NINE

Modules of Automation

TÜNKERS®
Ingenuity in series.

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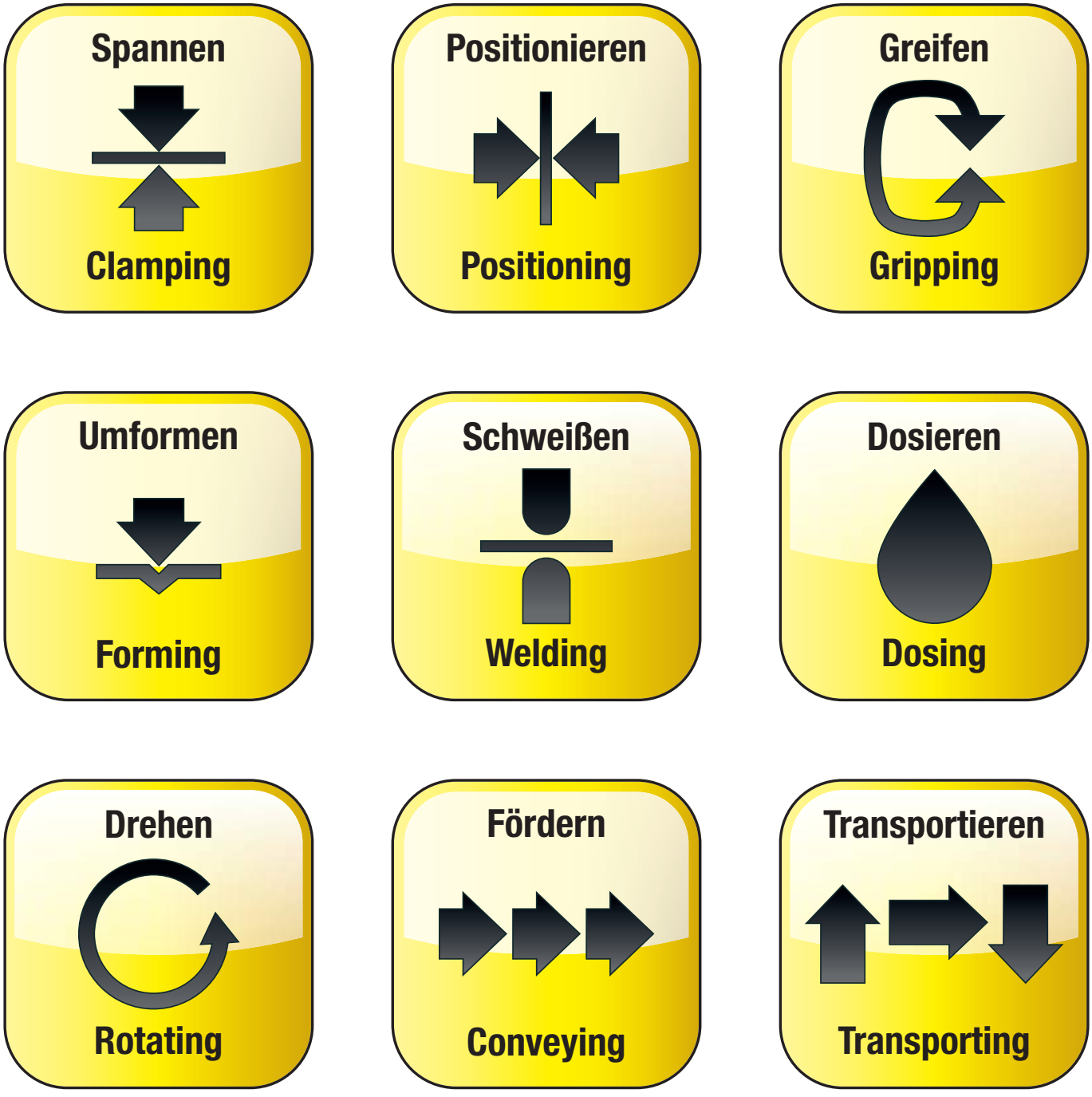
Modules of Automation



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QS according to VDA 6, Part 4 + DIN EN ISO 9001:2000

Nine Modules of Automation

When you mention the name TÜNKERS in our industry, the products that immediately come to mind are TÜNKERS clamps. During the 1970s, the patented toggle-locked clamp was a tool that pointed the way to the current fully-automated systems. Today, due to a wide variety of developments – some of them patented – TÜNKERS is well-known in the field of positioning and traversing, in forming technology and for modular gripper systems.

TÜNKERS has expanded into other fields as well. EXPERT and SOPAP, with rotary indexing tables, now form part of the TÜNKERS product range, just as well as the APM conveyor systems. In January 2016, TÜNKERS-NICKEL GmbH was added to the range with dosing units, with the emphasis on bonding technology.

Clamping, positioning, gripping, forming, welding, dosing, rotating, conveying and transporting – today these 'Nine Modules of Automation' in the field of industrial robots represent the range of products offered by the TÜNKERS Group.

For the first time, we have incorporated this TÜNKERS range into a catalogue. By doing so, we have drawn a line under the separate catalogues, which have been overtaken by the Internet and rapid access to the World-wide Web. Nonetheless, we are firmly convinced that paper – and in the case the overview catalogue – still has its place, with particular regard to rapidly identifying technical solutions at a glance.

The 'Nine Modules of Automation' catalogue is not intended to be a comprehensive representation of our product range. Everywhere you will find references and links to our Internet pages which, in the event of any doubt, display the latest information.

At this juncture, we would like to refer you to our TÜNKERS App which, in the new version available for Android and iPhones, not only contains technical information but can also assist you in selecting the most suitable product.

However, even in the era of the Internet, personal contact is still very important to us. Do not hesitate to contact us directly at 02102/4517-0.

André Tünkers | Josef-Gerhard Tünkers | Olaf Tünkers

Content

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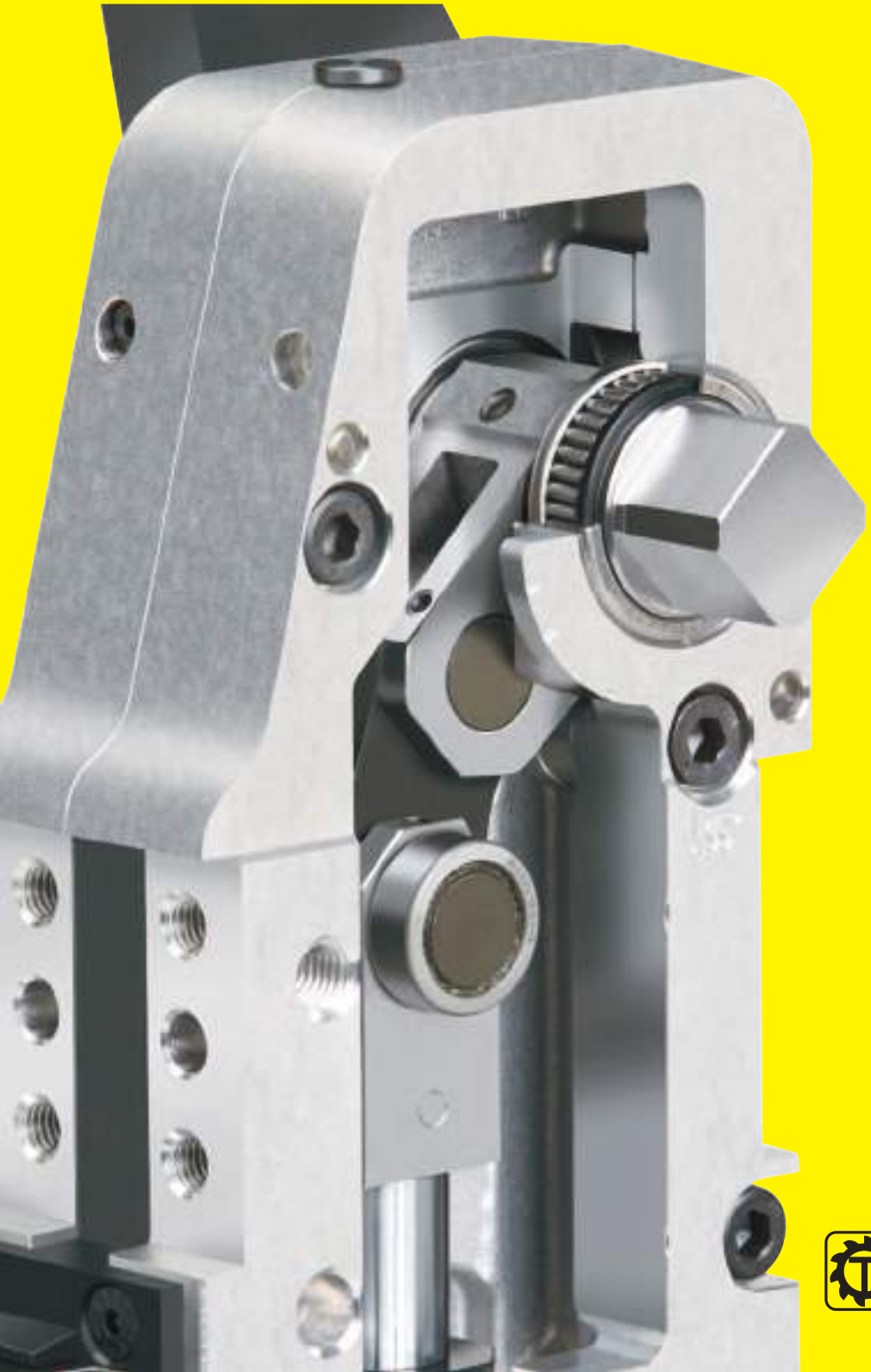
CLAMPING

Spannen

Clamping



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For more than 40 years, clamping technology has formed the basis of the TÜNKERS Automation Programme, which now encompasses 9 modules. Indeed, professional clamping and positioning of the workpiece is still one of the first stages in the automation of a production system.

For decades, TÜNKERS has followed the standards for clamping solutions in car body assembly. From the introduction of the slim clamp, the position sensing cassette and the Alpha curve-driven clamp to the present day, with the introduction of the multi-purpose clamp and an integrated electrical application, TÜNKERS is setting the standards for clamping solutions in body frame automation.

With our company slogan **'Every day a new idea – every week a new product'**, we regard ourselves as your innovative companion for all your clamping requirements.

This catalogue will provide you with an overview of our current product range.

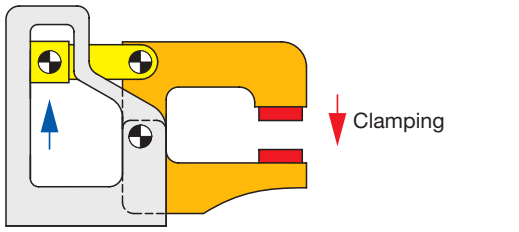
What you should know about clamping

The purpose of clamping tools is to securely hold the workpiece in position without obstructing the production process. High clamping forces combined with compact dimensions are therefore the most important requirements for a clamping tool. For this reason, clamps are also equipped with mechanical transmission gear units.

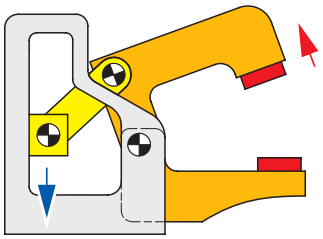
Transmission principle (force intensifier)

Knee-lever principle

The pneumatic cylinder powers the clamp arm by means of a knee-lever mechanism. Depending on the configuration of the mechanism, this is locked in the end position.



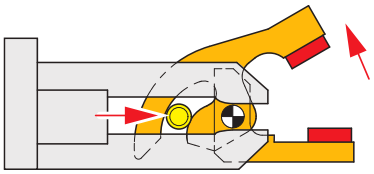
Closure with considerable force due to the knee lever



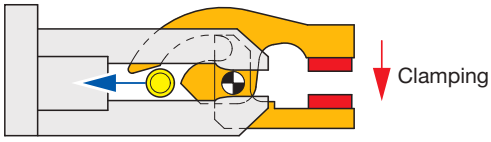
Opening at high speed

Curved wedge principle

The pneumatic cylinder activates the gripper arm via a gate-shaped curve which, in the end position, is so slim that an intensified force of approx. 1:8 is achieved.



Opening with high motion speed

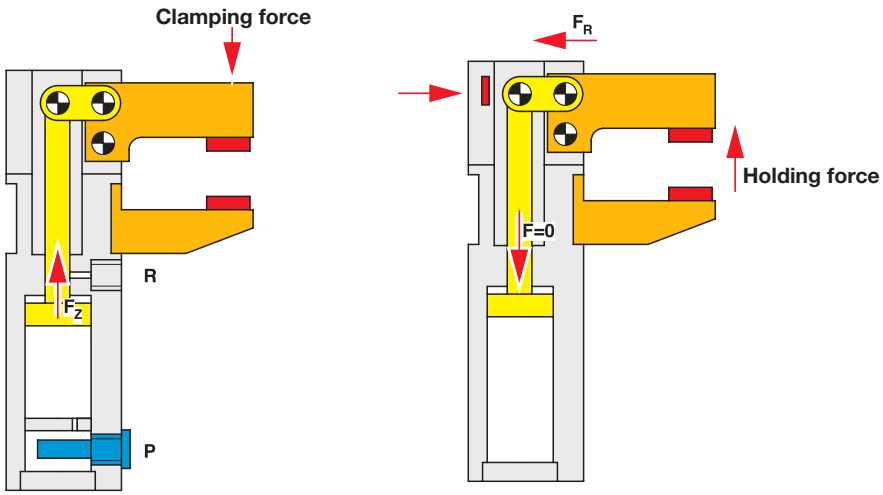


Closure with considerable force,
gate block acts on the slim curve wedge

Clamping force is not the same as holding force

Clamping force signifies the force applied to the workpiece by the drive mechanism via the clamp arm during gripping or clamping operations.

Holding force, on the other hand, denotes the maximum force, after locking the knee-lever (over-centre position), that can be applied by the workpiece on the gripper/clamp arm without destroying the mechanism. Therefore, particular attention must be paid to the maximum holding force when, for example during the production process (welding, bonding), there is a possibility of distortion of the component or if the clamp arm is used as a fixed stop. If the holding force specified in the technical details is exceeded, this will inevitably result in destruction of the mechanism, the clamp arm or the bearing position.

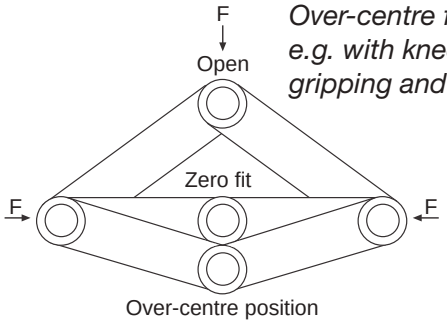


Safety function

As standard, every TÜNKERS knee-lever system is equipped with an **over-centre function**, which retains the gripper or clamp in the closed position, even in the event of a loss of pressure. For all other products, as an option we can supply a **non-return valve** that, in the event of a loss of pressure, uses the air trapped in the cylinder to safeguard the end position.

If the production line is shut down or in the event of a sudden loss of pressure, this ensures that the workpiece remains in the working position.

Integral non-return valve e.g. with parallel gripper

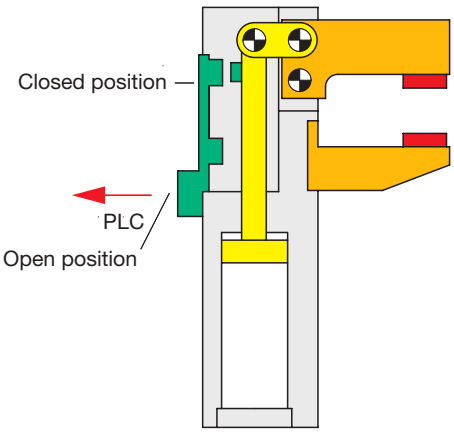


Over-centre function e.g. with knee-lever gripping and clamping

Position sensing technology

The end position sensing feature, supplied as an option for all TÜNKERS products, indicates the position (closed or open) to the central control unit/PLC. With the integral LED for clamping and position control, maintenance personnel are also able to directly view the operating status of the gripper, enabling them to react swiftly to any malfunctions.

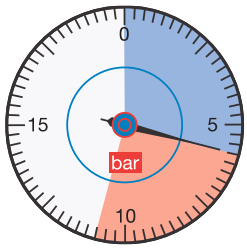
Position sensing cassette fitted to a knee-lever clamp



Valves and pneumatic control system

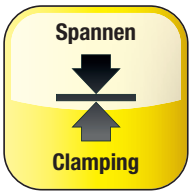
Every TÜNKERS pneumatic tool is designed to function at an operating pressure of between 5 and 6 bar and up to a maximum of 8 bar. This is controlled by five conventional 2-way valves.

During clamping with manual feed, we recommend the use of 5/3-way valves, as the gripper or clamp can only be operated manually in the closed position with the valve in the central, vented position.



CLAMPING

Mini Clamps



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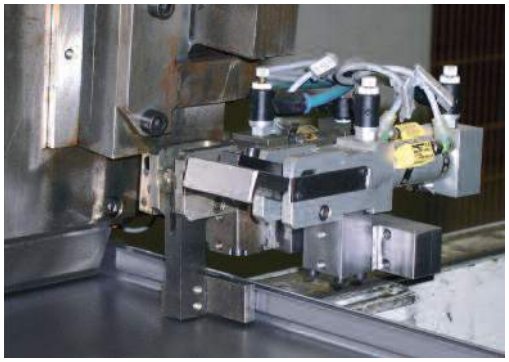
Mini Clamps

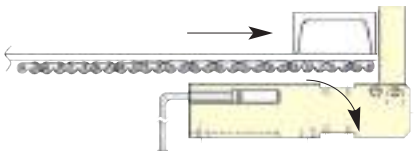
The smallest examples of our tool technology using the knee-lever principle are the mini clamps, which are specially designed for the clamping and gripping requirements of smaller to medium-sized components. They are mainly characterised by their compact size and low weight, distinctive features of these professional tools. This has been made possible by the design of the housing in monoblock construction. With this exceptionally compact form of construction, all the mechanical and pneumatic components, including the drive cylinder, the knee-lever mechanism and the clamp arm bearings, are housed in a high-strength aluminum housing. As an option, the miniature series of clamps can be supplied with magnetically-operated limit switches. The mini clamps feature cylinder sizes of 16 to 40 mm for clamping force levels up to approx. 800 N.

Typical applications

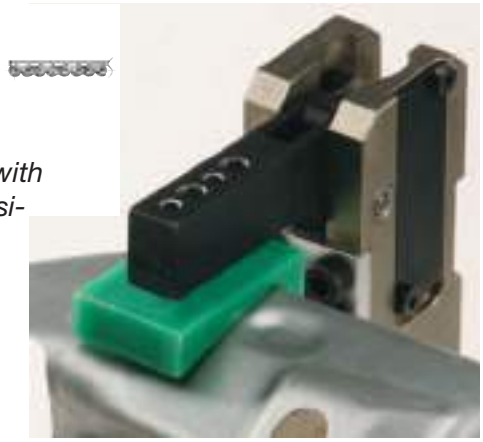


PKS 25 pneumatic clamp used as a component end stop in a welding fixture – domestic appliance manufacture

PKSG 20 in threaded form for clamping an aluminum component during the chip removal process

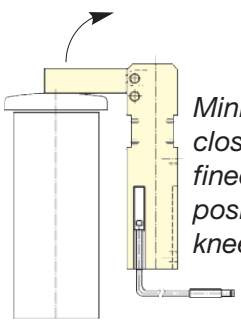


Mini clamp as stopper with securely locked end position



Clamping sheet metal components

Securing printed circuit boards



Mini clamp as 'cover closure device'. Defined, locked closed position due to the knee-lever mechanism

Order Code

PKS 20.1 N D ZL A17 T03 90°

Model:
– PKS Standard (pneumatic knee-lever clamp)
– K-enclosed Model

Frame size/cylinder diameter:
16, 20, 25 mm

Type of locking mechanism:
_ – Standard with locking mechanism
N – Without locking mechanism / with adjustment function

Safety function:
_ – Standard, without safety function
D – Dual force/safety function, size: 25mm dia.

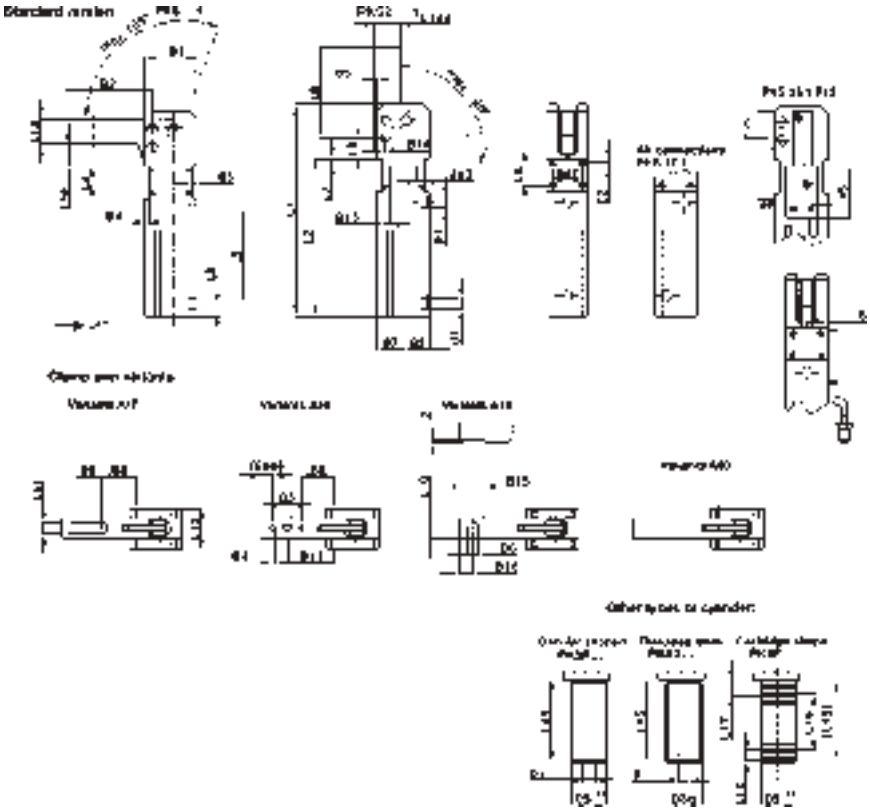
Hand feed:
_ – None
ZL – Lever left
ZR – Lever right

Armvariants:
A00 – Without drillings, standard
A17 – With elongated hole, e.g. for set-screws
A18 – With normal drilling pattern, e.g. for contour blocks
A19 – With drilling and keyway, e.g. for clamping jaws

Position sensing:
T03 – Prepared for magnetic switches
T12 – With inductive position sensing cassette, size 25 mm dia.
T23 – With magnetic switch

Opening angles:
45°, 60°, 75°, 90°, 96°, 105°

Mini Clamp PKS 16-25.1



- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 16 to 25 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Versions: Standard, circular shaped, threaded stem, cartridge variants
- Prepared with magnetic pistons for position sensing system

Optional:
- Position sensing for closed and open positions

Ordering example:

PKS 20.1 A17 T03 90°

- 90° → Opening angle
- T03 → Position sensing system
- A17 → Clamp arm variants
- 20.1 → Piston Ø
- PKS → Type

Order code, TÜNKERS position sensing system:

...T03 Magnet sensor (standard), prepared for Position sensing system
...T12 Inductive sensing (PKS 25-1 only)
...T23 Magnetic sensing, incl. 2 magnetic switches mounted on the clamp

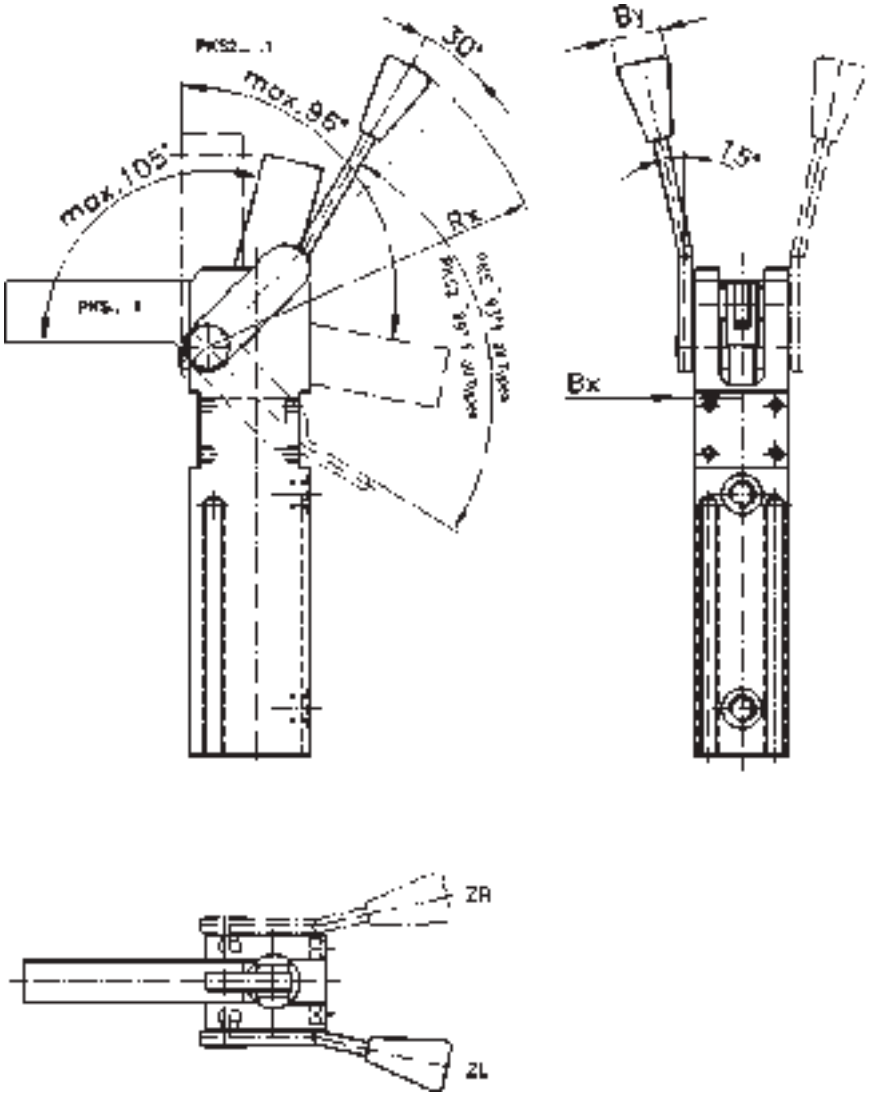
Opening angle, available in variants 45°, 60°, 75°, 90°, 96° und 105°.

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
PKS 16.1	8	25	5	6	M5	1	0,3
PKS 20.1	15	54	5	6	G1/8	1	0,5
PKS 25.1	25	75	5	6	G1/8	1	0,8

Type	L1	L2	L3	L4	L4a	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	B1	B2	B3	B4
PKS 16.1	123	96	12	20	7,5	7,5	10	5	50	57	10	5,5	26	16	15	61	39	5,5	16,5	32	50	2,5	2,5
PKS 20.1	158	120	15	25	15	14	15	5	60	69	12	6,5	30	20	18	83	50	11	22	39	60	3	3
PKS 25.1	182	136	17,5	28	19	17	18	5	75	80	16	8,5	35	25	22	95	61	12	22	45	75	4	4

Type	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	D1	D2	D3	D4	D5	D5a	D6
PKS 16.1	2	14	18	28	16	6	36	5	7	3,5	12	9	16	M5	M5	5,5	4	25	M25x1,5	6,5
PKS 20.1	3	17	22	32	20	8	42	6	8	4	12	9	20	G1/8	M5	6,5	5	30	M30x1,5	6,5
PKS 25.1	4	20	25	40	25	10	52,5	6	8	3	12	9	25	G1/8	M5	8,5	6	34	M35x1,5	6,5

Subject to technical modifications.



– Compact clamp, special design with manual feed
– Manual closing and locking
– Pneumatic opening and closing

Please Note:
A 5/3-way valve, central position, vented, is required.

All other dimensions identical to the PKS Standard Series.

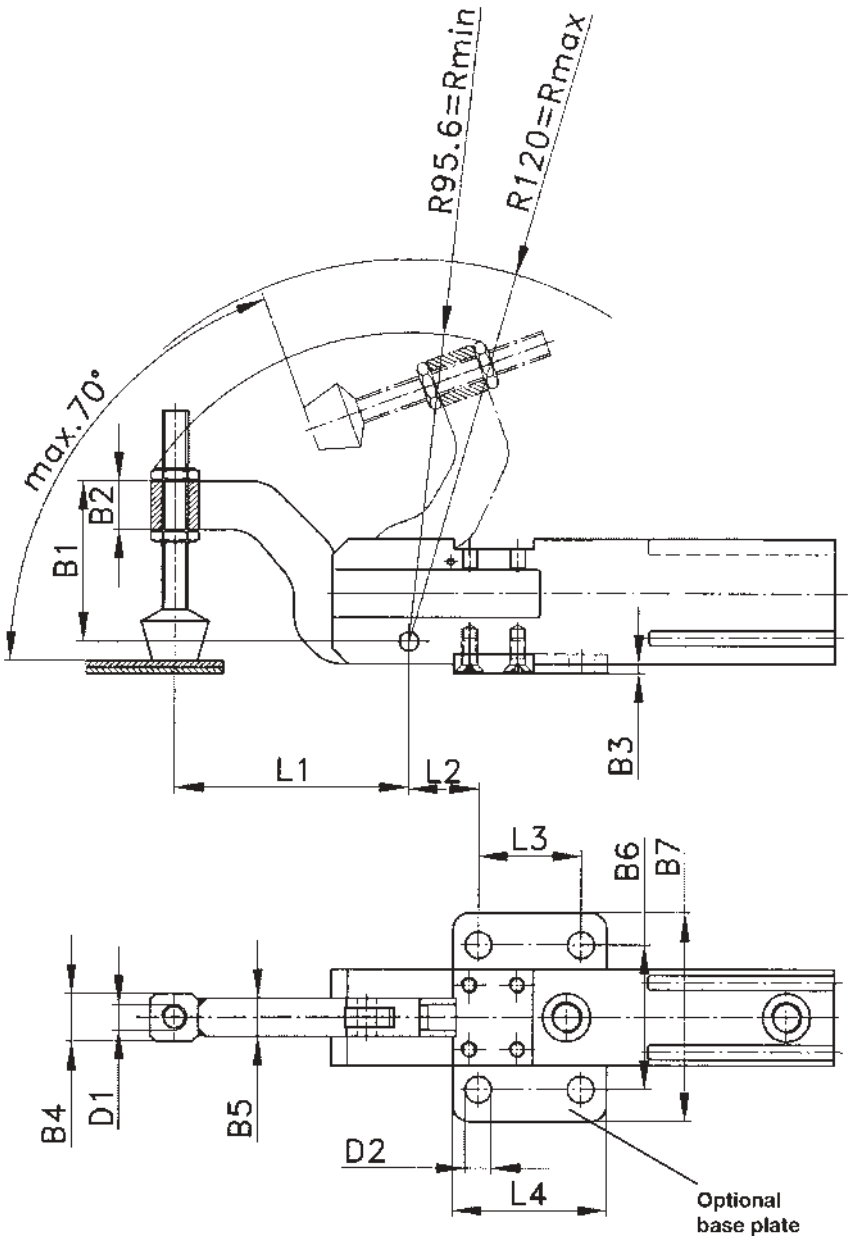
Type	Bx	By	Rx	Weight (kg)
PKS 16.1 Z	9	20	135	0,32
PKS 20.1 Z	9	20	135	0,70
PKS 25.1 Z	9	20	135	0,928

Subject to technical modifications.

Mini Clamp PKG 16-25.1

- Compact clamp with knee-lever mechanism for horizontal assembly
- Assembly compatible with conventional manual clamps, e.g. T Series
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 16 to 25 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear

Optional:
- Position sensing for closed and open positions



Ordering example:

PKG 20 A17 GP T03 45°
- 45° → Opening angle
- T03 → Position sensing system
- GP → Option: Base plate
- A17 → Clamp arm variants
- 20 → Piston Ø
- PKG → Type

Order code, TÜNKERS position sensing system:
...T03 magnet sensing, prepared for position sensing system
...T23 magnet sensing, incl. 2 magnetic switches

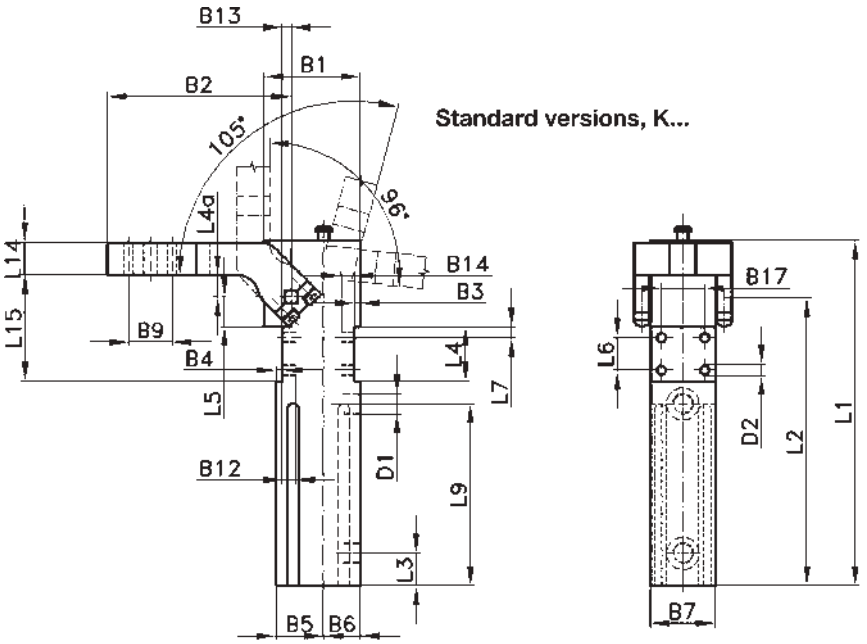
Optional: Magnetic switch Type 'AFS T03' (2-off) must be ordered separately and do not form part of the scope of delivery!

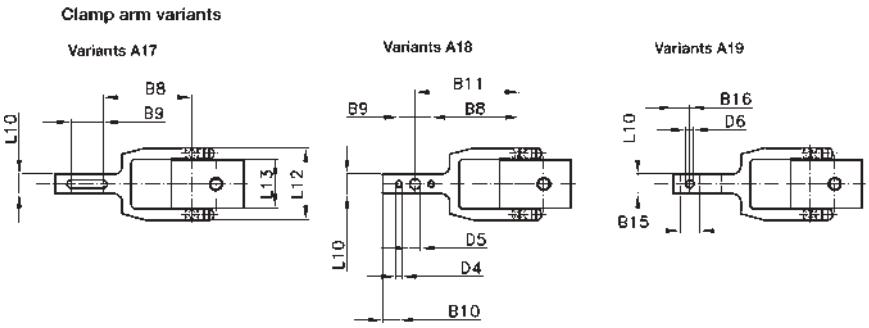
Opening angle:
Available in variants 45°, 60°, 70°.

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
PKG 16.1	8	25	5	6	M5	1	0,3
PKG 20.1	15	54	5	6	G1/8	1	0,5
PKG 25.1	25	75	5	6	G1/8	1	0,8

Type	L1	L2	L3	L4 +0,1	B1	B2	B3	B4	B5	B6	B7	D1	D2 dia.
PKG 16.1	50	16	32	48	33	12	3	12	10	45	65	M6	5
PKG 20.1	73	22	32	48	50	15	3	15	12	45	65	M8	8,3
PKG 25.1	80	26,5	45	64	52	12	4	16	16	50	70	M8	8,5

Subject to technical modifications.





- Compact clamp with knee-lever mechanism
- Over-centre locking
- Fully enclosed mechanism
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 16 to 25 mm
- Fork-type clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard

Optional:
- Position sensing for closed and open positions

Ordering example:

K 20.1 A17 T03 105°
- 105° → Opening angle
- T03 → Position sensing system
- A17 → Clamp arm variants
- 20.1 → Piston Ø
- K → Type

Order code, TÜNKERS position sensing system:
...T03 Magnet sensor (standard), prepared for Position sensing system
...T23 magnet sensing, incl. 2 magnetic switches

Optional: Type 'AFS T03' – must be ordered separately (2-off).

Opening angle, available in variants 45°, 60°, 75°, 90°, 96° und 105°.

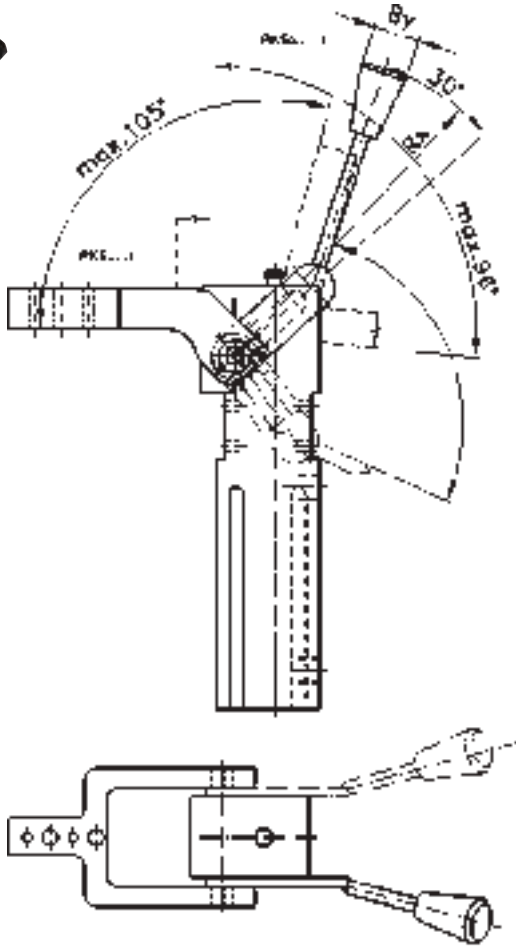
Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
K 16.1	8	25	5	6	M5	1	0,40
K 20.1	15	54	5	6	G1/8	1	0,60
K 25.1	25	75	5	6	G1/8	1	0,90

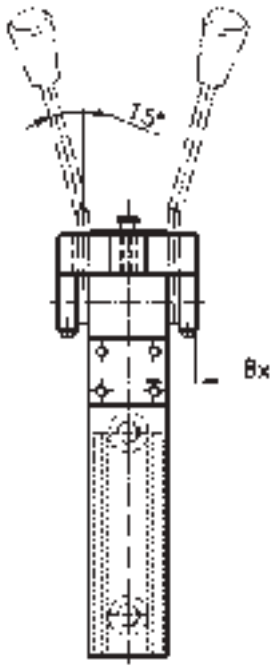
Type	L1	L2	L3	L4	L4a	L5	L6	L7	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	B1	B2	B3	B4
K 16.1	126	103,5	12	20	10	7,5	10	5	69	10	5,5	40	26	15	37,5	61	5,5	16,5	39	38	62	2,5	2,5
K 20.1	159,5	133,5	15	25	10	14	15	5	84	12	6,5	45	30	18	49	83	11	22	50	45,5	76	3	3
K 25.1	185	152,5	17,5	28	10	17	18	5	80	16	8,5	52	35	20	55	95	12	22	61	52	93	4	4

Type	B5	B5	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	D1	D2	D3	D3a	D4	D5	D6
K 16.1	18	14	26	40	16	6	48	7	3,5	5	12	9	16	M5	M5	25	M25x1,5	4	5,5	6,5
K 20.1	22	17	30	50	20	6	60	8	4	6	12	9	20	G1/8	M5	30	M30x1,5	5	6,5	6,5
K 25.1	25	20	35	60	25	8	72,5	6	3	8	12	9	25	G1/8	M5	34	M35x1,5	6	8,5	6,5

Subject to technical modifications.

Mini Clamp K 16-25.1 Z





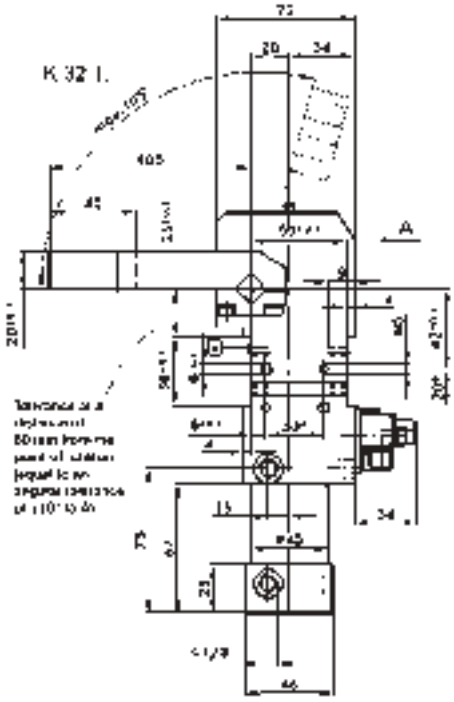
– Compact clamp in special configuration, with manual feed
– Manual closing and locking
– Pneumatic opening and closing

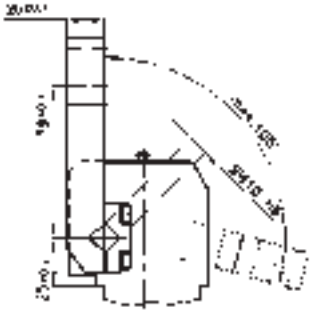
Please Note:
A 5/3-way valve, central position, vented, is required.

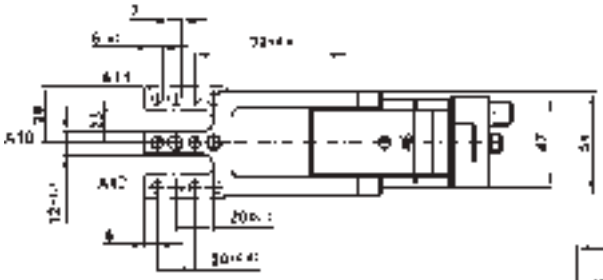
All other dimensions identical to the K Standard Series.

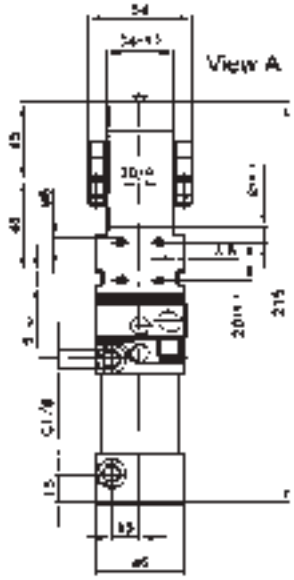
Type	Bx	By	Rx	Weight (kg)
K 16.1 Z	12,5	20	135	0,45
K 20.1 Z	12,5	20	135	0,80
K 25.1 Z	12,5	20	135	1,02

Subject to technical modifications.









- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 32 mm
- Fork-type clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard

Optional:
- Position sensing for closed and open positions

Ordering example:

K 32 A10 T12 105°
- 105° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- 32 → Piston Ø
- K → Type

Order code, TÜNKERS position sensing system:
...T00 without position sensing system
...T09 24 V inductive position sensing, 2 outputs with integral LEDs 4-pole
...T12 24 V inductive position sensing, 1 output with integral LEDs 4-pole

Standard opening angle: K-105°, K2-105°
Special opening angle: between 45° and 105° in 15° increments (must be specified on the order).

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Piston Ø (mm)	Weight (kg)
K 32 T...	55	180	32	1500

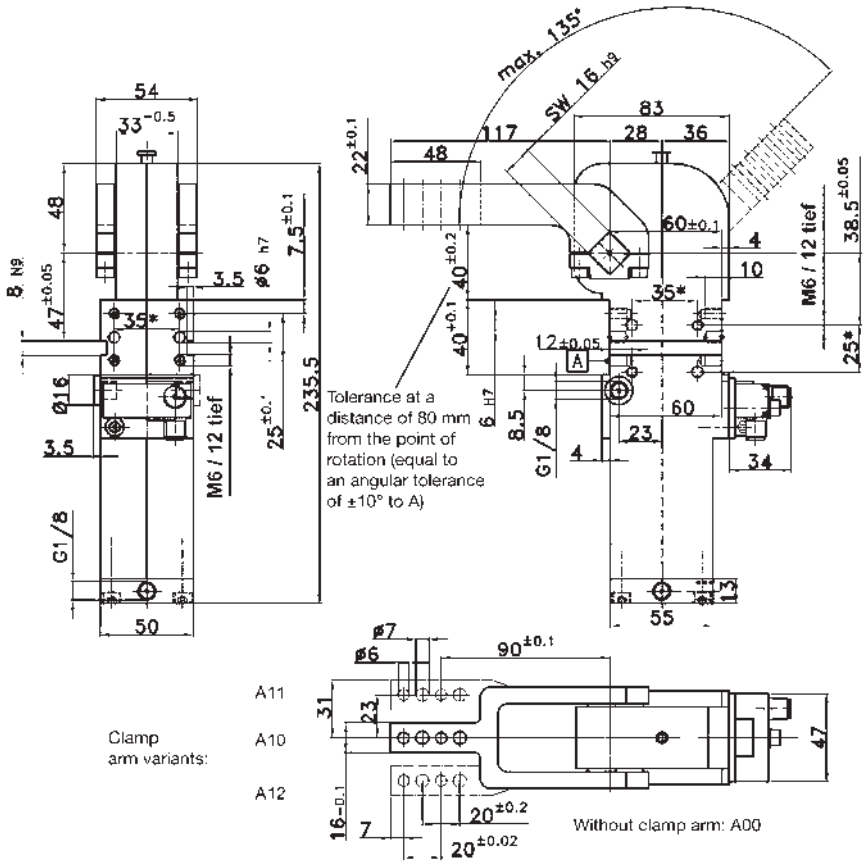
Subject to technical modifications.

Pneumatic Clamp K 40.1 BR2

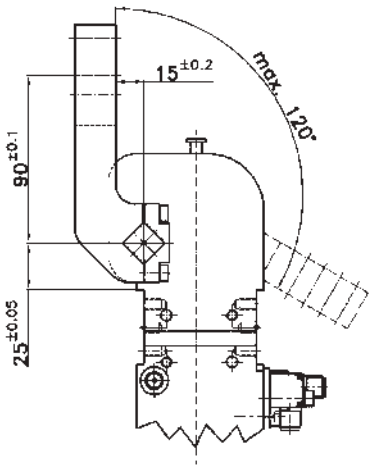
- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 40 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard

Optional:
- Position sensing for closed and open positions

K 40.1



K2 40.1



Ordering example:

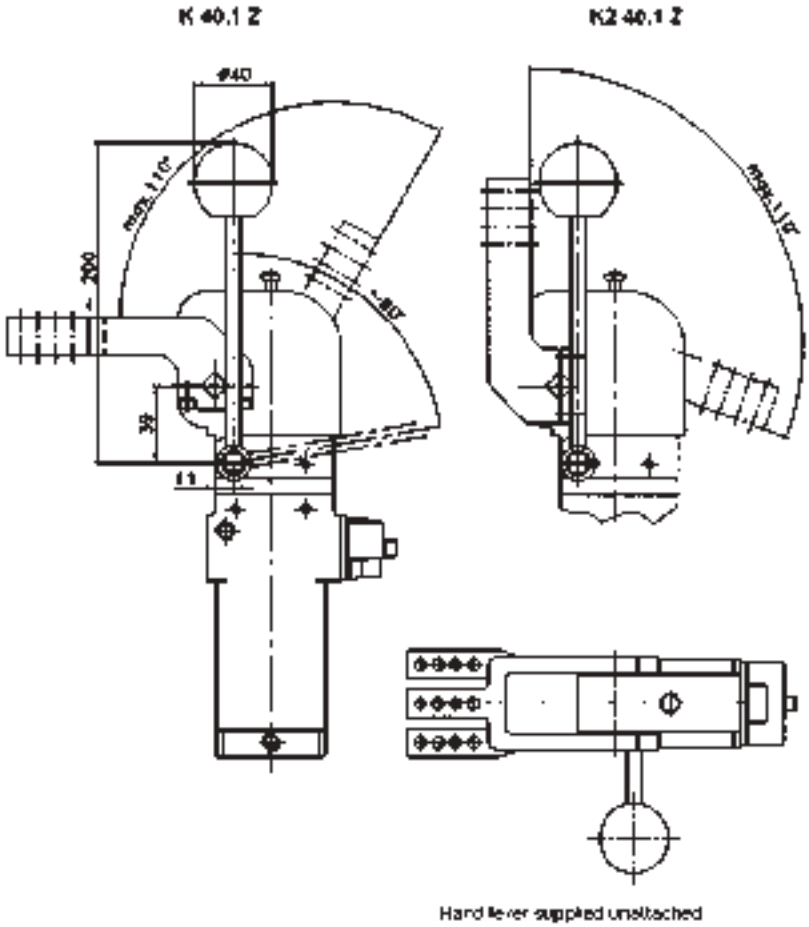
K 40.1 BR2 A10 T12 135°
- 135° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- BR2 → Piston Ø
- 40.1 → Type
- K → Type

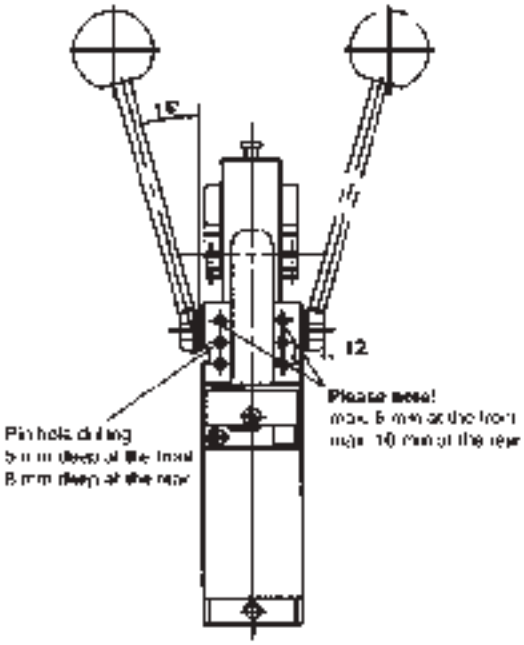
Order code, TÜNKERS position sensing system:
...T00 without position sensing system
...T12 24 V inductive position sensing, 1 output with integral LEDs 4-pole

Standard opening angle: K-135°, K2-120°
Special opening angle: available between 45° and 105° in 15° increments.

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Ø Piston	Weight ~ (kg)
K 40.1 BR2	120	360	40	2

Subject to technical modifications.





- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 40 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard
- Manual feed

Optional:
- Position sensing for closed and open positions

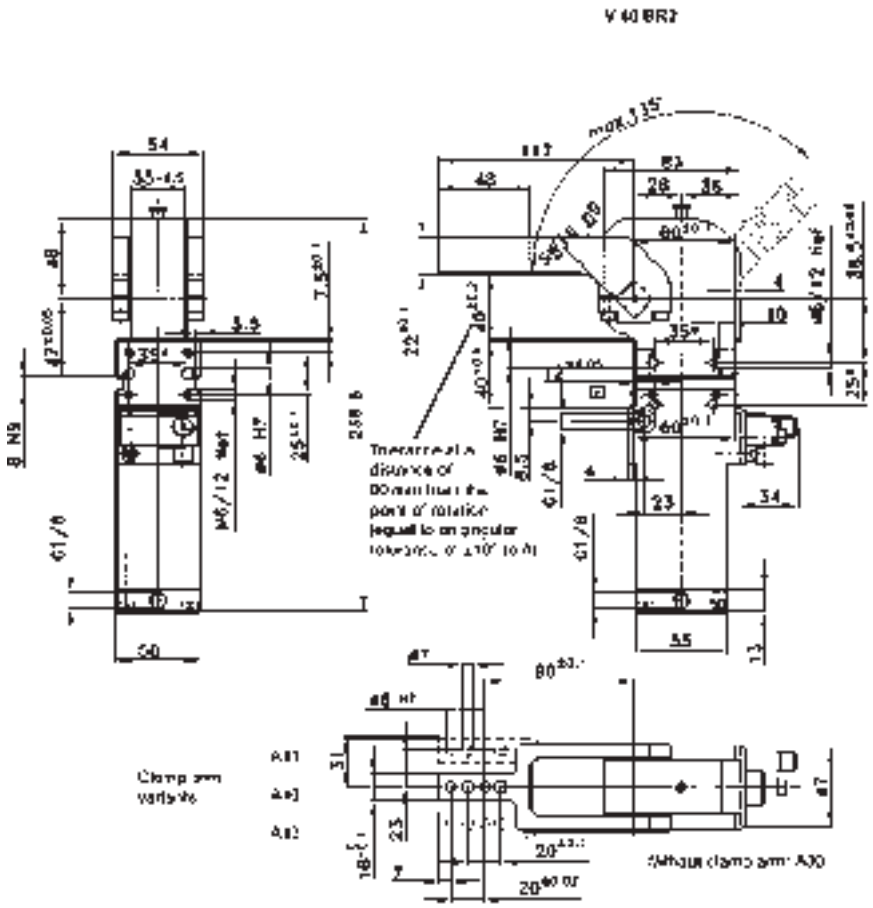
Position sensing systems
...T00 without position sensing system
...T12 Inductive sensing 24V, 1 output with integral LED's

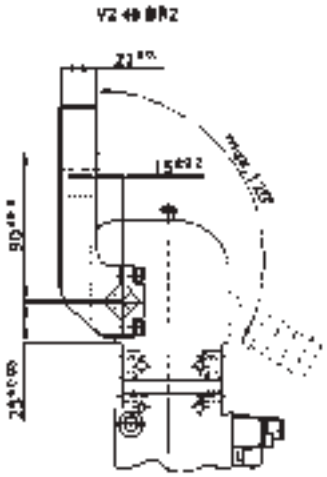
Ordering example:

K 40.1 BR2 Z A10 T12 135°
- 135° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- Z → Manual feed
- BR2 → Piston Ø
- 40.1 → Type
- K → Type

Subject to technical modifications.

Pneumatic Clamp V/V2 40 BR2





- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 40 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard
- Infinitely adjustable opening angle

Optional:
- Position sensing for closed and open positions

Ordering example:

V 40 BR2 A10 T12 135°
- 135° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- 40 BR2 → Piston Ø
- V → Type

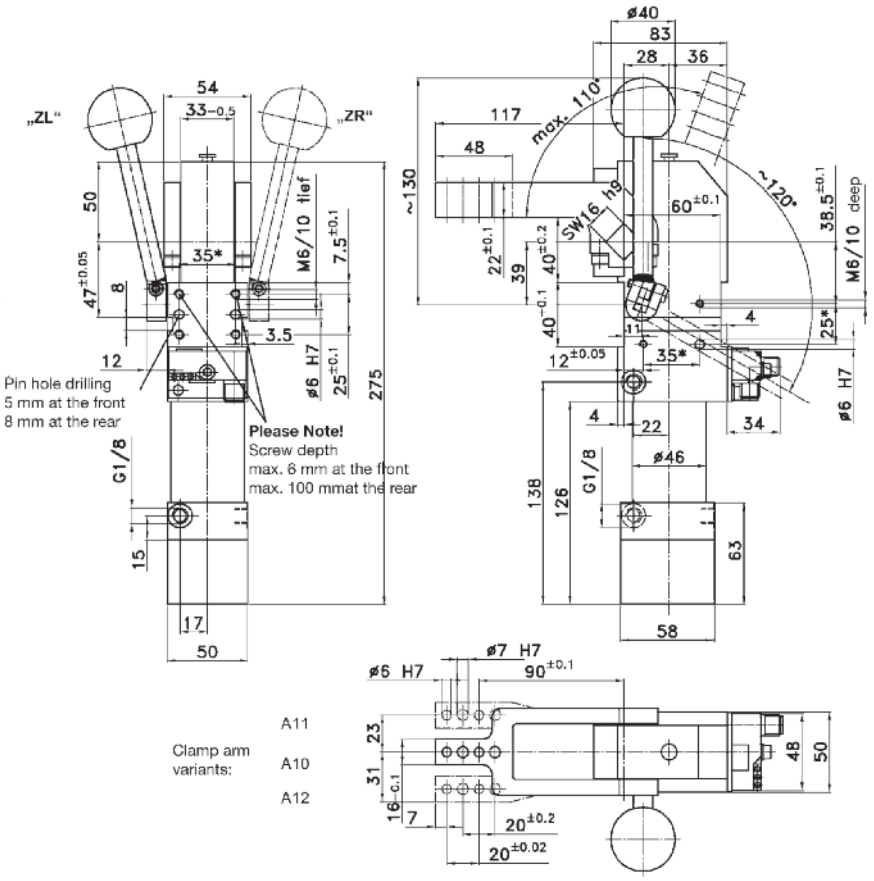
Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Ø Piston	Weight ~ (kg)
V/V2 40 BR2	120	380	40	2,2

Subject to technical modifications.

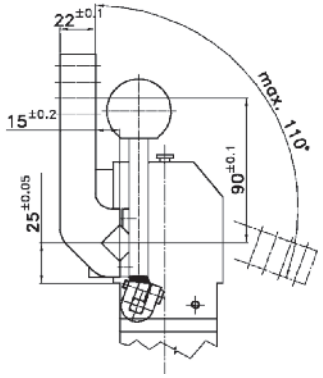
- Compact clamp with knee-lever mechanism
- Over-centre locking
- Monoblock housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 40 mm
- Clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole patterns front and rear
- Version: Standard
- Manual feed
- Infinitely adjustable opening angle

Optional:
- Position sensing for closed and open positions

V 40 ZL/ZR



V2 40 ZL/ZR



Position sensing systems
...T00 without position sensing system
...T12 Inductive sensing 24V, 1 output with integral LED's

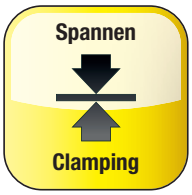
Ordering example:

V 40 ZL A10 T12 115°
- V → Type
- 40 → Piston Ø
- ZL → Manual feed left (ZR = right)
- A10 → Clamp arm variants
- T12 → Position sensing system
- 115° → Opening angle

Subject to technical modifications.

CLAMPING

Pneumatic Grippers



TÜNKERS®
Ingenuity in series.

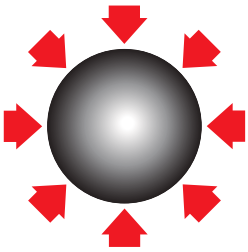
Pneumatic Grippers

Pneumatically-operated grippers are the tools of choice for manual handling operations. Typical applications include robot-controlled gripper systems which transfer the workpiece from one preliminary process to another workstation. Due to short cycle times with dynamic movements pneumatic grippers must be light.

Based on the operating principle of the mechanism, there are two different types of gripper – the so-called knee-lever gripper and the curve-driven lever gripper.

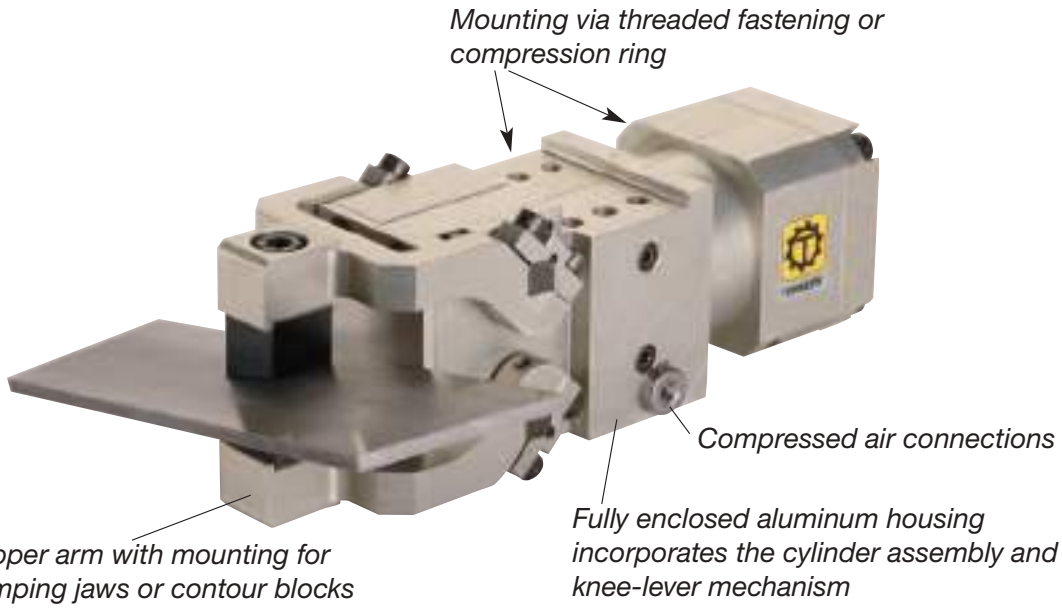
Pneumatic grippers with knee-lever mechanism

Knee-lever grippers are compact tools in which a pneumatic cylinder moves the gripper arms by means of a knee-lever mechanism. In addition to the high level of powergear ratio (8 to 10 times), the over-centre locking feature of the mechanism ensures secure immobilisation of the work-piece, even in the event of a loss of pressure. For this reason, knee-lever grippers are ideally suited for use in systems that are subject to potential personal injury (emergency stop, for example).



The mechanical and pneumatic components installed in the fully-enclosed housing are resistant to dirt caused by the production process, such as welding operations. Thus, even in harsh working conditions, TÜNKERS knee-lever grippers feature high levels of availability. The gripper arms, with opening angles up to 90°, allow easy removal of the workpiece.

Design principle

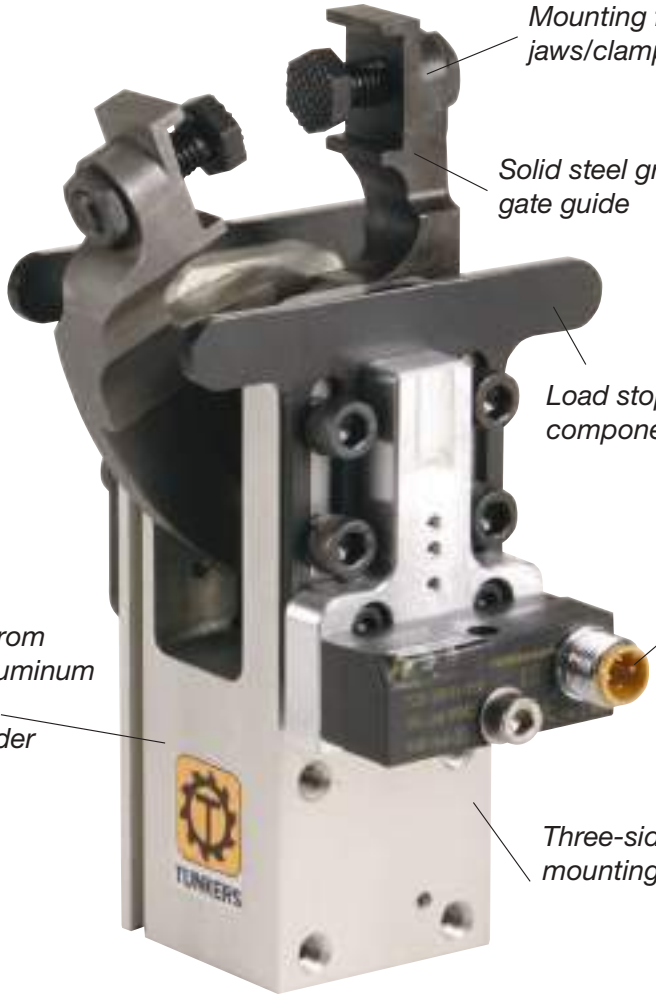


Pneumatic grippers with curve-driven lever mechanism

Using the clamping wedge principle, curve-driven grippers convert the driving force of the pneumatic cylinder into a high clamping force. The advantage of this type of mechanism is a very simple and robust basic structure which, in long-term use, is characterised by extremely short cycle times. The integration of cylinder and mechanism in one housing facilitates the manufacture of highly compact and weight-optimised tools. For this reason, TÜNKERS curve-driven grippers are ideally suited for production processes in which weight, size and short opening and closing times are decisive factors.

Typical applications for curve-driven grippers include transport and handling tasks, as in car body manufacture, in press sequencing, general logistics and fixture construction.

Design principle

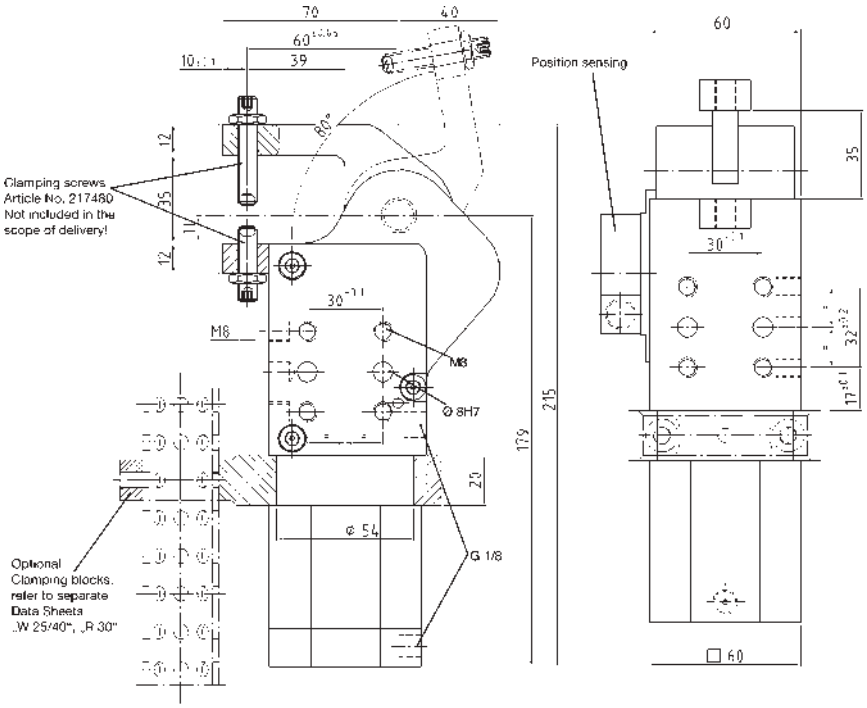


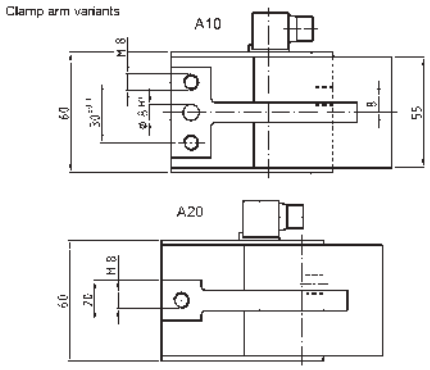
Product range

Type	 **APG 40.1**	 **APG 40.1 AS**	 **GN 32**	 **GN 32 AS**	 **GN 40**	 **GN 40 AS**
Clamping force (N)	1200	1300	600	400	1000	600
Max. opening angle	80°	2 x 85°	50°	2 x 80°	50°	2 x 80°
Weight (kg)	1,6	2,0	1,3	1,1	2,0	1,8
Dimensions (mm)	212x60x65	109x63x60	139x50x50	139x50x50	165x55x55	165x55x55

Type	 **PG 32**	 **PG 40**	 **PG 32 AS**	 **PG 40 AS**
Clamping force (N)	900	1300	900	1300
Opening angle	75°	75°	2 x 75°	2 x 75°
Weight (kg)	0,87	1,5	0,91	1,55
Dimensions (mm)	158x45x45	198x55x55	158x45x45	198x55x55

Pneumatic Gripper APG 40.1 BR2 A10/A20





- Compact gripper with knee-lever mechanism
- Over-centre locking
- Fully-enclosed mechanism
- Monoblock housing made from high-strength aluminum material
- Integrated pneumatic cylinder, Ø 40 mm
- One powered clamp arm with mounting for gripper jaws, contour blocks or clamping screws
- Mounting hole pattern at the front, alternative mounting with shaft-clamping bush
- No clamping delay by virtue of clamping on the axis of rotation

Optional:
Integrated position sensing for closed and open position

Ordering example:

APG 40.1 A10 T12 45°

- 45° → Opening angle
- T12 → Position sensing system
- A10 → Arm variants
- 40.1 → Piston Ø
- APG → Type

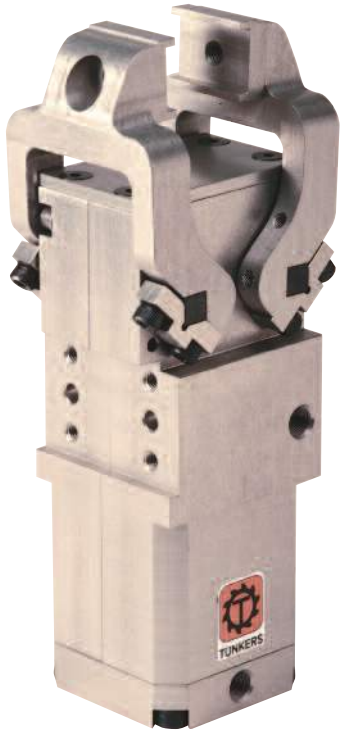
Order code TÜNKERS
Position sensing:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

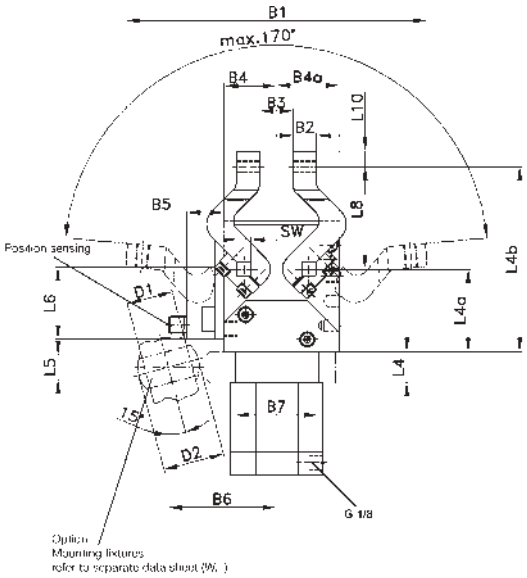
Opening angle:
Supplied in 80° configuration. Other variants on request

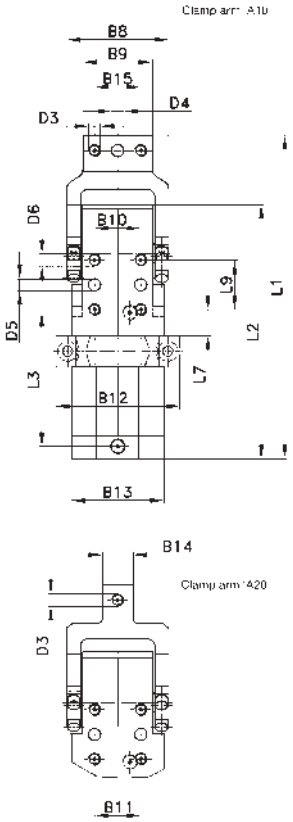
Type	Clamping force at 5 bar (N)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
APG 40.1	1200	5	6	1/8	1	1,6

Subject to technical modifications.

Pneumatic Gripper APG 40.1 BR2 AS







– Compact gripper with knee lever mechanism
– Over-centre locking
– Fully-enclosed mechanism
– Monoblock housing made from high-strength aluminum material
– Integral pneumatic cylinder, Ø 40 mm
– Two synchronously-driven clamp arms with mounting for gripper jaws, contour blocks or clamping screws
– Mounting hole pattern at the front, alternative mounting with shaft-clamping bush

Optional:
– Integrated position sensing for closed and open positions
– Mounting fixtures

Ordering example:

APG 40.1 BR2 AS A10 T12 45°
- 45° → Opening angle (2 x 45°)
- T12 → Position sensing system
- A10 → Arm variants
- AS → Dual arm
- BR2 → Piston Ø
- APG 40.1 → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Opening angle:
Supplied in 2 x 85°configuration. Other variants on request!

