

ToolsTalk MT

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Software

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Configuration Manual



⚠ WARNING

Read all safety warnings and instructions

Failure to follow the safety warnings and instructions may result in electric shock, fire and/or serious injury.

Save all warnings and instructions for future reference



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Configuration overview

Introduction to ToolsTalk MT

The MicroTorque system is the Atlas Copco screw driving range for low torque applications.

ToolsTalk MT is a PC software package that offers easy and user friendly programming and real time monitoring of MicroTorque controllers, including:

- Multistep screw fastening procedure with torque and angle control.
- Flexible programmable screw fastening step sequences.
- Precise tightening torque, angle control and multistep process data documentation.
- Multipoint communication via USB for parameter settings, graphical read-out and process data communication.

Pset

The tightening programs in ToolsTalk MT are called Psets. A Pset can consist of different steps. All steps have precise speed control and many options of angle and torque monitoring.

Batch sequence

Batch sequence is a way of grouping and adding control over the tightening work flow. A batch sequence can be a list of batches, events or information steps that will be executed by the controller in sequential order. The batch sequence can interact with the operator in terms of screen instructions and with the use of external equipment, for example PLC or scanners.

Batch

A batch is defined as how many times a specific Pset should run.

Event

An event is a way of controlling the surroundings, setting output, waiting for input, monitoring the level of an input, setting a delay or collecting data from scanners.

Information

The information step can be used to inform and guide the operator.

Work selection

The system can select work, that is Psets and batch sequences, in four different ways:

- Protocol (Tools Talk MT + Atlas Copco Open Protocol)
- Digital I/O
- Scanner (Barcode/Rfid)
- Controller

Result handling

After each tightening, result data is generated and stored on the controller memory. Up to 100.000 results and 1000 graphs can be stored on the controller. When 100.000 results have been reached the newest result will overwrite the oldest result.

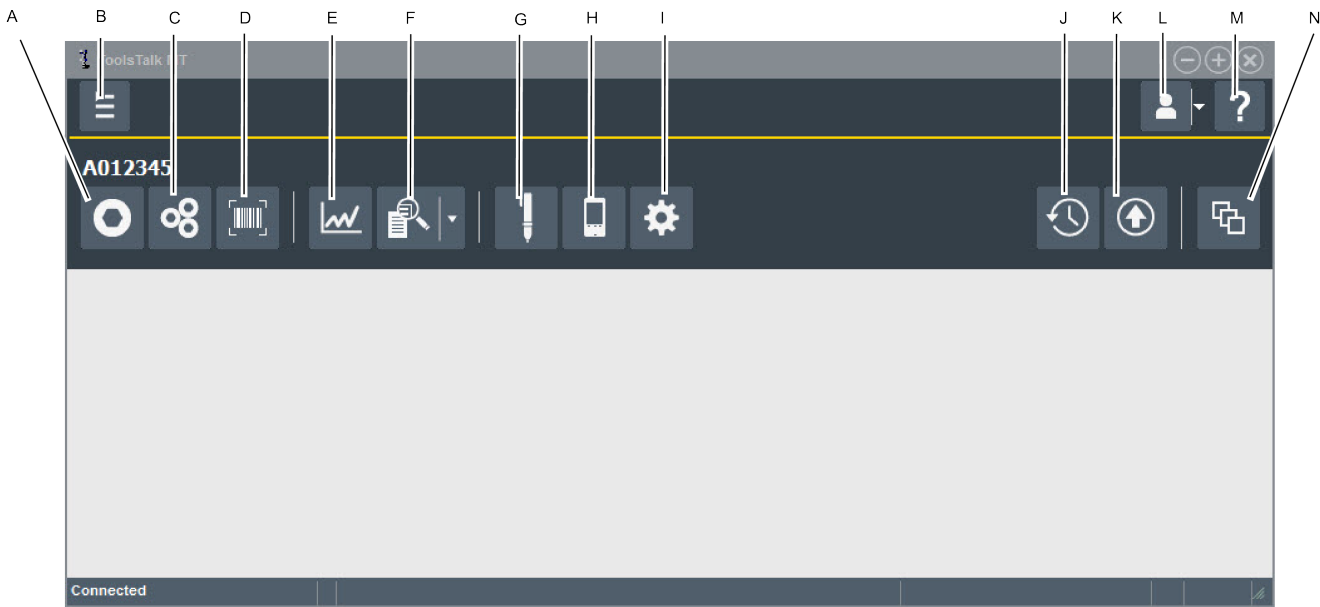
It is possible to collect serial numbers and production data via scanners and storing it with the results for increased traceability and continuous improvement.

The result can be exported from the controller over the communication network (Ethernet or USB) or by manual extraction with a USB flash drive.

For increased traceability and production monitoring, the MTF 6000 can connect to ToolsNet 8.

User interface

The figure below shows the main window when connected to a controller.



A	Pset
B	Manage connections
C	Batch sequence
D	Identifiers
E	Analysis
F	Step results/Results/Events

G	Tool settings
H	Controller settings
I	Digital I/O and password settings
J	Undo all changes
K	Save changes to controller. In offline mode changes are saved to a file.
L	User settings.
M	Help
N	Select how to display the open windows: tile, cascade or one single window.

Getting started

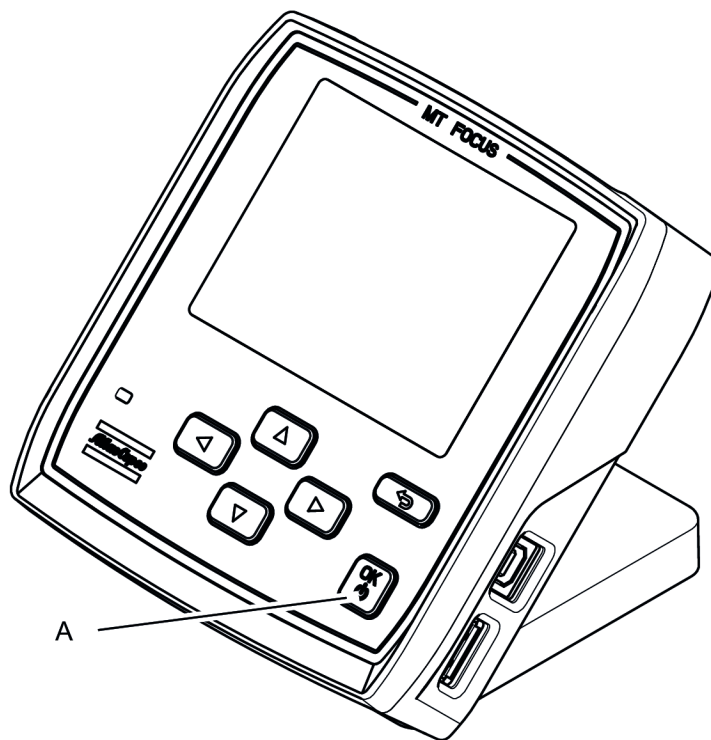
Start the controller

Press and hold the **OK** button (A) until the display lights up.

⚠ WARNING Risk of Injury

The tool may rotate when the system is switched on and the tool is initializing.

- Keep body parts, hair and clothing away from the tool.



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Start ToolsTalk MT

Start ToolsTalk using the icon on the PC desktop or the shortcut in the program menu.

Manage connections menu



It is possible to connect to a MTF 6000 in different ways:

- USB
- Serial
- Ethernet

Controllers connected via Ethernet can be saved as favorites.

Offline

In offline mode ToolsTalk MT is connected to a virtual device. All features have the same functionality as when connected to a real controller.

It is possible to export and import offline files from controller via usb flash

drive.

Save all changes done while working in offline mode by clicking the **Save**-button.

- ❗ The file must be named *offline.mtp* if it will be imported to a MTF6000 controller via an USB flash drive.
If the file will be imported via ToolsTalk MT, the name do not need to be specific.

Settings

Pset



The tightening programs in ToolsTalk MT are called Psets.

A Pset is set to the tool that is connected to the controller when the Pset is created. If another tool is connected when the Pset is active a prompt will be shown that explains that the Pset will not work.

Introduction to the Pset list

Each line represents one Pset. The columns contain the following information:

- Check box to select the Pset
- Number
- Name, a user defined name
- Step no.
- Last change
- Tool model, the tool model that the Pset will work with.
- Tuning
- Active

Adding a Pset

To add a Pset, perform the following steps:

1. Click the **Pset** icon the Menu bar. The workspace area shows a list of all the current Psets.
2. Click the **Add** button. The Create Pset window opens
3. Enter Pset number and name.
4. Click the **OK** button.

A new Pset is added and the list is updated.

Deleting a Pset

To delete one or several Psets, perform the following steps:

1. Click the **Pset** icon in the Menu bar. The workspace area shows a list of all the current Psets.
2. For each Pset to be deleted, mark the check box in the leftmost column in the workspace area.
3. Click the **Delete** button.
4. Confirm the deletion in the **Confirm** window.

