

Fastening Technology / Installation Tools

TIOS® Control Process Control

Tracks and documents setting processes in fastening technology



Contents

Page

TIOS® Control process control	Overview	4
	Installing blind rivets	6
	Installing blind rivet nuts	8
	Installing lockbolts	10
	Equipment manufacturing with TIOS® Control	14

TIOS® Control process control



Each TIOS Control tool comprises a sensor for recording both the installation force and the installation displacement involved in the setting processes. These values provide very precise information on the entire setting process and are evaluated by an HBM MP 85a measurement amplifier. The data can be forwarded to superordinate systems (SPS, industrial PCs, etc.).

TIOS Control makes it possible to constantly track the fastening technology quality. Even sensitive fasteners requiring mandatory documentation can be seamlessly controlled – without the need for additional apparatus. Whether very high-quality products or fasteners with high safety considerations:

TIOS Control gives the user the peace of mind that every single fastener meets the reference properties determined in the pre-testing phase. The recorded data provide customers with documentary proof of the process quality and for their in-house quality management systems.

The technology behind continuous process tracking

TIOS Control is a multi-component system. The evaluation unit consists of a control box that houses the measurement amplifier and SPS. The measurement amplifier evaluates the sensor technology while the SPS regulates communications to an external SPS unit.

The evaluation unit can be upgraded to incorporate e.g. a port to back up data on a PC or server as well as ports for scanners, printers, light signals or monitors.

The setting tools are supplied ready calibrated and can be immediately replaced whenever necessary with identically constructed tools. As soon as the tool is connected, all of the sensor technology performance indicators are loaded on the measurement amplifier. If any tools need to be replaced – for maintenance purposes, for example – the replacement tools can immediately continue doing the work. This eliminates the need for any reprogramming at the work station.

To view and set the measurement amplifier, a PC (laptop) is required that is connected to the evaluation unit via an Ethernet or a special USB cable. All of the software required to perform the settings is supplied with the evaluation unit. The basic software settings are pre-loaded in the evaluation unit so that you can immediately start running the process tracking. The exact settings will need to be determined and defined through specific field testing.

Benefits at a glance

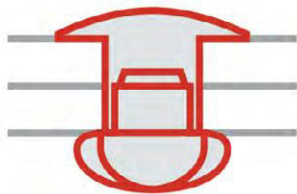
- Comprehensive evaluation of the setting process: setting force recorded according to the displacement
- Immediate notification if the required parameters are not met (process impact)
- Tracks and seamlessly documents the ongoing manufacturing process
- Documents and archives data on error-free production (product liability)
- All data of relevance to the process control are made available:
 - Correct setting function of the fastener
 - Material and grade of fastener
 - Application parameters such as grip range or hole pattern
- Avoids complaints and recalls
- Cuts back on the cost of unnecessary service and after-sales tasks resulting from faulty controls
- Complete reliability significantly enhances your image among customers



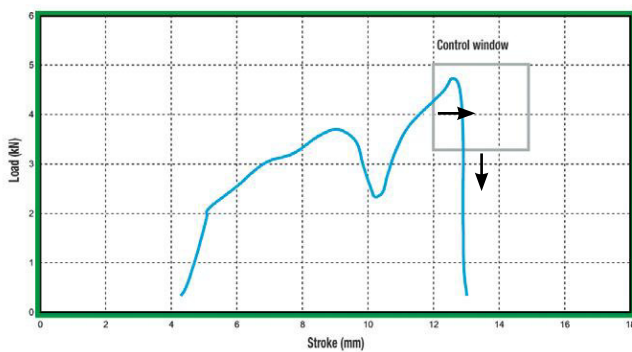
TIOS® Control makes setting processes transparent

The setting process is shown in a load-displacement diagram. The result – a curve showing the ratio of load to displacement – is available in real time. The monitoring unit checks the curve based on a variety of parameters and displays an "OK" or "Not OK" message. This message can e.g. be linked to the machine's controls to e.g. inhibit the compressed air being fed to the manual tool or to block the sub-assembly in the jig. The data can also be displayed as a graph. For a reading to be designated "OK", the edges of the measurement windows must traverse the setting curves in the direction of the entry and exit arrows. A detailed evaluation of the setting process is possible.

