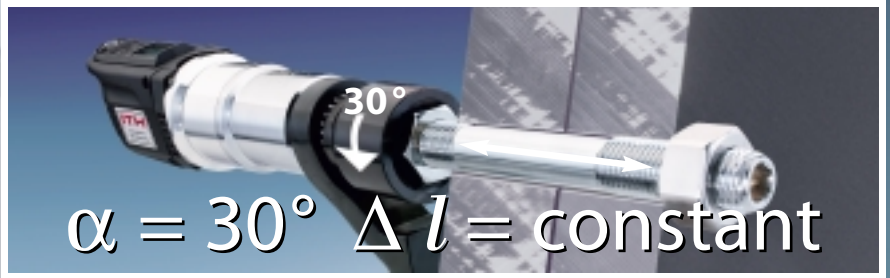




Torque-Angle Electric Nut Runner

ALPHA

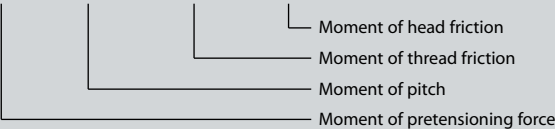


INNOVATIVE
BOLTING
TECHNOLOGY

Tensioning Process

Basics

The pretensioning force necessary for installation can be applied either with stretching tools (hydraulic bolt-tensioning cylinders) or with rotating tools. When a rotating process is used, three different types of resistance have to be overcome.

$$M_A = M_{GSt} + M_{Greib} + M_K$$


Moment of head friction
 Moment of thread friction
 Moment of pitch
 Moment of pretensioning force

Only the moment of thread pitch is of importance for the pretensioning force required for installation. The moments of thread friction and head friction are loss factors which make up approx. 90 % of the required pretensioning force. Thus, the pretensioning force required for installation depends on the widely varying frictional factors (dry, oiled, greased, cut or rolled thread) in the thread and under the head. For a constant torque, the pretensioning force may fluctuate by up to 100 % (see diagram 1) at different coefficients of friction ($\mu_{ges} = 0.08$ to $\mu_{ges} = 0.16$, friction class B).

Only by using ITH rotation-angle controlled tools of type Alpha or the ITH Stretch Method (hydraulic bolt-tensioning cylinder) is it possible to tension bolts with reproducible accuracy. With the ITH rotation-angle controlled tools of type Alpha it is possible to achieve a precision of $\pm 2.0\%$.

Rotation-angle controlled tensioning

The rotation-angle controlled tensioning process is divided into a torque and a rotation-angle sector (diagram 2). First of all, the components to be tensioned are brought into full-surface contact by means of torque. The joining moment or threshold moment required for this should be, at the most, 20 % to 30 % of the maximum value. When the joining torque has been reached, the pre-set angle of rotation is approached. The approximate angle of rotation can be calculated mathematically. However, it is more practical to determine the angle of rotation by trial and error on the component itself, so that any deformation of the component which may occur can be taken into account.

An important precondition for using the rotation-angle controlled tensioning process is that the bolt can deform to a sufficient extent, i.e. the minimum ratio of bolt grip should be 1:3.

Example: bolt M30 -> min. clamp length: 90.0 mm. Bolts with approx. 90 % yield strength can be tensioned by means of rotation-angle control. Bolts which have already been stretched once beyond the upper yield point must not be re-used.

