



# *MicroTorque Tightening*

Get smart, connected & efficient

*Atlas Copco*

# Smart Tools for the Smart Factory

## Realizing the Smart Factory with Atlas Copco MicroTorque

Industry 4.0 – The Fourth Industrial Revolution – is driving the evolution of the assembly process. The digitalization of manufacturing and assembly means shifting the way we look at manufacturing in terms of production optimization and automation.

The more informed you are, the better decisions you can make. Having smart tools on your line means that you have specific tightening information fed into the production system, information communicated to you concerning critical details of your components, materials and tightening process. This provides a valuable opportunity to increase efficiency and results with pro-active problem solving, alongside with considerable energy savings from efficiency improvements.

*We call it – Smart Connected Assembly.*

### A part of Atlas Copco Smart

**Connected Assembly.** The industry is moving forward with Industry 4.0 – and the benefits to gain from the evolution are huge. With MicroTorque you have a fastening solution that is fully equipped to meet the requirements of the future. Whatever your needs – there is a solution in the MicroTorque family.



**Increased uptime:** Schedule preventive maintenance and use multiple and flexible tightening strategies to easily switch settings and increase your uptime. Decrease downtime with instant reaction to tightening issues and drive data driven process improvements.



#### Reduction in defects:

A secure and effective error proofing assembly with smart tightening strategies and work flow instructions directly in the compact controller.



#### New product introduction:

Save time and make efficient new product introductions. Set up new advanced processes quickly – and utilize existing information for the future.



#### Improved productivity:

Drive process improvements and boost your productivity while reducing rework from common tightening issues such as floating screws and stripped joints.



**Human factors:** Give the tightening system full control. Assure high quality tightenings with smart and advanced tightening strategies, and simplify the process with work flow sequences and instructions.



#### Reduction in energy use:

MicroTorque is designed to be energy efficient with its compact and lightweight systems and integrated functionalities.

# Ready for Industry 4.0 when you are

*Connecting it, controlling it,  
and passing it forward.*

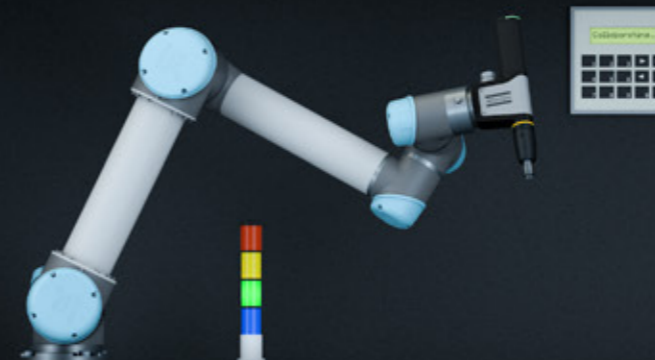


*The only way to deliver in the era of Industry 4.0, is to work with smart tools and smart solutions that connect and communicate. The MTF6000 is revolution-ready!*

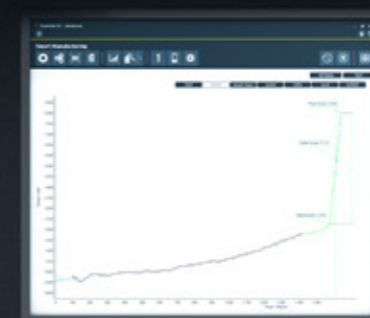
## MES



**INFORMATION TRANSPARENCY:** Toolsnet 8 delivers the information and the overview you need to form correct decisions. Or integrate via Open Protocol with any MES system and make the information available where and when needed. With the power of knowledge your process will be optimized – and your results will speak for themselves.



**INTEROPERABILITY:** MTF6000 makes sure that all your machines, devices and sensors are connected and communicating efficiently – anything from barcode readers to PLC:s, sensors and collaborative robots. With the interoperability and commonality of working with tools that are made to collaborate, you gain complete error proof workstations.



**TECHNICAL ASSISTANCE:** Powered by ToolsTalk MT, the MTF6000 takes responsibility of the process. With a user friendly software interface, and the power to easily analyze and configure improvements, it makes complex processes simple. The MicroTorque system is a natural step towards automating and systemizing manual operations.



**DECENTRALIZED DECISIONS:** The MicroTorque system decentralizes the decision, down to the smallest of components making sure no faulty products leave your hands. With advanced error proofing tightening strategies and complete workflows, MicroTorque takes control of your tightening process – giving you an automated, stable and flexible production process.

# The enabler of Smart Connected Assembly

ToolsTalk MT lets you take advantage of all the benefits the MicroTorque system has to offer your assembly process. ToolsTalk MT is a powerful software for setup, viewing results, analyzing graphs and keeping track of tool information. Taking your tightening into Industry 4.0.

