

ITTH[®]

Bolting Technology



Tools



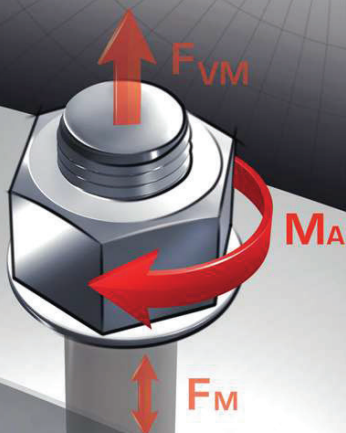
Engineering



Fasteners



Service



Exclusive Agent



中華五金有限公司
CHUNG WAH METAL CO., LTD.

Worldwide leading
system supplier



www.ITTH.com

EN

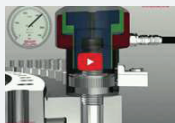


Tensioning Tools: ITH-Stretch-Method

Introduction

The ITH-Strech-Method ("Hydraulic, friction-free and torsion-free tensioning") was introduced by ITH-founder Hans Hohmann back in 1980. Today the ITH-Strech-Method is the leading method to tighten and loosen bolted joints on slewing bearings, gas and steam turbines, flange applications and many other industrial bolted joints bigger than M16 (3/8").

See the application video online



Scan the QR code with your smart phone or visit www.ITH.com

Benefits of the method:

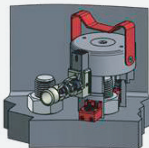
- ✓ **Wide ranges**
from M16 (3/8") and up
- ✓ **Small tool dimensions and weight**
compared to high output forces (F_H)
- ✓ **High utilization of the proof stress**
up to >90% $R_{p0.2}$ possible
- ✓ **Small α_p -factors up to 1.05***
when designing bolted joints
- ✓ **ITH patented features**
- ✓ **Customized designs**
- ✓ **And many more**

*clamping length ratio must be $l_c / d \geq 5$, fasteners must be machine processed

ITH Bolt Tensioning Cylinder types

Single-stage BTC, type ES

- ✓ Short and wide design for radially open but vertically limited clearance applications



Multi-stage BTC, type MS

- ✓ Slim design for vertically open but radically limited clearance applications



BTC type ESH for foundation bolts

- ✓ For special thread types as the commonly seen anchor rods, foundation bolts



Multi Tensioning System

- ✓ Multiple BTC's are used simultaneously by connecting them to one hydraulic unit



Standard features

- ✓ Patented safety fracture device *
- ✓ Automatic piston return *
- ✓ Interchangeable parts for different thread and nut profiles
- ✓ Pre-configured for optional bolt elongation measurement
- ✓ Direct gear drive with internal gear **
- ✓ Spring loaded turning sleeve *
- ✓ Stroke limitation (Over-stroke limiter [seal break])
- ✓ Control notch (Inspection groove)

Optional features

- ✓ Patented cycle counter
- ✓ Chromium-nickel surface coating NIOX
- ✓ Patented carrying handle
- ✓ Safety measurement pin for thread projection (Thread projection or Bolt elongation)
- ✓ Swivel connection for high-pressure coupling nipples
- ✓ Multi-connection high-pressure coupling
- ✓ Digital documentation systems PD / PSD
- ✓ Customer specific solutions

* Not on ESH

** Not on pictured ESH



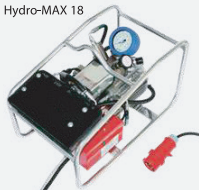
Most ITH Bolt Tensioning Cylinders are designed to customer specification

ITH BTC's are designed according to nearly all bolt qualities, any bolt/nut-configurations or customer specific requirements. Contact us and we would be pleased to help you to find the right ITH Bolt Tensioning Cylinder or with technical questions.

Hydraulic Pumps For Bolt Tensioning Cylinders

Series Hydro-MAX - Electric

Hydro-MAX 18



Application:

- High operating pressures
- High number of bolting cycles
- High operation frequency
- Service jobs: Hydro-MAX 18
- Shop floor applications: Hydro-MAX 37, 38 and 39



Data and features:

- Max. operating pressure: 2,500 bar
- Voltage range from 90 V - 480 V for 50 Hz and/or 60 Hz*
- Safe positioning of the two high-pressure couplings
- Digital remote (optional)
- Automatic pressure control (APC) (optional)

Series Eco-MAX - Electric

Eco-MAX 18



Application

- Standard applications
- Service jobs



Data and features

- Max. operating pressure: 1,500 bar
- Voltage range from 90 V - 690 V for 50 Hz and/or 60 Hz*
- Continuous rotor-eccentric shaft, wear-free single-shaft design
- Digital remote (optional)
- Automatic pressure control (APC) (optional)

Series Micro-MAX – Electric / Battery

Micro-MAX 70

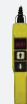


Micro-MAX 72



Application

- Ideal for service jobs, particularly in limited spaces because of the very small dimensions and weight
- Small number of bolt cycles



Data and features

- Convenient, compact design (L 340 x W 250 x H 450 mm, 18 kg) for easy handling
- Battery version offers wireless working environments
- Max. operating pressure: 1,500 bar
- Voltage ranges from 90 V - 110 V or 190 V - 230 V for 50 and 60 Hz
- Frequency independent motor
- Digital remote (optional: standard-remote)

Series Aero-MAX and Travel-MAX - Pneumatic

Aero-MAX 70



Travel-MAX 41



Application:

- Areas without power supply (e.g. oil and gas industries)
- Shop floor applications: Aero-MAX 9 and 10
- Aero-MAX 89 and 90 and also "Travel-MAX"

Data and features:

- Powered by standard air compressors, no electric power supply
- Max. operating pressure: 3,000 bar (Travel-MAX: 2,500 bar)
- Full control of pressure setting via pressure adjusting valve**
- Pneumatic remote (optional for Aero-MAX)

*Depending on type

**All types but not Aero-MAX 10 and 90



Torquing Tools: Hydraulic Torque Wrenches

ITH hydraulic torque wrench portfolio is completed by digital application and management systems such as:

- ✓ ITH System Alpha (torque-angle controlled tightening)
- ✓ ITH Auto-Torque (Automatic bolting process)
- ✓ ITH Docu (digital documentation system)

Type D-Flex



Application

- Flexible use: 1 cylinder unit runs up to 5 different cassettes with different A/F
- Reduced head radiuses for smallest bolt spacings
- D-Flex design matches flange standards ASME B16.5 - 2003 and MSS SP-44 - 2006

Data and features

- Power classes from 280 Nm to 40,000 Nm
- Dual-hose system
- TORQUE-FIX feature holds D-Flex in position during torquing. Useful on overhead applications
- TWIN-swivel connection
- In-line reaction-point

Type CX



Application

- Designed for tight spaces
- Bolts that are difficult to loosen
- One of the fastest dual-hose torque wrench systems on the market

Data and features

- Power classes from 600 Nm to 40,000 Nm
- Dual-hose system
- TORQUE-FIX feature holds D-Flex in position during torquing. Useful on overhead applications
- TWIN-swivel connection

Type DRS



Application

- Radially limited spaces
- Different reaction positions (e.g. cast housing)

Data and features

- Power classes from 600 Nm to 80,000 Nm
- Radially and axially adjustable reaction arm
- Single-hose system
- TWIN-swivel connection turnable in all directions

Type DKS



Application

- Axially limited spaces
- Repeating reaction positions

The low-profile design type DKS is used for axially limited spaces and tight nut clearances. Bending stresses are avoided due to the in-line reaction point and nut rotation.

