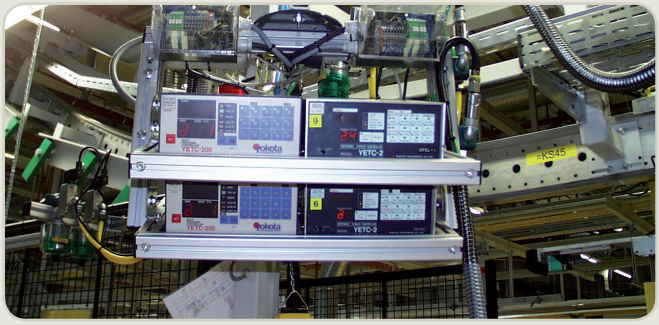
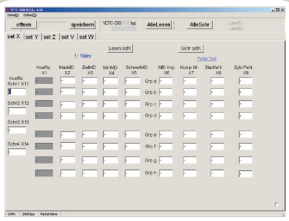
EC Tightening System with Torque Control YETC-210

YETC-210

TKa-70

YED-240





Accs: Software tool for parameterizing via PC.

Optionally: Special equipment, e.g. installation rack with light signal stack and 2-step valve.

Multifunctional Controller

According to *VDI Directive 2862 for the use of Tightening Systems in the Automobile Industry* bolt joints are classified in precise categories. The directive also is a guideline for the selection and the use of suitable assembly tools or tightening systems.

The Yokota EC Tightening System consists of YETC controller, TKa impulse wrench, a solenoid valve for compressed air control plus further optional system components. To statistically analyse, document and of course tighten security related joints of category A with the proper preload force, Yokota has equipped the impulse wrench with an integrated transducer. In combination with the controller YETC-210 the *Torque Value* can be controlled, monitored and of course also recorded. The also monitored *Pulse Number* refers as second parameter. The exact parameterization for individual joint characteristic (soft/hard) is feasible.

The Yokota controller YETC is especially designed for the requirements of a process-proof system. Each bolt joint is measured, judged, counted and stored within the controller and/or personal computer. The YETC provides wide programming capabilities for individual adjustment to the joint parameters. The improved electronics enables even more accurate and faster torque calculations.

The programmable monitoring of bolt groups allows the changing from group to group, without operating the controller. An actuating by external signals is also feasible, e.g. by a socket change box.

Hence the Yokota controller YETC fully supports the implementation in a *Poka-Yoke* System: Zero-Error accept, Zero-Error assemble, Zero-Error passing.

The YETC-210 controller is available in different equipment variants. Several input/output relays enable various auxiliary uses , like integration in the production line or light signal stack etc. So the modular designed and expandable system can be configured and installed as required individually. Optionally the controller is available also in a networkable equipment version (LAN).

Electronically Controlled Impulse Wrenches

Yokota has equipped the system impulse wrenches with an integrated transducer. Non-contacting strain gauges are positioned on the main shaft, picking up the twisting torque at each impulse as close as possible to the socket. The electric signals are transmitted by induction through the internal and external coils. By the difference between initial and output current the systems processor calculates the torque and compares it to the set parameters (upper and lower torque limit, shut-off value). The torque adjustment of the tool is made on the impulse mechanism.

Free Parameterization Software

Without surcharge an auxiliary software tool is available from Yokota for each YETC controller, by which the parameter sets can be administrated comfortably via personal computer.

The controller and the computer are interconnected by straight cable via serial RS-232 interface. Data exchange is proceeded in the ASCII character code. The controller functions as data communications equipment (DCE) and the attached computer as data terminal equipment (DTE).

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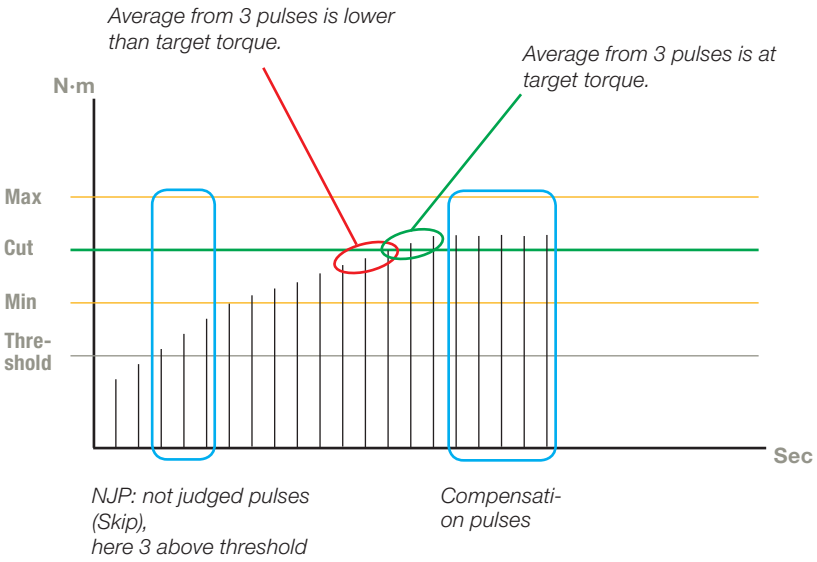
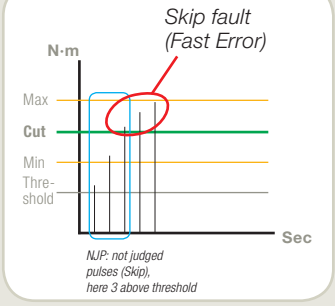
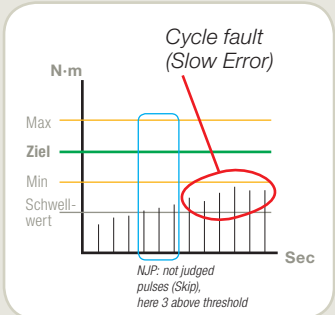