The selected Pset(s) are removed and the list is updated.

Copy Pset

To copy a Pset, perform the following steps:

1. Right-click on the **Pset** you want to copy from.
2. Select **Copy**.

3. Right-click on the **Pset** you want to copy to.
4. To confirm, press the **Yes** button in the **Confirm** window.

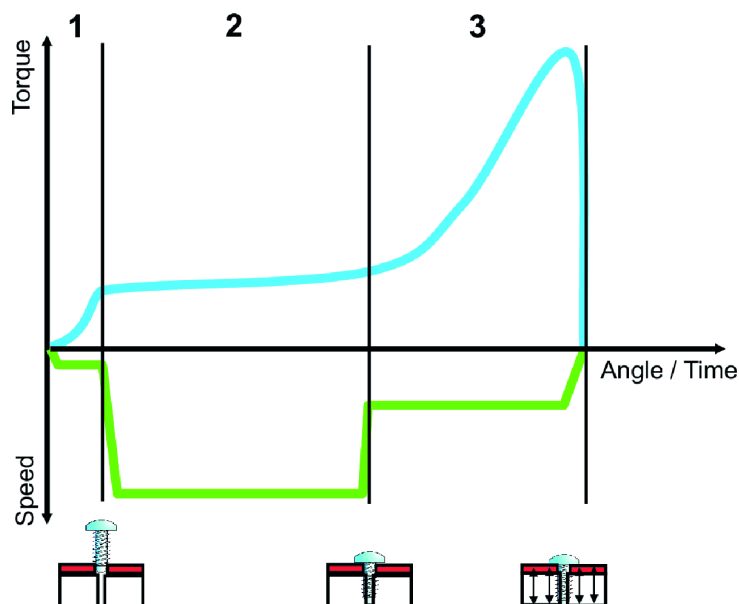
Set up a new Pset

The basic workflow when programming a Pset in ToolsTalk MT consists of the following steps:

1. Open the **Psets** window.
2. Click the **Add** button.
3. Select a Pset number and a Pset name.
Click the **OK** button.
The Pset will appear in the Pset list.
4. Doubleclick on the Pset to open the **Pset** window or mark and click **Open**.
5. Enter general settings.
6. Add the Pset steps. This is the most common setup for a standard screw tightening application:
 - Thread engagement step
 - Angle step
 - Torque step.
7. Press the **Expand all** button or doubleclick on a step.
8. Set step type for each step and set the step parameters.
9. Click the **Save** button to save the settings to the controller.



Example, three-step tightening strategy

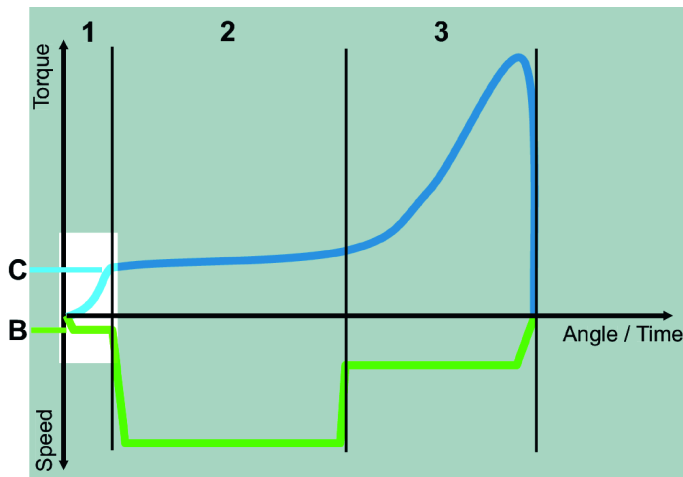


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1. Finding the thread.
2. Run down until the screw head touches the work piece.
3. Clamping the joint.

Step 1: Finding the thread

First use the thread engagement step to find the thread.

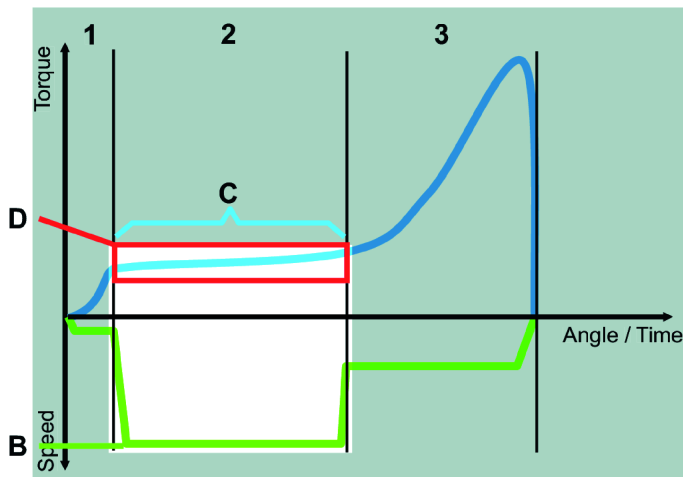


B - Slow speed, 100-150 rpm.

C - Transition to next step on raised torque when the screw enters the thread

Step 2: Run down

Use the angle step to run down the screw.



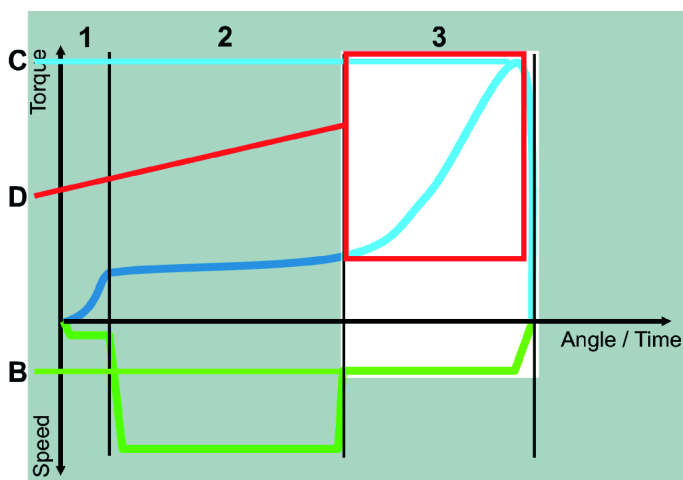
B - High speed

C - Transition to next step on angle, corresponding to the thread length before the screw head touches the work piece

D - Torque window to supervise the run down and alert on faults, e.g. damaged thread

Step 3: Clamping the joint

Use the torque step to clamp the joint.



B - The speed the tool has been configured with

C - The joint is finished when the target torque is reached

D - Angle window from torque level to supervise the clamping and alert on faults, e.g. broken work piece or missing washer

Add Pset with Quick programming on controller

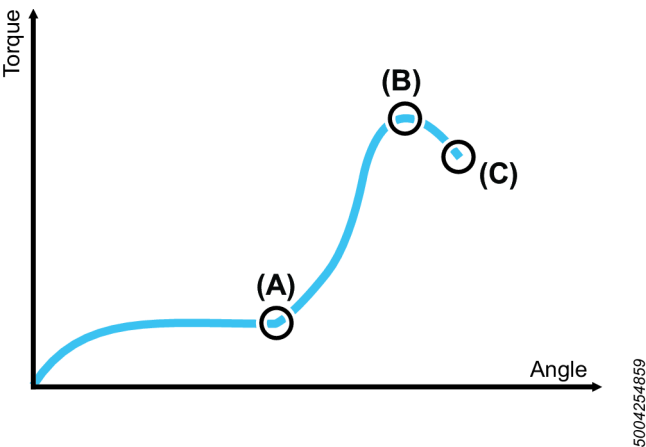
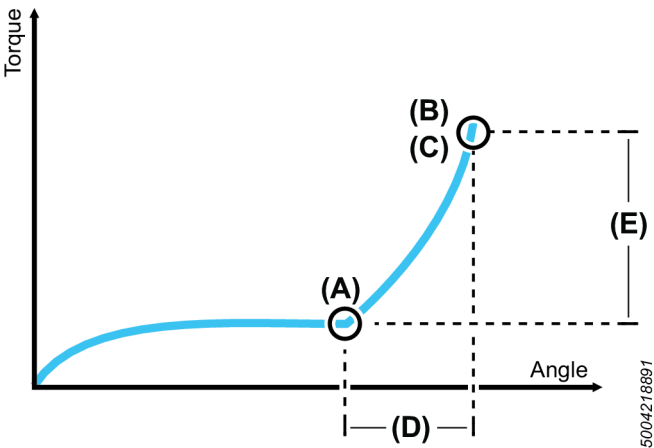
It is possible to add a Pset using the controller, see *MTF 6000 Configuration guide*.