Data and features

- Power classes from 1,250 Nm to 130,000 Nm
- Direct reaction
- Single-hose system
- TWIN-swivel connection turnable in all directions

Torquing Tools: Nut Runners

ITH Nut Runners are available in three different versions: Digital, Standard and Basic. Angle-versions of each type complete the portfolio.

- ✓ ITH System Alpha (torque-angle controlled tightening) is available for EDS digital and ADS digital
- ✓ Digital documentation system Docu is available for EDS digital.

Type EDS: Electric Nut Runner



Application:

- Universally designed for service jobs and in-field applications
- Right-angle version EDSw designed for axially limited spaces

Data and features:

- New option ITH Auto-Shift: Automatic shifts from load gear to speed gear automatically
- Power classes from 400 Nm to 13,000 Nm, 110 V or 230 V
- High degree of reproducibility of $\pm 4\%$
- Easy-to-use multi-function display (EDS digital)
- Option Docu: Digital documentation of the tightening process
- Automatic free-run

Type ADS: Battery Nut Runner



Application:

- Ideal for service jobs
- Fast and flexible bolting procedures by best handling (ADS has the best weight-to-power-ratio of its class)
- Right-angle version ADSw for axially limited spaces

Data and features:

- Class leading power-to-weight ratio kg/Nm up to 4,000 Nm for an optimal handling
- Smallest and lightest tool of its class
- High 18V-Li-Ion-battery capacity of 5.2 Ah for untiring bolting procedures
- Brushless motor: wear-free

Type PDS: Pneumatic Nut Runner



Application:

- Ideal for operation where electric power supplies are unavailable (e.g. oil & gas industries)
- Powered by standard air compressors
- Right-angle version PDSw for axially limited spaces

Data and features:

- Power classes from 250 Nm to 14,000 Nm
- 4-step rotary-switch for pre-selection of torque
- The change gear (high and low gear) enables a higher range of rotational speed and fast operation (optional)
- Fine-tooth reaction arm

Accessories



ITH Sidedrive

- For axially limited spaces



ITH Torque Extension

- Output extension for radically limited spaces

Engineering

Technical Approach

High quality bolting tools are our foundation. Built on this ITH develops numerous industry-specific or customized bolting solutions due to engineering capacities. Our business partners benefit from this unique capability and receive the best technical and cost-effective solutions.

Patented safety features

- For BTC: Safety fracture device, cycle counter, protection handle
- Safety springs for high pressure hoses
- Safety pump control

Digital input and management systems

- Digital application management systems for all bolting tools
- Digital documentation systems for all bolting tools
- Customer specific application and management software for PD / PSD system for bolt tensioning cylinders



ITH develops customer solutions

Projects

- ITH Autostretch: Robot supported automation solution for BTC
- Large scale BTCs up to W 510 and bigger
- IHF Stretch-Bolt: Maintenance free solution for bolted joints on wind turbines

Transport- and lifting devices

- Several, high performance transport- and lifting devices up to capacities of 350 kg (771 lbs) and more
- Mounting systems, e. g. for BTC on wind power turbines or flange cover lifting devices
- For clear working environments: ITH shop trolley

Tool testing- and calibration systems

- For hydraulic bolt tensioning cylinders, hydraulic torque wrenches, nut runners



Innovation & Quality

Continuous Improvement

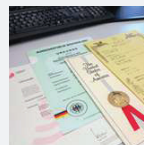
- With more than 35 years in the bolting industry, ITH continuously invests experience and know-how into new technical developments.

ITH sets new standards

- More than 200 national and international patents prove the innovative capabilities of ITH. Many of these developments have become standards of bolting technology.

Pioneer in quality management

- In 1995 as the first bolting company ITH has introduced a quality management system, certified according to the strict specifications of ISO 9001. This strong commitment to quality persists.



Fasteners

Standard and Special Fasteners

The wide range of ITH fasteners covers among others:

- | | |
|---------------------------|--|
| Thread sizes | • M 20 (3/4") up to W 510 (510 mm/20,078") and bigger |
| Surface treatments | • Galvanic methods, zinc flake coatings, hot dip galvanizing, PTFE-Fluorocarbon coating and more |
| Material | • Heat-treatable steel, high temperature steel, cold temperature steel, stainless steels, special materials and more |

Furthermore ITH develops special fasteners like stress-optimized nuts (ITH RMS/RMZ) and the maintenance free solution ITH-Stretch-Bolt for applications on wind power turbines or steel constructions.



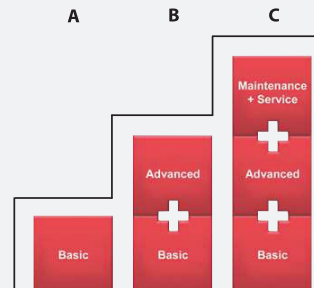
Qualification in Bolting Technology

ITH has designed training programs organized in three levels:

- | | |
|----------------|-------------------------------|
| Level A | • Basic user training |
| Level B | • Advanced user training |
| Level C | • Intensified expert training |

- Exemplary contents:**
- Working safely: Safety introduction
 - Theoretical knowledge of Bolting Technology
 - Hands on tools: Correct use, maintenance issues

After finishing a final test every participant gets certified.
The training contents can be customized according to customers needs.



Tool Service, Rental & In-Field Jobs

1. On-site services

ITH offers on-site maintenance and calibration service for ITH tools, ITH equipment and complete ITH tool sets as well as rental tools.

2. Quick & certified

All services are handled quickly, reliably and are recorded internally. Tool calibrations are certified.

3. Proven reliability

With more than 500 successful on-site bolting jobs on gas and steam turbines worldwide the ITH bolting staff has proven to work quickly, reliably and safely.