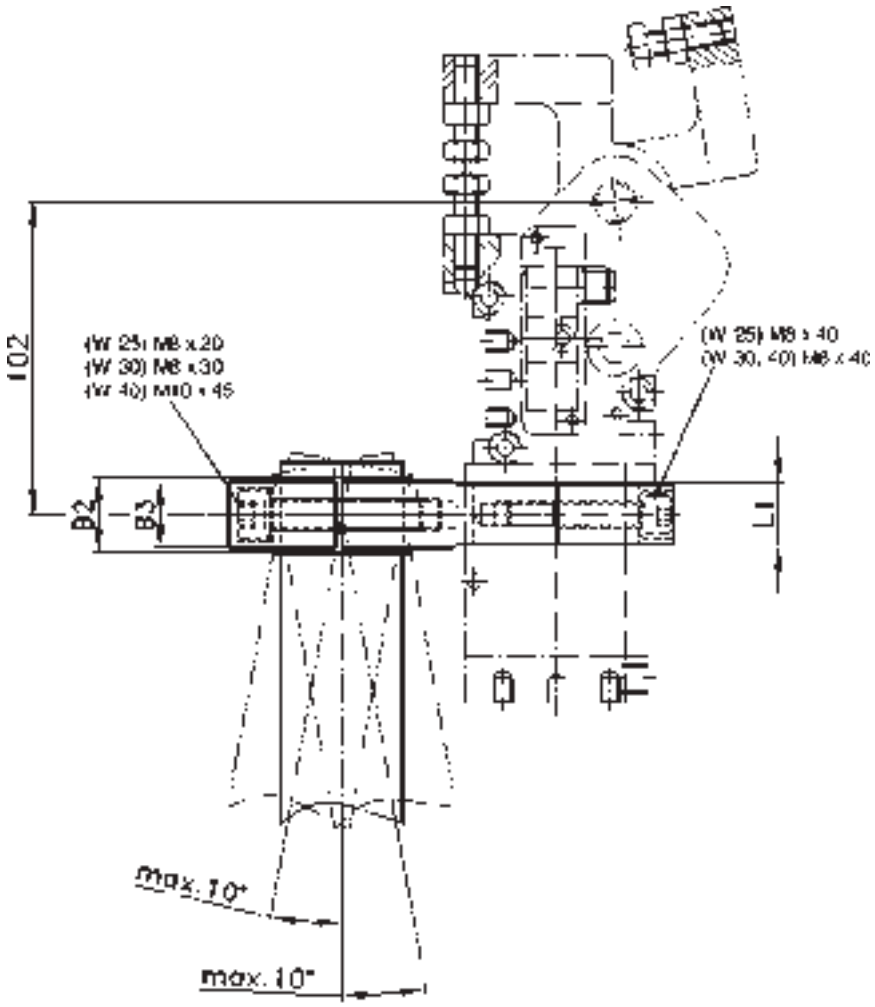
Type	Clamping force at 5 bar (N)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
APG 40.1 BR2 AS	600	5	6	1/8	1	2,0

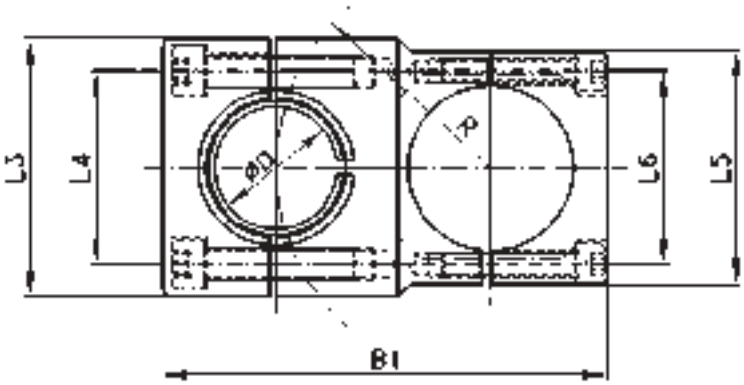
Type	L1	L2	L3	L4	L4a	L4b	L5	L6	L7 ±0,1	L8	L9 ±0,1	L10 ±0,1	B1	B2	B3	B4	B4a	B5	B6 ±0,1	B7	B8	B9	B10 ±0,1
APG 40.1 BR2 AS	210	165	87	20	53,5	120	16	47	17	66,5	32	10	195	15	22	34	41	24	70	54	66	45	30

Type	B11 -0,02	B12	B13	B14	B15	D1 dia.	D2	D3	D4 H7	D5 H7/8	D6 10 tief	SW
APG 40.1 BR2 AS	30	80	60	20	30	30	40	M8	8	8	M8	9

Subject to technical modifications.

Attachment adapter to fit pneumatic grippers APG 40 and APG 40 AS, to attach the tube attachment arm on the 25/40 mm diameter TÜNKERS modular gripper system



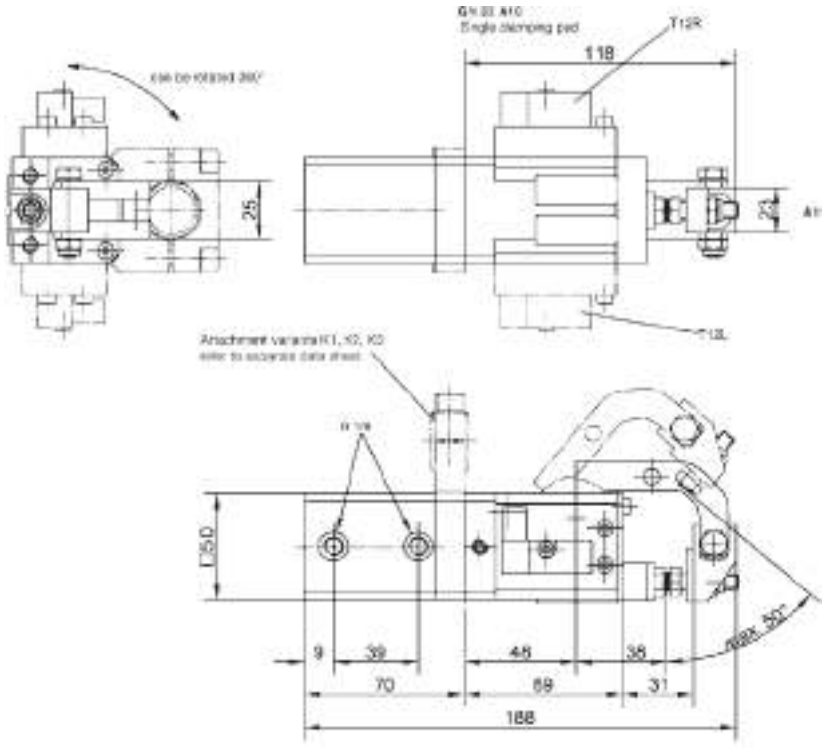


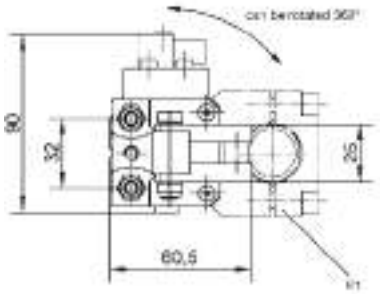
Type	Weight ~(kg)	B1	B2	B3	L1	L3	L4 ±0,2	L5	L6 ±0,2	D	R
W 25	0,4	127	20	16	20	65	63	76	50	25	65
W 30	0,5	133	16	16	20	76	63	76	63	30	70
W 40	0,6	145	25	22	20	84	63	76	63	40	70

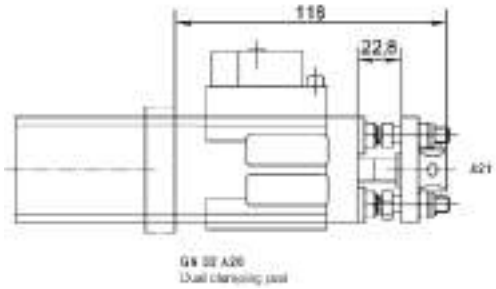
Subject to technical modifications.

Ordering example – Order No.
W25 Article No. 260257
W30 Article No. 287302
W40 Article No. 260258

Pneumatic Gripper GN 32/40







- Compact gripper with gate mechanism
- Fully-enclosed housing made from high-strength aluminum material
- Integral pneumatic cylinder, Ø 32/40 mm
- Two synchronously-driven clamp arms with mounting for gripper jaws, contour blocks or clamping screws
- Attachment using adapter
- Head can be rotated 360°

Optional:
- Integrated position sensing for closed and open positions
- Mounting variants K1, K2, K3

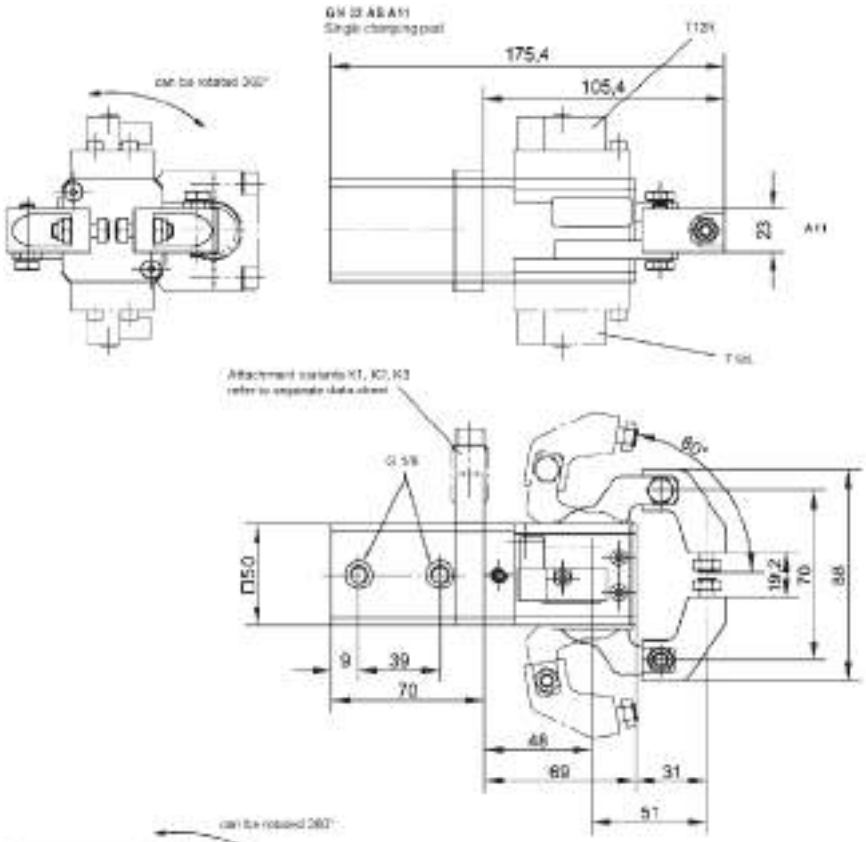
Ordering example:

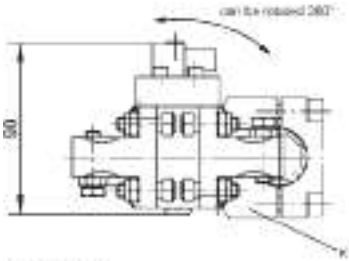
GN 32 A21 K1 T12R 50°
- 50° → Opening angle
- T12R → Sensing on the right (optional left) with LEDs
- K1 → Mounting
- A21 → Arm variants, incl. clamping screws corrugated carbide tips
- GN 32 → Type

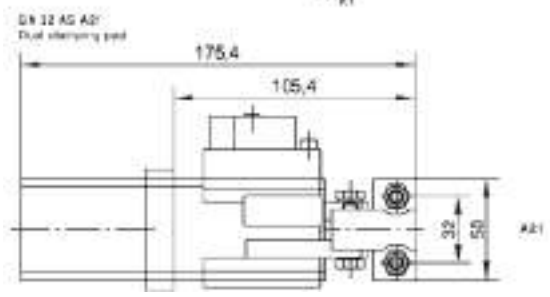
Opening angle:
Standard: 50°
Optional: 15°, 30°, 45°

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Dimensions (l x w x d) (mm)	Weight (kg)
GN 32	600	600	139x50x50	1,3
GN 40	1000	1000	165x55x55	2,0

Subject to technical modifications.







– Compact gripper with curve driven lever mechanism
– Fully-enclosed housing made from high-strength aluminum material
– Integral pneumatic cylinder, Ø 32/40 mm
– One synchronously-driven clamp arm with mounting for gripper jaws, contour blocks or clamping screws
– Attachment by means of adapters
– Head can be rotated 360°

Optional:
– Integrated position sensing for closed and open positions
– Mounting variants K1, K2, K3

Ordering example:

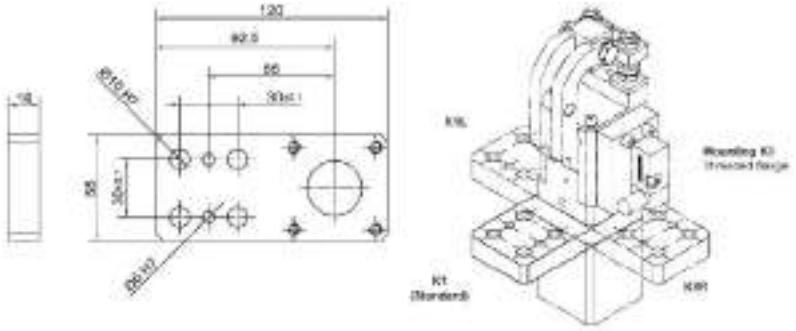
GN 32 AS A 21 K1 T12R 2x80°
- T12R 2x80° → Opening angle
- T12R → Sensing on the right (optional left) with LEDs
- K1 → Mounting
- 21 → No. of clamping positions · 1 = with clamping screw · 0 = without clamping screw
- A → Clamp arm
- GN 32 AS → Type

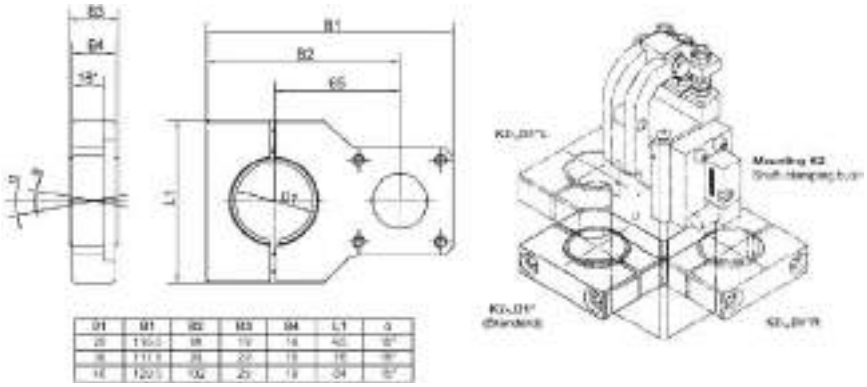
Opening angle:
Standard: 2x80°
Optional: 2x30°, 2x45°, 2x60°

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Dimensions (l x w x d) (mm)	Weight (kg)
GN 32 AS	400	400	139x50x50	1,1
GN 40 AS	600	600	165x55x55	1,8

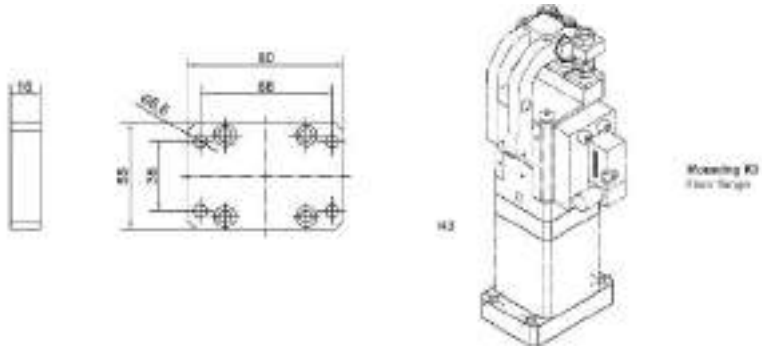
Subject to technical modifications.

Accessories for Pneumatic Grippers





D1	B1	B2	B3	B4	L1	α
25	110.0	88	72	16	40	30°
32	111.0	88	72	16	40	30°
40	122.0	104	85	18	54	30°

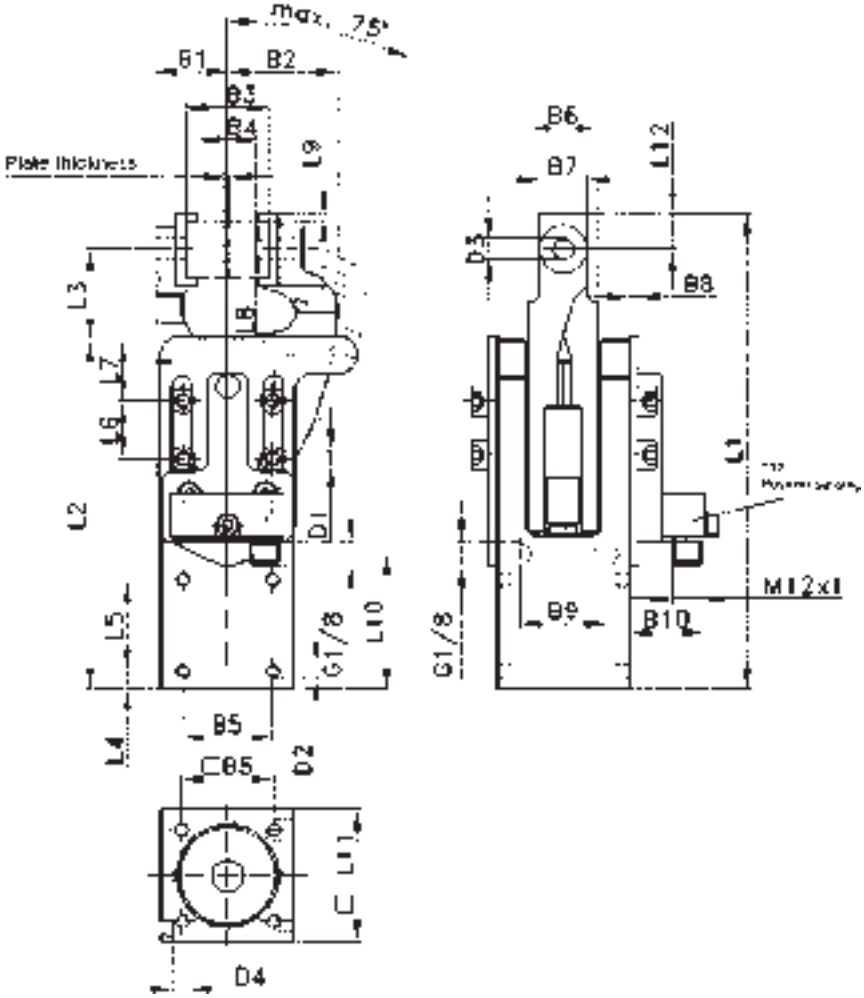


Ordering example:

K2 GN 32 25 L

- L → Left-hand version ('R' = right-hand)
- 25 → Diameter „D1"
- 32 → Pneumatic Grippers Type
- K2 → Shaft-clamping bush

Subject to technical modifications.



– Compact gripper with curve-drive mechanism
– One driven and one fixed gripper arm
– Robust housing made from high-strength aluminum material with integral pneumatic cylinder
– Steel gripper arms with curve driven lever mechanism and mounting for gripper jaws
– Multi-sided mounting options on the housing

Optional:
– Integrated position sensing for the closed and open positions
– Sensor for component recognition
– Lateral external stops for workpiece positioning

Ordering example:

PG 32 T12 22,5°
→ Opening angle
→ Position sensing system
→ Piston Ø
→ Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Opening angle:
Available in 2 x 22.5°, 2 x 45° and 2 x 75° configurations

Accessories:
– Clamping jaws (not included in the scope of delivery)
– Adjustable plates (not included in the scope of delivery)
– Protective panel to prevent impact damage to the housing

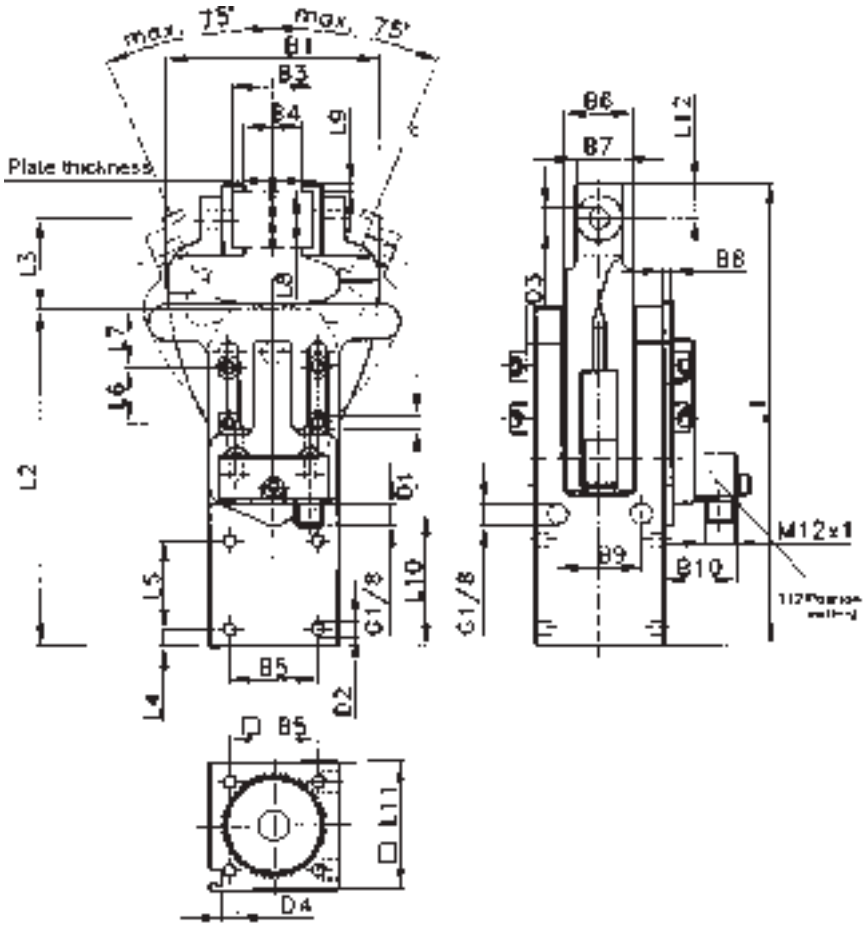
Type	Clamping force at 5 bar (N)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
PG 32	900	5	6	1/8	1	0,87
PG 40	1300	5	6	1/8	1	approx. 1,5

Type	L1	L2	L3	L4 ±0,1	L5 ±0,1	L6 ±0,1	L7	L8 ±0,02	L9 ±0,05	L10	L11	L12	B1	B2	B3 ±0,1	B4 ±0,1	B5 ±0,1	B6	B7	B8	B9	B10	D1
PG 32	158	116	30,5	6	30	17,5	20	19	2,5	55	45	11,5	24	36	28	20	30	23	16	3	28	18	M6
PG 40	198	145	38	7,5	38	24	25	24	3	56	55	15	30	46	35	25	38	29	20	3,5	36	20	M6

Type	D2 °	D3 °	D4 °
PG 32	M5	M8	M6
PG 40	M6	M10	M6

Subject to technical modifications.

Pneumatic Gripper PG 32/40 AS



– Compact gripper with curve-drive mechanism
– Two synchronously-driven gripper arms
– Robust housing made from high-strength aluminum material with integral pneumatic cylinder
– Steel gripper arms with curve driven lever mechanism and mounting for gripper jaws
– Multi-sided mounting options on the housing

Optional:
– Integrated position sensing for the closed and open positions
– Sensor for component recognition
– Lateral external stops for work-piece positioning

Ordering example:

PG 32 AS T12 22,5°
- PG: Type
- 32: Piston Ø
- AS: Arm variants (both movable)
- T12: Position sensing system
- 22,5°: Opening angle

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Opening angle:
Available in 2 x 22.5°, 2 x 45° and 2 x 75° configurations

Accessories:
– Clamping jaws (not included in the scope of delivery)
– Adjustable plates (not included in the scope of delivery)
– Protective panel to prevent impact damage to the housing

Type	Clamping force at 5 bar (N)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight (kg)
PG 32 AS	900	5	6	1/8	1	0,91
PG 40 AS	1300	5	6	1/8	1	approx. 1,55

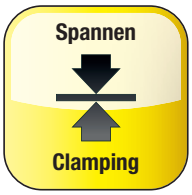
Type	L1	L2	L3	L4 ±0,1	L5 ±0,1	L6 ±0,1	L7	L8 ±0,02	L9 ±0,05	L10	L11	L12	B1	B2	B3 ±0,1	B4 ±0,1	B5 ±0,1	B6	B7	B8	B9	B10	D1 ø
PG 32 AS	158	116	30,5	6	30	17,5	20	19	2,5	55	45	11,5	24	36	28	20	30	23	16	3	28	18	M6
PG 40 AS	198	145	38	7,5	38	24	25	24	3	56	55	15	30	46	35	25	38	29	20	3,5	36	20	M6

Type	D2 ø	D3 ø	D4 ø
PG 32 AS	M5	M8	M6
PG 40 AS	M6	M10	M6

Subject to technical modifications.

CLAMPING

Parallel Grippers



TÜNKERS®
Ingenuity in series.

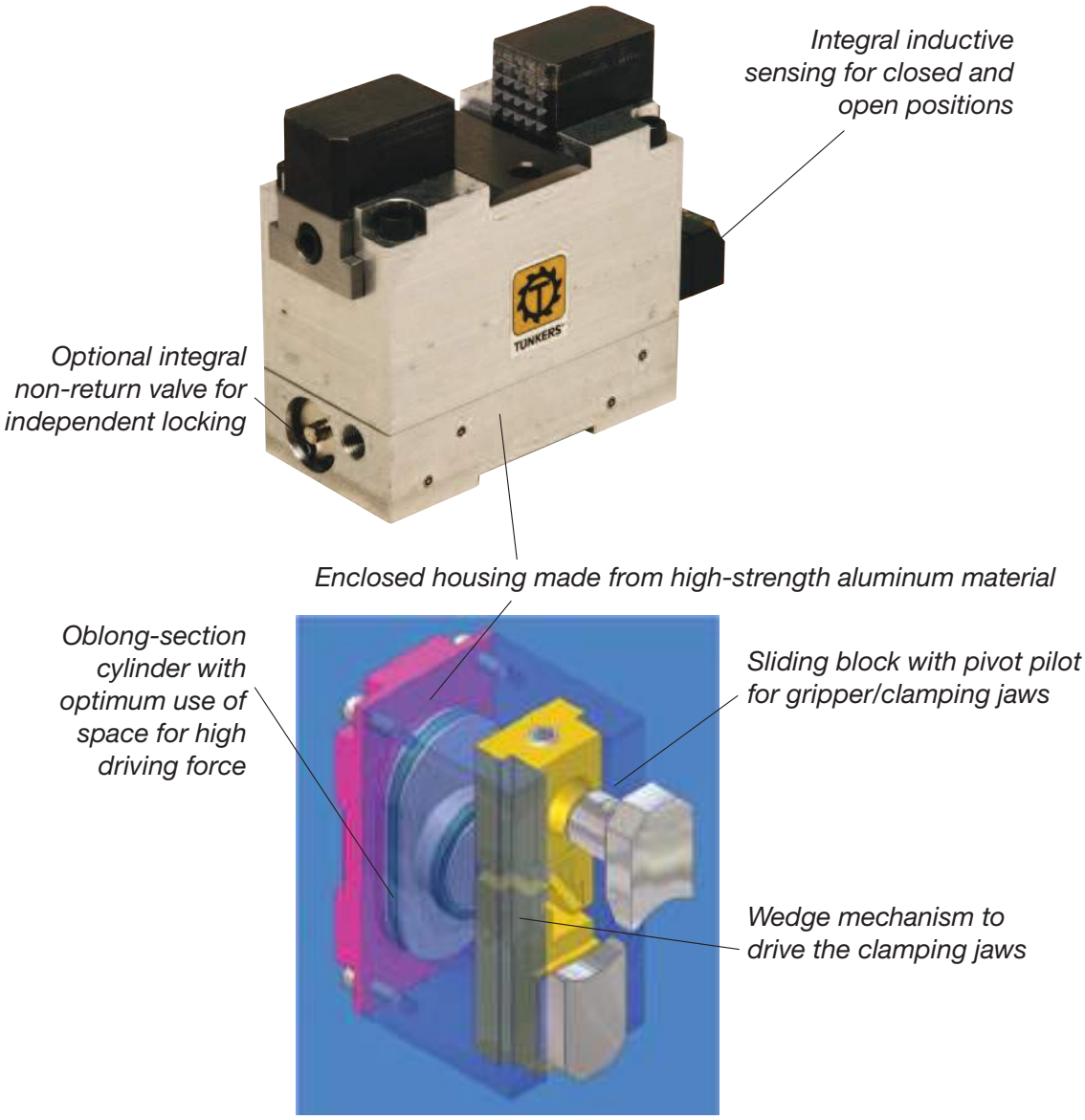
Parallel Grippers

With extremely high clamping forces combined with compact dimensions, parallel grippers are particularly suitable for clamping/holding heavy workpieces. The centrally-closing gripper jaws ensure that the position of the workpiece remains unchanged during the gripping operation.

As the transmit power is applied in both directions, the TÜNKERS parallel gripper can be used for external as well as internal gripping. The constant clamping force applied over the full stroke makes it possible to grip workpieces with undefined dimensions and surfaces (casting materials).

The optional non-return valve maintains the clamping position even in the event of a loss of pressure. The mounting dimensions are compatible with the current industry standard, thus ensuring replaceability during servicing operations.

Design principle



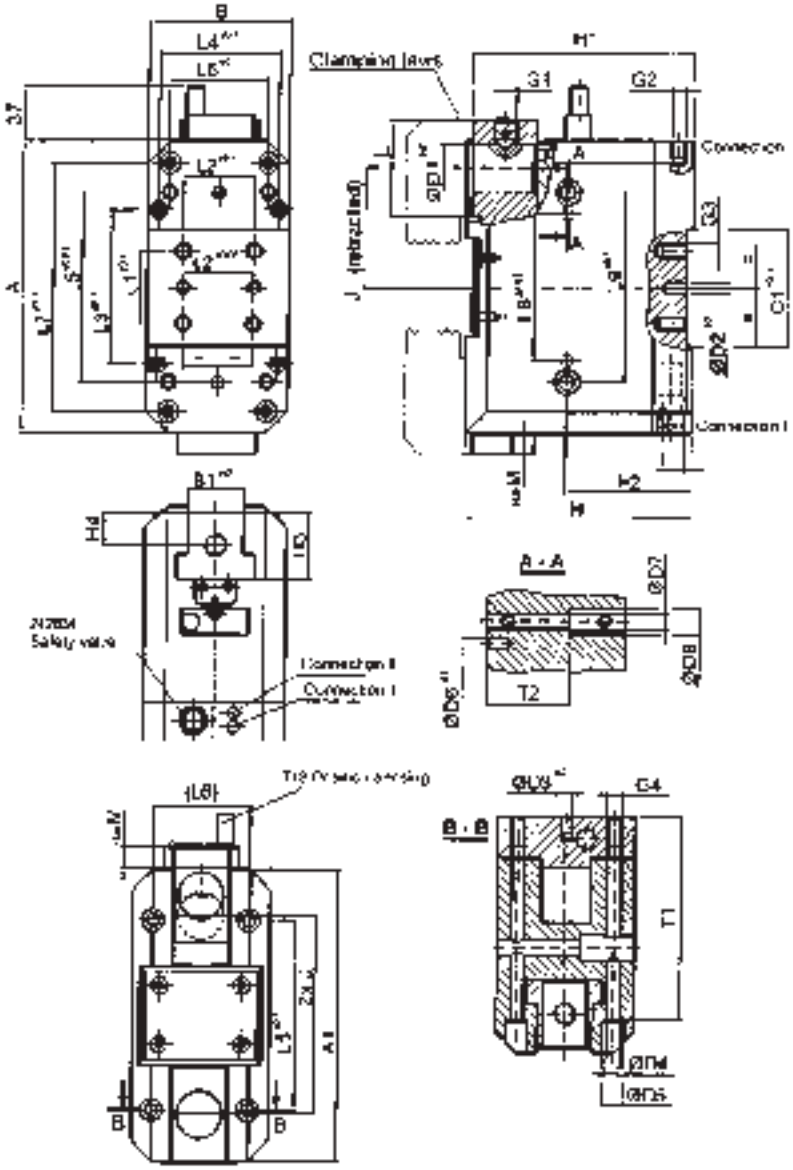
Parallel Gripper GP 80-200 (typical example)

Parallel gripper with clamping jaws to secure rod material

Product range

Type	GP 80	GP 100	GP 125	GP 160	GP 200
Clamping force (N)	1200	1700	3000	5000	7500
Stroke (mm)	4	4	6	8	14
Locking	Optional	Optional	Optional	Optional	Optional
Weight (kg)	1,3	1,5	2,7	8,2	12

Parallel Gripper GP 80-200



- Compact gripper with wedge mechanism, synchronously driving two clamping jaws
- Robust housing made from high-strength aluminum material with integral oblong-section pneumatic cylinder
- Clamping jaw mounting with circular-section spigots
- Multi-sided mounting options

Optional:
- End position sensing
- Pneumatic self-locking with integrated non-return valve

Type	max. pressure (p) (bar)	max. clamping force at 5 bar external clamping at N	max. clamping force at 5 bar internal clamping at N	Weight (kg)
GP 80...	10	1200	800	1,3
GP 100...	10	1900	1400	1,5
GP 125...	10	3000	2400	2,7
GP 160...	10	5000	4000	5,2
GP 200...	10	7500	6000	12

Ordering example:

GP 80 H T12
- GP 80 → Type
- H → Pneumatic self-locking
- T12 → Position sensing system

Order code, TÜNKERS position sensing system:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Options:
- Clamping jaws to customer's choice
- Pneumatic self-locking „H“

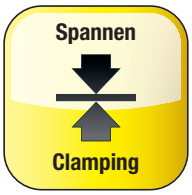
Type	A	A1	B	B1	C1	D1	D2	D3	D4	D5	D6	D7	D8	G1	G2	G3	G4
GP 80...	100	80	50	20	40	13	6x8	-	-	-	4x5	5,5	9,5	G1/8	M8x12	M6x10	-
GP 100...	100	100	50	24	40	16	6x8	-	-	-	-	-	-	G1/8	M10x14	M6x10	-
GP 125...	125	125	60	28	40	20	6x8	-	6,6	11	6x11	9	15	G1/8	M10x16	M6x10	M8x18
GP 160...	160	160	72	35	80	25	8x14	-	6,6	11	6x11	9	15	G1/8	M12x20	M10x16	M8x18
GP 200...	200	200	100	40	80	32	8x14	8x14	9	15	8x14	11	18	G1/8	M16x25	M10x16	M10x20

Type	H	H1	H2	H3	H4	J min.	J max.	L	L1	L2	L5	L6	L8	L9	M	T	T1	T2
GP 80...	83	80	50	19	9,5	25,5	29,5	25	25	35	-	-	50	32	4	3	-	42
GP 100...	83	80	-	20	10	32	36	32	25	35	-	-	-	-	4	3	-	-
GP 125...	100	97	59	25	12,5	40	46	42	25	35	110	45	62	86	6	3	90	52
GP 160...	123	119	72,5	30	15	52,5	60,5	55	50	50	100	56	76	100	8	4,5	110	55
GP 200...	162,5	158,5	90	46	23	67,5	81,5	65	50	50	130	70	100	130	14	4,5	140	60

Subject to technical modifications.

CLAMPING

Standard Clamps

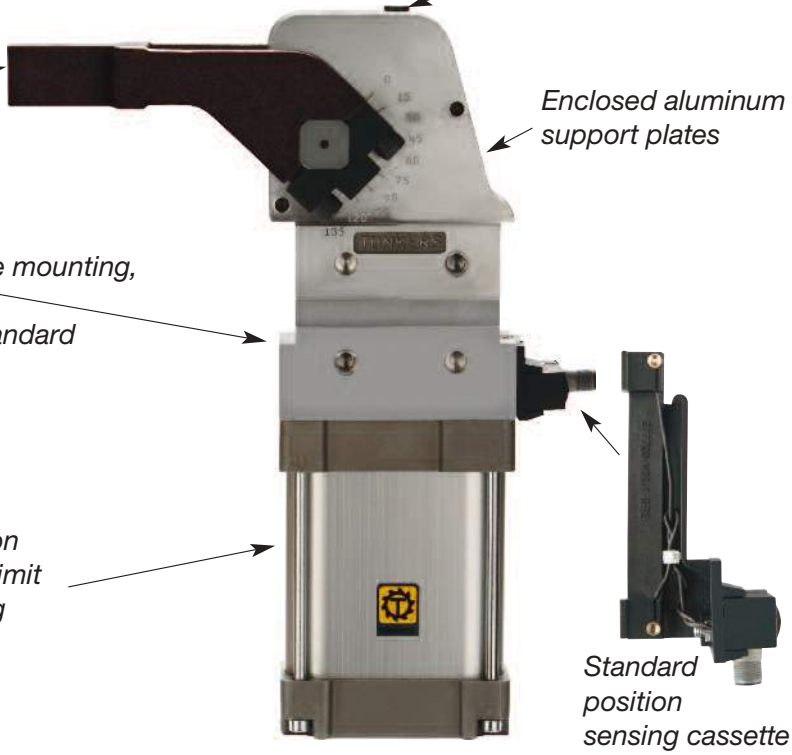


TÜNKERS®
Ingenuity in series.

Due to their enclosed structure, TÜNKERS standard clamps, with sizes 50 to 80, provide solutions for clamping and gripping forces up to 4 kN. In addition to the robust construction, with integral needle roller bearings for optimum force transmission and high load cycles (up to 3 million), a particular feature of TÜNKERS Clamps is the slim version with the oblong-section cylinder. This allows optimum accessibility in fixtures, for the use of spot welding guns.

All the standard series knee-lever clamps are equipped with integrated limit switches in cassette form, thus facilitating replacement and adjustment. As an option, the products are available with manual feed.

Configuration of a knee-lever clamp



Detail: Opening angle

Housing with angle scale

Detail: Limit stop damping

Cylinder with genuine limit stop damping

Detail: Vario Principle

The Vario Principle: infinitely-adjustable opening angle with allen key

Manual feed
Secure over-centre locking due to adaptable – right- or left-hand-operated lever, which directly activates the cylinder piston rod.

End position detent
Optional mechanical retaining clip, which can be mounted on the right or left side and secures the clamp arm in the end position, even in the case of large and heavy contour blocks

The ALPHA principle

With extremely compact dimensions and the new design of mechanism, the ALPHA Clamp is capable of completely new applications in fixture construction.

ALPHA Plus Compact
Monocoque construction with cylinder and mechanism enclosed in one compact housing

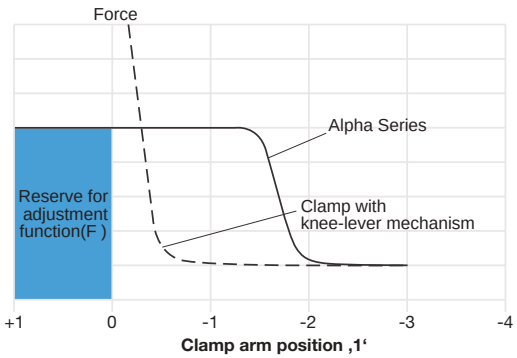
Result: Shorter tool length, lower weight, reduced space in the installation and higher power density.

V 63 Standard Clamp for comparison

APH 63

Cylinder integral with the housing!

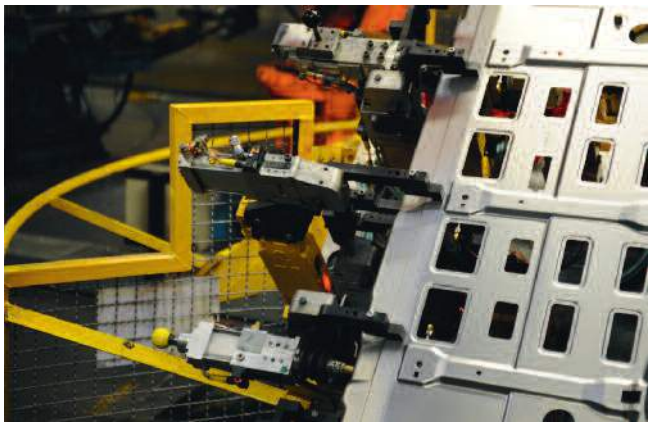
ALPHA Plus curve-drive mechanism
Early-acting clamping force, applied throughout a defined range of angles. The adjustment function-compensates for the negative effects of tolerances, adjusting actions or wear of the contour parts and mechanism with no loss of clamping force. When clamping components with undefined tolerance, such as cast components.



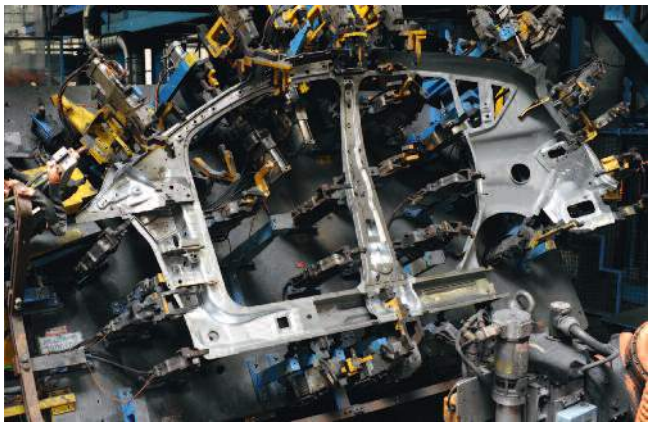
ALPHA for repetitive pressing

The ALPHA Series
– The applied force holding function compensates for variations in components and adjusting actions in the fixture
– Defined and constant clamping force which is applied to the component
– Benefits: when clamping components with undefined surfaces (cast parts) and pressure-sensitive materials (aluminum)

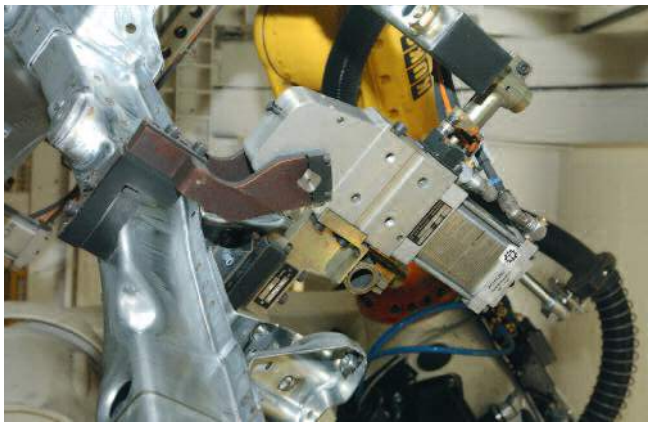
Typical applications



Vario Clamp with lateral arm



Clamping fixture with Vario Clamp for side wall body panel



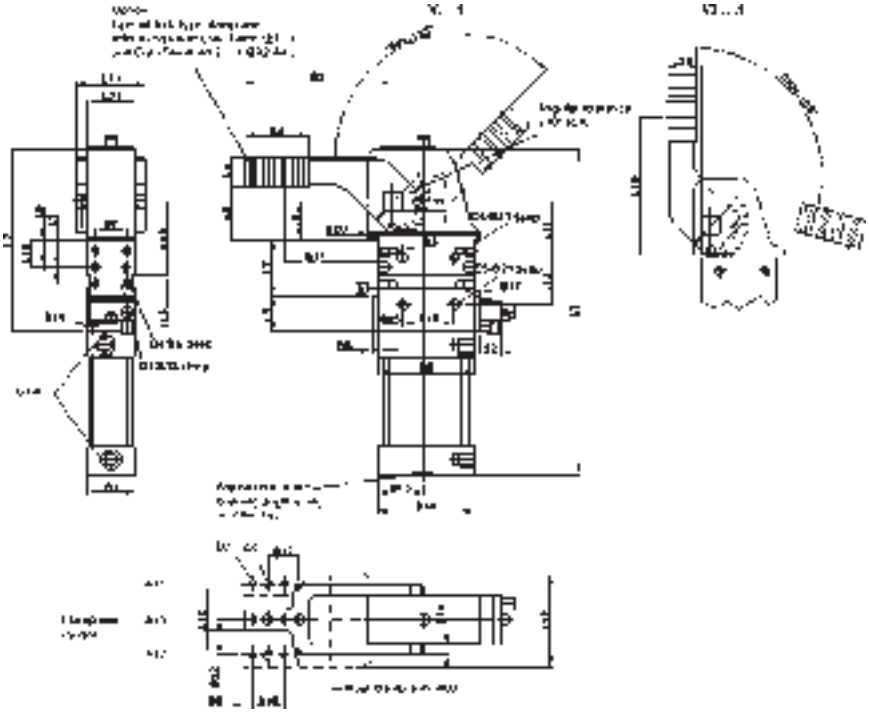
Vario Clamp for positioning side members

Group of clamps with Vario and Alpha Clamps

Detail: Alpha Gripper with contour pressure block

Alpha Clamp fitted to robot gripper

V Series Standard Clamp V/V2... .1 BR2 5-135°



– Vario Clamp with knee-lever mechanism and stepless adjustable opening angle
– Over-centre locking
– Enclosed housing made of aluminum
– Oblong-section cylinder in sizes 50, 63, 80
– Fork-type clamp arm with standard hole pattern for mounting contour blocks
– Opening angle stepless adjustable from 5° to 135°

Optional:
– Inductive sensing, weld-resistant for closed and open positions (T12)

Ordering example:

V 50.1 BR2 A10 T12

→ Position sensing
→ Clamp arm variants
→ Type

Position sensing variants:
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Max. holding torque (Nm)	Clamping torque at 5 bar (Nm)	Piston Ø (mm)	Weight ~ (kg)
V/V2 50.1	800	160	50	3,9
V/V2 63.1	1500	380	63	4,8
V/V2 80.1	2500	800	80	14

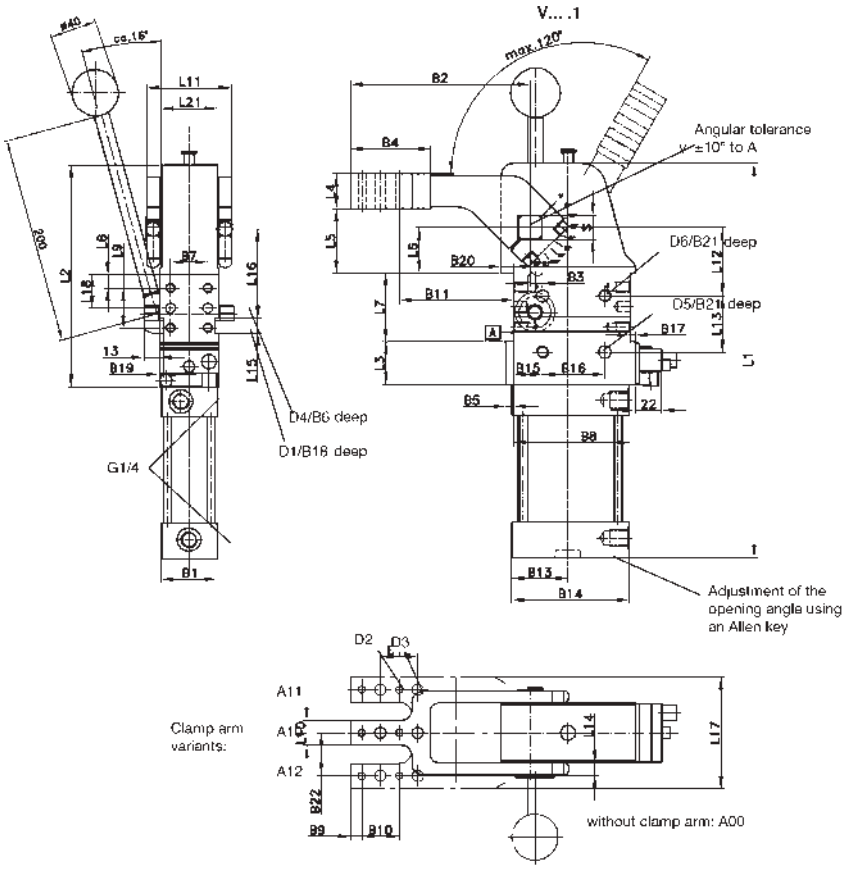
Type	B1	B2	B3 ±0,05	B4	B5	B6	B7*	B8*	B9	B10 ±0,02	B11 ±0,1	B12 ±0,2	B13	B14	B15 ±0,1	B16*	B17	B18	B19	B20	B21	B22 ±0,1	D1
V/V2 50.1	48	144	10	65	6,5	12	30	93	9	30	92	30	47	94	23	50	4,5	12	3,5	10,5	12	34	M8
V/V2 63.1	54	144	10	65	7,5	12	30	93	9	30	92	30	54	106	23	50	7,5	12	3,5	12	12	37	M8
V/V2 80.1	76	179	15	65	8	12	50	134	9	30	119	30	70	140	36	70	8	15	3,5	20	13	50,5	M10

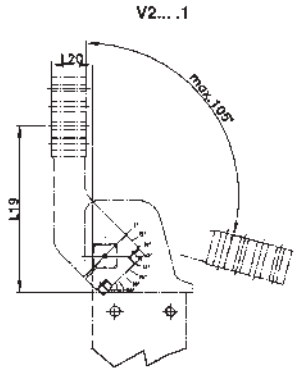
Type	D2 H7	D3	D4 H7	D5 H7	D6	L1	L2	L3	L4 ±0,1	L5 ±0,2	L6 ±0,05	L7 +0,1	L8 ±0,1	L9 ±0,1	L10	L11	L12 ±0,05	L13*	L14 ±0,1	L15 N9	L16 ±0,05	L17	L18 ±0,05
V/V2 50.1	6	9	8	10	M10	321	178	35	28	51,5	36,5	55	11	32	20	68	55	45	10	12	71,5	78	27
V/V2 63.1	6	9	8	10	M10	335	185	35	28	51,5	36,5	55	11	32	20	78	55	45	10	12	71,5	86	27
V/V2 80.1	6	9	8	12	M12	488	270	55	35	70	50	80	15	50	25	108	65	75	12,5	12	96,5	117	40

Type	L19 ±0,1	L20 ±0,2	L21	S h9
V/V2 50.1	141,5	30	45	19
V/V2 63.1	141,5	30	52	22
V/V2 80.1	190	34	74	30

Subject to technical modifications.

V Series Standard Clamp V/V2... .1 BR2 Z 5-120°





- Vario Clamp with hand lever, knee-lever mechanism and stepless adjustable opening angle
- Over-centre locking
- Enclosed housing made of aluminum
- Oblong-section cylinder in sizes 50, 63, 80
- Fork-type clamp arm with standard hole pattern for mounting contour blocks
- Opening angle stepless adjustable from 5° to 120°

Optional:
- Inductive sensing (weld-resistant for closed and open positions (T12))

Ordering example:

V 50.1 BR2 Z A10 T12

- T12 → Position sensing
- A10 → Clamp arm variants
- Z → Manual feed
- V 50.1 BR2 → Type

Position sensing variants:
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	B1	B2	B3 ±0,05	B4	B5	B6	B7*	B8*	B9	B10 ±0,02	B11 ±0,1	B12 ±0,2	B13	B14	B15 ±0,1	B16*	B17	B18	B19	B20	B21	B22 ±0,1	D1
V/V2 50.1	48	144	10	65	6,5	10	30	93	9	30	92	30	47	94	23	50	4,5	11	3,5	10,5	12	34	M8
V/V2 63.1	54	144	10	65	7,5	10	30	93	9	30	92	30	54	106	23	50	7,5	11	3,5	12,5	12	37	M8
V/V2 80.1	76	179	15	65	8	12	50	134	9	30	119	30	70	140	36	70	8	15	3,5	20	13	50,5	M10

Type	D2 H7	D3	D4 H7	D5 H7	D6	L1	L2	L3	L4 ±0,1	L5 ±0,2	L6 ±0,05	L7 +0,1	L8 ±0,1	L9 ±0,1	L10	L11	L12 ±0,05	L13*	L14 ±0,1	L15 N9	L16 ±0,05	L17	L18 ±0,05
V/V2 50.1	6	9	8	10	M10	321	178	35	28	51,5	36,5	55	11	32	20	68	55	45	10	12	71,5	78	27
V/V2 63.1	6	9	8	10	M10	361	211	61	28	51,5	36,5	55	11	32	20	78	55	45	10	12	71,5	86	27
V/V2 80.1	6	9	8	12	M12	486	270	55	35	70	50	80	15	50	25	108	65	75	12,5	12	96,5	117	40

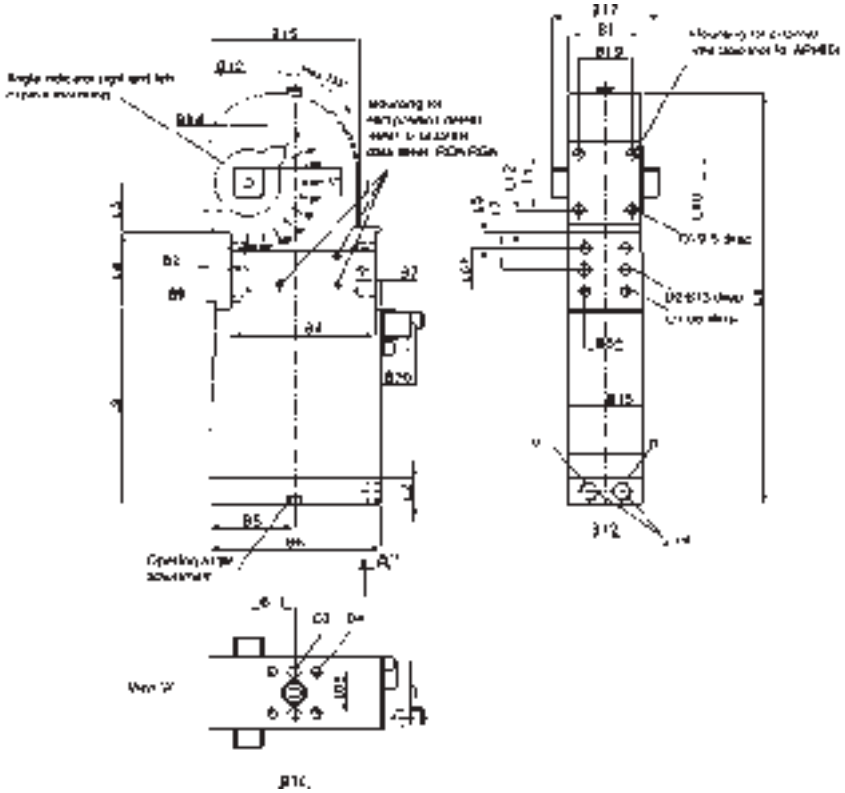
Type	L19 ±0,1	L20 ±0,2	L21	S h9
V/V2 50.1	141,5	30	45	19
V/V2 63.1	141,5	30	52	22
V/V2 80.1	190	34	74	30

Type	Max. holding torque (Nm)	Clamping torque at 5 bar (Nm)	Piston Ø (mm)	Weight (kg)
V/V2 50.1	800	160	50	4,0
V/V2 63.1	1500	380	63	5,2
V/V2 80.1	2500	800	80	17

Subject to technical modifications.

ALPHA Series Standard Clamp APH 50-80 BR5

Drive shaft with angle indicator



- Compact clamp with curve-drive mechanism for constant clamping force and applied force holding
- Enclosed monocoque housing made from aluminum material with integral mechanism and oblong-section cylinder, sizes 50/63/80
- Fork-type clamp arm with standard hole pattern for mounting contour blocks
- Opening angle stepless adjustable from 15° to 135°
  80 Ø T12 – 30 to 135°
  80 Ø T60 – 60 to 135°
- Pneumatic end position damping

Optional:
- Inductive sensing (weld-resistant for closed and open positions (T12))
- Pneumatic locking of the end positions (V+R setting) (H)
- Hand lever (Z)

Subject to technical modifications.

Ordering example:

APH 50 H A00-K00 T12
- T12 → Position sensing
- K00 → Clamp arm variants
- H → pneumatic locking
- 50 → Piston Ø
- APH → Type

Order code TÜNKERS position sensing systems:

...T12 24 V inductive position sensing, 1 output with integrated LEDs, insulated as per DIN VDE 0100

Please note!

External flow control valves must be fitted during assembly.

Type	Max. holding torque (Nm)	Clamping torque at 5 bar (Nm)	Piston Ø (mm)	Weight (kg)
APH 50	800	200	50	3,3
APH 63	1500	400	63	4,1
APH 80	2500	800	80	11,5

Type	B1	B2 ±0,05	B3*	B4 ±0,1	B5	B6	B8	B9	B10 ±0,1	B11 ±0,05	B12	B13	B14	B15
APH 50	45	11	30	98	54,5	112	3	11	6	32	30,5	24	10	13
APH 63	52	15	30	105	61,5	124	4	11	10	32	33,5	24	10	13
APH 80	74	20	50	143	78	153	5	15	5	50	52	40	12	21

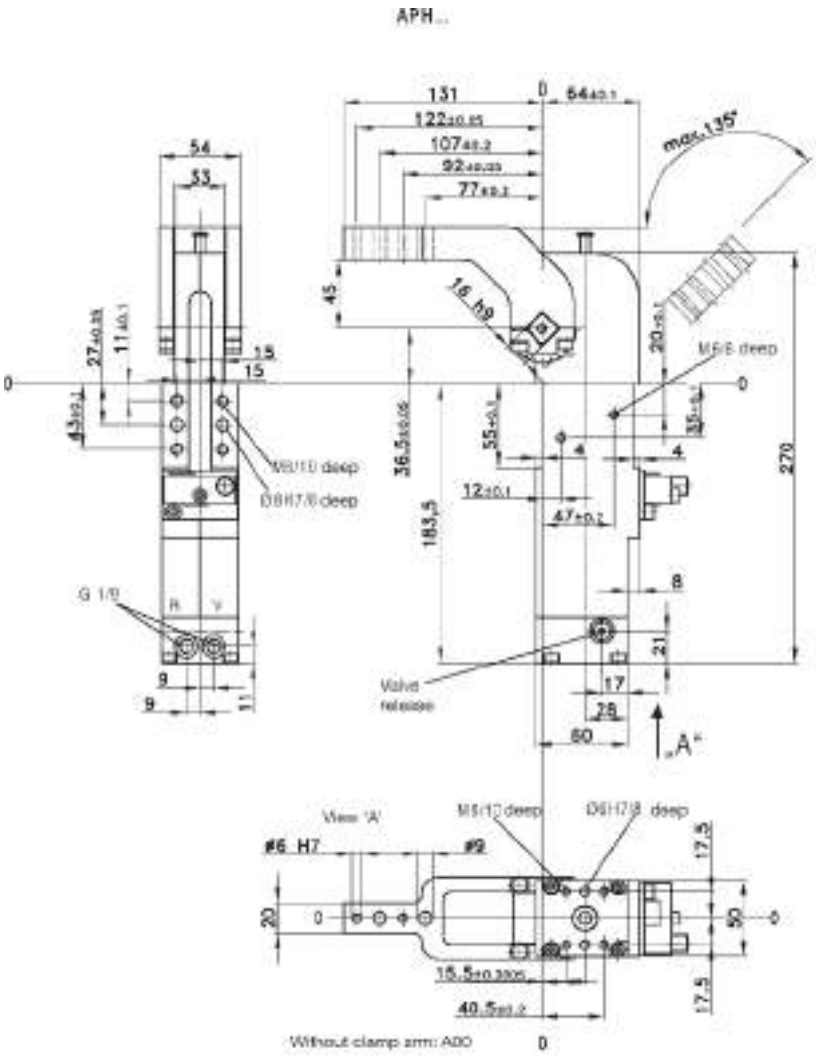
Type	B16	B17	B18	B19 ±0,1	B20	D1	D2 H7	D3 H7	D4	D5	~L1	L2	L3 ±0,05	L4 +0,1
APH 50	99	48	69	22	26	M8	8	8	M8	M8	286	18	36,5	55
APH 63	108,5	54	79	25,5	26	M8	8	8	M8	M8	299	18	36,5	55
APH 80	152	76	108	-	26	M10	8	8	M10	-	440	27	50	80

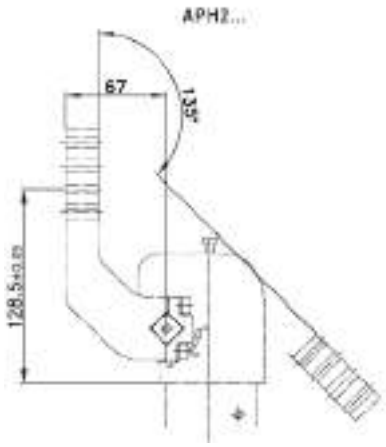
Type	L5 ±0,1	L6*	L7 ±0,05	L8*	L9	L10 ±0,1	L11 ±0,1	L12 ±0,1	S
APH 50	11	32	27	30	133	20	35,5	21	19
APH 63	11	32	27	30	142	20,5	40,5	16,5	22
APH 80	15	50	40	50	210	-	-	-	30

ALPHA Series Standard Clamp APH 40.5 H BR2 A60

- Compact clamp with curve-driven mechanism for constant clamping force and applied force holding
- Enclosed monocoque housing made from aluminum material
- Fork-type clamp arm with standard hole pattern for mounting contour blocks
- Cylinder size 40 mm dia.
- Opening angle adjustable from 5° to 135°
- Pneumatic locking of the end positions

Optional:
- Inductive sensing (weld-resistant for closed and open positions (T12))





Ordering example:

APH 40.5 H BR2 A60 T12

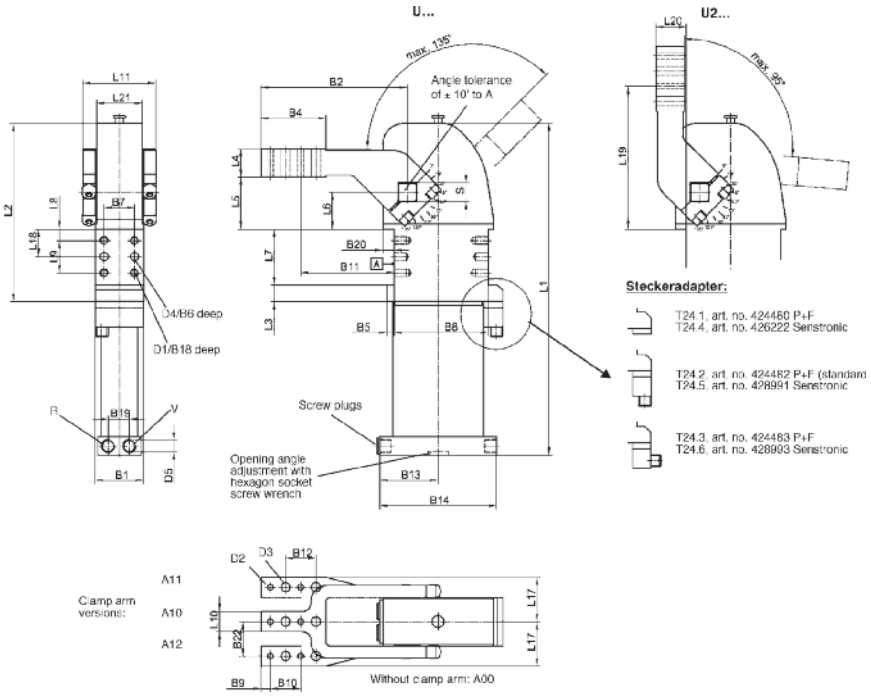
- APH → Type
- 40.5 → Piston Ø
- H → pneumatic self-locking
- BR2 → Arm and jaw with clamping screws
- A60 → Position sensing
- T12

Order code TÜNKERS
Position sensing:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs, insulated as per DIN VDE 0100

Please note!
External flow control valves must be fitted during assembly.

Type	Max. holding torque (Nm)	Clamping torque at 5 bar (Nm)	Piston Ø (mm)	Weight (kg)
APH 40.5	380	120	40	2,4

Subject to technical modifications.



Patented

- New standard series
- Universal clamp with force-optimised knee-lever mechanism
- Compressed air consumption reduced by approx. 30% by using smaller cylinder diameters of 50, 63, 80 mm
- Optional weld protection using Gliss coating
- Both pneumatic connections in the base plate

Position sensing variants:
...T24.1/.4 Without plug adapter
...T24.2/.5 With straight plu adapter (standard)
...T24.3/.6 With plug adapter 90° angle

Opening angle:
Stepless adjustable in the range of 5° to 135° (type U 50/63), 10° to 135° (type U 80)

Ordering example:

U 50 W A10 T24.2
- T24.2 → Position sensing
- A10 → Clamp arm variants
- W → On request: Weld spatter-resistant coating for the housing
- U 50 → Type

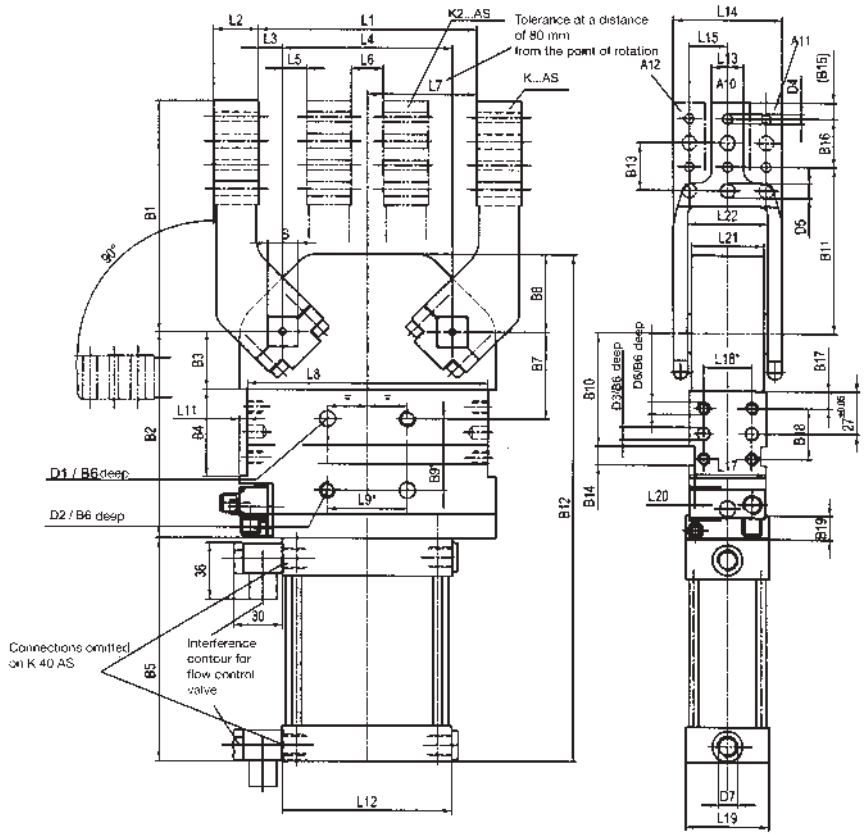
Type	Max. holding torque (Nm)	Clamping torque at 5 bar (Nm)	Weight ~ (kg)
U/U2 50	800	160	3,5
U/U2 63	1500	360	4,8
U/U2 80	2500	800	11,6

Type	B1	B2	B4	B5	B6	B7*	B8 ±0,1	B9	B10 ±0,02	B11 ±0,1	B12 ±0,1	B13	B14	B18	B19	B20	B22 ±0,1	D1	D2 H7	D3	D4	D5	L1
U/U2 50	48	144	65	6,5	12	30	93	9	30	92	30	41	82	12	19,5	10,5	34	M8	6	9	8	G 1/8	286
U/U2 63	48	144	65	7	12	30	93	9	30	92	30	57,5	115	12	21	11	37	M8	6	9	8	G 1/4	329
U/U2 80	68	179	65	8	12	50	134	9	30	119	30	67,5	135	15	24	20	50,5	M10	6	9	8	G 1/4	473

Type	L2	L3	L4 ±0,1	L5 ±0,2	L6 ±0,05	L7 +0,1	L8 ±0,1	L9 ±0,1	L10	L11	L17	L18 ±0,05	L19	L20 ±0,2	L21	S h9
U/U2 50	166	16,5	28	51,5	36,5	55	11	32	20	69	34,5	27	141,5	30	45	19
U/U2 63	175	16,5	28	51,5	36,5	55	11	32	20	79	39,5	27	141,5	30	48	22
U/U2 80	257	29	35	70	50	80	15	50	25	108	63	40	190	35	65	30

Subject to technical modifications.

Standard Clamp Dual-Arm Clamp K...AS



- Compact clamp with knee-lever mechanism for powering two clamp arms
- Over-centre locking
- Enclosed housing made from aluminum material
- Oblong-section cylinder, size Ø 40, 63
- Two fork-type clamp arms with standard hole pattern for mounting one contour block in each clamp
- Opening angle max. 2 x 90°

Optional:
- Inductive sensing (weld-resistant for closed and open positions)

Ordering example:

K 40 AS A10 T12
- T12 → Position sensing system
- A10 → Clamp arm variants
- K 40 AS → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Clamping force at 6 bar (N)	Piston Ø (mm)	Weight (kg)
K 40 AS	550	40	3,5
K 63 AS	1000	63	5,8

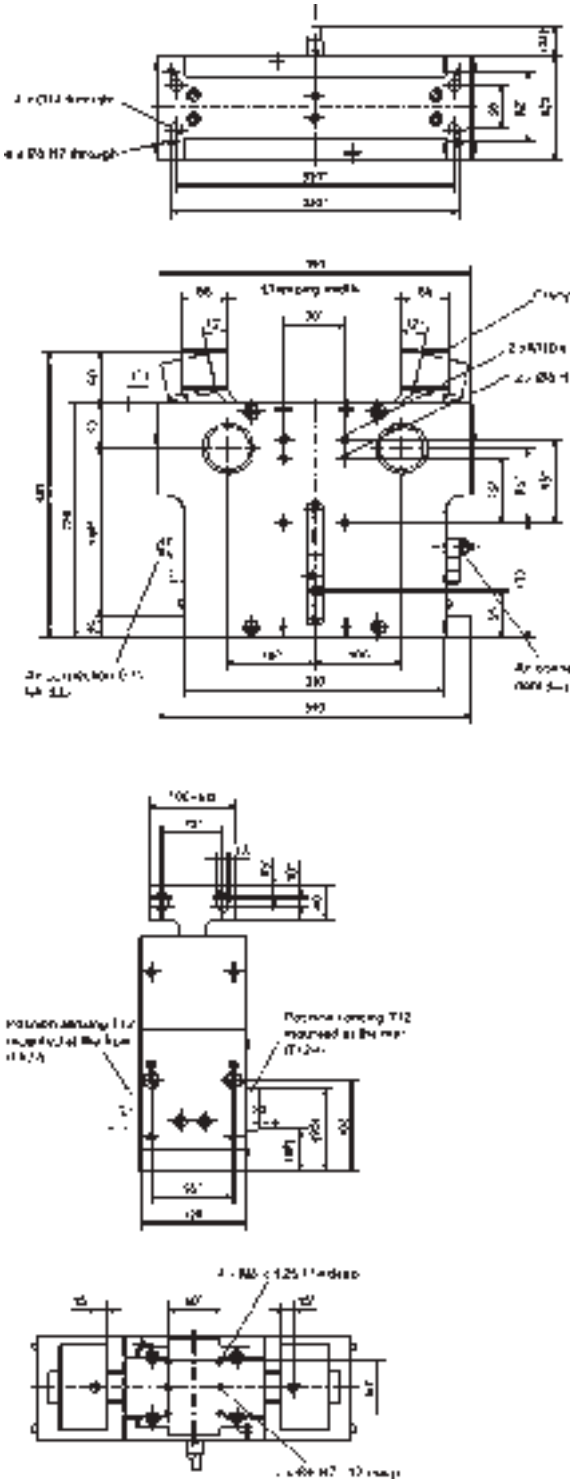
Type	B1	B2	B3 ±0,1	B4 +0,1	B5	B6	B7 ±0,05	B8	B9*	B10 ±0,05	B11 ±0,1	B12	B13 ±0,2	B14 N9	B15	B16 ±0,02	B17 ±0,1	B18 ±0,1	B19	D1 H7	D2 ±0,1	D3	D4
K 40 AS	110	97	38	55	125	11	50	38	25	58,5	84	260	20	8	6	20	11	32	-	6	M6	8	6
K 63 AS	144	130	36,5	55	140	12	55	49	45	71,5	105	319	30	12	9	30	11	32	15	10	M10	8	6

Type	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7 ±0,2	L8	L9*	L11	L12	L13	L14	L15 ±0,05	L17	L18*	L19	L20	L21	L22
K 40 AS	7	M8	G1/4	93	19	10	73	10	15	46,5	107	35	5	70	15	55	20	47	30	36	3	34	36
K 63 AS	9	M8	G1/4	136	28	15	106	15	20	68	150	50	5	106	20	68	34	48	30	52	3,5	45	50

Type	S
K 40 AS	11
K 63 AS	19

Subject to technical modifications.

