does not include an engine / alternator sub-frame bolted directly to the engine's four feet and the alternator feet and so, forms a stressed member of the engine to alternator torsional and mechanical structure. It is further expected that this sub-frame will then be connected by anti-vibration mounts to the Generating Set's base frame.