## ToolsTalk MT – empowering the MicroTorque System

ToolsTalk MT is the software that makes everything possible. It is an important piece that completes and empowers the MicroTorque System – and it is the right solution for any low torque application management system.



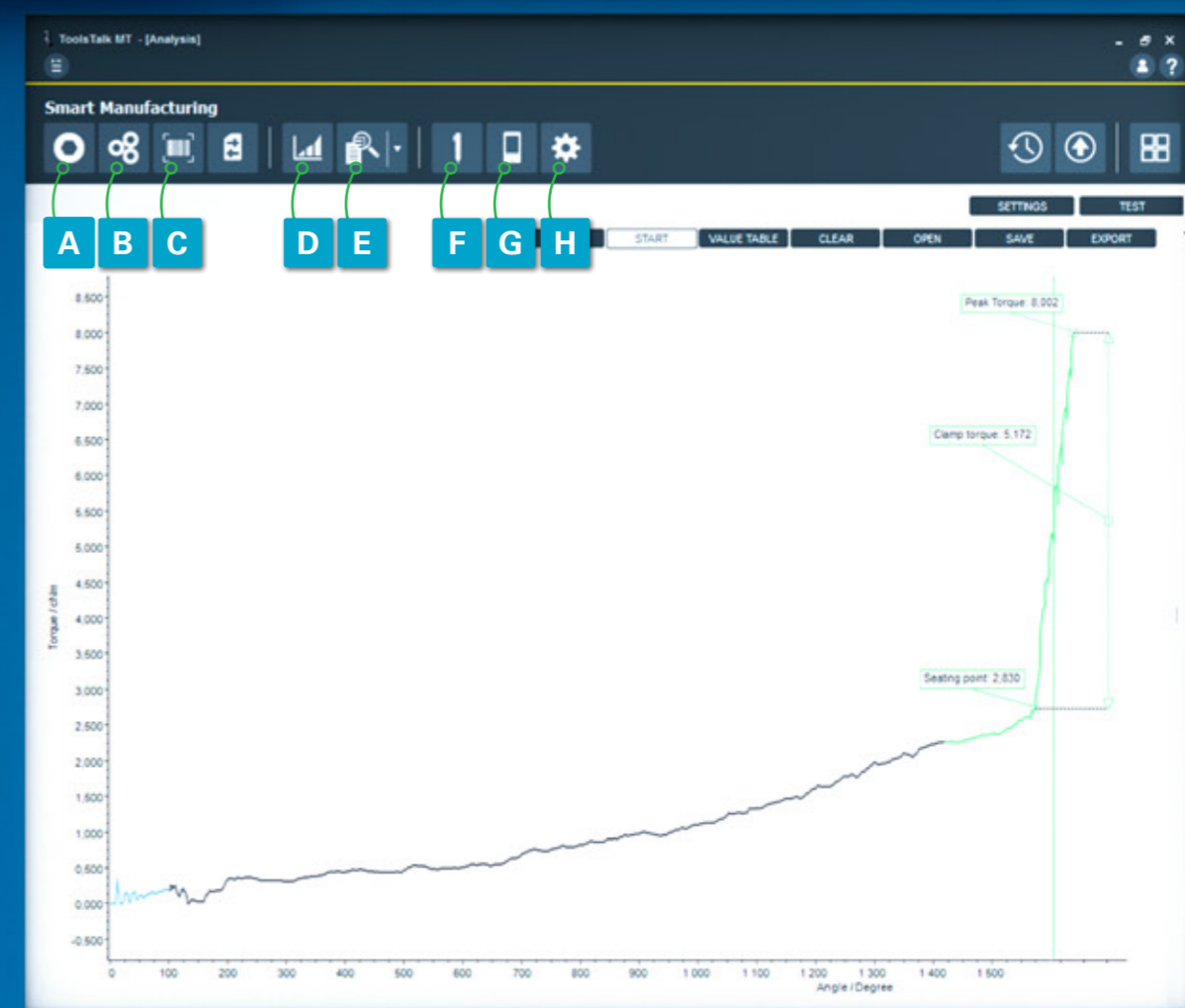
**A PSETS:** Optimize your quality and productivity by creating customized tightening programs, Psets, for each joint. Define angle, speed and torque – or simply use our smart tightening strategies. And easily change the settings whenever needed.

**B BATCH SEQUENCES:** Set your workflow sequence with batch sequence, and let your MTF6000 do the rest. It will automatically apply requested torque or instruct the operator, all to ensure an error proof and productive assembly.

**C IDENTIFIERS:** Reach higher flexibility by adding barcodes or RFID codes to easily activate workflow instructions (batch sequences), tightening programs (Psets), save important information to your tightening or set up rejection management.

**D ANALYSIS:** Review your tightening in depth, with information from critical details of your process and components. Elevate your productivity and quality by making decisions based on accurate and reliable information.