- Dual-arm clamp with a clamping force of more than 20,000 N
- Toggle locked end position
- 2 functions in one clamp:
  - internally-adjustable limit stop for precise positioning
  - external preloading for difficult clamping processes
- Fully enclosed steel construction for harsh operating conditions
- Integrated end position sensing



Ordering example:

HD 100 AS A10-200 T12V LR SB

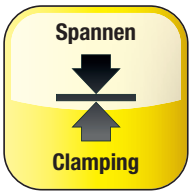
- HD → Type
- 100 → Piston Ø
- AS → Dual arm
- A10-200 → Clamp arm variants (Standard)
- T12V → Position sensing system at the front (T12H = at the rear)
- LR → Right-hand air connection (LL = Left hand)
- SB → Optional: Protective panel

Type	Clamping force at 5 bar (N)	Operating pressure with oil-free air (bar)	Maximum pressure with oil-free air (bar)	Mounting (G)	Opening and closing time (approx. sec.)	Weight ~ (kg)
HD 100 AS	20000	5	6	1/4	1	55,0

Subject to technical modifications.

CLAMPING

Electric Clamps



TÜNKERS®
Ingenuity in series.

24V DC electric series

Electric clamps are compatible alternatives to pneumatic clamps. Prompted by the safety concept in factories, they are powered by a conventional direct current motor with extra-low voltage protection. In combination with an exceptionally robust trapezoidal thread spindle, the electrically-driven clamp, with virtually similar dimensions, is an extremely compact and, at the same time, robust equivalent to the current compressed air standard.

System configuration – Electric clamps

TM 8 stand-alone motor control panel to drive up to 8 clamps, together with position sensing with 8 component sensors

Electric clamps with energy saving potential

The table below shows the energy consumption of a standard pneumatic clamp with a cylinder diameter of 50 mm, compared with its electrically-driven equivalent.

The basis is a clamp with a throat depth of 100 mm, an operating pressure of 6 bar and a 3-metre compressed air hose with an inside diameter of 10 mm.

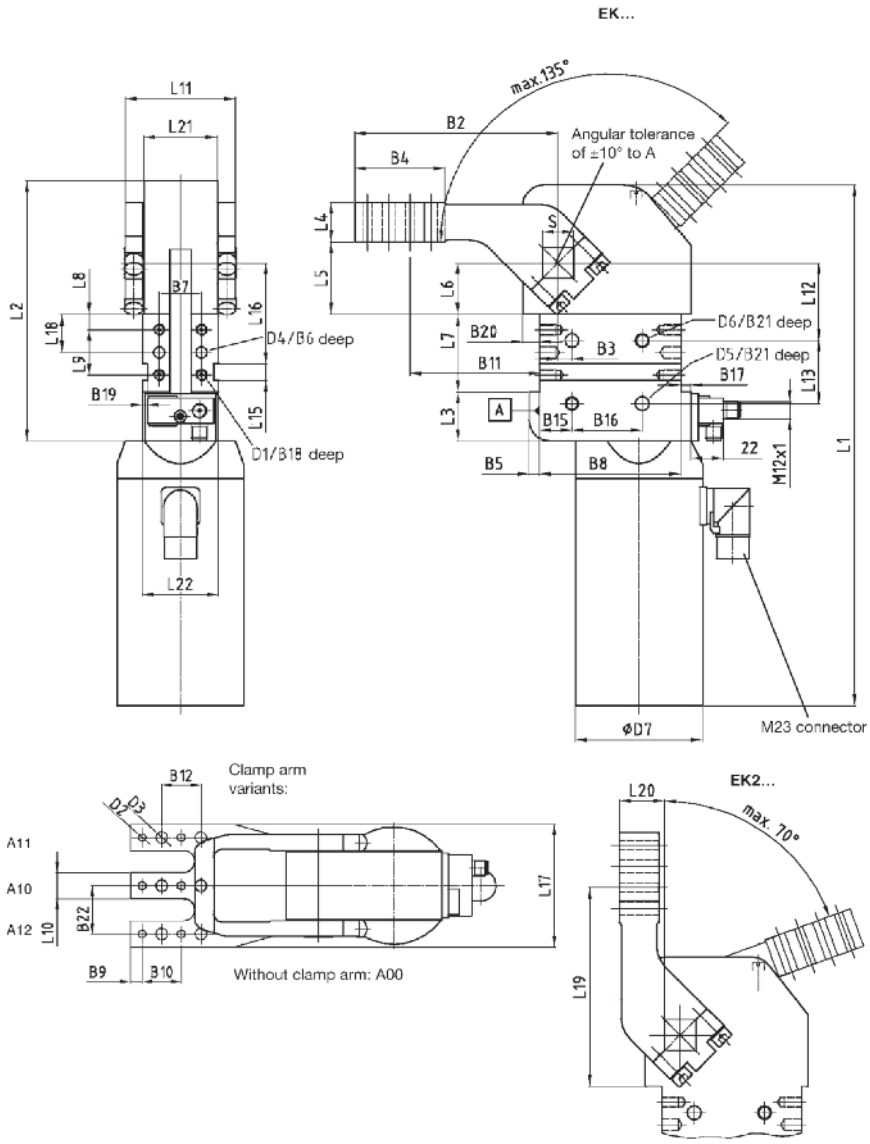
The table shows the values for energy consumption, CO2 emissions and the operating costs for 1,000 cycles per day, per year and over a project duration of 8 cycles.

Comparison between pneumatic and electric clamps

50er Series; 135° Opening angle	Pneumatic clamp (V)	Electrically-driven clamp (EK)
	Single clamp	Single clamp
Energy consumption (at 6 bar)	**[l]**	**[kWh]**
Energy consumption (l or kWh) (cycle)	1,71	0,00003
Energy consumption (cycle) clamping station incl. compressed air feed hose (3m) >> 1,8 l	3,52	/
Energy consumption (0,13 kWh/m³)	**[kWh]**	**[kWh]**
per day (1.000 cycles per day)	0,46	0,03
per year (250 day)	114	7,50
during the project (8 year)	915	60
CO2 emissions (600 g/kWh)	**[kg]**	**[kg]**
per day (1.000 cycles per day)	0,27	0,02
per year (250 day)	69	4,5
during the project (8 year)	549	36

Electrically-driven Clamp EK...

- Electrically-driven clamp with integrated knee-lever mechanism
- Inductive sensing, weld-resistant for open/closed position
- Housing and principal dimensions compatible with the pneumatic series
- Powered by a 24 V direct current motor
- Opening angle infinitely adjustable in the range 5 to 135°



Ordering example:

EK 50 A10 T12 135°

- 135° → Opening angle
- T12 → Position sensing system
- A10 → dependent on Piston Ø
- EK 50 → Type

Order code TÜNKERS position sensing systems:
...T12 24 V inductive position sensing, 1 output with integral LEDs

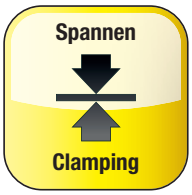
Please note!
Tünkers drive variants required for operation.

Type	Clamping torque at 5 bar (Nm)	Max. holding torque (Nm)	Operating voltage (V)	Dimensions (l x w x d) (mm)	Weight (kg)
EK 25	25	75	24	212x52x70	1,5
EK 40/40.5	120	200	24	306,9x95x54	3,15
EK 50	160	800	24	328,5x111x68	4,3
EK 63	380	1500	24	370x118,5x78	7,3
EK 80	800	2500	24	485x110x185	15

Subject to technical modifications.

CLAMPING

Pin Clamps



TÜNKERS®
Ingenuity in series.

Competence with Underbody Clamping Technology

Hook clamps, UZ clamps or underbody clamps – many terms are used to describe this special clamping technology, particularly when used for clamping the complete underbody subassembly. In this case, the components are usually positioned on four to eight underbody clamps with the aid of a centring pin and clamped by means of a centring pin located in the hook. With this integrated configuration, in which the two functions – clamping and centring – are combined in one product, underbody clamps are also suitable for use as compact gripping tools in robotic gripper systems. For the reproducible clamping of high-strength steels and aluminum components, we can devise special underbody clamping concepts with compatible, surface-treated centring pins.

Greater flexibility with the ALPHA curve-driven mechanism

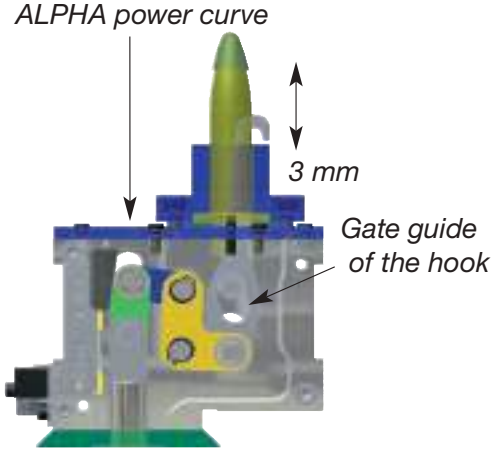
– The ALPHA curve-driven mechanism compensates variations in the part (e.g. in the case of casting materials) and is also suitable for clamping multiple models, with the cycling function (3 mm and higher).

– Clamping hook motion with optimum displacement profile, e.g. in the case of collar punches.

– Oblong-section cylinder for a totally slim tool profile.

– Locking solutions:
a. Mechanical braking system for a secure stop position of the clamped setting
b. Pneumatic back-pressure valve, which retains the air in the cylinder in the event of a loss of pressure.

APH-pin clamps with 3 mm power stroke



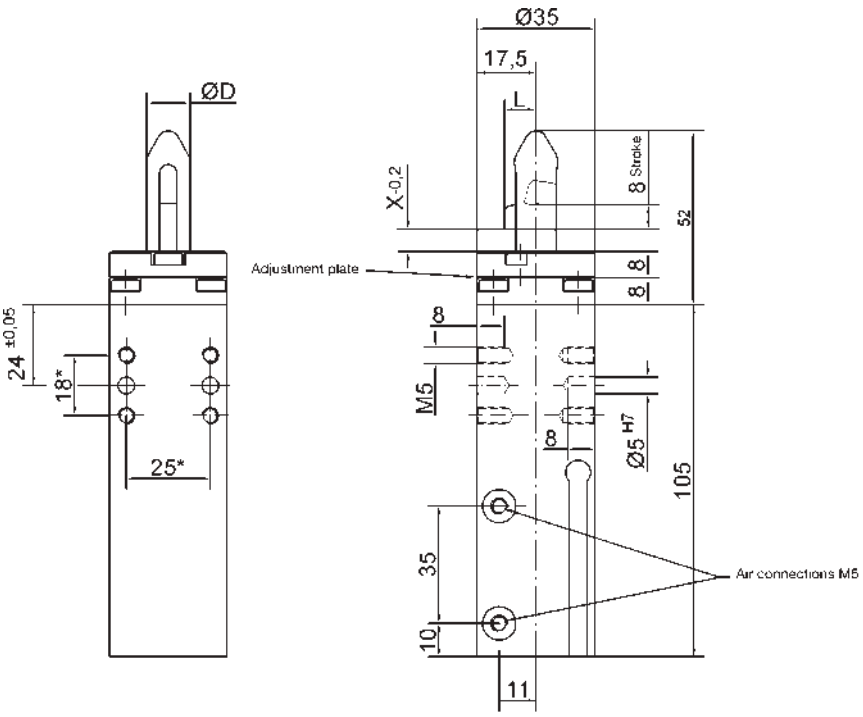
APH 60 FUZ B
with mechanical locking

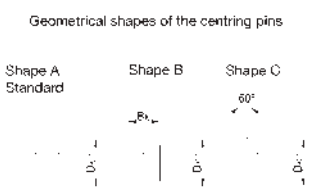
APH 60 FUZ H
with pneumatic holding valve

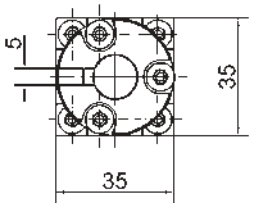
Typical applications

Underbody clamp for mounting the floor after the roller conveyor has been lowered

Underbody clamp with fitted and positioned floor assembly







- Underbody clamp for centring and clamping in workpiece opening
- Centring fitting produced to specifications, with a diameter of 10 to 16 mm
- Clamping hooks with gate guide, powered by the pneumatic cylinder integral with the housing
- Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides

Optional:
- Position sensing (weld-resistant for the closed and open positions (T03, T23))

Ordering example:

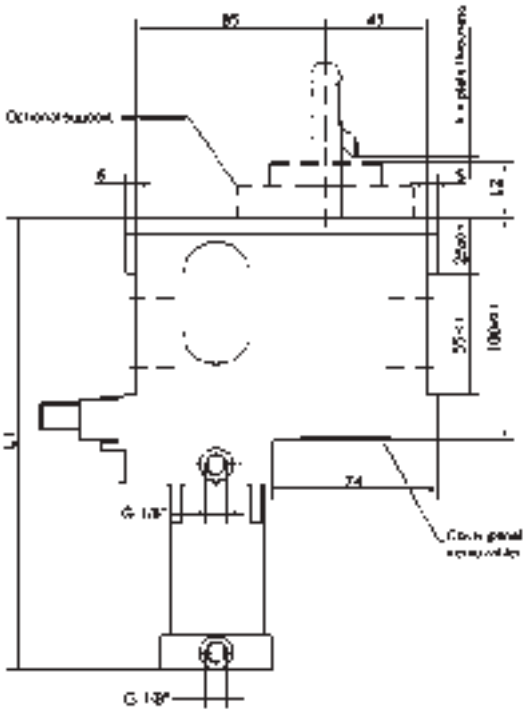
K 25 UZ T03 A 13 1,5
- 1,5 → Plate thickness 'X'
- 13 → Pin diameter 'D'
- A → Pin shape
- T03 → Position sensing system
- K 25 UZ → Type

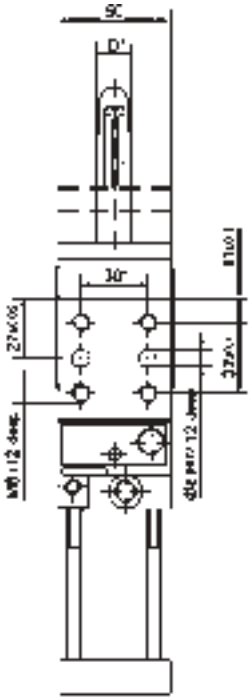
Order code TÜNKERS position sensing systems:
...T03 Magnetic position sensing, prepared for position sensing
...T23 Magnetic position sensing, incl. 2 magnetic switches mounted on the clamp

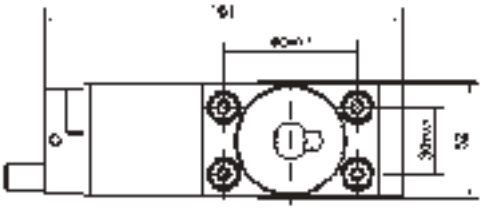
Type	Max. holding force (N)	Clamping force (N)	Weight (kg)
K 25 UZ	160	160	0,9

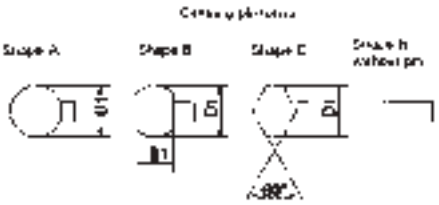
Subject to technical modifications.

Pin Clamp K 32 UZ









– Underbody clamp for centring and clamping in workpiece opening
– Centring pin with a diameter of 20 to 40 mm
– Clamping hook powered by the pneumatic cylinder by means of a knee-lever mechanism
– Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides

Optional:
– Inductive sensing (weld-resistant for the closed and open positions (T12))

Typical sensing mechanism:

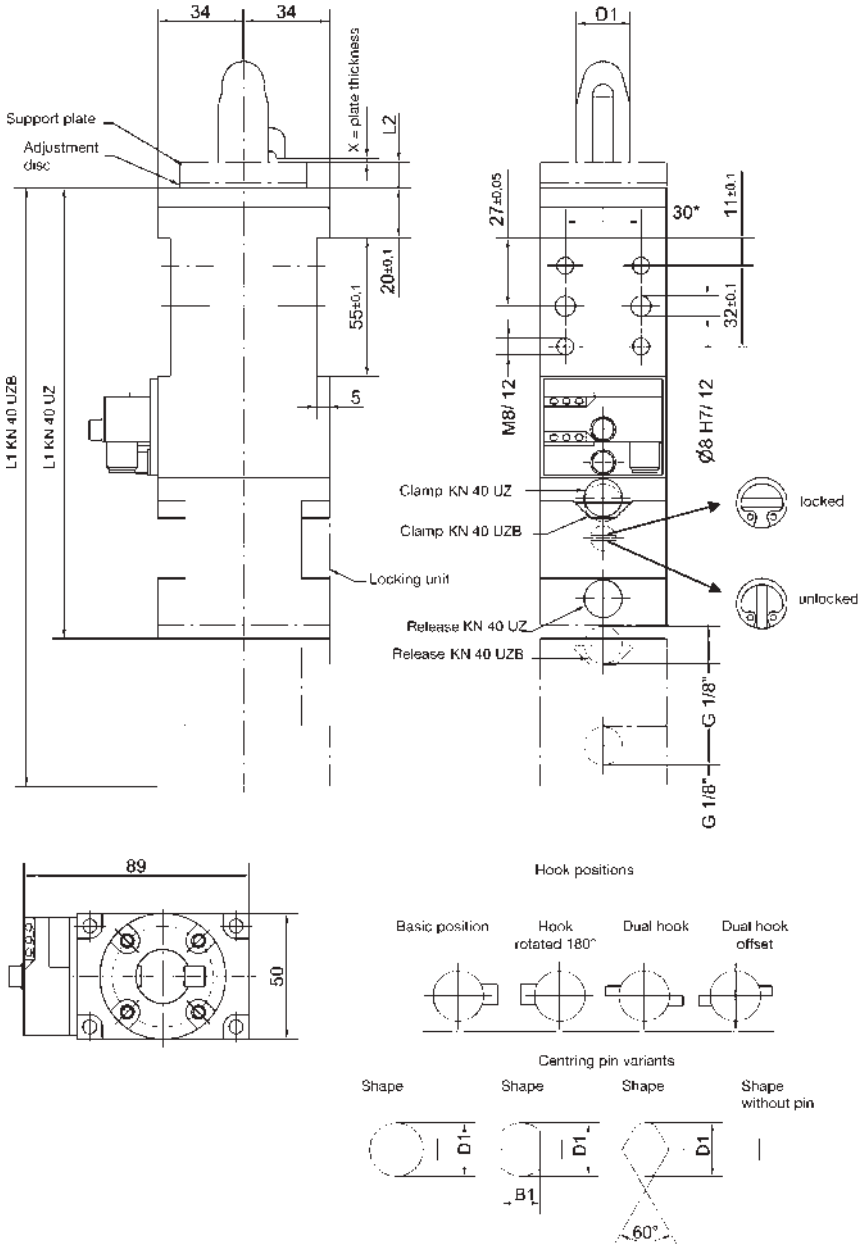
K 32 UZ A 30 45 T12 X=4,2

- X=4,2 → Plate thickness X
- T12 → Position sensing system
- 45 → Support height L2
- 30 → Pin diameter D1
- A → Centring pin variants
- K 32 UZ → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Max. holding force (N)	Clamping force at 6 bar (N)	Weight (kg)	L1
K 32 UZ	2500	1800	2,4	203

Subject to technical modifications.



- Underbody clamp for centring and clamping in workpiece opening
- Centring fitting produced to specifications, with a diameter of 15 to 40 mm
- Single or dual clamping hook with gate guide, powered by pneumatic cylinder integral with the housing
- Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides

Optional:
- Inductive sensing (weld-resistant for the closed and open positions (T12))
- Locking unit for locking the clamping position in the open and closed position

Typical sensing mechanism:

K 40 UZ 1 A 30 45 T12 X=4,2

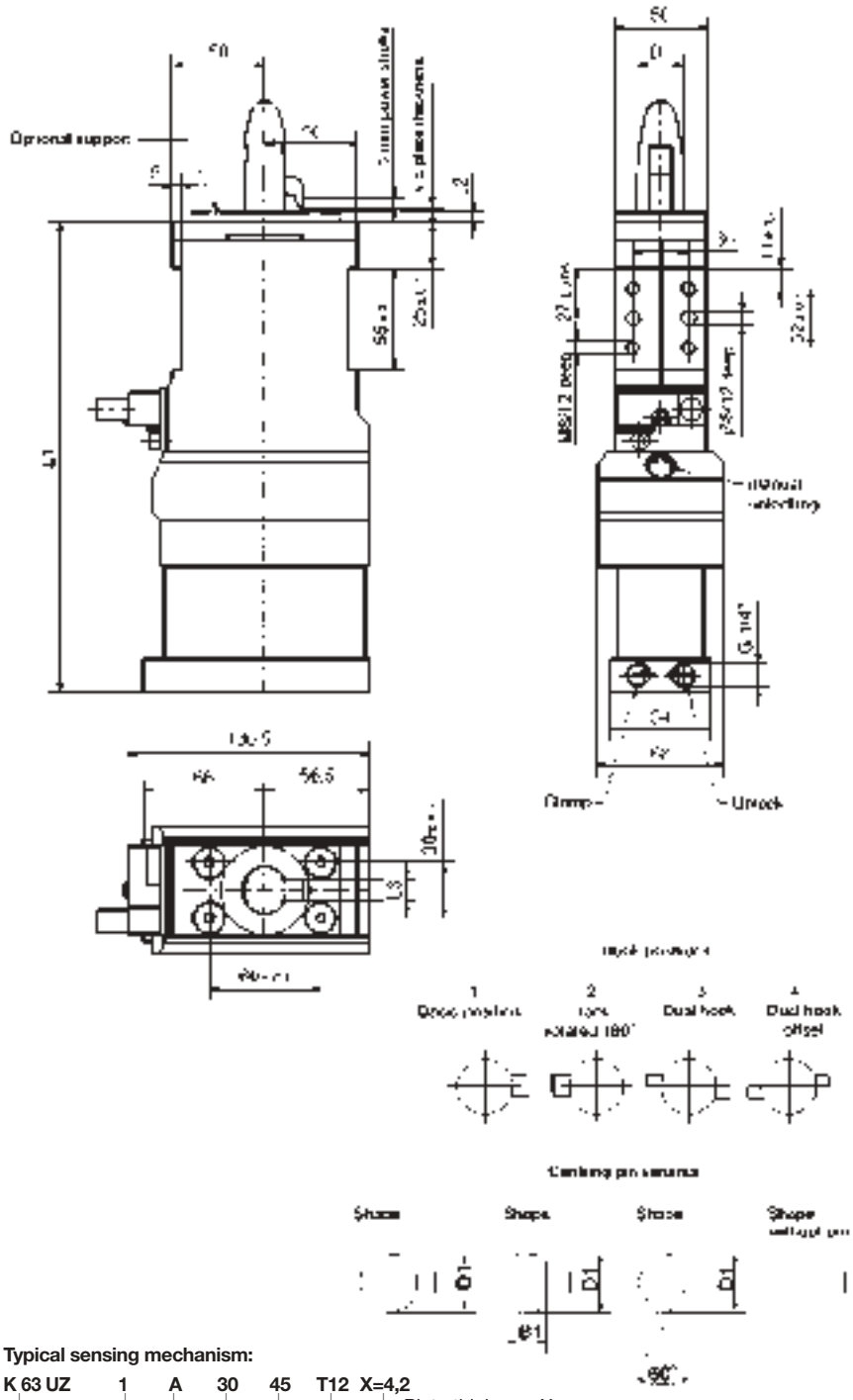
- X=4,2 → Plate thickness X
- T12 → Position sensing system
- 45 → Support height L2
- 30 → Pin diameter D1
- A → Pin shape
- 1 → Hook position
- K 40 UZ → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Max. holding force (N)	Clamping force (N)	Weight (kg)	L1
KN 40 UZ	500	500	2,3	179
KN 40 UZB	1000	500	2,8	238

Subject to technical modifications.

Pin Clamp K 63 UZ



– Underbody clamp for centring and clamping in workpiece opening
– Clamping function with plate thickness compensation
– Centring pin with a diameter of 20 to 40 mm
– Single or dual clamping hook with gate guide, powered by pneumatic cylinder integral with the housing
– Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides

Optional:
– Inductive sensing (weld-resistant for the closed and open positions (T12))
– H: Pneumatic self-locking
– B: Mechanical piston rod locking

Typical sensing mechanism:

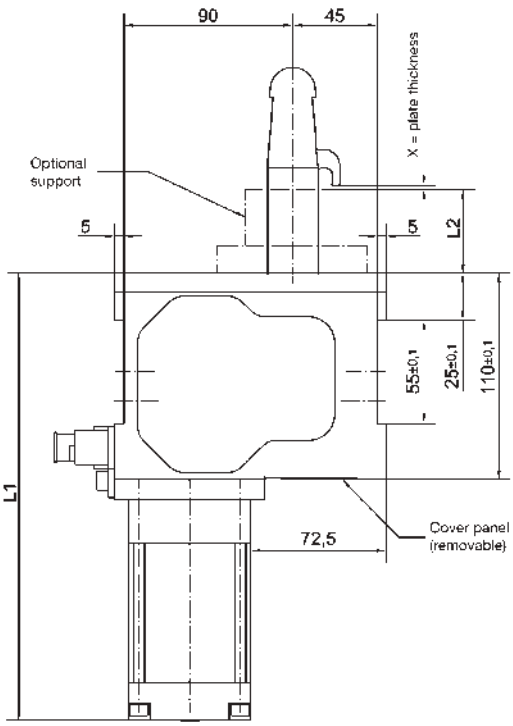
K 63 UZ 1 A 30 45 T12 X=4,2

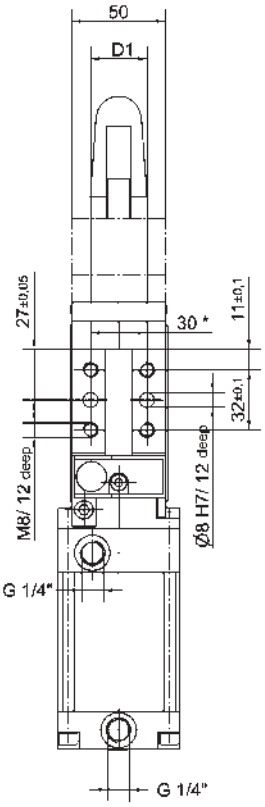
- X=4,2 → Plate thickness X
- T12 → Position sensing system
- 45 → Support height L2
- 30 → Pin diameter D1
- A → Centring pin variants
- 1 → Hook position
- K 63 UZ → Type

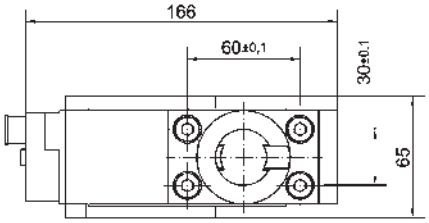
Order code TÜNKERS position sensing system:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

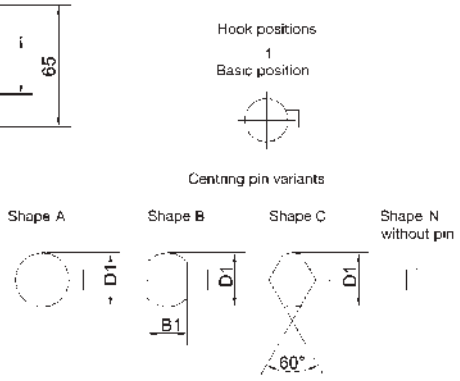
Type	Max. holding force (N)	Clamping force (N)	Weight (kg)	L1
K 63 UZ	1200	1200	4,2	208
K 63 UZB	1200	1200	4,8	254
K 63 UZH	1200	1200	4,4	218

Subject to technical modifications.









- Underbody clamp for centring and clamping in workpiece opening
- Centring pin with a diameter of 20 to 40 mm
- Clamping hook powered by the pneumatic cylinder by means of a knee-lever mechanism
- Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides

Optional:
- Inductive sensing (weld-resistant for the closed and open positions (T12))

Typical sensing mechanism:

K 60 UZ 1 A 30 45 T12 X=4,2
- X=4,2 → Plate thickness X
- T12 → Position sensing system
- 45 → Support height L2
- 30 → Pin diameter D1
- A → Centring pin variants
- 1 → Hook position
- K 60 UZ → Type

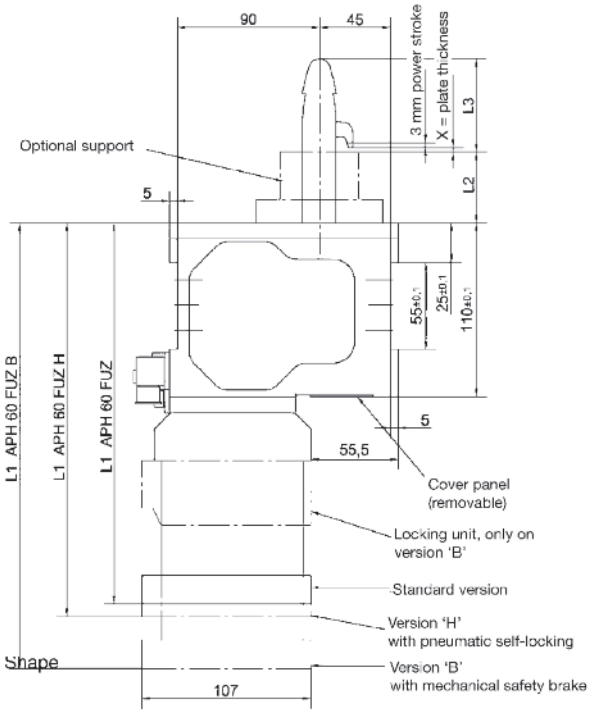
Order code TÜNKERS position sensing system:
...T00 without position sensing system
...T12 24 V inductive position sensing, 1 output with integral LEDs

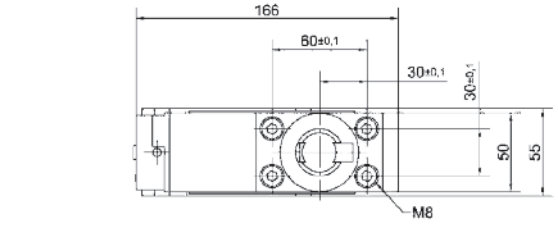
Type	Max. holding force (N)	Clamping force (N) at 6 bar	Weight (kg)	L1
K 60 UZ	3800	3300	5,2	238

Subject to technical modifications.

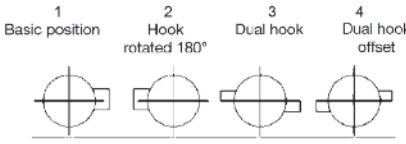
Pin Clamp APH 60 FUZ...

- Underbody clamp for centring and clamping in workpiece opening
- Applied force retention with 3 mm power stroke
- Enclosed housing, made of aluminum and with mounting hole patterns on the right and left sides
- Inductive sensing (weld-resistant for the open and closed positions (T12))
- Optional mechanical locking (B) or pneumatic self-locking (H)

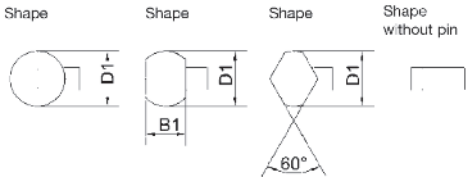




Hook positions



Centring pin variants



Typical sensing mechanism:

APH 60 FUZ 1 A 30 45 T12 X=4,2

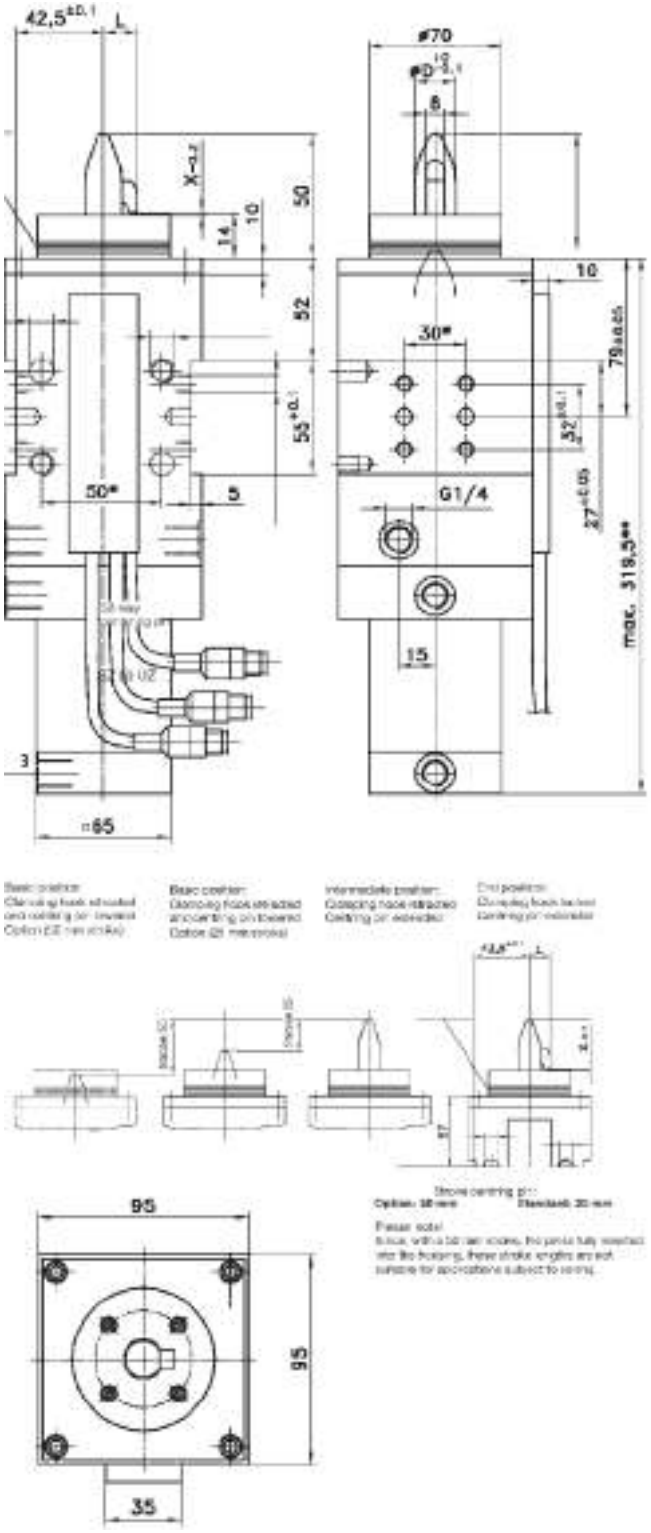
- T12 → Plate thickness X
- T12 → Position sensing system
- 45 → Support height L2
- 30 → Pin diameter D1
- A → Centring pin variants
- 1 → Hook position
- APH 60 FUZ → Type

Type	Clamping force at 6 bar (N)	Max. holding force (N)	Dimensions (l x w x d) (mm)	Weight (kg)
APH 60 FUZ	2800	2800	235x145x50	4,6
APH 60 FUZB	2800	2800	283x145x50	4,8
APH 60 FUZH	2800	2800	243x145x50	4,6

Subject to technical modifications.

Order code TÜNKERS position sensing system:
...T00 without position sensing system
...T12 24 V inductive position sensing, 1 output with integral LEDs

- Underbody clamp for centring and clamping in workpiece opening
- Additional lowering function for the centring pin, in order to release the workpiece prior to removal
- With lighter-weight materials such as aluminum, distortion is prevented when the workpiece is lifted out
- Power supplied to the clamp hook and lowering/with drawing function via a separate pneumatic cylinder
- Optionally with one or two clamping hooks
- 15 to 35 mm dia. centring pin
- Inductive sensing for every working position



Typical sensing mechanism:

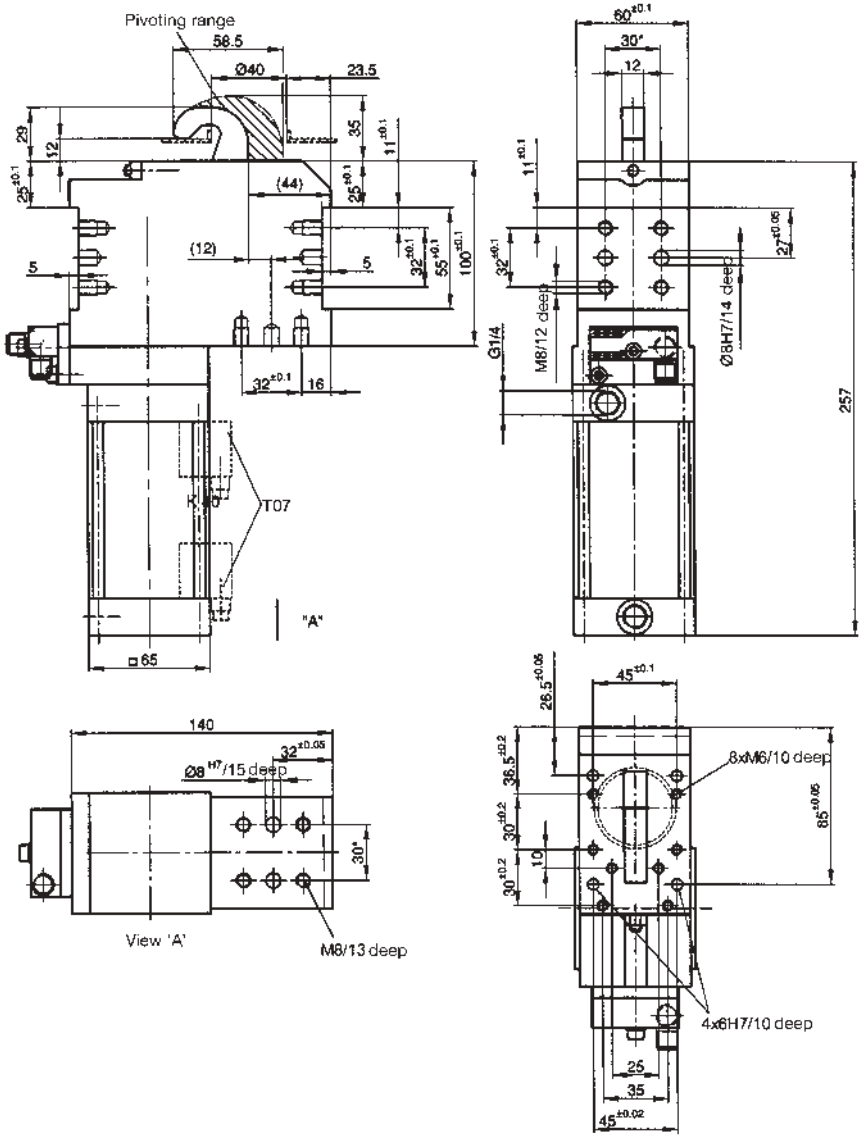
SZ 50 UZ **25** **T31** **D** **X**
- X → Material thickness
- D → Pin diameter
- T31 → Position sensing system
- 25 → Stroke (Option: 50 mm)
- SZ 50 UZ → Type

Order code, TÜNKERS position sensing system:
...T31 Inductive sensing, 3 outputs

Type	Clamping force at 6 bar (N)	Max. holding force (N)	Dimensions (l x w x d) (mm)	Weight (kg)
SZ 50 UZ	3000	3800	319,5x95x95	7,5

Subject to technical modifications.

Pin Clamp K 60 U



– Underbody clamp with fully-retractable clamping hooks for clamping in component opening
– Clamping hook powered by a pneumatic cylinder acting on the knee-lever mechanism
– Over-centre position locked
– Enclosed housing in the aluminum version, with mounting hole patterns on the right and left sides

Optional:
– Inductive sensing (weld-resistant for the closed and open positions (T12))

Typical sensing mechanism:

K 60 U **T12**
- T12 → Position sensing
- K 60 U → Type

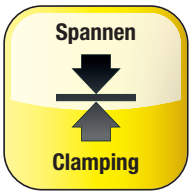
Order code TÜNKERS position sensing systems:
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Clamping force at 6 bar (N)	Holding force (N)	Operating pressure (bar)	Piston diameter (mm)	Weight (kg)
K 60 U	3300	3300	max. 8	60	3,5

Subject to technical modifications.

CLAMPING

Swivel Units



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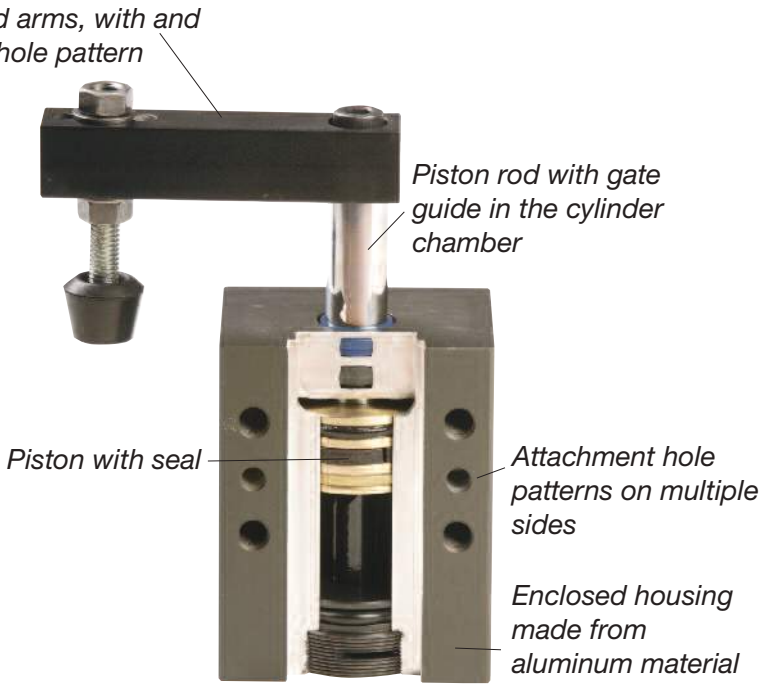
Ingenuity in series.

Swivel Units

The clamp arm or gripper arm of the pivoting clamp is attached directly to the piston rod of the dual-acting pneumatic cylinder. With the stroke movement, the piston rod is rotated by 90° into a gate guide. The clamp arm moves by a corresponding distance from the clamping position and releases the workpiece. Space-saving clamping concept with low mounting height. The clamping force corresponds to the cylinder force. By virtue of the centralised location of the piston rod, the maximum possible length of the clamp arm is limited. The pneumatic pivoting clamp is available as a modular unit and screw-in version.

System configuration



Alternative versions

TÜNKERS Swivel Units are available in two versions:

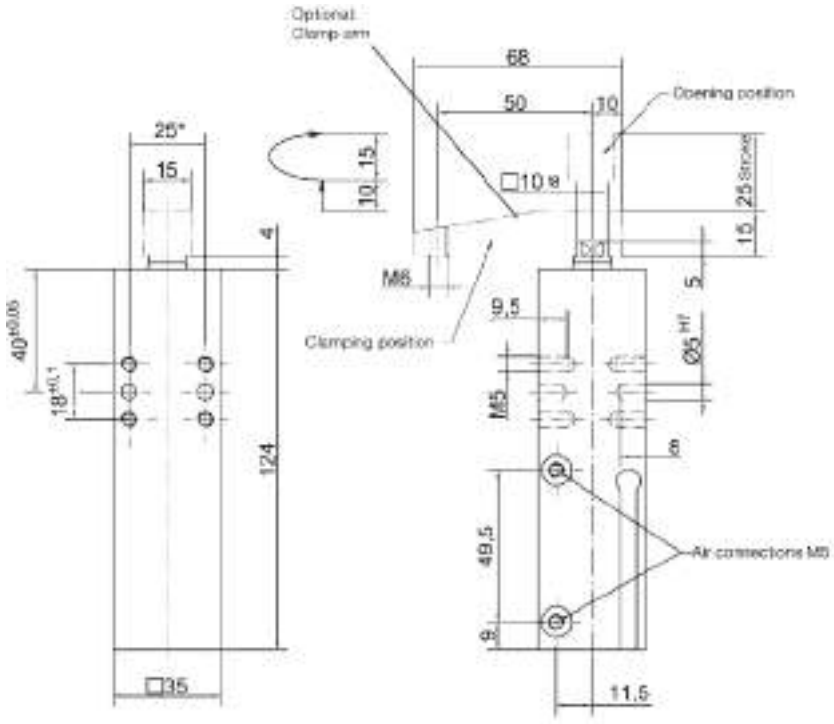
Screw-in version
Housing with external thread for insertion into the corresponding circular opening in a mounting plate.

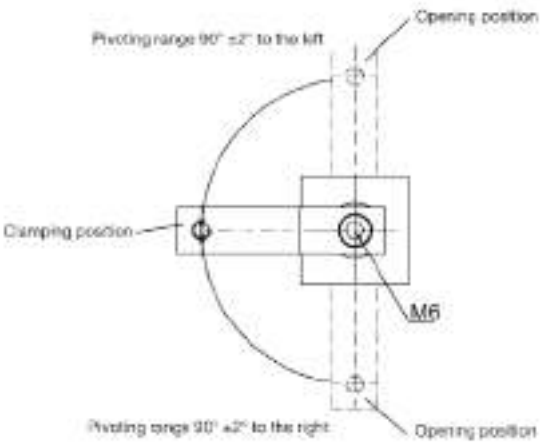
Modular unit
For screwing onto brackets or plates by means of the specified mounting hole pattern.

Product range

Type	 **SCBM 25**	 **SCB/SCT 25**	 **SCB/SCT 32**	 **SCB/SCT 40**	 **SCB/SCT 50**	 **SCB/SCT 63**
Clamping force (N)	170	200	350	600	1000	1600
Stroke (mm)	25	27	30	30	32	30
Locking	No	No	No	No	No	No
Weight (kg)	0,6	0,8	1	1,2	1,46	1,66
Dimensions SCB (mm)	145x35x35	125x55x35	145x60x45	145x70x55	162x85x65	162x100x80
Dimensions SCT (mm)	–	118x40	132x48	135x58	145x63	152x77

Mini-Pivoting Clamp SCBM 25-25





– Modular housing
– 90° pivoting range
– Optional right or left pivoting motion
– Basic enclosure made of aluminum with integral pneumatic cylinder
– Attachment options on multiple sides

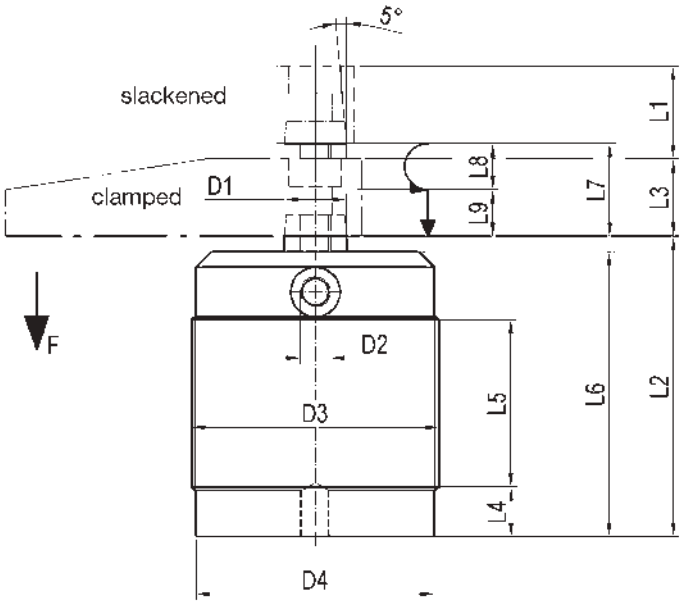
Optional:
– Magnetic position sensing

Type	Clamping force at 5 bar rod extended (N)	Clamping force at 5 bar rod retracted (N)	Weight inkl. Clamp arm (kg)
SCBM 25-25	220	170	0,6

Subject to technical modifications.

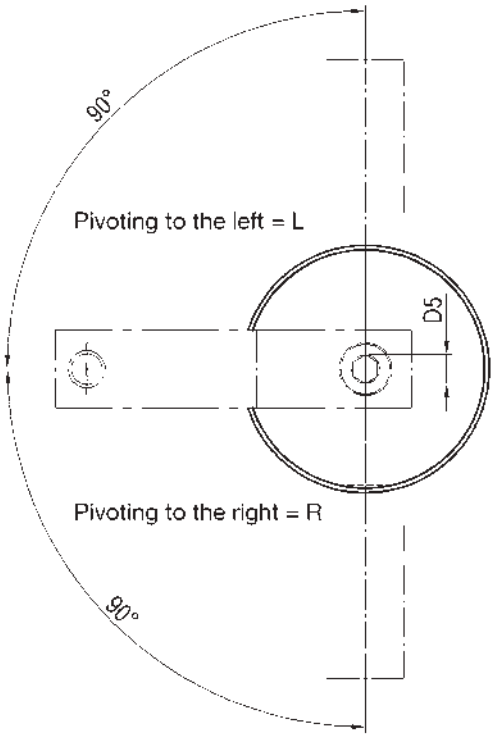
Ordering example:

SCBM 25-25 **90° L** **T03**
- **SCBM 25-25** → Type
- **90° L** → Direction of rotation left (R = right)
- **T03** → Position sensing system



– Screw-in version
– Optional right-hand or left-hand pivoting
– 90° pivoting range
– Aluminum basic enclosure with integral pneumatic cylinder and pivoting mechanism
– Attachment by external thread
– adapter for mounting the clamp arm

Optional:
– Clamp arms:
refer to ‘Accessories’



Type	Total stroke (mm)	Dependent on piston diameter (mm)	Weight (kg)	Force (F) (kN)
SCT 25	28	25	0,660	0,2
SCT 32	30	32	0,90	0,35
SCT 40	29	40	0,970	0,6
SCT 50	28	50	1,230	1,0
SCT 63	30	63	1,430	1,6

Ordering example:

SCT 25 R
- R → Right pivoting
- 25 → Piston Ø
- SCT → Type

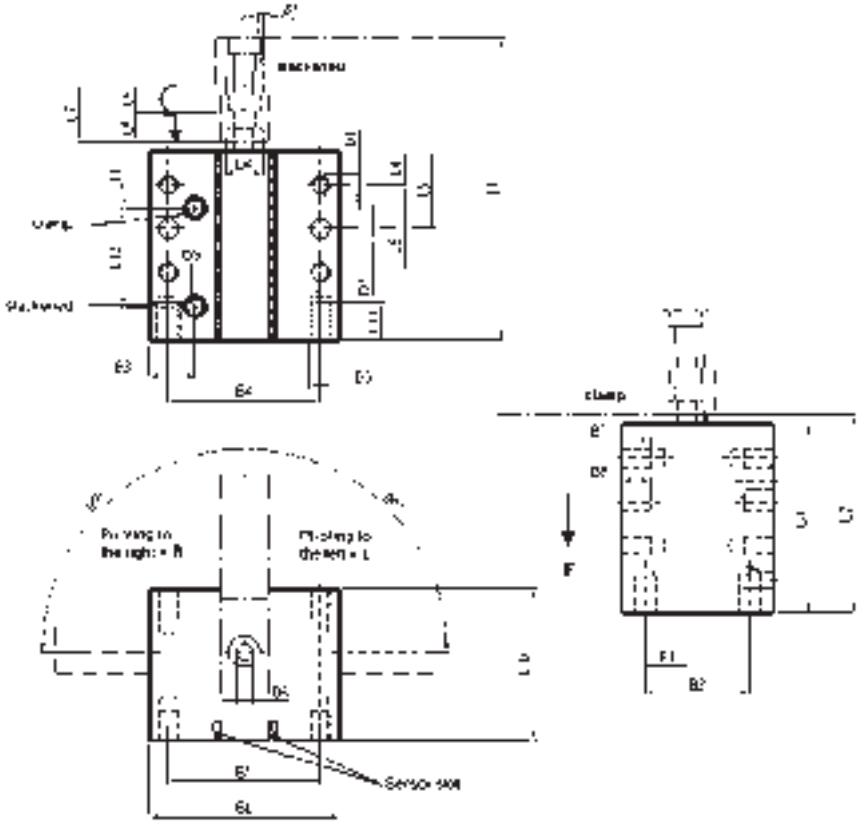
Accessories:
Clamp arm, keyway nut, threaded flange and adapter

R – Right pivoting
L – Left pivoting

Type	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5	L6	L7	L8	L9
SCT 25	14	M5	M40x1,5	39,5	M9	28	74	16	3	43	70	28	14	14
SCT 32	16	G1/8	M50x1,5	47,5	M8	30	83	19	3	55	79	30	16	14
SCT 40	16	G1/8	M55x1,5	57,5	M8	29	87	19	3	59	83	29	15	14
SCT 50	20	G1/8	M65x1,5	62,5	M10	28	92	25	3	63	87	28	14	14
SCT 63	20	G1/8	M80x1,5	77	M10	30	97	25	3	66	92	30	15	15

Subject to technical modifications.

Pivoting Clamp SCB...



– Modular construction
– 90° pivoting range
– Optional right-hand or left-hand pivoting
– Aluminum basic enclosure with integrated pneumatic cylinder and pivoting mechanism
– Attachment options on multiple sides
– Tapered adapter for mounting the clamp arms

Optional:
– Magnetic piston for external position sensing
– External magnetic switch
– Clamp arms:
refer to 'Accessories'

Ordering example:

SCB 25 R T07
- T07 → Position sensing system
- R → Right pivoting
- 25 → Piston Ø
- SCB → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T07 Magnetic piston for end position sensor

Accessories:
Clamp arm, keyway nut, threaded flange and adapter

R – Right pivoting
L – Left pivoting

Type	Total stroke (mm)	Dependent on piston diameter (mm)	Weight (kg)	Force (F) (kN)
SCB 25	27	25	0,825	0,2
SCB 32	30	32	1,066	0,35
SCB 40	30	40	1,216	0,6
SCB 50	32	50	1,462	1
SCB 63	30	63	1,662	1,6

Type	B1	B2	B3	B4	B5	B6	B7	B8	D1	D2 h7	D3	D4	D5	D6	L1	L2	L3	L4	L5	L6	L7	L8	L9
SCB 25	8	20	17	40	40	55	10	10	M8	6	M8	14	M5	M8	125	82	78	15	30	30	27	14	13
SCB 32	12,5	30	18	45	45	60	15	15	M8	6	M8	16	G1/8	M8	145	95	90	20	30	35	30	14	16
SCB 40	15,5	37	21	52	52	70	15	15	M8	6	M8	16	G1/8	M8	145	95	90	20	30	35	30	15	15
SCB 50	21,5	46	26	66	66	85	20	15	M10	8	M10	20	G1/8	M10	162	105	100	20	40	40	32	15	17
SCB 63	28	60	30	80	80	100	20	15	M10	8	M10	20	G1/8	M10	162	105	100	20	40	40	30	15	15

Type	L10	L11	L12	L13
SCB 25	35	16,5	44,5	15
SCB 32	45	18,5	51	20
SCB 40	55	17	52	20
SCB 50	65	21	53	20
SCB 63	80	19,5	53	20

Subject to technical modifications.

Standard Clamp Arm

Material: High-strength aluminum alloy, Hart-coat®

Special arms on request

Type	B1	B2	B3	L1	L2	Ø D1	Ø D2	Ø D3	D4	Weight (g)
PSZS 25	66	6	50	16	6	14	9	14	M6	210
PSZS 32	80	9	60	19	7	14	9	16	M8	240
PSZS 40	90	9	70	19	7	14	9	16	M8	270
PSZS 50	105	10	80	25	9	17	11	20	M12	380
PSZS 63	115	10	90	25	9	17	11	20	M12	430

Clamp arm for attaching contour blocks

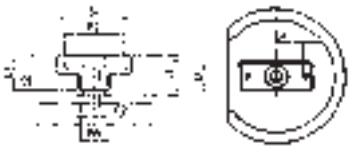
Material: Steel, burnished

Type	B1	B2 ±0,1	B3	B4 ±0,02	B5 ±0,1	L1	L2	Ø. D1	Ø D2	Ø D3	D4 H7	D5
PSZSA 40	91	54	6	20	10	22	7	14	9	16	6	7
PSZSA 50/63	125	70	10	30	15	28	9	17	11	20	6	9

Adapter for clamp arm mounting

Material: Steel, burnished

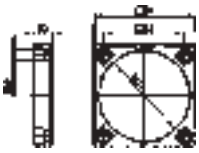
Suitable for complete clamping fixtures



Type	B1	B2 ±0,1	B3	L1	L2	L3	L4	dia. D1	dia. D2
PSSA 25	50	38	25	24,5	12	28,5	25	5,5	M8
PSSA 32/40	60	45	30	29	18	33	30	7	M10
PSSA 50/63	65	48	32	32	18	36	32	9	M10

Threaded flange

For screw-in type pivoting clamps
Material: Steel, galvanised
Screw-in flange with four mounting holes
Secured with locknuts.

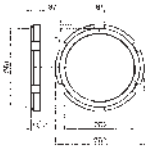


Type	B1	B2	B3	Ø D1	Ø D2	Weight (g)
PSZG 25	50	37	9	M40x1,5	5,5	80
PSZG 32	60	45	12	M50x1,5	6,5	100
PSZG 40	65	50	12	M55x1,5	6,5	120
PSZG 50	75	58	15	M65x1,5	8,5	150
PSZG 63	88	70	15	M80x1,5	8,5	200

Locknuts

For screw-in type pivoting clamps
Material: Steel, galvanised

For use with hook spanners.

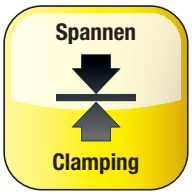


Type	B1	B2	L1	Ø D1	Ø D2	Ø D3	Weight (g)
PSZK 25	7	8	3,3	49	56	M40x1,5	63
PSZK 32	8	8	3,8	60	68	M50x1,5	84
PSZK 40	8	8	3,8	67	75	M55x1,5	106
PSZK 50	11	9	4,3	76	85	M65x1,5	132
PSZK 63	11	10	4,3	91	100	M80x1,5	180

Subject to technical modifications.

CLAMPING

Manual Clamps

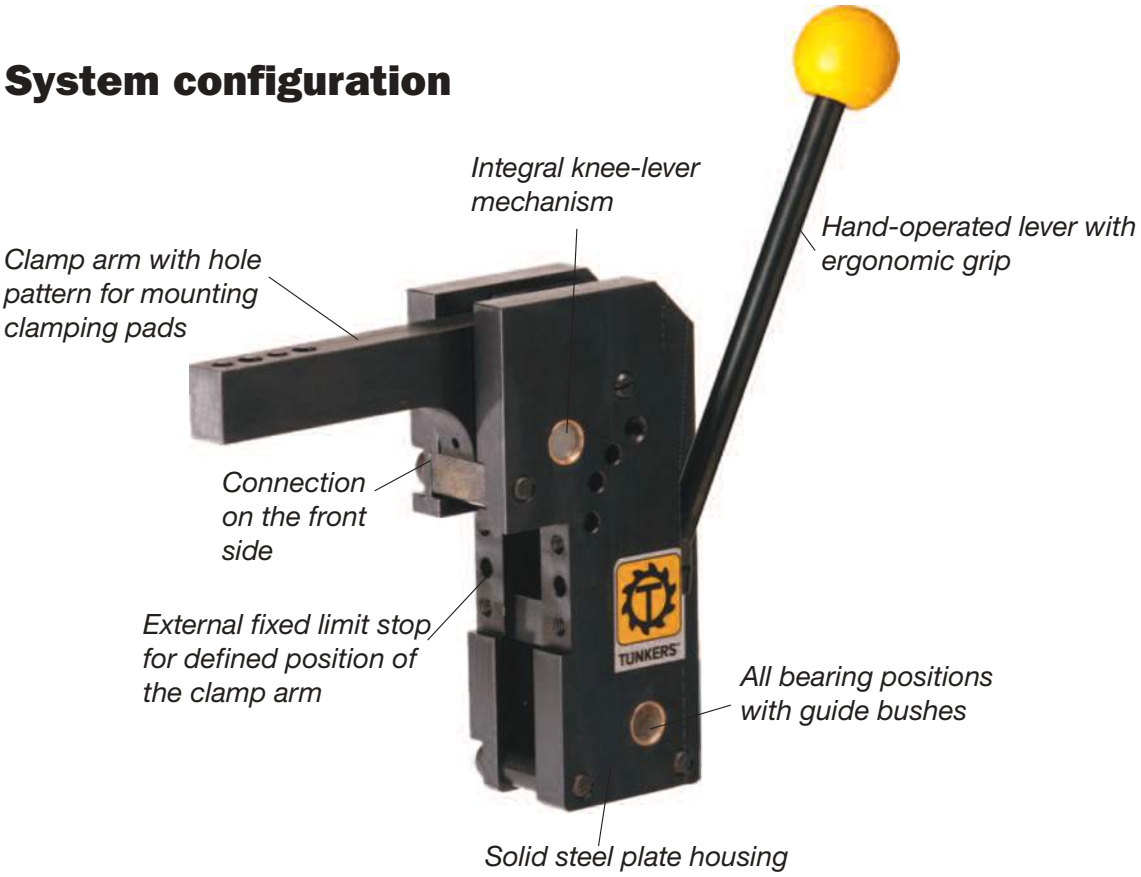


TÜNKERS®
Ingenuity in series.

Manual Clamps

Secure clamping of car body components, for example, requires clamping forces of more than 200 to 400 N. Therefore, TÜNKERS professional manual clamps are based on automated clamping technology. They are characterised by an integrated knee-lever mechanism for transmitted power, together with exceptionally robust construction of the housing and the bearings. For this reason, TÜNKERS manual clamps are also suitable for use in series production applications.

System configuration

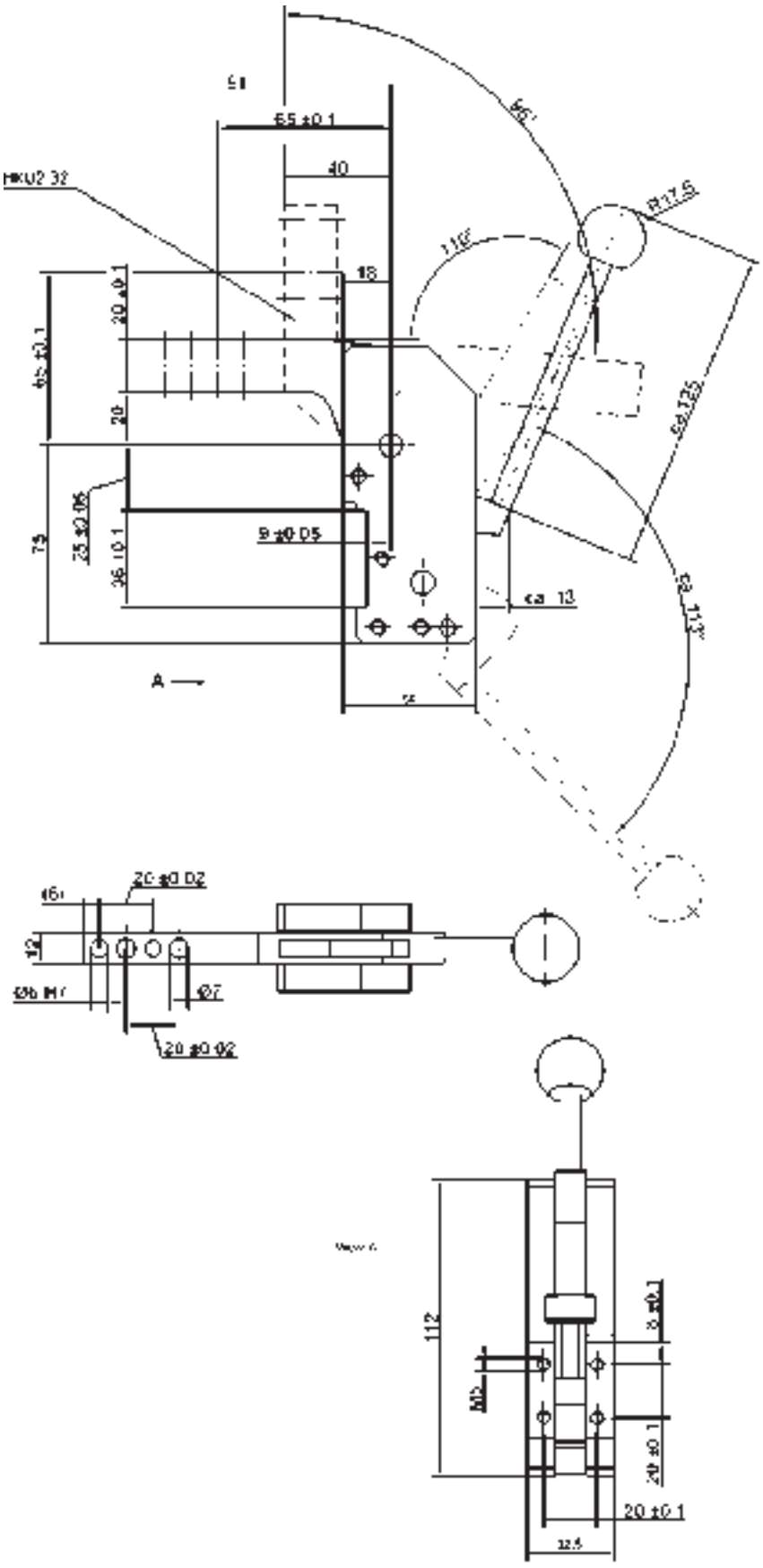


Typical applications

T5 Series Manual Clamp for prototype construction

HKC 40 Manual Clamp in clamping fixture

- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Clamp arm with fixed limit stop for reproducible end position
- Solid steel plate housing with hole pattern at the front
- All shafts in the mechanism inserted through bushes
- Hand-operated lever with ergonomic spherical knob
- Clamp arm with hole pattern for mounting contour blocks



Type	Clamping torque (Nm)	Holding torque (Nm)	Weight (kg)
HKU/HKU2 32	55	110	1,25

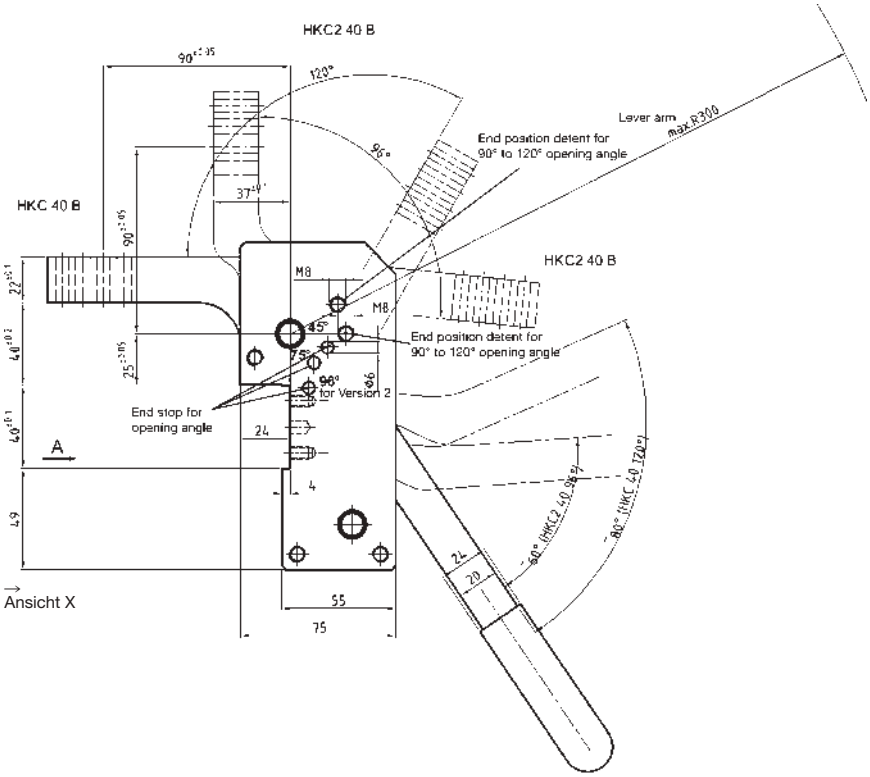
Subject to technical modifications.

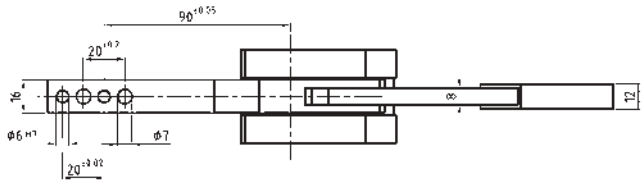
Ordering example:

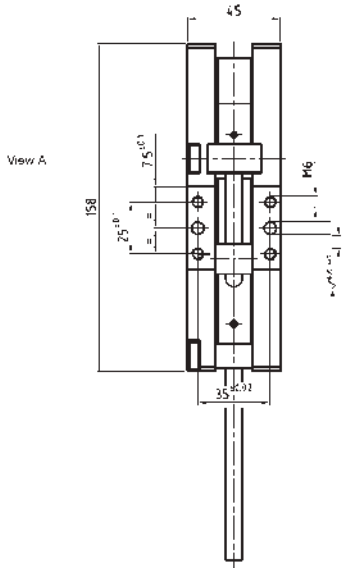
HKU 32 **110°**

- **HKU 32** → Type
- **110°** → Opening angle

Manual Clamp HKC 40 B







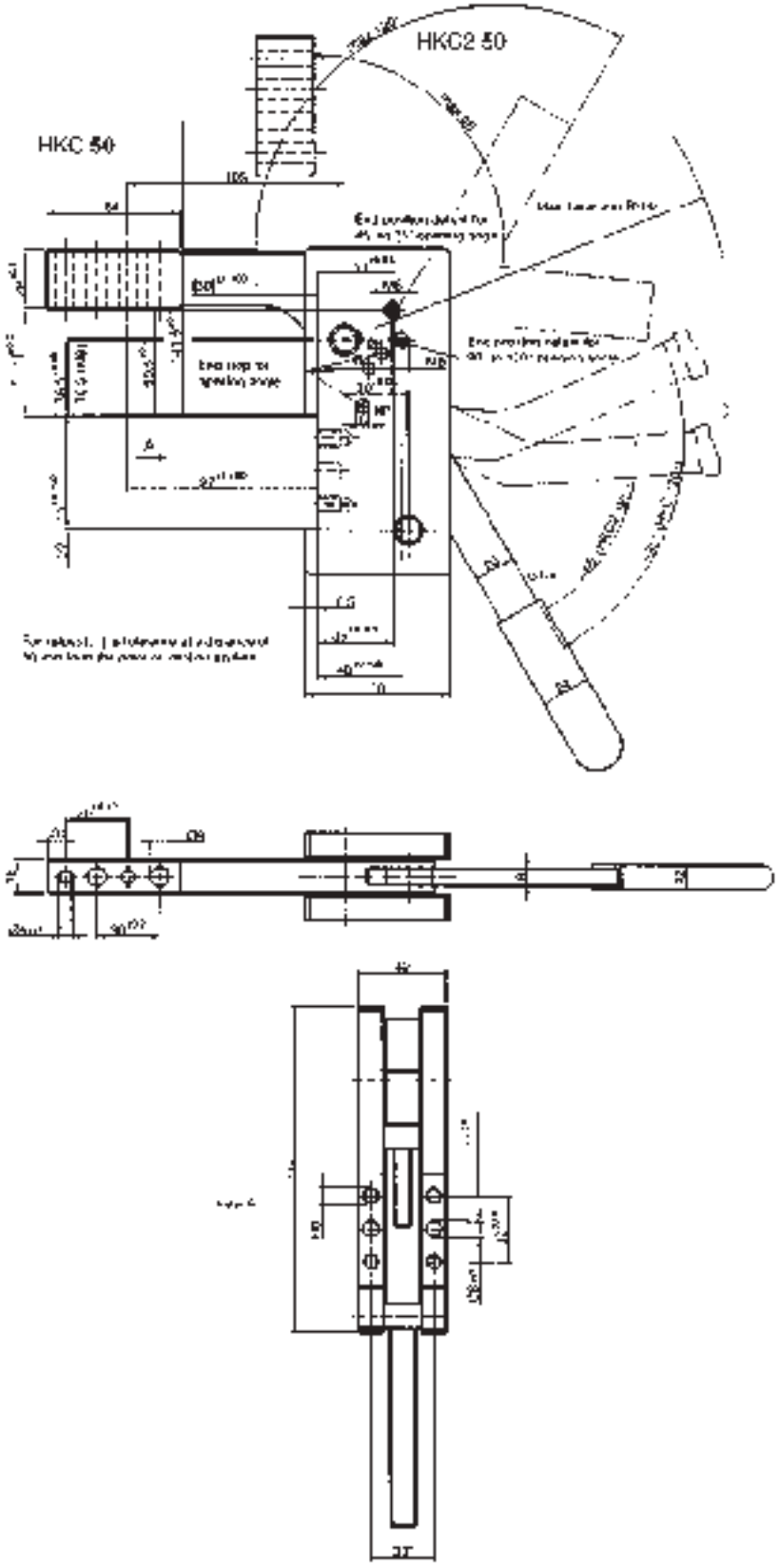
- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Clamp arm with fixed limit stop for reproducible end position
- Solid steel plate housing with hole pattern at the front
- All shafts in the mechanism inserted through bushes
- Hand-operated lever with ergonomic handhold
- Clamp arm with hole pattern for mounting contour blocks

Standard opening angle type HKC 40 B:
45°; 75°; 120°
Standard opening angle type HKC2 40 B:
45°; 75°; 96°

Type	Clamping torque (Nm)	Holding torque (Nm)	Weight (kg)
HKC 40 B	160	320	3,5
HKC2 40 B	160	320	3,5

Subject to technical modifications.

- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Clamp arm with fixed limit stop for reproducible end position
- Solid steel plate housing with hole pattern at the front
- All shafts in the mechanism inserted through bushes
- Hand-operated lever with ergonomic handhold
- Clamp arm with hole pattern for mounting contour blocks



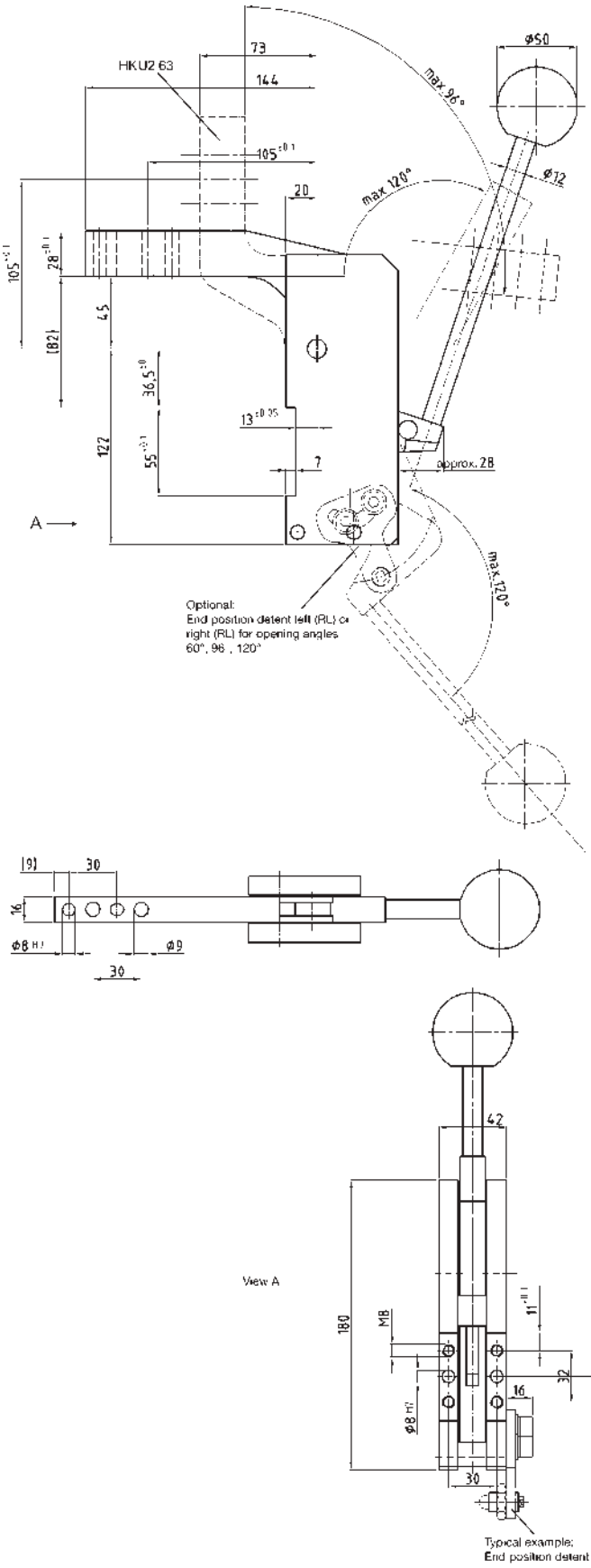
Standard opening angle type HKC 50:
45°; 75°; 120°
Standard opening angle type HKC2 50:
45°; 75°; 96°

Type	Clamping torque (Nm)	Holding torque (Nm)	Weight (kg)
HKC 50	160	320	3,2
HKC2 50	160	320	3,2

Subject to technical modifications.

Manual Clamp HKU 63

- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Clamp arm with fixed limit stop for reproducible end position
- Solid steel plate housing with hole pattern at the front
- All shafts in the mechanism inserted through bushes
- Hand-operated lever with ergonomic spherical knob
- Clamp arm with hole pattern for mounting contour blocks



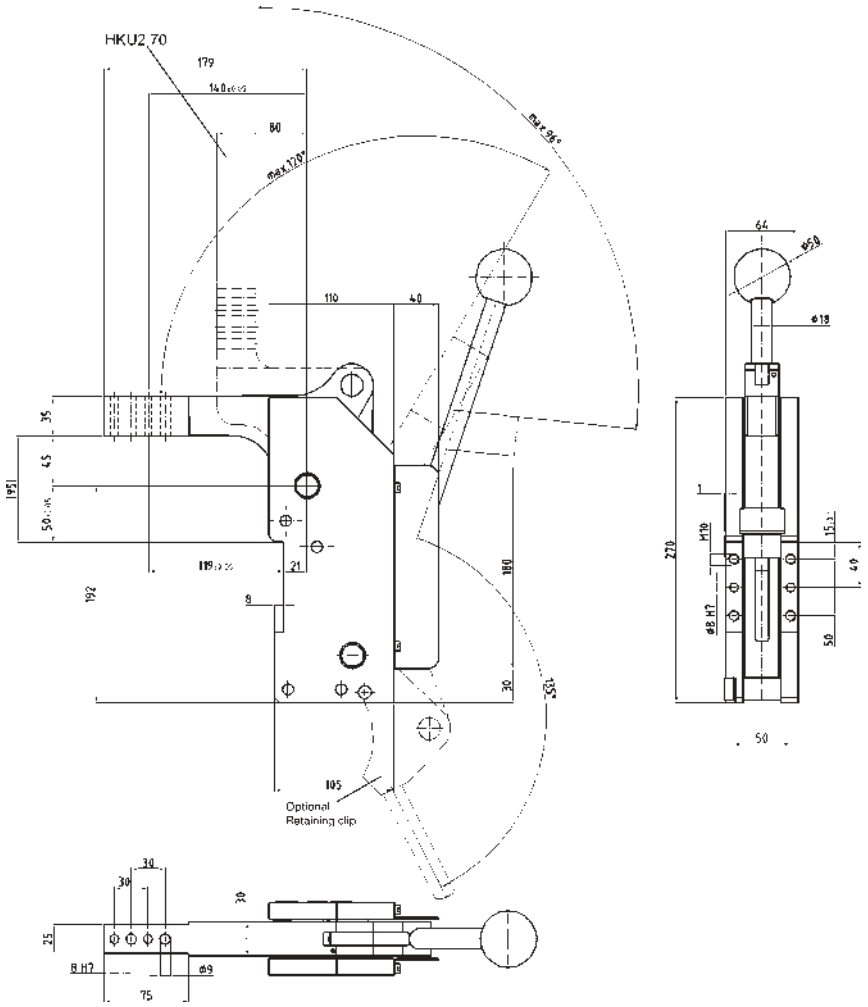
Type	Clamping torque (Nm)	Holding torque (Nm)	Weight (kg)
HKU/HKU2 63	160	320	3,2

Subject to technical modifications.

Ordering example:

HKU 63 **RR** **60°**

- 60° → Opening angle
- RR → Optional: End position detent on the right (RL= left)
- HKU 63 → Type

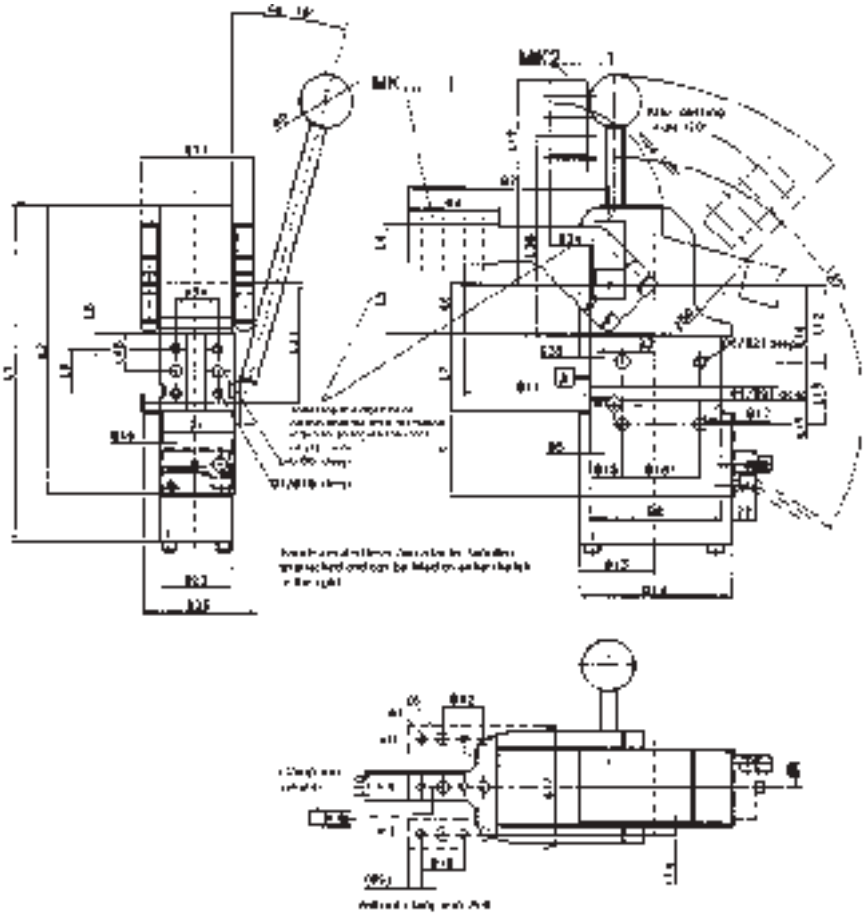


- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Clamp arm with fixed limit stop for reproducible end position
- Solid steel plate housing with hole pattern at the front
- All shafts in the mechanism inserted through bushes
- Hand-operated lever with ergonomic spherical knob
- Clamp arm with hole pattern for mounting contour blocks

Type	Clamping torque (Nm)	Holding torque (Nm)	Weight (kg)
HKU/HKU2 70	700	1000	11

Subject to technical modifications.

Manual Clamp MK 50/63.1



- Hand-operated clamp with integrated knee-lever mechanism and over-centre lock
- Enclosed aluminum housing
- Compatible with pneumatic clamp V 50/63.1
- Hand-operated lever with ergonomic spherical knob, can be mounted on the right or left
- Optional inductive sensing (weld-resistant for closed or open positions)

Ordering example:

MK 50.1 A10 45°

- 45° → Opening angle
- A10 → Clamp arm variants
- 50.1 → Piston Ø
- MK → Type

Tolerance for pin drillings ± 0,02
for threaded rods ± 0,1

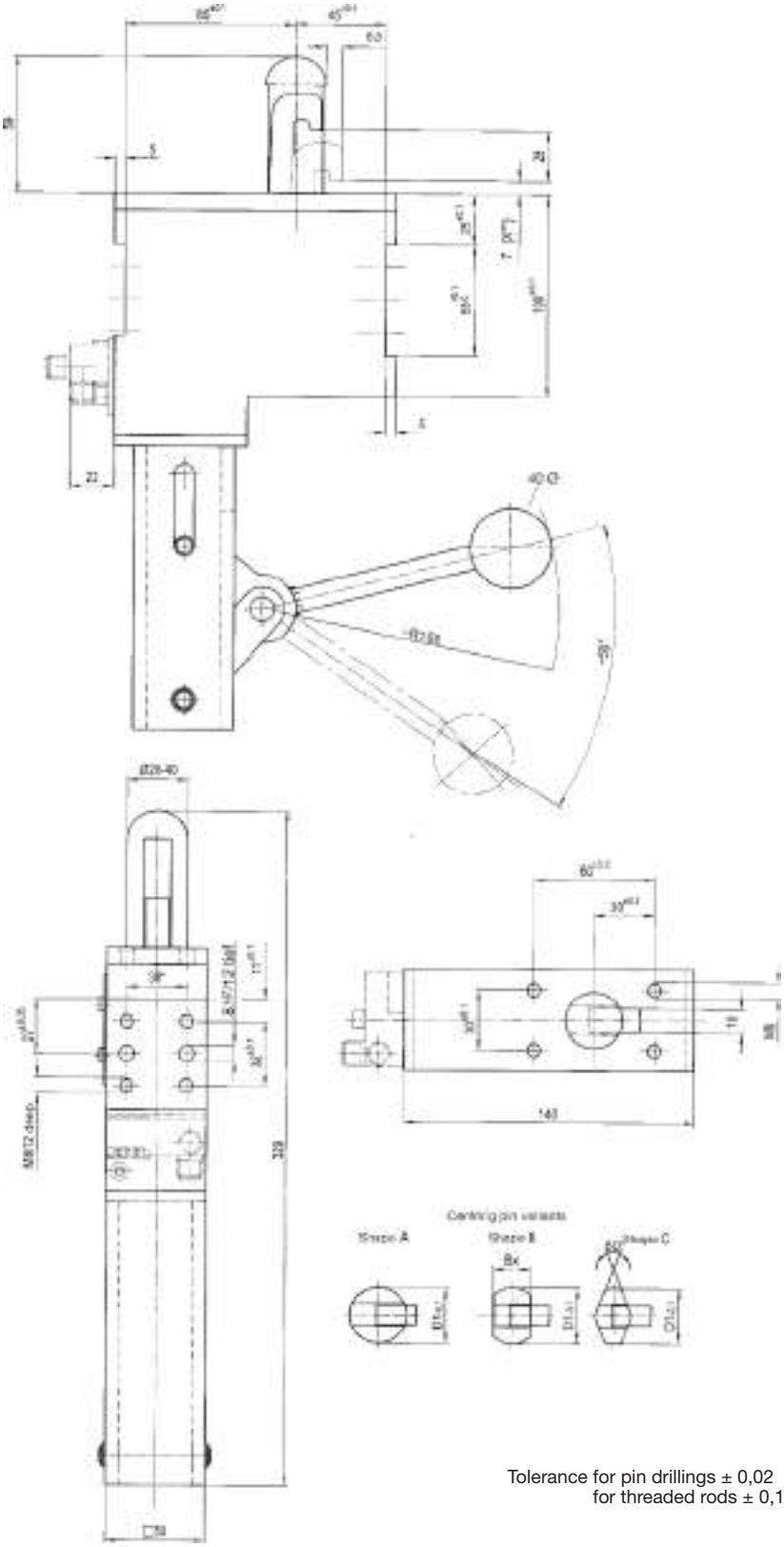
Type	Max. holding torque (Nm)	Clamping torque (Nm)	Dependent on Ø Piston (mm)	Weight (kg)
MK 50.1	800	160	50	5,8
MK 63.1	1500	380	63	7,9

Type	B1	B2	B3 ±0,05	B4	B5	B6	B7*	B8 ±0,1	B9	B10 ±0,02	B11 ±0,1	B12 ±0,2	B13	B14	B15 ±0,1	B16*	B17	B18	B19	B20	B21	B22	B23
MK 50.1	48	144	10	64	6,5	10	30	93	9	30	92	30	47	94	23	50	4,5	11	3,5	9,5	12	12	45
MK 63.1	54	144	10	64	7,5	10	30	93	9	30	92	30	53	106	23	50	7,5	11	3,5	9,5	12	12	52

Type	B24	B25	D1	D2 H7	D3	D4 H7	D5 H7	D6	L1	L2	L3	L4 ±0,1	L5 ±0,2	L6 ±0,05	L7 ±0,06	L8 ±0,1	L9 ±0,2	L10	L11	L12 ±0,05	L13*	L14 ±0,1	L15 N9
MK 50.1	30	74	M8	6	9	8	10	M10	218	178	35	28	51,5	36,5	55	11	32	20	68	55	45	10	12
MK 63.1	30	80	M8	6	9	8	10	M10	243	209	61	28	51,5	36,5	55	11	32	20	78	55	45	10	12

Type	L16 ±0,05	L17	L18 ±0,05	L19	L20	L21	S H9
MK 50.1	71,5	78	27	144	141,5	68	19
MK 63.1	71,5	86	27	144	141,5	86	22

Subject to technical modifications.



- Hand-operated clamp with integrated knee-lever mechanism
- Component centred and clamped with clamping hooks
- Centring pin Ø 20 to 40 mm as specified by the client
- Enclosed aluminum housing
- Hand-operated lever with ergonomic spherical knob
- Optional inductive sensing (weld-resistant for closed or open positions)

Tolerance for pin drillings ± 0,02
for threaded rods ± 0,1

Type	D1/Bx
MK 32 UZ	20/16; 25/20; 30/22; 35/25; 40/28

Type	Max. holding force (N)	Clamping force (N)	Piston Ø (mm)	Dimensions (mm)	Weight (kg)
MK 32 UZ	2500	1800	32	329x140x50	2,4

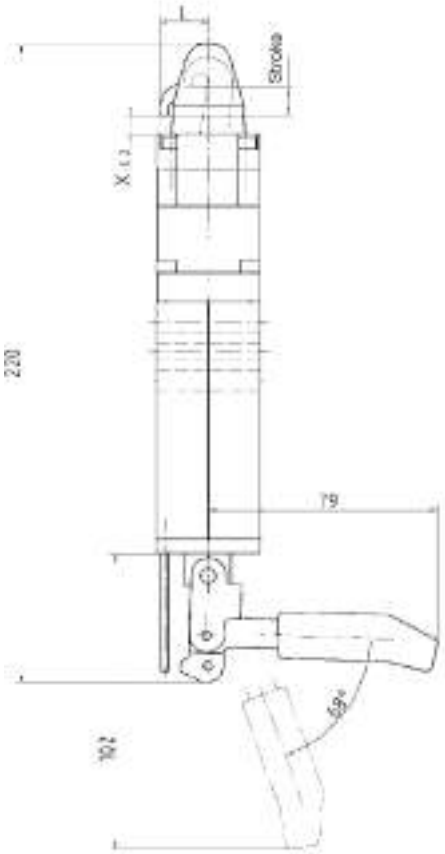
Subject to technical modifications.

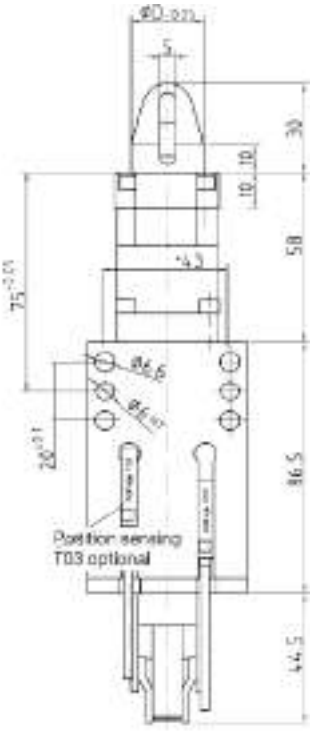
Ordering example:

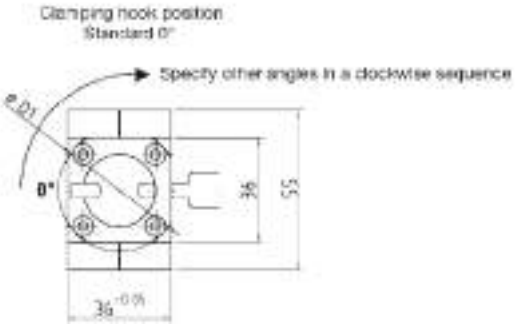
MK32 UZ A 30
MK32 UZ B 30/22

- 30/22 → Pin size Dx, Bx
- B → Pin shape
- MK32 UZ → Type

Manual-Pin Clamp M 400 UZ







- Hand-operated underbody clamp
- Variable hook position
- Hand-operated clamp with integral knee-lever mechanism and locked end position
- Component centred and clamped with clamping hooks
- Centring pin Ø 10 to 25 mm as specified
- Enclosed aluminum housing
- Hand-operated lever with ergonomic handhold
- Optional position sensing (weld-resistant for open and closed positions (T23))

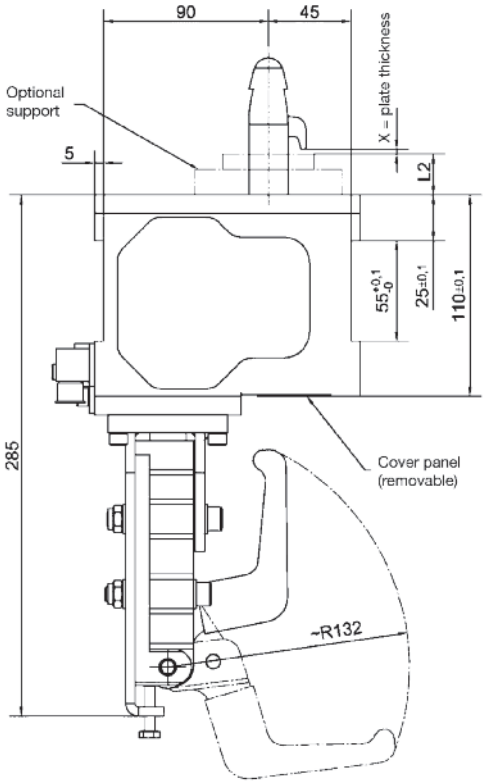
Order code, TÜNKERS position sensing system:
...T00 without position sensing system
...T03 Magnetic position sensing, prepared for position sensing
...T23 magnet sensing, incl. 2 magnetic switches

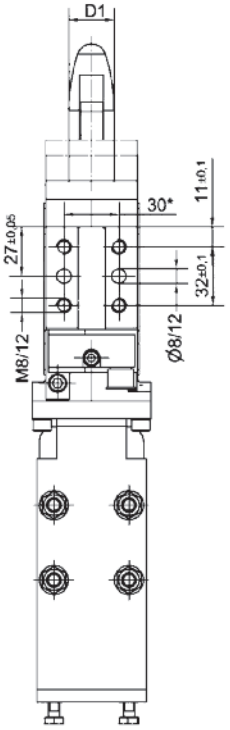
Ordering example:

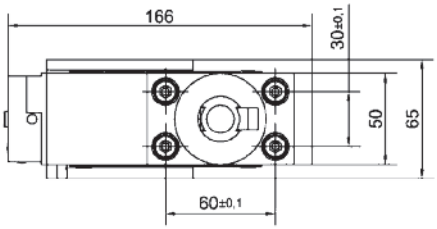
MK 400 UZ 12 1,5 T03 0°
- MK 400 UZ → Type
- 12 → Pin Ø
- 1,5 → Plate thickness 'X'
- T03 → Position sensing system
- 0° → Clamping hook position (Standard)

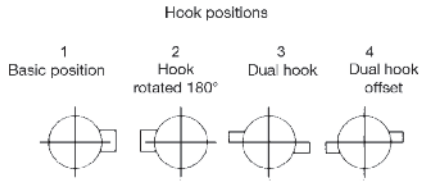
Type	Max. holding force (N)	Clamping force (N)	Dimensions (mm)	Weight (kg)
M 400 UZ	1000	400	220x55x36	1,2

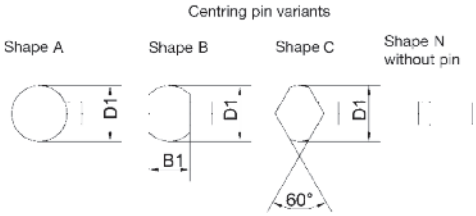
Subject to technical modifications.











- Hand-operated clamp with integrated knee-lever mechanism
- Component centred and clamped with clamping hooks
- Centring pin 20 to 40 mm as specified
- Enclosed aluminum housing
- Hand-operated lever with handhold
- Optional inductive sensing (weld-resistant for closed and open positions (T12))

Ordering example:

MK60 UZ T12 A 30

- 30 → Pin size
- A → Pin shape
- T12 → Position sensing system
- MK60 UZ → Type

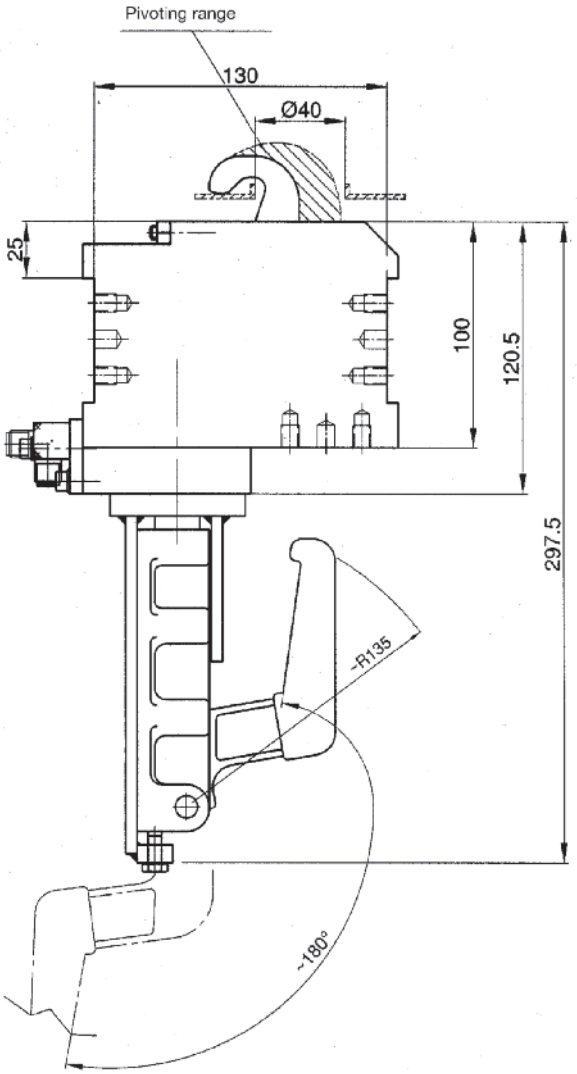
Order code TÜNKERS position sensing systems:

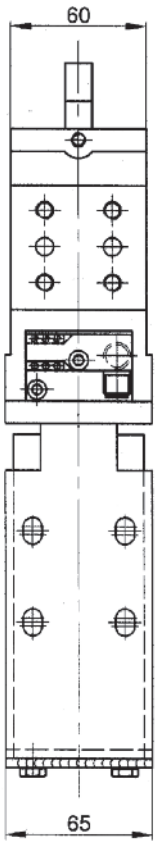
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral 3 LEDs, 4-pole

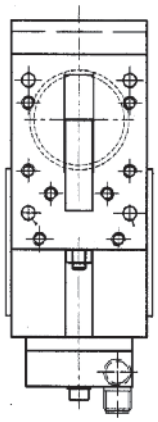
Type	Max. holding force (N)	Clamping force (N)	Weight (kg)	L1
MK 60 UZ	3800	3300	5,2	285

Subject to technical modifications.

Manual-Pin Clamp MK 60 U







- Hand-operated clamp with integrated knee-lever mechanism
- Component clamped with clamping hooks
- Enclosed aluminum housing
- Hand-operated lever with handhold
- Optional inductive sensing (weld-resistant for closed and open positions (T12))

Ordering example:

MK60 U **T12** **A** **30**

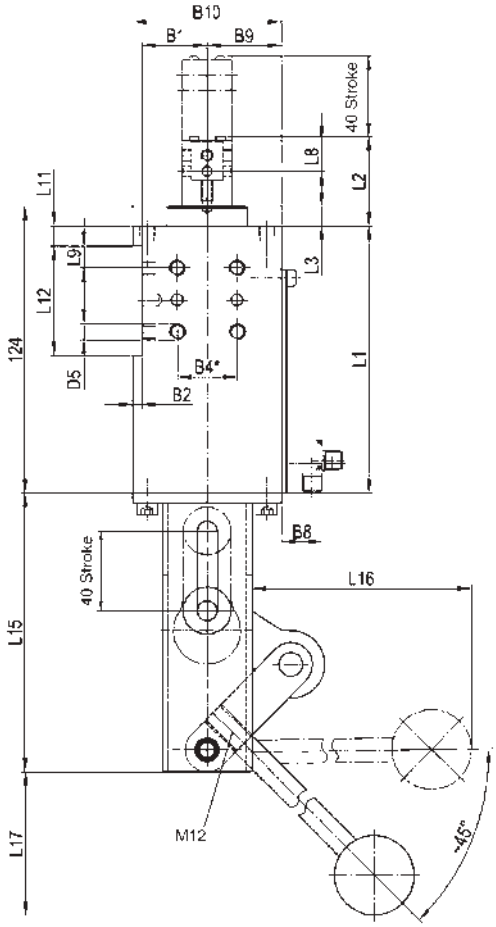
- 30 → Pin size
- A → Pin shape
- T12 → Position sensing system
- MK60 U → Type

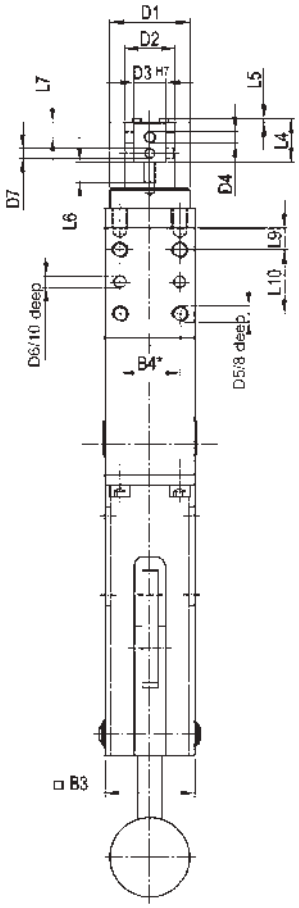
Order code TÜNKERS position sensing systems:

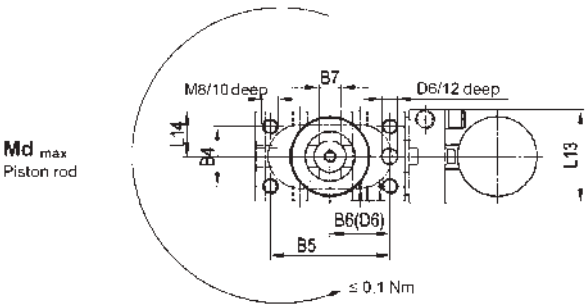
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral 3 LEDs, 4-pole

Type	Max. holding force (N)	Clamping force (N)	Weight (kg)	L1
MK 60 U	3300	3300	3,5	298

Subject to technical modifications.







- Pin extraction and positioning unit
- Standard mounting for centring pins
- Knee-lever mechanism, upper position over-centre point locked
- Enclosed aluminum housing with attachment options on multiple sides
- Hand-operated lever with ergonomic spherical knob
- Optional inductive sensing (weld-resistant for closed and open positions (T12))

Type	Stroke (mm)	Max. static transverse force (N)	Dependent on piston Ø (mm)	Weight (kg)
MSZK 40	40	150	40	1,8

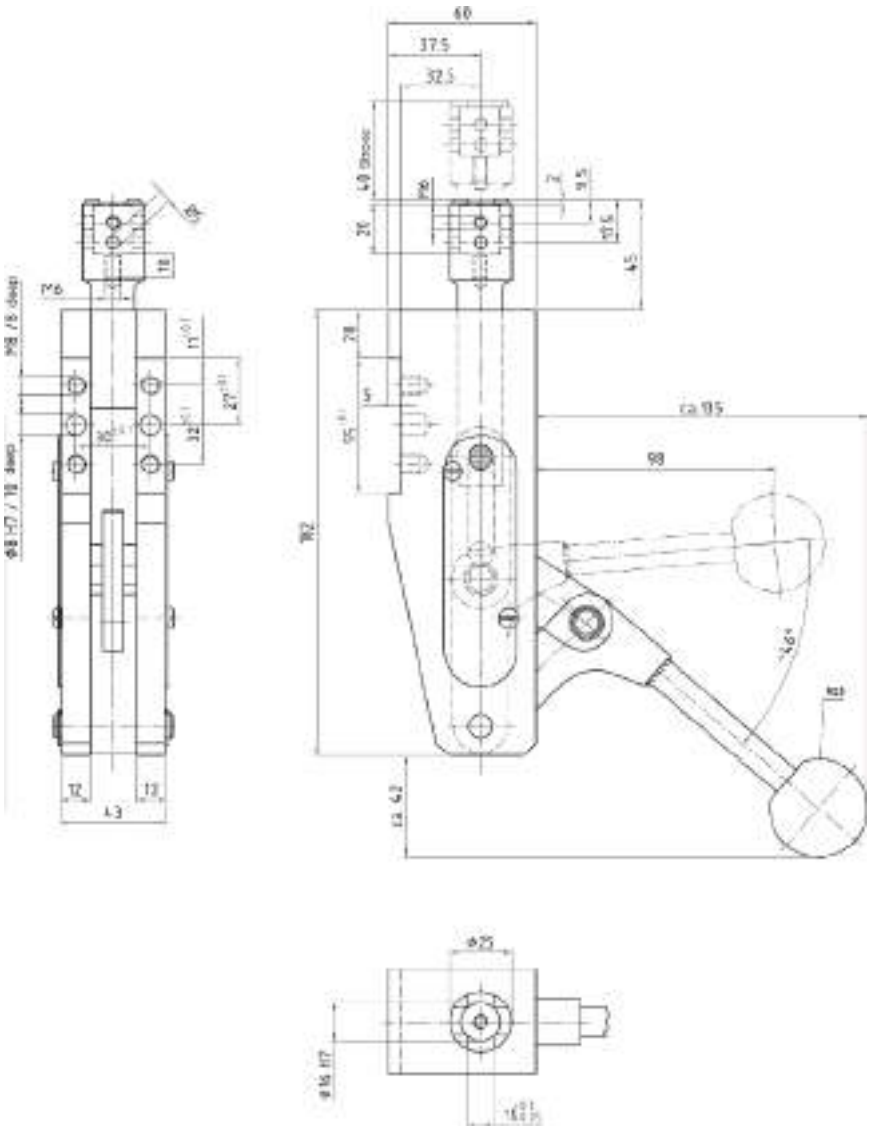
Available as an option:
...T12 Inductive sensing 24V, 1 output with integral LEDs

Type	B1 ±0,1	B2	B3	B4*	B5 ±0,2	B6 ±0,2	B7 +0,1/+0,05	B8	B9	B10	D1 f7	D2 f7	D3 H7	D4	D5	D6 H7	D7	D8	L1	L2	L3	L4	L5
MSZK 40	32,5	5	50	30	60	30	11	21	37,5	75	40	25	16	M6	M8	8	5	–	114	45	10	22	2

Type	L6	L7	L8	L9 ±0,1	L10 ±0,1	L11	L12 +0,1	L13	L14 +0,1	L15
MSZK 40	10	7,5	15,5	11	32	10	55	47	22,5	140

Subject to technical modifications.

Manual-Pin Unit SZM 40



- Pin extraction/positioning unit, manual operation
- Knee-lever mechanism, upper position over-centre point locked
- Standard mounting for centring pins
- Housing with lateral mounting hole pattern
- Hand-operated lever with ergonomic spherical knob

Ordering example:

SZM 40 **A01** **x40**
- x40 → Stroke
- A01 → Adapter position
- SZM 40 → Type

Type	Stroke (mm)	Max. static transverse force (N)	Dependent on Ø Piston (N)	Weight ~ (kg)	Dimensions l x w x d (mm)
SZM 40	40	150	40	1,8	254x75x45

Subject to technical modifications.

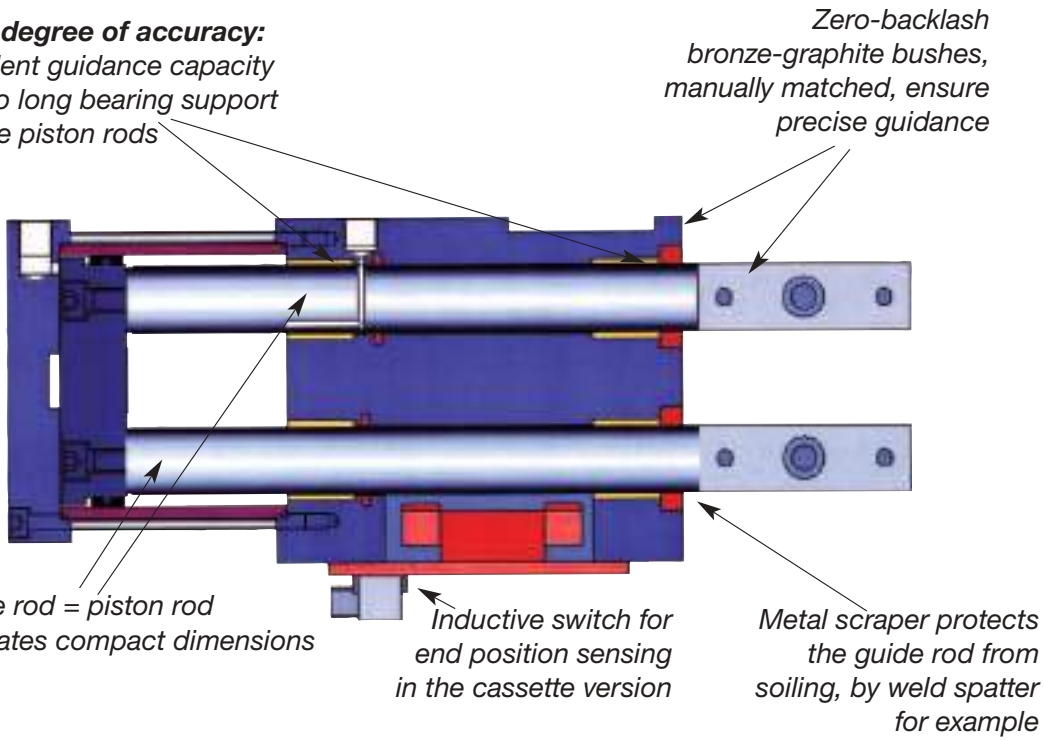
The manual clamps featured in this section of the catalogue have been specially designed for high-volume production in body assembly lines.

For clamping tasks without demanding requirements regarding clamping forces and idle times, we recommend our catalogue of hand-operated clamps, which also includes fabricated steel versions.

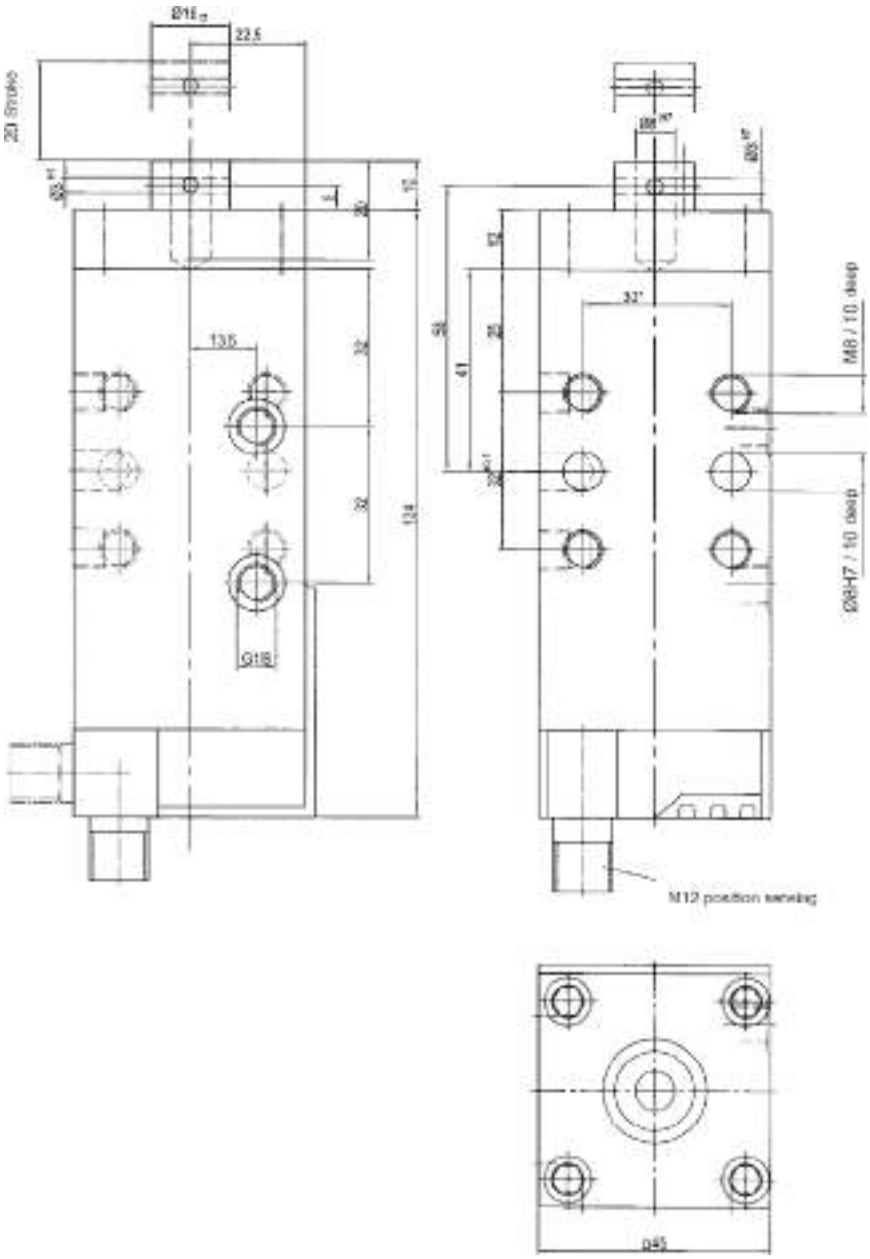
In addition to clamping tasks, pneumatic drive systems are used, for example, in machinery and fixture construction for inserting and extracting centring pins. These products, known as pin extractor cylinders, must convey the centring pin or the mountings precisely into the end position. They must also exhibit high levels of extraction force, so that, after machining – spot welding for example – the centring pin can be extracted from the component before the removal process begins. By virtue of their accurate guidance characteristics, extractor/positioning cylinders can also be used for feeding limit stops and contour blocks.

Positioning/clamping cylinders

TÜNKERS linear cylinders combine in one compact housing the pneumatic drive mechanism, a very precise one, and, in some cases, the guide rod is supported in two bearings, together with electrical position sensing. In addition, the SZV series versions are equipped with a mechanical end position lock.



Locating Pin Unit SZK 30 20 Stroke



- Compact housing made from high-strength aluminum material with connections on multiple sides
- Drive mechanism with circular-section cylinder (Ø 30 mm) for thrust and extraction forces of approx. 350 to 250 N
- Pushrod secured against rotation, inserted in a bronze bush
- Integrated position sensing using inductive technology (T12)
- Total stroke 20 mm

Ordering example:

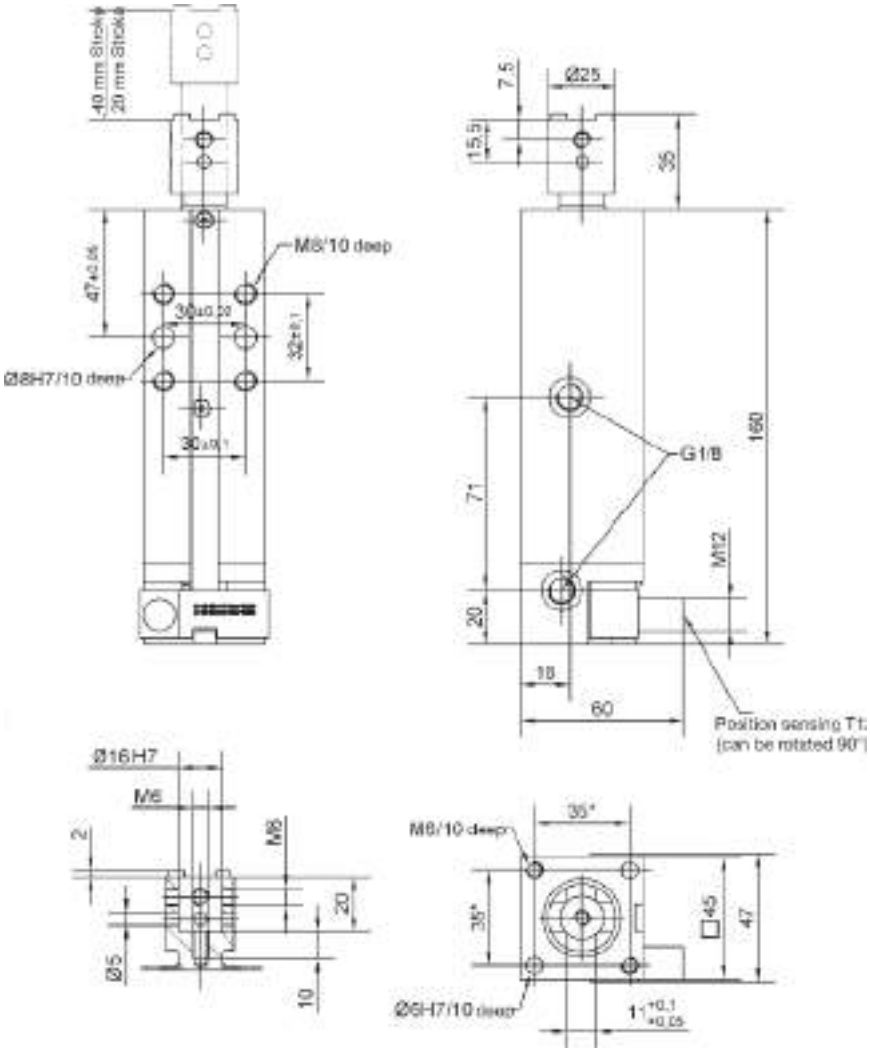
SZK30 20 T12
- T12 → Position sensing system
- 20 → Stroke
- SZK30 → Type

Order code position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Stroke (mm)	Ø Piston (mm)	Extraction force at 5 bar (N)	Weight ~ (kg)
SZK 30	20	30	250	0,8

Subject to technical modifications.

Locating Pin Unit SZK 30.8



- Compact housing made from high-strength aluminum material with connections on multiple sides
- Drive mechanism with circular-section cylinder (Ø 30 mm) for thrust and extraction forces of 350 to 250 N
- Pushrod secured against rotation, inserted in a bronze bush
- Integrated position sensing using inductive technology (T12)
- Total stroke 40 mm

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

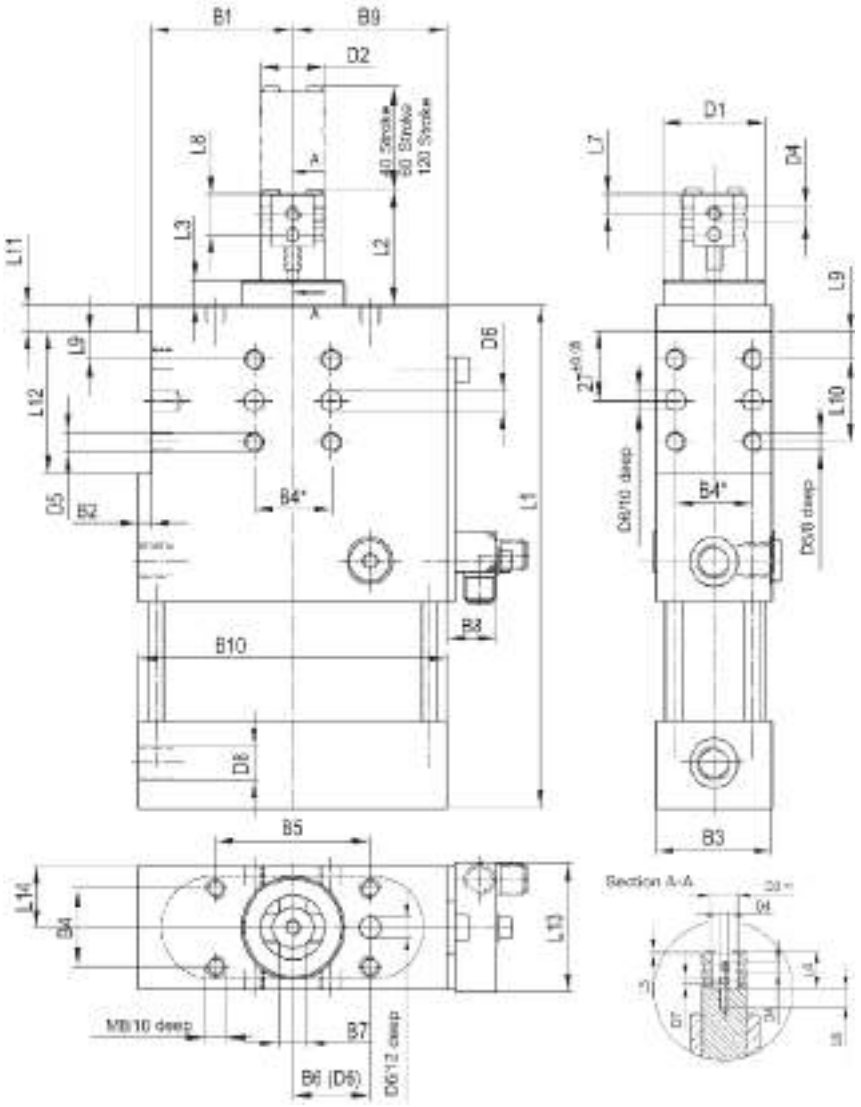
Ordering example:

SZK 30.8 **40** **T12**
- T12 → Position sensing
- 40 → Stroke: additional special stroke lengths (e.g. 20 mm) available on request
- SZK 30.8 → Type

Type	Piston rod dia.	Extraction force (N)	Thrust force (N)	Weight (kg)	Dimensions l x w x d (mm)
SZK 30.8	30	250	350	1,3	160x45x45

Subject to technical modifications.

Locating Pin Unit SZK 40/63



- Secured against rotation
- Slim housing made from high-strength aluminum material
- Drive mechanism using oblong-section cylinder, Ø 40 to 63 mm, for thrust and extraction forces of up to approx. 1200 N
- Pushrod secured against rotation, inserted in a bronze bush, duplicated
- Integrated position sensing using inductive technology
- Total stroke 40, 60, 120 mm; intermediate lengths on request

Type	Stroke (mm)	Max. static transverse force (N)	Dependent on Ø Piston (N)	Weight ~ (kg)	Dimensions l x w x d (mm)
SZK 40	40	150	40	1,8	195x75x45
SZK 40.1	60	150	40	2,4	195x120x45
SZK 40.2	120	150	40	1,8	235x75x45
SZK 63	40	200	63	2,4	235x120x45
SZK 63.1	60	200	63	2,3	355x75x45
SZK 63.2	120	200	63	3,6	425x120x45

Ordering example:

SZK 40 **25** **T12**

- T12 → Position sensing
- 25 → Special stroke lengths (15 < 40 mm)
- SZK 40 → Type

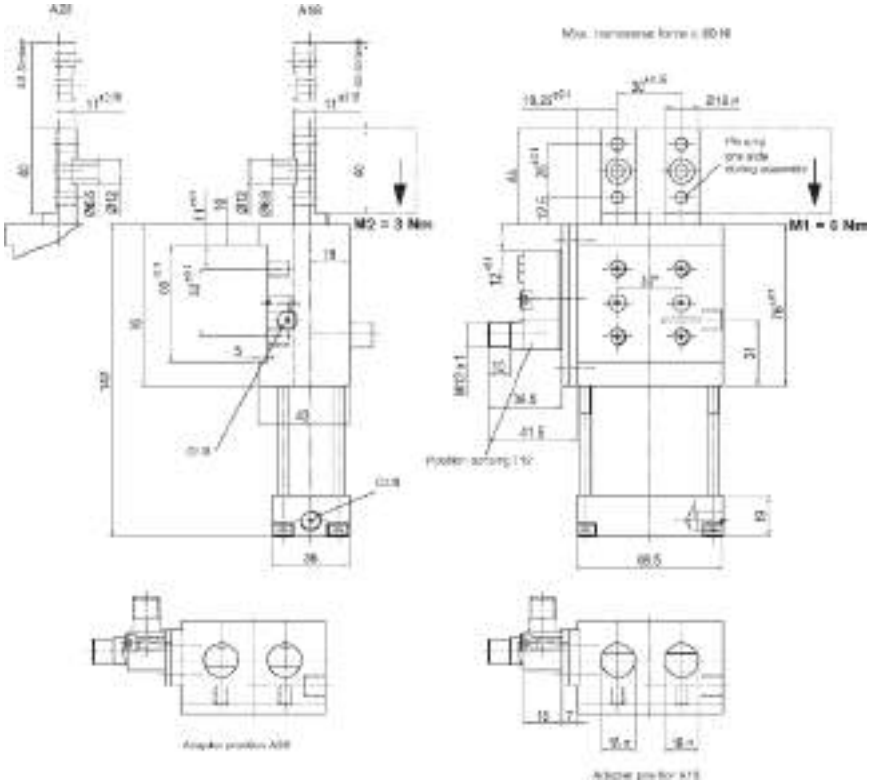
Order code TÜNKERS position sensing systems:
...T12 24 V inductive position sensing,
1 output with integral LEDs

Type	B1	B2	B3	B4*	B5 ±0,2	B6 ±0,2	B7 +0,1/+0,05	B8	B9	B10	D1 f7	D2 f7	D3 H7	D4	D5	D6 H7	D7	D8	L1	L2	L3	L4	L5
SZK 40	32,5	5	45	30	60	30	11	21	37,5	75	40	25	16	M6	M8	8	5	G1/8	195	45	10	22	2
SZK 40.1	32,5	5	45	30	60	30	11	21	37,5	75	40	25	16	M6	M8	8	5	G1/8	235	45	10	22	2
SZK 40.2	32,5	5	45	30	60	30		21	37,5	75	20	40	25	16	M8	8	4	G1/8	355	35	10	30	2
SZK 63	55	5	45	30	60	30	11	21	60	120	40	25	16	M6	M8	8	5	G1/4	195	45	10	22	2
SZK 63.1	55	5	45	30	60	30	11	21	60	120	40	25	16	M6	M8	8	5	G1/4	235	45	10	22	2
SZK 63.2	55	5	45	30	60	30		21	60	120	30	40	25	16	M8	8	4	G1/4	355	35	10	30	2

Type	L6	L7	L8	L9 ±0,1	L10 ±0,1	L11	L12 +0,1	L13	L14 +0,1
SZK 40	10	7,5	15,5	11	32	10	55	47	22,5
SZK 40.1	10	7,5	15,5	11	32	10	55	47	22,5
SZK 40.2	10	6	37	11	32	10	55	47	22,5
SZK 63	10	7,5	15,5	11	32	10	55	47	22,5
SZK 63.1	10	7,5	15,5	11	32	10	55	47	22,5
SZK 63.2	10	6	37	11	32	10	55	47	22,5

Subject to technical modifications.

Locating Pin Unit SZKD 40/40.5



– Slim housing made from high-strength aluminum material with mounting surfaces on 3 sides
– Drive mechanism with oblong-section cylinder (Ø 40 mm) for thrust and extraction forces of approx. 400 to 600 N
– Synchronously-driven guide rods, with double bearing support in the form of graphite/bronze bushes
– If required, the pushrods can rotate into the desired position
– Integrated position sensing (T12)

Ordering example:

SZKD 40.5 A13 T12 25 Stroke

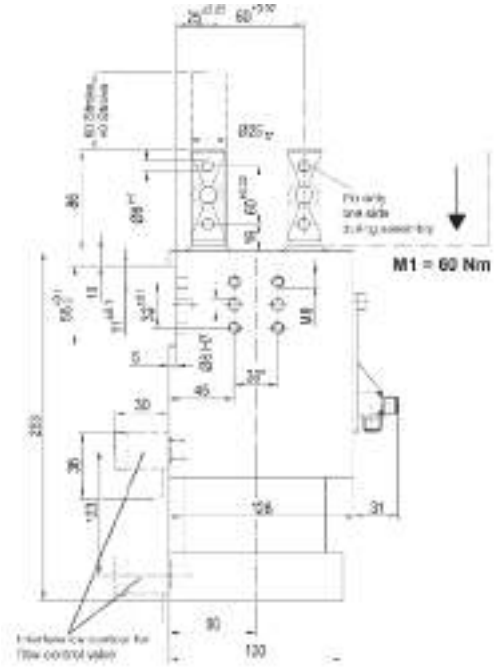
- Special stroke lengths 10 < 40 mm
- Position sensing system
- Adapter position
- Piston Ø
- Type

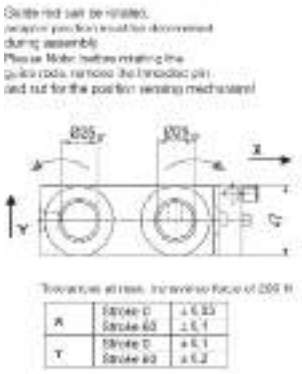
Order code TÜNKERS position sensing:

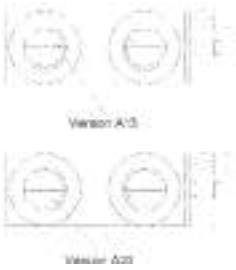
...T12 24 V inductive position sensing, 1 output with integral LEDs

Type	Extraction force (kN)	Thrust force (kN)	Operating pressure with oilfree air max. (bar)	Mounting (G)	Weight ~ (kg)
SZKD 40.5	0,4	0,6	6	1/8	1,4

Subject to technical modifications.







- Direct-drive linear cylinder with tandem piston rod
- Compact and robust basic construction for precision stroke and thrust tasks
- Slim housing made from high-strength aluminum material, with mounting surfaces on 3 sides
- Drive mechanism with Ø 60 mm oblong-section cylinder for thrust forces of 1400 N
- Synchronously-driven tandem-piston rod with double bearing-support in the form of graphite/bronze bushes
- If required, the pushrods can rotate into the desired position
- Integrated position sensing (T12)

Ordering example:

SZKD 63.5 BR3 60 T12

- T12 → Position sensing
- 60 → Stroke
- SZKD 63.5 BR3 → Type

Order code TÜNKERS position sensing systems:

...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Subject to technical modifications.

POSITIONING

TÜNKERS®
Ingenuity in series.

Positioning

Pivoting, traversing, lifting, rotating – these are typical functions that are the order of the day in the construction of fixtures and installations and they are used, for example, to:

– swivel-in a welding gripper

– raise a complete subassembly to working level

– traverse a clamp in order to remove components.

In the majority of cases, straightforward cylinder or traversing axes do not satisfy the requirement in terms of reproducibility and accuracy of control. Inevitably, in practice it is necessary to resort to special designs, consisting of drive mechanisms, linear control, shock absorbers and switches, which are frequently newly-designed for each particular application.

We claim that we are able to provide you with precise customised solutions – robust, compact, complete and, in addition, tried and tested with car production.

With a view to offering a robust configuration for volume production, all the products described in this catalogue feature enclosed housings, heavy-duty bearings, guides and defined end position settings with fixed limit stops, mechanical locking and position sensing.

POSITIONING

Pivoting dump units

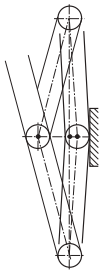
TÜNKERS®
Ingenuity in series.

Swivel Units

TÜNKERS Swivel Units are industry-proven power tools for traversing loads up to approx. 100 kg at pivoting angles up to 180°. With pneumatically- or electrically-operated cylinders, integrated knee-lever technology, positive stop and position sensing elements, TÜNKERS Swivel Units are genuine ready-to-use complete systems.

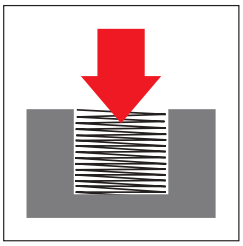
Design principle

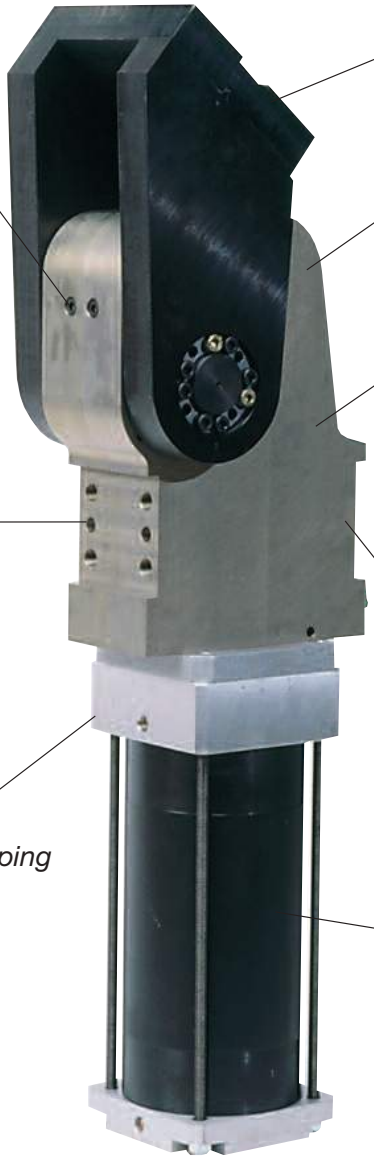
Knee-lever mechanism for secure end position and high pivoting power, with internal hard stop



Mounting options at the front and rear, optionally at the side

Pneumatic end position damping for both positions

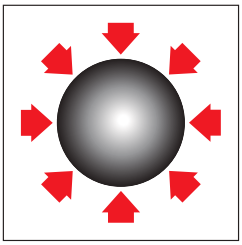




Robust swivel traverse with defined threaded mounting surface

High-grade quality bearing support with axial and radial bearings

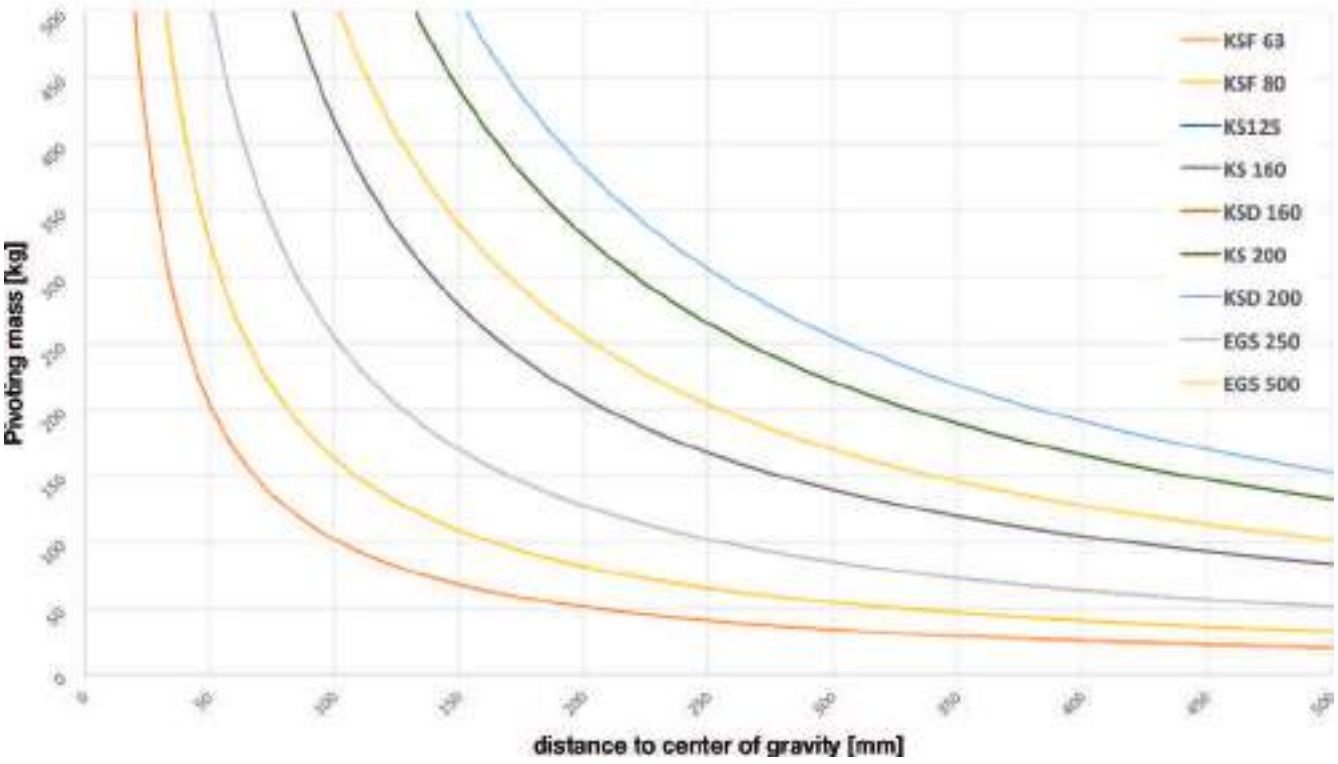
Enclosed aluminum housing protects all the mechanical components



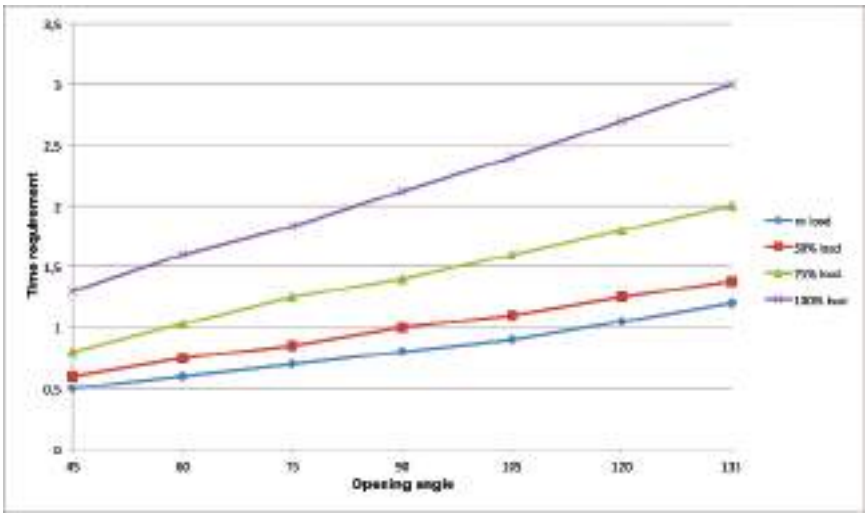
End position sensing Forward & Back with M12 central connector

Pneumatic cylinder for 6 bar operating pressure

Permissible pivoting weight as a function of the distance to the center of gravity



Opening and closing times as a function of the opening angle

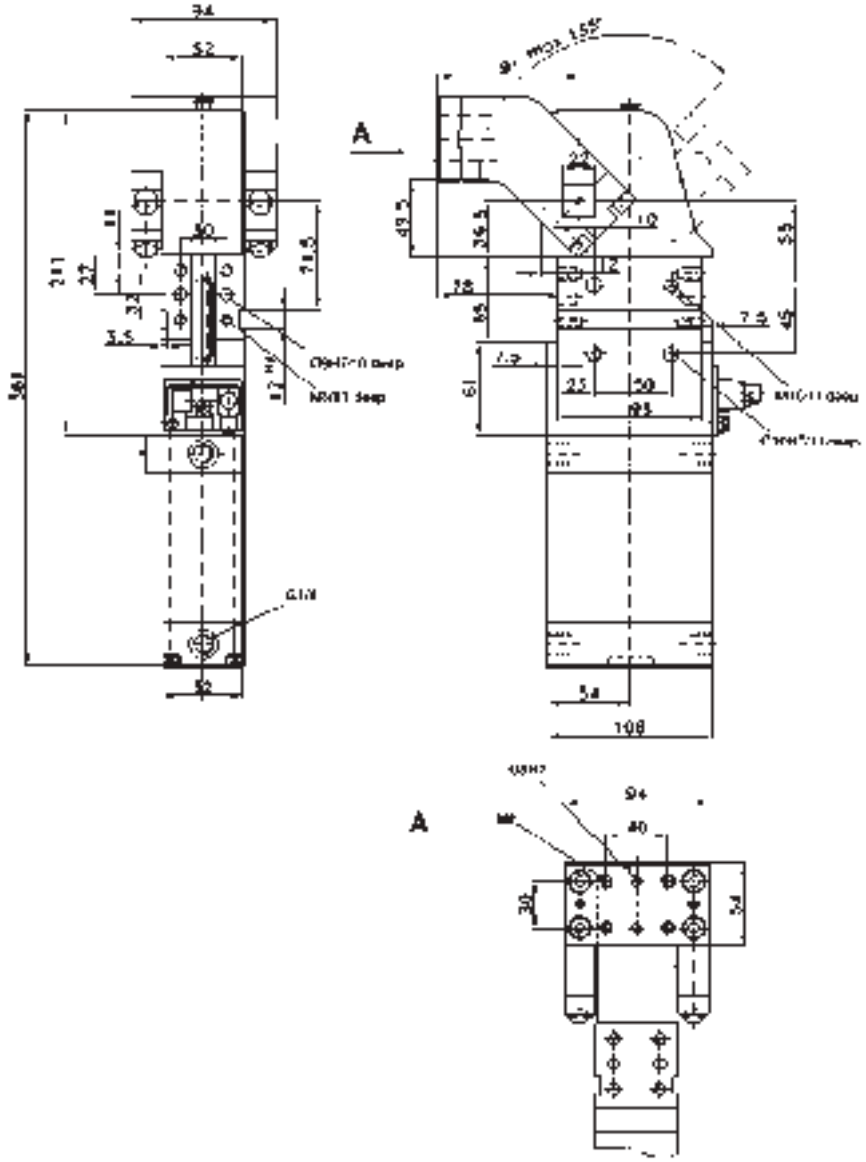


Compressed air consumption

for a complete work cycle (open/closed) as a function of the opening angle

Type	Opening angle 15°	30°	45°	60°	75°	90°	105°	120°	135°
KS 80	0,17 0,20 0,37	0,24 0,28 0,52	0,30 0,35 0,65	0,35 0,42 0,77	0,41 0,49 0,90	0,47 0,56 1,03	0,53 0,63 1,16	0,59 0,69 1,28	0,62 0,74 1,36
KS 100	0,32 0,35 0,67	0,44 0,48 0,92	0,55 0,60 1,15	0,65 0,72 1,37	0,76 0,83 1,59	0,87 0,95 1,82	0,98 1,08 2,06	1,08 1,19 2,27	1,15 1,27 2,42
KS 125	0,57 0,63 1,20	0,79 0,88 1,68	0,98 1,10 2,08	1,17 1,30 2,48	1,36 1,51 2,87	1,56 1,74 3,30	1,76 1,96 3,72	1,94 2,16 4,10	2,07 2,31 4,38
KS 160	0,97 1,03 2,00	1,35 1,44 2,79	1,68 1,79 3,47	2,00 2,14 4,14	2,32 2,48 4,80	2,67 2,85 5,52	3,01 3,21 6,22	3,32 3,54 6,86	3,55 3,78 7,33
KS 200	1,54 1,61 3,15	2,16 2,25 4,41	2,69 2,80 5,49	3,20 3,33 6,53	3,74 3,87 7,58	4,27 4,45 8,72	4,84 5,01 9,82	5,31 5,53 10,84	5,67 5,91 11,58

Mini-Swivel Unit KS 63



- Configuration with enclosed main body made from high-strength aluminum material
- Drive mechanism with oblong-section pneumatic cylinder, Ø 63 mm
- Force transmitted via knee-lever mechanism
- Locked end position
- Swivel traverse mounted on square-section shaft
- Pneumatic damping for open position
- Drive shaft running in needle roller bearings
- Maximum pivoting angle 135°
- Stepless adjustment of the opening angle from 45° to 135° (with simultaneous adjustment of the end position damping)
- Adjustment via the set screw in the base of the cylinder

Ordering example:

KS 63 T12 45°

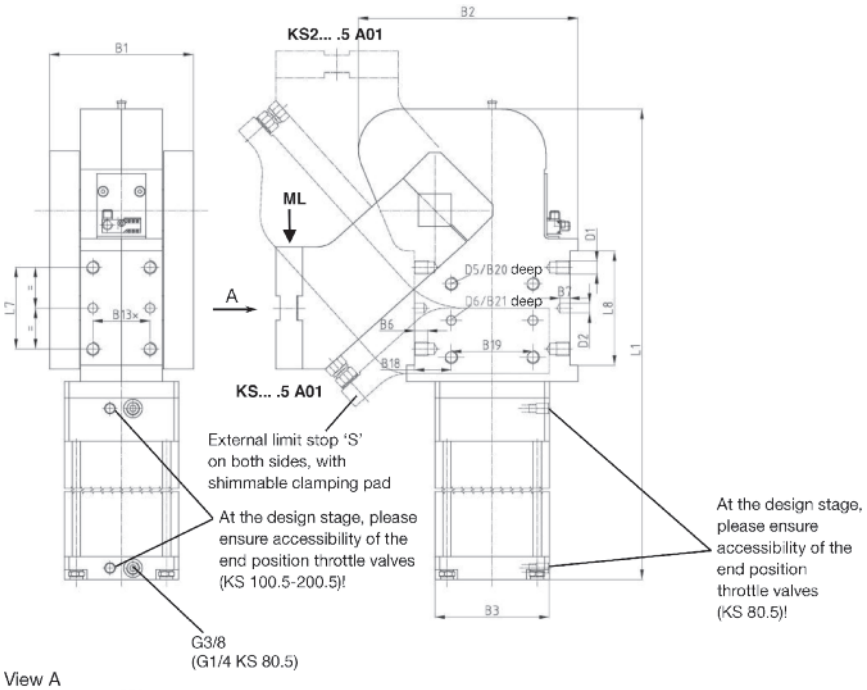
- 45° → Opening angle
- T12 → Position sensing system
- 63 → dependent on Piston Ø
- KS → Type

Order code TÜNKERS position sensing systems:

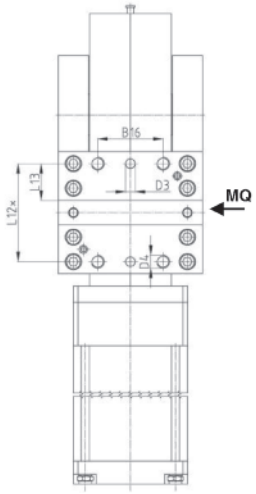
...T00 without position sensing
...T12 Inductive position sensing 24 V, 2 outputs without LED display

Type	Torque (Nm)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
KS 63	23	63	6,8	335x106x78

Subject to technical modifications.