Pset window

GUI object	Description
Change tool type	Only available in offline mode.
Test button	Opens a window that enables you to start, stop and re-set the active Pset
Activate button	Sets the current Pset to the active Pset on the controller. The <i>Selected source</i> must be set to Protocol/ToolsTalk MT .

Key tightening definitions

The screw is run down until the screw head touches the work piece at the seating point (A). The screw is then tightened until the final torque (C) is reached, this is often also the peak torque (B), but in some cases the final torque is lower. The clamp angle (D) and clamp torque (E) is measured between the seating point and the peak torque.




A	Seating point
B	Peak torque
C	Final torque
D	Clamp angle

E

Clamp torque

General settings

Parameter	Description
Pset name	Is shown in Pset list. The Pset name is stored with the result and will be displayed in the controller result view.
Pset revision	Revision number of the Pset.
Pset created	The date when the Pset was created.
Pset modified	The date when the Pset was last modified.
Configured tool name	The tool type the Pset was linked to (model type in text).
Min. total time	Minimum time a tightening must run to pass as a tightening.
Max. total time	Maximum time a tightening can run to pass as a tightening.
Min. total angle	Minimum number of degrees the tool must turn during a tightening.
Max. total angle	Maximum number of degrees the tool is allowed to turn during a tightening.
Graph start step	The number of the step from which the graph is started.
Torque tuning	Adjust torque calibration for this Pset.
Final report step	Defines which tightening step in a Pset should report the final torque in the result. It is usually the last step in a Pset but can sometimes be another step.
Final report torque	Decides if the final report step should report the peak, clamp or final torque. In most cases peak and final torque will be the same, but not in the angle step where peak torque can be higher than final torque.
Final report angle	Decides if the final report step should report the step, clamp or tightening angle.
Bit slip detection	(Licenced feature) Bit slip is a function to detect when the bit slips out of the joint. It is a sign that the bit or the screw head is damaged. When detecting a sudden dip in torque the controller will monitor the torque over a 360° window, if the torque has dropped 50% bit slip is detected. Bit slip is not enabled at torques lower than 10% of tool max torque. When bit slip detection is enabled, the screw driver will stop when a torque drop is detected and an error message will be displayed in the controller  If bit slip occurs during a Seating Control Step or a Torque Seating Monitoring and bit slip is disabled, a seating can falsely be detected.

Damaged thread detection	(Licenced feature)
Trigger lost torque	Will detect if the screw's threads have been damaged. An error will be sent if the tool button is released after the Trigger lost torque value have been passed but before the tightening is completed. This is to make sure that no error codes will be sent if the tool button is pressed by mistake

Configure Pset

The configuration pane includes the steps in the Pset.

Add step

There are two ways to add steps:

- To add a single step, click the **Add** button.
- To add several steps, right-click on the **Add** button and select the number of steps you want to add.

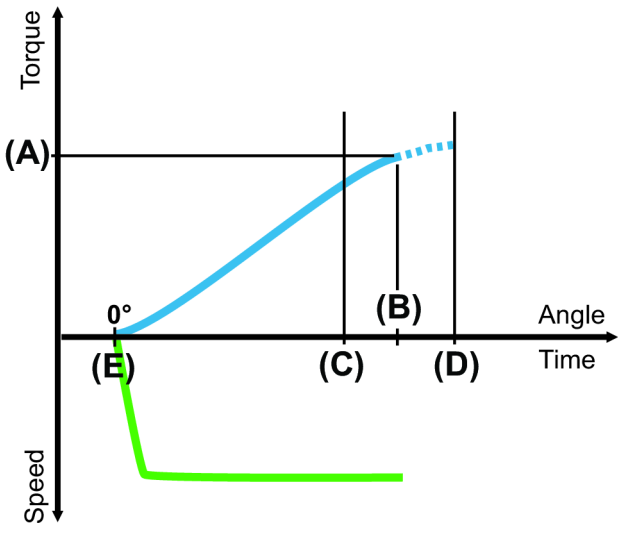
Delete step

To delete one or several steps, perform the following steps:

1. Mark the check box in front of the steps you want to delete.
2. Click the **Delete** button.
3. Click the **Yes** button in the **Confirm** window.

Thread engagement step

The thread engagement step is used to facilitate screw engagement, normally at low RPM (100-150 rpm). This step is finished by either reaching transition torque or transition angle. If the transition angle is set to infinite, the step can be finished only by reaching the transition torque or it will be aborted when the max. step time has been reached.



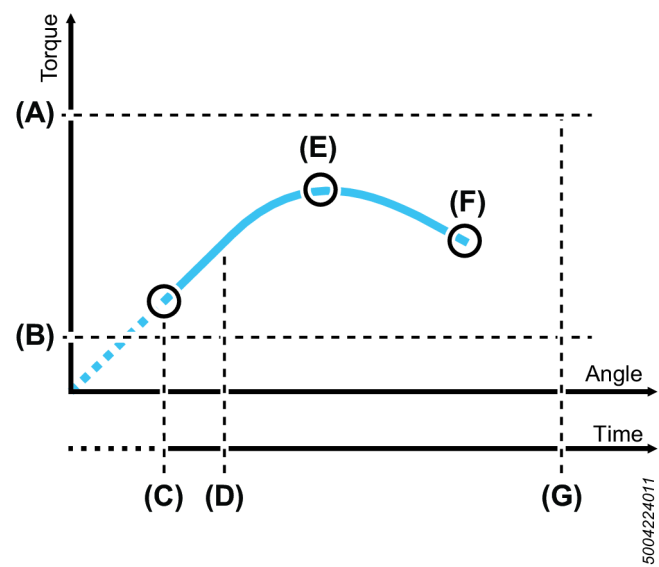
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Parameter	Description
Speed	The tool speed is programmable within the valid range.
Transition torque (A)	The step is considered done when the step torque reaches the transition torque.

Transition angel (B)	The step is considered done when the step angle reaches the transition angle.
Direction	Direction of the tightening, clockwise or counter-clockwise. Use clockwise setting for normal tightening.
Vacuum pump	Digital output to switch on an external vacuum pump.
Fast speed change	Makes it possible to shift fast between fast and slow speed. When enabled it will be possible to get a more accurate torque estimation for current controlled tools over a longer time frame.
Step start delay (E)	Delay from trigger to tool start.
Min. step time (C)	Setting a minimum time for the step. If not reached the controller will display an error message.
Max. step time (D)	Setting a maximum time for the step. If exceeded, the controller will display an error message.

Angle step

The angle step is used to run the screw down for a certain number of revolutions, most of the time at high RPM. The angle step is finished when the angle target is reached.



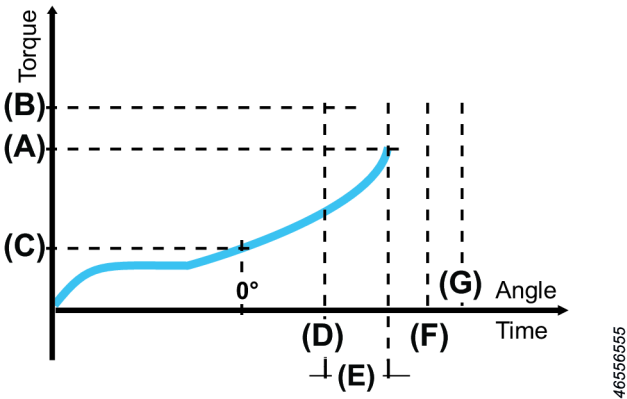
A	Max. torque
B	Min. torque
C	Step start
D	Min. step time
E	Peak torque
F	Target angle / Final torque
G	Max. step time

Parameter	Description
Speed	The tool speed is programmable within the valid range.

Target angle (F)	The angle that shall be reached to successfully complete the step.
Direction	Use clockwise setting for normal tightening.
Vacuum pump	Digital output to switch on an external vacuum pump.
Fast speed change	Makes it possible to shift quickly between different speeds. When enabled it will be possible to get a more accurate torque estimation for current controlled tools over a longer time frame.
Min. torque (B)	<p>The torque must not be below the set min. torque during the step. If the torque drops below the minimum torque the driver will stop and the controller will display an error message.</p> <p>If min. Torque is set above 0 cNm, add a step before the angle step to reach the set torque before the angle step starts.</p>
Max. torque (A)	The maximum torque value must not be exceeded during the step. If the maximum torque is reached, the driver will stop and the controller will display an error message.
Step start delay	Delay from trigger to tool start.
Min. step time (D)	Setting a minimum time for the step. If not reached the controller will display an error message.
Max. step time (G)	Setting a maximum time for the step. If exceeded, the controller will display an error message.

Torque step

The torque step is used for final tightening of the screw and to ensure that the correct torque is reached.