**E RESULTS:** Review your results. Understand your process and make informed decisions. Make sure to have a traceable production and track results to understand current and previous tightening results.



**F TOOL SETTINGS:** Keep track of the quality of your tools, by analyzing the tool lifetime performance and setting calibration intervals.

**G CONTROLLER SETTINGS:** Modify your controller to fit your needs. Name it, customize units for your reports, choose your result view and make it an integrated part of your process. Simply access everything you need to set up the controller the way you want it.

**H DIGITAL I/O AND PASSWORD SETTINGS:** Make MTF6000 an integrated part of the assembly process by managing the configurable Digital I/O, and define access levels for different users. Make your controller an integrated, intelligent part of your process.

# MTF6000 – our latest innovation in MicroTorque

Whether you are manufacturing high value consumer goods or sensitive electronics – MTF6000 is, together with ToolsTalk MT and our wide range of screwdrivers, designed to bring productivity and quality to your production.

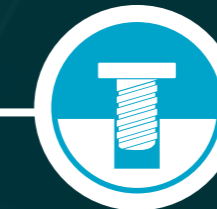
## It's Smart

Get full process control, improved quality and an optimized tightening process with MTF6000. The smart tightening strategies Torque Seating Monitoring and Seating Control Strategy automatically reveal and eliminate tightening issues such as floating screws, stripped joints or insufficient torque. Combined with saving and

graphically displaying tightening data, MTF6000 assures detection and reporting of process abnormalities. Providing you with invaluable information on the tightening, as well as the complete assembly process. This is the investment that will, from day one, save you time and money.



TORQUE SEATING  
MONITORING



SEATING CONTROL  
STRATEGY



GRAPHIC DATA  
& ANALYSIS

## It's Connected

Reduce down time and setup time, assure full traceability and integrate with any system using one of the many communication ports. Get complete access from anywhere, using Remote Access and Ethernet to detect and react instantly to any tightening process abnormality. Connect barcode

scanner and RFID reader directly with the controller to assure traceability, control operators' access level and add rejection management. Easily connect to the powerful software ToolsNet 8 for full visualization of your process. All this, only using MTF6000.



MULTI  
COMMUNICATIONS



REMOTE  
PROGRAMING



TOOLSNET 8  
REPORTING

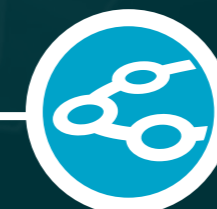
## It's Efficient

It has never been easier to combine productivity with flexibility. Multiple Torque Programs minimizes and eliminates setups while Multistep Tightening helps you to reduce cycle time maintaining high quality. With batch sequence it is easy to create work

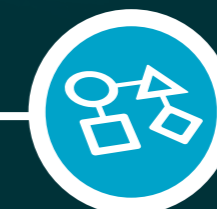
flow sequences that combine multiple strategies, customized for your product, that will error proof your assembly – sometimes eliminating the need of a PLC altogether. It is all you need to maintain maximum productivity with maximum flexibility.