Features YETC-210 ETB

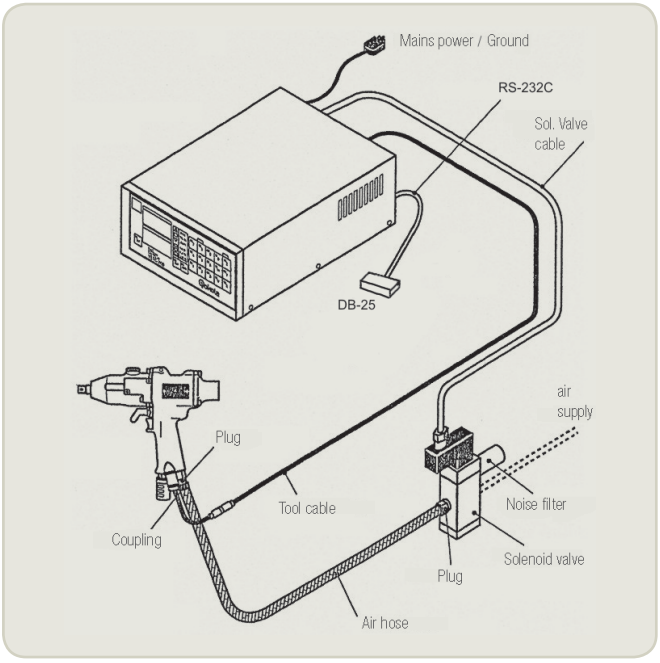
- Easily to program according to joint parameters.
- Improved electronics with 32-bit processor architecture for faster *Torque Control* during tightening process.
- Torque calculation over several impulses (average) – see above depiction.
- Standard 1 tool controller. Optionally available as 4 tool model. With latter up to 4 impulse wrenches with different torque adjustment and programming can be controlled by the same controller (alternate use).
- Compensation pulses programmable for minimized subsidences (on soft joints).
- Poka Yoke: error-proof assembly.
- 2-step tightening optionally.
- 8 groups programmable with different parameter sets.
- 36-pin parallel interface (Centronics) for printout.
- 25-pin serial interface (RS-232C) for data export.
- External shut-off valve.
- 8 points input terminal and 8 non-voltage output relays enable line integration (PLC), implementation of a multi-coloured light signal stack, etc.

Additional Features YETC-210 EA

- Bi-directional communication.
- Automatic group change (programmable sequence).
- Display of date and time.
- Timer function for group tightening.
- Integrable into all production processes.
- Statistics functionality, process ability factors Cp and Cpk.
- Circular memory for 9 999 tightening cycles.

Additional Features YETC-210 EA-L

- Ethernet 100 BASE-TX/10 BASE-T, autodetect function.
- Protocol TCP/IP.
- LAN port 8P8C (RJ-45).
- 9-pin serial interface (RS-232C) instead of 25-pin port.



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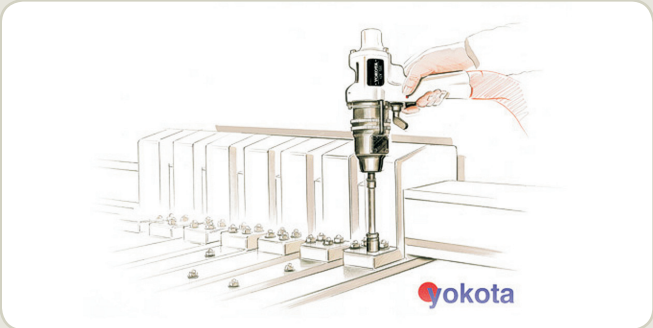