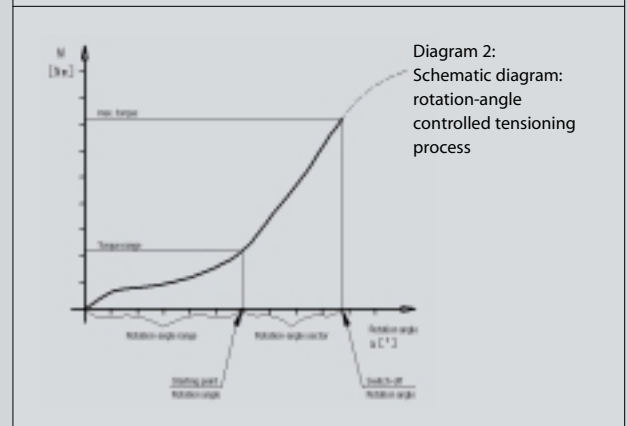
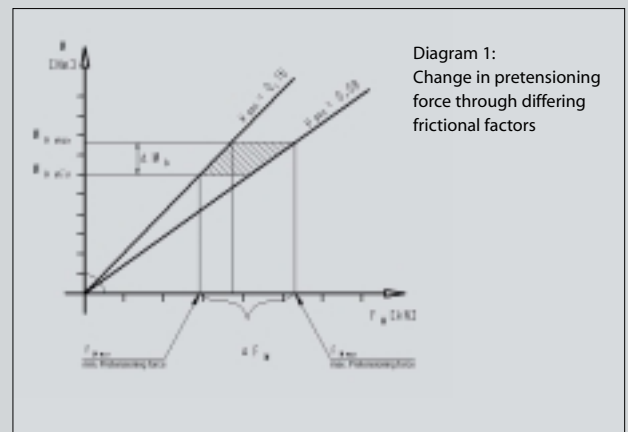
Rotation-angle controlled tensioning tools of type Alpha

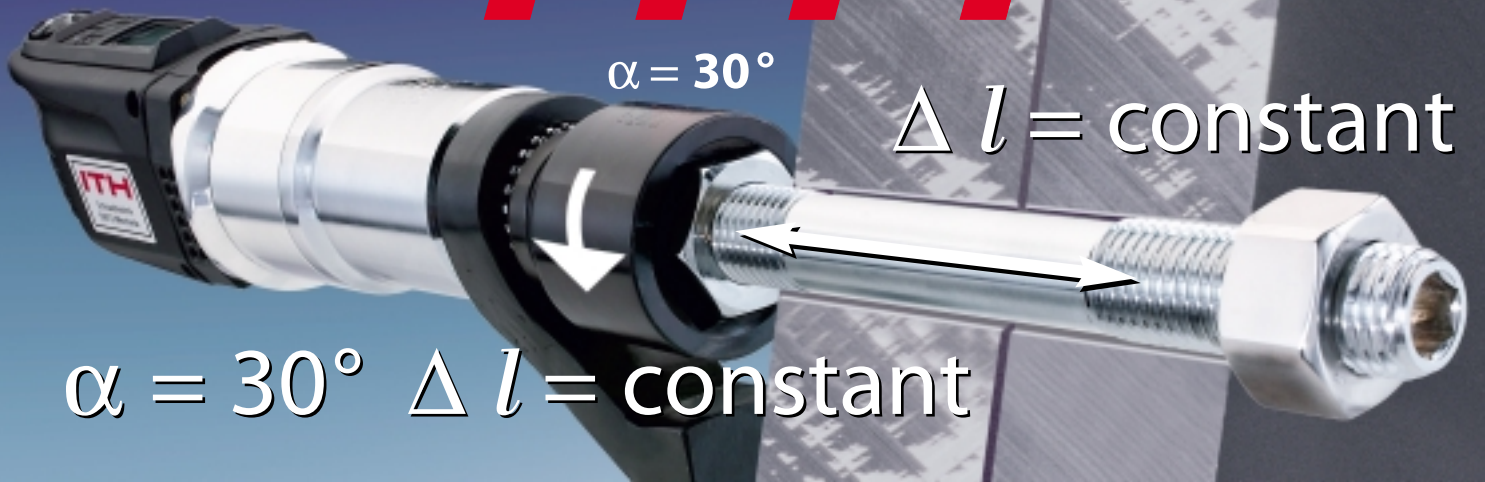
On the one hand, the Alpha range includes the continuously rotating Nut Runner EDS and on the other, the hydraulic torque wrenches of type DR and DK.

The ITH tensioners of type Alpha are designed to tension the bolt continuously. The machine does not stop when the joining moment is reached. This makes it possible to achieve greater system accuracy.