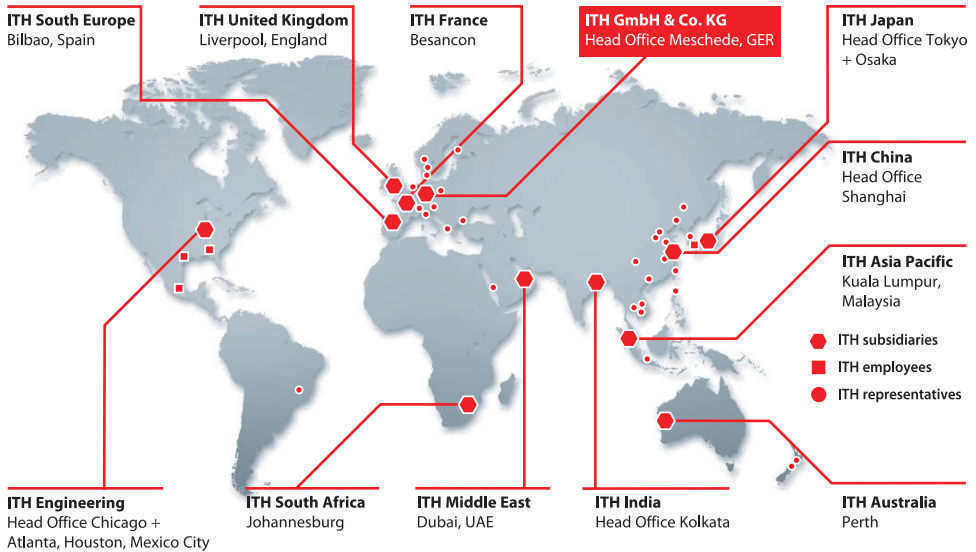


Technical Sales & Service Offices Worldwide

ITH drives innovation in Bolting Technology

With more than 30 years in the bolting industry, ITH continuously invests experience and know-how into new technical developments. More than 200 national and international patents prove the innovative capabilities of ITH. Many of these developments have become standards of bolting technology.

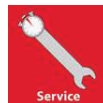
- ✓ Individual industry- and customer solutions
- ✓ Expert advisory service in all questions involving bolts
- ✓ Synergy effects being a whole system supplier
- ✓ Since 1995: ITH was the first mover to implement the international quality guideline DIN ISO 2008-9001
- ✓ Fast and qualified service, worldwide spare part availability



ITH offers synergy effects as a system supplier

The quality of a bolted connection depends on several factors: design elements, fasteners, bolting method and assembly. As a system supplier only ITH offers complete bolting solutions by

analysing all 4 core components: tools, engineering, fasteners, service. These components are combined to create the best technical and cost-effective solutions for customers.



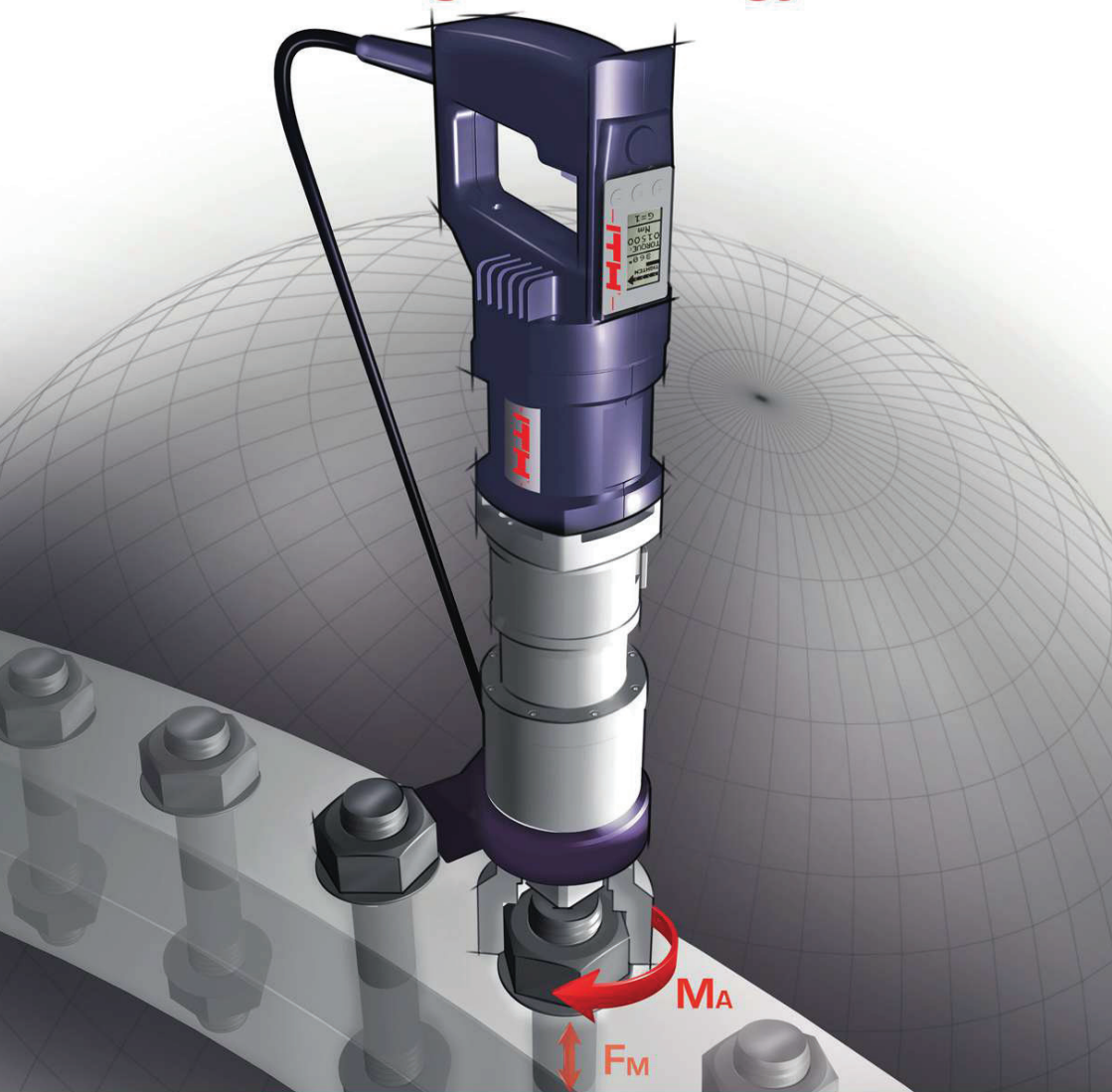
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ITH[®]

Bolting Technology



Nut Runners

Electric, battery-powered, pneumatic and manual torque wrenches
from 200 – 14,000 Nm (147 – 10,325 ft·lbs)