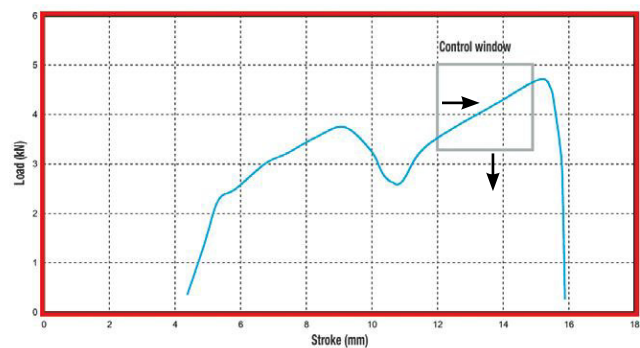
Installing blind rivets



- Example: steel blind rivet, 4.8 mm
- Records the grip range of various fasteners
- Records various bore dimensions
- Records various fasteners (material, rivet sleeve length)



Result "OK", grip range 3.0 mm



Result "Not OK", grip range 2.0 mm, e.g. one component missing

TC 20

Hydropneumatic rivet tool for installing 2.4 mm - 5.0 mm blind rivet nuts, all materials

Technical specifications

Stroke:	16.0 mm
Insertion force:	12.5 kN at 6 bar
Installation force/Weight ratio:	8.1 kN/kg
Air consumption:	approx. 2 l / blind rivet
Connection pressure:	5 – 7 bar
Air supply:	ø 6 mm (G1/4")
Dimensions:	350 x 280 (BxH)
Weight:	2.4 kg

Article No. 431 501 300



TC 60

Hydropneumatic rivet tool for installing 4.0 mm - 6.4 mm blind rivet nuts, all materials

Technical specifications

Stroke:	25.0 mm
Insertion force:	18.2 kN at 6 bar
Installation force/Weight ratio:	7.0 kN/kg
Air consumption:	approx. 4.8 l / blind rivet
Connection pressure:	5 – 7 bar
Air supply:	ø 6 mm (G1/4")
Dimensions:	320 x 360 (BxH)
Weight:	3.4 kg

Article No. 431 620 001



KRB 010 evaluation unit

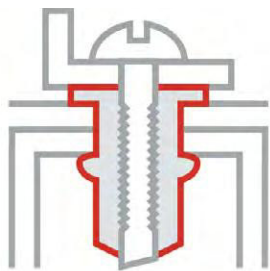
Technical specifications

Dimensions:	300 x 370 x 240 mm (WxHxD)
Power supply:	24 V DC
Inputs/outputs:	Connects to external SPS depending on requirement
Port:	Multi-pin Sub-D connector for tool Ethernet interface on measurement amplifier
Accessories:	USB set-up cable, Article No. 430 001 000

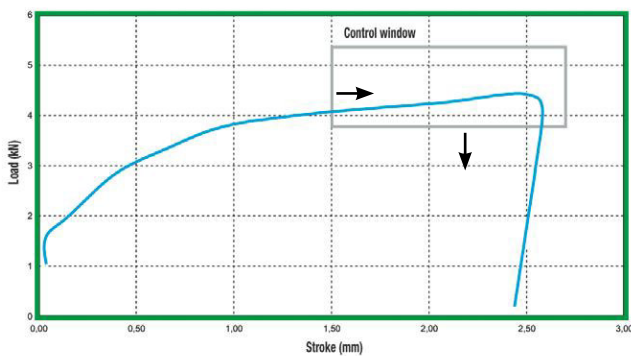
Article No. 430 009 003



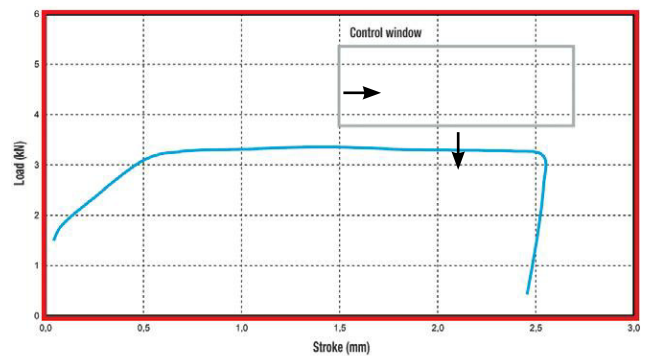
Installing blind rivet nuts



- Example: steel, M6 blind rivet nuts
- Detects when the blind rivet nut has been correctly installed
- Records various fasteners
- Can monitor grip range



