

# Dry Flexible Load & Accessory Coupling

## Benefits

- Increased production
- Higher efficiency
- Compliance with environmental regulations
- Availability and Reliability**
- Life extension

Customer benefits include the following:

- Maintenance free system
- Higher reliability/availability compared to the lubricated gear type coupling
- Lower expenditure of maintenance man-hours



## What it is

Two couplings are installed on a gas turbine: one to connect the accessory gear box and one to connect the load equipment. Each of them accomplishes the following tasks:

- Connect two rotating shafts in order to transmit torque from one to the other
- Compensate for different types of misalignment (parallel, angular or both)
- Compensate for axial movement of the shafts so that neither exerts an excessive thrust on the other

In many turbomachinery installations lubricated gear couplings were installed. This type of coupling has some drawbacks which become obvious after years of operation and are as follows:

- Wear occurs between the gear teeth, which increases the operating clearances of the coupling
- Any malfunction or incorrect maintenance of the lubrication system can lead to rapid deterioration of the toothed joint
- The high rotational velocity of the coupling tends to make it act somewhat like a centrifuge such that wear particles and dirt collect inside the coupling

This effect is amplified if the oil spray system is not working properly. The effects of the above problems can lead to:

- Increasing levels of vibration
- A tendency for the coupling to seize up, which increases the effects of residual

- misalignment on the turbomachinery
- Higher expenditure of maintenance man-hours

For the above reasons, it is necessary to carry out maintenance of the coupling on a routine basis.

*Figure 1* shows the lubricated gear type load coupling for the MS3002J. On modern machines, dry flexible element couplings are used, which helps overcome the problems listed for lubricated couplings.

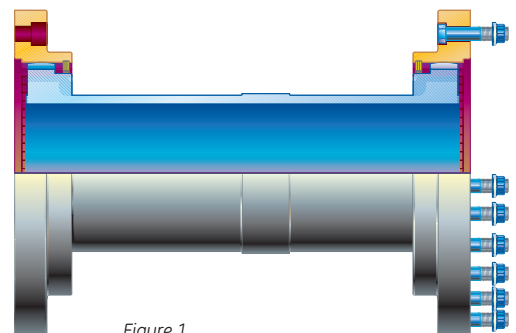


Figure 1



## How it works

The basic principle of the dry flexible coupling is that the torque is transmitted through one, or a series of flexible disks which spread out the stress. The dry flexible element is maintenance free as there are no moving parts. There are different types of flexible element couplings available to fit most applications. The coupling is generally supplied with the same shaft end mounting arrangement as previously used for the gear type coupling. On gas turbine applications the shaft end arrangement is usually flanged, and in a few cases is taper fit or interference fit with keys. The dry flexible element coupling is selected to minimize the need for modification of the existing equipment and is usually directly interchangeable, except for modifications to the existing coupling guards and oil spray nozzles. In most cases, the replacement coupling can be selected to have similar stiffness and weight as the original gear coupling in order to avoid changes in the rotor dynamic behaviour of the machine.

Dry couplings fall mainly into two categories:

### 1) Diaphragm Couplings

The torque is transmitted by the coupling hub bolted to one/two diaphragms welded to the spacer. The main advantage of this type of coupling is the simple configuration and therefore the limited problems in balancing and the absence of fretting problems, i.e., rubbing and corrosion caused by friction between the flexible torque transmitting elements. *Figure 2* shows the diaphragm type dry flexible load coupling for the single shaft PGT5.

### 2) Multiple Membrane Couplings

The torque is transmitted by the coupling hub bolted to some of the flexible elements which are in turn, bolted to a spacer. The main advantage of membrane couplings is their light weight and thus reduced overhung moment.

*Figure 3* shows the membrane type dry flexible load coupling for the single shaft PGT16.

### Applicability

The following tables list the load and accessory dry flexible couplings used by GE Oil & Gas.

### Accessory Dry Flexible Coupling

Gas turbine model	Type
PGT5/2	MEMBRANE
PGT10	MEMBRANE
MS3002	MEMBRANE
MS5001	DIAPHRAGM
MS5002	DIAPHRAGM
MS6001	DIAPHRAGM
MS7001	DIAPHRAGM

Aeroderivative machines and the single shaft PGT5 are not listed as they do not require an accessory coupling.

### Load Dry Flexible Coupling

Gas turbine model	Type
PGT5/2	MEMBRANE
PGT10	MEMBRANE
PGT16	MEMBRANE
PGT25	DIAPHRAGM
MS3002	MEMBRANE
MS5001	DIAPHRAGM
MS5002	DIAPHRAGM
MS6001	DIAPHRAGM
MS7001	DIAPHRAGM

The single shaft PGT5 is not listed as it is usually equipped with a dry membrane type load coupling.

### Scope of Supply

Dry element couplings are generally supplied in three parts as follows:

- A hub for mounting on the driver shaft end including the flexible steel element assembly
- A spacer tube for connecting the two hub assemblies
- A hub for mounting on the driven shaft end including the flexible steel element assembly

The scope of supply also includes the following items:

- Joint guard (as necessary)
- Installation and modification drawings

Torsional and lateral analysis of the load coupling behaviour can be provided upon customer request.



Figure 2

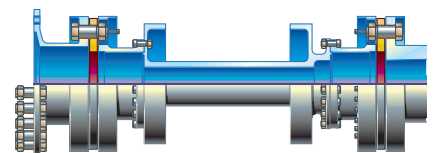


Figure 3



GE imagination at work

#### GE Oil & Gas

Global Headquarters  
Via Felice Matteucci, 2  
50127 Florence, Italy  
T +39 055 423 211  
F +39 055 423 2800

Nuovo Pignone S.p.A.  
Nuovo Pignone S.r.l.

E [customer.service.center@ge.com](mailto:customer.service.center@ge.com)  
W [www.ge.com/oilandgas](http://www.ge.com/oilandgas)

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