View A



- Pivoting dump units with optimised knee-lever mechanism for constant torque cycle
- Enclosed main body made from high-strength aluminum material
- Powered by pneumatic cylinder, Ø 80 to 200 mm
- Locked end position
- Pivot arm mounted on square-section shaft
- Pneumatic damping for the end position
- Drive shaft running in needle roller bearings, with axial and radial bearings
- Maximum pivoting angle 135°
- Built-in end position sensing
- Optional: BD locking unit

Ordering example:

KS 125.5 (SG) S A01 LH T12 75°

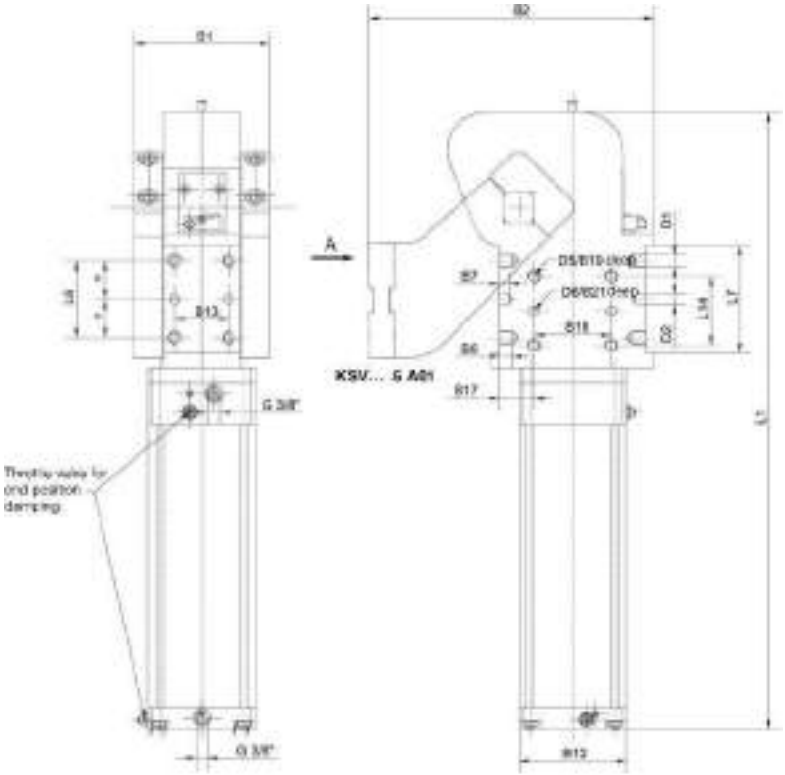
- 75° → Opening angle
- T12 → Position sensing system
- LH → Compressed air connection at the rear (standard)
- A01 → Pivot arm variants
- S → External limit stop (incl. SG)
- (SG) → Prepared for external limit stop
- 125.5 → Piston Ø
- KS → Type

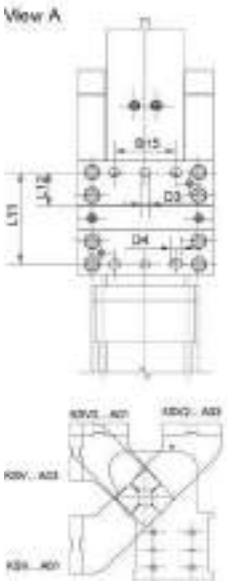
Type	Max. permissible torque ML max. 0-135° (Nm)	Transverse torque load MQ max. (Nm)	Pivoting time at 135° opening angle (sec).	Ø Piston (mm)	Weight ~ (kg)
KS 80.5	90	360	3,3	80	30
KS 100.5	140	380	3,3	100	35
KS 125.5	250	1000	3,3	125	65
KS 160.5	410	1000	3,3	160	75
KS 200.5	650	1000	4,3	200	85

Type	B1	B2	B3	B6	B7	B13*	B16	B18 ±0,1	B19*	B20	B21	D1	D2 H7	D3 H7	D4	D5	D6 H7	L1 (max. 135°)	L7 ±0,1	L8 +0,1	L12*	L13
KS 80.5	145	288	140x62	18	12	50	60	30	85	16	10	M12	10	10	M12	M16	12	604	50	80	90	30
KS 100.5	145	288	110	18	12	50	60	30	85	16	10	M12	10	10	M12	M16	12	602	50	80	90	30
KS 125.5	176	370	140	16	12	70	80	45	100	16	12	M16	12	12	M16	M16	12	730	100	140	120	45
KS 160.5	176	370	180	16	12	70	80	45	100	16	12	M16	12	12	M16	M16	12	746	100	140	120	45
KS 200.5	176	370	220	16	12	70	80	45	100	16	12	M16	12	12	M16	M16	12	751	100	140	120	45

Subject to technical modifications.

Vario-Swivel Unit KSV... .5





- Enclosed main body made from high-strength aluminum material
- Powered by pneumatic cylinder, Ø 80 to 200 mm
- Locked end position
- Pivot arm mounted on square-section shaft
- Pneumatic damping for the end position
- Drive shaft running in needle roller bearings, with axial and radial bearings
- Maximum pivoting angle 135°
- Built-in end position sensing
- Vario-pivoting dump units with stepless adjustment of the opening angle
- Optional: BD locking unit

Ordering example:

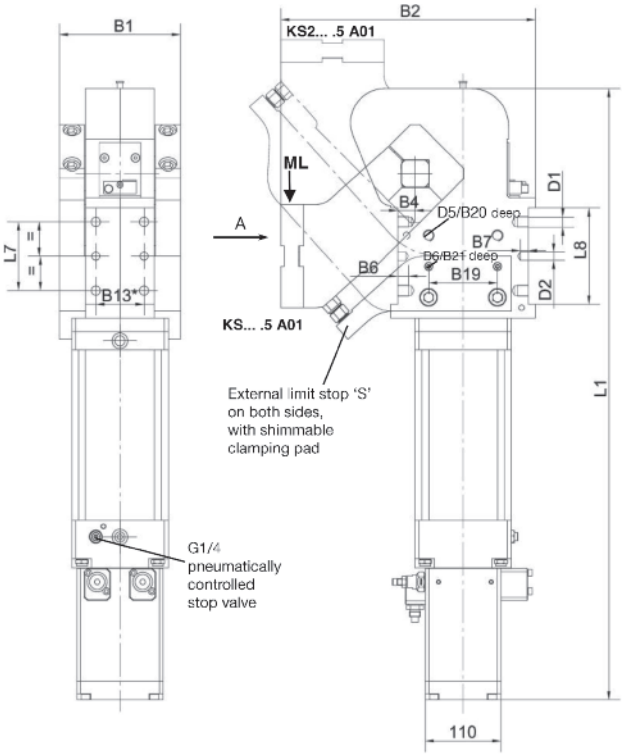
KSV 125.5 SG S A01 T12 75°

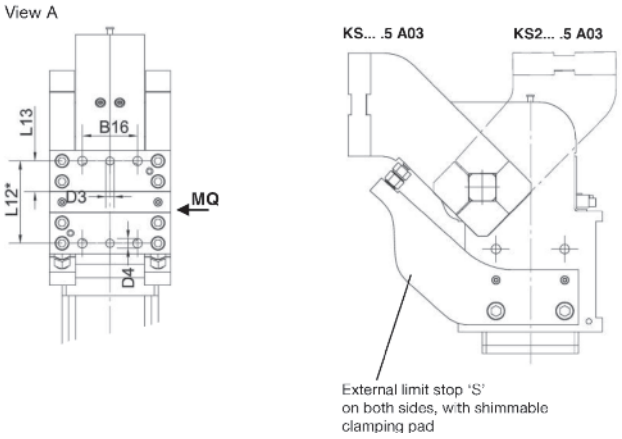
- 75° → Opening angle
- T12 → Position sensing system
- A01 → Pivot arm variants
- S → External limit stop (incl. SG)
- SG → Prepared for external limit stop
- 125.5 → Piston Ø
- KSV → Type

Type	Max. permissible torque ML max. 0-135° (Nm)	Transverse torque load MQ max. (Nm)	Pivoting time at 135° opening angle (sec).	Ø Piston (mm)	Cylinder R = Circular-section F = slim	Weight ~ (kg)
KSV 80.5	90	360	3,3	80	F	33
KSV 100.5	140	380	3,3	100	R	38
KSV 125.5	250	1000	3,3	125	R	70
KSV 160.5	410	1000	3,3	160	R	80
KSV 200.5	650	1000	4,3	200	R	90

Type	B1	B2 ±0,1	B6	B7	B12	B13*	B15	B17 ±0,1	B18*	B19	B21	D1	D2 H7	D3 H7	D4	D5	D6 H7	L1 (max. 135°)	L6 ±0,1	L7 +0,1	L11*	L12* ±0,1	L14*
KSV 80.5	145	288	18	12	140x62	50	10	30	85	16	10	M12	10	10	M12	M16	12	680	50	80	90	30	60
KSV 100.5	145	288	18	12	110	50	10	30	85	16	10	M12	10	10	M12	M16	12	684	50	80	90	30	60
KSV 125.5	176	370	16	12	140	70	20	45	100	16	12	M16	12	12	M16	M16	12	805	100	140	120	45	90
KSV 160.5	176	370	16	12	180	70	20	45	100	16	12	M16	12	12	M16	M16	12	820	100	140	120	45	90
KSV 200.5	176	370	16	12	220	70	20	45	100	16	12	M16	12	12	M16	M16	12	825	100	140	120	45	90

Subject to technical modifications.





- Pivoting dump units with hydraulic speed damping and emergency stop function
- Enclosed main body made from high-strength aluminum material
- Powered by hydraulic cylinder Ø 100 to 200 mm
- Locked end position
- Pivot arm mounted on square-section shaft
- Pneumatic damping for the end position
- Drive shaft running in needle roller bearings, with axial and radial bearings
- Maximum pivoting angle 135°
- Built-in end position sensing

Ordering example:

KS 125.5 H SG S A01 T12 75°

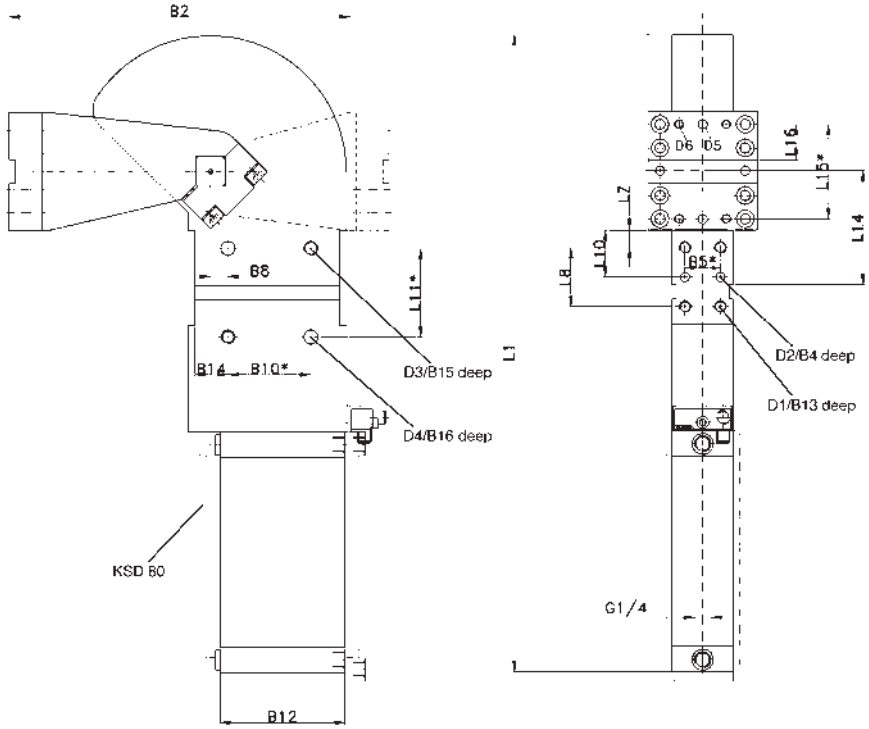
- 75° → Opening angle
- T12 → Position sensing system
- A01 → Pivot arm variants
- S → External limit stop (incl. SG)
- SG → Prepared for external limit stop
- H → Hydraulic speed damping
- 125.5 → Piston Ø
- KS → Type

Type	Max. permissible torque ML max. 0-135° (Nm)	Transverse torque load MQ max. (Nm)	Pivoting time at 135° opening angle (sec).	Ø Piston (mm)	Weight ~ (kg)
KS 80.5 H	140	380	3,3	100	30
KS 125.5 H	250	1000	3,3	125	68
KS 200.5 H	650	1000	3,3	200	85

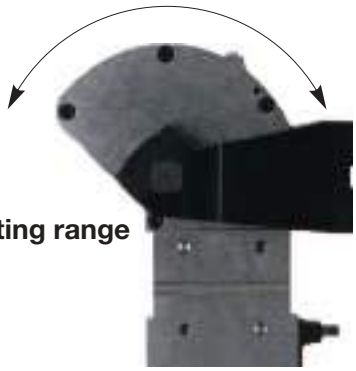
Type	B1	B2	B4	B6	B13*	B16	B19*	B20	B21	D1	D2 H7	D3 H7	D4	D5	D6 H7	L1 (max. 135°)	L7 ±0,1	L8 +0,1	L12*	L13*
KS 80.5 H	145	288	20	18	50	60	85	16	10	M12	10	10	M12	M16	12	814	50	80	30	30
KS 125.5 H	176	370	25	16	70	80	100	16	12	M16	12	12	M16	M16	12	890	100	140	120	45
KS 200.5 H	176	370	25	16	70	80	100	16	12	M16	12	12	M6	M16	12	890	100	140	120	45

Subject to technical modifications.

180°-Swivel Unit KSD...



- Slim configuration with 180° pivoting angle
- Powered by oblong-section cylinder, Ø 63 and 80 mm
- Force transmitted via knee-lever mechanism
- Locked end position
- Pneumatic damping for both end positions
- Drive shaft running in needle roller bearings, with axial and radial bearings
- Optional built-in end position sensing



180° pivoting range

Ordering example:

KSD 63 A10 T12 180°

- 180° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- 63 → Piston Ø
- KSD → Type

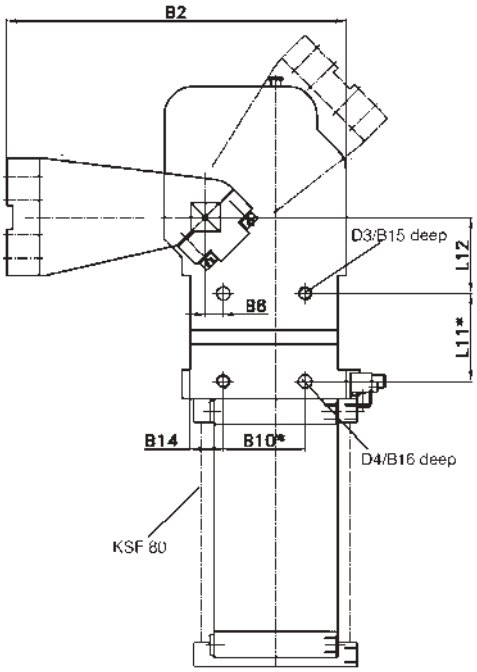
Type	Torque (Nm)	Ø Cylinder (mm)	Weight ~ (kg)
KSD 63	50	63	20
KSD 80	90	80	22

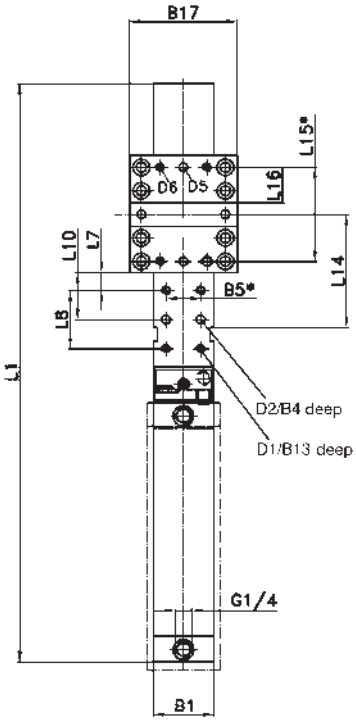
Type	B2	B4	B5*	B8 ±0,05	B10*	B12	B13	B14 ±0,1	B15	B16	B17	D1	D2 H7	D3	D4 H7	D5 H7	D6	L1	L7 ±0,1	L8 ±0,2	L10 ±0,05	L11*	L14
KSD 63	290	12	30	15	70	106	18	28	15	12	102	M8	8	M12	12	8	M8	680	15	50	40	75	96,5
KSD 80	290	12	30	15	70	140	18	28	15	12	102	M8	8	M12	12	8	M8	730	15	50	40	75	96,5

Type	L15*	L16 ±0,1
KSD 63	80	30
KSD 80	80	30

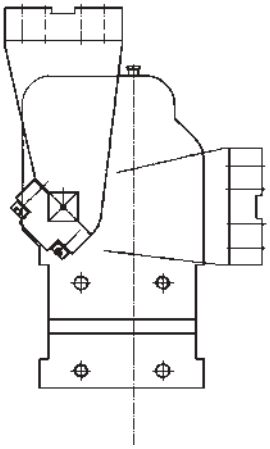
Subject to technical modifications.

KSF...





KSF2...



- Slim configuration with oblong-section cylinder
- Force transmitted via knee-lever mechanism
- Locked end position
- Pneumatic damping for both end positions
- Drive shaft running in needle roller bearings, with axial and radial bearings
- Maximum pivoting angle 135°
- Optional built-in end position sensing

Ordering example:

KSF 63 A10 T12 135°

- 135° → Opening angle
- T12 → Position sensing system
- A10 → Clamp arm variants
- 63 → Piston Ø
- KSF → Type

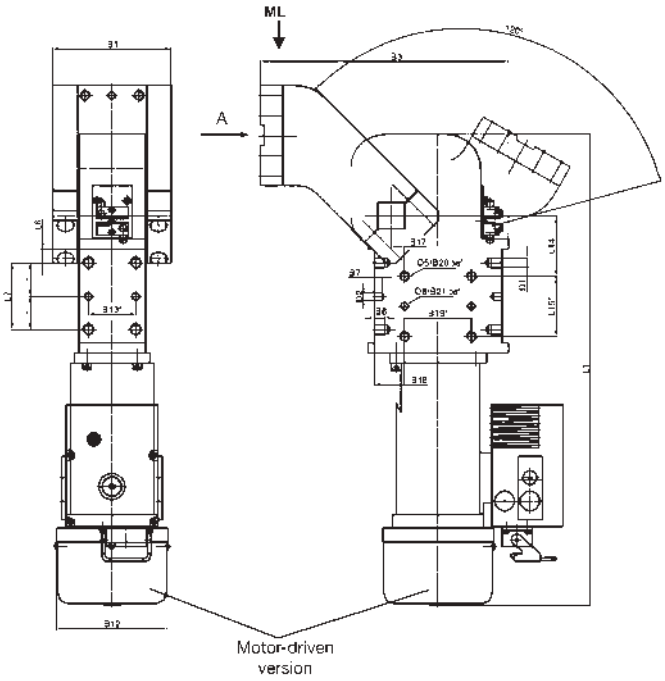
Type	Torque (Nm)	Ø Cylinder (mm)	Weight ~ (kg)
KSF 63	50	63	17
KSF 80	110	80	19

Type	B1	B2	B8 ±0,05	B10*	B14 ±0,1	B17	D5 H7	D6	L1 ~	L7 ±0,1	L8 ±0,2	L10 ±0,05	L11*	L12 ±0,05	L14	L15*	L16 ±0,1
KSF 63	52	290	15	70	28	92	8	M8	530	15	50	40	75	65	96,5	80	30
KSF 80	62	290	15	70	28	102	8	M8	600	15	50	40	75	65	96,5	80	30

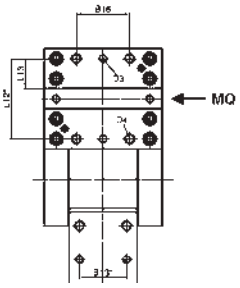
Subject to technical modifications.

Electric Pivoting Dump Unit EKS... .6

EKS... .6 A03



View A



- Pivoting mechanism powered by electric hollow shaft motor and ball screw
- Dimensions compatible with pneumatic series
- Holding brake for securing end position and emergency stop fitted as standard
- Optional frequency converter flange-fitted to the motor to regulated the pivoting motion, with soft start, acceleration and braking profile

Option:
adapted frequency converter

Ordering example:

EKS 160.6 (SG) S A01 T12 120° MS01

- MS01 → SEW MOVIMOT
- 120° → Opening angle
- T12 → Position sensing system
- A01 → Pivot arm variants
- S → External limit stop (incl. SG)
- (SG) → Prepared for ext. limit stop
- EKS 160.6 → Type

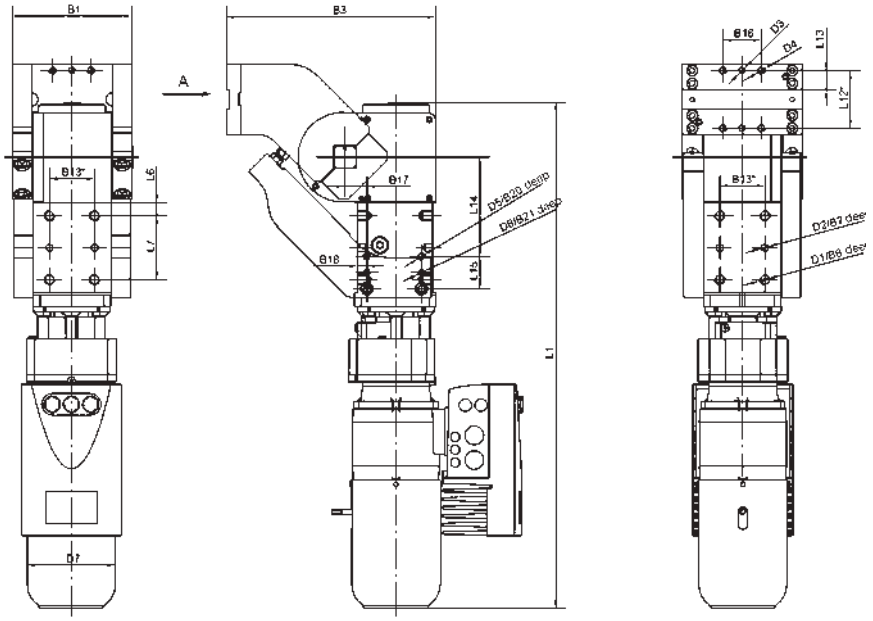
Type	Max. permissible torque ML max. (Nm)	Transverse torque loading MQ max. (Nm)	Pivoting time at max. 180° opening angle (sec.)	Weight (kg) without pivoting traverse
EKS 100.6	180	380	2,35	52
EKS 160.6	320	1000	2,35	60
EKS 200.6	450	1000	2,55	78

Type	Drive motor						
	Nominal voltage U Y AC (V)	Duty cycle (ED)	Nominal power (W)	Nominal rating n_N (1/min)	Motor Md at N_M (Nm)	Nominal current I (A)	Protection type DIN 40050
EKS 100.6	400	20%	280	830	3,2	1,3	IP 54
EKS 160.6	400	20%	720	900	7,6	3,3	IP 54
EKS 200.6	400	20%	1700	1230	13,0	5,6	IP 54

Type	B1	B3	B7	B12 dia.	B13*	B16 ±0,1	B17 ±0,05	B18 ±0,1	B19*	B20	B21	D1	D3 H7	D4	D5	D6 H7	L1 –	L6 ±0,1	L7 ±0,1	L12* ±0,1	L13 ±0,1	L14 ±0,05	L15*
EKS 100.6	145	288	12	164	50	60	10	30	85	16	10	M12	10	M12	M16	12	615	15	50	90	30	85	60
EKS 160.6	176	370	12	164	70	80	20	45	100	16	12	M16	12	M16	M16	12	701	20	100	120	45	90	90
EKS 200.6	176	370	12	164	70	80	20	45	100	16	12	M16	12	M16	M16	12	729	20	100	120	45	90	90

Subject to technical modifications.

Electric Globoid Pivoting Dump Unit EGS



- Conversion of the pivoting motion by mean of a globoidal index drive
- Eccentric location of the shaft for zero-backlash bearing support of the drive mechanism
- Compact configuration with principal dimensions compatible with the TÜNKERS pneumatic series
- High emergency stop resistance
- Cycle time advantage compared with the pneumatic series due to adjustable traverse speed (<2 sec to >3 sec at 135° opening angle)
- Rotational speed feedback via combination sensor for high-precision positioning due to constant torque until idle state
- Compact configuration due to bolt-on frequency converter
- Control via any established systems (Profibus, Profinet, etc.)

Ordering example:

EGS 250 (SG) S A03 T80 180°

- 180° → Opening angle
- T80 → Position sensing system
- A03 → Pivot arm variants
- S → External limit stop (incl. SG)
- (SG) → Prepared for ext. limit stop
- EGS 250 → Type

Type	Max. permissible torque ML max. (Nm)	Transverse torque loading MQ max. (Nm)	Pivoting time at max. 180° opening angle (sec.)	Weight (kg) without pivoting traverse
EGS 125	125	400	2,5	32
EGS 250	250	400	2,5	65
EGS 500	500	400	2,5	110

Type	Drive motor					
	Nominal voltage AC (V)	Nominal current I_0 (A)	Duty cycle (ED)	Nominal rev/min n_N (1/min)	Motor M_n at N_n	Protection type DIN 40050
EGS 125	400	0,95	20%	1380	0,8	IP54
EGS 250	400	0,96	20%	1380	1,73	IP54
EGS 500	400	3,6	20%	1380	5,3	IP54

Type	B1	B2 ±0,1	B3	B4	B5	B6	B7	B8	B9 ±0,1	B10	B11	B13*	B15	B16 ±0,2
EGS 125	167	101,5	202,5	10	5	18	12	5	120	130	168	50	5	60
EGS 250	187	122	215	20	5	16	12	5	117	127	180	70	5	60
EGS 500	216	140	280	20	10	18	15	10	145	165	239	70	5	80

Type	B17 ±0,1	B18 ±0,1	B19	B20	B21	B23	X1	X2	D1	D2 H7	D3 H7	D4	D5	D6 H7	L1 –	L3	L4 ±0,1	L5 ±0,1	L6 ±0,1	L7 ±0,1	L8 +0,1	L9	L10 –
EGS 125	25	15	85	16	12	235,5	156	140	M12	10	10	M12	M12	10	710	100	30	77,5	15	50	80	147,5	238,5
EGS 250	35	15	85	16	12	269	156	140	M16	12	10	M12	M12	10	789	110	30	71	20	100	140	176	296,5
EGS 500	47	27	100						M16	12	12	M16	M16	12	930,5	150	30	110	20	100	140	248	379,5

Type	L11 ±0,02	L12* ±0,1	L13 ±0,1	L14 +0,1	L15*	L16	L17
EGS 125	195	90	30	130	50	214,5	434
EGS 250	233	90	30	155	50	145,2	471
EGS 500	260	120	45	125	90	198	551

Subject to technical modifications.

POSITIONING

Linear Units

TÜNKERS®
Ingenuity in series.

Linear Units

Linear units for moving loads up to a maximum 1,000 kg with stroke lengths up to approx. 500 mm. Powered by pneumatic cylinders or, alternatively, by electric motors with ball screws. Dependent on load and stroke, we can provide two different system solutions:

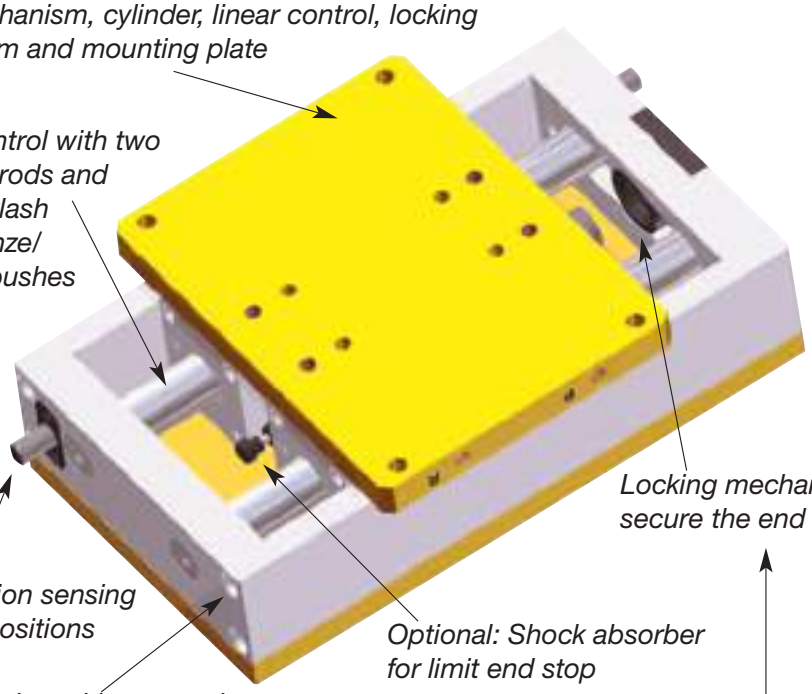
Compact Linear unit
Linear unit in integral configuration, whereby the drive mechanism, guide and locking system are combined in one housing.

Standard Linear unit
Unit in modular configuration, with separate mounting plate, recirculating ball bearing guide, drive cylinder and locking mechanism.

System configuration: Compact version

Guide carriage as integral subassembly with drive mechanism, cylinder, linear control, locking mechanism and mounting plate

Linear control with two precision rods and zero-backlash fitted bronze/ graphite bushes

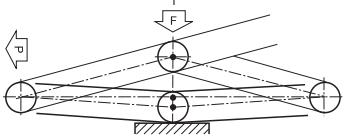


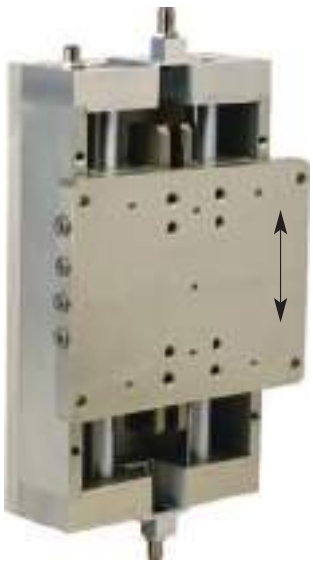
Locking mechanism to secure the end positions

End position sensing for both positions

Optional: Shock absorber for limit end stop

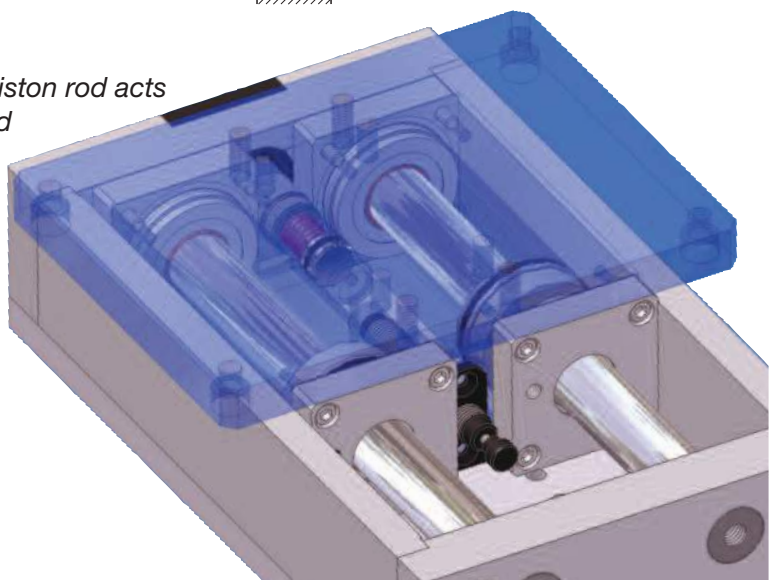
Basic housing with screwed aluminum plates





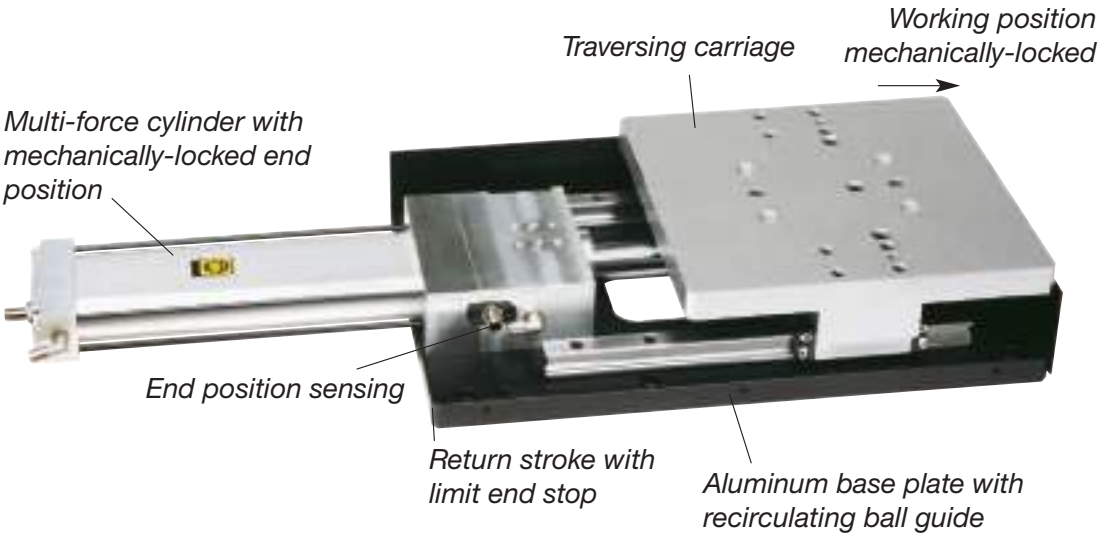
Vertical
e.g. as lifting unit

Principle: piston rod acts as guide rod



System configuration Standard-Version

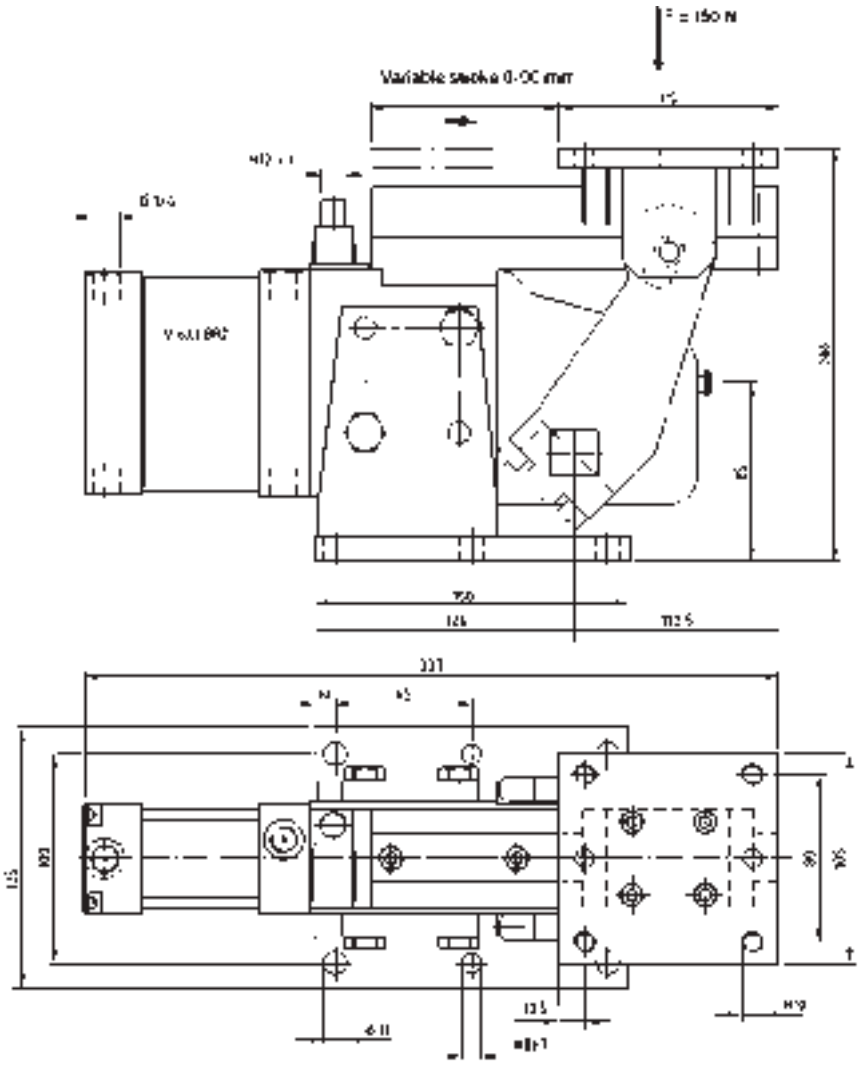
with pneumatic drive mechanism



with electric drive mechanism

Structurally similar to the pneumatic unit, but skid driven by servo-motor and ball screw.

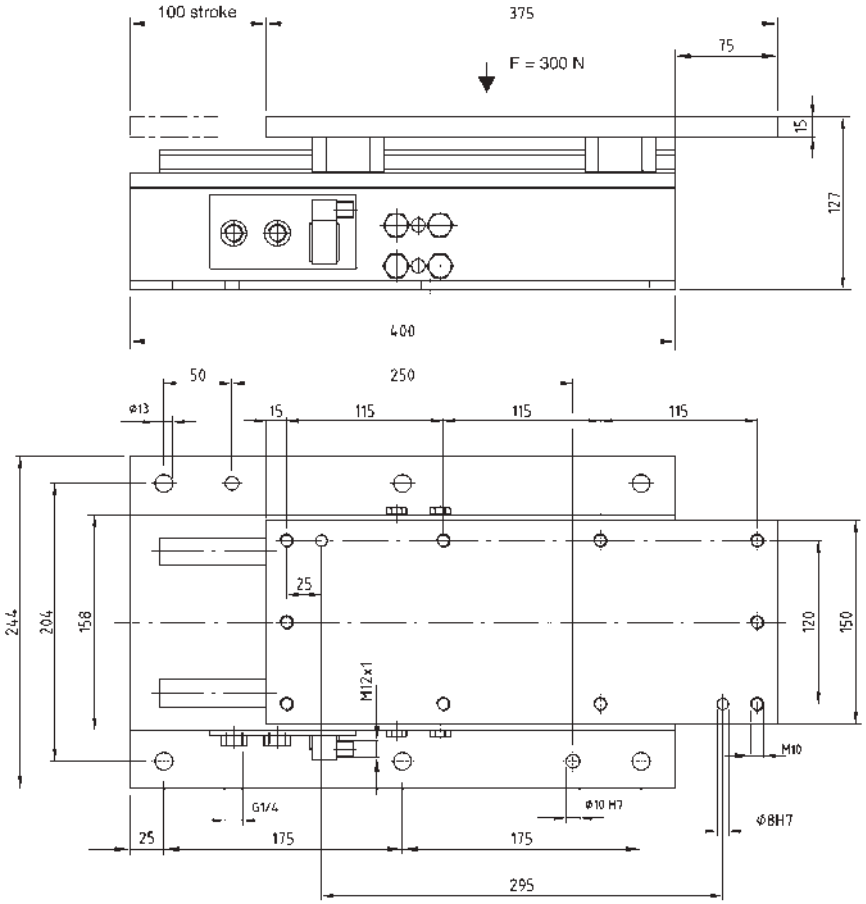
Linear unit LE 15



– Mini-Linear unit for moving loads up to 15 kg
– Skid with recirculating ball guide
– Powered by pneumatic clamping unit
– End position locked by knee-lever
– Forward/back end position sensing using inductive sensors

Type	Loading force (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
LE 15	0,15	15	7,6	337x202,5x125

Subject to technical modifications.



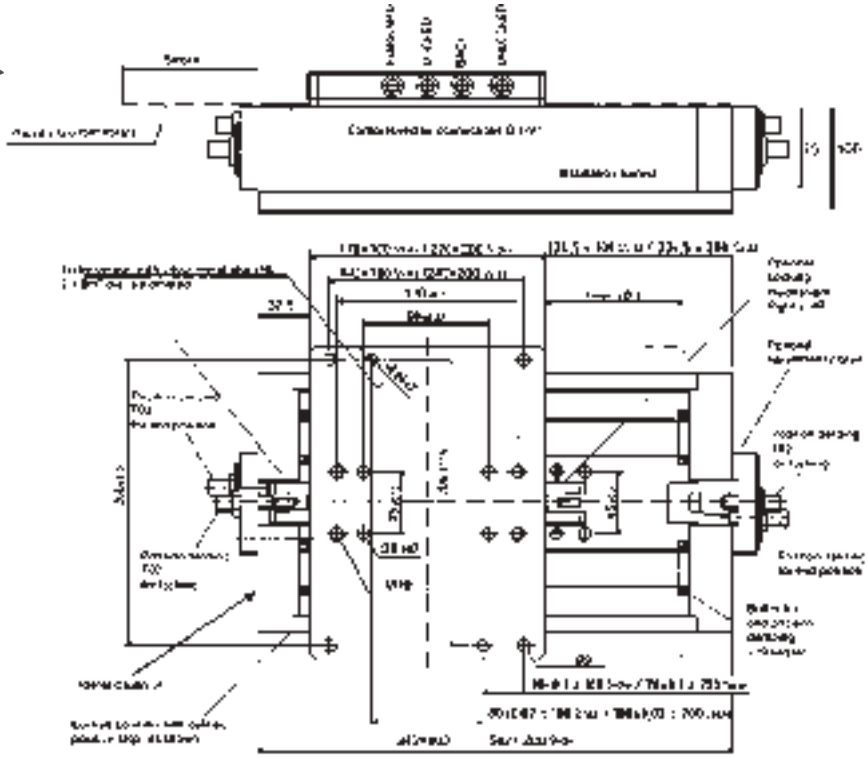
– Linear unit for moving loads up to approx. 30 kg
– Skid in double-rail configuration, each with two recirculating ball guides
– Powered by pneumatic clamping unit
– Forward end position knee-lever locked
– Forward/back end position sensing using inductive sensors

Clamp as drive mechanism unit

Type	Loading force (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
LE 30	0,3	30	24	475x244x130,5

Subject to technical modifications.

Linear unit LE 60



– Robust housing made of screwed aluminum plates
– Linear unit guide with 2 precision rods running in 4 bronze/graphite bushes for stroke lengths up to max. 200 mm
– 2 Pneumatic cylinders, 55 mm diameter, integral with the guide skid, for traversing forces up to 1,750 N
– End position switch for both positions
– Standard with end position damping by buffers
– Optional: mechanical end position locking using knee-lever system

Ordering example:

LE60 100 VR SB T02

- T02 → Position sensing system
- SB → Option: Guard plate
- VR → Option: locking mechanism on the right
- 100 → Stroke
- LE60 → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 2 outputs without LED display

Weight: 100 mm Stroke = approx. 13,5 kg
200 mm Stroke = approx. 16,8 kg
G max.: 30 kg
M max.: 60 Nm
Fast stroke at 5 bar = 1750 N

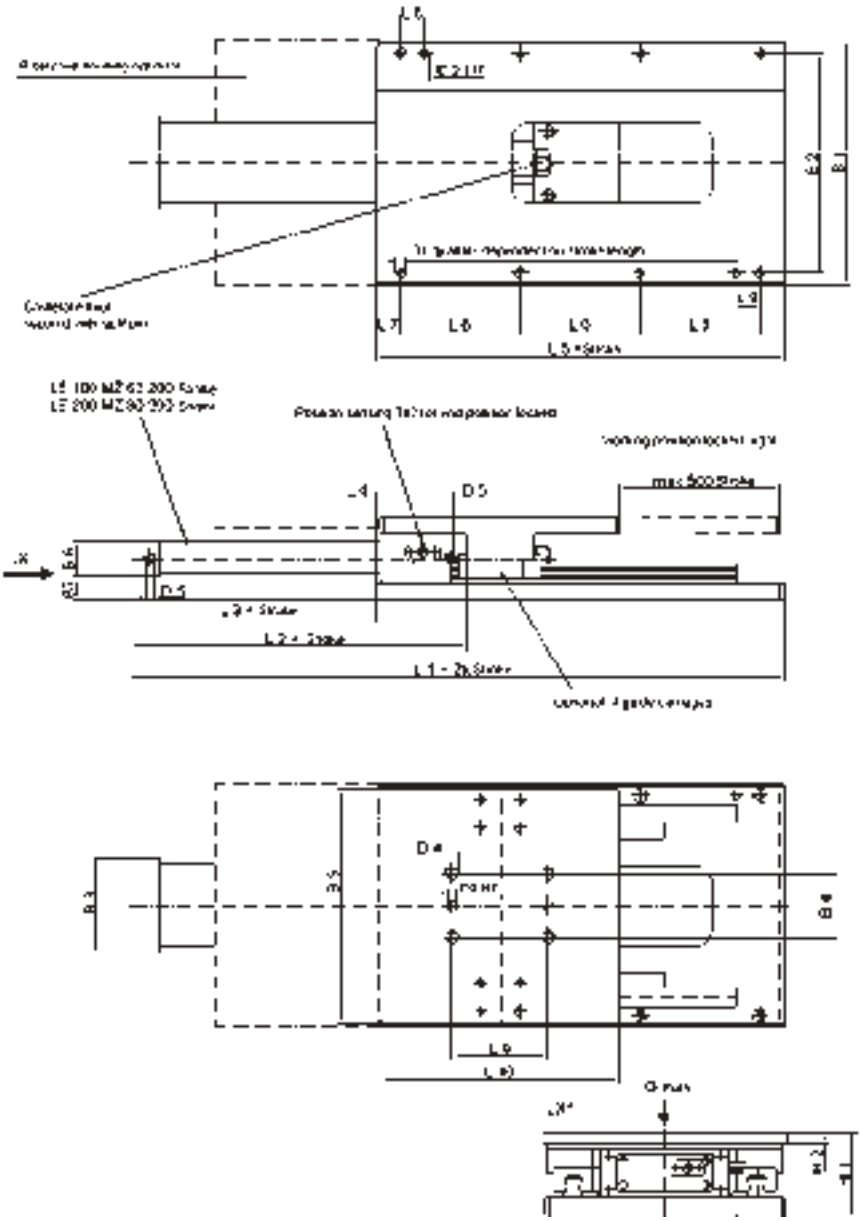
Standard stroke lengths:
100 mm; 200 mm
Intermediate stroke lengths for LE 100 (50 to 100 mm) and LE 200 (110 to 200 mm) on request

Options:
VR: Locking mechanism on the right
VL: Locking mechanism on the left
VRL: Locking mechanism on the right and the left
SB: Guard plate on the right and the left

Type	Loading force (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
LE 60	0,3	60	13,5	542x226x100

Subject to technical modifications.

- Robust steel base plate
- Two guide rails with recirculating ball guides
- Skid plate made from aluminum with standard mounting hole pattern
- Powered by multi-force pneumatic cylinder with end position locking on one side
- End position sensing
- Optional: Protective covers



Ordering example:

LE100 200 SB T02

- T02 → Position sensing system
- SB → Option: Protective housing
- 200 → Stroke
- LE100 → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 2 outputs without LED display

G max.: LE 100 = 100 kg
LE 200 = 200 kg

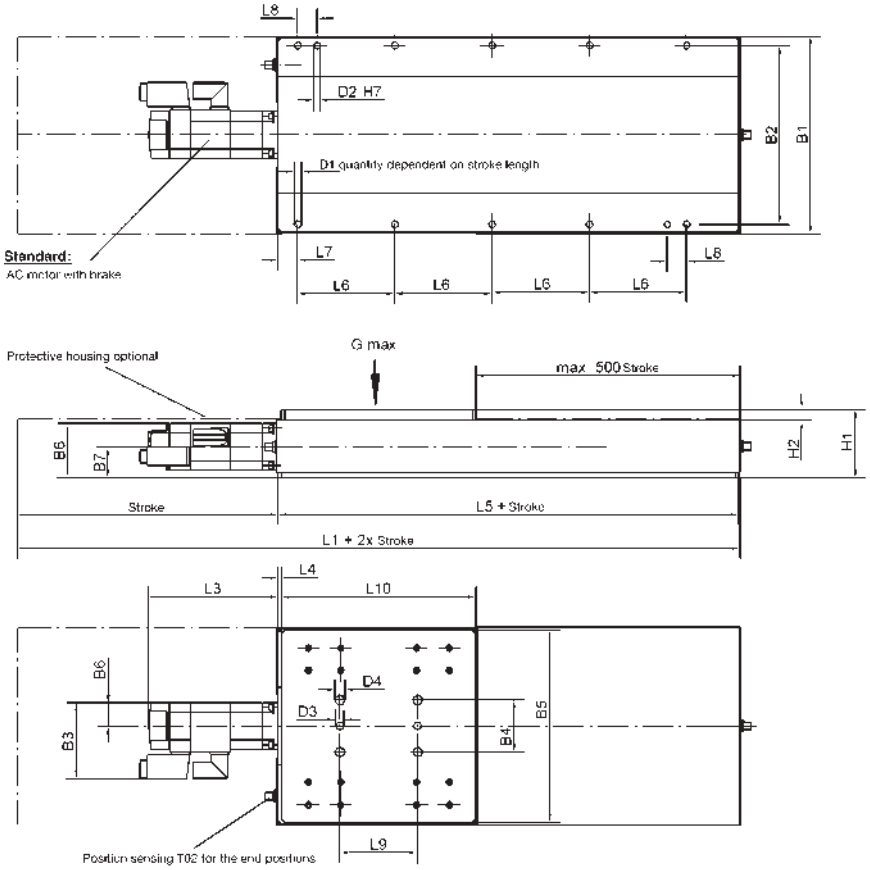
Type	Fast stroke force at 6 bar (kN)	Torque M max. (Nm)	Standard stroke length (mm)	Weight at 200 mm stroke ~ (kg)
LE 100	1,75	100	100, 200, 300, 400, 500	60
LE 200	2,8	300		110

Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	B1	B2	B3	B4	B5	B6	B7	D1dia.	D2dia.	D3dia.	D4	D5	H1	H2
LE 100	416	219	106	5	310	150	30	30	120	300	305	276	120	80	295	45	31	11	10	12	M16	1/8	105	15
LE 200	550	339	153	5	410	180	35	40	150	400	405	376	140	100	395	62	34	13	12	12	M20	1/4	130	22

Subject to technical modifications.

Electric Linear unit ELE 100/200

- Robust steel base plate
- Dual recirculating ball guides with four traversing carriages
- Steel skid plate with standard mounting hole pattern
- Powered by rotary current motor or servo-motor, as per end client's specification
- Skid motion via ball screw



Ordering example:

ELE 100 200 42 V DM SB T02

- T02 → Position sensing system
- SB → Optional: Guard plate (SB)
- DM → Standard rotary current motor / Optional: Servo-motor (SM)
- 42 V → Nominal voltage
- 200 → Stroke
- 100 → Type

Order code TÜNKERS
Position sensing:
...T00 without position sensing
...T12 24 V inductive position sensing, 2 outputs without LED display

G max.: LE 100 = 100 kg
LE 200 = 200 kg
LE 500 = 500 kg

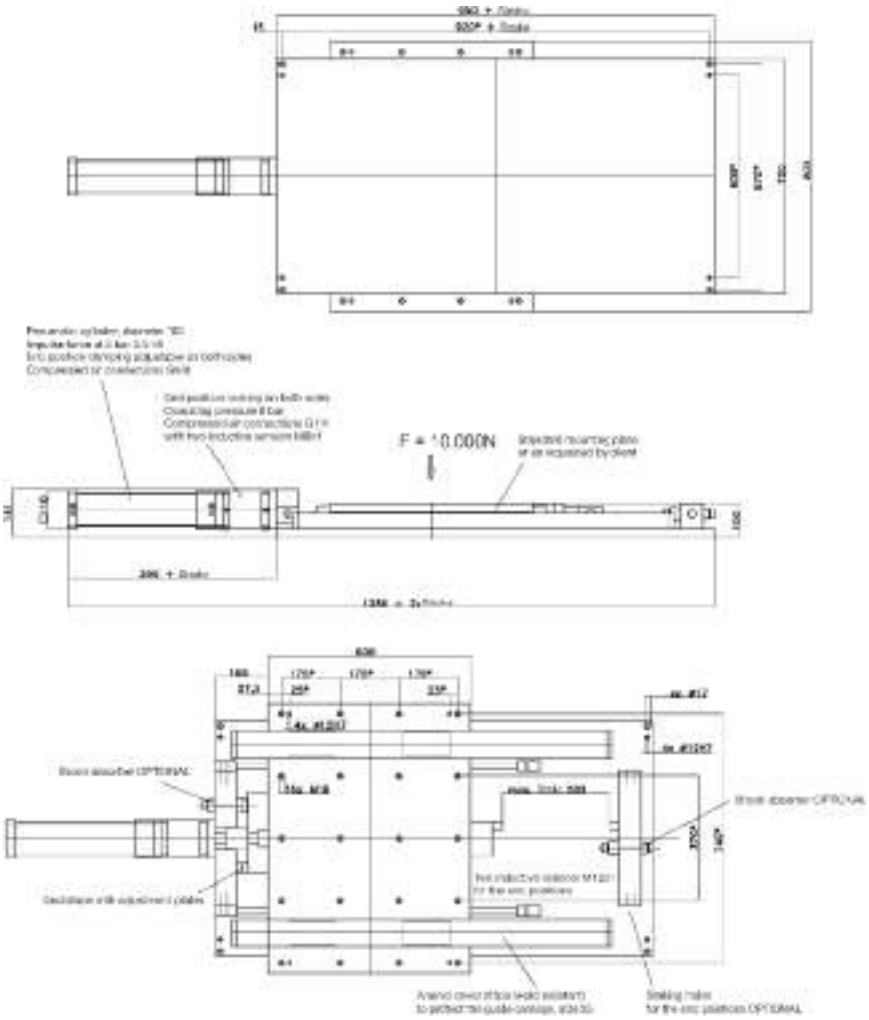
Standard rotary current motor:
Protection type: IP 54
Nominal voltage: 42 V or 400 V
Nominal power: 50 W
Idle period: min. 10 sec.

Optional:
Servo-motor with brake and transducer for multiple positions

SB: Guard plate

Type	Fast stroke force (kN)	Torque M max. (Nm)	Standard stroke length (mm)	Weight at 200 mm stroke ~ (kg)	Dimensions (mm)
ELE 100	1,75	100	100, 200, 300, 400, 500	60	435x305x105
ELE 200	2,8	300		110	635x376x130

Subject to technical modifications.



- Base plate made of high-grade aluminum material
- Dual recirculating ball guide
- Skid plate with standard mounting hole pattern
- Powered by pneumatic cylinder with end position locking and damping on both sides
- End position sensing and locking sensing on both sides
- Linear control protected against weld spatter by aramid cover strip
- Fine adjustment of the stroke length ±5 mm
- Optional: Protective covers
- Optional: Staking drilling for the end positions
- Optional: Shock absorber

Ordering example:

LE 1000 200 VRL T02

- T02 → Position sensing system
- VRL → Locking mechanism right/left
- 200 → Stroke
- LE 1000 → Type

Order code TÜNKERS position sensing systems:

...T00 without position sensing
...T12 24 V inductive position sensing, 2 outputs without LED display

Type	Fast stroke force at 5 bar (kN)	Torque M max. (Nm)	Standard stroke length (mm)	Weight (kg)	Length
LE 1000	3,5	6400	100, 200, 300, 400, 500	195	950 + Stroke

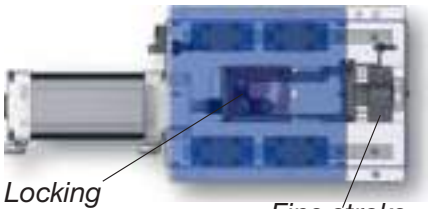
Subject to technical modifications.

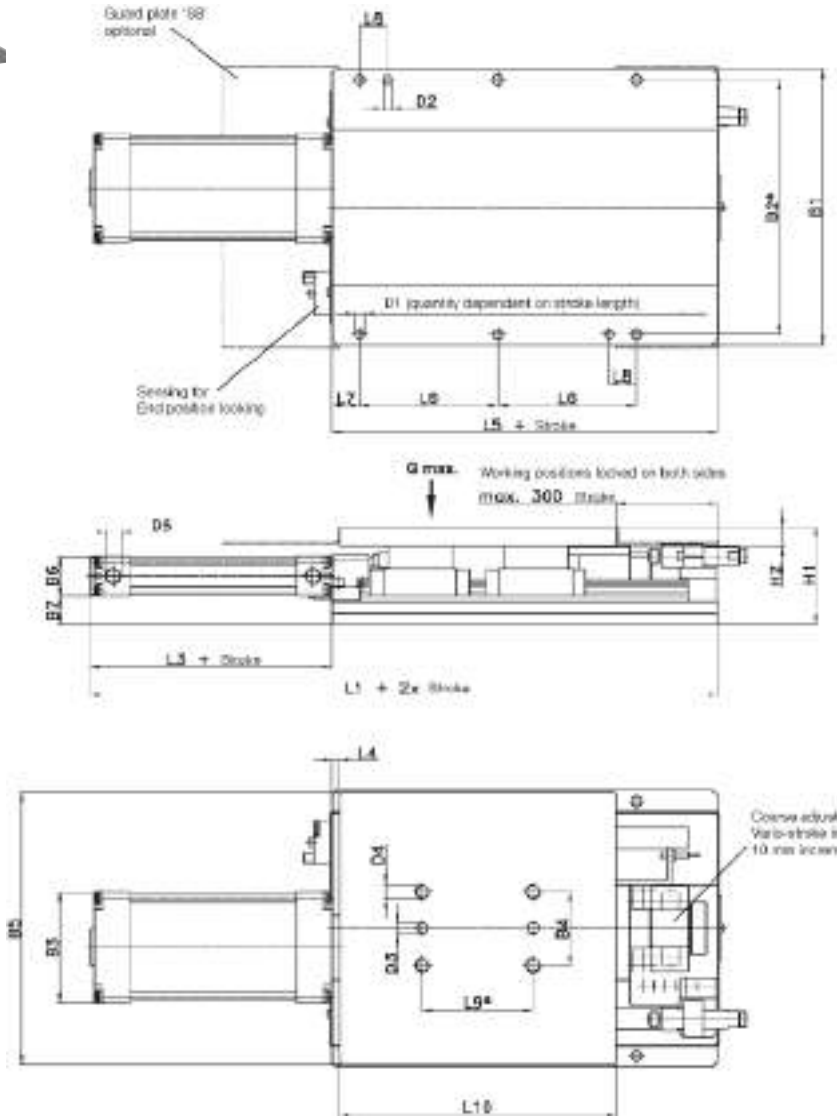
Linear unit LEV 100/200 with dual locking

- Pneumatic linear unit with dual knee-lever locking
- Purely mechanical over-centre locking for the forward and rear positions, using patented dual system
- Defined end position location with zero-backlash and mechanically secured
- Robust 4-point star guide
- Designed for traverse weights from 100 up to 200 kg

Vario principle:
- Fine adjustment of the end position in the 0 to 50 mm stroke range
- Designed for traverse weights from 100 up to 200 kg

Application: e.g. traversing fixtures or clamping subassemblies in two necessary working positions





Ordering example:

LEV 100 **200** **SB** **T02**
- T02 → Position sensing system
- SB → Option: Guard plate
- 200 → Stroke
- LEV 100 → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 2 outputs without LED display

Type	Fast stroke at 6 bar (kN)	Torque M max. (Nm)	Standard Variostrokes (mm)	Weight at 100 stroke ~ (kg)
LEV 100	1,75	100	100, 200, 300	40
LEV 200	2,8	300	100, 200, 250, 300	60

Type	L1	L3	L4	L5	L6 ±0,1	L7	L8 ±0,02	L9	L10	B1	B2	B3	B4	B5	B6	B7	D1	D2 H7	D3 H7	D4	D5	H1	H2
LEV 100	481	163	8	318	150	30	30	120	300	300	276	120	80	295	44	30	11	10	12	M16	G 3/8	105	20,5
LEV 200	656	236	8	420	180	35	40	150	400	405	376	150	100	390	62	29	13	12	12	M20	G 3/8	130	22

Subject to technical modifications.

POSITIONING

Linear Cylinders

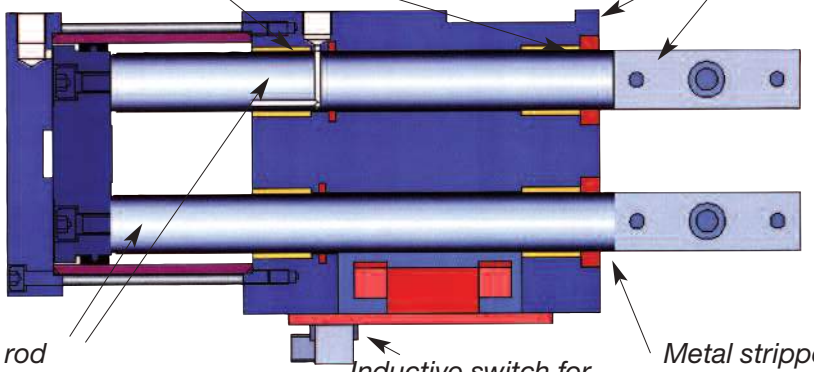
TÜNKERS®
Ingenuity in series.

Linear Cylinders

TÜNKERS Linear Cylinders combine in one compact housing the pneumatic drive mechanism, a precise guide rod running in dual bearings and the electric position sensing system. In addition, the V Series versions incorporate a mechanical end position lock. Due to their special technical properties, TÜNKERS Linear Cylinders are suitable for positioning tasks, locking operations and staking functions, for example.

High precision:
very good guide capacity due to wide bearing support for the piston rods

Zero-backlash bronze/graphite bushes, manually fitted, ensure precise guide capacity



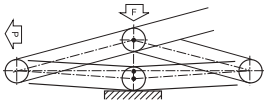
Guide rod = Piston rod facilitates compact size

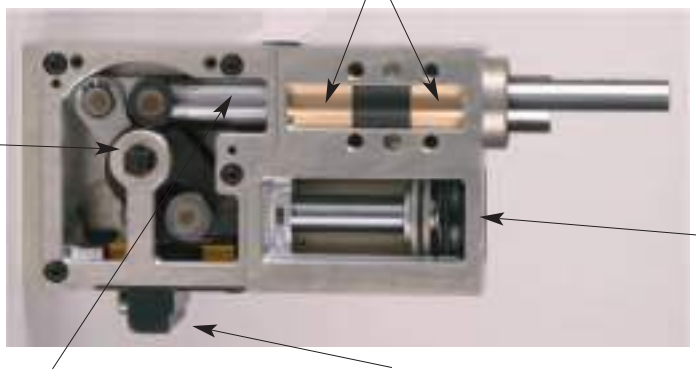
Inductive switch for end position sensing

Metal stripper protects the guide rod from soiling, due to weld spatter, for example

Version with mechanical end position locking

Pushrod with dual bearings with optimum guide capacity, bronze/graphite bushes





Robust knee-lever mechanism with guide rollers running in needle roller bearings

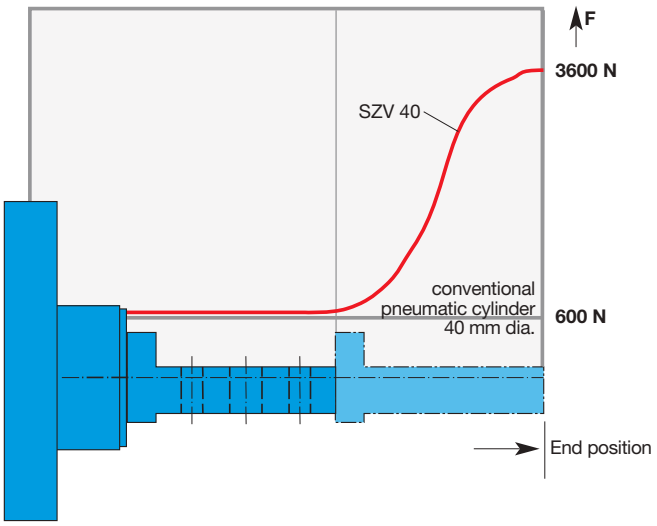
Pneumatic cylinder, Ø 40 mm

Mechanical anti-rotation device with additional roller guide

Position sensing in cassette configuration

Load/displacement cycle using knee-lever mechanism

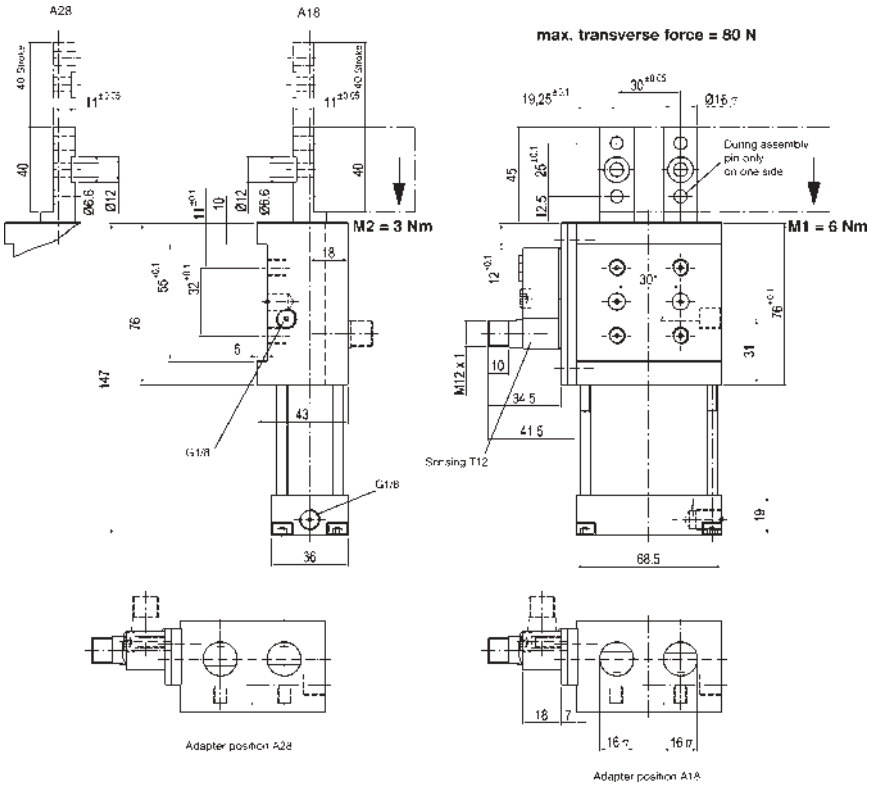
Higher tensile and thrust forces in the critical end position, for insertion processes or to overcome breakaway forces



Type	 **SZKD 40**	 **SZKD 63**	 **SZV 40.1**	 **SZV 60**	 **SZVD 50**	 **SZVD 32**
Tensile/thrust force in the end position (kN)	0,6	1,4	4,0	8,0	4,6	0,61
Infeed force (kN)	0,5	1,4	0,8	1,5	0,7	0,16
Stroke (mm)	40	40	40	60	40	25
Locking	No	No	Yes	Yes	Yes	Yes
Weight (kg)	1,4	5	3,5	9,2	7	2
Dimensions (mm)	192x69x43	369x120x45	240x115x45	365x175x80	290x160x64	182x50x100

Type	 **MZ 40**	 **MZ 63**	 **MZ 80**	 **MZR 40**	 **MZR 50**	 **MZR 63**
Tensile/thrust force in the end position (kN)	4	10	25	4	7	10
Infeed force (kN)	0,7	1,75	2,8	0,7	1	1,75
Stroke (mm)	300	50-300	50-300	50-300	50-300	50-300
Locking	Yes	Yes	Yes	Yes	Yes	Yes
Weight (kg)	2,6	4,3	6,7	2,1	4	6,5
Dimensions (mm)	265x100x45	320x160x45	410x200x62	171xdia.54	200xdia.66	228xdia.79

Linear Cylinder SZKD 40



- With dual anti-rotation guide
- Slimline housing made of high-strength aluminum material
- Powered by oblong-section cylinder, Ø 40 mm, for thrust and tensile forces of up to 600/500 N
- Synchronously-operated guide rods, with dual bearings running in bronze/graphite bushes
- Integrated position sensing

Ordering example:

SZKD 40.5 A18 T12

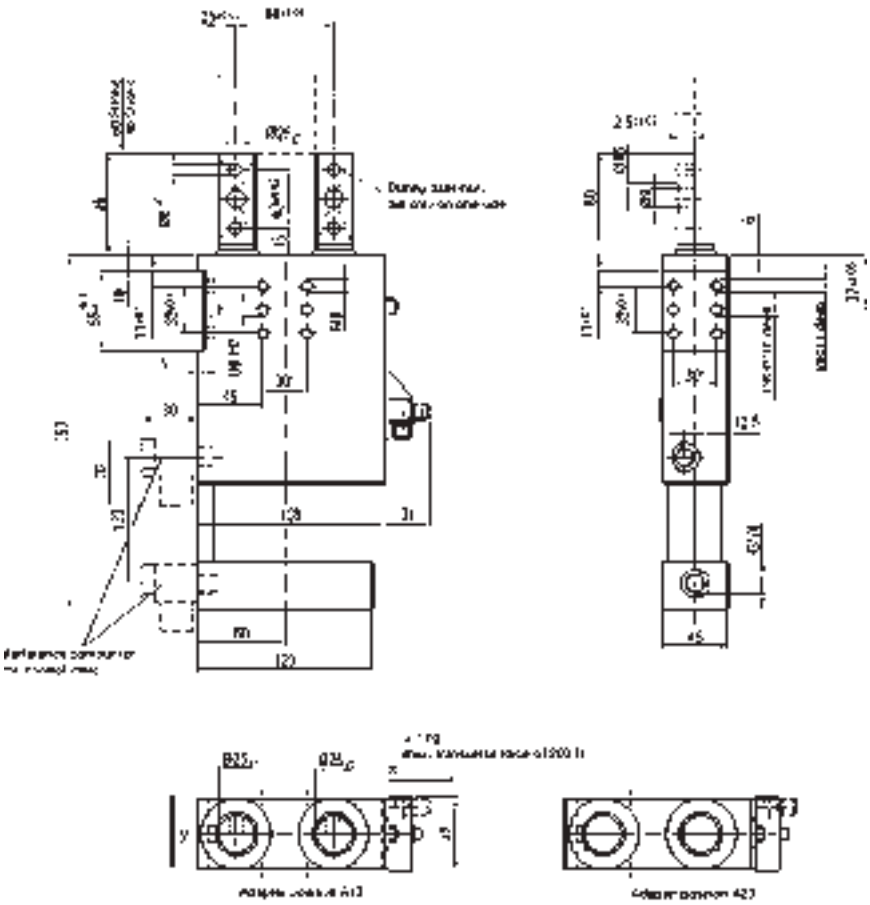
- T12 → Position sensing system
- A18 → Adapter position
- 40.5 → Piston dia. 40
- SZKD → Type

Order code Position sensing systems:

...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Tensile/thrust force: 0,6 kN
Infeed force: 0,5 kN
Weight: 1,4 kg

Subject to technical modifications.