Result "OK", setting process in component



Result "Not OK", setting process without component

TC 50-13

Hydropneumatic rivet tool for installing M3 to M10 (M12 aluminium) blind rivet nuts

Technical specifications

Stroke:	1.5 - 9.0 mm
Insertion force:	23.5 kN at 6 bar
Installation force/Weight ratio:	9.4 kN/kg
Air consumption:	4.9 l/rivet
Connection pressure:	5 - 7 bar
Air connection:	ø 10 mm
Weight:	2.5 kg

Article No. 348 503 000



Evaluation unit

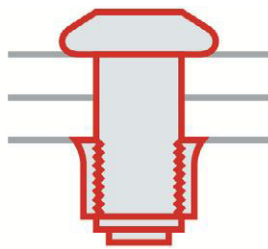
Technical specifications

Dimensions:	300 x 370 x 240 mm (BxHxT)
Power supply:	24 V DC
Inputs/outputs:	Connects to external SPS depending on requirement
Port:	Multi-pin Sub-D connector for tool Ethernet interface on measurement amplifier
Accessories:	USB set-up cable, Article No. 430 001 000

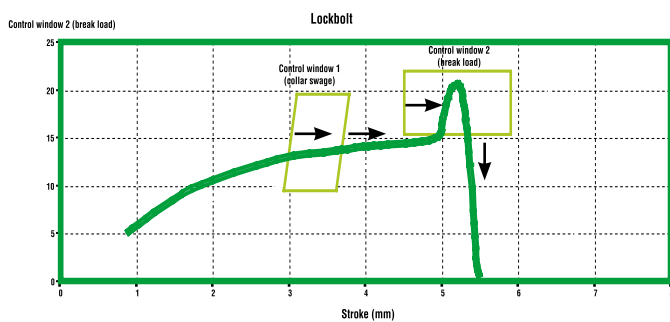
Article No. 430 009 005



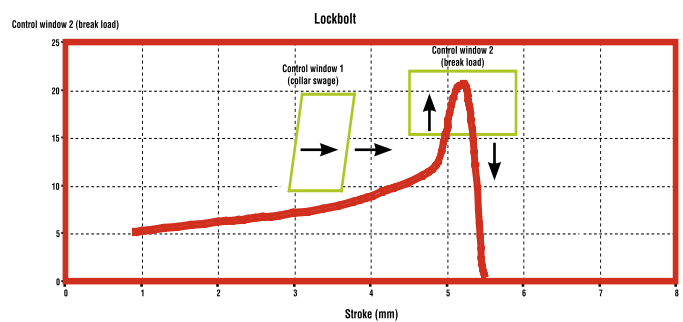
Installing lockbolts



- Example: lockbolt, 6,5 mm, steel
- Detects if the collar has correctly swaged
- Detects fastener material and grade



Result "OK", setting process with collar



Result "Not OK", setting process without collar

TC 75

Hydropneumatic rivet tool for installing lockbolts and 6.5 mm high-strength blind rivets as well as BOM® blind rivets up to 5.0 mm

Technical specifications

Stroke:	15.0 mm
Insertion force:	22 kN at 6 bar
Installation force/Weight ratio:	10 kN/kg
Air consumption:	2.8 l/rivet
Connection pressure:	5 – 7 bar
Air supply:	ø 6 mm (G1/4")
Dimensions:	280 x 335 (BxH)
Weight:	2.8 kg

Article No. 385 501 014

Note

Pulling heads supplied separately
See table on page 13 for product selection.