A	Target torque
B	Max. torque
C	Tightening angle trigger
D	Min. angle
E	Tightening angle
F	Max. angle
G	Max. tightening angle

Parameter	Description
Speed	The tool speed is programmable within the valid range.
Target torque (A)	The target torque of the joint. This is also the final and peak torque of the step.
Min. torque	If the minimum torque value is not reached, the controller will display an error message.
Max. torque (B)	The maximum torque value must not be exceeded during this step. If the maximum torque is reached, the tool will stop and the controller will display an error message.
Min. angle (D)	Angle that must have been reached when the step is finished.
Max. angle (F)	Angle that must not be exceeded prior to reaching target torque.
Direction	Use clockwise setting for normal tightening.
Step start delay	Delay from trigger to tool start.
Min. step time	Minimum time for the step. If not reached, the controller will display an error message.
Max. step time	Maximum time for the step. If exceeded, the controller will display an error message.
Vacuum pump	Digital output to switch on an external vacuum pump.
Tightening angle trigger (C)	Once the tightening angle trigger value is reached, angle counting begins for this step. If adjusted to a torque level where the screw is already seated, the gradient of torque vs. angle can give an indication for the clamping force within the joint (typical for metal joints).
Min. tightening angle	The tightening angle must exceed the min. tightening angle for the tightening to pass.
Max. tightening angle (G)	The maximum tightening angle (E) value must not be exceeded during this step. If the maximum tightening angle is reached, the tool will stop and the controller will display an error message.

Torque seating monitoring step

This step is a torque step with additional seating monitoring. When a seating isn't found a tightening error will be triggered. It is also possible to collect clamp torque and clamp angle data. The torque seating monitoring step has a given target torque and includes a seating detection.

Parameter	Description
Speed	The tool speed is programmable within the valid range.
Target torque	The target torque of the joint.
Min. torque	If the total torque is below minimum torque, an error message will be displayed.

Max. torque	The maximum torque value must not be exceeded during this step. If the maximum torque is reached, the driver will stop and the controller will display an error message.
Min. angle	Angle that must have been reached when the step is finished. If not reached, the controller will display an error message.
Max. angle	Angle that must be exceeded when the step is finished. If exceeded, the controller will display an error message.
Min. clamp torque	The min. clamp torque can be used to detect joint anomalies.
Max. clamp torque	The max. clamp torque can be used to detect joint anomalies.
Min. clamp angle	The min. clamp angle can be used to detect joint anomalies.
Max. clamp angle	The max. clamp angle can be used to detect joint anomalies.
Step start delay	Delay from trigger to tool start.
Min. step time	Minimum time for the step. If not reached, the controller will display an error message.
Max. step time	Maximum time for the step. If exceeded, the controller will display an error message.
Vacuum pump	Digital output to switch on an external vacuum pump.
Seating angle displacement	Angle window for calculating the seating point from the gradient trigger point.
Gradient trigger point	The torque level when the tool detects that the screw head has touched the work piece. This is the end point of the Seating angle displacement .

Seating control step

This step is specialized for joints with increased rundown friction, such as thread cutting, thread forming screws or joints with sideloads from misaligned parts.

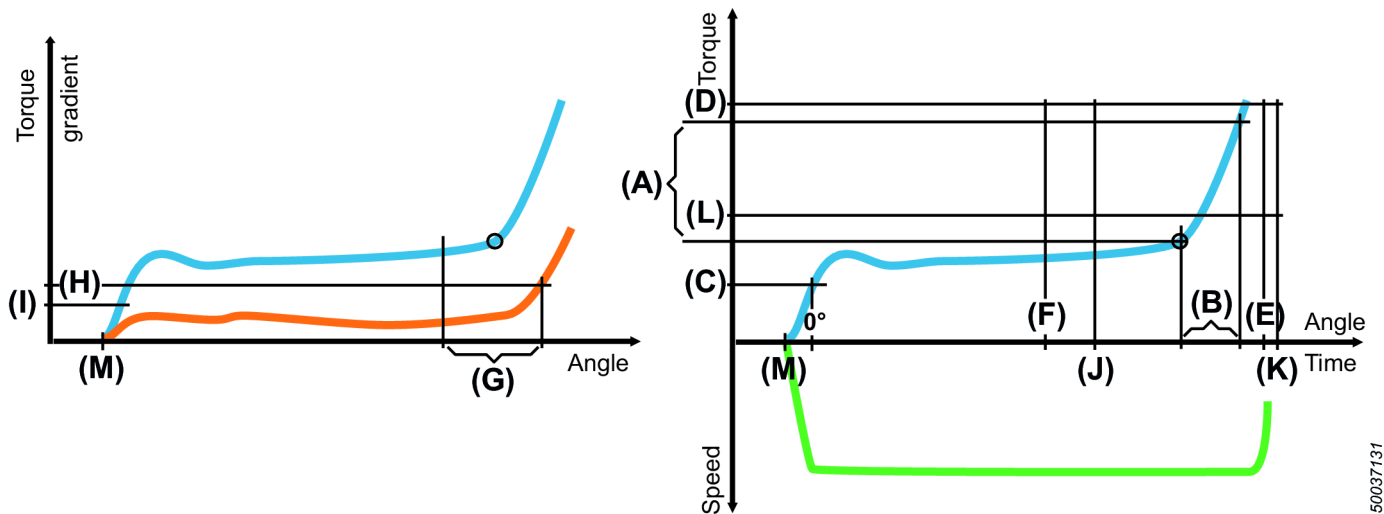
In this type of applications it is common with variations from joint to joint. The main goal of this step is to eliminate floating screws and apply the same clamp torque or clamp angle to all joints even though the joints vary. The step monitors the gradient of the clamp torque over clamp angle and can detect when the screw is seated, that is when the screw head is in contact with the joint surface. From the seating point, the configured torque or angle is applied. The total torque or angle may differ from tightening to tightening but the same amount of clamp torque is used to compress the joint.

The method works as follows:

1. A torque level, the **gradient trigger point**, is set for detection of the point where the screw head is touching the work piece.
2. When the torque gradient exceeds the gradient trigger point, the seating point is detected. The torque gradient can be displayed in the tightening graph in the analysis window.

From this point, where the torque curve starts rising, the **Seating point** is calculated. This is done by calculating the mean torque from the gradient trigger point and looking back the amount of degrees from seating angle displacement.

- ⓘ This step type allows lower target torque and higher speeds than Torque step. However, precision can not be guaranteed under these conditions.



Parameter	Description
Speed	The tool speed is programmable within the valid range.
Final tightening method	Decides if the tightening should use clamp torque or clamp angle.
Clamp torque (A) / Clamp angle (B)	Sets the value for the clamp torque or the clamp angle.
Min. clamp torque	The min. clamp torque can be used to detect joint anomalies.
Max. clamp torque	The max. clamp torque can be used to detect joint anomalies.
Min. clamp angle	The min. clamp angle can be used to detect joint anomalies. If below, the controller will display an error message.
Max. clamp angle	The max. clamp angle can be used to detect joint anomalies. If exceeded, the controller will display an error message and the tool will stop.
Min. torque (L)	If the total torque for a seating control step is below minimum torque, an error message will be displayed.
Max. torque (D)	The Maximum torque value must not be exceeded during this step. If the Maximum torque is reached, the driver will stop and the controller will display an error message.
Min. angle (F)	Angle that must have been reached when the step is finished. If not reached, the controller will display an error message.
Max. angle (E)	Angle that must not be exceeded prior to reaching target torque. If exceeded, the controller will display an error message.

Step start delay (M)	Delay from trigger to tool start.
Min. step time (J)	Minimum time for the step. If not reached, the controller will display an error message.
Max. step time (K)	Maximum time for the step. If exceeded, the controller will display an error message.
Vacuum pump	Digital output to switch on an external vacuum pump.
Seating angle displacement (G)	Angle window for calculating the seating point from the gradient trigger point.
Gradient trigger point (H)	The torque level when the tool detects that the screw head has touched the work piece. This is the end point of the Seating angle displacement .

Loosening

The loosening step is used to loosen or unscrew a screw.

Parameter	Description
Loosening torque	Maximum torque allowed for a loosening.
Loosening angle	Maximum angle allowed for a loosening.
Loosening speed	Speed for loosening.
Loosening vacuum pump	Digital output to switch on an external vacuum pump.
Loosening start delay	Delay from trigger to tool start.

Screw pickup

Screw pickup helps the operator to pick up a screw before starting the tightening.

Tightening procedure when **Screw pickup** is enabled:

1. Hold start button to pick up screw.
2. Place the screw at the right position.
3. Press the start button again to trigger the tightening.

Parameter	Description
Vacuum on	Sets vacuum to on at startup.
Rotate on pickup	Will rotate slowly CCW on pickup.
Timeout	Timeout is used to set an interval how long the pickup should take. If the time is exceeded the controller will leave the busy state and go back to idle.