MULTIPLE TORQUE  
PROGRAMS



MULTI STEP  
TIGHTENING



BATCH  
SEQUENCE

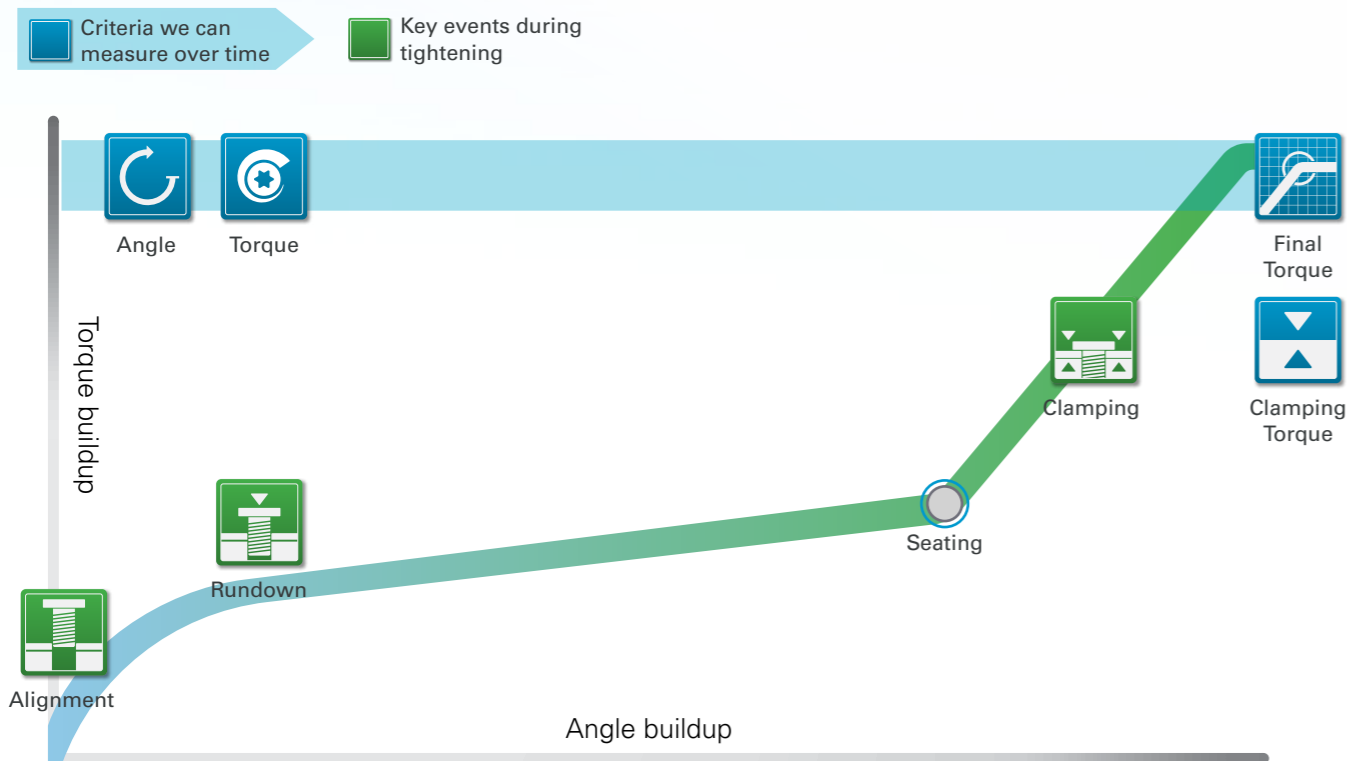


# We focus on clamping torque – so should you

It really pays off to take a closer look at what happens during a tightening. There is a lot more to it than meets the eye. In order to visualize the general concept of a tightening we split the process into three phases: alignment, rundown and clamping. In the alignment phase, the tightening process is initiated, and the screw gently aligned with the joint. In the rundown, productivity is of importance and the screw is quickly tightened. The clamping force is initiated at the seating point, the point where the screw head meets the surface. During all phases, critical

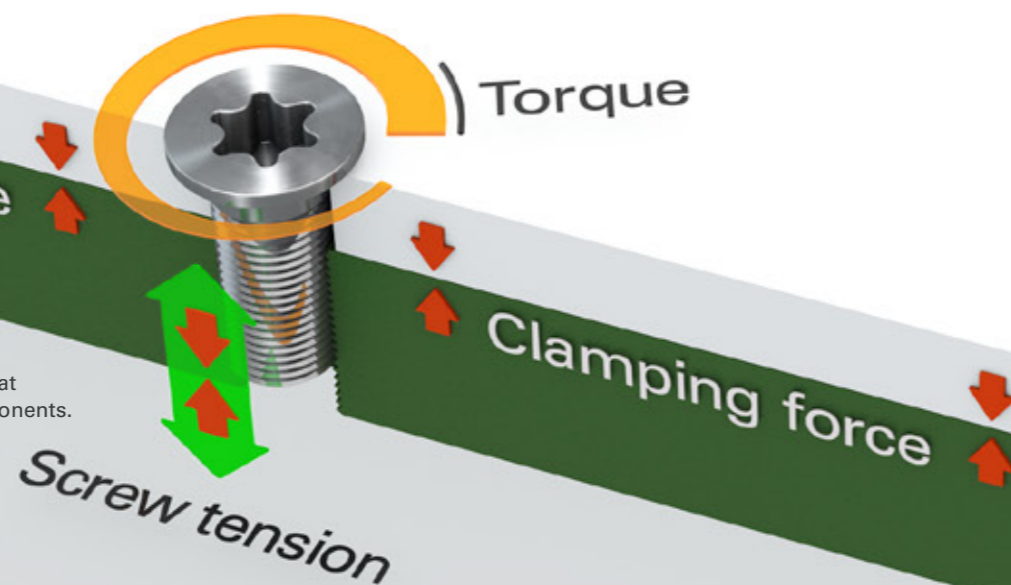
factors are controlled and monitored; **rotation angle, running torque** and **clamping torque**.

With this information actions can be triggered in order to achieve a perfect tightening. And also, of course, in order to abort tightenings where errors such as damaged threads, missing parts and floating screws, would occur. These are all issues that would go undetected if you use conventional clutch screwdrivers. More about that on the page to the right.



## It's all about the clamping torque

Torque rotates the screw, creating tension that generates clamping force between the components. The best available reference of the clamping force is the clamping torque. This is why clamping torque should be monitored or controlled in any tightening process.