KRB 010 evaluation unit

Technical specifications

Dimensions:	300 x 370 x 240 mm (WxHxD)
Power supply:	24 V DC
Inputs/outputs:	Connects to external SPS depending on requirement
Port:	Multi-pin Sub-D connector for tool Ethernet interface on measurement amplifier
Accessories:	USB set-up cable, Article No. 430 001 000

Article No. 430 009 003



H 35N

Hydropneumatic rivet tool for installing lockbolts and 6.5 mm high-strength blind rivets

Technical specifications

Stroke:	30.0 mm
Insertion force:	27 kN
Max. operating pressure:	350 bar
Dimensions:	54 x 230 x 269 (WxHxL)
Hose length	approx. 2.5 m
Weight (setting head):	2.5 kg

Article No. 385 300 000

Note

Pulling heads supplied separately
See table on page 13 for product selection.



Hydraulic unit with TIOS® Control TIOS® 350N

This unit is ideal for use in large-scale industrial use. It can be employed for installing lockbolts (ø 6.5, 8.0 and 10.0 mm) as well as high-strength blind rivets (ø 6.5 mm) with simultaneous process control. The unit runs hydraulically, with the hydraulic unit comprising a pump and valve control. What's more, a measurement amplifier is housed in the control box to evaluate load and displacement. The sensor system is located inside the setting head. An SPS is installed for the systems control. A communication interface (Harting connector) enables the system to be readily incorporated into existing machinery. An Ethernet port is provided in order to set the application's process control and read out the curve data.

Technical specifications

Dimensions:	780 x 400 x 660 mm
Power supply:	400/50 Hz
Supply voltage:	24 V
Max. operating pressure:	350 bar
Weight:	90 kg
Communication interface:	Harting connector/Ethernet (IP)

Article No. 385 122 003



Standard/HV pulling heads



Pulling heads for TC 75

Fastener	Nominal bolt ø [mm]	Pulling head type	Article No.
Standard lockbolts	4.8	99-3003	371 680 000
	6.4	99-3006	371 705 000
	8.0		
	9.6		
DeltaBolt® lockbolts	4.8	99-3003	371 680 000
	6.4	99-3006	371 705 000
	8.0		
	9.6		
Multigrip lockbolts	4.8	99-1456	372 985 000
	6.4	99-1477UK	371 980 000
	7.8		
	9.6		
Hucktainer® Plus TIBULB blind rivets	9.5	99-3465	371 730 000
	4.8	99-3303	371 805 000
	6.4	99-3305	371 815 000
	7.8	20-0353	385 150 000
M-LOCK blind rivets	4.8	99-3303	371 805 000
	6.4	99-3305	371 815 000
	9.5		
MAGNA-BULB blind rivets	4.8	99-3303	371 805 000
	6.4	99-3305	371 815 000
	7.8		
BOM blind rivets	4.8	99-994	372 780 000
	6.4		
	7.8		
	9.5		