Controller result view

The custom view makes it possible to customize the last view on the controller. The selected information will only be displayed during the selected Pset. If no Pset is selected the screen will be blank.

The screen can be configured to show one to four fields. For each field it is possible to display general or step information.

- ❗ The first field have a white background, the following have grey background. This is to give a focal point and have no other intended meaning.

General data

Parameter	Description
Final torque	Shows the final torque of the tightening. Final torque can be configured in the general settings of the Pset.
Peak torque	Shows the maximum achieved torque in the tightening.
Tracking torque	Follows the torque during the tightening.
Final angle	Shows the final angle of the tightening. Final angle can be configured in the general settings of the Pset.
Total angle	Shows the total angle of the tightening.
Tracking angle	Follows the angle during the tightening.
Tightening error	Shows the current error message, blank if no current error.
Pset name and number	Shows Pset number and name.
Date	Controller date.
Controller name	Controller name (configured under Controller settings).
Station name	Station name (configured under Controller settings).
Line name	Line name (configured under Controller settings).
Logged in user	Displays if any user level is logged in (L1-L3) or "-" if no user is logged in.
Tightening duration	The time in seconds of the last tightening.
Tool serial number	The serial number of the connected tool.
Tool type	The type of the connected tool.
Calibration date	Date of last calibration.
Tool statistics	Tool statistics, displays the OK and NOK tightenings since last calibration.
Select source	Displays the source of Pset and batch sequence selections.
Time	Controller time.

Step data

Parameter	Description
Step peak torque	Shows the maximum achieved torque in the selected step.
Step clamp torque	Shows the achieved clamp torque in the selected step.
Step transition torque	Shows the maximum last measured torque in the selected step.
Step angle	Shows the achieved angle for the selected step.
Step clamp angle	Shows the achieved clamp angle in the selected step.
Seating torque	Shows the seating torque of the step.

Batch sequence



This function provides the possibility to control a sequence of screw joints with different tightening strategies related to the assembly of one workpiece.

Batch

To set-up a batch a pre-defined Pset and a batch size is needed, that is the number of tightenings to be performed.

It is possible to define a repair Pset and a repair limit. If a tightening fails, the repair limit is incremented. If the repair attempts exceed the repair counter the whole batch sequence is failed.

It is possible to set two timeout values, from start and from tightening. If a batch takes longer time than the set value, the batch is failed and aborted.

Event

The event step can be used to interact with the workstation and control the flow of the tightening process.

Input

The input step will wait for a given state on a digital input signal before exceeding to the next step. It is possible to select the input signal between Batch sequence DI1 to Batch sequence DI12. These signals must then be connected to an actual input signal in the menu **I/O and Passwords settings > Digital I/O**. Signal flank defines if the input step should react on changes from zero to one (positive flank) or changes from one to zero (negative flank) or if the signal should just be set high or low.

Output

The output step sets a digital output signal to a defined level. Similar to the Input step, a batch sequence output signal must be selected and later connected to a real output signal in the menu **I/O and Passwords settings > Digital I/O**. Output signal level defines if the signal should be set high (one) or low (zero). The output mode defines if the signal should be permanently set to the output signal level or be pulsed (duration). In the case of duration, the time for the pulse must be selected. The max time for the pulse is three seconds, if a longer step is needed it is possible to use two output steps in set mode with a delay step in-between.

Delay

It is possible to delay the sequence for a given time between 0.01 and 30 seconds.

Advanced scan

This step forces the user to scan a barcode or read a RFID-tag. The data can be stored with the tightening result data for traceability.

Configuring this step requires one or more pre-defined identifiers. An identifier is a rule that is used to verify if the scanned string is correct.

This step can house up to four identifiers, this is to manage variations in product serial numbers. For example it can be that the scan will store the serial number of a module in the product. The module can come from two different suppliers and have different serial numbers. Then serial numbers of both types should be accepted as correct.

Simple scan

This step forces the user to scan a barcode or read a RFID-tag. The data can be stored with the tightening result data for traceability.

The information is saved to a custom ID. No validation is made.

Input monitor step

The input monitor step can be used to monitor the level of a digital input during the batch sequence.

Adding a batch sequence

To add a batch sequence, perform the following steps:

1. Click the **Batch sequence** icon in the **Menu** bar. The workspace area shows a list of all the current batch sequences.
2. Click the **Add** button. The Create batch sequence window opens.
3. Enter batch sequence number and name.
4. Click the **OK** button.

A new batch sequence is added at the place of select number and the list is updated.

Deleting a batch sequence

To delete a batch sequence, perform the following step:

1. For each batch sequence to be deleted, mark the check box in the left most column in the workspace area.
2. Click the **DELETE** button.
3. Confirm the deletion in The **Confirm** window.

The selected batch sequence(s) are removed and the list is updated.

Copy batch sequence

To copy a batch sequence, perform the following steps:

1. Right-click on the **batch sequence** you want to copy.
2. Select **Copy**.
3. Right-click on the **batch sequence** you want to copy to.
4. Select **Paste**.
5. To confirm, press the **Yes** button in the **Confirm** window.

General settings

Parameter	Description
Batch sequence name	Is shown in the batch sequence list. Will be displayed on the result screen on the controller. Will be saved together with all tightening results made in the batch sequence.
Batch sequence revision	Revision of the batch sequence.
Batch sequence created	The date when the batch sequence was created.
Batch sequence modified	The date when the batch sequence was last modified.

Beep on error	When enabled, the controller will beep if a batch sequence has failed.
Abort time	If a batch sequence takes longer time than this, the batch sequence is failed and aborted with an error message.

Configuration

The configuration pane includes the batch, events or information steps in the batch sequence.

Add batch, event or information step

There are two ways to add steps:

- To add a single step, click the **Add** button.
- To add several steps, right-click on the **Add** button and select the number of steps you want to add.

1. Click the **Add** button.

Delete batch, event or information step

To delete a batch, event or information step perform the following steps:

1. Mark the check box in front of the batch, event or information step you want to delete.
2. Click the **Delete** button.
3. Click the **Yes** button in the Confirm window.

Batch parameters

A batch is a series of tightenings with one defined Pset.

Parameter	Description
Pset number	Number of the Pset to use.
Batch size	The number of tightenings with the selected Pset.
Repair mode	Enabled/Disabled. If enabled the loosening trigger will automatically be disabled until a tightening error. When the loosening trigger is enabled the tool trigger is disabled. After a loosening, the repair Pset mode is enabled.
Increment batch counter on	OK or OK/NOK. Should the batch counter increase on OK tightenings only or on OK and Not OK tightenings.
Max. consecutive NOK	The maximum number of allowed failed tightenings during a batch.
Repair Pset	Select a repair Pset.
Repair limit	If a tightening fails, the repair limit is incremented. If the repair attempts exceed the repair counter the whole batch sequence is failed.
From start	The maximum execution time for the batch step. If the batch step takes longer time than this, the batch sequence is failed and aborted with an error message.

From tightening

The maximum execution time for a batch step counting from the start of the first tightening. If the batch step takes longer time than this, the batch sequence is failed and aborted with an error message.

Event parameters

Parameter	Description
Event type	Advanced scan, input, output, delay or simple scan.

Advanced scan

Parameter	Description
Identifier source	Scanner
Identifier rule 1-4	Up to four identifier rules to parse incoming identification strings.
Information text	User defined text to be displayed on the screen during the advanced scan step.
Timeout	If an Advanced scan takes longer time than this, the batch sequence is failed or aborted.

Input

Parameter	Description
Input signal	Decides which digital input signal to wait for.
Signal flank	Decides if the step should react to positive/negative/any flank or positive/negative level.
Timeout	If an Input step takes longer time than this, the batch sequence is failed or aborted.

Output

Parameter	Description
Output signal	Decides which digital output to set.
Output signal mode	Decides if the signal should be permanently set or for a set time.
Output signal level	Decides if the output should be set high or low.
Output signal duration	Appears if signal mode is set to duration and decides for how long the output should be active.

Delay

Parameter	Description
Delay time	Decides for how long the event will stay active. Can be set from 0.01-30 s.

Simple scan

Parameter	Description
Identifier source	Scanner

Destination	Save to one Custom ID.
Information text	User defined text to be displayed on the screen during the simple scan step.
Timeout	If a simple scan takes longer time than this, the batch sequence is failed and aborted with an error message.
Key	Static text defined by user and saved with data in custom ID.

Input monitor

The input monitor step can be used to monitor the level of a digital input during the batch sequence. When enabling an input monitor it will be active until end of the batch sequence or until it is disabled.

If the monitor error is triggered, it will activate an batch sequence error.