## The clutch tool will let a floating screw pass ...

Many errors can go undetected when using clutch tools. As long as the final torque is reached, the tool will shut off. Even if, for instance, the tightening results in a floating screw, and your product leaves the assembly line with a built-in defect. Resulting in rework, expensive recalls and damage to your brand.

- Misaligned entry
- Broken screw
- Damaged thread
- Missing parts
- Floating screw

## Know when to avoid a clutch tool

When it comes to error proofing, all parameters you set for angle and torque is really to control the clamping torque. So why not just control the clamping torque to start with? A clutch tool will shut off when the right tension is reached on the clutch. The relation between the tension and the torque is not consistent for different joints, nor a reliable measurement. So it really says nothing about the clamping torque. And this is a good reason – for anyone working with high quality requirements – a smart tool!



## False comfort

The clutch tool has signaled the tightening as OK. But there is no way to know what really happened during the tightening. It's really just guess work.



# The benefit of knowing – it's yours if you want it



With the MTF6000 teamed up with ToolsTalk MT you set up and adjust any kind of tightening process to fit your exact needs. This is the fastest and most productive way for you to make sure that your products are assembled with perfect tightenings time after time. Safeguarding you from reworks and expensive recalls.

**COMMON TO BOTH PROCESSES:** The tightening strategy (Pset) is activated, automatically or manually, in this case by a barcode scan. The tightening program (Pset) is loaded into the MTF6000. During the complete process torque and angle is monitored. If they are not within defined limits, the tightening will be aborted and given a NOK status.

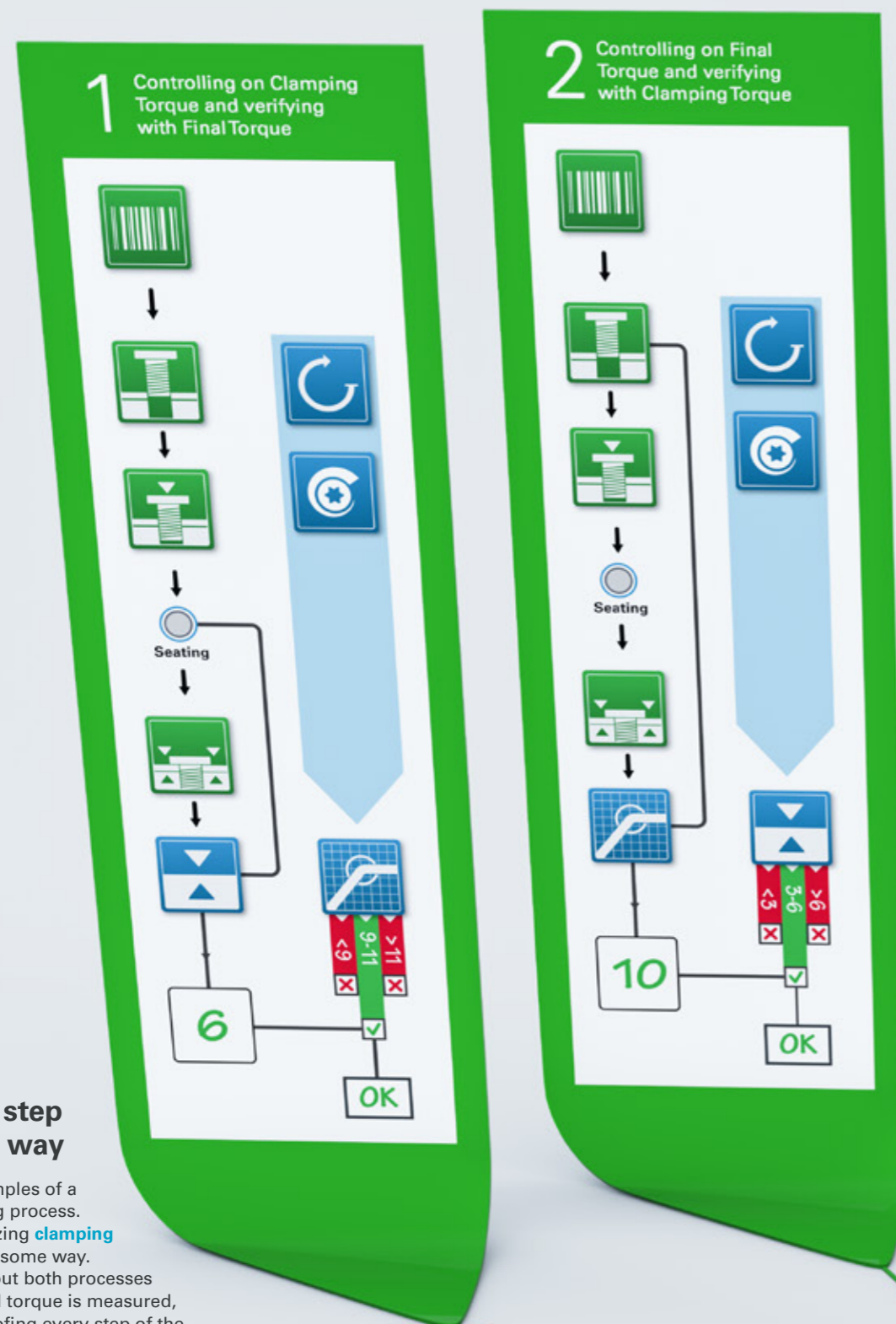
**PROCESS 1 – SEATING CONTROL STRATEGY:** MTF6000 controls clamping torque and monitors final torque. When the screw is seated, the MTF6000 detects the seating point, in this case 4 cNm, and adds the predefined clamping torque, in this case 6 cNm. Upon completion, it is verified that final torque is within defined limits, in this case 9-11 cNm. If not, the tightening is signaled NOK.