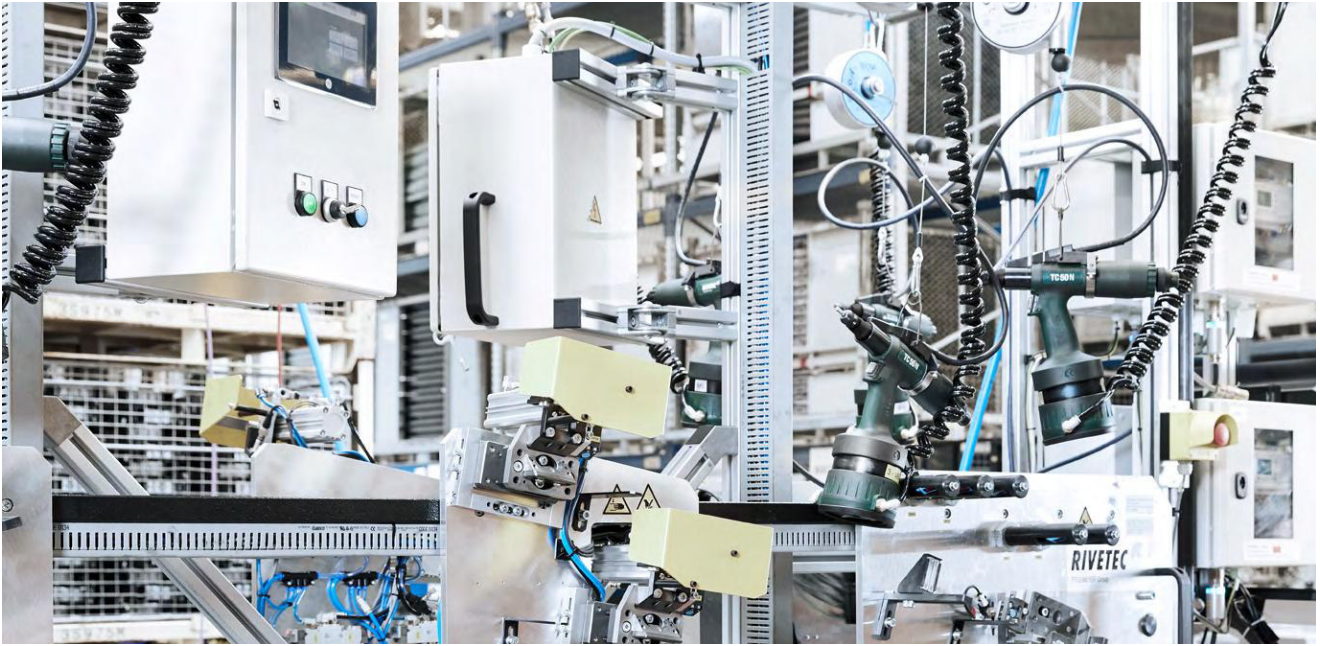
For technical specifications on pulling heads – see catalogue:

Tools for Lockbolts, table on pages 24/25.

Pulling heads for H 35N

Fastener	Nominal bolt ø [mm]	Pulling head type	Article No.
Standard lockbolts	4.8	99-3003	371 680 000
	6.4	99-3006	371 705 000 ¹
	8.0	99-99-245	375 885 000
	9.6		
DeltaBolt® lockbolts	4.8	99-3003	371 680 000
	6.4	99-3006	371 705 000
	8.0	99-99-245	375 885 000
	9.6		
Multigrip lockbolts	4.8	99-1456	372 985 000
	6.4	99-1477	371 980 000
	7.8	99-1439	371 965 000
	9.6		
Hucktainer® Plus TIBULB blind rivets	9.5		
	4.8		
	6.4	99-3305	371 815 000
	7.8	20-0353	385 150 000
M-LOCK blind rivets	4.8	99-3303	371 805 000
	6.4	99-3305	371 815 000
	9.5		
MAGNA-BULB blind rivets	4.8	99-3303	371 805 000
	6.4	99-3305	371 815 000
	7.8		
BOM blind rivets	4.8		
	6.4		
	7.8		
	9.5		

Equipment manufacturing with TIOS® Control



Copyright

All texts, images, technical documents and other information contained in this catalogue are subject to copyright held by Titgemeyer GmbH & Co. KG. Any reproduction or disclosure, whether as a copy or other form of duplication or use, is expressly prohibited without the prior consent of Titgemeyer GmbH & Co. KG.

Registered trademarks

The trademarks BÖRTI, GETO, GETO therm, GETOVAN, GTO, LockBolt, MEGA PORT, plasti van, PLYFIX, POLYSTIC, press-ti, RIEKO, RIV-TI, ROLL-TO, TIBOLT, TIBULB, TIFAS, TILA, TIOS and Titgemeyer are registered trademarks and the intellectual property of Titgemeyer GmbH & Co. KG.

Term of Delivery and Payment

All deliveries are carried out in compliance with our Terms of Delivery and Payment.

Limitation of liability

All technical data, performance descriptions, drawings, illustrations, measurements, weights or any other performance data, recommendations and guidelines contained in this catalogue and relating to the installation of parts that we supply are only binding if so expressly agreed. Moreover, the user is obliged at all times to check each individual use and decide whether the components that we supply can be used as needed.