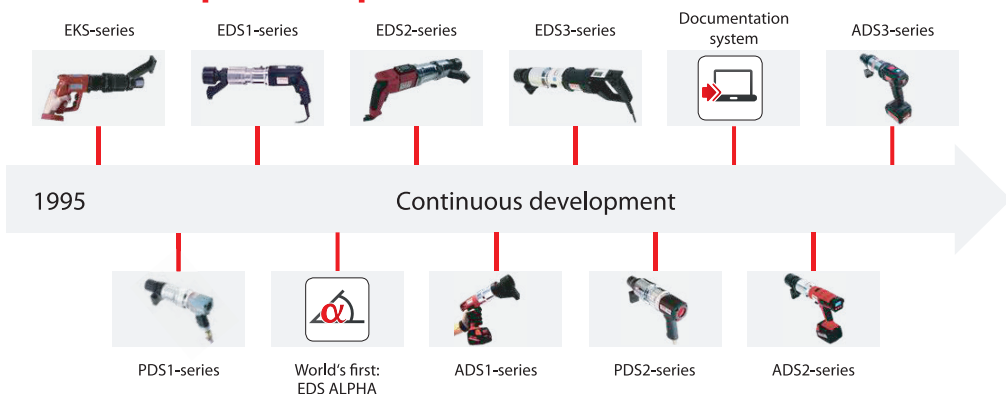


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Development expertise



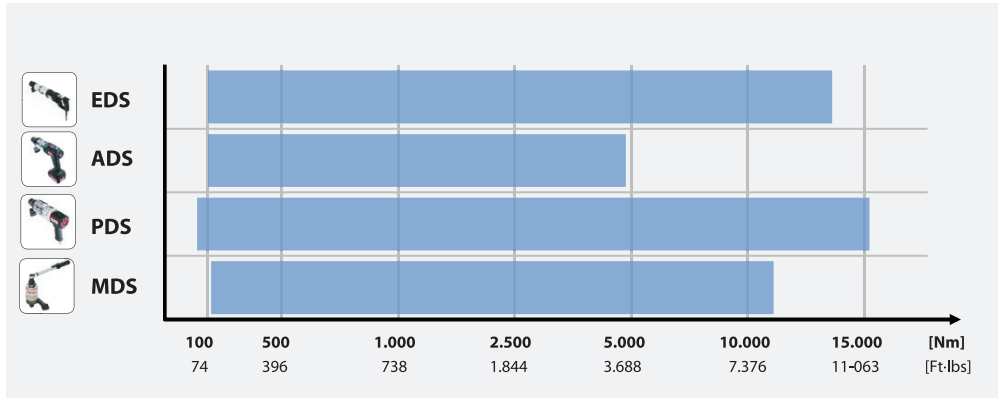
More than 20 years of continuous development

Innovation, continuity & quality: ITH Bolting Technology develops, produces and distributes ITH Nut Runners since 1995. Meanwhile also ITH management software and smart electronic controls are developed in-house.

Chosen highlights:

- ✓ **1995:** First ITH Nut Runner, type EKS.
- ✓ **1997:** World's first electric nut runner with digital display, ITH patented (ITH type EDS1).
- ✓ **2005:** World's first electric nut runner with function for angle-controlled tightening, ITH patent (ITH System ALPHA).
- ✓ **2009:** First ITH Battery Nut Runner type ADS 1.
- ✓ **2016:** New ITH Battery Nut Runner type ADS 3 with class leading weight-to-power ratio.

Overview ranges



Overview types, versions and options

Types & Options	Versions			EDS Electric Nut Runner			ADS Battery Nut Runner			PDS Pneumatic Nut Runner			MDS Mechanical Nut Runner		
															
Ausführungen*	Digital	Standard	Basic	Digital	Standard	Basic	Digital	Standard	Basic	Digital	Standard	Basic	Digital	Standard	Basic
	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	✓	-		
Option Winkel Winkel- Ausführung 	✓	✓	✓	✓	✓	✓	-	✓	-	-	-	-	-	-	-
Option ALPHA Torque-angle controlled bolt tightening 	✓	✓	-	✓	✓	-	-	-	-	-	-	-	-	-	-
Option Docu Documentation System** 	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-
Option Auto-Shift Automatic gear drive 	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-

*Feasible variations of the ITH nut runners are:

1 **Digital** - Digital application management by digital display (EDS) / hand device with radio link (ADS)

2 **Standard** - Analog adjustment of nut runner by a setting dial

3 **Basic** - Predefined torque ex factory

**For Option Docu: option ALPHA is inclusive

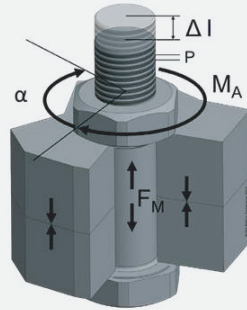
Angle-controlled tightening: ITH option ALPHA

Introduction

Angle-controlled tightening is a method, where the achieved bolt elongation Δl is measured indirectly. Δl is calculated from the (theoretical) relation between bolt pitch P and tightening angle α .

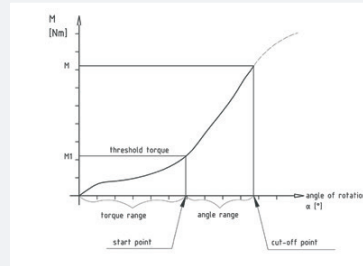
$$\text{Simplicistic: } \Delta l = \text{bolt pitch } P \times \frac{\text{tightening angle } \alpha}{360^\circ}$$

From achieved bolt elongation Δl you can gain insights about the reached assembly preload F_M , which is your target value when tightening bolt connections (source VDI 2230).



Process

1. **Torque range:** One pre-defined torque M_t is applied on the bolt connection until all gaps between all components are closed. That is the point where the threshold torque is reached.
2. **Angle range:** After threshold torque the angle range begins: Control parameter tightening angle α is applied on the bolt connection.
3. **ITH ALPHA sensor controls** torque M_t and tightening angle α .
4. **Tightening process ends** after reaching tightening angle α .
5. **ITH ALPHA software** offers process evaluation, for example automatically generated Excel- or PDF-protocols.



Advantage of higher precision: less affection of friction

1. **Angle range is not affected by friction values:** The angle range uses the tightening angle α as a control parameter – which is independent from friction effects, which could be occurring. This leads to higher precision and higher repeatability of the whole bolting process.
2. **Digital ITH application software:** Easy set-up and management of all relevant application parameters, available for ITH EDS Digital and ITH ADS Digital.
3. **Low alpha-a-factors (tightening factors):** When designing bolting joints you can calculate with small α_a -factors* from 1.2 to 1.4 in most cases. (source VDI 2230).

$$* \alpha_a = \frac{F_{M \max}}{F_{M \min}}$$

✓ "Smart factory"-ready by connectivity (Industry 4.0)
✓ Ready to be upgraded on existing EDS Digital and ADS Digital



Option Alpha: Available for ITH EDS Digital und EDS Digital



Option Alpha: Available for ITH ADS Digital and ITH ADS Standard

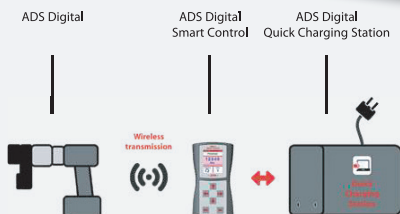


Benefits of Nut Runner version Digital

Type ADS Digital

1. Hand-held „ADS Digital Smart Control“ controls ADS Digital by wireless radio transmission.
2. High-resolution colour display offers easy input of torques, gear selection, tightening angle (version ALPHA) and more.
3. Status indicators for battery and wireless connection.
4. Set-up of the duration of the ITH Automatic Free-Run function, language selection, Nm or ft-lbs selection.

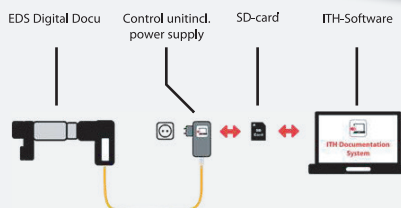
Find more information on page 9 or on www.ITH.com.