Parameter	Description
Monitor mode	Enable or disables the input monitor. If enabled the input monitor will be active until the end of the batch sequence or until disabled. An input monitor is bound to a specific pin. It is possible to have multiple input monitors for different pins running at the same time.
Input signal	Select the batch sequence input signal that should be monitored. The input signal must be assigned to an actual input in the I/O configuration. The signals in the drop down list are the same as in the input event type, that is DI1-12.
Error trigger	If the signal assumed the error trigger state, high or low, the batch sequence will be aborted and a batch sequence error will be active.

Information parameters

Parameter	Description
Information text	User defined text to be displayed on screen during the information step.
Information transition mode	This parameter defines how the information step is finished. It can transition to the next step after a given time or after a press of the OK button.
Information transition time	If transition mode is selected, a time can be entered.
Buzzer frequency	The frequency of the buzzer.
Buzzer duration	The duration of the buzzer - set to zero if no buffer wanted.

Identifiers



Identifiers are used when an external signal is used to select the next task. The external input signals can originate from, for example, a scanner.

A scan results in a long string of characters. The significant characters in the scanned string are located, combined and compared with pre-defined characters. If the comparison results in a match, an action is set for the next task.

A scanner can be connected to a USB or a serial port on the controller.

The USB-scanners must have:

- USB HID interface (Keyboard)
- English-US keyboard interface

Scanner

MTF6000 offers the possibility of connecting scanners via USB HID (as keyboard) and RS232. It is possible to use any type of scanner that uses any of these interfaces. The system will accept text strings of up to 512 characters.

There are several different ways of using scanner data:

- Traceability and production monitoring (Save ID)
- Work control (Select Pset/Select batch sequence)
- User access control (Login).

To configure how scanners are used, the user needs to setup identifier rules. These rules first tries to validate an incoming identification string (scanner input). If the identification string is validated by the rule, it will issue an action to the system.

Adding an identifier

To add a identifier perform the following steps:

1. Click the **Identifier** icon in the **Menu** bar. The workspace area shows a list of all the current identifiers.
2. Click the **Add** button. The **Create** window opens.
3. Enter identifier number and name.
4. Click the **OK** button.

A new identifier is added at the place of select number and the list is updated.

Deleting an identifier

To delete a identifier, perform the following step:

1. For each identifier to be deleted, mark the check box in the left most column in the workspace area.
2. Click the **DELETE** button.
3. Confirm the deletion in The **Confirm** window.

The selected identifier(s) are removed and the list is updated.

Copy identifier

To copy an identifier, perform the following steps:

1. Right-click on the identifier you want to copy.
2. Select **Copy**.
3. Right-click on the identifier you want to copy to.

4. Select **Paste**.
5. To confirm, press the **Yes** button in the **Confirm** window.

General settings

Parameter	Description
Name	Name of the identifier.
Identification string	The set string. The Enter/Scan button can be used to manually enter a barcode.

Validation

The validation settings are used to verify if the rule applies to the incoming identification string. If the rule applies, the controller will execute the actions attached to the rule.

It is possible to select anything from 1 to 64 characters in the string to match against a given text.

Example:

Match part-> 1-3, 9-10

Match string->SNPDL

String 1-> SNP12345DL -> Match (bit 1-3 is SNP and bit 9-10 is DL)

String 2-> SNPDL1234 -> No match (bit 1-3 SNP but bit 9-10 is 34)

Parameter	Description
Identification string length	Length of identification string. Set automatically when the Enter/scan button and then the OK button is clicked.
Match part	Positions in the identification string. Position numbers can be between 1 and 16. The selection is done in a separate window.
Match string	Characters that will match the string according to the match part.

Configuration

In all identifier actions except login it is possible to save up to 100 characters in each custom ID. This string will then be attached to the result data from the tightening.

There are four custom ID slots that the user can fill with text. Each custom ID has two fields, key and format. The key value is a static text that can be entered when configuring the identifier. The value field will be filled when the scan happens. The value format setting decides what data is entered into the field, it will define the number and order of bits to select.

Parameter	Description
Action type	Save ID Select Pset Select Batch sequence Login


Save ID

 The Save ID action can only be used inside a batch sequence.

This action is used to save data from the scanned tag with the result data. By adding a static key the data will be searchable in a database. It is possible to set up to four save strings. The scanner input can save 100 key characters and 100 scanned characters, that is, 200 in total.

Parameter	Description
Format 1-4	The part of incoming string that will be saved in the custom ID.
Key 1-4	Static text defined by user saved with scanner data.
Save destination 1-4	None Custom ID 1 Custom ID 2 Custom ID 3 Custom ID 4

Select Pset


 This action can only be executed if the selected source is set to scanner.

This is set in **Controller settings > Configuration > Select source**.

This action will select a Pset.

Parameter	Description
Pset	Select from available Psets.
Save destination	None Custom ID 1 Custom ID 2 Custom ID 3 Custom ID 4
Key	Static text defined by user saved with scanner data.
Format	Part of incoming string that will be saved with the result.

Select batch sequence

 This action can only be executed if the selected source is set to scanner.

This is set in **Controller settings > Configuration > Select source**.

This action will select a batch sequence.

Parameter	Description
Batch sequence	Select from available batch sequences.
Batch sequence restart mode	Decide whether the batch sequence should wait for a new scan or start automatically when it finishes.
Save destination	None Custom ID 1 Custom ID 2 Custom ID 3 Custom ID 4
Key	Static text defined by user.

Format	Part of incoming string that will be saved with the result.
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Login

This action enables a user to log in to a user level. The user level is set in **I/O and Password settings > Password > Controller**.

Scanning the code while logged in will automatically log out the user.

Parameter	Description
Level	Select level 1 to 3.

Analysis



Analysis can be used for viewing of new tightening traces from controllers connected via USB and stored/saved tightening graphs.

GUI object	Action
Stop	Stops analysis from collecting/receiving real time traces.
Start	Starts the analysis. Each tightening starts a new graph.
Value table	Displays the graph in a table.
Clear	Erases the graph(s).
Open	Opens an earlier saved graph.
Save	Saves the displayed graph as a .dia file.
Export	Export the results to a .jpg- or .bmp-file .
Settings	Changes the analysis functions. Selected in three tabs. <ul style="list-style-type: none"> • General settings • Torque trigger • Chart settings
Test	Opens a window that enables you to run the tool from ToolsTalk MT.
Path	Path to the working folder. The .dia- or .mtg-files in the selected folder are displayed.
Show multiple traces	Show multiple traces. Print up to 8 graphs.
Refresh	Press to update the working folder/path.
.dia- and .mtg-files	The .dia- and .mtg-files in the selected working folder are displayed. Doubleclick on the filename to view the graph.

Navigate in a graph in analysis menu


Action	Description
Zoom in	Hold the left mouse-button and drag it diagonally to the right.

Zoom out	Hold the left mouse-button and drag it diagonally to the left.
Move	Hold the right mouse-button and move the mouse.
Copy chart	To copy the chart right-click and select Copy chart
Add comment	Click the right mouse-button on the graph to add a comment (to that specific graph).
Delete	Click the right mouse-button on the graph and select Delete to remove it from the chart.

Settings

Settings for ToolsTalk MT Analysis.

General settings

Parameter	Description
Path	The recording is stored to the specified folder. The files are named with an index.  The user must have write permission to the selected path.
Automatic store	Enables saving of the files to the specified folder automatically.
Show legend	Shows and hides the legend from the diagram.
Step color	The steps in a tightening program gets different colors. If disabled each graph have a unique color.

Torque trigger

Torque trigger is used to control the activation and deactivation of recordings.

Parameter	Description
Torque	The real time trace is recorded as long as the torque exceeds this value.
Start delay	The delay time can be adjusted between 0 and 50 seconds. The real time trace is recorded as long as the execution time exceeds this value. If both start delay and torque trigger is used then the real time trace will not start recording until both limits are exceeded.

Chart settings

Parameter	Description
Diagram type	Torque/Time displays the torque as a function of time. Torque/Angle displays the torque as a function of angle.
Show torque gradient trace	Shows the torque gradient trace.

Results



GUI object	Action
First	Opens the first page which contains the 100 latest results/events.
Previous	Opens the previous page.
Next	Opens the next page.
Last	Opens the last page which contains the oldest ≤ 100 results/events.
Refresh	Updates the results/events list.
Auto update	The list is automatically updated when a new result is stored.

Results

The **results** window shows all tightening results that are stored on the controller

Right click in the **results** window to select which columns that will be displayed in the table.

Select result

Select a tightening in the table in the upper left corner in the **Tightening results** window.

The torque/angle graph and the data for the selected tightening is displayed.

Step results

The **step result** window shows the step torque and angle values from the latest tightening/loosening.

Events

The **events** window shows a list of the latest 512 events.

Doubleclick on an event to open a window with information on that event.