- Slimline housing made of high-strength aluminum material mounting surfaces on 3 sides
- Powered by oblong-section cylinder, Ø 63 mm, for thrust and tensile forces of up to 1,400 N
- Synchronously-operated guide rods, with dual bearings running in bronze/graphite bushes
- Integrated position sensing
- If required, the push rods can be rotated into the desired position

Tensile and thrust force: 1400 N at 5 bar

Tolerances at max. transverse force of 200 N

x	Stroke 0	± 0,03
	Stroke 60	± 0,1
y	Stroke 0	± 0,1
	Stroke 60	± 0,2

Ordering example:

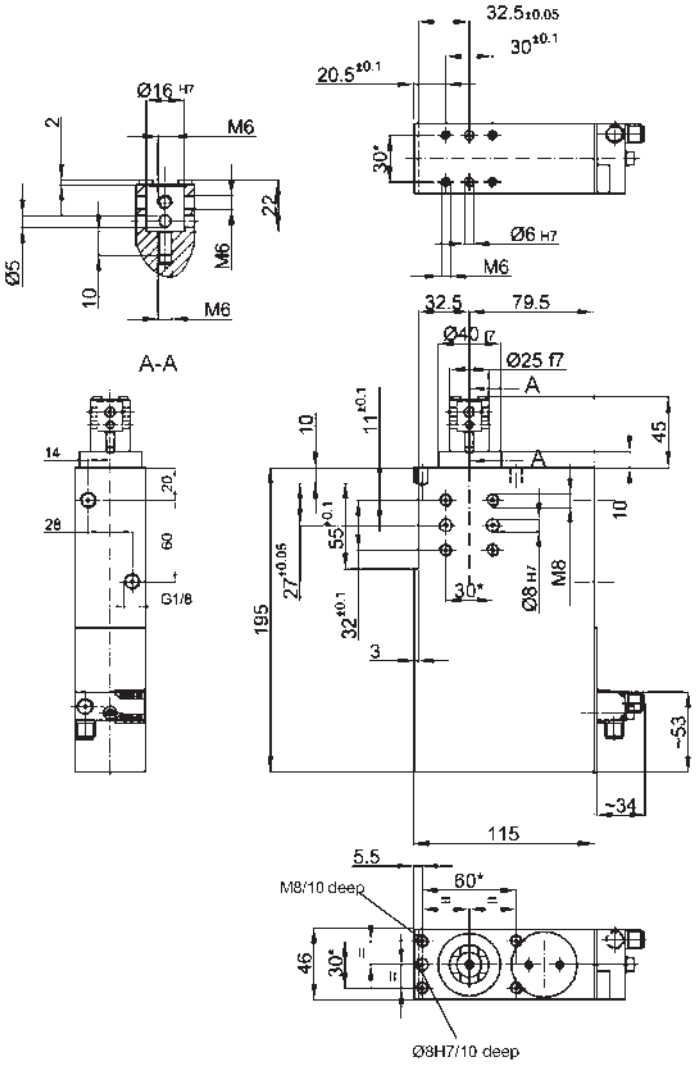
SZKD 63.5 BR3 A13 T12

- T12 → Position sensing system
- A13 → Adapter position
- SZKD 63.5 BR3 → Type

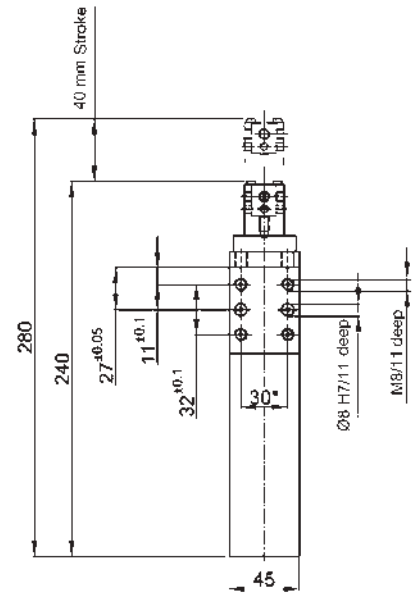
Type	Extraction force (kN)	Thrust force (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions (lxwxd) (mm)
SZKD 63 BR3	1,4	1,4	63	4,95	283x18x45

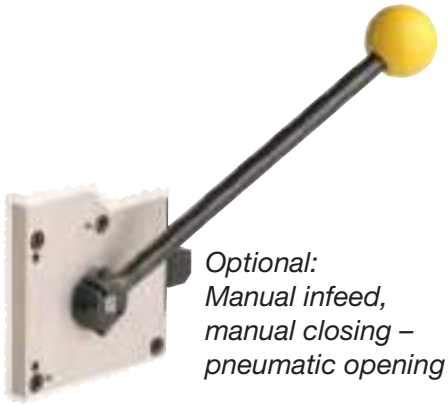
Subject to technical modifications.

Linear Cylinder SZV.1 40



- Slimline housing in monobloc configuration, made of high-strength aluminum material
- Powered by built-in pneumatic cylinder, Ø 40 mm, which acts on the push rod via a knee-lever mechanism
- High thrust and tensile forces up to 4 kN by means of knee-lever transmission into the end position
- Double-guided push rod running in bronze/graphite bushes
- Mounting options at the side and at the base
- Integral end position sensing in cassette configuration
- Optional: Manual infeed and pneumatic closing





Optional: Manual infeed, manual closing – pneumatic opening

Ordering example:

SZV.1 40 A12 T12

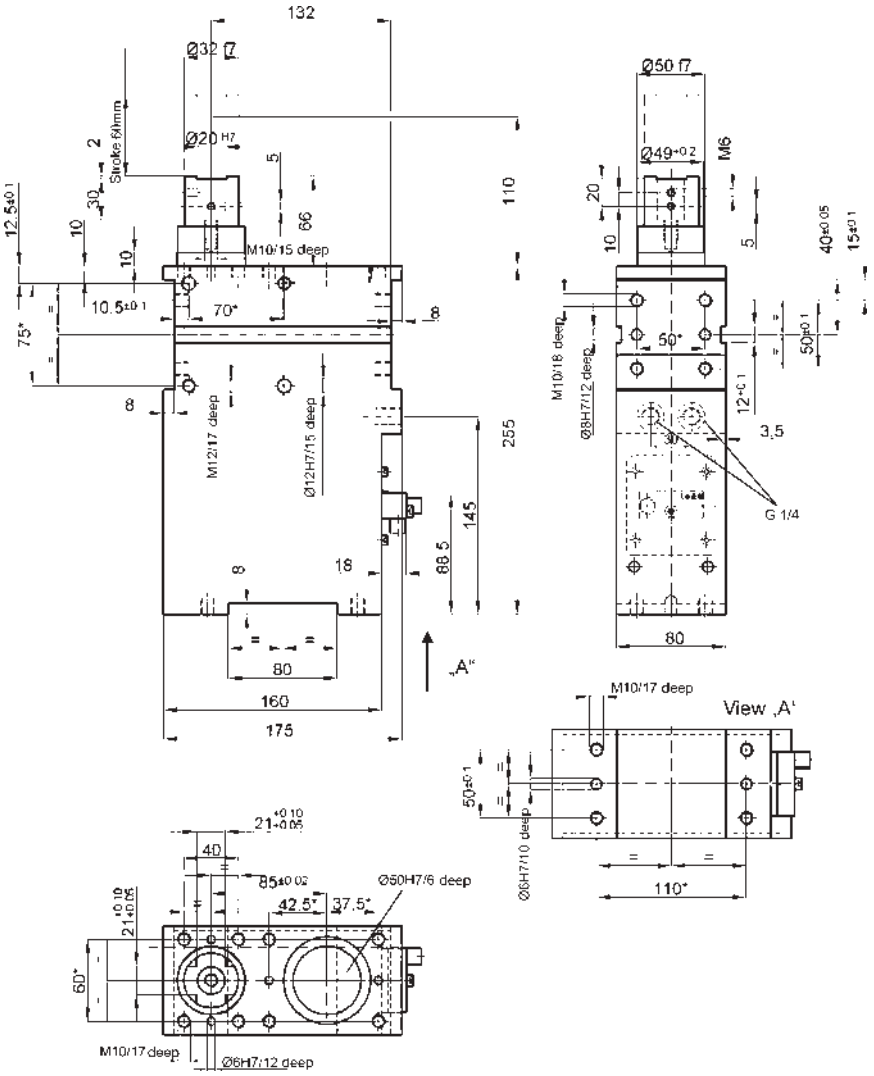
- T12 → Position sensing system
- A12 → Adapter position
- 40 → Type

Order code TÜNKERS position sensing systems:

...T00 without position sensing
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Thrust force:	min. 500 N at 6 bar, max. in end position 3000 N
Tensile force:	min. 420 N at 6 bar, max. breakaway force 3000 N
Holding force:	5 kN
Transverse load:	300N
Piston Ø:	40 mm
Weight:	3,4 kg

Subject to technical modifications.



- Slimline housing in monobloc configuration, made of high-strength aluminum material
- Powered by built-in pneumatic cylinder, Ø 60 mm, which acts on the push rod via a knee-lever mechanism
- High thrust and tensile forces up to 8 kN by means of knee-lever transmission into the end position
- Double-guided push rod running in bronze/graphite bushes
- Mounting options on all sides (at the sides and at the base)
- Integral end position sensing in cassette configuration

Ordering example:

SZV 60 A12 T12

- T12 → Position sensing system
- A12 → Adapter position
- 60 → Type

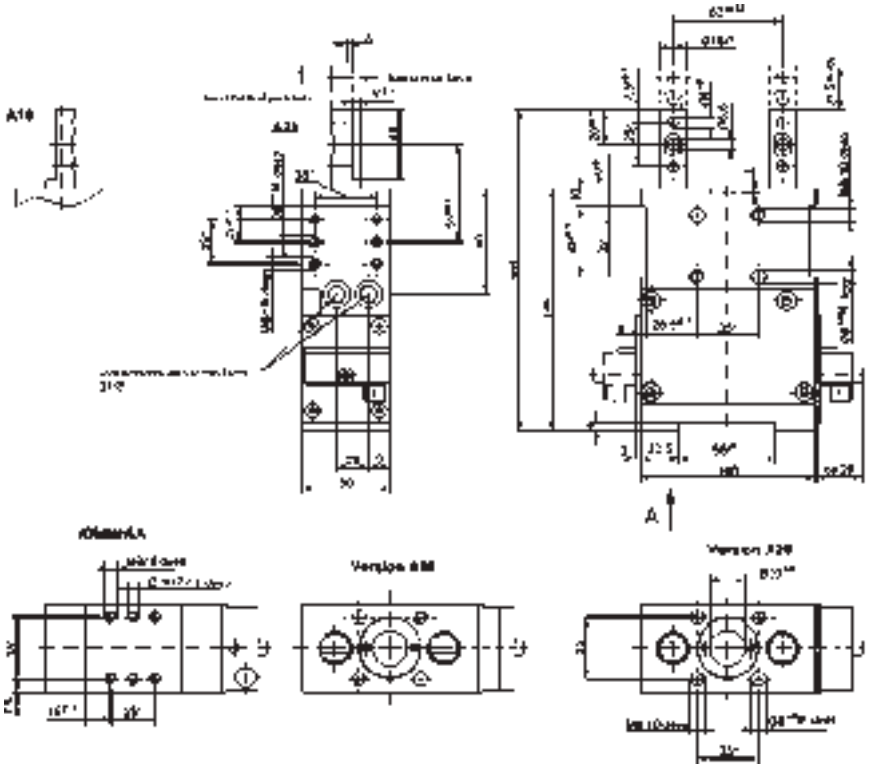
Order code TÜNKERS position sensing systems:

...T00 without position sensing
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Thrust force:	min. 880 N at 6 bar, max. in end position 7500 N
Tensile force:	min. 800 N at 6 bar, max. breakaway force 7500 N
Max. permissible transverse load:	approx. 500 N
Weight:	approx. 9,2 kg

Subject to technical modifications.

Linear Cylinder SZVD 32



– Slimline housing in monobloc configuration, made of high-strength aluminum material
– Pneumatic cylinder, Ø 32 mm and integral with the housing, synchronously powers the push rods by means of a knee-lever mechanism
– High thrust and tensile forces up to 600 N by means of knee-lever transmission into the end position
– Double-guided push rod running in bronze/graphite bushes
– Mounting options on all sides (at the sides and at the base)
– Integral end position sensing in cassette configuration
– Optional: Manual infeed and pneumatic closing

Ordering example:

SZVD 32 A18 T12

- T12 → Position sensing system
- A18 → Adapter position
- 32 → Type

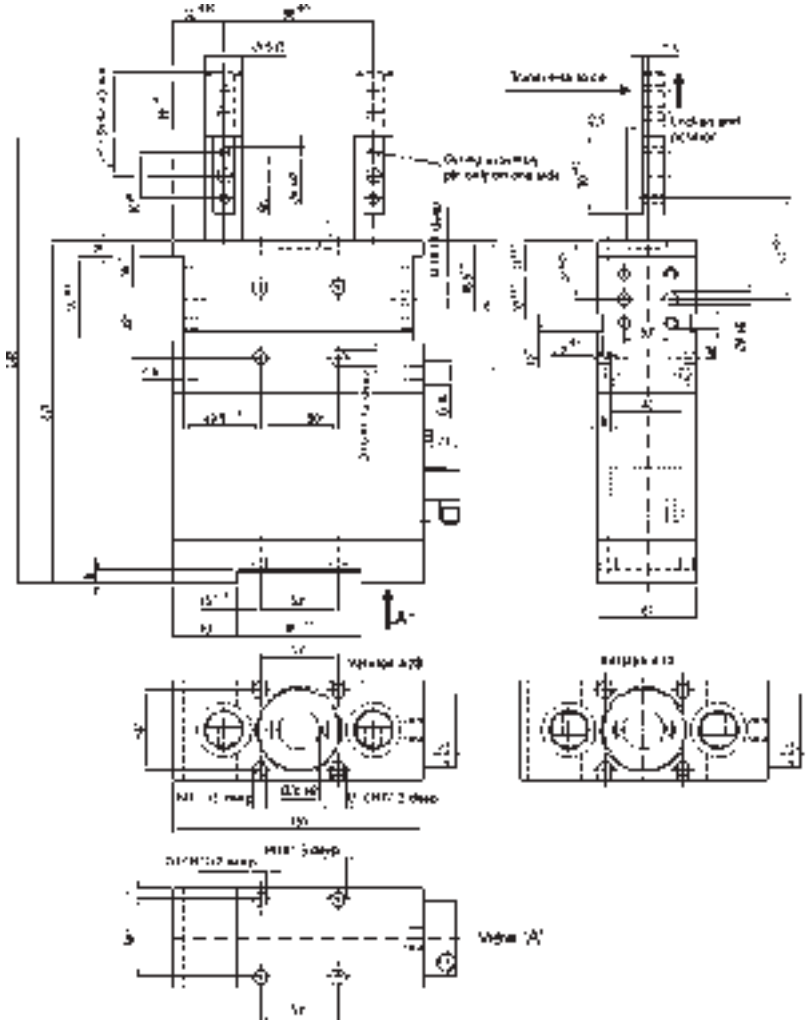
Order code TÜNKERS position sensing systems:

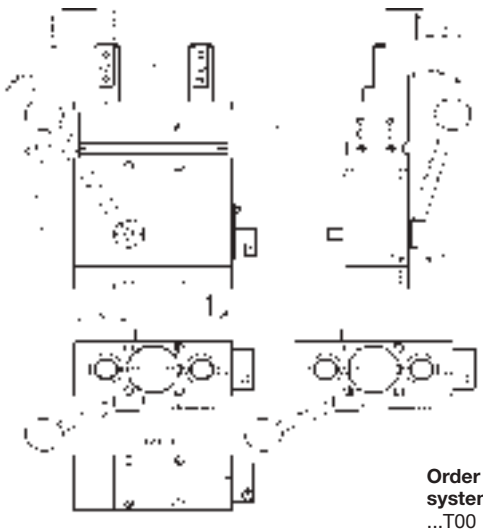
...T00 without position sensing
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Thrust force:	160 N at 6 bar, max. in end position approx. 600 N
Tensile force:	130 N at 6 bar, max. breakaway force approx. 600 N
Transverse force per piston rod:	250 N
Weight:	2 kg
Max. flexing:	0.1 mm, at max. transverse force and 25 mm stroke
Max. offset:	100 mm from the centre point

Subject to technical modifications.

- Slimline housing in monobloc configuration, made of high-strength aluminum material
- Pneumatic cylinder, Ø 50 mm and integral with the housing, synchronously powers the push rods by means of a knee-lever mechanism
- High thrust and tensile forces up to 2.3 kN by means of knee-lever transmission into the end position
- Double-guided push rod running in bronze/graphite bushes
- Mounting options on all sides (at the sides and at the base)
- Integral end position sensing in cassette configuration
- Optional: Manual infeed and pneumatic closing





Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 24 V inductive position sensing, 1 output with integral LEDs

Thrust force:	min. 700 N at 6 bar, max. in end position approx. 2000 N
Extraction force:	min. 640 N at 6 bar, max. breakaway force approx. 2000 N
Side land per piston rod:	400 N

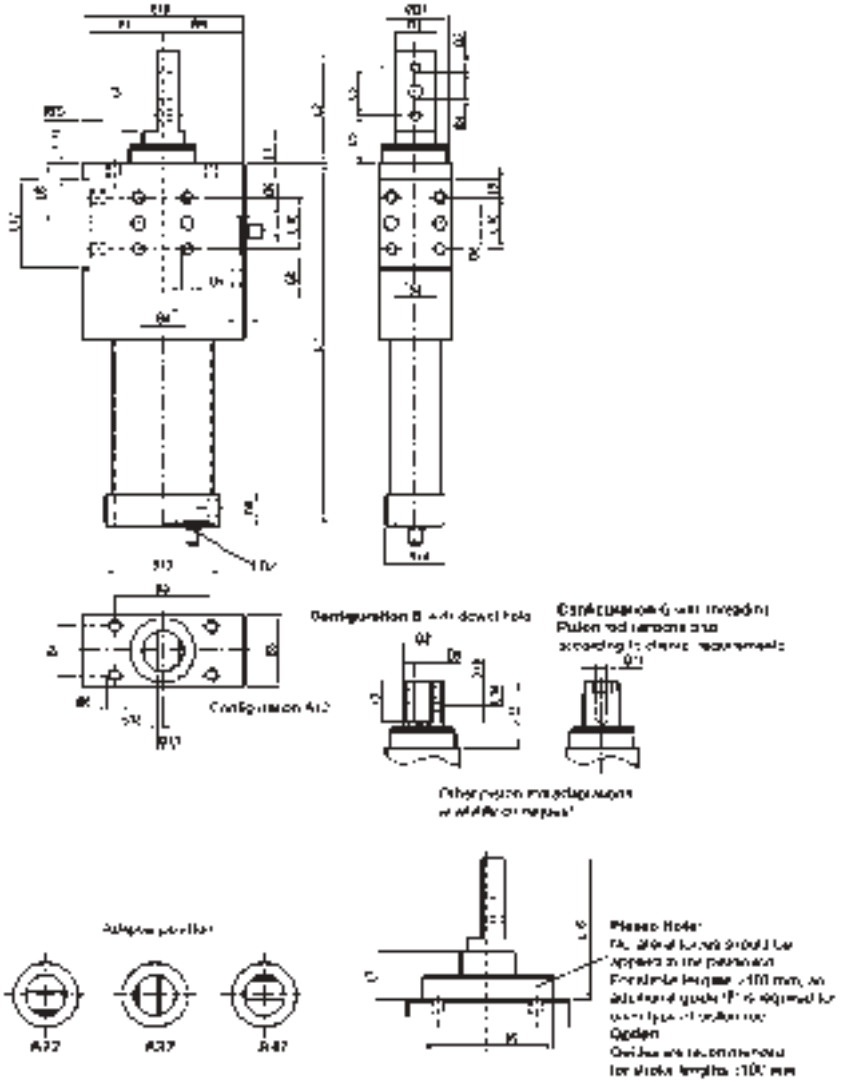
Max. flexing = 0.1 mm, at max. transverse force and 40 mm stroke
Max. Offset = 200 mm from the centre point
Weight: 7 kg

Ordering example:

SZVD 50 A13 T12
- T12 → Position sensing system
- A13 → Adapter position
- 50 → Type

Subject to technical modifications.

Multi-force Cylinder MZ 40...80

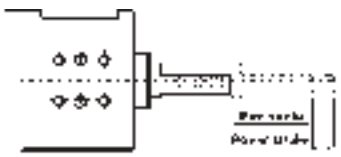


- Cylinder with integrated force transmission at the same level as the locking force in the end position
- Pneumatic cylinder with mechanical force transmission that, in the end position, multiplies the cylinder force by a factor of 8
- Main body and transmission mechanism made of steel
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure: 4 to 6 bar
- Force transmission by means of wedge mechanism for defined power stroke
- Stroke: 50 to 300 mm

Ordering example:

MZ F 40 V 120 A12 T02

- MZ → Type
- F → Optional: with additional guide
- 40 → Piston Ø
- V → V = Optional: with locking
- 120 → Stroke
- A12 → Adapter position or configuration
- T02 → Position sensing system



Type	Clamping force of the power stroke at 6 bar (kN)	Power stroke (mm)	Fast stroke force of the fast stroke at 6 bar (kN)	Corresponding Ø Piston (mm)
MZ 40	4	6	0,7	40
MZ 63	10	6	1,75	63
MZ 80	25	6	2,8	80

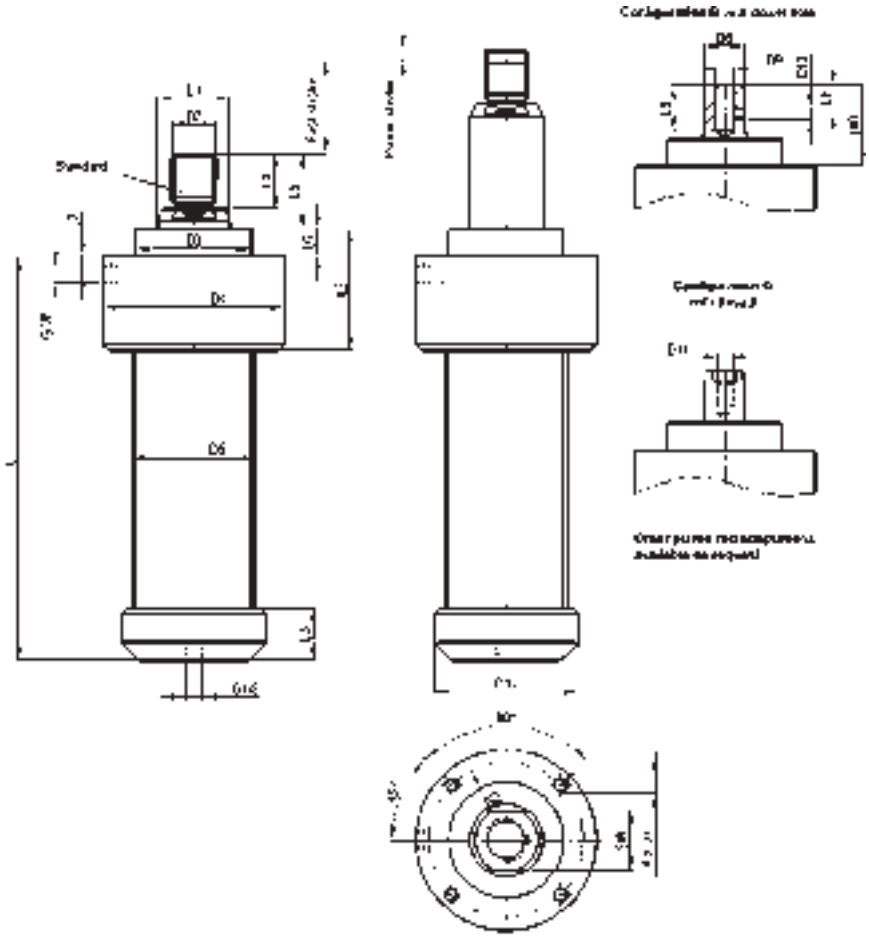
Fast stroke min. 15 mm
Standard fast stroke series: 50; 100; 150 mm
(does not include the 6 mm power stroke)

Other special stroke lengths on request
up to max. 300 mm

Type	B1 ±0,02	B2	B3	B4	B5 ±0,2	B6	B9	B10	B11	B12	B13 ±0,05	B14	D1	D2 f7	D3 f7	D4 H7	D5	D6 H7	D7 H7	D8	D9 H7	D10	D11
MZ 40	45	5	45	30	60	80	50	100	13	3	70	45	40	25	10	9	M8	8	6	G1/8	10	M6	M8
MZ 63	75	5	60	30	85	105	80	160	15	3	120	45	55	30	15	9	M8	8	6	G1/8	16	M8	M12
MZ 80	92	8	80	50	100	125	100	200	20	3	140	62	75	40	25	11	M10	8	8	G1/4	20	M10	M16

Type	L1	L2	L3	L4	L5	L6 ±0,02	L7	L8 ±0,05	L9 ±0,1	L10 ±0,1	L11	L12 +0,1	L13	L14	L15	L16
MZ 40	195+Stroke	70	12	50	30	30	45	37	11	32	10	55	25	15	41	115
MZ 63	250+Stroke	70	12	50	30	30	55	37	11	32	10	55	40	20	56	125
MZ 80	340+Stroke	80	20	50	40	30	81	55	15	50	15	80	40	20	80	161

Subject to technical modifications.



- Cylinder with integrated force transmission for high clamping and locking force in the end position
- Main body and transmission mechanism made of steel
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure: 4 to 6 bar
- By means of wedge mechanism for defined power stroke
- Stroke: 50 to 300 mm

Ordering example:

MZ R 40 50
- 50 → Stroke
- 40 → Piston Ø
- R → Circular-section cylinder - Standard
- MZ → Type

Optional:
...B: Configuration 'B' with dowel hole
...G: Configuration 'G' with internal thread

Standard series of fast strokes: 50; 100; 150 mm
(does not include the 6 mm power stroke)

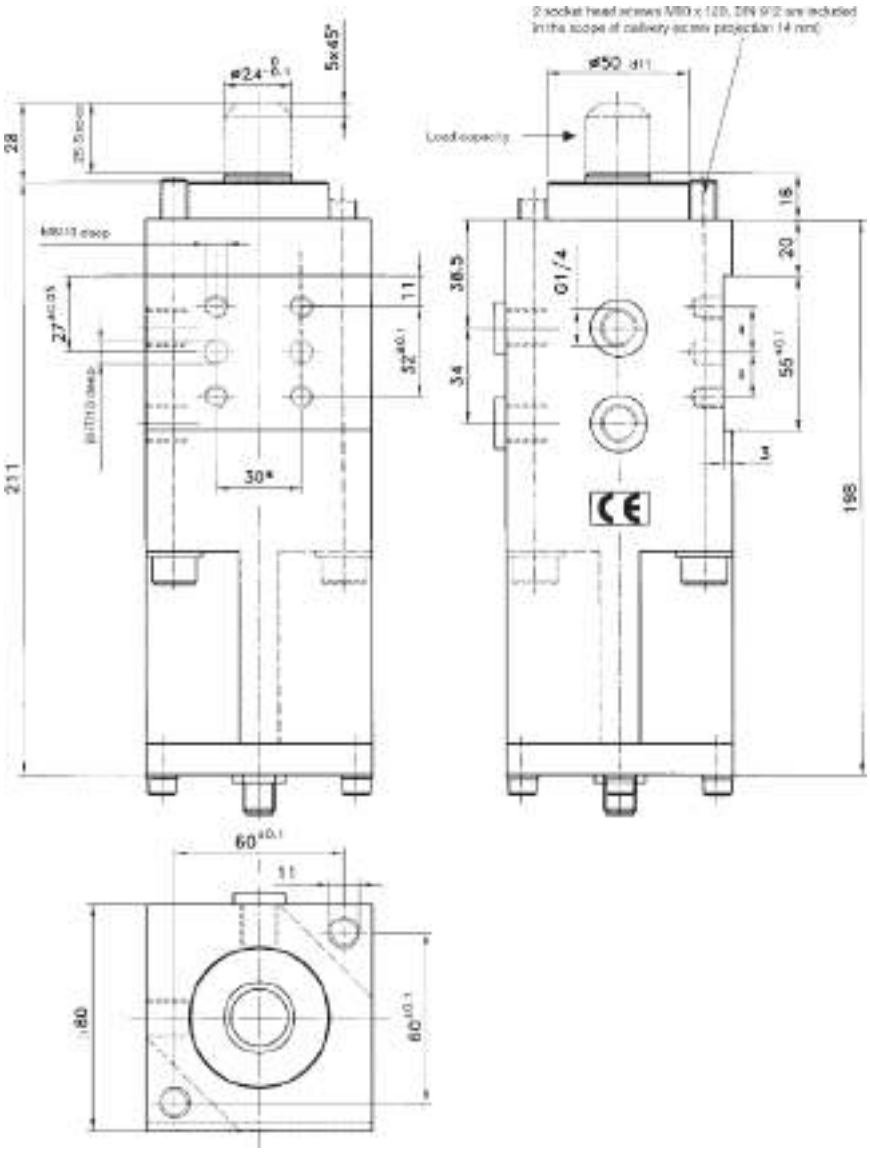
Other special stroke lengths on request up to max. 300 mm

Type	Clamping force of the power stroke at 6 bar (kN)	Power stroke (mm)	Fast stroke force of the fast stroke at 6 bar (kN)	Corresponding Ø Piston (mm)	Weight (kg)
MZR 40	4	6	0,7	40	2,1
MZR 50	7	6	1	50	4
MZR 63	10	6	1,75	63	6,5

Type	D1 H7	D2	D3 H7	D4	D5	D6	D7	D8 H7	D9 H7	D10	D11	D12	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	SW
MZR 40	25	M16x1,5	40	63	45	54	M5	25	10	M6	M8	54	130+Stroke	51	23,5	20	29	12	10	25	15	41	21
MZR 50	30	M16x1,5	46	78	60	68	M6	25	10	M6	M8	66	165+Stroke	65	29	20	29	15	10	25	15	44	24
MZR 63	40	M24	63	99	68	85	M8	30	16	M8	M12	79	172+Stroke	51	67	29	30	41	15	10	40	20	56

Subject to technical modifications.

Shot Pin SA 50-25/25



- Safety shot pin for secure positioning of, for example, roller conveyors, rotary loads and lifts
- Compact version with integrated pneumatic cylinder, integrated guide and position sensing
- Aluminum housing with robust guide for staking pins
- Safety switch for the Forward/Back end positions

Ordering example:

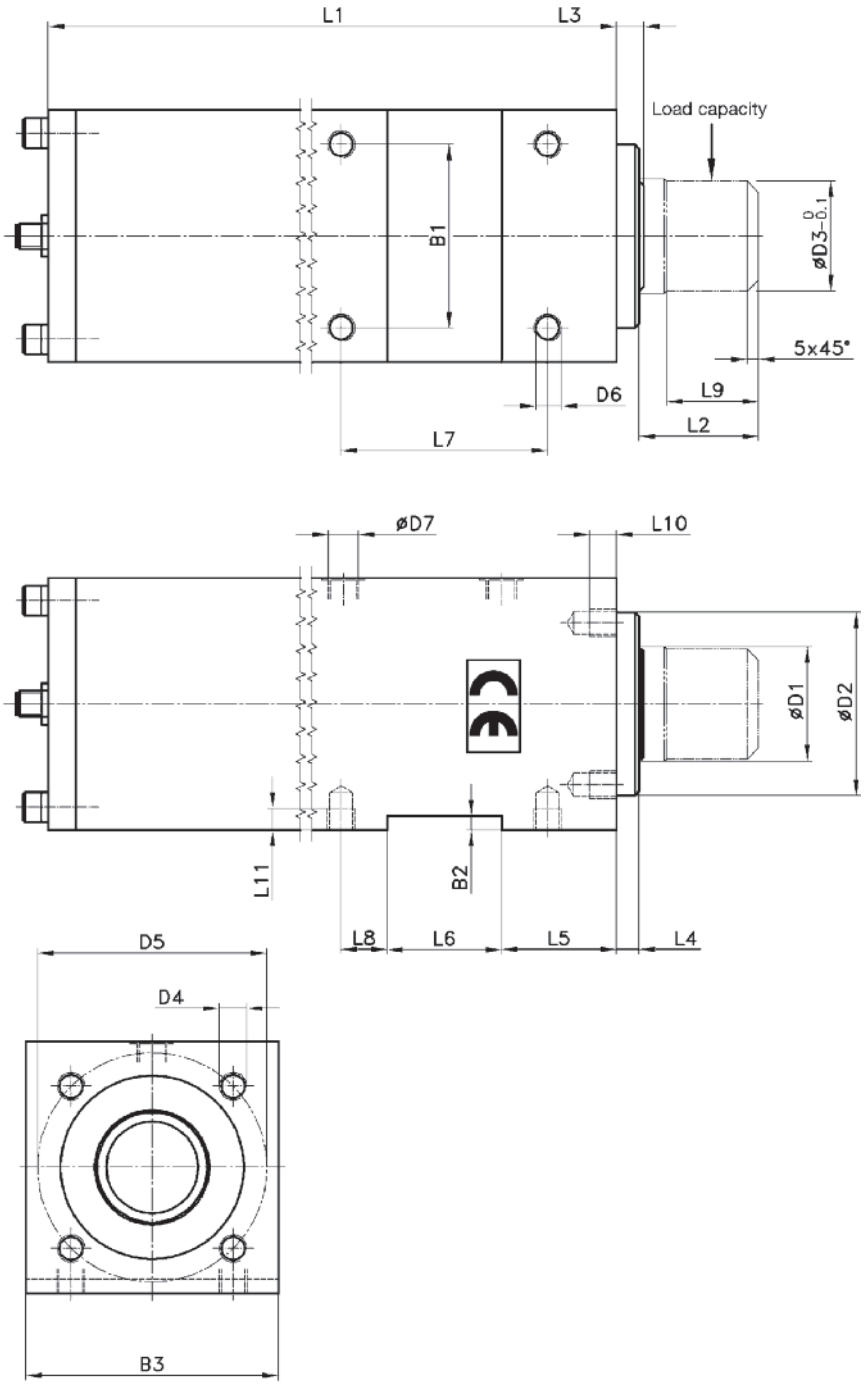
SA 50-25 25 T01

- T01 → Position sensing system
- 25 → Stroke
- SA 50-25 → Type

Order code TÜNKERS position sensing systems:

...T00 without position sensing
...T02 Position sensing system in accordance with VW Standard 39D 1673, with central power supply to both switches
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Subject to technical modifications.



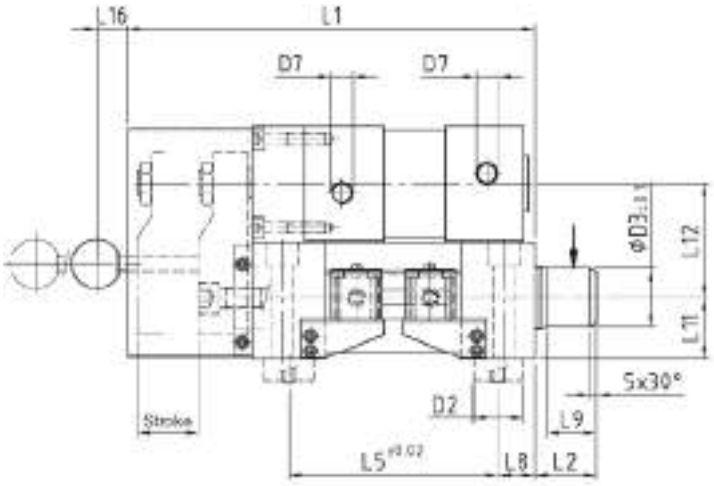
– Safety shot pin for secure positioning of, for example, roller conveyors, rotary loads and lifts
– With integrated pneumatic cylinder, integrated guide and position sensing
– Aluminum housing with robust guide for staking pins
– Safety switch for the Forward/Back end positions

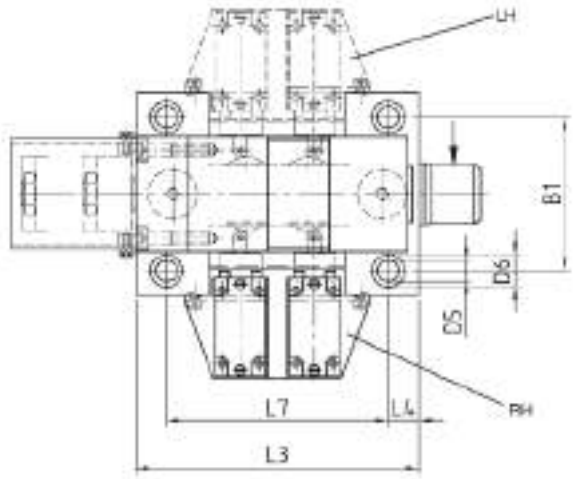
Type	Ø Pin (mm)	Stroke (mm)	Static load capacity (kg)	Weight ~ (kg)	Dimensions l x w x d (mm)
SA 80-50/50	50	50	2200	6	328x110x110
SA 100-70/80	70	80	6000	12	453x135x135

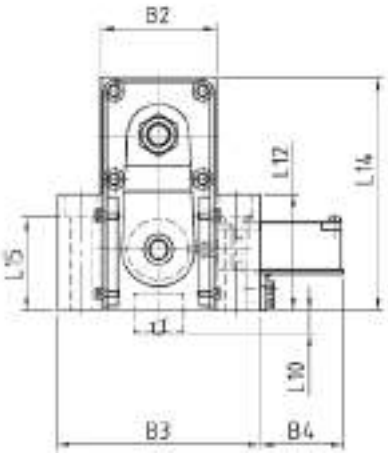
Type	B1	B2	B3 j	D1 f7	D2 f7	D3 -0,1	D4	D5 +0,1	D6	D7	L1	L2	L3	L4	L5	L6 +0,1	L7	L8	L9	L10	L11
SA 80-50/50	80	6	110	50	80	48	M12	105	M12	G1/4	328	52	12	10	50	50	90	20	40	16	17
SA 100-70/80	95	6	135	70	110	68	M16	140	M16	G3/8	453	85	15	10	70	150	200	25	60	25	20

Subject to technical modifications.

Shot Pin SAN 40-80





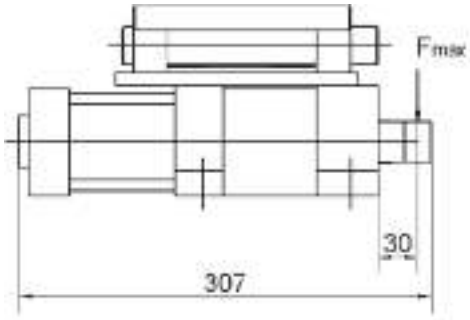


- Safety shot pin for secure positioning of, for example, roller conveyors, rotary loads and lifts
- Modular construction with separate guide housing and external flange-mounted standard cylinder
- Single staking pin
- Optional switching mechanism with mechanical safety switches

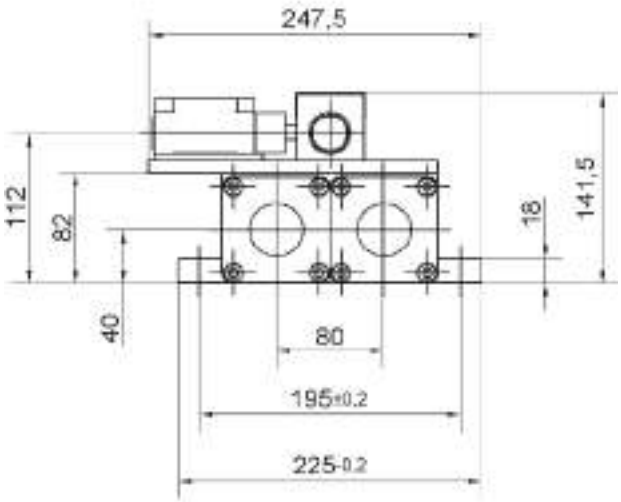
Type	Ø Cylinder (mm)	Stroke (mm)	Static load capacity (kg)	Weight ~ (kg)	Dimensions l x w x d (mm)
SAN 40-25/50	40	50	3000	9	241x201x124
SAN 50-25/25	50	25	8000	9	205x197x119
SAN 80-50/25	80	25	22000	24	230x229,5x205
SAN 80-50/50	80	50	22000	24	230x229,5x205

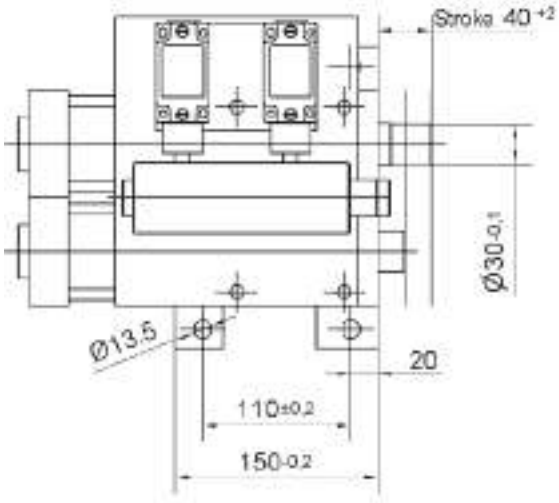
Type	B1	B2	B3	B4	D2 G6	D3	D5 +0,1	D6	D7	L1	L2	L3	L4	L5	L7	L8	L9	L10	L11	L12	L14	L16
SAN 40-25/50	94	64	124	77	30	24	13	-	G1/4	313	50	241	13	201	215	20	25	8	28	69	124	-
SAN 50-25/50	90	64	120	77	30	24	13	20	G1/4	267	25	205	15	165	175	20	25	8	30	66	119	25
SAN 80-50/25	125	93	160	69,5	40	48	17	26	G3/8	275	25	230	25	170	180	30	20	18	50	93	205	25
SAN 80-50/50	125	93	160	69,5	40	48	17	26	G3/8	325	50	230	25	170	180	30	40	18	50	93	205	25

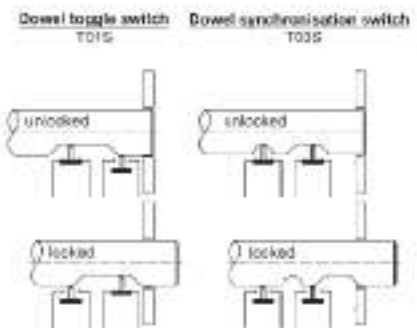
Subject to technical modifications.



- Safety shot pin for secure positioning of, for example, roller conveyors, rotary loads and lifts
- Modular construction with separate guide housing and external flange-mounted standard cylinder
- With pneumatic drive mechanism
- With dual staking pins
- Optional switching mechanism with mechanical safety switches





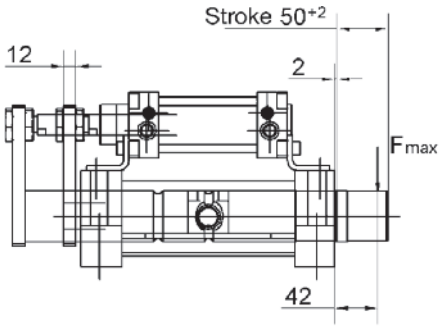


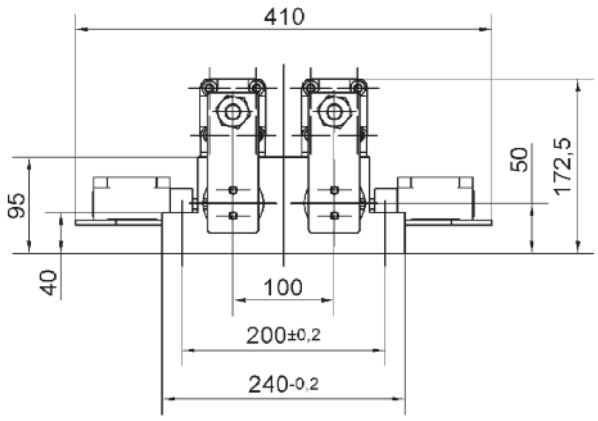
Type	Load capacity (kN)	Staking base Ø (mm)	Stroke (mm)	Dimensions l x w x d (mm)
SAND 50	4,5	30	40	307x247,5x141,5

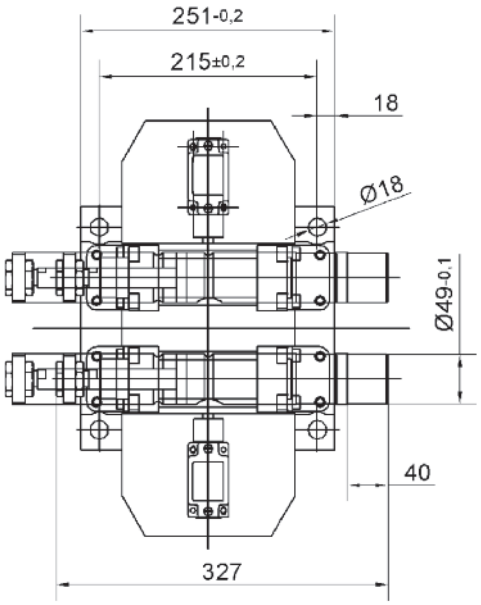
Subject to technical modifications.

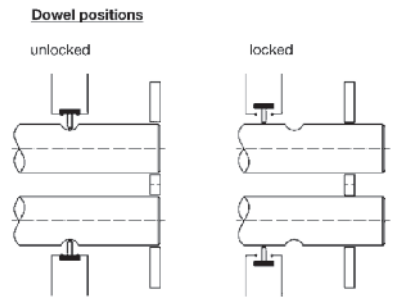
Shot Pin SAND 80

- Safety shot pin for secure positioning of, for example, roller conveyors, rotary loads and lifts
- Modular construction with separate guide housing and external flange-mounted standard cylinder
- Dual staking pins
- Optional switching mechanism with mechanical safety switches









Type	Load capacity (kN)	Staking base Ø (mm)	Stroke (mm)	Dimensions l x w x d (mm)
SAND 80	22	50	50	410x327x172,5

Subject to technical modifications.

POSITIONING

Rotary Units

TÜNKERS®
Ingenuity in series.

Rotary Units

Rotary motion is always the simplest solution in order to change tools or fixture components. Not without reason have rotary step drive mechanisms gained acceptance in interchangeable magazines, such as those fitted to machine tools or turret lathes.

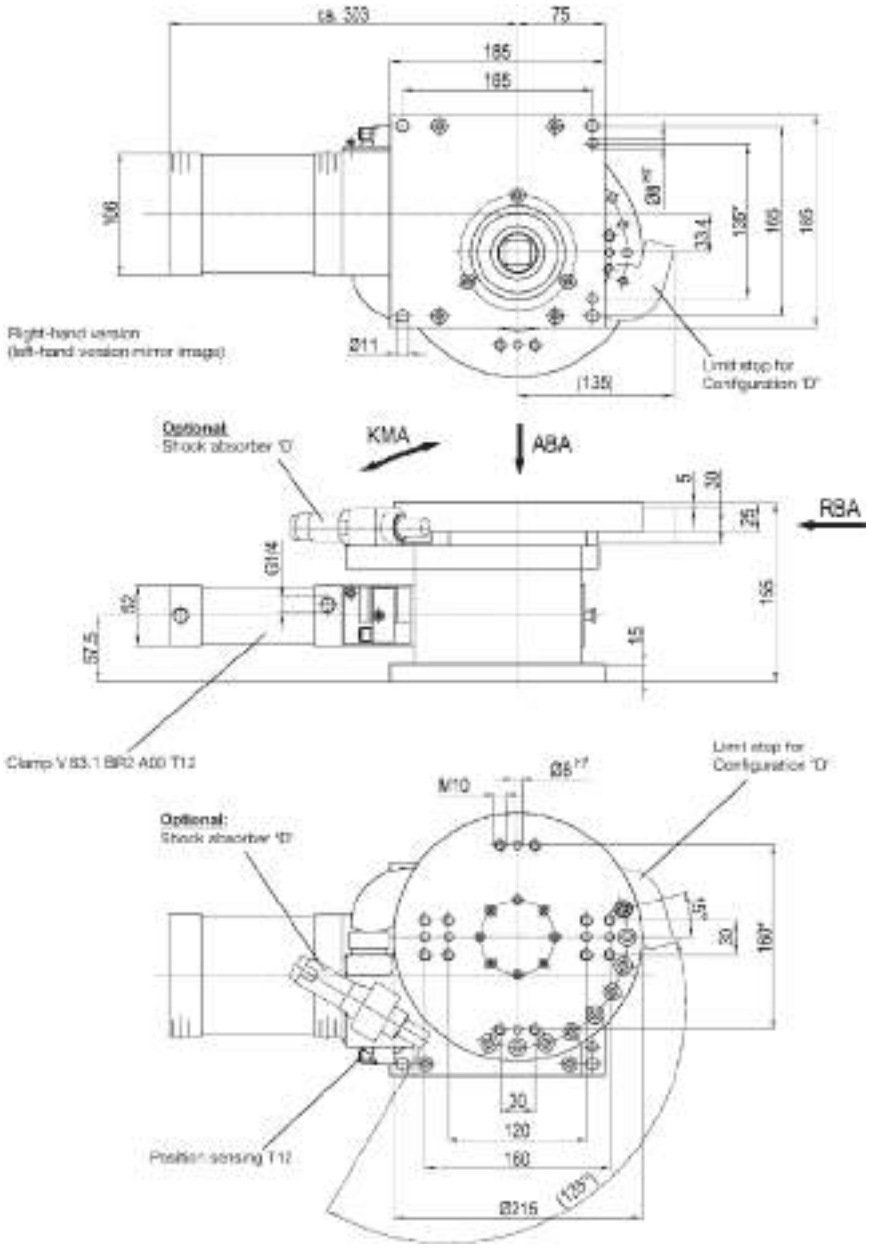
The rotary indexing units described here are suitable for torque values from 4 to 40 Nm. Alternatively, the systems can be supplied with 2-, 3- or 4-way partitioning, whereby the end positions are mechanically locked.

As is always the case with TÜNKERS products, the mechanism is fully enclosed and optionally available with end position sensing.

Typical applications:

Rotary indexing unit for swivelling-in 4 different positioning dowels

- Rotary table for reversing operations up to 135°
- Dial with robust bearing support for max. loads of 3,000 N
- Powered by pneumatic clamping unit
- End position mechanically locked
- Straightforward control with 5/2-way valve
- Optional: Shock absorber for end position location
- End position switch

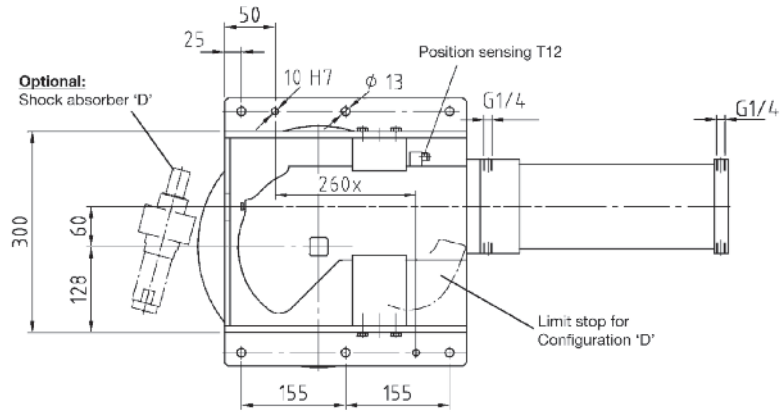


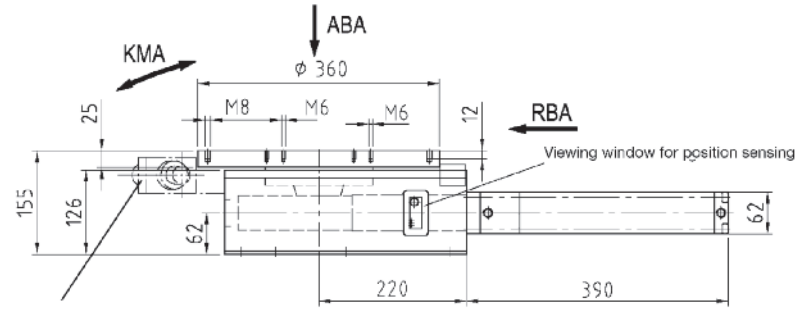
Type	Loading force ABA (N)	Radial load RBA (N)	Overturning torque KMA (Nm)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
TD 215	3000	2000	80	63	approx. 14	351,5x185x155

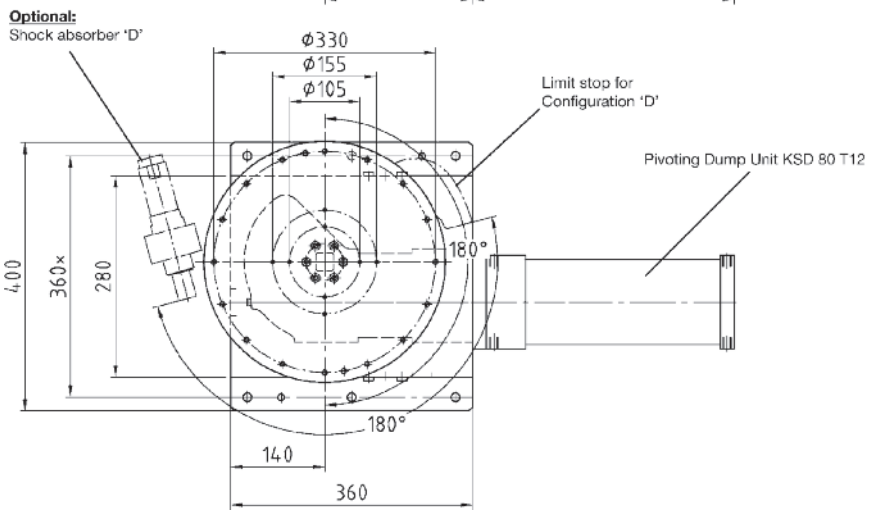
Subject to technical modifications.

Rotary Unit TD 360

- Rotary table for reversing operations up to 180°
- Dial with robust bearing support for max. loads of 2,000 N
- Powered by pneumatic clamping unit
- End position mechanically locked
- Straightforward control with 5/2-way valve
- Optional: Shock absorber for end position location
- End position switch



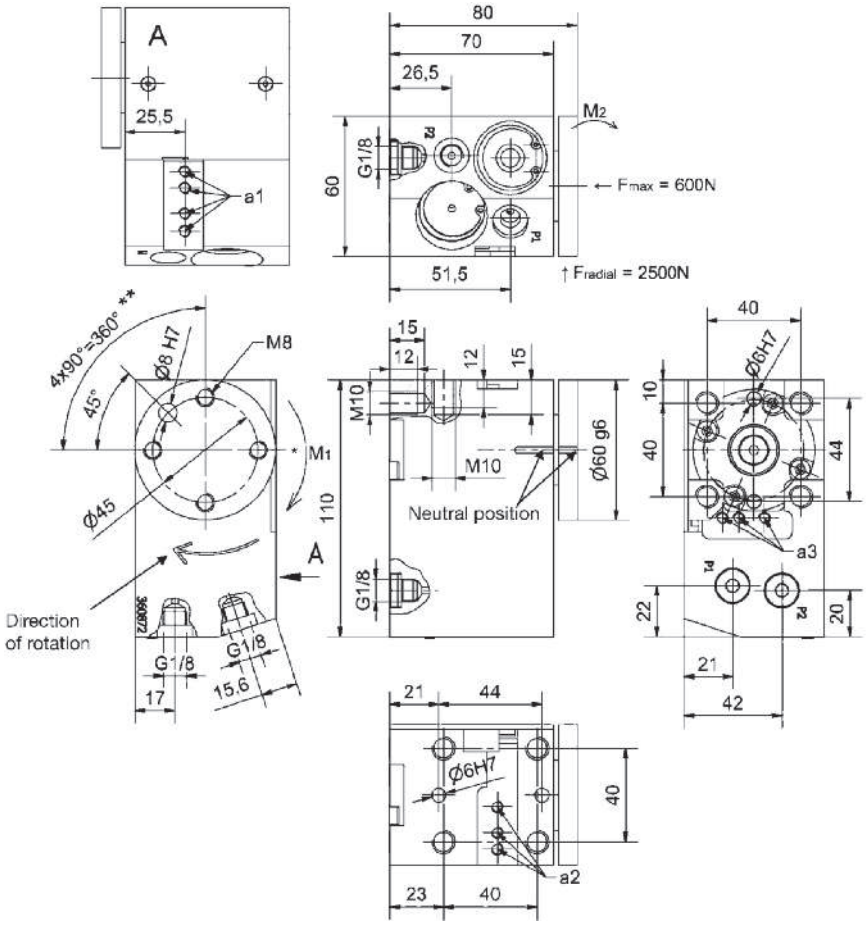




Type	Loading force ABA (N)	Radial load RBA (N)	Overturning torque KMA (Nm)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
TD 360	2000	1000	80	80	approx. 35	438x233,4x155

Subject to technical modifications.

- Basic housing in practical aluminum configuration
- Ø 50 mm dial with axial and radial bearings
- Powered by two pneumatic sliders for clocked motion with 2-, 3- or 4-part partitioning (180°/120°/90°)
- Mechanically locked, zero-backlash end position
- End position sensing with inductive switches



Ordering example:

RT 4-C 4 T12 a1

- a1 → Assembly T12
- T12 → Position sensing system
- 4 → Partitioning: 4 = 90°
- RT 4-C → Type

Order code TÜNKERS position sensing systems:
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Mounting thread M12 x 1, 4-pole

Technical data:

Positioning accuracy:	±0,1°
Partitioning accuracy:	±0,02°
Repetition accuracy:	±0,02°
Torque M1:	4 Nm at 6 bar
Tilting moment M2:	max. 40 Nm
Weight:	approx. 1,7 kg

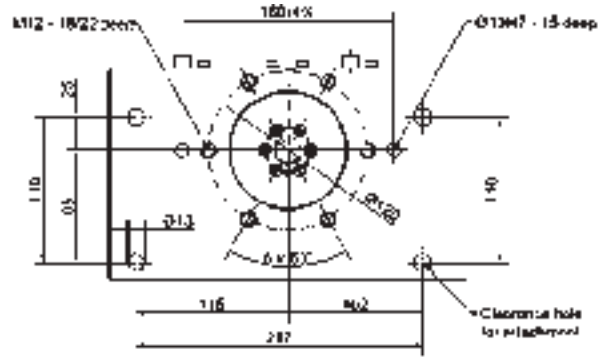
The position sensors should only be interpreted after the traversing movement, since incorrect interpretation can occur during the movement.

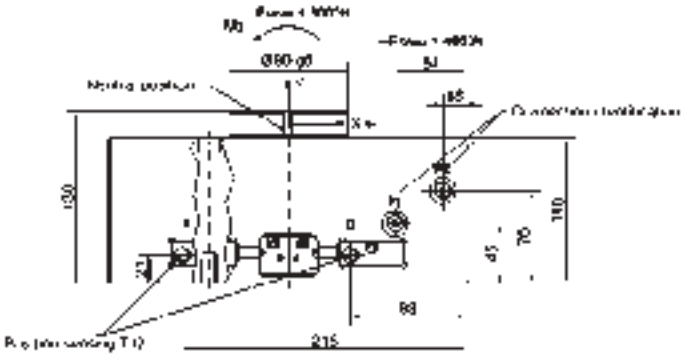
Type	Torque (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
RT4-C	4	25	1,7	110x80x60

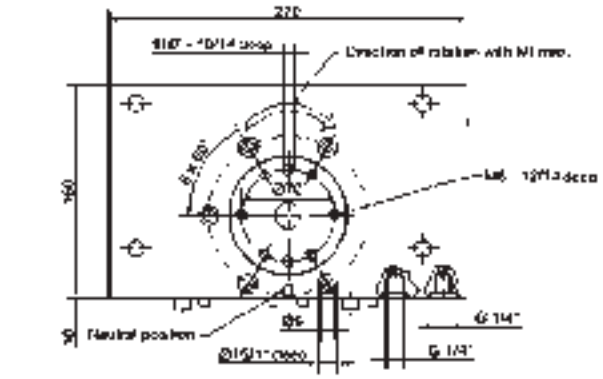
Subject to technical modifications.

Rotary Indexing Table RT 40 BR2

- Basic housing in enclosed aluminum configuration
- Ø 90 mm dial, with axial and radial bearings
- Powered by two pneumatic sliders for clocked motion with 2-, 3- or 4-part partitioning (180°/120°/90°)
- Mechanically locked, zero-backlash end position
- End position sensing with inductive switches







Ordering example:

RT 40 2 T12

- T12 → Position sensing system
- 2 → Partitioning: 2 = 180°; 3 = 120°; 4 = 90°
- 40 → Type

Order code TÜNKERS position sensing systems:
...T12 Inductive position sensing 24 V,
1 output with integral LEDs

Torque: 40 Nm at 6 bar
Tolerance for dowel holes ±0.02, for threaded holes ±0.1
Medium: Compressed air, max. 6 bar, operation with oil-free air permissible

Technical data:

Positioning accuracy:	±0,1°
Partitioning accuracy:	±0,02°
Repetition accuracy:	±0,02°
Torque Mt_{max}:	40 Nm at 6 bar
Radial force FR_{max}:	4000 N (at 64 Nm tilting moment)
Tilting moment max. M_2:	64 Nm = Fr x (Y+0,016) m
Axial force Fa_{max}:	3000 N
Pneumatic locking torque:	approx. 50 Nm
Weight:	approx. 14 kg

Type	Torque (kN)	Ø Cylinder (mm)	Weight (kg)	Dimensions l x w x d (mm)
RT40	40	60	14	270x170x130

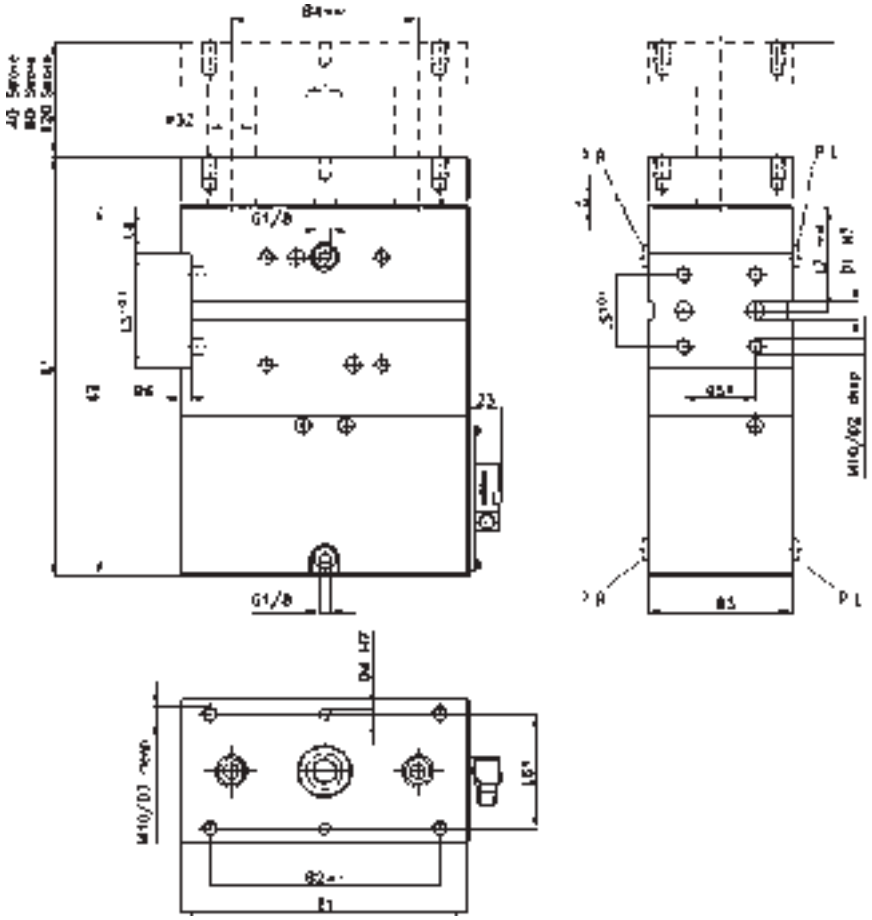
Subject to technical modifications.

POSITIONING

Lifters

TÜNKERS®
Ingenuity in series.

Lifting Unit MZVD...



– Enclosed aluminum housing in with multi-sided mounting options
– Two push rods running in graphite bushes
– Powered by Multi-force cylinder located in the housing, with end position locking
– End position sensing Forward/Back with inductive sensors

Ordering example:

MZVD 40 80 PL T12

- T12 → Position sensing system
- PL → Pneumatic connection on the left (PR = right)
- 80 → Stroke
- MZVD 40 → Type

Order code TÜNKERS position sensing systems:
...T00 without position sensing
...T12 Inductive position sensing 24 V, 1 output with integral LEDs

Type	Fast stroke (kN)	Clamping force (kN)	Ø Cylinder (mm)	Weight ~ (kg)
MZVD 40-40	0,4	4	40	17,5
MZVD 40-80	0,4	4	40	19
MZVD 40-120	0,4	4	40	20,5
MZVD 50-40	0,6	7	50	19
MZVD 50-80	0,6	7	50	20,5
MZVD 50-120	0,6	7	50	22
MZVD 63-120	1,2	10	63	35

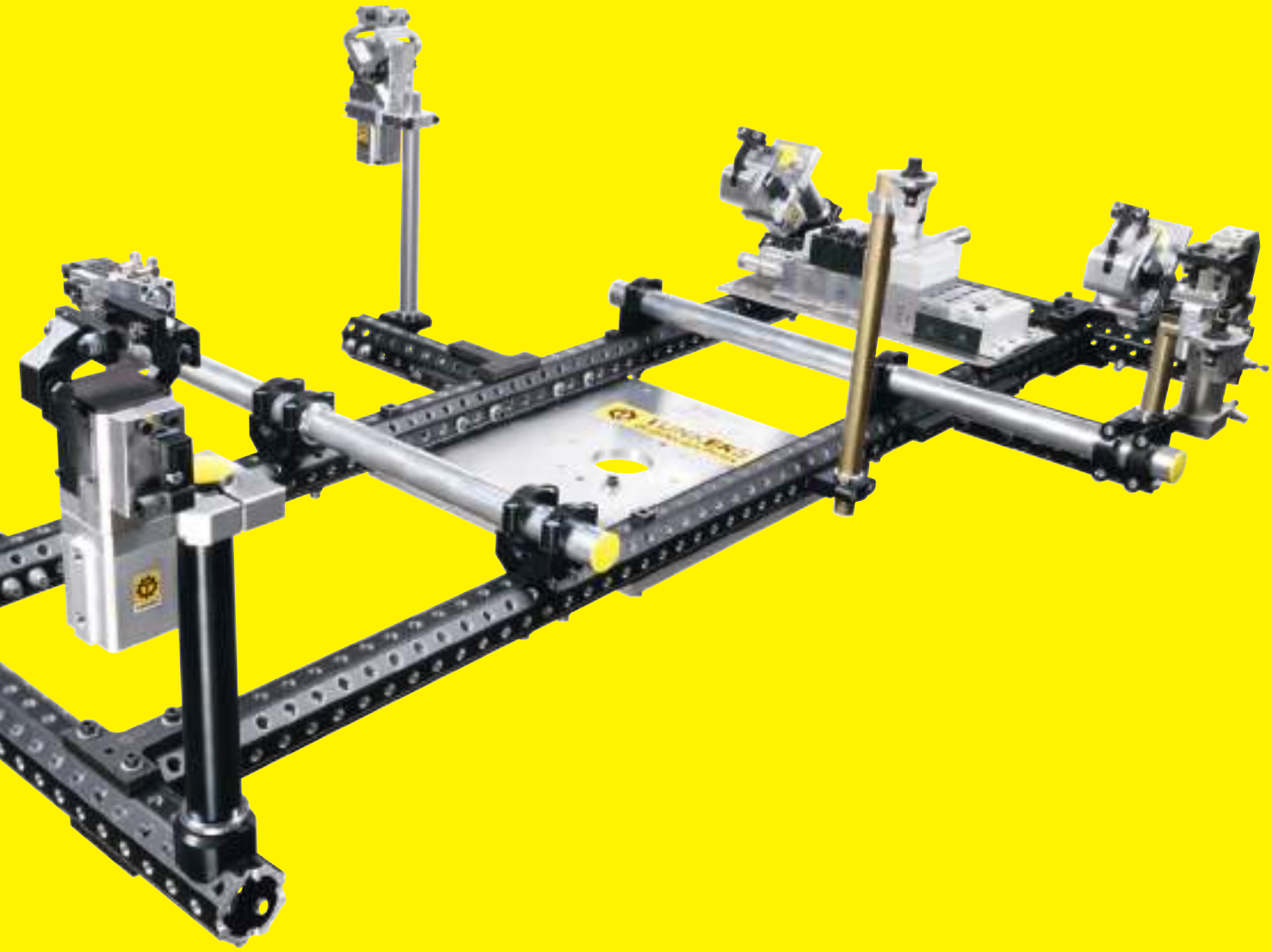
Type	B1	B2 ±0,1	B3	B4 ±0,02	B5*	B6	L1	L2	L3 +0,1	L4	L5 ±0,1	L6*	L7 ±0,05	D1 H7	D2	D3	D4 H7
MZVD 40-40	200	160	100	130	50	6,5	253	218	80	32,5	50	80	72,5	12	15	15	8
MZVD 40-80	200	160	100	130	50	6,5	293	258	80	32,5	50	80	72,5	12	15	15	8
MZVD 40-120	200	160	100	130	50	6,5	333	298	80	32,5	50	80	72,5	12	15	15	8
MZVD 50-40	200	160	100	130	50	6,5	287	252	80	32,5	50	80	72,5	12	15	15	8
MZVD 50-80	200	160	100	130	50	6,5	327	292	80	32,5	50	80	72,5	12	15	15	8
MZVD 50-120	200	160	100	130	50	6,5	367	332	80	32,5	50	80	72,5	12	15	15	8
MZVD 63-120	250	200	125	180	70	8	400	340	120	25	80	90	85	12	16	20	12

Subject to technical modifications.

GRIPPING

Greifen

Gripping



TÜNKERS®

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TÜNKERS Gripper Systems – the arms and hands of the industrial robot

Robotic gripper systems have become a standard in today's automotive body assembly lines. With increased performance, robotic handling has replaced conventional transport systems like shuttle and conveyor systems.

They do not only move small and add-on parts, but also side panels, complete underbody groups and - for the first time now - even entire car bodies.