✓ "Smart factory"-ready by connectivity (Industry 4.0)

Type EDS Digital: optional with documentation

1. All relevant application data are set-up by the ITH software on PC and saved on a SD-card.
2. Transfer the SD-card into the control unit of the EDS and start an application.
3. Automatic control of the bolting procedure, documentation of the results on the SD-card.
4. Easy and comfortable evaluation of the results on the PC.
5. When choosing EDS Digital Docu option ALPHA is always included.



✓ "Smart factory"-ready by connectivity (Industry 4.0)
✓ Ready to be upgraded on existing EDS Digital

ITH Documentation Systems

ITH documentation systems allow for an easy digital documentation of all relevant application data like for example:

- ✓ Torque values.
- ✓ Tightening angles (Option ALPHA).
- ✓ Bolt dimensions.
- ✓ Bolt quality.
- ✓ Application, bolt or employer number.
- ✓ Easy and comfortable documentation and evaluation of the results on PC.
- ✓ Automatically generated Excel or PDF protocols.



Process

1. Create a bolting job profile
2. Transfer the job to the ITH Nut Runner
3. Start the job
4. Save the results
5. Read and evaluate the results on PC
6. Automatically generated Excel- or PDF protocols.

ITH EDS: Electric Nut Runner



Features:

1. Compact high performance planetary gearbox
2. Powerful 1,300 W motor
3. User-friendly multi-function display
4. Suitable for on-site construction applications with ergonomic positioning of the directional switch (tighten / loosen)
5. Lock button
6. Spade handle: Ergonomic and convenient
7. Motor and casing stand for quality „Made in Germany“
8. Rotary switch: Gear selection between gear 1 (load-gear) and gear 2 (high-speed)
9. Fine-tooth reaction arm. Optional: TWIN-reaction arm, swivel foot, customized solutions available
10. Interchangeable sockets available, secured with clip

Functions & advantages

- ✓ **Comprehensive control electronic:** The ITH Soft Turn Automatic (STA) maintains continuous control of the tightening process and automatically adjusts the rotational speed according to the application.
- ✓ **Automatic free-run:** Once the previously set torque value has been reached the EDS automatically initiates "free-run", relieving torsional binding at the reaction point for easy and safe removal of the tool after each bolting process.
- ✓ **Suitable for on-site construction:** The powerful motor is made to withstand the drastic voltage fluctuations common with using on-site generator power supplies.
- ✓ **Optimal for international machine outfits:** Automatic detection and adjustment to 50 Hz or 60 Hz power supplies.
- ✓ **2 gear stages** for the changing between low and high gear, new optional automatic gear shift (ITH Auto-Shift).
- ✓ **High degree of reproducibility of the torque $\pm 4\%$ ***
- ✓ **Independent rotation between handle and gearbox** ensures steady and optimal positioning of the ITH EDS.

*on comparable bolting conditions

Multi-functional display

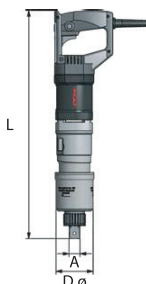


All bolting parameters at a glance

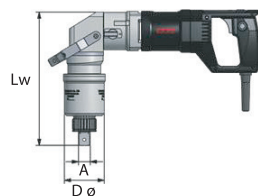
- ✓ **Easy and convenient:** Input of all relevant application parameters by multi-function display
- ✓ **Control:** All data can be controlled during bolting process
- ✓ **Display offers easy overview:**
 - a. Tightening / Loosening
 - b. Process status indication
 - c. Torque value
 - d. Tightening-angle ALPHA (optional)
 - e. Load-gear or high-speed gear (not with Auto-Shift option)

Designs and technical data

EDS



EDSw



ITH type	ITH order no.*	Max. Torque		Out-put-drive A	Gearbox diameter d ø		EDS, straight				EDSw, angle			
							Length L		Weight		Length L		Weight	
		[Nm]	[ft-lb]		[mm]	["]	[mm]	["]	[kg]	[lb]	[mm]	["]	[kg]	[lb]
EDS- 40	2x.30040-yzz7	400	295	3/4	70	2.76	467	18.39	5.2	11.46	238	9.37	6.2	13.67
EDS- 75	2x.30075-yzz7	750	550	3/4	72	2.84	480	18.90	6.0	13.23	259	10.20	7.0	15.43
EDS- 150	2x.30150-yzz7	1,500	1,100	1	84	3.31	509	20.04	6.9	15.21	337	13.27	7.9	17.42
EDS- 250	2x.30250-yzz7	2,500	1,850	1	86	3.39	528	20.79	7.9	17.42	368	14.50	8.9	19.62
EDS- 400	2x.30400-yzz7	4,000	2,960	1 1/2	93	3.66	567	22.32	9.1	20.06	401	15.79	10.1	22.27
EDS- 600	2x.30600-yzz7	6,000	4,440	1 1/2	105	4.13	590	23.23	14.7	32.41	426	16.77	15.7	34.61
EDS- 800	2x.30800-yzz7	8,000	5,900	1 1/2	125	4.92	643	25.32	21.0	46.30	476	18.74	22.0	48.50
EDS-1000	2x.31000-yzz7	10,000	7,350	1 1/2	127	5.00	643	25.32	21.0	46.30	476	18.74	23.2	51.15
EDS-1300	2x.31300-yzz7	13,000	9,550	2 1/2	180	7.09	738	29.01	44	97.00	495	19.50	28.0	61.73

EDS, straight: x = 8
EDSw, angle: x = 9

EDS Digital: y = 0
EDS Standard: y = 2
EDS Basic: y = 3

EDS ALPHA: y = 1
230 V (50 + 60 Hz): zz = 23
110 V: zz = 11

Application: Designed for both first-installation and service jobs



Angle-versions of all ITH Nut Runners are usually used on applications where space is limited. In the picture tower-segment bolts M48 (17/8") of a wind turbine are pre-tightened.



Expand your application options with wide-range ITH accessories like side-drives or the torque extension, which is used in the picture together with an EDS 250.



Battery Nut Runner type ADS

Smallest & lightest tool in the market!

- ✓ Brushless Motor (long-life)
- ✓ Strong 5,2 Ah Battery extra Power



Features:

1. **Compact high performance housing**
2. **Safety turning knuckle, lockable**
3. **Slide Switch** selection between gear 1 (load) and gear 2 (high-speed)
4. **Motor LED**
offers user feedback
5. **Powerful motor, brushless**
Brushless technology increases motor lifetime
6. **Pistol grip** ergonomic, non-slip design
7. **Strong 18V Li-Ion battery 5,2 Ah**
rechargeable, with long lasting 5,2 Ah extra power, including push button to indicate battery status via LED
8. **Torque control wheel** * for torque setup
9. **2 integrated LEDs** application light-up for a clear working environment: LEDs shed light to the bolt connection during bolting procedure
10. **On/Off pressure switch and Switchover lever**
(tighten / loosen / transport lock)
11. **Fine toothing** (at the gearbox) to adjust the reaction arm in 360°. Optional designs of the reaction arm: TWIN reaction arm, reaction arm swivel foot, customized reaction arms
12. **Interchangeable sockets** square drive output at the gearbox, fixable by locking pin

* ADS Digital: Replaced with digital display

Functions & Advantages

- ✓ **Safety turning knuckle:** Protects the user's wrist from occurring reaction forces. Easy and fast positioning of the reaction arm (together with the gear box).
- ✓ **Automatic shut-off and automatic free-run:** After reaching the target torque the ITH ADS shuts off automatically. After that the ADS initiates „automatic free-run“ to avoid torsional binding at the reaction point or nut, ensuring an easy and safe removal of the ADS after each bolt.
- ✓ **High degree of torque reproducibility** of the applied preloads $\pm 4\%$, which enables the ADS to be used on steel construction bolts according to DIN EN 1090.
- ✓ **Flexible, fast and easy working procedures:** Not having wires the ITH ADS promotes a clear and safe working environment. Small dimension make the ADS especially useful for service jobs, in tight application areas or areas which are difficult to reach (e.g. offshore wind turbines).
- ✓ **Expandable application options** by ITH equipment for Nut Runners: Customized reaction arms, ITH elongations and ITH side drives.