Tool settings



Controller settings



Connect controller to ToolsNet

Static mode


1. Connect the controller to the factory network via Ethernet.
2. Set *Network mode* to **Static** in **Controller settings > Configuration > Network**.
3. Set IP-address, subnet mask, gateway to the controller.
4. **Enable** ToolsNet.
5. Set IP-address of ToolsNet server.
6. Set ToolsNet port, 6700 is the standard port for all MT devices.

7. Select if the controller should synchronize time with ToolsNet.

DHCP mode

1. Connect the controller to the factory network via Ethernet.
2. Set *Network mode* to **DHCP** in **Controller settings > Configuration > Network**.
3. **Enable** ToolsNet.
4. Set IP-address of ToolsNet server.
5. Set ToolsNet port, 6700 is the standard port for all MT devices.
6. Select if the controller should synchronize time with ToolsNet.

General settings

GUI object	Description
Update firmware	Update firmware in a connected controller.  The controller must have firmware version 1.4.1 and higher to be able to be updated.
Set date and time	Set date and time.

Parameter	Description
Calibration date	Date of latest calibration.
Controller name	A user defined name of the controller.
Controller ID	A user defined identification number of the controller.
Station name	A user defined station name.
Station ID	A user defined station identification number.
Line name	A user defined line name.
Line ID	A user defined line identification number.
Controller language	<ul style="list-style-type: none"> • English • Chinese • Spanish • French • German • Italian • Korean • Japanese • Portuguese
Torque unit	Unit of torque to be displayed in the controller.
Temperature unit	The temperature unit to be displayed in the controller.

Configuration

Parameter	Description
Beep on OK	If set to enabled the controller will beep on an OK tightening.

Beep on NOK	If set to enabled the controller will beep on an NOK tightening.
Beep on Batch complete	If set to enabled the controller will beep when a batch finishes.
Beep on Batch sequence complete	If set to enabled the controller will beep when a batch sequence finishes.
Select source	<p>This parameter controls how Psets and batch sequences are selected and activated.</p> <ul style="list-style-type: none"> • Controller - the Pset and batch sequences are selected via the controller menus. • Protocol/ToolsTalk MT - Pset and batch sequences are selected via the communication protocol over USB/Ethernet/Serial. • Digital I/O - Psets and batch sequences are selected via Digital input signals (I/O select signals needs to be configured). • Scanner - Psets and batch sequences are selected with scanner (identifier rules needs to be configured).
Startup mode	<p>None / Pset / Batch sequence.</p> <p>At startup select Pset or batch sequence.</p>
Pset number	If Pset is selected in Startup mode select Pset number.
Batch sequence number	If batch sequence is selected in Startup mode select batch sequence number.
Startup view	Defines which view in the controller should be opened at start-up.
Backlight activate on tightening	If set to yes the controller screen is lit up during a tightening.
Lock on error	<p>This parameter enables an event on a tightening error. This event has to be acknowledged before a new tightening can begin. It can be used to stop the system, if for example a robot is running the system. For locking out operators to continue after a failed tightening, a password rule should be enabled.</p>
Save graphs	<p>(Licenced feature)</p> <p>Decides if all, none or only failed tightening results should save their graphs.</p>
Auto start tightening	Automatically starts the active tightening at a given interval.

Standby enabled	<p>With standby enabled the controller is set to standby mode after the set time. When the controller wakes up from standby mode no tool initiation is needed.</p> <p>Controller wake up from standby when input from either of the following:</p> <ul style="list-style-type: none"> • Tool button start/loosen/PTS • I/O Wake up • I/O Start • I/O Loosen • DC Tool • DC IAM • Connect tool • Controller buttons • Start/loosen via PC.
Tool init. confirmation	<p>Defines if the operator/user needs to press OK before the tool starts initialization. Tool init happens at system start-up and when a tool is connected.</p>
Tool start trigger	<ul style="list-style-type: none"> • Enable - Start trigger activated • Disable - Start trigger deactivated • Push to start - Starts when the chuck is pushed into the tool. Available for PTS compatible tools.
Tool loosening trigger	<ul style="list-style-type: none"> • Enable - Loosening trigger activated • Disable - Loosening trigger deactivated
Tool trigger mode	<ul style="list-style-type: none"> • Hold - The tool will run as long as the start/loosening signal/trigger is high. If released the tool will stop. • Pulse - The tool will run until the tightening/loosening is finished (or aborted) regardless if the signal/trigger is released.
Tool rehit enabled	<p>Rehit is tightening an already tightened screw. This setting will give a tightening error if the system detects a rehit.</p>
Network mode	<p>(Licenced feature)</p> <p>Disabled - No IP address is configured for the controller.</p> <p>Static - Manually edit the IP-address, subnet mask and gateway.</p> <p>DHCP - Get IP address, subnet mask and gateway from a DHCP server.</p>
ToolsNet	<p>(Licenced feature)</p> <p>Enable / disable connection with ToolsNet version 8.4 and later.</p>
ToolsNet IP address	<p>(Licenced feature)</p> <p>IP address of ToolsNet server.</p>

ToolsNet port	(Licenced feature) Port of ToolsNet server, 6700 is the standard port for all MT devices.
ToolsNet sync. time	(Licenced feature) Select if the controller should synchronize time with ToolsNet.
RS232 mode	<ul style="list-style-type: none"> • Protocol • Scanner
Baudrate	Data transmission rate for RS-232
Clear DB on USB export	<ul style="list-style-type: none"> • Yes - Remove all results and graphs stored on the controller after export via USB. • No - Keep all data.

System Info.

Parameter	Description
Software version	
Software date	Build date of the software.
MAC address	The MAC-address of the IAM.
Serial number	The controller serial number.
Licence ID	The licence code.
License level	The licence level.
Date and time	Set time and date.

System Diag.

Parameter	Description
Current sensor zero	
Torque sensor zero	

Network

Parameter	Description
Link status	Status of the current connection.
DHCP	Address to configured DHCP.
IP address	Controller IP address.
Subnet mask	Subnet mask.
Gateway	IP for gateway.

Digital I/O and password settings



Digital I/O

Input signals to the controller.

Parameter	Description
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I/O select mode	Defines if I/O select pins should start a Pset or a batch sequence. To enable, the source must be set to Digital I/O. Select source in Controller settings menu > Configuration > Startup > Select source.
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Digital in

Input signals to the controller.

Parameter	Description
Disabled	The signal is disabled.
Start tightening	Starts a tightening, will start on a positive flank (transition 0->1).
Start tightening (hold)	Starts a tightening, will start on a positive flank (transition 0->1). If the signal is brought low during the tightening, it will be canceled.
Start loosening	Starts a loosening, will start on a positive flank (transition 0->1).
Start loosening (hold)	Starts a loosening, will start on a positive flank (transition 0->1). If the signal is brought low during the loosening, it will be canceled.
Stop operation	Stops any ongoing tightening/loosening.
Reset	This signal will stop any ongoing tightening. If no tightening is active it will clear the screen from the previous tightening data.
Disable tool	Set the tool in disabled mode, no new tightening or loosening can be started.
Initialize tool	Makes the tool run the initial self-calibration. Will amongst other things measure the internal friction.
Clear event	Will clear a non-blocking controller event. This is the same as acknowledging an error/event by pressing the OK button on the controller.
Clear all events	Clear all active (non-blocking) controller events.
Select bit 0-7	Used to select a Pset or batch sequence, if select source is set to digital I/O.
Reset Batch sequence	Restart a batch sequence.
Increment Batch	Skip one tightening in a batch.
Decrement Batch	Redo one tightening in a batch.
Reset Batch	Restart a batch.
Batch sequence DI1-12	Batch sequence input signals. These signals will control the batch sequence input events.
Reboot	Reboots the controller software.
Increment Batch sequence	Skip one step in a batch sequence.
Decrement Batch sequence	Redo one step in a batch sequence.

Digital out

Output signals from the controller.

Parameter	Description
Disabled	The signal is disabled.
Ready	The controller is ready to commence tightening.
Busy	The output is active when the tool is running, either by a tightening or a loosening process.
Error	An error is active.
Tightening OK	The tightening program was completed successfully. The signal is inactive as long as the sequence is in process.
Tightening NOK	The tightening program was not completed successfully. The signal is inactive as long as the sequence is in process.
Batch complete	The batch step was completed.
Active event	An event is active.
Blocking event	An event is preventing operation until resolved.
Clearable event	Set if an event is acknowledgeable.
Initializing tool	Indicates that the initial tool self-calibration is ongoing.
Tool disabled	Indicates if the tool is disabled.
Vacuum pump	Indicates if the vacuum pump is active.
Start signal	The output is active, as long as the start lever on the tool is pressed.
Loosening signal	The output is active, as long as the reverse lever on the tool is pressed.
Push to start signal	The output is active, as long as the tool bit switch is pressed.
Batch sequence DO1-8	Batch sequence output signal. These signals will be controller by batch sequence output events.
Batch sequence OK	A batch sequence has finished successfully.
Batch sequence error	Indicates if a batch sequence error was triggered.