We accept liability in the case of wilful intent, gross negligence and infringement of cardinal contractual duties as well as for errors in respect of express or implied representations. Notwithstanding this, any claims for compensation not explicitly agreed to in these terms and conditions are hereby excluded in the case of customers who are not consumers and, in the case of such customers, who are not consumers, at all events limited to the damage foreseeable at the time of concluding the contract as well as to the value of the delivered consignment. To the extent that our liability is excluded or limited, this shall extend accordingly to the personal liability of employees, legal representatives and vicarious agents. In all instances of gross negligence committed by vicarious agents, we shall solely be liable to customers, who are not consumers, to compensate for typically foreseeable damage. The statutory regulation governing the burden of proof shall remain unaffected. The aforementioned limitation of liability shall not apply to claims resulting from product liability, for damage resulting from injury to life, limb or health, or for damage to privately used property.

All technical specifications contained in this brochure are approximate and no guarantee is given as to their accuracy. Designs are subject to change.

About us

Titgemeyer Group is a leading fastening technology and transport technology group of companies with 15 sites across Europe. Steeped in tradition, the company develops, manufactures and sells more than 30,000 fastening elements, tools and vehicle components – in series and to customer specification.

Headquarters

Titgemeyer GmbH & Co. KG
Hannoversche Straße 97
49084 Osnabrück / DE

POB 4320
49033 Osnabrück / DE

T +49 541 5822-0
E info@titgemeyer.com
W titgemeyer.com



Sales locations

Gebr. Titgemeyer GmbH
Brunner Straße 77 – 79
1230 Wien / AT

T +43 (0) 1/6 67 90 40 – 0
E sales@titgemeyer.com
W titgemeyer.at

Titgemeyer CZ spol. s r. o.
U Vodárny 1506
397 01 Písek / CZ

T +420 382 2067 – 25
E sales@titgemeyer.com
W titgemeyercz.cz

Titgemeyer Polska sp. z o.o.
Cypriana Bazylika 17
98-200 Sieradz / PL

T +48 (0) 43 828 20 – 15
E sales@titgemeyer.com
W titgemeyer.pl

Titgemeyer Skandinavien A/S
Lunikvej 32
2670 Greve / DK

T +45 4360 0966
E info@titgemeyer.dk
W titgemeyer.dk

Titgemeyer Skandinavien A/S
Box 3218
550 03 Jönköping / SE

T +46 36 128350
E info@titgemeyer.se
W titgemeyer.se

Titgemeyer Turkey Bağlantı Teknolojileri San. ve Tic. A.Ş.
Barbaros Mah. Is Merkezi No.1
Kat: 8 D.58
34746 Atasehir, Istanbul / TR

T +90 (0) 21 66 88 20 – 27
E sales@titgemeyer.com.tr
W titgemeyer.com.tr

Titgemeyer (UK) Limited
A2 Link One Industrial Park
George Henry Road
DY4 7BU Tipton / UK

T +44 (0) 1 21 5 57 97 – 77
E sales@titgemeyer.co.uk
W titgemeyer.co.uk

Production locations

Baker & Finncore Limited
199 Newhall Street
Birmingham, B3 1SN / UK

T +44 121 23 62 – 347
E info@bakfin.com
W bakfin.com

**Titgemeyer GmbH & Co. KG
Werk Lotte**
Daimlerstraße 13 – 15
49504 Lotte / DE

T +49 5404 9666 – 0
E info@titgemeyer.com
W titgemeyer.com

RIEKO GmbH
Robert-Bosch-Straße 9
72124 Pliezhausen / DE

T +49 7127 9744 – 0
E info@rieko-web.com
W rieko-web.com

**Titgemeyer Tools & Automation
spol s.r.o.**
U Vodárny 1506
397 01 Písek / CZ

T +42 382 2067 – 11
E info@rivetec.cz
W rivetec.cz

**TS Gesellschaft für Transport- und
Sicherungssysteme mbH**
Haßlinghauser Straße 156
58285 Gevelsberg / DE

T +49 541 5822 – 900
E ts@cargocontrol.de
W wir-sind-ladungssicherung.de