* at comparable bolting conditions

Control

- ✓ **ITH Soft Turn Automatic (STA):** The EDS maintains continuous control of the tightening process and automatically adjusts the rotational speed rpm according to the application.
- ✓ **Motor LED offers user feedback continuously:**
 - a. LED flashes slowly: ongoing torquing process
 - b. LED lights up permanently: Target torque reached / Automatic shut-off
 - c. LED flashes quickly: Error / Target torque not reached / Battery low

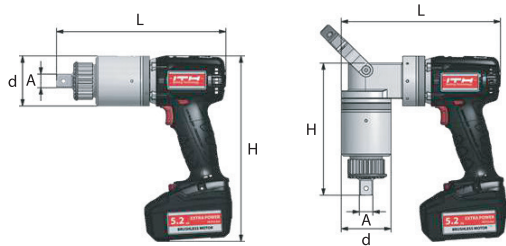
Battery power

Included in every delivery:

- ✓ **2 x 18 V Li-Ion batteries 5,2 Ah**
extra durable 5,2 Ah offer extra power, one extra battery is for interchange – which means you can keep on working.
- ✓ **1 x Quick Charger Station**
small dimensions, available versions are 230 V (50 Hz + 60 Hz) version or alternatively 110 V version.



Technical data



ITH type	ITH order no.	Max. Torque		Max. rpm	Out-put	Gearbox diameterd		ADS, straight						ADSw, angle					
		(gear1)		(gear 2)	A	ø	Length L		Height H		Weight		Length L		Height H		Weight		
		[Nm]	[ft-lb]	[rpm]	[°]	[mm]	[°]	[mm]	[°]	[mm]	[°]	[kg]	[lb]	[mm]	[°]	[mm]	[°]	[kg]	[lb]
ADS-40	2x310.0040-yyz7	400	295	63	3/4	70	2.76	212	8.35	260	10.24	3.1	6.83	224	8.82	162	6.37	3.4	7.5
ADS-75	2x310.0075-yyz7	750	550	30	3/4	70	2.76	234	9.21	260	10.24	3.5	7.72	224	8.82	184	7.24	4.1	9.04
ADS-150	2x310.0150-yyz7	1,500	1,100	16	1	70	2.76	258	10.16	260	10.24	4.0	8.82	258	10.16	209	8.23	4.8	10.58
ADS-250	2x310.0250-yyz7	2,500	1,850	8.0	1	75	2.95	322	12.68	260	10.24	5.4	11.91	226	8.89	229	9.01	5.7	12.57
ADS-400	2x310.0400-yyz7	4,000	2,960	5.5	1 1/2	92	3.62	325	12.80	260	10.24	6.0	13.23	234	9.21	235	9.25	6.0	13.23

ADS, straight: x = 4
ADSw, angle: x = 3

ADS Digital: y = 0
ADS Standard: y = 2
ADS Basic: y = 3

Quick Charging Station 230 V (50 + 60 Hz): zz = 23
Quick Charging Station 110 V: zz = 11

Version ADS Digital

✓ "Smart factory"-ready by connectivity (industry 4.0)



1. Hand-held unit „ADS Digital Smart Control“ controls ADS Digital via wireless radio transmission.
2. High-resolution color display offers easy set-up of torque values, speed or load-gear, tightening angles (version ALPHA only) and more.
3. Status indicators for wireless radio transmission and bolting progress. Users can control the bolting procedure easily.
4. Angle-controlled bolt tightening with optional version ADS ALPHA.
5. Battery of the hand-held „ADS Digital Smart Control“ can be charged at the Quick Charging Station.

Find more information on page 5 and on www.ITH.com.



ITH PDS: Pneumatic Nut Runner

Features:

1. **Compact, high-performance planetary gearbox**
2. **Air-powered motor**
3. **4-step rotary-switch** for preselection of torque
4. **Directional switch** (tighten / loosen)
5. **Impact-resistant and anti-slip pistol grip**
6. **Air high-pressure coupling**
7. **On/Off Trigger**
8. **Fine-tooth reaction arm.**
Optional: TWIN-Reaction arm, swivel foot, customized solutions available
9. **Interchangeable sockets** available, secured with clip

PDS with optional change gear: rotary switch is positioned at the gear box.



Functions

- ✓ **No electric power supplies required.** Pneumatic Motor can be power by standard air compressors.
- ✓ **Special version suitable for jobs in explosion-risk areas:** On demand the ITH PDS can be covered with a coating on the gearbox and reaction arm - ideal for applications in the oil and gas industry.
- ✓ The required torque is set via the **compressed air precision control valve** at idling according to the tabular data.
- ✓ **The change gear** (high and low gear) enables a higher range of rotational speed (optional) and faster work.
- ✓ **Independent rotation between handle and gearbox** ensures steady and optimal positioning of the ITH PDS.



Compressed air precision control valve:
(included in delivery)
ITH-Order no.: 74.08450-7000



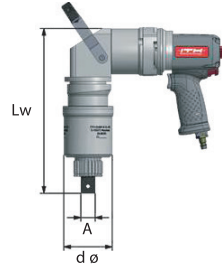
Practical transport case:
PDS 25 – PDS 250: Hard plastic case,
ITH-Order-no. 80.00911
PDS 400 – PDS 1400: Steel case,
ITH-Order-no. 80.00900