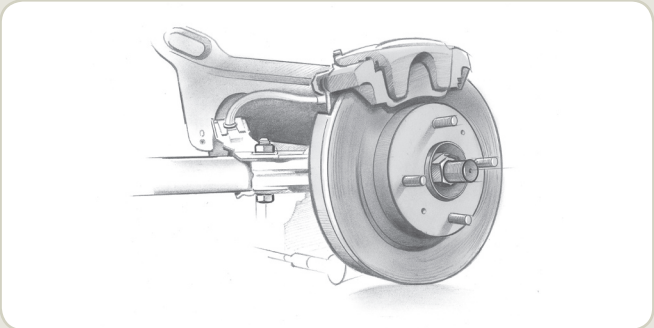

Example protocols for standard tightening

a) with enabled group monitoring

Example for: Upper Torque Limit: 40 N·m
Lower Torque Limit: 35 N·m

Group Name	Group No. / Remaining	Torque N·m	Pulse No.	Judge-ment
a	1 - 4	36.1	24	OK
a	1 - 3	37.1	23	OK
a	1 - 2	37.1	23	OK
a	1 - 1	37.0	22	OK
a	2 - 4	36.5	24	OK
a	2 - 3	29.2		UNDER
a	2 - 3	20.6		UNDER
a	2 - 3	31.7		UNDER
a	2 - 3	37.8	27	OK
a	2 - 2	36.2	23	OK
a	2 - 1	36.6	24	OK
a	3 - 4	42.6		OVER
a	3 - 4	37.3	27	OK
a	3 - 3	36.5	25	OK
a	3 - 2	37.1	26	OK
a	3 - 1	38.8	23	OK

NOTE: With the 4 channel controller the tool No. would stand before the group name, e.g.:

1a	1 - 4	36,1	25	OK

In the accompanying example the logging is illustrated during switched on group monitoring: The system counts down all OK tightenings within one group and moves forward to the next group after the group OK.

Readable is that in group #1 all 4 joints were tightened without objection.
At group #2 on the second joint the target torque was achieved only in the fourth attempt – and finally judged as OK. Once all joints in this group were judged as OK the system releases this group and jumps to the next group.
In group #3 on the first joint the target torque was exceeded first (OVER). The second tightening was judged as OK.

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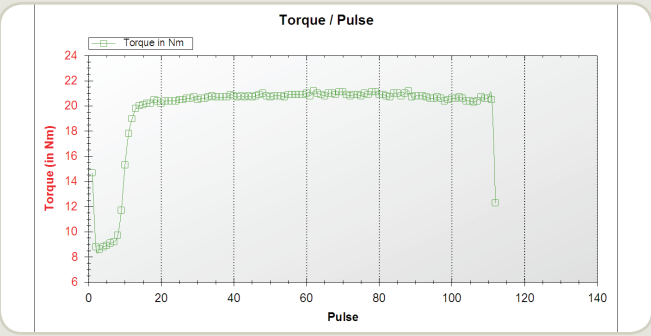


Option:
Software tool for the analysis of the tightening process with torque as control parameter and impulse number as second parameter.

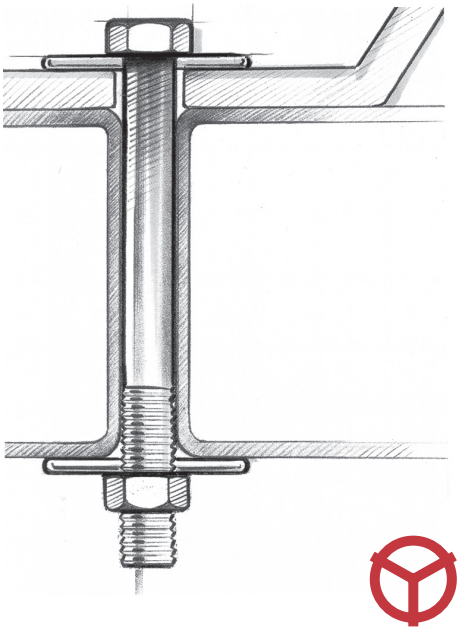
b) with disabled group monitoring

Example for: Upper Torque Limit: 40 N·m
Lower Torque Limit: 35 N·m

Group Name	Joints No.	Torque N·m	Pulse No.	Judge-ment
a	1	36,1	26	OK
a	2	37,1	29	OK
a	3	37,1	27	OK
a	4	37,0	26	OK
a	5	36,5	28	OK
a	6	29,2		UNDER
a	6	10,6		UNDER
a	6	31,7		UNDER
a	6	37,8	24	OK
a	7	36,2	26	OK
a	8	36,6	27	OK
a	9	42,6		OVER
a	9	37,3	25	OK
a	10	36,5	28	OK

In the second example the logging is illustrated during switched off group monitoring: The system counts up all tightenings and jumps to the next joint only in each case of OK.

Readable is, that joint #1 to #5 were tightened without objection and judged as OK.
On joint #6 the target torque has three times fallen below (UNDER) and been achieved only in the fourth attempt – and finally judged as OK.
On joint #9 the target torque was exceeded first (OVER). The second attempt has been judged as OK.



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