The Alpha tensioning tools possess the following distinctive features:

- ITH** High reproducible accuracy $\pm 2.0\%$
- ITH** Customer-specific display configuration
- ITH** 6 power categories from 400 to 6000 Nm (EDS)
- ITH** Straight and angular tensioner design
- ITH** High operating speed



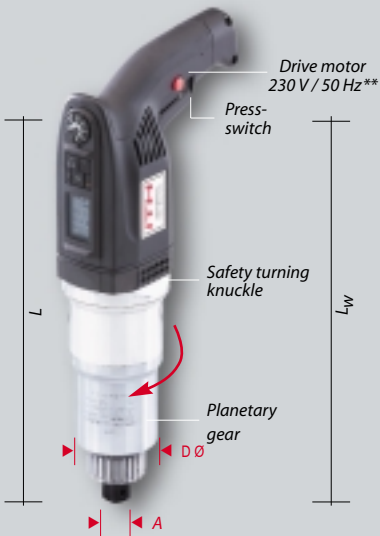


Electric Rotation Nut Runner, type EDS- α

The ITH Rotation Nut Runner of type EDS – α can be used either as torque and rotation-angle tensioners. When used as torque rotation tensioner, the torque can be entered or

selected directly via the menu control system. When used as rotation-angle tensioner, the rotation angle and the joining moment are entered using the + and – buttons.

Type EDS- α
Rotation-angle controlled electric tensioner



Type EDSw*- α
Rotation-angle controlled electric tensioner, right-angled form



Menu selection



ITH Type	Art. no.	Max. Torque [Nm]	Min. Joining Torque [Nm]	A (inch)	Ø = D (mm)	L (mm)	L _w (mm)	Weight (kg)	
								M*	M
EDS- α -40	2x.10040 α	400	50	3/4	70	366	217	6,2	5
EDS- α -75	2x.10075 α	750	100	3/4	72	373	229	7	5,8
EDS- α -150	2x.10150 α	1.500	150	1	84	397	244	7,9	6,7
EDS- α -250	2x.10250 α	2.500	250	1	86	424	275	8,9	7,7
EDS- α -400	2x.10400 α	4.000	300	1 1/2	88	447	298	10,1	8,9
EDS- α -600	2x.10600 α	6.000	400	1 1/2	105	472	321	15,7	14,5

Art. no. EDS- α : 28..... α , art. no. EDSw- α : 29..... α , special custom-built version

* = angle version, ** other voltages and frequencies on request





*Electric rotation Nut Runner EDS-250,
bolting of rudder propellers*



*Hydraulic torque wrench cylinder DR 2.2,
bolting of construction-machine chassis*



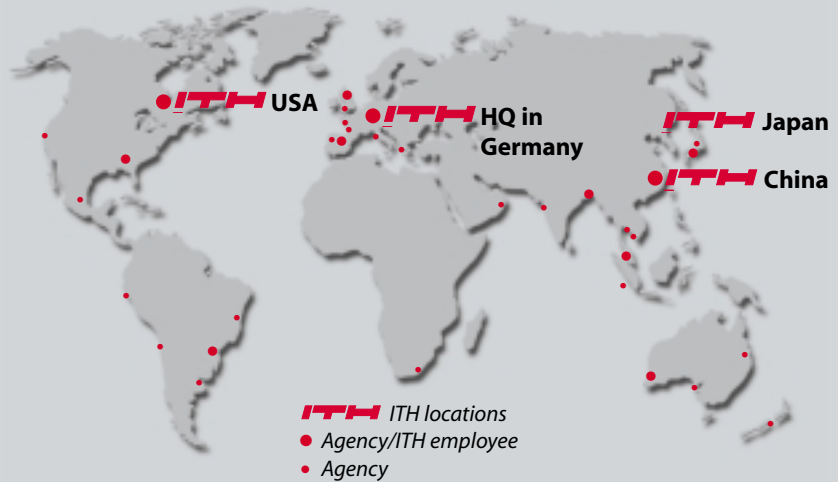
*Electric rotation Nut Runner EDS-150, bolting of
large roller bearing on construction machine*

ITH is a system supplier providing a complete package consisting of special bolts and the correct machines for tightening them.

The leading position on the market enjoyed by ITH is reflected in the following facts:

- worldwide distribution network
- international patents
- expert advisory service by qualified mechanical engineers (not salesmen) in all questions involving bolts
- decades of experience in the bolting sector
- lean production
- fast service

Worldwide Network



ITH GmbH · Industrie-Technische Konstruktionen Hohmann
Postbox 1365 · D-59872 Meschede
Phone +49 (0) 291 / 9962-0 · Fax +49 (0) 291 / 9962-11
sales@ith.de · www.ith.de