Designs of the PDS

PDS



PDSw



ITH-Type	ITH order no.	Max. Torque		Output drive A	Gearbox diameter ø		PDS, straight**				PDSw, angle **			
							Length L		Weight		Length L		Weight	
		[Nm]	[ft-lb]		[mm]	["]	[mm]	["]	[kg]	[lb]	[mm]	["]	[kg]	[lb]
PDS-25	2xy0025	250	184	3/4	83	3.27	246	9.69	2.9	6.39	216	8.50	4.7	10.36
PDS-40	2xy0040	400	295	3/4	83	3.27	271	10.67	3.8	8.38	238	9.37	5.2	11.46
PDS-75	2xy0075	750	553	3/4	83	3.27	283	11.14	4.2	9.26	259	10.20	5.7	12.57
PDS-150	2xy0150	1,500	1,106	1	90	3.54	307	12.09	4.5	9.92	280	11.02	6.8	14.99
PDS-250	2xy0250	2,500	1,844	1	90	3.54	334	13.15	6.5	14.33	305	12.01	7.9	17.42
PDS-400	2xy0400	4,000	2,950	1 1/2	95	3.74	372	14.65	7.9	17.42	338	13.31	9.1	20.06
PDS-600	2xy0600	6,000	4,425	1 1/2	105	4.13	394	15.51	13.5	29.76	371	14.61	14.7	32.41
PDS-800	2xy0800	8,000	5,900	1 1/2	127	5.00	447	17.60	16.8	37.04	417	16.42	21.0	46.30
PDS-1000	2xy1000	10,000	7,376	1 1/2	127	5.00	447	17.60	16.8	37.04	417	16.42	22.2	48.94
PDS-1400	2xy1400	14,000	10,326	2 1/2	180	7.09	503	19.80	42	92.59	480	18.90	27	59.52

PDS, straight:

PDSw, angle:

x = 6

x = 7

With change gear:

Without change gear:

y = 0

y = 1

**Without change gear

Application: Designed for both first-installation and service jobs



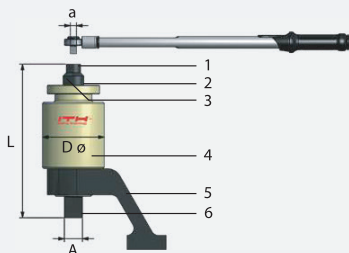
This clutch bolt connection M36 (13/8") of a tractor unit is tightened with a PDS 250.



Customer specific supports (reaction arms) can be delivered for all ITH Nut Runners. This conical support was used to tighten the bolts of a waste incineration machine with a PDS 250.



ITH MDS: Mechanical Nut Runner (torque multiplier)



Features:

1. ½" square-drive
2. Return lock, switch able for tightening and loosening
3. Overload safety device by shear pin
4. Planetary gear
5. Fine-tooth reaction arm. Optional: TWIN-Reaction arm, rotating foot, individual version
6. Square drive 1" or 1 ½" for replacement nut with square socket and safety clamp

ITH type	ITH order no.	Max. Torque		Ratio	Output		Input		Diameter		Length		Weight*	
		[Nm]	[ft-lb]		A	a	a	a	D ø	D ø	L	L	[kg]	[lb]
					["]	["]	["]	["]	[mm]	["]	[mm]	["]	[kg]	[lb]
MDS-150	30.10150	1,500	1,100	1:4	1	1/2	85	3.34	190	7.48	3.4	7.5		
MDS-320	30.10320	3,200	2,360	1:18	1	1/2	88	3.36	230	9.05	5.2	11.5		
MDS-420	30.10420	4,200	3,100	1:16	1	1/2	88	3.36	244	9.05	5.9	13.0		
MDS-600	30.10600	6,000	4,425	1:18	1	1/2	102	4.02	257	4.02	7.0	15.4		
MDS-800**	30.10800	8,000	5,900	1:22	1	1/2	130	5.11	279	5.11	10.5	23.1		
MDS-1000**	30.11000	10,000	7,375	1:62	1	1/2	130	5.11	315	5.11	15.7	34.6		

*Without support, sockets and manual torque wrench

**MDS-800 and MDS 1000 have a double return locking mechanism

Accessories

ITH Manual Torque Wrench



Bit insert ø 4 - 20

Interchangeable ratchet head from 3/8" to 1"

ITH order no.	Max. Torque		a	D ø		L	
	[Nm]	[ft-lbs]		[mm]	["]	[mm]	["]
31.10020	5-50	3.7 - 36.9	3/8	34	1.33	320	12.6
31.10021	10-100	7.4 - 73.7	3/8	34	1.33	370	15.6
31.10022	40 - 200	29.5 - 147.5	1/2	47	1.85	470	18.5
31.10024	60 - 360	44.2 - 265.5	1/2	47	1.85	560	22.0
31.10026	200 - 850	147.5 - 626.9	3/4	68	2.68	1,480	58.27
31.10028	300 - 1,250	221.7 - 922	3/4	68	2.68	1,650	65.0

Power wrench socket



Order example

ITH order no. 31.000 04 - 0046

inch sockets

power wrench socket version

02 = drive ½"

03 = drive ¾"

04 = drive 1"

05 = drive 1 ½"

06 = drive 2 ½"

08 = drive ½"

09 = drive ¾"

10 = drive 1"

11 = drive 1 ½"

A/F-width SW 46

Hexagon socket



Order example

ITH order no. 31.00128 - 0024

inch sockets

hex key socket version

126 = drive ¾"

128 = drive 1"

130 = drive 1 ½"

A/F-width SW 46

Contact us for a complete list of available power wrench and hexagon sockets: Metric, imperial or custom design.

ITH side drive type ST



1. Schematic gearbox of an ITH Nut Runner, compatible to all types
2. Fine-toothed input
3. Input square drive
4. Output hexagon SW | A/F, customer specific designs optional
5. Flexible reaction arm

- Ideal for applications with vertically limited spaces or long threaded rods (e.g. heat exchangers).
- Easy positioning of all ITH Nut Runners.
- The SW | A/F of the input square drive can be chosen according to the ITH Nut Runner type.

ITH type	ITH order no.	Min. output SW A/F	Max. output SW A/F	Max. Torque	
				[Nm]	[ft-lbs]
ST - 55*	31.00755	36	56	2,000	1,475
ST - 65*	31.00765	46	65	2,500	1,843
ST - 75**	31.00775	55	75	4,000	2,950
ST - 85**	31.00785	65	85	4,000	2,950

Contact us for imperial dimensions or custom designs.

* Fine-toothed input matches EDS / ADS / PDS - 250

** Fine-toothed input matches EDS / ADS / PDS - 400 and bigger

ITH torque extension type TE



- Ideal for applications with radially limited space.
- Compatible to all ITH Nut Runner types with simple spline connection.
- Swivel foot on reaction arm (optional).
- Customized special design.

ITH type	ITH order no.	Max. Torque		Length		Input A1	Output A2	D ø	
		[Nm]	[ft-lbs]	[mm]	["]			["]	["]
TE-75	31.00802-2-200	750	555	200	7.88	3/4	3/4	64	2.5
	31.00802-2-300			300	11.8	3/4	3/4	64	2.5
	31.00802-2-400			400	15.7	3/4	3/4	64	2.5
TE-250	31.00803-3-250	2,500	1,845	250	9.8	1	1	84	3.3
	31.00803-3-350			350	13.8	1	1	84	3.3
	31.00803-3-450			450	17.7	1	1	84	3.3
TE-400	31.00804-4-250	4,000	2,950	250	9.8	1 1/2	1 1/2	93	3.6
	31.00804-4-450			450	17.7	1 1/2	1 1/2	93	3.6

Application



ITH side drive offers reaction points in radial surroundings of the bolted joints.



ITH Torque Extensions are used on applications in radial limited spaces. See another application example on page 7.