The Seating Control Strategy controls clamping torque – which is the key to understanding if the tightening has been made according to plan.

**PROCESS 2 – TORQUE SEATING MONITORING:** MTF6000 controls the final torque and monitors the clamping torque. Final torque is set, in this case to 10 cNm. When the seating point is detected, clamping torque is monitored to make sure it stays within the predefined limits, in this case 3-6 cNm. If the clamping torque stays within the limits, the tightening proceeds until final torque is reached, in this case 10 cNm. If the clamping torque is outside of the limits, the tightening is aborted, making sure that tightenings with insufficient clamping torque are detected. All to assure the clamping – the key to a successful tightening.

## Every step of the way

Two examples of a tightening process. Both utilizing **clamping torque** in some way. Throughout both processes angle and torque is measured, error proofing every step of the process. At completion, clamping torque and final torque is used to validate that the tightening was successful.



## True error proofing – total comfort

When using **clamping torque** as one of the monitored factors you can rest assured that all your tightenings are done correctly. No "guess work" here.

# Smart, Connected and Efficient

## IAM – Intelligent Application Module

Intelligence in the palm of your hand. Choose the right functionality level for your needs. Pick IAM Workstation to access the basic functionalities of the advanced controller, perfect choice for a single workstation. With IAM Process, you will have full access to the complete functionalities of MTF6000, the ultimate choice for any integrated assembly process or advanced tightening. Easy to upgrade, the IAM modules assure a future proof tightening solution that will grow with upgrades, over years to come.

## Highly connectible

Your MTF6000 comes equipped with a wide range of connection choices. Accessible on the sides of the controller or on the back side.



IAM Functionality Matrix	IAM Workstation 8432 0852 10	IAM Process 8432 0852 20
Tightening		
Number of Psets	50	150
Multi Step Tightening	✓	✓
Number of tightening steps	5	10
Number of Batch sequences	20	50
Batch Sequence - Batch Count	250	250
Batch Sequence - Steps	30	30
Number of identifiers	20	50
Torque & Angle Control	✓	✓
Thread Engament Step	✓	✓
Angle Step	✓	✓
Torque Step	✓	✓
Seating Control Strategy (SCS)		✓
Torque Seating Monitoring (TSM)		✓
Bit Slip Detection		✓
Damaged thread detection		✓
Data Storage & Analysis		
Detailed Data Results Stored in the Controller	✓	✓
Results - Data Storage	100000	100000
Graphs - Data Storage		1000
Download Results Data via USB Memory	✓	✓
Download Graphs Data via USB Memory		✓
RealtimeTrace Analysis - ToolsTalk MT (USB Only)	✓	✓
Save Graphs via ToolsTalk MT Analysis		✓
Auto Save Graph via ToolsTalk MT Analysis (USB Only)	✓	✓
ToolsNet 8 Data Reporting		✓
Communication		
Configurable Digital I/Os	✓	✓
Number of Digital I/Os (in/out)	(12/8)	(12/8)
Open Protocol (Atlas Copco V2)		RS232, Ethernet
Direct Communication with ToolsNet 8		✓
Others		
Transducerized Tools		✓
Barcode Reader	✓	✓
Quick Programming	✓	✓
Password Protection	✓	✓
Customized 3 Levels of Password Protection	✓	✓
Remote Configuration via Ethernet		✓

# The handheld range

The MicroTorque Handheld Screwdriver range is extremely ergonomic, very compact and full of functionalities. It is the most advanced tightening solution for any low torque application. Boost productivity and quality, resulting in high efficiency and cost reduction.

## Accuracy and torque consistency

With a reassuring accuracy, MicroTorque handheld screwdriver secures torque consistency at every joint, giving you higher process and product quality. Designed for users, with superior ergonomics and operator feedback, MicroTorque brings advanced error proofing possibilities to detect and reduce product defects. All to improve your productivity and reduce your costs.