In special designs, robotic grippers are now also used for processes including handling procedures using welding guns, glueing or clinching units and in some cases, they even have geometric functions.

While until a couple of years ago, steel welding frames used to be the backbone of robotic grippers, modular systems are the state of the art now.

TÜNKERS – the specialist in gripper and handling technology

Introduction

Gripper and handling technology is the core competancy of the comprehensive TÜNKERS product range. The portfolio includes a variety of system solutions, based on force-closed and form-closed concepts. The principal application for these grippers is the body in white production, in which handling, process and geometric applications are implemented. Due to the flexible nature of the car body, gripper tasks can also be performed in other aspects of automobile technology.

Versatility and flexibility

In addition to standard TÜNKERS® Round tube, Carbon tube, One Screw or Euro-Gripper-Tooling, we also offer customer-specific products in customised form. On request, our sphere of competence also includes special products.

Worldwide experience and problem-solving expertise

With eight production plants for grippers around the world and a total of approx. 14,000 gripper systems supplied to date, TÜNKERS is a strong business partner. Our handling systems are used by many original equipment manufacturers in the automobile sector, including, for example, Audi, BMW, Daimler, Ford, GM, Land-Rover, Renault, Volvo, Volkswagen or Skoda. As specialists in gripper systems, with this background experience we are able to react flexibly to problems of any kind and to offer you prompt and competent potential solutions to design challenges, for example.

TÜNKERS as system supplier

In implementing gripper projects, if required we can offer you integrated solutions. These include:

– Design consultancy and the creation of gripper system concepts

– Project management and ongoing contract implementation

– Mechanical assembly, including the production of special components and the procurement of parts

– Installation of pneumatically- and electrically-operated components

– 3D measurement and documentation

– On-site commissioning

In the first instance, please make direct contact with your local Field Service Team or send an e-mail to gripper@tuenkers.de.

In designing a gripper system, the user is faced with the choice of either a modular system or a gripper of welded construction. The advantages of modular construction are self-evident:

Key factors

Maintenance:

– No need for replacement systems, as is frequently the case with welded-construction gripper systems

– Faster replacement of components

– For maintenance, modular grippers only require a small number of standard spare parts

Weight:

– Lightweight precision round tubes out of aluminum, thin-walled steel or carbon fibre semi-finished products

– Weight reduction to retain or downgrade the category of robot

Flexibility:

– Rapid adaptation to short-notice modifications to components, for example expansion to accommodate an additional clamping station

– Combination of the various round tube gripper systems is possible → similar tube diameter and offsets of the clips

– Weight reduction due to the use of carbon fibre components

Delivery times:

– Standard components in stock

– Available worldwide

Costs:

– Design costs - Standardised 3D-CAD libraries mean the design becomes simply ‘composition’

– Storage costs – Small variety of parts, few special-production parts required

– Project costs – Volume production in high numbers at low prices

General configuration of modular gripper systems

1. Gripper base plate

Versions in the form of sheet aluminum or sheets of composite material in a variety of material thicknesses and dimensions, compatible with the size of the gripper and the weight of the component.

2. Modular base frame

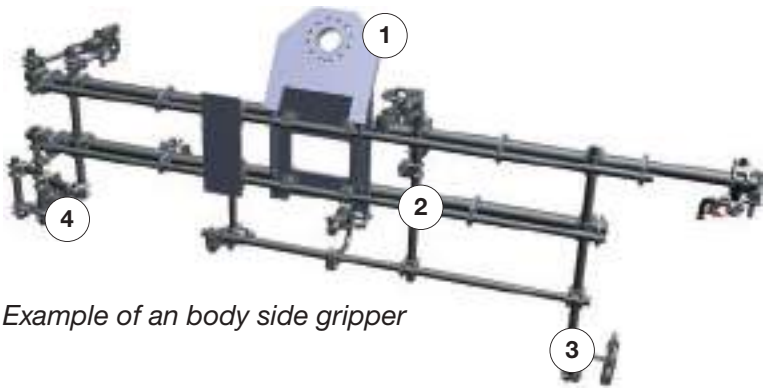
Mainly responsible for the overall rigidity of the system. Depending on the system, the base frame can be in the form of circular- or octagonal-section tubing.

3. Connections

Extensions/gripper arms for connecting actuators and pins to the base frame.

4. Machines for gripping, clamping and positioning

Lightweight Tünkers actuators provide for a dynamic apprach.



Example of an body side gripper

GRIPPING

TÜNKERS Round Tube System (TRR)

TÜNKERS®
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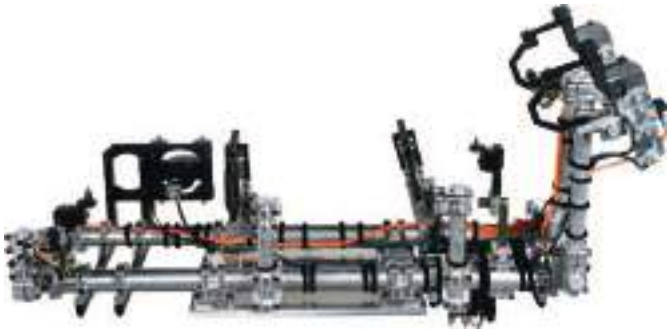
TÜNKERS Round Tube System (TRR)

From a technical viewpoint, the force-closed TÜNKERS® Round Tube System makes use of the optimum moment of inertia of tubes and, in comparison with square-section forms, they exhibit the ideal relationship between low weight, high rigidity and low vibration levels.

– System consisting of precision aluminum tubes in diameters of 25, 40 and 60 mm
– High geometric flexibility → optimum accessibility to components → positioning possible in all directions
– Similar offset with both aluminum and carbon fibre joints (hybrid system possible)
– Safety in case of a crash → the clips rotate without destroying the machines
– Reproducibility → Scale on GSKN clips or optional reference holes

Gripper system for handling a body side



Round Tube Gripper System

Aluminum cross joints – GSKN Series

Precision aluminum tubes Ø 25, 40 and 60 mm

Nonius for precise adjustment

Round Tube Gripper System

Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
GR 60	EN AW 2007	2,50 kg/m	329376 mm⁴	10979 mm³

Ordering information: GR60-…
Profile lengths in 10 mm increments (maximum length 6000 mm)

Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
GR 40	EN AW 2007	1,83 kg/m	95492 mm⁴	4775 mm³

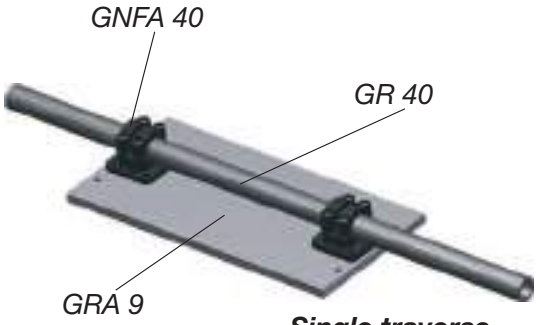
Ordering information: GR40-…
Profile lengths in 10 mm increments (maximum length 6000 mm)

Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
GR 25	EN AW 2007	1,40 kg/m	19175 mm⁴	1534 mm³

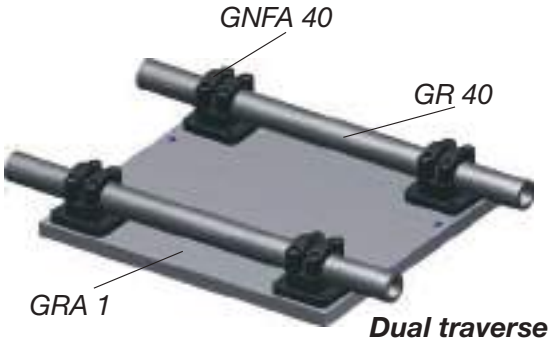
Ordering information: GR25-…
Profile lengths in 10 mm increments (maximum length 3000 mm)

Please Note:
All technical data relating to the profiles have been determined using Autodesk Inventor Professional 2014. Tünkers does not guarantee that the actual product exactly corresponds to the technical data provided. Tünkers accepts no liability for damage which may occur as the result of individual use of the product.

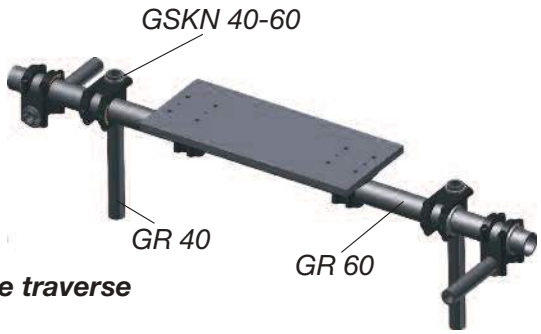
System configuration – Base Frames and Gripper Arms



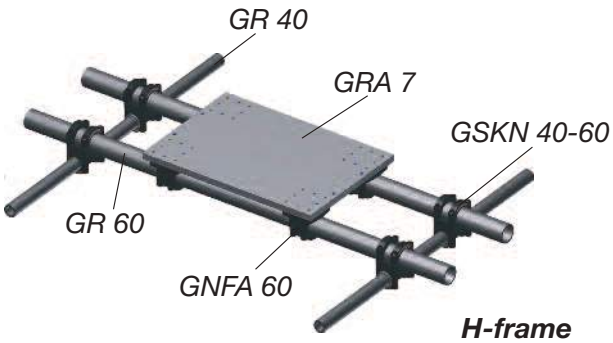
Single traverse



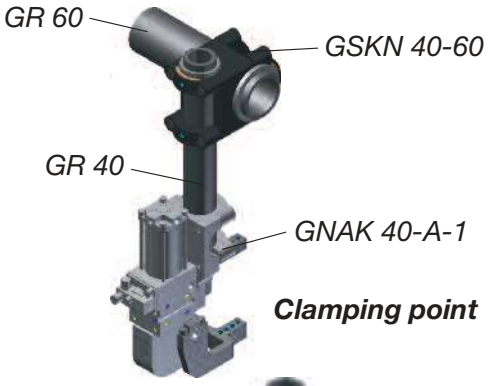
Dual traverse



Single traverse

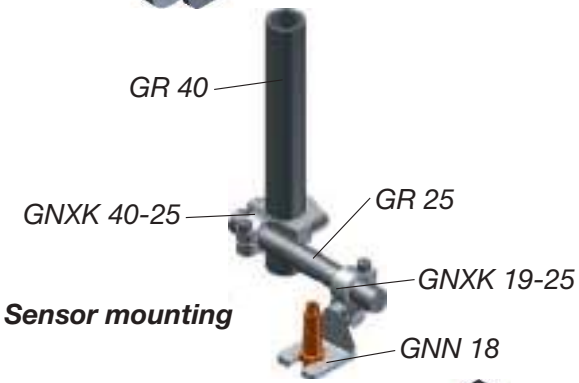


H-frame



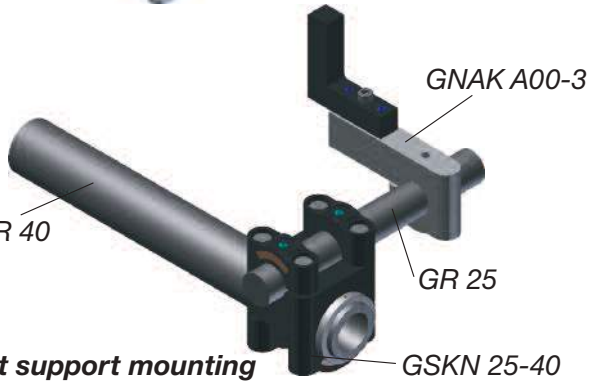
Clamping point

Clamping point



Sensor mounting

Centring pin mounting



Component support mounting

Suction pad mounting

GRIPPING

TÜNKERS Carbon Fibre Tube System (TCR)

TÜNKERS®
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TÜNKERS Carbon Fibre Tube Systems (TCR)

From a technical viewpoint, the force-closed TÜNKERS® Carbon Fibre Tube System makes use of the optimum moment of inertia of tubes and, at the same time, the special properties of carbon fibres.

Right at the beginning of the project phase and without knowledge of the component or gripper weight in question, the maximum permissible weight category is defined by determining the type of robot. If this weight category of the gripper solution designed for the actual application is exceeded, apart from selective measures to reduce weight, the designer must resort to using a larger robot, with negative consequences in terms of investment, space requirement (footprint) and cycle time.

With potential weight savings of up to 50%, the TÜNKERS® Carbon Fibre Tube System is a genuine alternative and creates new design leeway, as both a complete system and a hybrid solution, in which aluminum, steel and carbon fibre components can be flexibly combined in one product.

– System consisting of precision carbon fibre tubes in diameters of 25, 40 and 60 mm
– Combination and integration in existing gripper systems possible → similar offset between aluminum and carbon fibre joints
– Weight reduction → Use of a lower category of robot
– In comparison with an aluminum system: weight reduction of 40%, price supplement approx. 20% in terms of the complete gripper system

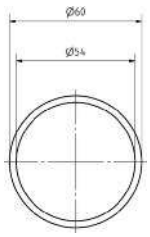
Precision carbon fibre tubes - GRC Ø 25, 40 and 60 mm

Carbon fibre cross joints - GKC

'Stingray' – the lightweight carbon fibre bracket Weight: from 6 kg

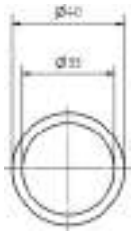
Stingray as gripper system – total weight approx. 30 kg

Example application – transporting 115 kg floor pan



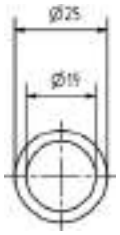
Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx	Surfave treatment
GRC 60	CFK	0,85 kg/m	218780 mm⁴	7293 mm³	ground

Ordering information: GRC60-…
Profile lengths in 10 mm increments (maximum length 3000 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx	Surface treatment
GRC 40	CFK	0,64 kg/m	67450 mm⁴	3372 mm³	ground

Ordering information: GRC40-…
Profile lengths in 10 mm increments (maximum length 3000 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx	Surface treatment
GRC 25	CFK	0,33 kg/m	12778 mm⁴	1022 mm³	ground

Ordering information: GRC25-…
Profile lengths in 10 mm increments (maximum length 3000 mm)

Please Note:
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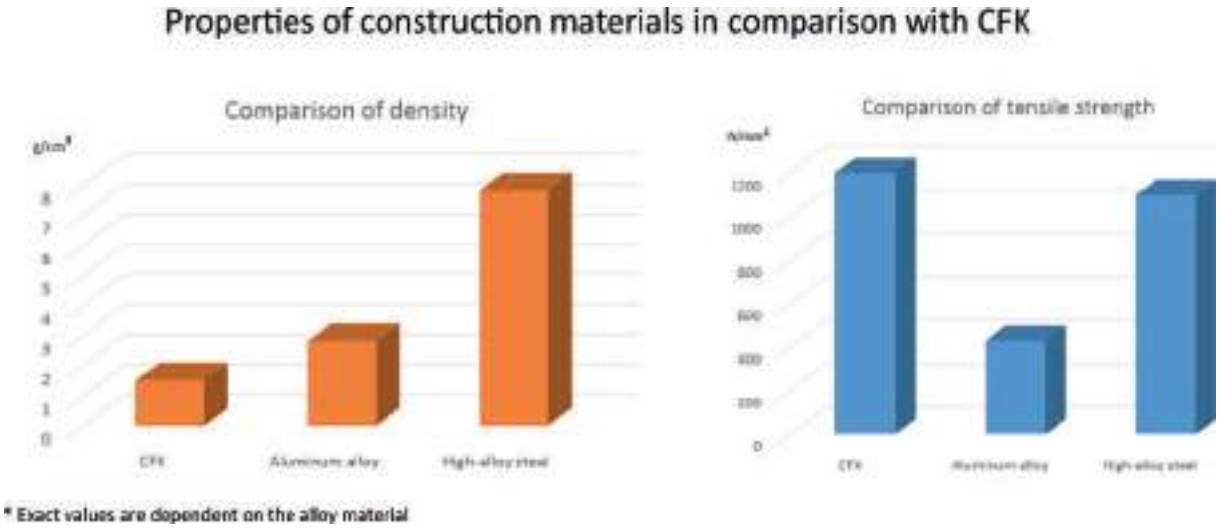
TÜNKERS Carbon Fibre Tube Systems (TCR)

Characteristics of CFK in comparison with steel or aluminum

– Exceptional strength to weight ratio (low weight, high tensile strength)
– High modulus of elasticity, high strength, rigidity and dynamic load-bearing capacity
– Good vibration absorption and dimensional stability
– Heat and corrosion resistance
– Minimal heat expansion
– High fatigue strength, high residual safety



Tube Ø	Steel (kg/m)	Aluminum (kg/m)	Carbon (kg/m)
25 mm	1,63	1,40	0,33
40 mm	2,31	1,83	0,64
60 mm	(6,78)	2,50	0,85

GSKN – Cross Joint (Aluminum)

GSKN 60-60
Weight: 1400 g

GKC – Cross Joint (Carbon & Aluminum)

GKC 60-60
Weight: 750 g

+ Rigidity – optimised design
+ Installation space – low interference contour
+ Flexibility – integration into existing systems possible
+ Compatibility – transfer of the existing design

Stingray

– Innovative gripper console
– Weight from 6 kg
– Integral tube clips, robot mounting face and centring sleeve for gripper station

Stingray gripper

Detail view: clamp connection

Integral tube clips with clamping screw (Ø 60 mm)

Top view

Integral robot mounting face (Position as required)
Standard – central mounting Hole diameters: Ø 125 mm or 160 mm

Sandwich-construction base

View from below

Integral centring sleeves for gripper station

GRIPPING

TÜNKERS One Screw System (TOS)

TÜNKERS®
Ingenuity in series.

TÜNKERS One Screw System (TOS)

The TÜNKERS® One Screw System combines the advantages of form-closed situation in the main frame (Level 1) with that of force-closed in the gripper arms (Level 2). Due to the ability to attach the joints in the main frame with one screw on the octagonal main frame profile, in certain applications this results in an extremely rapid assembly time. In order to guarantee a predefined clamping situation, each threaded connection should incorporate a clearance sleeve. The joints are optimally positioned by means of alternating hole templates at a distance of 30 mm from each surface and 15 mm offset from the adjacent surface.

– Octagonal-section aluminum profile in Level 1 and round tube in Level 2

– One of the fastest systems in automation in terms of MTTR

– Variable threaded connection concept

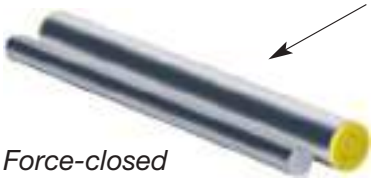
– Slim design in Level 1

– Small number of components

– No special tools required for assembly, no blind rivet nuts

TOS Gripper system

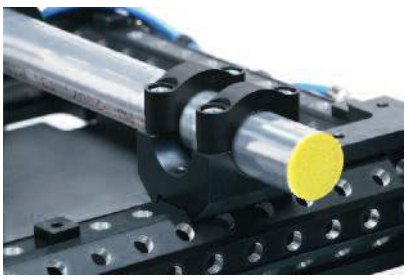
Form-closed profile
TOS 001
for main frame



Force-closed
aluminum tubes GR 25/40 for
gripper arms

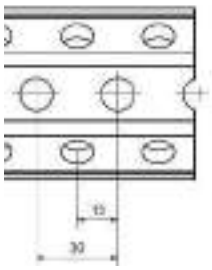
Optional: CFK tubes
GRC 25/40

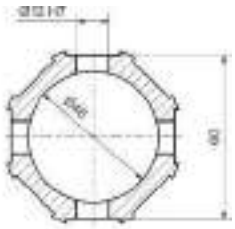
Detail view – Base frame connector
TOS 023 / TOS 024



Detail view – Cross joint
TOS 040

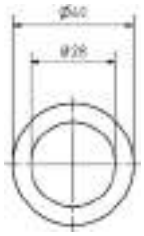
Detail view – clamp connection





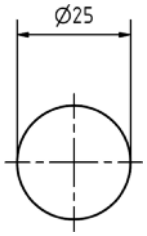
Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
TOS 001 - Octagonal profile	EN AW 6063 T66	2,8 kg/m	359886 mm⁴	11990 mm³

Ordering information: TOS001-…
Profile lengths in set 30 mm increments (maximum length 4078 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
GR 40 - Circular-section tube	EN AW 2007	1,83 kg/m	95492 mm⁴	4775 mm³

Ordering information: GR40-…
Profile lengths in 10 mm increments (maximum length 6000 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
GR 25 - Round bar	EN AW 2007	1,4 kg/m	19175 mm⁴	1534 mm³

Ordering information: GR25-…
Profile lengths in 10 mm increments (maximum length 3000 mm)

Please Note:
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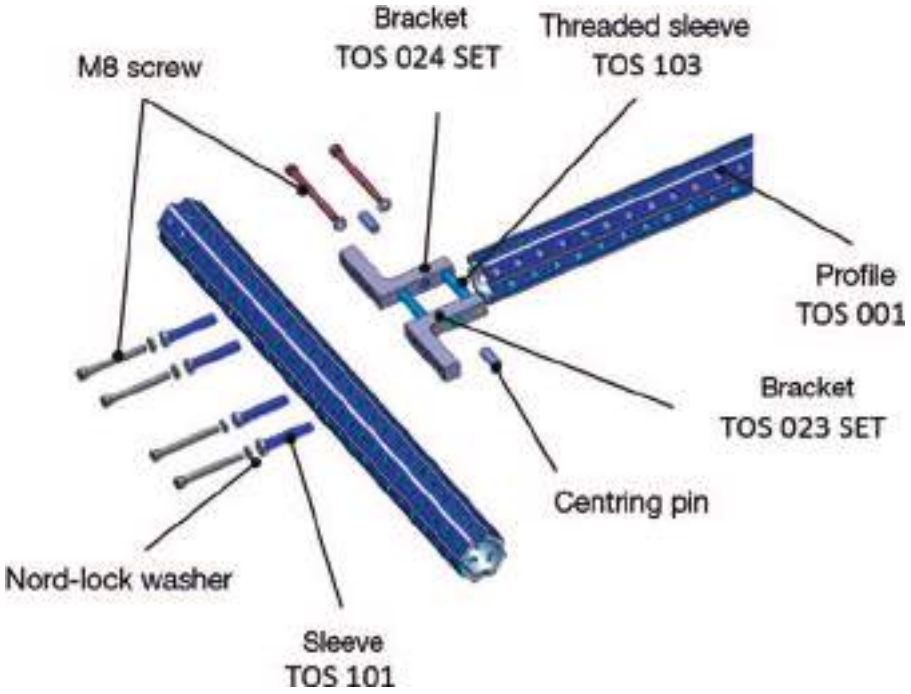
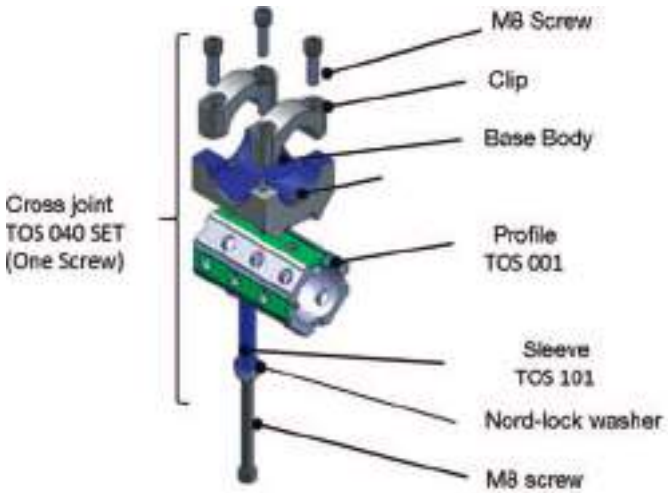
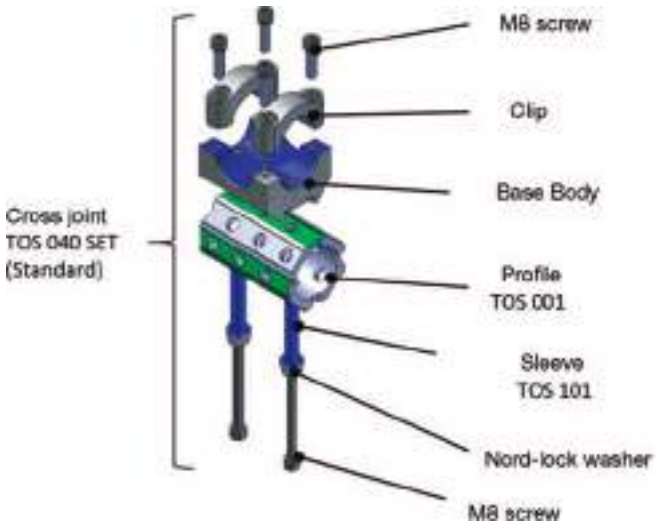
System configuration – base frame and cross joints







Components of the base frame (Level 1):

Base plate TOS 010

Base plate TOS 011

Flange connection SW60 TOS 015 SET

Basic profile TOS 001

TOS 023 SET TOS 024 SET

T-connector TOS 021 SET

Cross joint 40 TOS 040 SET

Joint 40 LW TOS 041 SET

Cross joint 25 TOS 044 SET

Joint 25 LW TOS 045 SET

Extension arm 40 TOS 043 SET

Joints for gripper arms (Level 2):

GSKN Cross joint

GSKN Series

Typical adapter / clamping unit connections

GNAK A10

GNAK A00

GNXK

GNAK 40-A-1

GRIPPING

Euro-Gripper-Tooling System (EGT)

TÜNKERS®
Ingenuity in series.

Euro-Gripper-Tooling System (EGT)

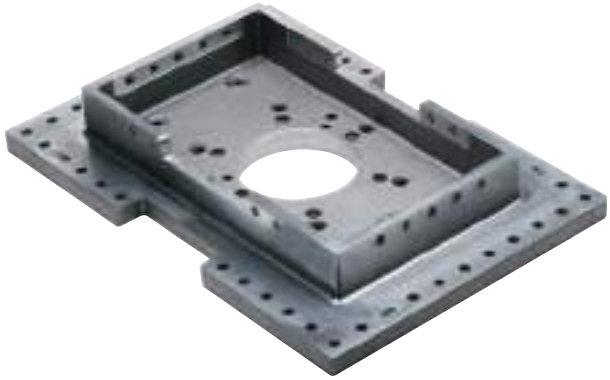
The Euro-Gripper-Tooling System (EGT) was developed by the Euro-Gripper Working Group (current members: Audi, BMW, Daimler, Porsche and Volkswagen) and is now exclusively intended for use in the factories of theses OEMs. The concept is based on an octagonal profile which, with connectors, adapters and tubes, facilitates the modular attachment of clamping or centring units for fixture building grippers. Apart from a few shared standard components, the specific versions vary from OEM to OEM. Consequently, there is a basic catalogue which varies according to the OEM.

– TÜNKERS is a licensed supplier of EGT components to German car manufacturers and the manufacturer of complete EGT gripper systems

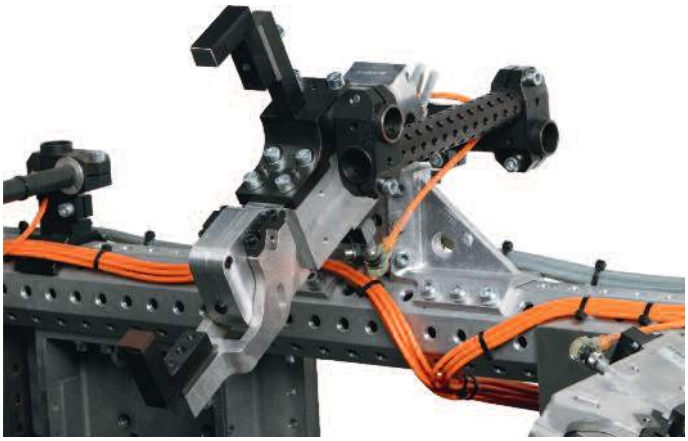
– They are based on SW 80/50 octagonal aluminum profiles with hole patterns

– Connections are attached by means of blind rivet nuts and screws to the profiles

– Reproducibility in the event of a crash provided by holes

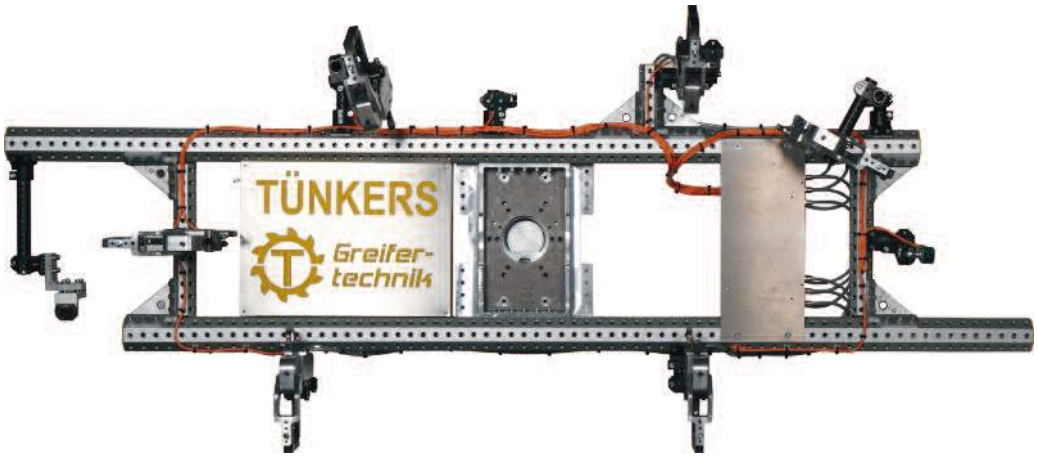


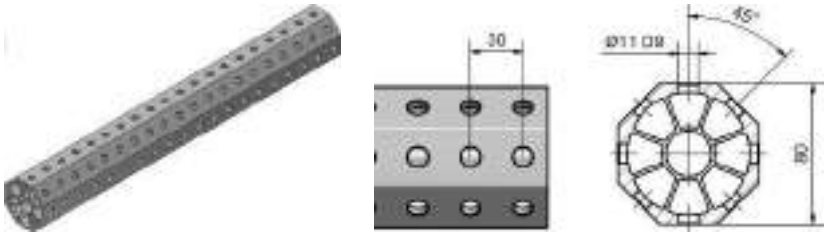
Base plate



Clamp connection

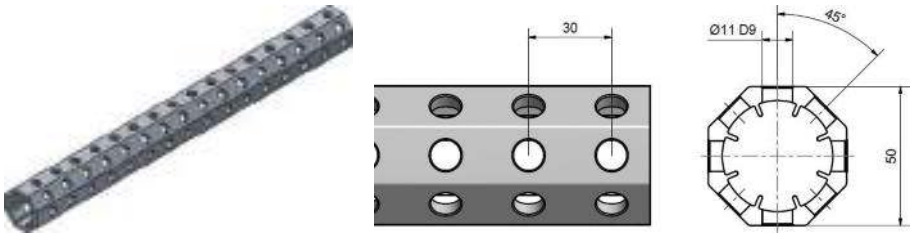
Profile of the Euro-Gripper system





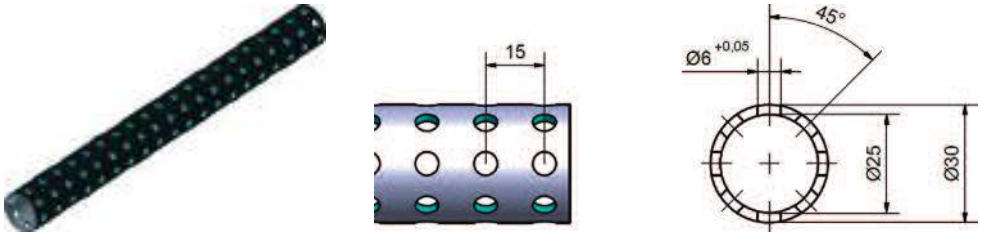
Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
EGT 001 - Octagonal profile	EN AW 6063 T66	4,89 kg/m	874065 mm⁴	21851 mm³

Ordering information: EGT 001 SW80X…
Profile lengths in preset 30 mm increments (maximum length 4078 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
EGT 002 - Octagonal profile	EN AW 6063 T66	2,05 kg/m	96624 mm⁴	3864 mm³

Ordering information: EGT 002 SW50X…
Profile lengths in preset 30 mm increments (maximum length 4078 mm)



Type	Material	Weight	Geometrical moment of inertia Ix	Section modulus Wx
EGT 006 - Precision steel tube	E355-N	1,45 kg/m	9119 mm⁴	2745 mm³

Ordering information: EGT 006 Version M D30X2,5X…
Profile lengths in preset 15 mm increments
Version M: 73 mm to 448 mm
Version S: 86 mm to 446 mm
(maximum length 1000 mm)

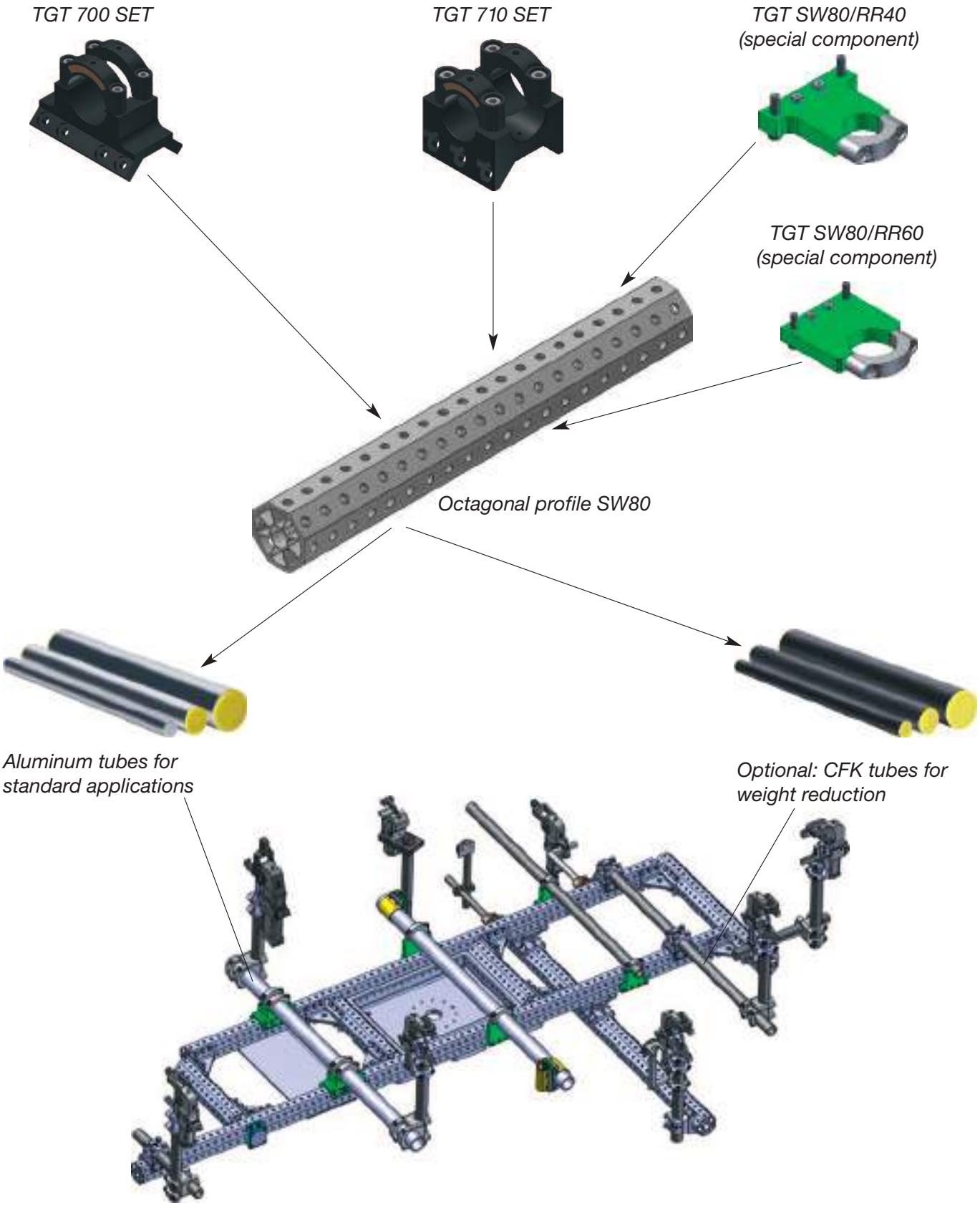
Please Note:
All technical data relating to the profiles have been determined using Autodesk Inventor Professional 2014. Tünkers does not guarantee that the actual product exactly corresponds to the technical data provided. Tünkers accepts no liability for damage which may occur as the result of individual use of the product.

Components as practical extensions to the EGT System

– TGT joints for attaching the TÜNKERS® Round Tube System (TRR) to the EGT SW80 octagonal profile

– Use of the entire TÜNKERS® Round Tube System (TRR) for the gripper arms

– Weight reduction by using the TÜNKERS® Carbon Fibre Tube System (TCR)

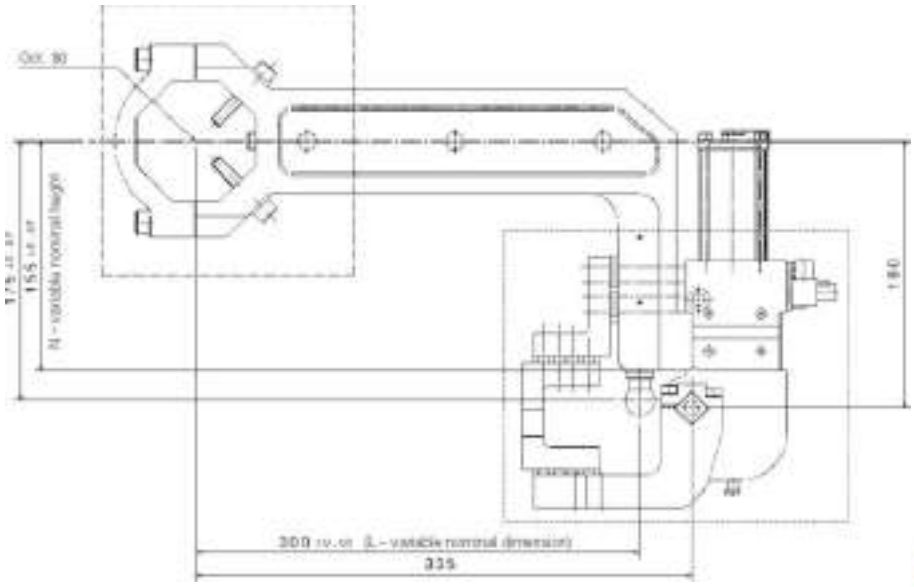


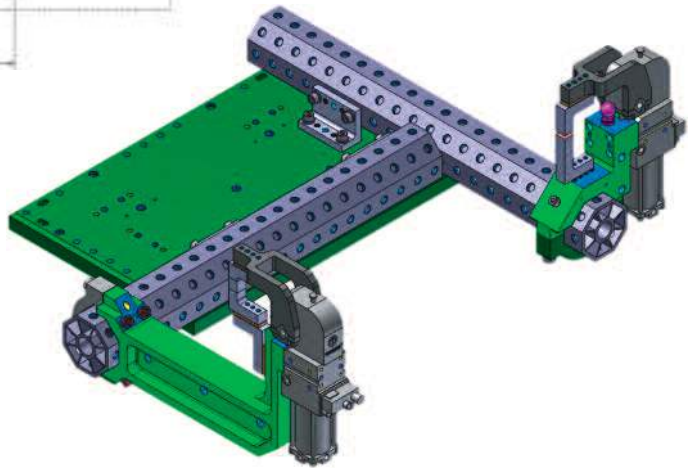
Components as practical extensions to the EGT System

– High-precision GEO blades (TGT 650) for the Euro-Gripper-Tooling System
– Application for GEO Grippers for direct attachment of clamping units to the base frame
– Variable lengths in the x- and y-directions
– Manufactured out of high-strength aluminum
– Maximum repetitive accuracy when replacing the GEO blade with a centring pin
– Optional: clip can be mounted on the reverse side in the case of high loadings

TGT 650 – GEO blade (300 mm x 155 mm)

Detail view – Attachment using a centring pin





Typical configuration – GEO blade integration

– Lightweight pneumatic clamps for use with gripper systems
  → Reduction of the weight of the gripper
  → Lower category of robot
  → Reduction of vibrations on the gripper
  → Improve cycle times

Typical grippers

GN 40 · 2,38 kg

APG 40.1 BR2 A10 · 1,6 kg

GN 40 AS · 2,36 kg

APG 40.1 BR2 AS · 2 kg

Typical pneumatic clamps

V 40 LW · 1,7 kg

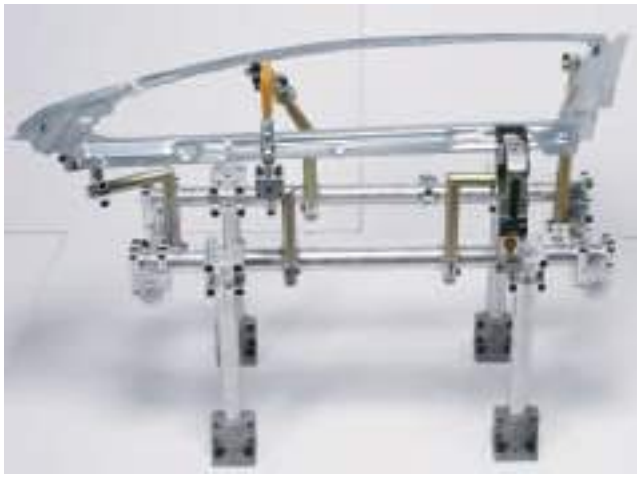
APH 40.5 H · 2,4 kg

Typical retractable pin units

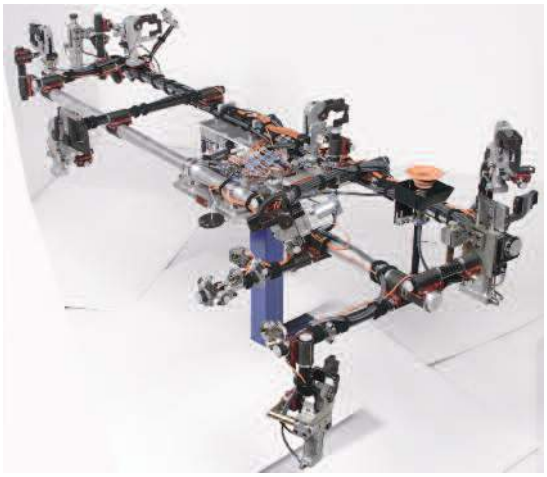
SZK 25 · 0,4 kg

SZKT 40 · 1,7 kg

SZK 30.8 · 1,3 kg



Fixture structure made from the Round Tube System (TRR)



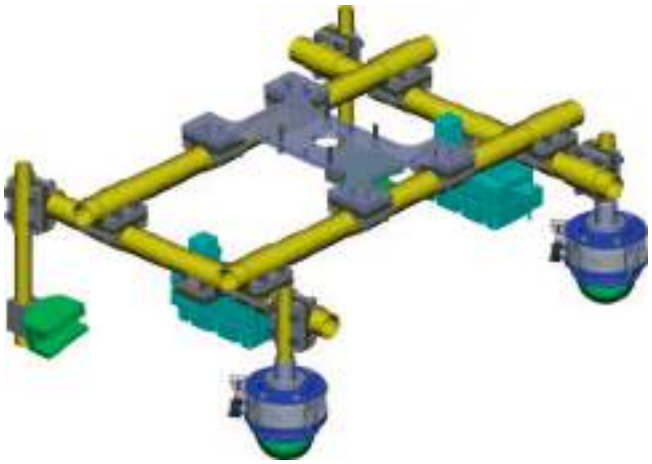
Hybrid Gripper (carbon fibre/aluminum)

Clamping fixture to client's specification

Manipulator gripper made from the Round Tube System (TRR)

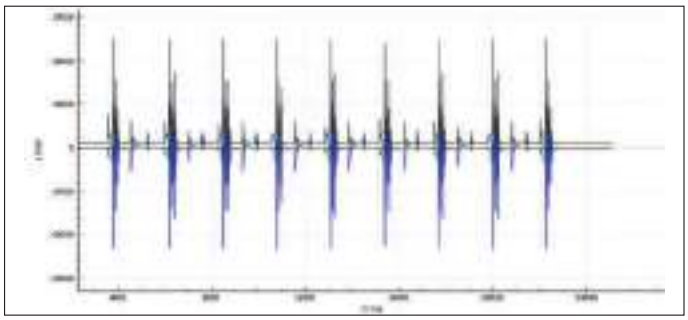
Design training for our modular gripper systems

Development of gripper concepts



Measurement of vibrations on gripper systems while in operation

TREC accelerometer



Acceleration diagram

FORMING

TÜNKERS®
Ingenuity in series.

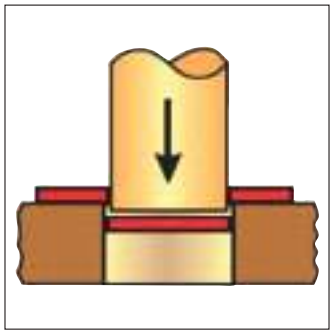
Forming

Forming – Our Speciality

The term “forming technology“ causes the obligatory association with large-scale presses, such as they are used for the production of sheet metal components or complete car body parts.

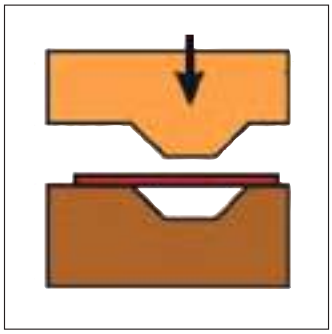
Contrary to this, we are primarily supplying sytems for post-processing of components made of steel and aluminum sheet metal or plastics. Typical applications include punching, stamping or joining operations required as additional processing steps for the manufacture of the finished part. The forming forces generated by these processes are in the range of approx. 1 bis 100 kN.

The main applications of TÜNKERS forming systems are:

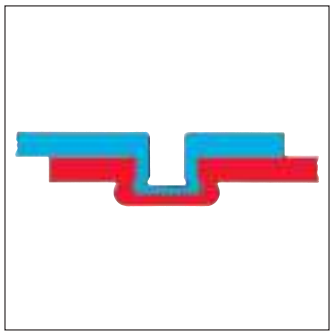


Punching

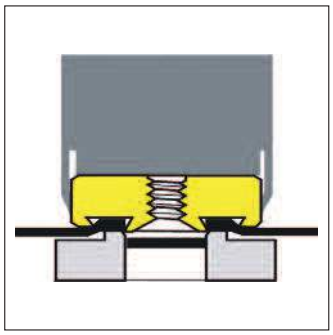
Marking



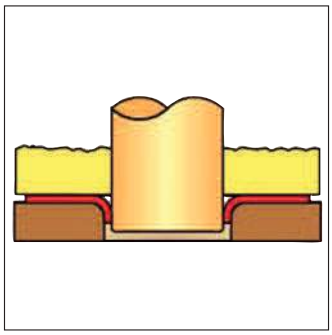
Nap Press Forming



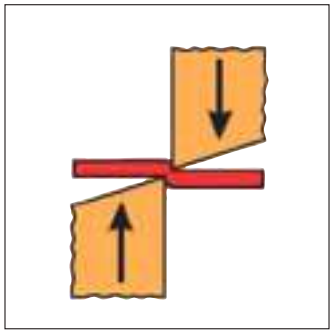
Clinching



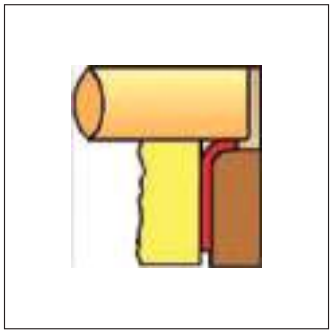
Setting of Nuts



Flanging



Cutting

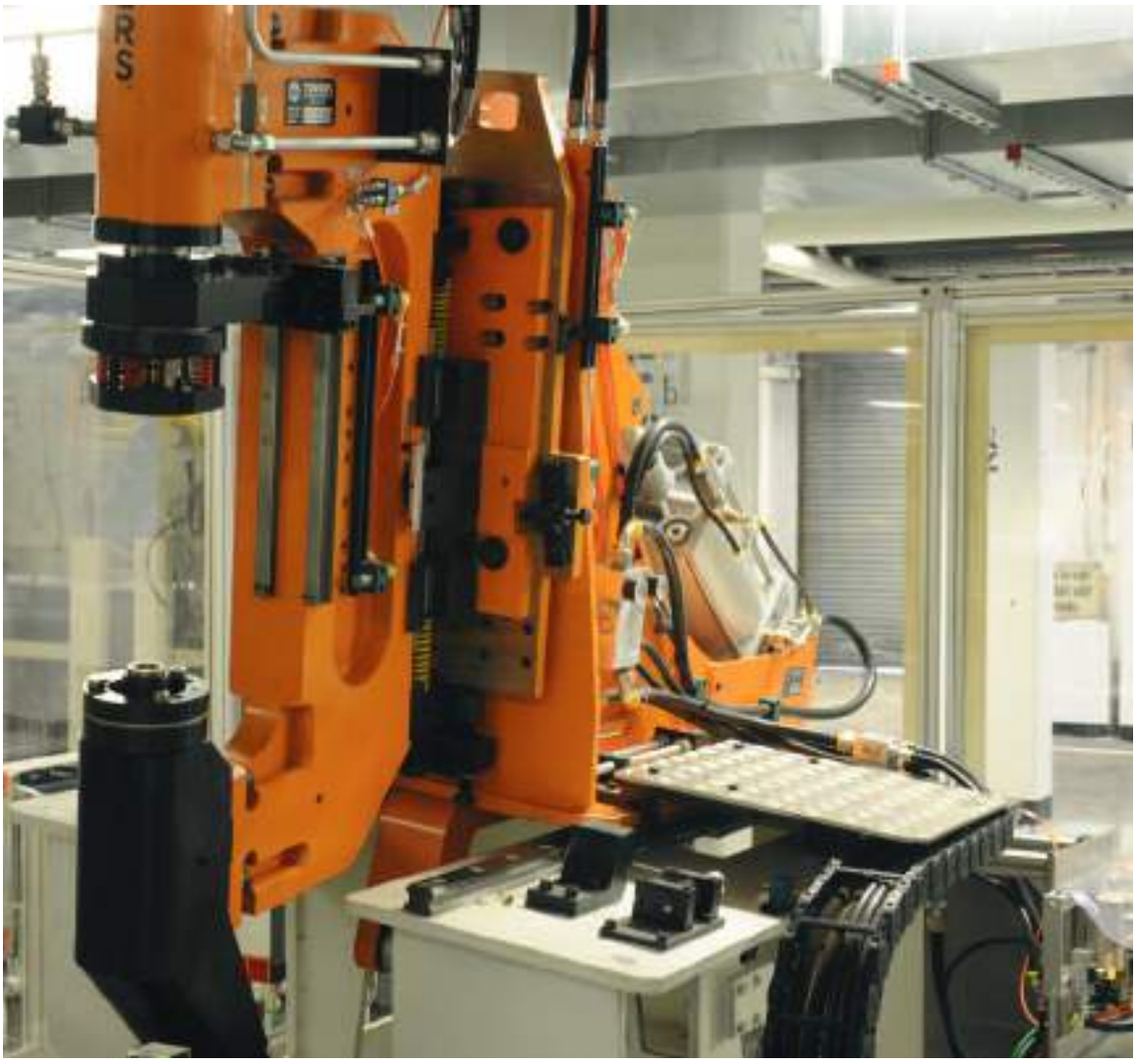


Folding

We have been specialising within this range of applications for over 20 years with a focus on body sheets. Especially with a view to customised solutions, we can offer you a wealth of experience.

This catalogue contains a selection of established standard components supplied by us. Even if you cannot find a suitable solution for your application straight away, please do not hesitate to contact us.

It does not matter if the application concerns a manual toggle unit, stationary toggle unit or robotic solution – we will find a suitable solution for you for any forming process manual, stationary or robotic unit.



Stationary C-Frame unit

Robotic C-Frame unit

Manual unit

FORMING

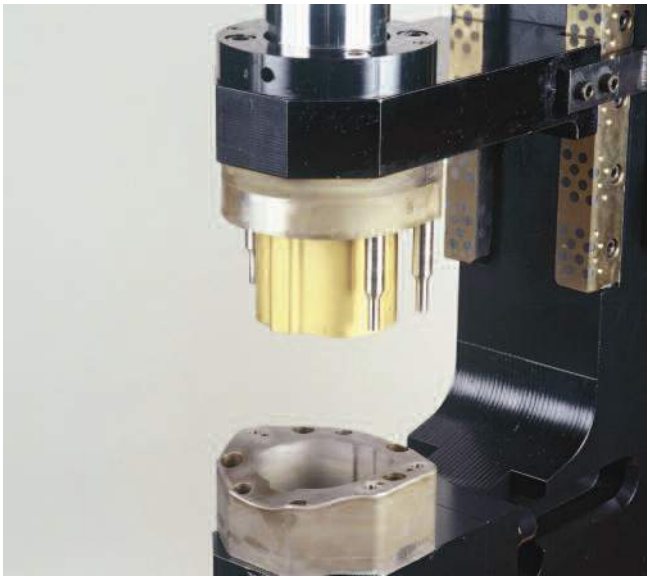
Punching

TÜNKERS®
Ingenuity in series.

Punching

With more than 1,000 applications for serial production, Tünkers offers a broad range of experience with punching and piercing applications for steel and aluminum sheet metal components.

Punching operations – even under complex conditions – are tasks which we realise on the basis of our compact power press units with pneumatic, hydraulic or pneumo-hydraulic drives especially developed for these applications.



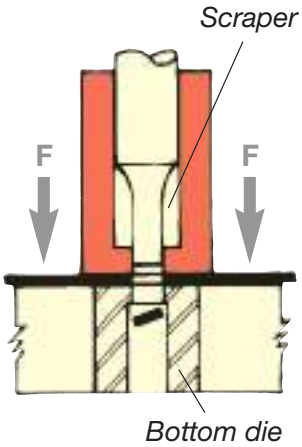
Tool Set

High-strength punch and die tools guarantee punching quantities of up to 200,000 cycles in connection with the TÜNKERS systems

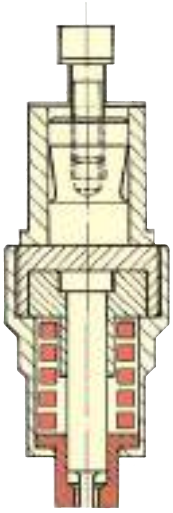
Alternative designs in HWS, HSS or titanium nitride coated for round, rectangular or contoured punches and dies.

Retainer Technology

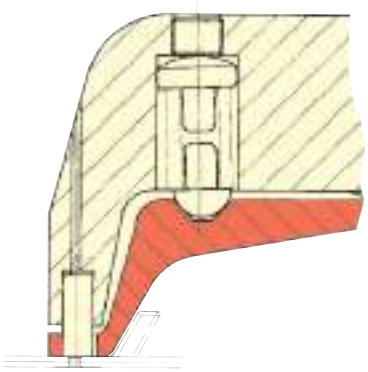
The holding system is crucial for the hole quality. The retainer holds the workpiece safely in position with a preload force of approx. 15 % of the punching force when the stamp moves down and provides for the repeatability of the punching process.



Polyurethane retainer of high-strength wear-free plastics



Tool cartridge with integrated stamp holder and spring-loaded retainer



Special retainer in forked or pin-form design, adjusted to the interference situation

Simplified calculation of the punching force

The first step in designing any type of clamp is to determine the punching force required for the process. The following formulae and tables will provide you with a quick overview. Please note that the calculations are based on maximum tensile strength. Particularly in the case of high-strength steel panels with tensile strengths of up to 1,200 Nmm², due account must be taken of corresponding factors.

Force F = cutting edge circumference x sheet metal thickness x tensile strength

Example 1 (circular hole):

– Steel sheet 1.0338 tensile strength 350 N/mm²
– Circular hole 10 mm dia.
– Sheet thickness 1 mm

10 mm · 3,14	·	1 mm	·	350 N/mm²	·	1,15	=	12.640 N	=	12,64 KN
(circumference (D · π))		(thickness s)		(tensile strength)		(stripping force)				

Example 2 (square hole):

– Steel sheet 1.0338 tensile strength 350 N/mm²
– Side length 10 mm
– Sheet thickness 1 mm

10 mm · 4	·	1 mm	·	350 N/mm²	·	1,15	=	16.100 N	=	16,10 KN
(circumference (a · 4))		(thickness s)		(tensile strength)		(stripping force)				

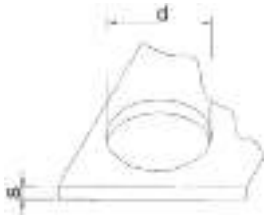
Tensile strengths of standard materials

Typical material, sheet metal	max. tensile strength Rm (N/mm²)
Steel 1.0338	350
Aluminum AlMg0,4Si1,2	260
Plastic Nylon	70
Copper Cu	200

Punching

Table showing examples of punching forces

Punching force [kN], for circular holes, material 1.0338

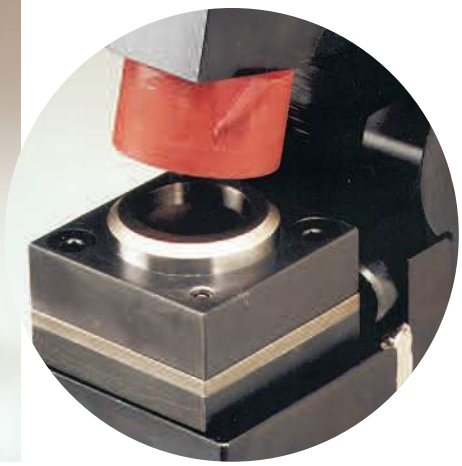


Sheet thickness s (mm)	Hole diameter d (mm)												
	3,00	**4,00**	**5,00**	**6,00**	**7,00**	**8,00**	**9,00**	**10,00**	**12,00**	**16,00**	**18,00**	**20,00**	**30,00**
0,50	1,90	2,53	3,16	3,79	4,42	5,06	5,69	6,32	7,58	10,11	11,37	12,64	18,96
0,70	2,65	3,54	4,42	5,31	6,19	7,08	7,96	8,85	10,62	14,16	15,92	17,69	26,54
0,80	3,03	4,04	5,06	6,07	7,08	8,09	9,10	10,11	12,13	16,18	18,20	20,22	30,33
1,00	3,79	5,06	6,32	7,58	8,85	10,11	11,37	12,64	15,17	20,22	22,75	25,28	37,92
1,20	4,55	6,07	7,58	9,10	10,62	12,13	13,65	15,17	18,20	24,27	27,30	30,33	45,50
1,40	5,31	7,08	8,85	10,62	12,39	14,16	15,92	17,69	21,23	28,31	31,85	35,39	53,08
1,50	5,69	7,58	9,48	11,37	13,27	15,17	17,06	18,96	22,75	30,33	34,12	37,92	56,87
1,80	6,82	9,10	11,37	13,65	15,92	18,20	20,47	22,75	27,30	36,40	40,95	45,50	68,25
2,00	7,58	10,11	12,64	15,17	17,69	20,22	22,75	25,28	30,33	40,44	45,50	50,55	75,83
2,20	8,34	11,12	13,90	16,68	19,46	22,24	25,02	27,80	33,37	44,49	50,05	55,61	83,41
2,40	9,10	12,13	15,17	18,20	21,23	24,27	27,30	30,33	36,40	48,53	54,60	60,66	91,00
2,60	9,86	13,14	16,43	19,72	23,00	26,29	29,57	32,86	39,43	52,58	59,15	65,72	98,58
2,80	10,62	14,16	17,69	21,23	24,77	28,31	31,85	35,39	42,47	56,62	63,70	70,78	106,16
3,00	11,37	15,17	18,96	22,75	26,54	30,33	34,12	37,92	45,50	60,66	68,25	75,83	113,75

Punching force [kN], for square holes, material 1.0338

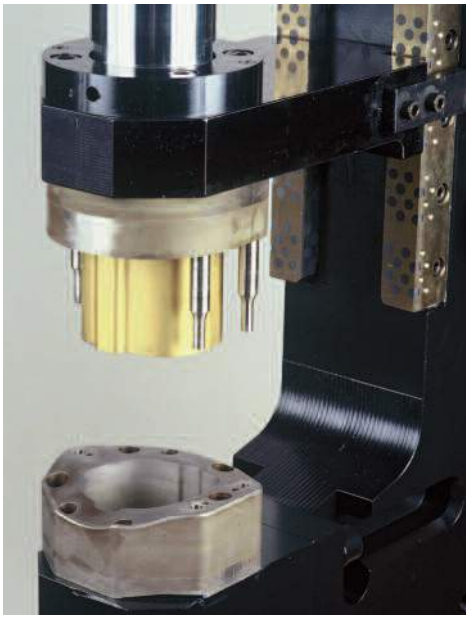
Sheet thickness s (mm)	Side length a (mm)												
	3,00	**4,00**	**5,00**	**6,00**	**7,00**	**8,00**	**9,00**	**10,00**	**12,00**	**16,00**	**18,00**	**20,00**	**30,00**
0,50	2,42	3,22	4,03	4,83	5,64	6,44	7,25	8,05	9,66	12,88	14,49	16,10	24,15
0,70	3,38	4,51	5,64	6,76	7,89	9,02	10,14	11,27	13,52	18,03	20,29	22,54	33,81
0,80	3,86	5,15	6,44	7,73	9,02	10,30	11,59	12,88	15,46	20,61	23,18	25,76	38,64
1,00	4,83	6,44	8,05	9,66	11,27	12,88	14,49	16,10	19,32	25,76	28,98	32,20	48,30
1,20	5,80	7,73	9,66	11,59	13,52	15,46	17,39	19,32	23,18	30,91	34,78	38,64	57,96
1,40	6,76	9,02	11,27	13,52	15,78	18,03	20,29	22,54	27,05	36,06	40,57	45,08	67,62
1,50	7,25	9,66	12,08	14,49	16,91	19,32	21,74	24,15	28,98	38,64	43,47	48,30	72,45
1,80	8,69	11,59	14,49	17,39	20,29	23,18	26,08	28,98	34,78	46,37	52,16	57,96	86,94
2,00	9,66	12,88	16,10	19,32	22,54	25,76	28,98	32,20	38,64	51,52	57,96	64,40	96,60
2,20	10,63	14,17	17,71	21,25	24,79	28,34	31,88	35,42	42,50	56,67	63,76	70,84	106,26
2,40	11,59	15,46	19,32	23,18	27,05	30,91	34,78	38,64	46,37	61,82	69,55	77,28	115,92
2,60	12,56	16,74	20,93	25,12	29,30	33,49	37,67	41,86	50,23	66,98	75,35	83,72	125,58
2,80	13,52	18,03	22,54	27,05	31,56	36,06	40,57	45,08		72,13	81,14	90,16	135,24
3,00	14,49	19,32	24,15	28,98	33,81	38,64	43,47	48,30	57,96	77,28	86,94	96,60	144,90

Pneumatic toggle-lever clamp for punching holes for 35 mm dia. pipe unions in sheet steel

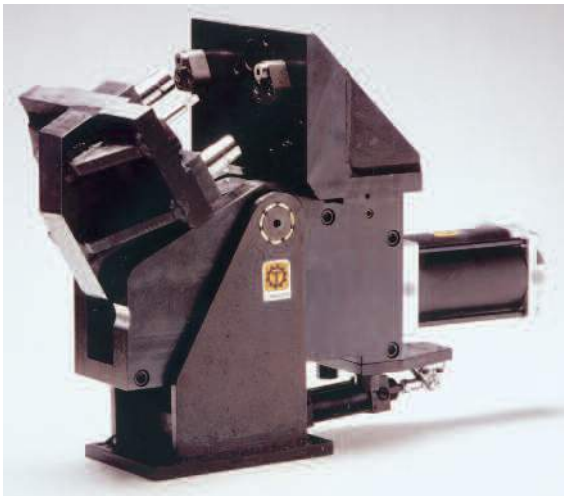


C-frame prepared for removal of scrap by suction for the overhead punching of holes

PFS400-60 for punching 2 holes simultaneously



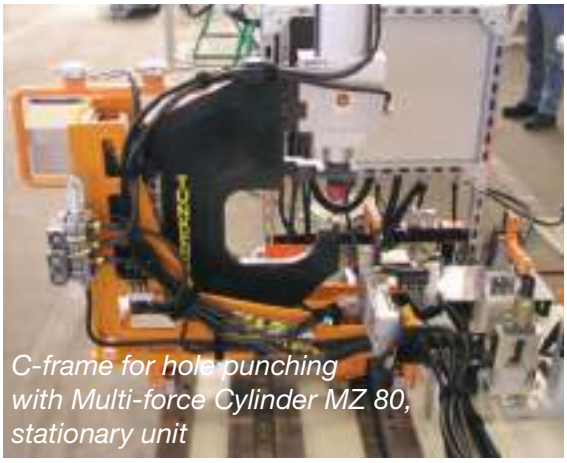
Bulkhead punch unit, right-hand drive breach



Hydraulic multiple punch tool with toggle-lever clamp

C-frame system with hydraulic cylinder for roof channel holes

C-frame system as dual punch with multi-force cylinder



C-frame for hole punching with Multi-force Cylinder MZ 80, stationary unit

FORMING

FORMING

Stamping

TÜNKERS®
Ingenuity in series.

Marking components with Stamping

Similar to simple steel-stamp numbers, the component is marked with letters, numbers or symbols via a forming process utilising > 5 kN forces.

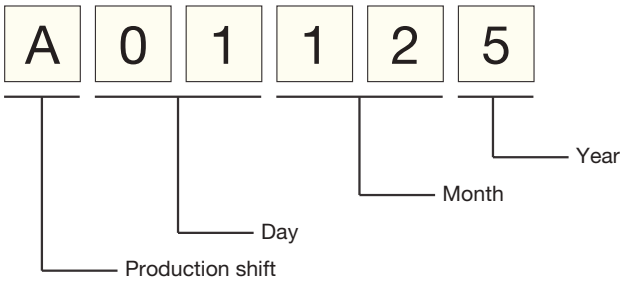
Good readability of the marking, also after painting, requires a penetration depth of the types into the workpiece of approx. 0.2mm.

Common stamping applications are shift and date stamps, name plates or company stamps.

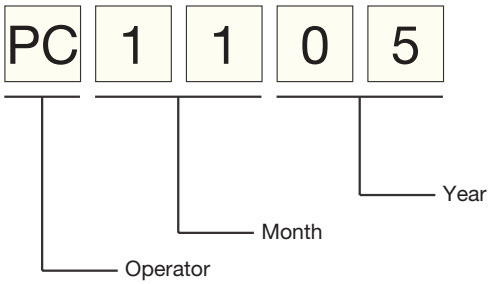
Examples

Shift/date stamps
Marking of workpieces in serial production, for the allocation of the production to the responsible assembly or production group.

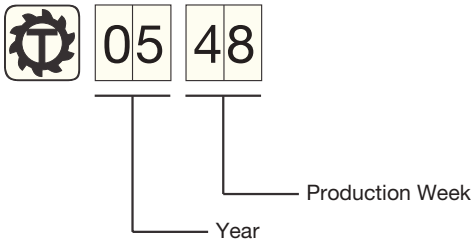
Example for a part number code –
6 digits. 6mm type height, press force ~ 40 KN



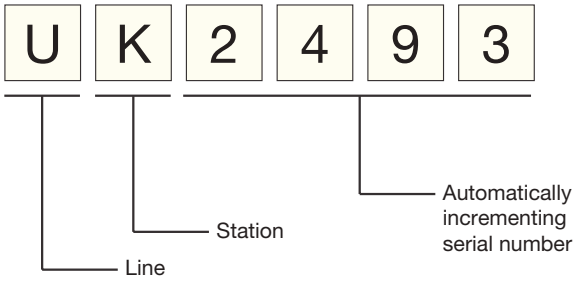
Operator stamp



Plant / company stamp



Production number



Stamping Tools

Robust type holders and stamping tools - alternatively key-operated or automated for digit heights of 2-8 mm.

Type holder

Stamping tool

Pressing Forces

Unlike other forming processes, stamping only requires a short power stroke (< 1 mm). That is why toggle-joint supported drives are particularly suited, as they generate maximum power just before the end position is reached. The pressing forces are proportional to type height and the number of digits. The following tables give an overview of common applications:

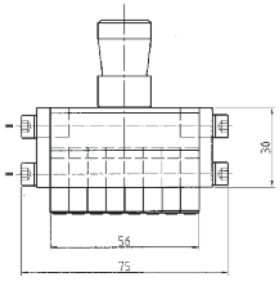
Sheet steel metal, 1.0338, tensile strength 350 N/mm²

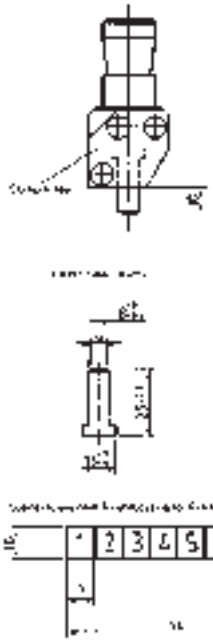
Stamping depth: 0,2 mm

Type height	Number of digits									
(mm)	1	2	3	4	5	6	7	8	9	10
4	3,0	6,0	8,9	11,9	14,9	17,9	20,8	23,8	26,8	29,8
5	3,7	7,4	11,0	14,7	18,4	22,1	25,7	29,4	33,1	36,8
6	4,4	8,8	13,1	17,5	21,9	26,3	30,6	35,0	39,4	43,8
7	5,2	10,3	15,5	20,7	25,8	31,0	36,1	41,3	46,5	51,6
8	5,9	11,7	17,6	23,5	29,3	35,2	41,0	46,9	52,8	58,6
	Pressing force in kN									

Type Holder PTH . . .

8 characters, 6 mm high





Ordering example:

PTH 8 6

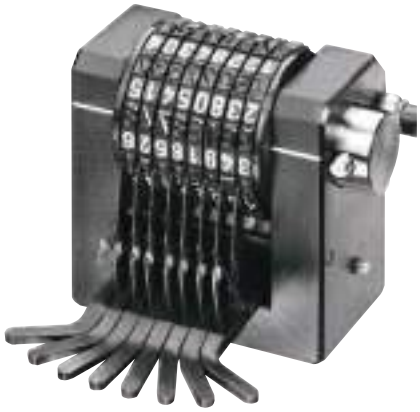
- 6 → 6 mm font height[1]
- 8 → Number of digits
- PTH → Type holder

[1] Customised stamps available

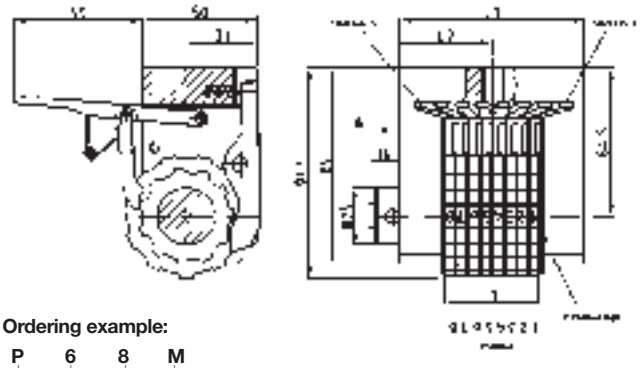
The typeface is **medium** pursuant to DIN 1451

We would be happy to offer further models upon request.