Measurement and testing equipment

Mobile test device: ITH Dynamic Torque Tester

1. Mobile testing and calibration on site

Dynamometer for electric, battery-driven and pneumatic torque wrenches of all types

2. Power classes

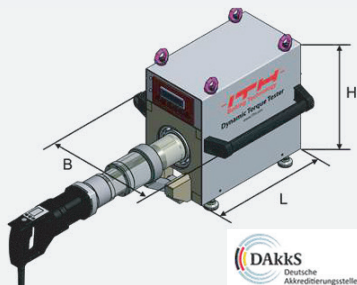
- 250 Nm to 2.500 Nm
- 600 Nm to 6.000 Nm

3. Features

- Digital display for the applied torque values
- Safety switch-off for electric nut runners
- Measurement of the tightening-angle
- ITH measurement software: Easy usage, custom-specific modifications optional
- Automatic generation of testing protocols (Excel oder PDF)

4. Certified precision

Accredited by the strict regulations of the German Accreditation Body (Deutsche Akkreditierungsstelle DAkkS)



Find more information on www.ITH.com.

ITH type	ITH order no.	Torque range		L		B		H		Weight	
		[Nm]	[ft-lbs]	[mm]	["]	[mm]	["]	[mm]	["]	[kg]	[lb]
DTT-250	22.00230	250 - 2,500	185 - 1,850	358	14	516	20.3	391	15.4	49.4	109.1
DTT-600	22.00233	600 - 6,000	442 - 4,425	417	16.4	554	21.8	466	18.3	93.0	205.0

ITH Torquemeter

1. Control during bolting procedures

Measuring, testing and applied torque values and torque angles are displayed and documented during the bolting procedure

2. Power classes

- 75 Nm to 750 Nm
- 250 Nm to 2,500 Nm
- 600 Nm to 6,000 Nm

3. Features

- On-site ready by robust design
- Internal battery for flexible, wireless use
- Available versions are 110 V or 230 V
- Digital display clearly shows reached values
- Option for data documentation

4. Certified precision

Accredited by the strict regulations of the German Accreditation Body (Deutsche Akkreditierungsstelle DAkkS)



Find more information on www.ITH.com.

ITH type	ITH order no.	Torque range		B1		L		H		B2		D ø	
		[Nm]	[ft-lbs]	[mm]	["]	[mm]	["]	[mm]	["]	[mm]	["]	[mm]	["]
DMW-75	20.00245	75 - 750	55 - 553	315	12.4	290	11.4	4.56	230	9.0	89	3.5	
DMW-250	20.00241	250 - 2,500	184.4 - 1,844	315	12.4	290	11.4	4.56	230	9.0	89	3.5	
DMW-600	20.00242	600 - 6,000	442.5 - 4,425	315	12.4	290	11.4	4.56	264	10.4	115	4.5	

ITH quality management

Before first delivery and after maintenance all ITH Nut Runners are tested and calibrated on dynamic torque measurement unit (DAkkS certified). Measured values are recorded on an ITH test certificate.

All ITH business procedures – including development, production and distribution of bolting tools and testing equipment – are certified according to the strict quality management directive ISO 9001.



Qualification in bolting technology

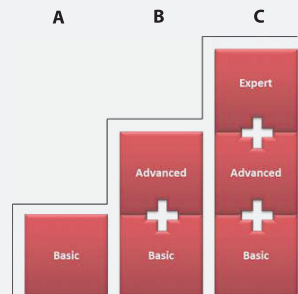
ITH has designed training programs organized in three levels, which combine practical experience and theory in bolting technology effectively:

- Level A** · Basic user training
- Level B** · Advanced user training
- Level C** · Intensified expert training

Exemplary contents:

- Working safely: Safety introduction
- Theoretical knowledge of Bolting Technology
- Hands on tools: Correct use, maintenance issues

After finishing a final test every participant gets certified. The training contents can be customized according to customers needs.



Tool service, rental & in-field jobs

1. On-site services:

ITH offers on-site maintenance and calibration service for ITH tools, ITH equipment and complete ITH tool sets as well as rental tools.

2. Quick & certified:

All services are handled quickly, reliably and are recorded internally. Tool calibrations are certified.

3. Provenliability:

With more than 500 successful on-site bolting jobs on gas and steam turbines worldwide the ITH bolting staff has proven to work quickly, reliably and safely – according to international safety standards.



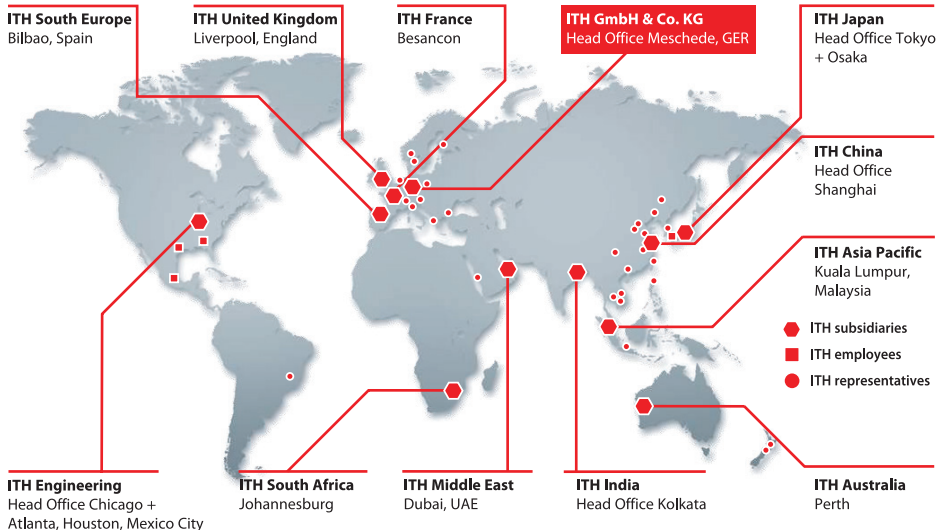


Technical Sales & Service Offices Worldwide

ITH drives innovation in Bolting Technology

With more than 30 years in the bolting industry, ITH continuously invests experience and know-how into new technical developments. More than 200 national and international patents prove the innovative capabilities of ITH. Many of these developments have become standards of bolting technology.

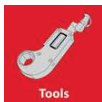
- ✓ Individual industry- and customer solutions
- ✓ Expert advisory service in all questions involving bolts
- ✓ Synergy effects being a whole system supplier
- ✓ Since 1995: ITH was the first mover to implement the international quality guideline DIN ISO 2008-9001
- ✓ Fast and qualified service, worldwide spare part availability



ITH offers synergy effects as a system supplier

The quality of a bolted connection depends on several factors: design elements, fasteners, bolting method and assembly. As a system supplier only ITH offers complete bolting solutions by

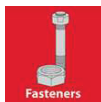
analysing all 4 core components: tools, engineering, fasteners, service. These components are combined to create the best technical and cost-effective solutions for customers.



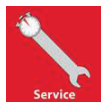
Tools



Engineering



Fasteners



Service



Find further information and your local person in charge on our website ~ mobile device optimized.
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Exclusive Agent



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CHUNG WAH METAL CO., LTD.