## Operator friendly

It has never been easier to set up advanced and customized strategies. With multiple torque programs it is easy to adapt the tightening to any needs, and with batch sequence the operator

is guided through complex operations. Operator feedback guides and supports the user – assuring an operator friendly system.



MULTIPLE TORQUE PROGRAMS



BATCH SEQUENCE



OPERATOR FEEDBACK

## Error proofing

Bring complete error proofing to your process with the MicroTorque handheld system. Utilize the angle monitoring and control, to customize the tightening strategy according to your needs, detecting wrong screws, missing components or floating and misaligned screws. With superior torque

accuracy, MicroTorque handheld system delivers perfect tightenings time after time. Combined with error proofing possibilities such as bit slip detection, damaged thread detection, torque and angle limits and automatic work flow sequences, it gives you complete control of your assembly process.



ANGLE MONITORING & CONTROL



HIGH TORQUE ACCURACY



ERROR PROOFING POSSIBILITIES

## Cost reducing

Reduce your costs utilizing the full functionality of MicroTorque handheld system. Advanced tightening strategies will minimize your scrap and rework costs. Extensive data reporting will store your

results, and data utilization will drive your process improvements. And graph analysis will guide your decision making with accurate and detailed real time information.



SEATING CONTROL STRATEGY



DATA REPORTING



GRAPHIC DATA & ANALYSIS

# The fixtured range



Boosting productivity, improving quality and reducing costs – it is extremely light, compact and full of functionalities. The MicroTorque QMC Series fixtured screwdrivers, combined with the powerful MTF6000 controller, is the most advanced tightening solution for any low torque application.



## Made for Automation

QMC series brings years of development and experience from Atlas Copco into a compact tightening solution. QMC is made for automation, with countless error proofing possibilities making sure your costs are reduced.



## Automation friendly

MicroTorque QMC series is an innovative and revolutionary fixtured solution in the MicroTorque family. The compact design brings a powerful solution full of features to a lightweight tool – making it optimal for

automation. It is easy to install on any robot or torque arm and the many communication ports allow communication with, and integration in, any production process.



COMPACT & LIGHTWEIGHT



EASY INSTALLATION



MULTI COMMUNICATIONS

## Error proofing

Bring complete error proofing to your process with the MicroTorque QMC system. Utilize the angle monitoring and control, to customize the tightening strategy according to your needs, detecting wrong screws, missing components and misaligned screws. With a superior torque accuracy, MicroTorque QMC system delivers

perfect tightenings time after time. Combined with error proofing possibilities such as bit slip detection, damaged thread detection, torque and angle limits or automatic workflow sequences, it gives you complete control of your assembly process.



ANGLE MONITORING & CONTROL



HIGH TORQUE ACCURACY



ERROR PROOFING POSSIBILITIES

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Reduce your costs utilizing the full functionality of MicroTorque QMC system. Advanced tightening strategies will minimize your scrap and rework costs. Extensive data reporting will store your

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SEATING CONTROL STRATEGY



DATA REPORTING



GRAPHIC DATA & ANALYSIS

# Atlas Copco MicroTorque – a sustainable system



*Sustainable solutions have always been our focus.*

*We take pride in offering our customers*

*eco friendly tools and solutions.*

*From how they are produced, to how they run.*

#### **Prolonging product life.**

A decreased weight on our fixtured tools contribute to the possibility of higher cycle rates on robot applications. Spare parts and service instructions are provided for the customer to ensure long product life.

**Software updates.** Easy to update with new software, following industrial trends and customer needs. Updates available via Ethernet or USB memory stick prolonging life length of controllers and tools.

**Decreased standby consumption.** Energy consumption decreased through integrated standby mode via timer, open protocol, digital I/O or standby button.

**Prohibited and restricted lists.** Compliance with Atlas Copco Prohibited and Restricted lists ensure use of safe chemicals and materials.

**RoHS II directive (2011/65/EU)**  
**REACH (EC No 1907/2006)**

**Triple certification.** Atlas Copco Industrial Technique and Assembly Solutions are certified against ISA14001, ISO9001 and OHSAS 18001.

#### **Recycling Information.**

Information regarding dismantling and recycling has been added in the Product Information to facilitate correct handling of parts within the MicroTorque system when it has served its purpose.

**WEEE (2012/19/EU)**

**Safe chemicals.** All chemicals used are ensured not to contain prohibited substances. Safety data sheets are available for all chemicals.

**Less transportation.** Minimized packaging and lower product weight decreases environmental impact from transport. The Atlas Copco worldwide service organization provides immediate and local service, reducing the need for unnecessary transportation.