Output signal mode

- Tracking - reacts on changes.
- Until next tightening - will be active until the next tightening is started.
- Duration - will be active for a set amount of time.

Password

The flexible password system makes it possible to completely tailor what the operator have access to. Technicians and line managers have the option to gain access to the system via password or by login in via scanner, for example bar-code or RFID.

If no password has been configured, the **No password** configuration will have full access to all functions.

If the password configuration is removed from the IAM MT the controller will generate a new password file where all levels will be fully restricted.

There are different ways to log in and out of the controller:

- Enter a PIN code to log in when a padlock symbol is displayed.
- Scan a barcode or rfid tag. One scan of the tag to login, scan one more time to log out.
- Pushing the **OK** button.

PIN code

When a function is restricted it will show a pad-lock symbol. Enter the PIN code to unlock the function.

Scanner login

To login in with a barcode or rfid-tag an identifier rule needs to be set-up. This identifier rule has an action that can be set to login, then the level of access is entered.

One scan of the code will login, scan again and the password level will be logged out.

Password settings

General settings

Parameter	Description
Automatic logout time	Time before the user is automatically logged out from the controller.

Controller

The **Controller** table enables you to set access rights.

The four digit PIN code is set in the box below the user number.

Parameter	Description
Menu access	Accessing the system menu in the controller.
Change view	Changing from one result view to another.
Select Pset	Selecting Pset from the controller.
Select Batch sequence	Selecting batch sequence from the controller.
Reset tightening error	Acknowledging tightening errors.
Reset Batch sequence error	Acknowledging batch sequence errors.
Abort Batch sequence	Reset a batch sequence.
Increment/decrement Batch sequence	Increase or decrease batch sequence step counter.
Increment/decrement batch	Increase or decrease batch counter.
Quick programming	Quick programming access.
Import settings	Import controller settings (Controller parameters, Pset, batch sequences, Identifiers and I/O settings)via USB flash drive.
Import software	Update the software.
Export settings	Export controller settings (Controller parameters, Pset, batch sequences, Identifiers and I/O settings) to USB flash drive.
Export results	Export results as CSV-file to USB flashdrive.
Export graphs	Export graphs to USB flashdrive.
Export all	Export everything to USB flashdrive.
Export software	Export software to USB flashdrive.

Controller information	Access of controller information menu.
Tool information	Access of tool information menu.
IP configuration	Access of IP configuration menu.
ToolsNet configuration	Access of ToolsNet configuration menu.
Digital I/O	Access of Digital I/O information menu.

References

Event codes

Error code	Event information	Instruction
101	Supply voltage exceeded	Check power supply.
102	Supply voltage too low	Check power supply.
103	Internal 24V exceeded	Disconnect external equipment.
104	Internal 24V too low	Disconnect external equipment.
105	Internal 12V exceeded	Disconnect tool if connected.
106	Internal 12V too low	Disconnect tool if connected.
107	Internal 5V exceeded	Disconnect tool if connected.
108	Internal 5V too low	Disconnect tool if connected.
109	External 24V error	
110	DC/DC temperature error	Replace the controller.
120	Zero offset error, Current	Replace the controller.
121	Zero offset error, Sensor	Replace the tool transducer or the tool.
122	Motor current low	Replace the tool.
123	Motor current exceeded	Replace the tool.
124	Motor driver voltage too low	Replace the tool.
125	Motor driver short circuit	Replace the tool.
126	Motor driver temperature exceeded	Replace the tool.
130	EEPROM read error	Replace the controller.
131	EEPROM write error	Replace the controller.
132	Internal hardware error	Replace the controller.
133	File system error	Replace IAM MT.
134	USB host overcurrent	Disconnect USB devices.
140	No tool connected	Connect tool.
141	Tool not supported	Connect supported tool.
142	Tool communication error	Replace the tool.
143	Tool 5V error	Replace the tool.
144	Tool 12V error	Replace the tool.
150	Tool initializing error	Check that the tool is running freely during start up.
151	Friction too high	Check that the tool is running freely during start up.
152	Tool angle encoder error	Connect tool.
153	Tool direction error	Connect tool.
154	Bit was blocked	Check that the tool is running freely during start up.
155	Tool motor temperature exceeded	Allow time for tool to cool down.
156	Tool not supported	
201	Runtime parameter error	Restart the controller.
202	Invalid controller parameters	Replace IAM MT.

Error code	Event information	Instruction
203	Invalid controller parameters	Replace the tool
204	Invalid I/O parameters	Replace IAM MT.
205	Invalid identifier parameters	Replace IAM MT.
206	Invalid Pset parameters	Replace IAM MT.
207	Invalid Batch sequence parameters	Replace IAM MT.
208	Invalid password parameters	Replace IAM MT.
209	Tool statistics error.	Replace the tool.
210	Unable to load fonts from IAM MT	Replace IAM MT.
220	Result database error	Replace IAM MT.
221	Graph database error	Replace IAM MT.
225	Reset result database	Result database was reset.
226	Reset graph database	Graph database was reset.
230	Pset not configured for connected tool	Select another Pset or configure new Pset in ToolsTalk MT.
231	Select error source	Change select source. Can be changed in ToolsTalk MT Controller settings.
232	Select error busy	Wait until tool is not running.
301	Tool connected	Press OK to initialize the tool.
302	Tool initializing	Please wait.
303	Tool software updating	Please wait.
304	Tool software update error	Check tool cable or replace the tool.
305	Tool calibration required	Calibrate the tool.
306	Service required	
310	Software has been updated	Press OK to continue.
311	Software file wasn't found on USB	Copy software file to USB flash drive.
312	Software update failed	Software file on USB may be broken. Update software file on USB and try again.
313	Copying software	Please wait. Software is being copied to/from USB
320	Login expired	User was logged out.
401	Tightening error	Press OK to continue
402	Batch sequence error	Press OK to continue
403	Batch sequence parameter error	Check controller to see which parameter is incorrect
404	Pset not supported	Select another Pset
901	IAM MT not present	Insert IAM MT.
902	Failed to initialize IAM MT	Restart controller or change IAM MT.
903	IAM MT read error	Replace IAM MT.

Error code	Event information	Instruction
904	IAM MT write error	Replace IAM MT.
905	Invalid software on IAM MT	Update software on IAM MT (manually from PC).
906	Flash programming error	Replace the controller.
907	Invalid license on IAM MT	Update software on IAM MT (manually from PC).

Tightening error codes

Tightening error	Description
Trigger lost	Tool trigger released before tightening was done.
Bit slip detected	The bit slipped out of the screw. It is recommended to replace the bit if this occurs often. (Can be enabled/disabled per Pset). Please note that this should not be turned off in Seating control steps because it may cause erroneous(false) seating triggers.
Re-hit detected	A screw was re-tightened. This can be enabled/disabled per Pset.
Seating was not detected	No seating point was detected.
Total time exceeded	The global maximum time limit for the tightening was exceed.
Global time not reached	The global minimum time limit for the tightening was not reached.
Time exceeded	The Pset step maximum time limit for the tightening was exceed.
Time not reached	The Pset step minimum time limit for the tightening was not reached.
Torque high	The Pset maximum torque limit was exceeded.
Torque low	The Pset minimum torque limit was not reached.
Angle high	The Pset maximum angle limit was exceeded.
Angle low	The Pset minimum angle limit was not reached.
Total angle high	The global maximum angle limit for the Pset was exceed.
Total angle low	The global minimum angle limit for the Pset was not reached.
Tightening angle high	The torque step maximum tightening angle was exceeded. The tightening angle is the angle from the angle trigger torque to the target torque.
Tightening angle low	The torque step minimum tightening angle was not reached. The tightening angle is the angle from the angle trigger torque to the target torque.
Seating angle high	The maximum clamp angle was exceeded. This can only happen in a Seating control step or a Torque seating monitoring step. The clamp angle is the angle from seating to finished tightening.

Tightening error	Description
Seating angle low	The minimum clamp angle was not reached. This can only happen in a Seating control step or a Torque seating monitoring step. The clamp angle is the angle from seating to finished tightening.
Seating torque high	The maximum clamp torque was not reached. This can only happen in a Seating control step or a Torque seating monitoring step. The clamp torque is the torque from seating to finished tightening.
Seating torque low	The minimum clamp torque was not reached. This can only happen in a Seating control step or a Torque seating monitoring step. The clamp torque is the torque from seating to finished tightening.
Clamp angle low	Clamp angle is above upper limit.
Clamp angle high	Clamp angle is below lower limit.
Clamp torque high	Clamp torque is above upper limit.
Clamp torque low	Clamp torque is below lower limit.

Original instructions



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