

*HIGH POWER systems*

## *GyroFlex – Angle Compensation for Handheld Tools*

*Angle Tightening without Support*

### **Disadvantage of conventional, handheld tools**

Handheld nutrunners are generally not suited to angle-controlled tightening processes, since the operator is not capable of holding the tool completely still throughout the entire process. Each movement on the part of the operator tampers with the angle of rotation. Therefore, the use of conventional, handheld nutrunners for angle-controlled tightening processes requires a support against the part or the permanent fixturing of the tool in a handling device. This limits the operator's freedom of movement and requires additional investment.

### **GyroFlex - the angle compensation unit**

In order to overcome this disadvantage, AMT has developed the **GyroFlex** system, a module which uses sensors to capture the operator's movement and transfer this data to the nutrunner control, where the movement is calculated with the required angle and compensated accordingly. Effective immediately, all wired AMT handheld nutrunners can be upgraded to add this capability.

**GyroFlex** compensates the operator movement real-time during the tightening process, thereby enabling the capture of the actual angle of rotation in the fastened connection.

### **Easier operation, less investment**

Supports and/or permanent nutrunner installation in handling devices are no longer necessary. This allows the operator to move more freely, and previously limited access to challenging fastening locations is improved, while substantially reducing investment costs at the same time.

### **GyroFlex - Innovation by AMT!**



# HIGH POWER systems

## GyroFlex – Handheld Tools with Angle Compensation

Innovation for Assembly

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### Current situation

During the tightening process with handheld tools, the operator moves unintentionally. The angle associated with this movement directly flows into the evaluation of the fastened connection.

### Angle-controlled tightening processes

With an angle-controlled tightening process, the angle after the snug or threshold torque has been reached is the control factor which directly determines the preload force.

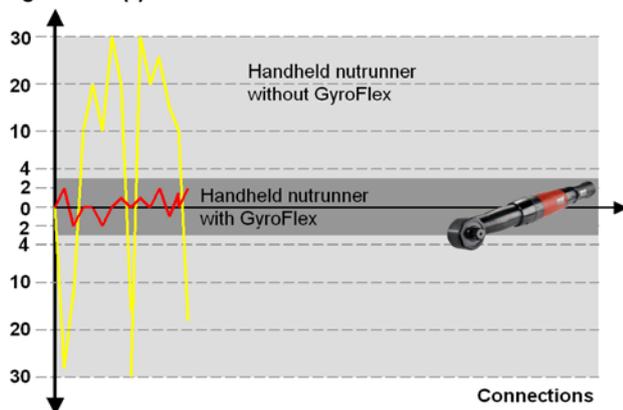
Conventional angle measuring units on motorized nutrunners, for which this tightening process is currently used, are integrated in the tools and measure the rotation angle directly from the output shaft. Any movement in the nutrunner during the tightening process (e.g. unintentional operator movement) has an influence on the angle by which a bolt or nut is to be turned after reaching the snug or threshold torque.

Since the accuracy in capturing the additional angle to turn the bolt or nut after the snug or threshold torque has a direct influence on the achieved preload force in the fastened connection, today's technology had only allowed this type of connection to be achieved with supports against the part or permanently fixtured, motorized nutrunners.

### Torque tightening process with angle monitoring

The tolerance boundaries for angle monitoring are generally set very wide so that process influences and potential operator movement do not lead to an increased rate of NOK parts.

Angle Error (°)



### Advantages of GyroFlex

Angle-controlled tightening processes can be performed in the future with **GyroFlex**, no longer requiring supports or permanently fixtured tooling. The tolerance boundaries for angle monitoring can be set tighter during torque-controlled tightening processes.

### Your advantages

- Eliminate additional cost for handling or supports.
- Reduce cycle time through simpler handling and/or improved access.
- Improve quality with torque tightening, resulting from tighter angle tolerances.
- Reduce bolt cross sections. Many fastening operations can be carried out in the future with angle-controlled tightening using **GyroFlex**. The decreased *tightening factor*  $\alpha_A$  allows you to dimension your threaded connections smaller.
- Reduce weight with reduced bolt cross sections and their corresponding flange dimensions.
- Optimize your cycle time. Replace manual angle tools (e.g. Saltus, GWK etc.) with motorized, electric tools using angle compensation.

Tightening Factor  $\alpha_A$   
Assembly Coefficient of Uncertainty

$$\alpha_A = \frac{F_{Mmax}}{F_{Mmin}}$$