Accessories and Part numbers



Controller & IAM

Controller Unit	Ordering No.
MTF6000	8432 0851 00
IAM MT Workstation	8432 0852 10
IAM MT Process	8432 0852 20

Fixtured Screwdrivers

Model	Torque range		Speed rpm	Length mm	Overall width mm	Weight		Bit Drive	Ordering No.*
	cNm	in lb				kg	lb		
Fixtured current controlled									
QMC 21-05-HM4	1.2 - 5	0.11 - 0.44	1500	124	57	0.3	0.46	HM4	8432 0844 05
QMC 21-10-HM4	3.0 - 10	0.27 - 0.89	1500	178	57	0.3	0.66	HM4	8432 0844 10
QMC 21-25-HM4	5.5 - 25	0.49 - 2.21	1000	178	57	0.3	0.65	HM4	8432 0844 25
QMC 41-50-HM4	12.5 - 50	1.11 - 4.42	2000	200	65	0.6	1.32	HM4	8432 0844 52
QMC 41-100-HM4	25.0 - 100	2.21 - 8.85	2000	200	65	0.6	1.32	HM4	8432 0844 53
QMC 41-50-I06	12.5 - 50	1.11 - 4.42	2000	205	65	0.6	1.32	1/4" Hex	8432 0844 61
QMC 41-100-I06	25.0 - 100	2.21 - 8.85	2000	205	65	0.6	1.32	1/4" Hex	8432 0844 62
QMC 41-150-I06	37.5 - 150	3.32 - 13.27	1000	213	65	0.6	1.32	1/4" Hex	8432 0844 63
QMC 41-250-I06	62.5 - 250	5.53 - 22.13	850	224	65	0.7	1.54	1/4" Hex	8432 0844 64

Hand held Screwdrivers

Model	Torque range		Speed rpm	Length mm	Overall width mm	Weight		Bit Drive	Ordering No. *
	cNm	in lb				kg	lb		
Handheld current controlled, without push-to-start									
ETD M08 ABL V2	2-8	0.18-0.7	1350	185	29	0.30	0.66	HM 4	8432 0815 18
ETD M20 ABL V2	5-20	0.44-1.77	900	185	29	0.30	0.66	HM 4	8432 0815 21
ETD M27 ABL V2	7.5-27	0.66-2.4	900	185	29	0.30	0.66	HM 4	8432 0815 27
Handheld current controlled, configurable push-to-start									
ETD M50 ABL V2	15-50	1.33-4.4	1000	238	36	0.61	1.37	HM 4	8432 0815 50
ETD M80 ABL V2	20-80	1.77-7.1	1100	238	36	0.61	1.37	HM 4	8432 0815 80
ETD M120 ABL V2	30-120	2.7-10.6	900	240	43	0.65	1.43	1/4" Hex	8432 0815 82
ETD M200 ABL V2	50-200	4.42-17.7	700	240	43	0.65	1.43	1/4" Hex	8432 0815 84
ETD M250 ABL V2	75-250	6.64-22.13	700	240	43	0.65	1.43	1/4" Hex	8432 0815 86

\* Ordering number for screwdriver only. Tool cable, controller and PSU need to be ordered separately

Cables QMC, ETD M ABL V2		Ordering No.
2 m		8432 0835 20
3.5 m		8432 0835 35
5 m		8432 0835 50

MTF6000 Power Supply Units		Ordering No.
36V/72W	ETD M08/20/27 ABL V2 & QMC21-05/10/25	8432 0840 01
36V/180W	ETD M ABL V2 & QMC, all tools	8432 0840 02

Vacuum Adapters		Ordering No.
QC Vacuum Adapter - HM4 (Ø8 mm)		8432 0770 58
QC Vacuum Adapter - ¼" HEX (Ø12 mm)		8432 0770 57

Vacuum Nozzles		Ordering No.
Plastic Nozzle - Ø8 mm		4216 1190 16
Plastic Nozzle - Ø12 mm		4216 1190 20
Metallic Nozzle - Ø8 mm		4216 1190 17
Metallic Nozzle - Ø12 mm		4216 1190 21

Screw Dispenser System	Screw Size	Ordering No.
Screw dispenser for magnetized bit		
SDS	M 1.0 - 5.0	8432 0830 00
Screw dispenser for vacuum pick up		
SDS SR 10	M 1.0	8432 0870 30
SDS SR 12	M 1.2	8432 0870 32
SDS SR 14	M 1.4	8432 0870 34
SDS SR 17	M 1.7	8432 0870 31
SDS SR 20	M 2.0	8432 0870 33
SDS SR 23	M 2.3	8432 0870 35
SDS SR 26	M 2.6	8432 0870 36
SDS SR 30	M 3.0	8432 0870 37

MT FOCUS 6000



MEDICAL

ELECTRONICS

SMARTPHONE

VEHICLE

*Committed to Sustainable Productivity*

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