Set Key Stamping Tool P . . . M



Manually operated type wheels with set keys



Ordering example:

P 6 8 M

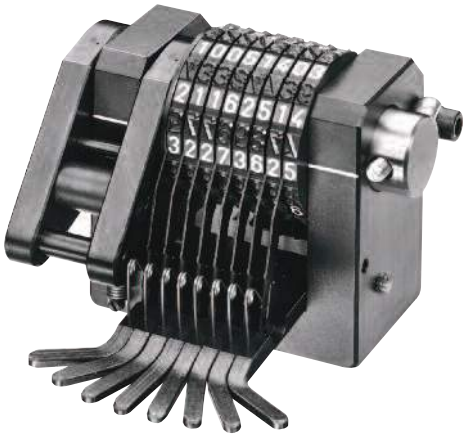
- M → Manual-operation
- 8 → Number of digits
- 6 → 6 mm font height
- P → Stamping tool

Number of digits	ain dimensions (6mm type height) L1	L2	L3
4	55	27,5	19,9
5	60	30	22,1
6	60	30	30,3
7	70	35	35,5
8	80	40	46,4

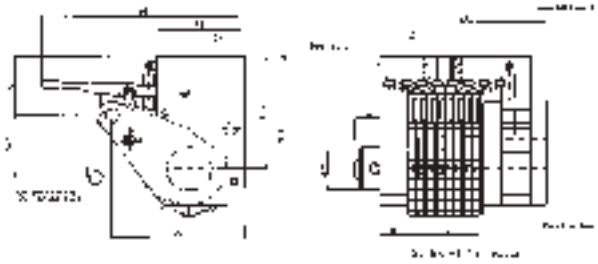
The typeface is **medium** pursuant to DIN 1451 (Optionaly available with narrow typeface pursuant to DIN 1451)

	Type height	Number of digits
Standard	4; 5; 6	4; 5; 6; 7; 8

Subject to technical modifications.



Set key stamping tool with automatically incrementing type wheels



The typeface is **medium** pursuant to DIN 1451 (Optionaly available with narrow typeface pursuant to DIN 1451)

We would be happy to offer further models upon request.

Ordering example:

P **6** **8** **A3**
- A3 → last three digits automatically incrementing
- 8 → Number of digits
- 6 → 6 mm font height
- P → Stamping tool

Number of digits	Main dimensions L1	L2	L3
4	75	26,5	19,9
5	80	30	25
6	85	31	30,3
7	90	46	36
8	95	36,5	40,7

	Type height	Number of digits	No. of automatically incrementing digits
Standard	4; 5; 6	4; 5; 6; 7; 8	A3; A4

On demand:

– Mirror-image writing

– Location of the counter selectable

– Max. 2 separate counters per stamping

– Switch crank left or right

– Engraving 0-9, letters, logos, etc.

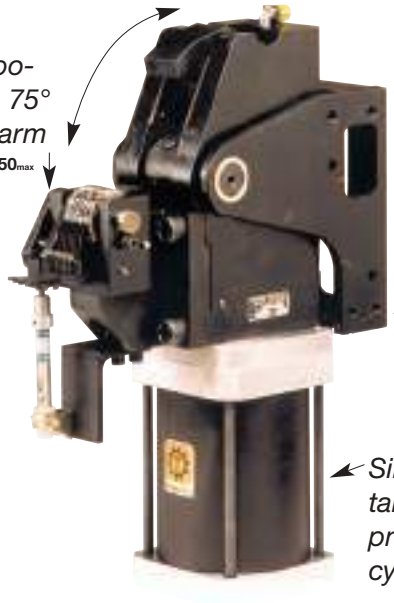
Subject to technical modifications.

Application examples

Complete component release via 75° opening swivel arm

F=50$_{max}$

high pressing forces of up to 50 kN due to toggle mechanism



Stamping unit as power press unit with pneumatic cylinder

Spring-loaded swivel bracket for unit equalisation

Single or tandem pneumatic cylinder

Multi-force cylinder with integrated guide, anti-rotating

Stamping unit as C-frame system with multi-force cylinder

Pressure pad

Automatic stamping tool

Automatic stamping unit

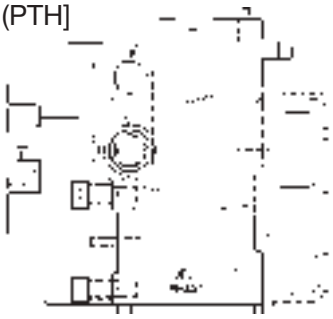
Stamping unit with 8 digits, switching keys and automatic changing via pneumatic cylinder

Product variants

Stamping tool mounted to swivel arm [PO]

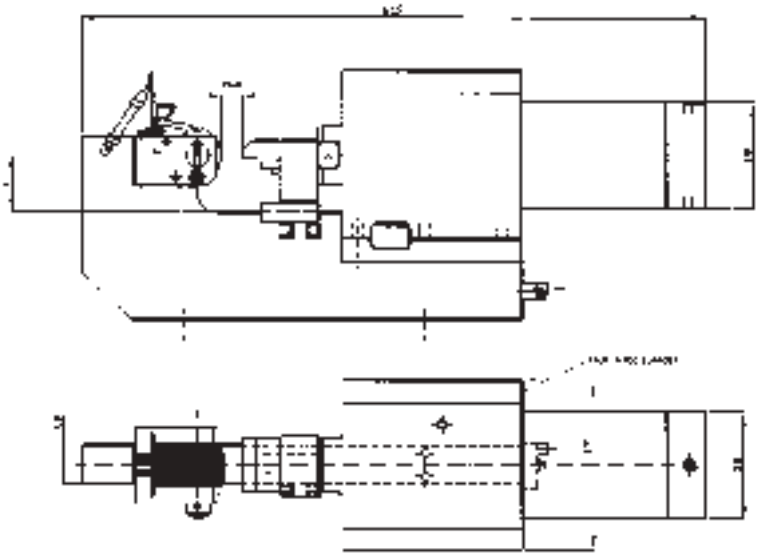
Stamping tool mounted to jaw [PU]

Type holder alternatively mountable on both sides (PTH]



Stamping Unit CBMZ 45

Example of a C-frame system
Drive: Multi-force cylinder
Medium: Compressed air: 5 bar
Pressing force: 45 kN
Reach X: 50, 100, 150 mm
Stroke: 50, 100, 150 mm
Tool: Automatic stamping tool



Ordering example:

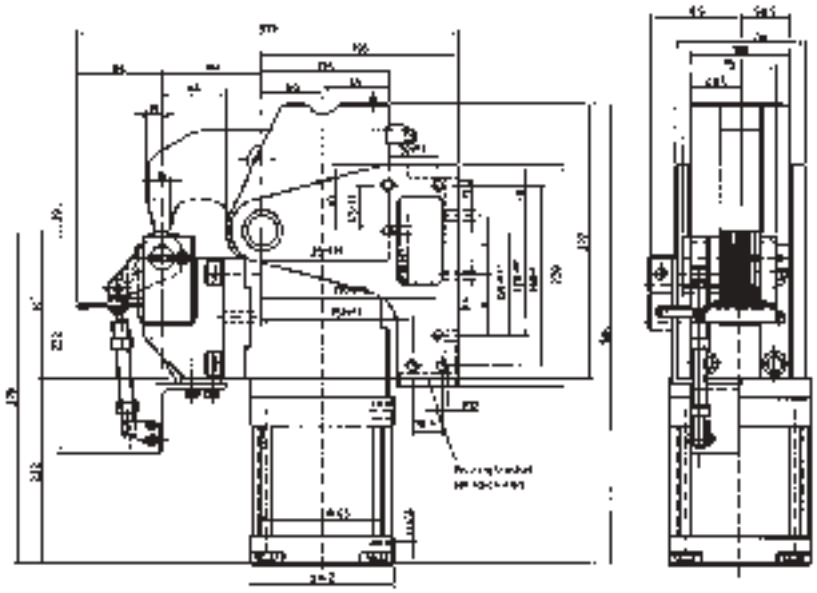
CBMZ 45 100 50 PU 6/8 A3 T12

- T12 inductive sensing system (option: T08 pneumatic)
- last 3 digits automatically incrementing
- 6 mm type height / 8 number of digits
- Stamping tool at bottom, PO: stamping tool at top (PTH=type holder)
- Stroke
- Reach Xstroke
- Type

FORMING

Stamping Unit PFS 400-60 PU

Example of power press unit
Drive: Pneumatic cylinder
Medium: Compressed air 5 bar
Pressing force: 50 kN
Reach: 60 mm
Opening angle: 75°
Tool: Automatic stamping tool



Ordering example:

PFS 400 60 PU 5/7 A2 T12

- T12 inductive sensing system (option: T08 pneumatic)
- last 2 digits automatically incrementing
- 5 mm type height / 7 number of digits
- Stamping tool at bottom, PO: stamping tool at top (PTH=type holder)
- Reach
- Type

Subject to technical modifications.


TONKERS

FORMING

Joining

TÜNKERS®
Ingenuity in series.

Joining

As a joining procedure for sheet metal components, clinching is the alternative to resistance welding. At comparable strengths, non-weldable materials, such as pre-coated and painted sheet metals, combinations of steel and aluminum and pairings with intermediate layers can be simply and more securely joined together.

This is one reason why, in many types of industry, such as domestic appliances, car body construction and in the ventilation and air conditioning sectors for example, clinching has become established as a joining procedure. In addition, mechanical joining offers other substantial advantages:

– Joints only produced by forming the material

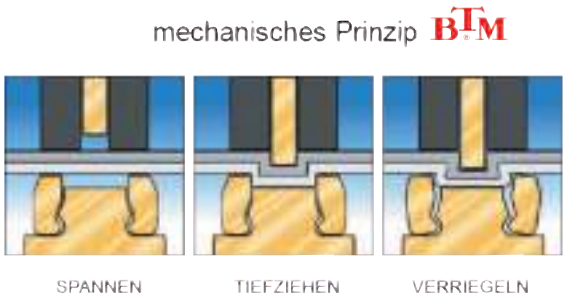
– No heating effects, which can result in tensions in the component

– Cost-effective joining without components vulnerable to welding (such as welding caps)

– Low energy costs for the joining process

Convincing arguments for the use of clinching.

Joining processes



Using a specially-shaped stamping tool and die, the sheet metal layers to be joined are formed by means of a deep-draw peening procedure in such a way that an undercut below the bottom layer is produced. The components are mechanically joined together.

Example of a clinched joint

Cross-section of a clinched joint
material: Aluminum 1.5 mm thick

Joint from below – die side

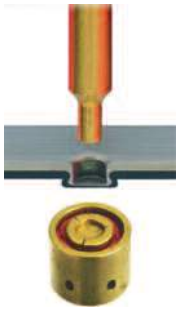
Joint from above – stamp side

Clinching is cost-effective

Lower investment and, above all, lower running costs mean that, in comparison with spot-welding, clinching is a cost-effective joining process.

Insertion tools

In the case of insertion tools for joining technology, we rely on the quality standards of our technology partner BTM, with its Tog-L-Loc products.



Tog-L-Loc® stamps feature a slight radius around the point of the stamp, enabling it to control any lateral movement of the material, without it becoming fractured.

BTM Tog-L-Loc® dies

Tog-L-Loc® dies are available in three basic versions, in order to satisfy a variety of clinching requirements.

940 Series type (preferred)

With this type of die, the three movable discs are encircled by elastomer and a support ring.

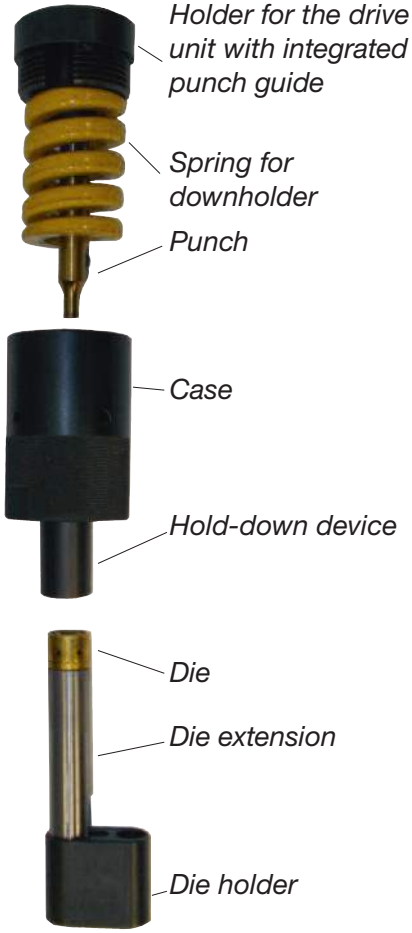
Copyright BTM Europe

Three-part dies with elastomer

Dies of this type feature three movable discs, which are retained by an elastomer. They are ideally suited for confined areas of construction. The die guard can be adapted to fit any specific component!

Two-part dies

This type of die is ideal for use in the most confined areas of construction; the flange or the interference edge runs parallel to the opening direction of the discs!



Tool construction and design

The Tog-L- Loc® clinching process includes two main components: a punch and a die. Tog-L- Loc® is a clinching process without cutting. The patented clinching tools generate a round, gas-tight and fixed clinching point.

Currently, there are six standard Tog-L- Loc® tool sizes: 3.0 mm, 3.8 mm, 4.6 mm, 5.5 mm, 6.4 mm and 7.6 mm punch diameter. The tool size of Tog-L- Loc® is determined by the punch diameter.

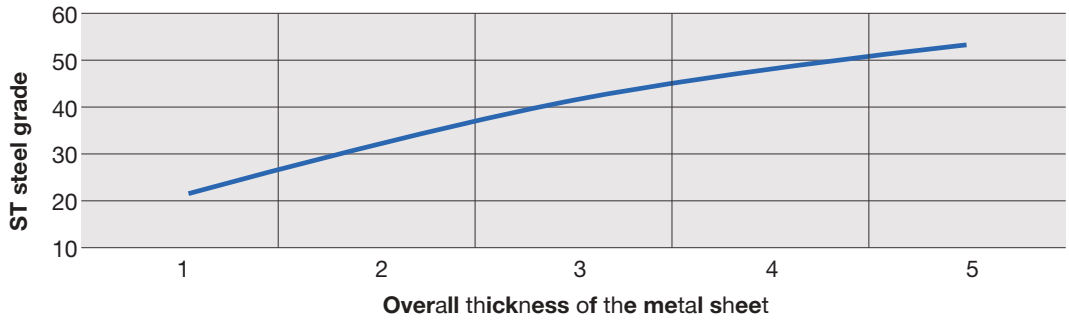
The selection of the right tool size for an application depends on various factors like type and thickness of the material to be clinched, the space available for the clinching point and the intended rigidity of the connection.

Unit design

Precise tool technology is a prerequisite for the repeatable production of clinching connections. A coaxility between punch and die of less than 0.05 mm must be ensured, as offsetting would inevitably result in reduced shear and head strength. The tool systems described in the power press unit technology chapter are tailored to meet these requirements.

Guideline for estimating the joining process forces

Concrete series of tests on the relevant sheet pairs are imperative for a process force prognosis. The required forming forces increase with increasing sheet thickness.



Quality criterion residual base thickness

A process supervision including force and force/path measuring systems developed together with our partner HIE SCHWEISS-SYSTEME GmbH ensures the joint connection quality and generates process reports (see chapter on power press unit technology).

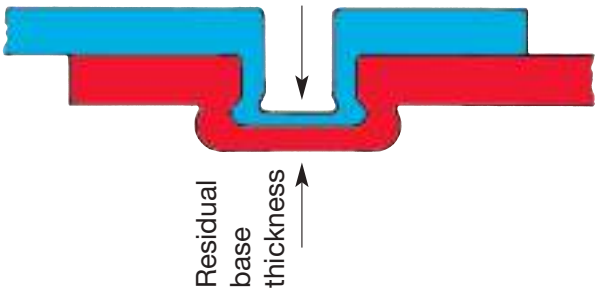
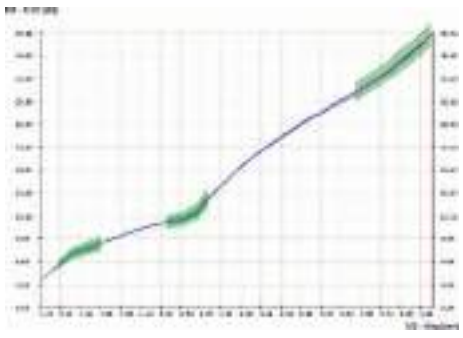
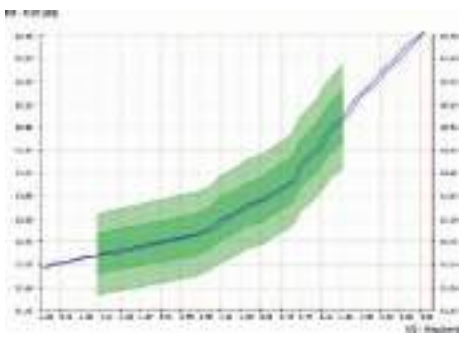


Image: Illustration process control, setpoint deviation and display the joining path





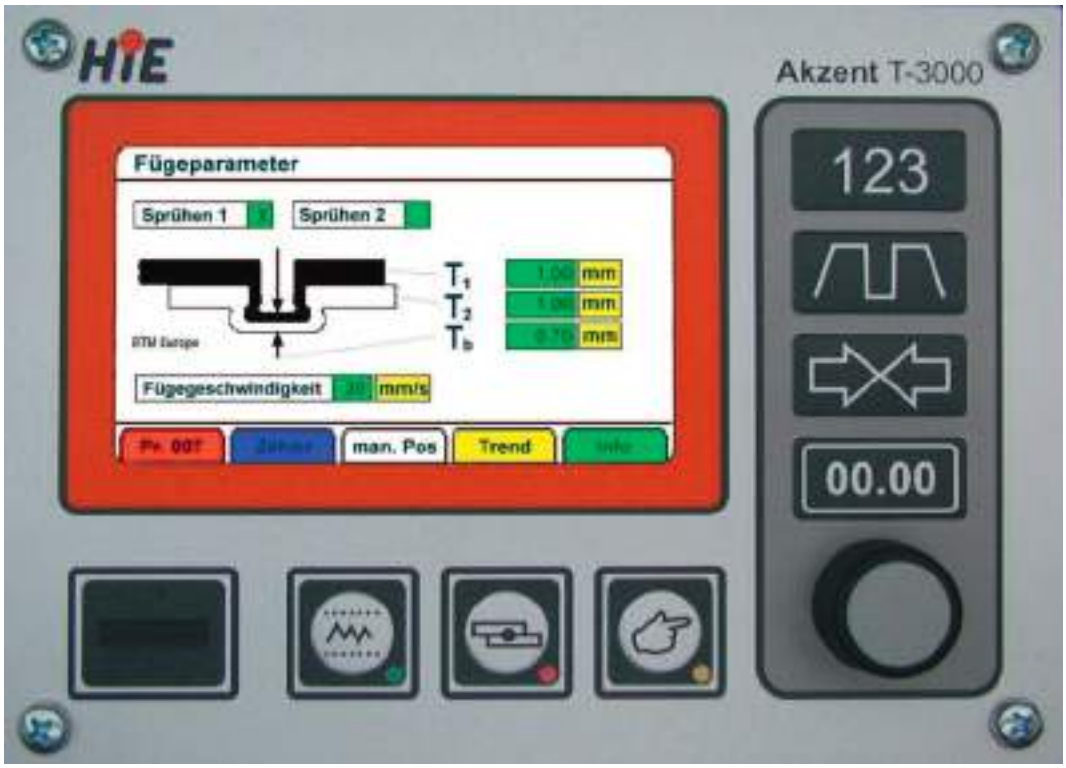
FORMING

Tool lubrication

In order to optimize product life, avoid cutting or cracking in the component, it may be necessary to use lubrication.

Our process control makes it possible to activate a lubrication for any point on the punch or die. The spray nozzles are fixed as closely as possible to the joining point at the C-frame.

For lubrication, we use standard greasing systems.



Imaging process control, activation spraying

Benefits:

– Stable process even for indexed components as any point may be lubricated.

– Minimum quantity of lubricant thanks to air-lubricant mix

– Even lubrication for increased product life

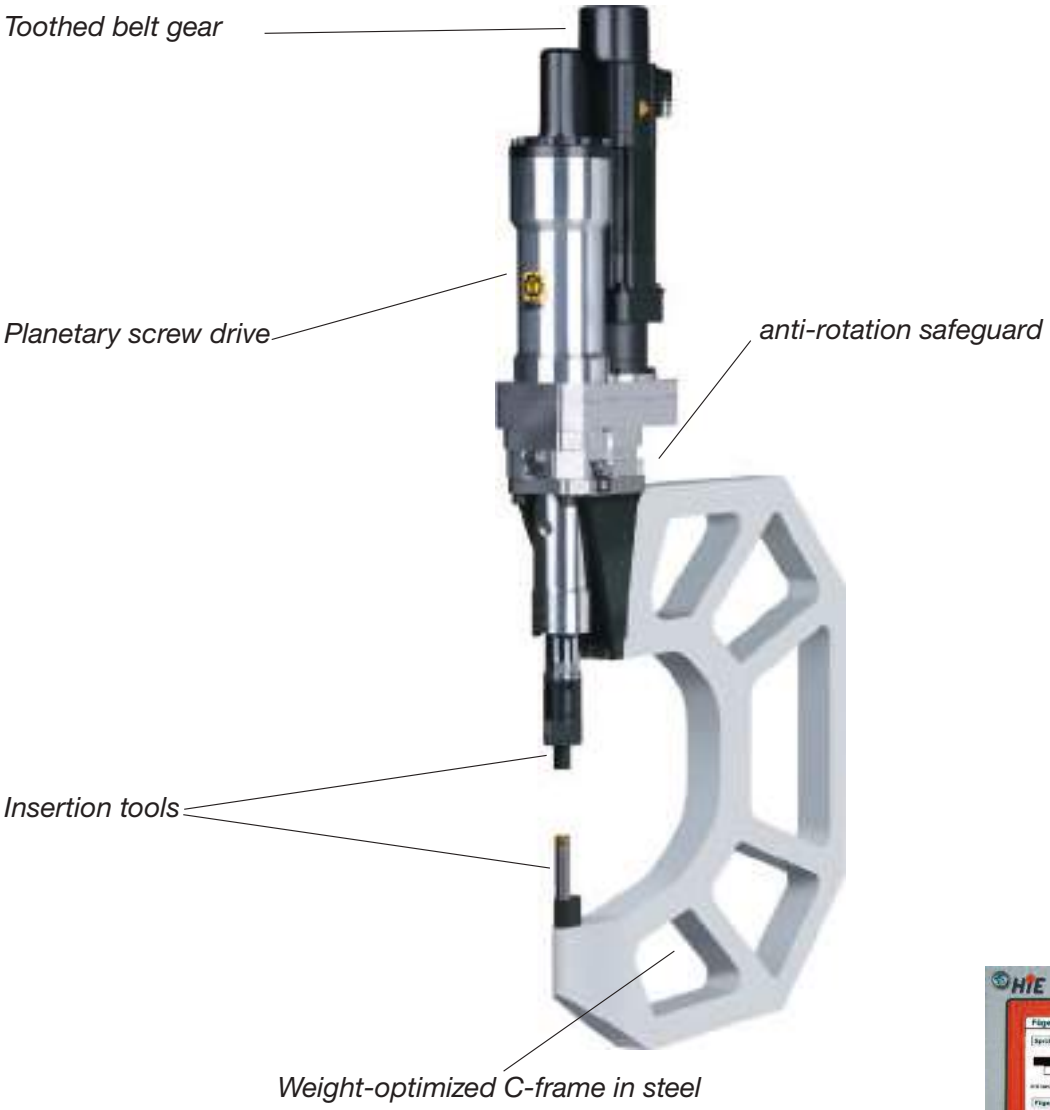
C-frame with electrical drive and process control

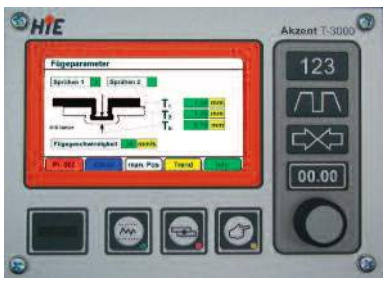
Our new electrically driven C-frame with process control was developed especially for robotic applications in joining. The control communicates with the robot which controls the C-frame as a 7-axis. The process control includes quality control, data back-up and lubrication control of the tools.

Performance data:

E-drive with planetary screw drives

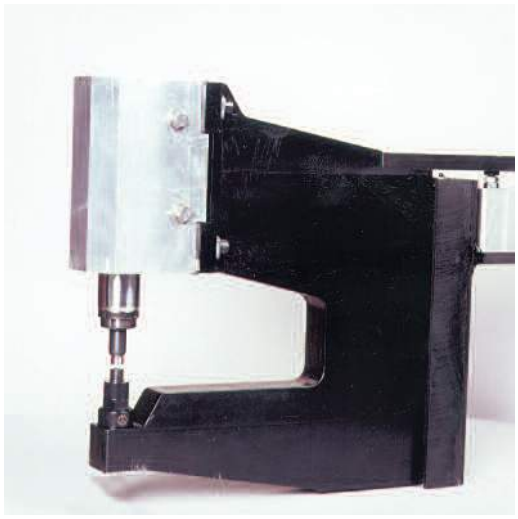
F_{max} = 50 kN, reach 300 mm, stroke 200 mm





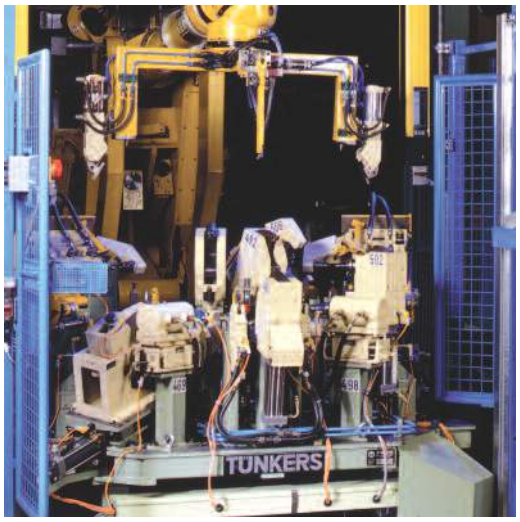
Process control and monitoring

Application examples



Hydraulic C-frame system for joining applications with hydraulic drive

Compact unit with pneumatic drive



Turnkey joining station with C-frames and power press unit

Power press unit with hold-down device

Power press unit with pneumatic tandem cylinder

Power press unit with pneumatic drive

FORMING

Specialities

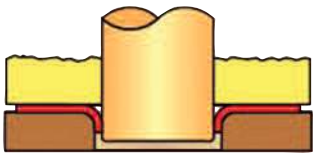
Special Processes for Forming

TÜNKERS®
Ingenuity in series.

Special processes for forming

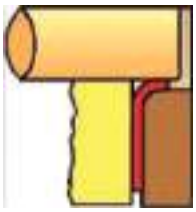
When sheet aluminum, sheet steel or plastic sheets have to be formed, we have the answer. With a whole series of special solutions for bending, cutting, folding and crimping, we can offer a wealth of experience with this process and tool technology. A selection is shown below:

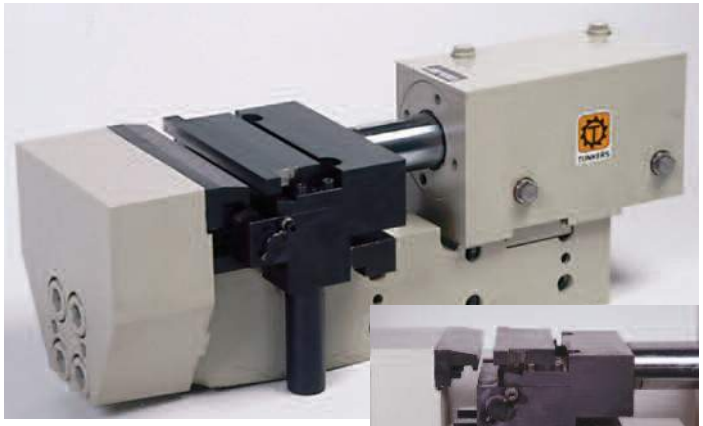
Collar forming



C-frame system with HydroAir cylinder

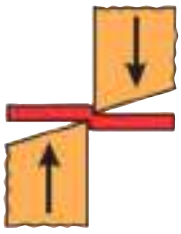
Folding





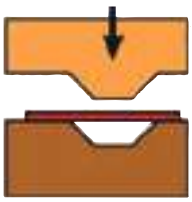
C-frame system for folding short sheet metal offcuts, with integral hold-down device

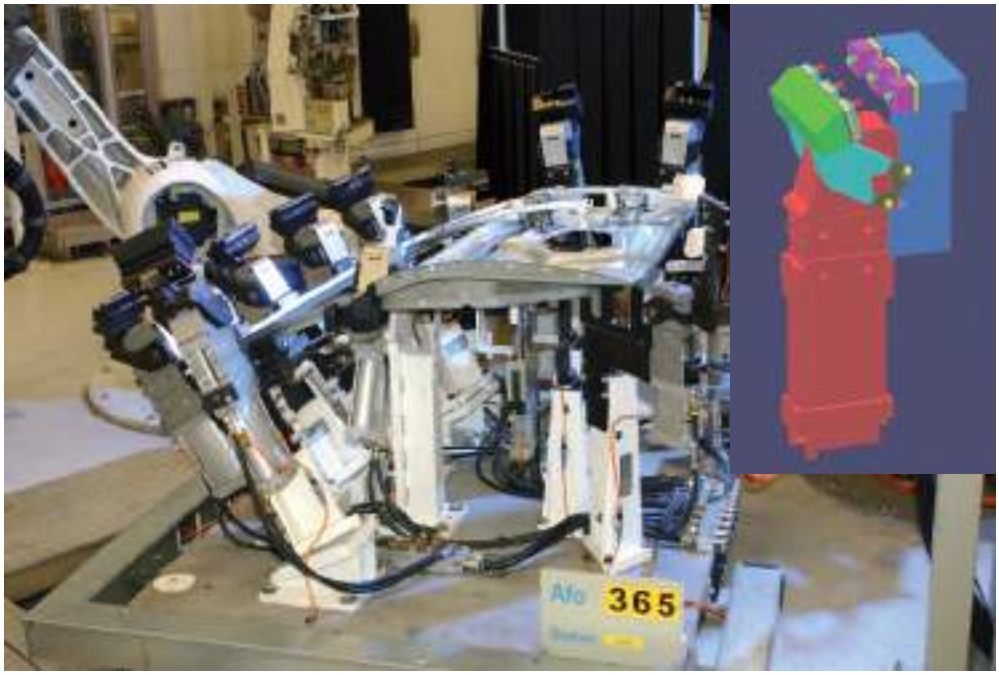
Cutting



Hydraulic power press unit for cutting car body sheet metals

Nap Press Forming





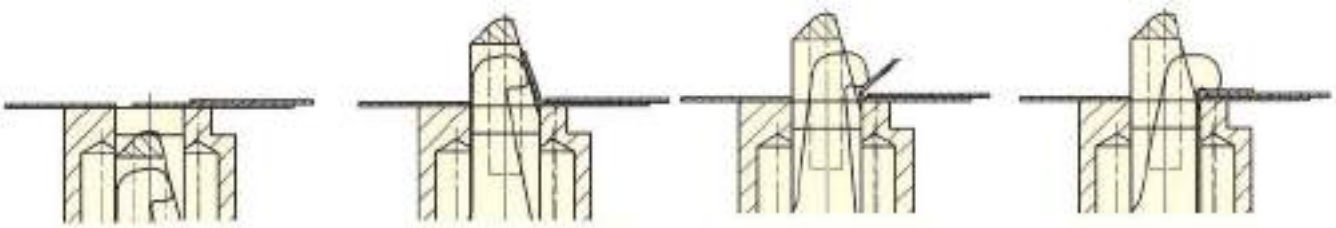
Fixture with power press units for stamping of naps/beads into steel sheets

Bending

Special power press unit for bending of a steel sheet by 180° in one step

Operational sequence

Initial position	Bending by 75°	Folding with clamp hook	Final position



Thread forming

Pneumatic power press unit for stamping of indentations into sheet metal components via punch and die

Flanging fuel tank hole

FORMING

Power Press Technology

TÜNKERS®
Ingenuity in series.

Power Press Technology

We offer a broad range of forming tools with our C-frame systems and power press units.

C-frame system as clinching unit

power press unit for stamping

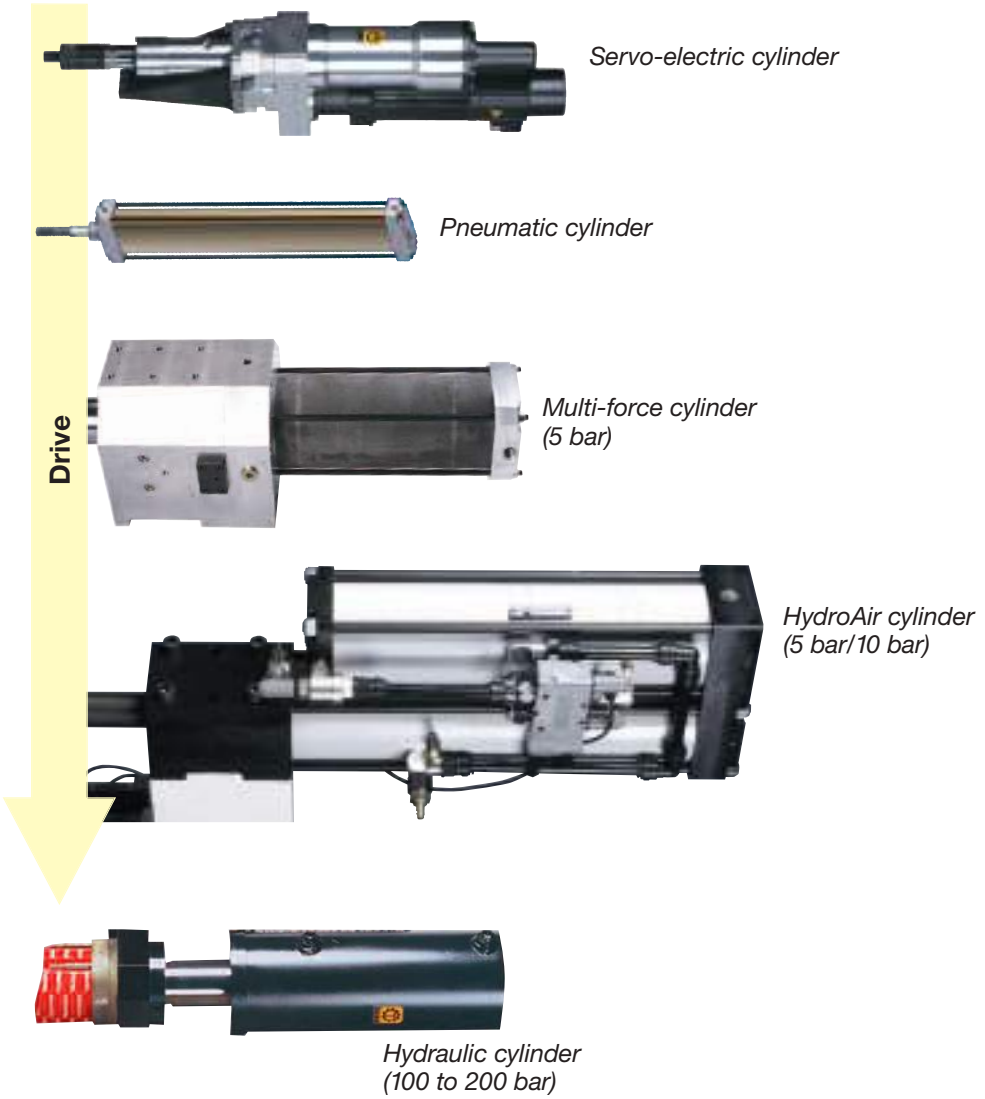
In combination with pneumatic, hydraulic, multi-force and HydroAir cylinder, suitable solutions can be found for almost every case of application.

In special cases, we are also happy to develop customised units for your forming application.

Drives

An extensive series of precision cylinders for linear feed of the tool for forming presses with capacities from 10 to 200 kN. The product range includes four types of cylinder:

– Servo-electric cylinders
  Servo-motor with reduction gear unit and planetary roller drive
– Pneumatic cylinder
  Alternatively in flat design or as conventional round cylinder
– Multi-force cylinder
  Pneumatic drive with integrated mechanical force transmission, operating pressure of 4 to 6 bar
– HydroAir cylinder
  Pneumatichydraulic device for power transmission in U- or G-design for operating pressures of 5 to 10 bar
– Hydraulic cylinder
  Solid steel, monoblock design for operating pressures of 100 to 200 bar



Servo-electric cylinder

Pneumatic cylinder

Multi-force cylinder (5 bar)

HydroAir cylinder (5 bar/10 bar)

Hydraulic cylinder (100 to 200 bar)

All TÜNKERS power cylinders combine drives and precision guides in one housing.

Design advantages:

– no separate C-frame tool guides required
– easy connection of the cylinder unit to the C-frame via the side flange connection directly on the C-frame

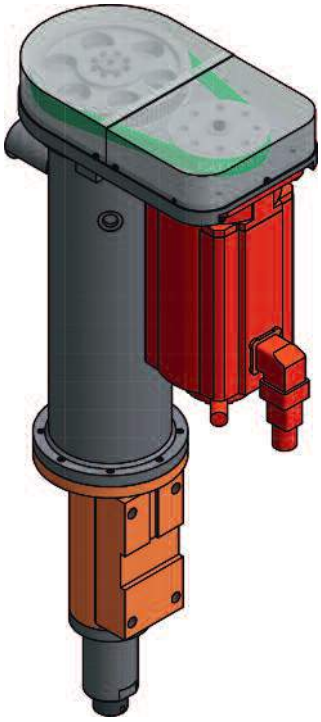
Servo-electric Cylinders

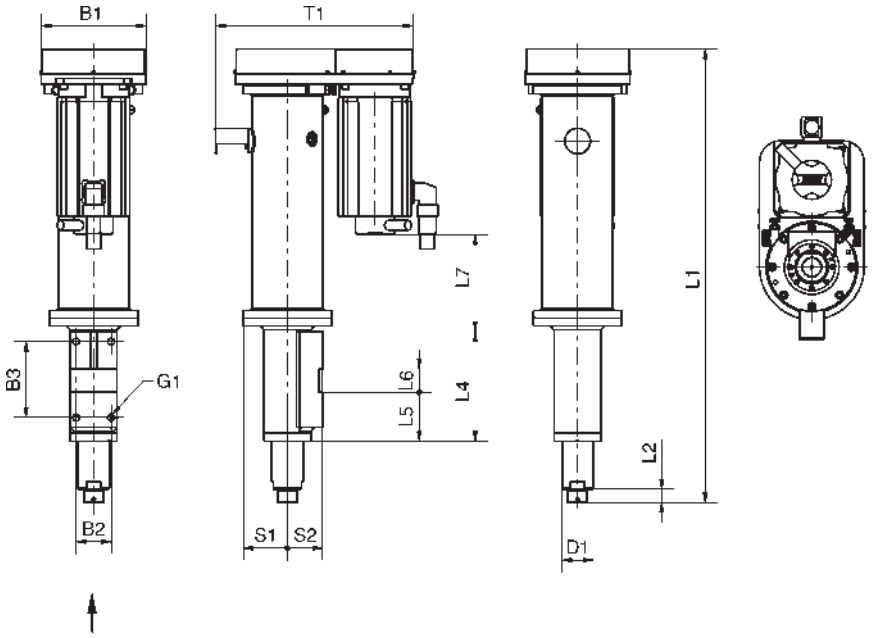
Electric servo drive mechanism with integral reduction gear and spindle guide.

With particular regard to the improved control properties and the optimisation of energy costs, electric drive mechanisms are becoming increasingly popular in the field of forming technology. Based on these requirements, in recent years we have developed a comprehensive series of servo-electric drive mechanisms, with a performance spectrum between 30 and 250 kN.

The design principle was developed from the well-proven structure, with a servo-motor and a reduction gear unit, which transmits the applied force to the piston rod by means of an exceptionally robust planetary roller gear. In standard form, the systems are self-lubricated with grease, with an operating life of 500,000 cycles. In the new version, as an option we offer a gear unit with oil lubrication for continuous loads, which is particularly recommended for high-performance workstations in car production.

By virtue of the optimised control properties, servo-electric drive mechanisms are not only suitable for straightforward punching and stamping applications but also for joining operations – such as clinching and setting of piercing nuts. A particular advantage is offered by the use of a process monitoring system, with which the process is not only monitored but also continuously documented.





– Main body made of steel
– Transfer mechanism with helical gearing
– Servo-motor
– Stroke 100 to 360 mm
– Force range 30 to 80 kN

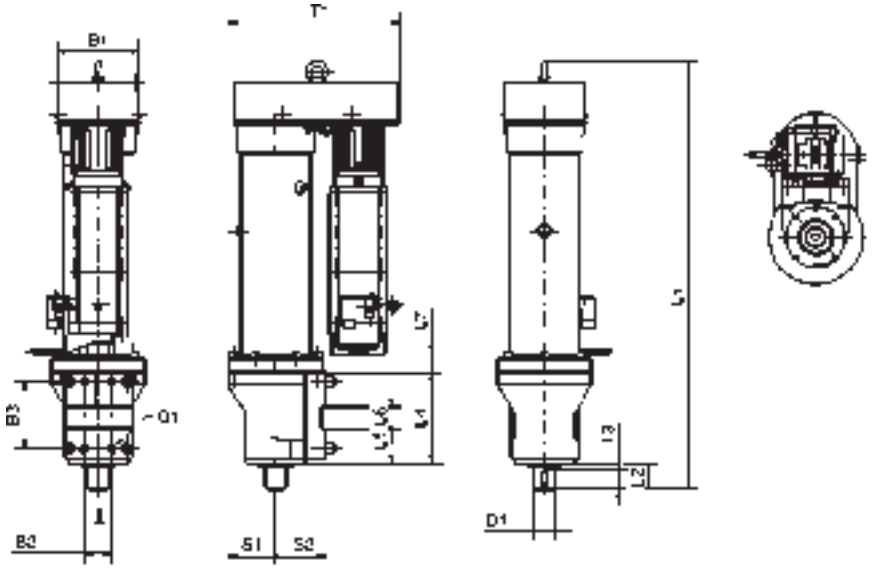
Ordering example:

EZ **80** **250**
→ Stroke
→ Force
→ Type

Type	Piston rod dia. D1	Overall length L1	Clear piston length L2	Mounting flange length L4	Lock lower edge L5	Lock height L6	Flange/ motor clearance L7	Max. width B1	Max. depth T1	Interfer-ence edge S1	Throat depth S2	Hole pattern width B2	Hole pattern heigth B3	Thread G1
EZ 80	80	1163	35	280	125	60	249	268	493	113	90	90	195	M20

Subject to technical modifications.

Servo-electric Cylinder EZ 150...250



– Main body made of steel
– Transfer mechanism with helical gearing
– Servo-motor
– Stroke 100 to 350 mm
– Force range 150 to 250 kN

Ordering example:

EZ 250 250
- 250 → Stroke
- 250 → Force
- EZ → Type

Type	Piston rod dia. D1	Overall length L1	Clear piston length L2	Mount-ings-länge L4	Lock lower edge L5	Lock height L6	Flange/ motor clearance L7	Max. width B1	Max. depth T1	Interfer-ence edge S1	Throat depth S2	Hole pattern width B2	Hole pattern heigth B3	Thread G1
EZ 250	60	1234,5	75	261	101	60	52,3	238	493	135,5	145	80	195	M20

Subject to technical modifications.

Multi-force cylinder – Pneumatic drive with mechanical power transmission

The limits of pneumatic drives are quickly reached when extremely high forces are required. Due to large installation space requirements and air consumption, such systems prove to be uneconomical.

However, most applications rely on the same requirement: Power is needed only in the end position, i.e. last millimeters of stroke!

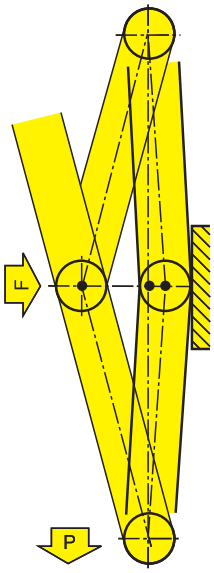
The new TÜNKERS multi-force cylinder implements this requirement profile, by means of a remarkably simple pneumatic-mechanical solution. A conventional pneumatic cylinder affects a power press mechanism in the end position – where the power is needed – and generates a force intensification of 1:8 to 1:10.

With press forces of up to 8 tons (80 kN), multi-force cylinders are suitable for diverse tasks, e.g. linear positioning, clamping, stamping, clinching, punching, bending and nut setting.

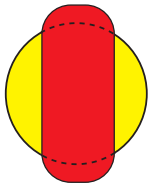
Therefore, applications are available which were restricted to hydraulic systems due to installation space and force requirements.

Multi-force cylinders – the power alternative!

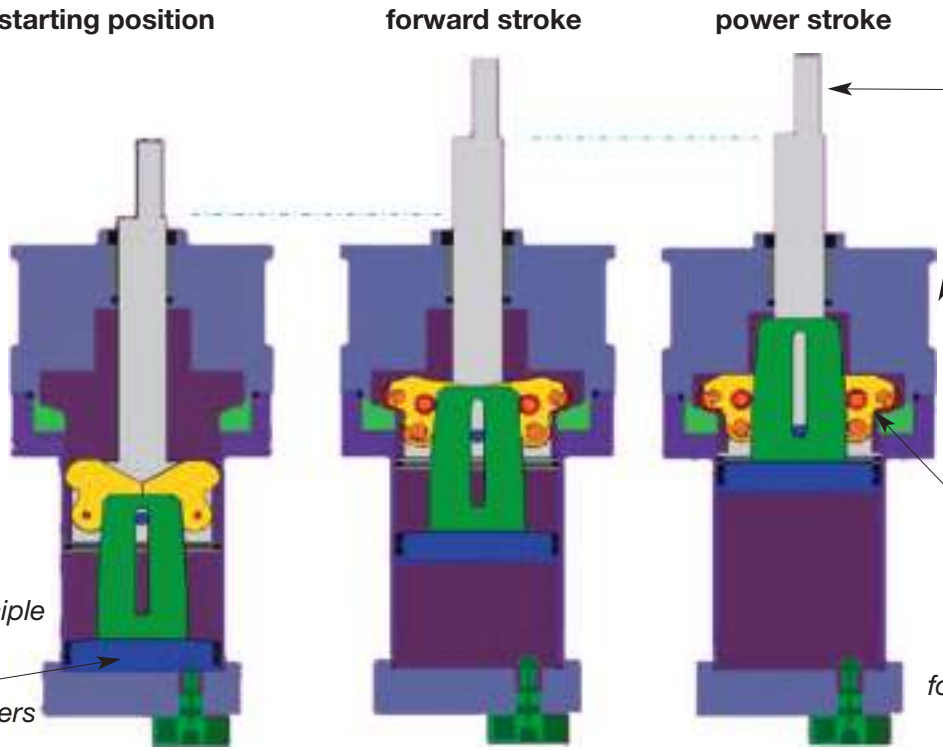
Toggle lever mechanism
–
high force transmission and safe positioning in case of pressure loss



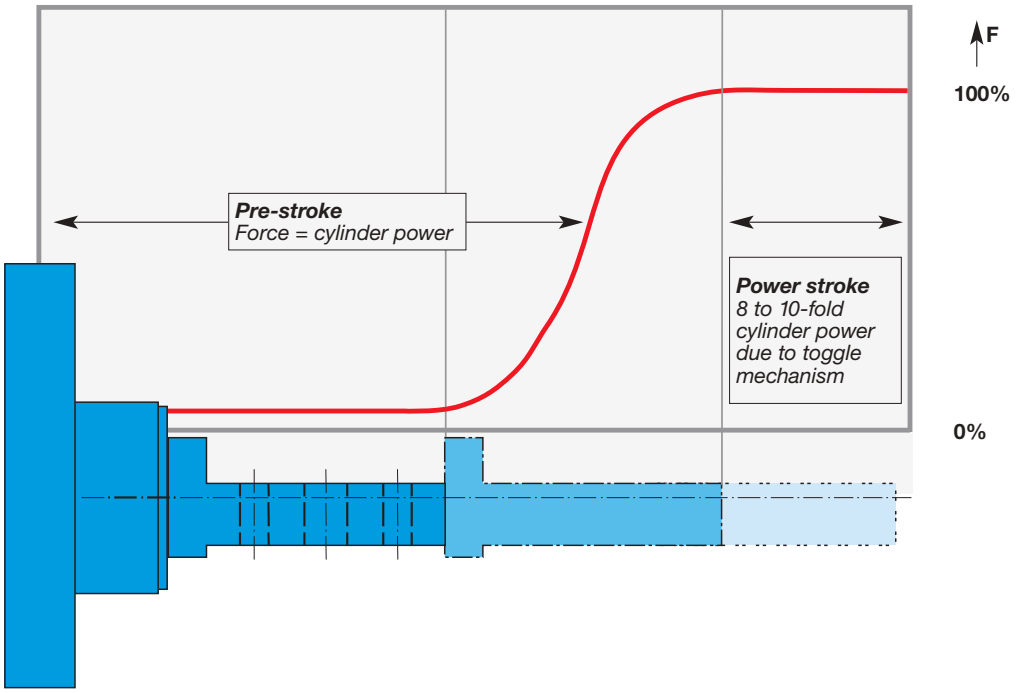
Anti-rotating guide and slim design to flat cylinder such as MZ 40-80

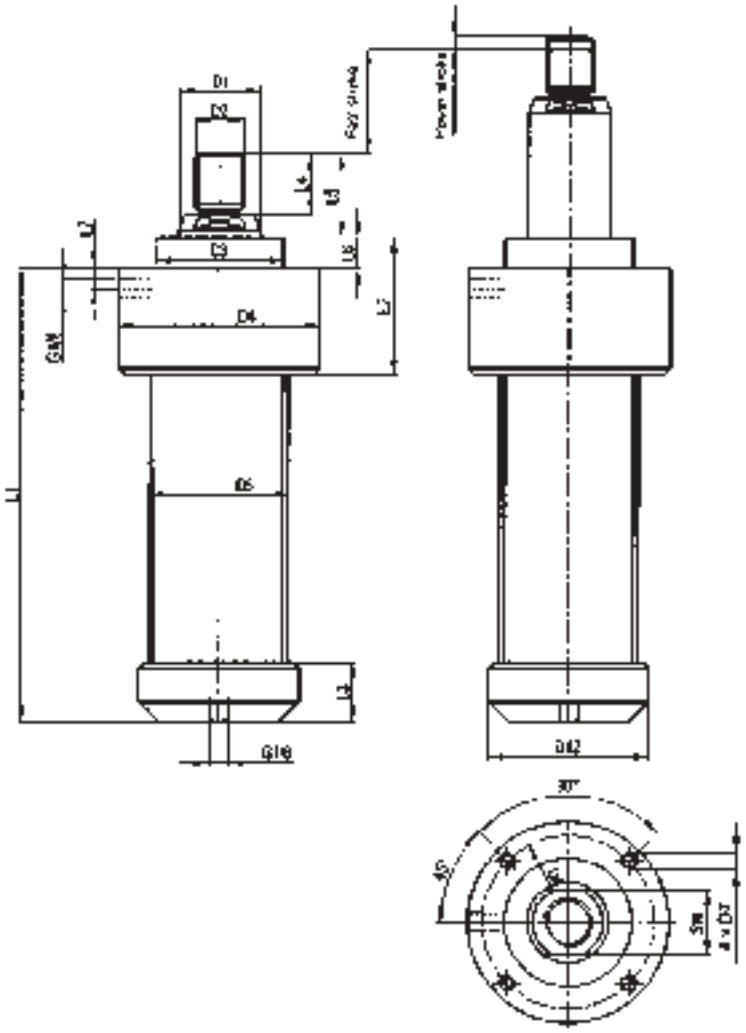


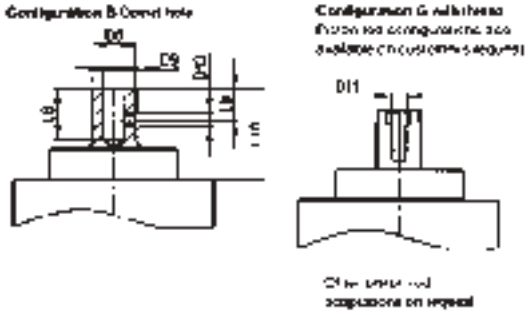
Operational principle multi-force cylinder



Force - Way diagram







- Main body and transfer mechanism made of steel
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure 4 to 6 bar
- Power transmitted via wedge mechanism for defined power stroke
- Stroke 50 to 300 mm

Ordering example:

MZ R 40 50
- 50 → Stroke
- 40 → Piston dia.
- R → Circular-section cylinder – standard
- MZ → Type

Standard series of fast strokes: 50; 100; 150 mm
(does not include the 6 mm power stroke)

Other special stroke lengths on request, up to max. 300 mm

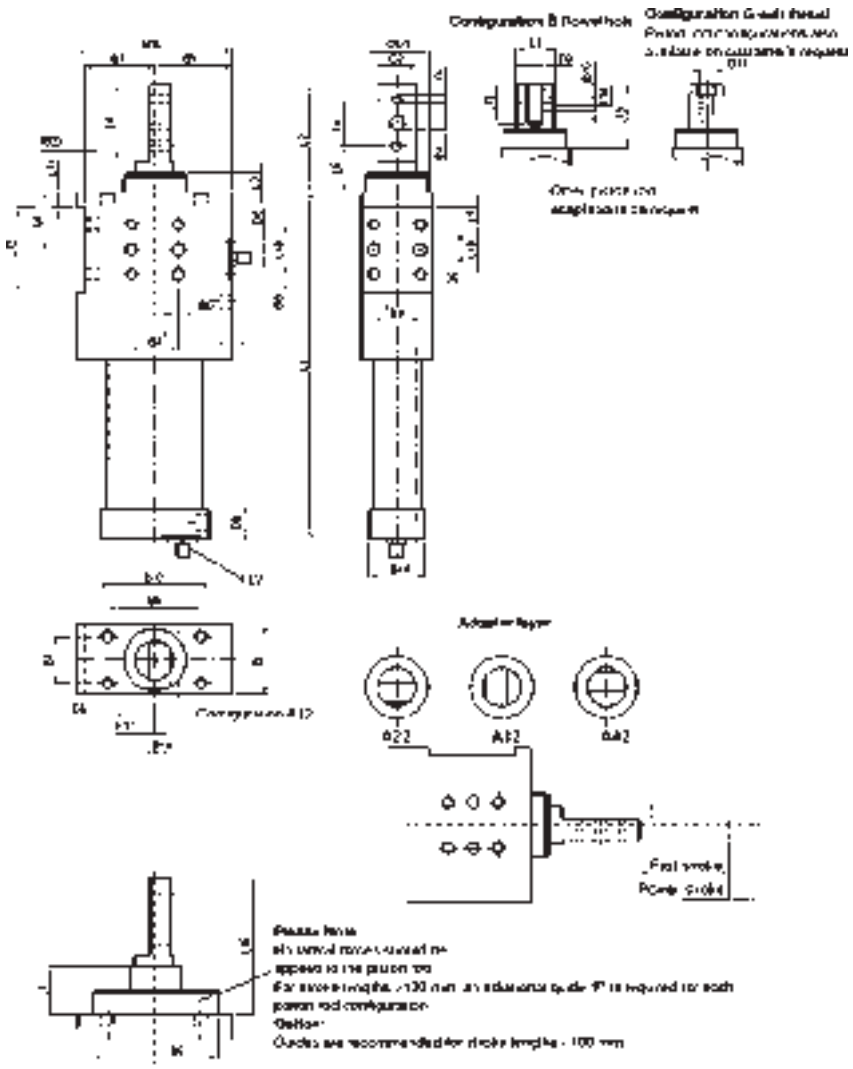
Type	Clamping force of the power stroke at 6 bar (kN)	Power stroke (mm)	Fast stroke force of the fast stroke at 6 bar (kN)	Dependent on piston dia. (mm)	Weight ~ (kg)
MZR 40	4	6	0,7	40	1,8
MZR 63	10	6	1,75	63	5

Option:
...B: Configuration 'B' with dowel hole
...G: Configuration 'G' with internal thread

Type	D1 H7	D2	D3 H7	D4	D5	D6	D7	D8 H7	D9 H7	D10	D11	D12	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	SW
MZR 40	25	M16x 1,5	40	63	45	54	M5	25	10	M6	M8	54	130+ Stroke	51	23,5	20	29	12	10	25	15	41	21
MZR 63	40	M24	63	99	68	85	M8	30	16	M8	M12	79	172+ Stroke	67	29	30	41	15	10	40	20	56	32

Subject to technical modifications.

Multi-force Cylinder MZ 40 ... 80



- Main body made of aluminum
- Transfer mechanism made of steel
- Pneumatic drive mechanism with slim cylinder
- Operating pressure 4 to 6 bar
- Power transmitted via wedge mechanism for defined power stroke
- Stroke 50 to 300 mm

Ordering example:

MZ F 40 V 120 A12 T02

- T02 → Position sensing system
- A12 → Adapter position or configuration
- 120 → Stroke
- V → V = Optional: with lock
- 40 → Piston dia.
- F → Optional: with additional guide
- MZ → Type

Fast stroke min. 15 mm
Standard series of fast strokes: 50; 100; 150 mm
(does not include the 6 mm power stroke)

Other special stroke lengths on request, up to max. 300 mm

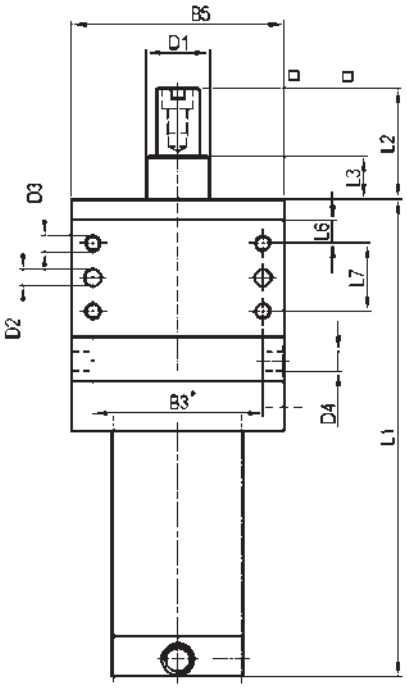
Type	Clamping force of the power stroke (kN)	Power stroke (mm)	Fast stroke force at 6 bar (kN)	Dependent on piston dia. (mm)
MZ 40	4	6	0,7	40
MZ 63	10	6	1,75	63
MZ 80	25	6	2,8	80

Type	B1 ±0,02	B2	B3	B4	B5 ±0,2	B6	B9	B10	B11	B12	B13 ±0,05	B14	D1	D2 f7	D3 f7	D4 H7	D5	D6 H7	D7 H7	D8	D9 H7	D10	D11
MZ 40	45	5	45	30	60	80	50	100	13	3	70	45	40	25	10	9	M8	8	6	G1/8	10	M6	M8
MZ 63	75	5	60	30	85	105	80	160	15	3	120	45	55	30	15	9	M8	8	6	G1/8	16	M8	M12
MZ 80	92	8	80	50	100	125	100	200	20	3	140	62	75	40	25	11	M10	8	8	G1/4	20	M10	M16

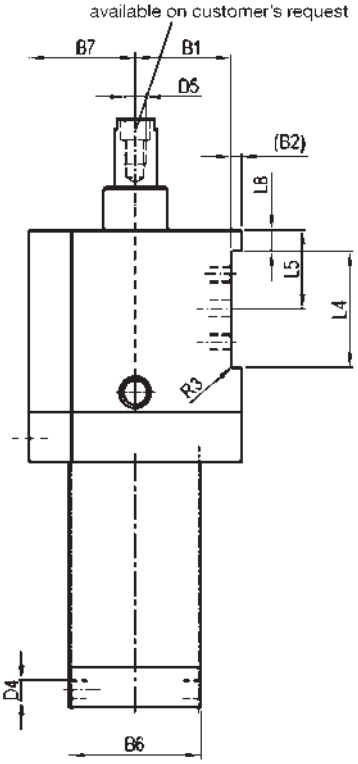
Type	L1	L2	L3	L4	L5	L6 ±0,02	L7	L8 ±0,05	L9 ±0,1	L10 ±0,1	L11	L12 +0,1	L13	L14	L15	L16
MZ 40	195+Stroke	70	12	50	30	30	45	37	11	32	10	55	25	15	41	115
MZ 63	250+Stroke	70	12	50	30	30	55	37	11	32	10	55	40	20	56	125
MZ 80	340+Stroke	80	20	50	40	30	81	55	15	50	15	80	40	20	80	161

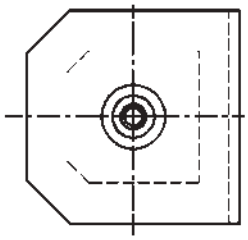
Subject to technical modifications.

Multi-force Cylinders MZ 100 und MZ 140



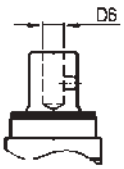
Configuration G with thread
Piston rod configurations also available on customer's request

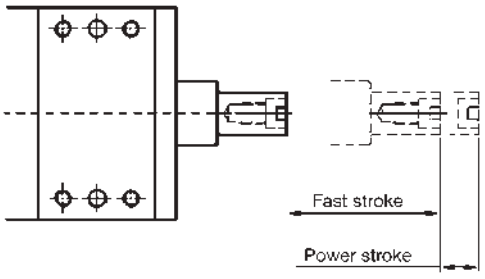




- Main body made of high-strength aluminum material with integral piston rod guide
- Steel transfer mechanism
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure 4 to 6 bar
- Power transmitted via wedge mechanism for defined power stroke
- Stroke 50-200 mm

Configuration B Dowel hole





Type	Clamping force of the power stroke (kN)	Power stroke (mm)	Fast stroke force at 6 bar (kN)	Piston dia. (mm)
MZ 100	45	6	4,3	100
MZ 140	60	6	8,5	140

Ordering example:

MZ 100 120
- 120 → Stroke
- 100 → Piston dia.
- MZ → Type

Fast stroke min. 15 mm
Standard series of fast strokes: 50; 100; 150 mm (does not include the 6 mm power stroke)

Other special stroke lengths on request, up to max. 300 mm

Type	B1 ±0,2	B2	B3	B4	B5	B6	B7 ±0,05	D1	D2 f7	D3 f7	D4 H7	D5	D6	L1	L2	L3	L4 -0,03 -0,04	L5 ±0,05	L6 ±0,1	L7 ±0,1	L8
MZ 100	75	15	140	42	180	114	90	63	10	M12	G1/4	M16	20	356+Stroke	139	69	80	65	15	50	25
MZ 140	107,5	17,5	210	42	250	155	125	80	10	M16	G1/2	M16	20	506+Stroke	139	69	120	85	22,5	75	25

Subject to technical modifications.

Application Examples

MZ 100 with piston rod guide, 60 kN, 150 mm stroke, for nut piercing operations

MZ 80 with piston rod guide, 25 kN, 100 mm stroke, for hole punching operations

Overview of performance data

Type	Press force kN	Ø Cylinder mm	approx. length (with 50 mm stroke)	Width mm
MZR 40	4	40	220	63
MZR 63	10	63	280	99
MZ 40	4	40	315	100
MZ 63	10	63	370	160
MZ 80	25	80	470	200
MZ 100	45	100	545	180
MZ 140	60	140	695	250

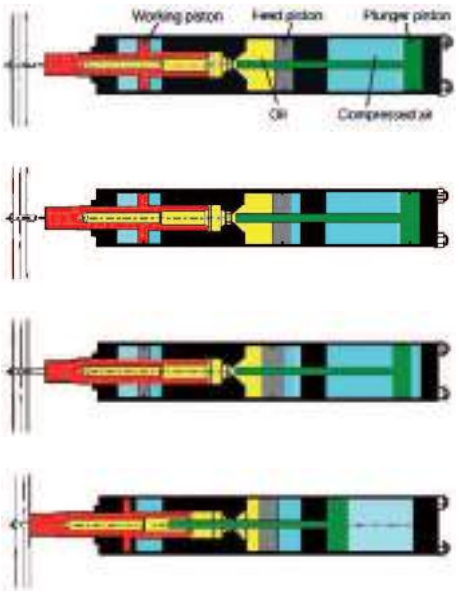
Hydraulic / pneumatic power transmission for drive forces of up to 200 kN (20 tons) with the following technical features:

– Division of the cylinder stroke into a soley pneumatically actuated fast stroke and a power stroke generated by hydraulics
– Automatic switching to power stroke via integrated pressure switch
– Defined power stroke of 6 or 12 mm length, constantly provided for the forming process within this range
– Speedy positioning and opening to generate short cycle times
– Absolute separation of air and oil
– Cylinder backstroke with wear resistant springs

Operating principle:

The power unit contains three cylinder sections:

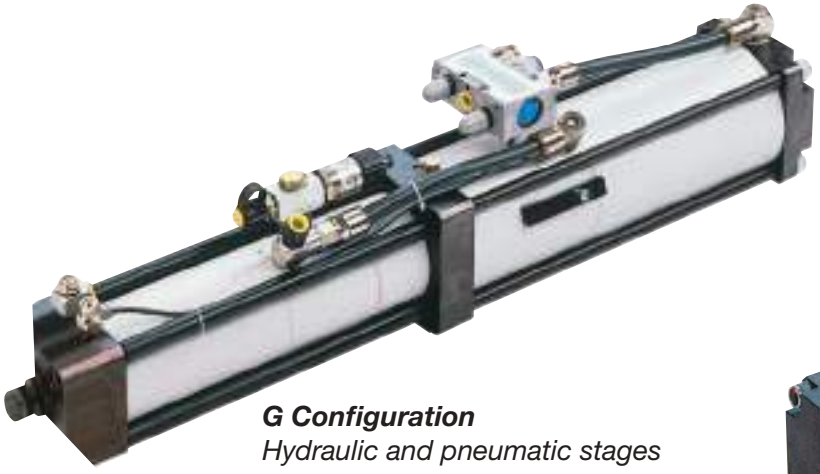
– Working piston
  hydraulically actuated on both ends
– Adjustment piston
  hydraulically actuated toward the power piston, pneumatically actuated toward the plunger piston
– Plunger piston
  pneumatically actuated



1. Initial state
   Working, adjustment and plunger piston are in inital highest position. Through impact pressure, the adjustment piston causes the oil to flow to the opposite side and the working piston to move.
2. Fast stroke
   In fast stroke, the adjustment piston moves the working piston into pre-position via the shared oil pressure chamber.
3. Power stroke
   The power stroke is actuated when a defined working position (end position switch) or the pre-defined pressure on the hydraulic side (pressure switch) is reached. To this end, the plunger piston is pressurised and its piston rod end moves into the pressure chamber of the working piston. The constant force applied over the entire length of the power stroke, results from the area ratio of piston rod and plunger piston.

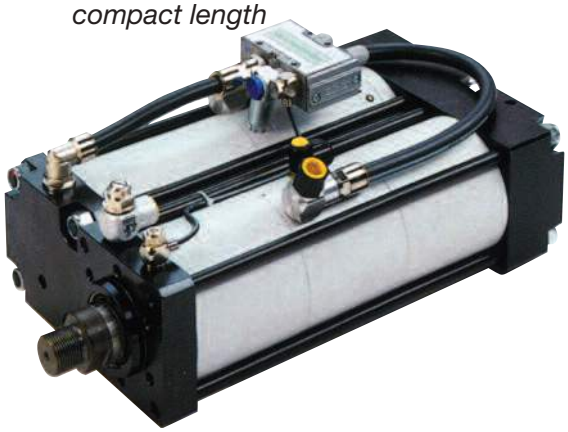
Configurations

The HydroAir Cylinder is available in two different standard configurations:



G Configuration
Hydraulic and pneumatic stages arranged in tandem (straight) in a slimmer but longer subassembly

U Configuration
Both stages arranged adjacent to each other (U-shaped) wider structure with compact length



Options:

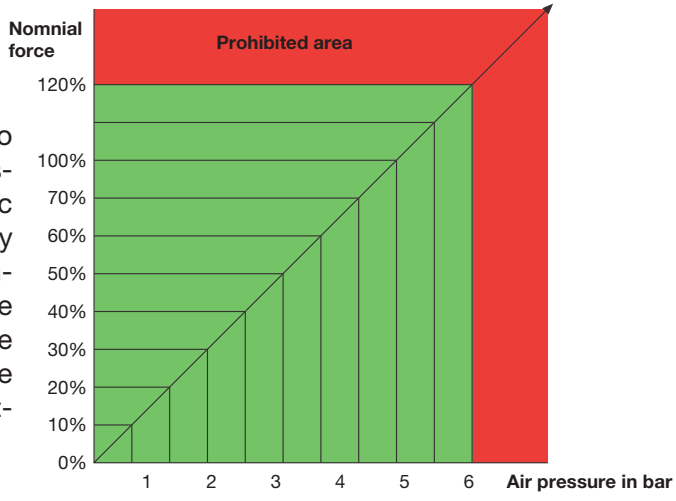
– Fluid level monitoring, optionally with either electrical, pneumatic or acoustic output signal
– Electrical pressure switch, 0 to 400 bar, with display, optionally with distribution unit, so that the high pressure metering connection is still available
– Fluid/pressure sensor, 0 to 400 bar, with analogue output 0 to 10 V (force measurement)
– Configurations with separate working and transmission sections

Typical application

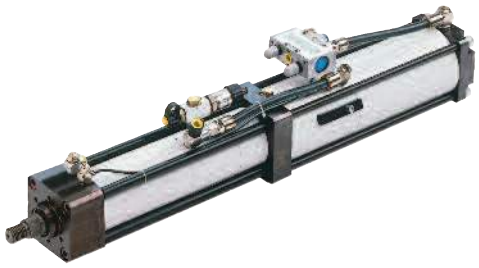
HydroAir Cylinder, U Configuration,
110 kN compression force,
100 mm stroke for crimping steel sheet

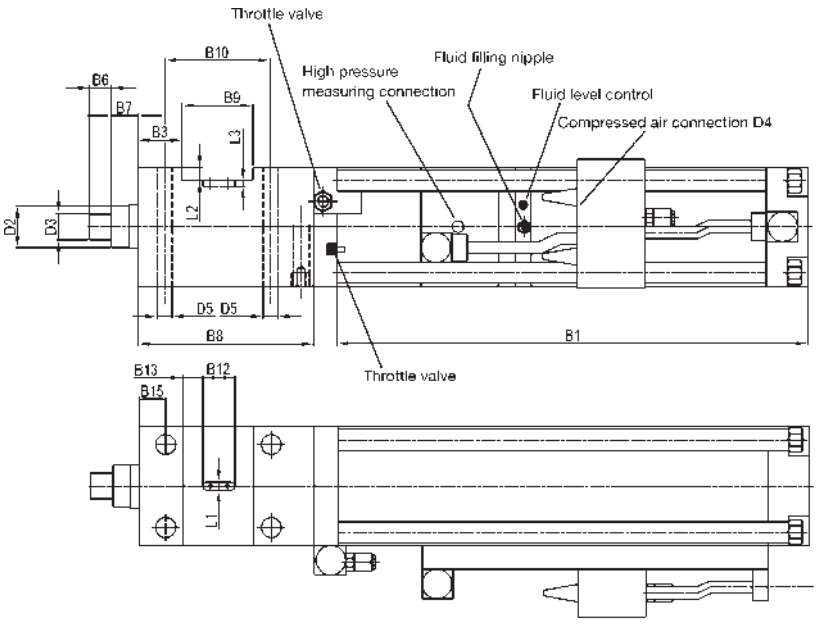
Usable force range

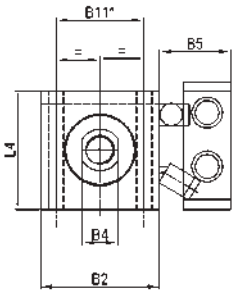
The nominal forces quoted in the technical data relate to an operating pressure of 5 or 6 bar. Since the gear transmission ratio between the hydraulic and the pneumatic stages in each cylinder is constant, the force is directly proportional to the particular operating pressure. The entire sealing system is designed for a maximum pressure of 6 bar. Higher operating pressures can result in failure of the cylinder system. For this reason, for preference the configuration of the drive mechanism should be compatible with an operating pressure of 5 bar.



HydroAir Cylinder HAZG 65 . . 240







- Main body in high-strength aluminum material with integral piston rod guide
- In-line arrangement of the hydraulic and pneumatic stages
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure 4 to 6 bar
- Power transmitted via hydraulic / pneumatic transducer
- Stroke 50 to 250 mm

Ordering example:

HAZG 65 50 6

→ Power stroke length
→ Stroke, including power stroke length
→ Nominal force kN (5 bar)
→ Type

Type HAZG 65

Total stroke length	50	100	150	200	250
Power stroke length	B1				
6	588	706	824	942	1060

Type HAZG 110

Total stroke length	50	100	150	200	250
Power stroke length	B1				
6	735	860	980	1105	1225

Type HAZG 240

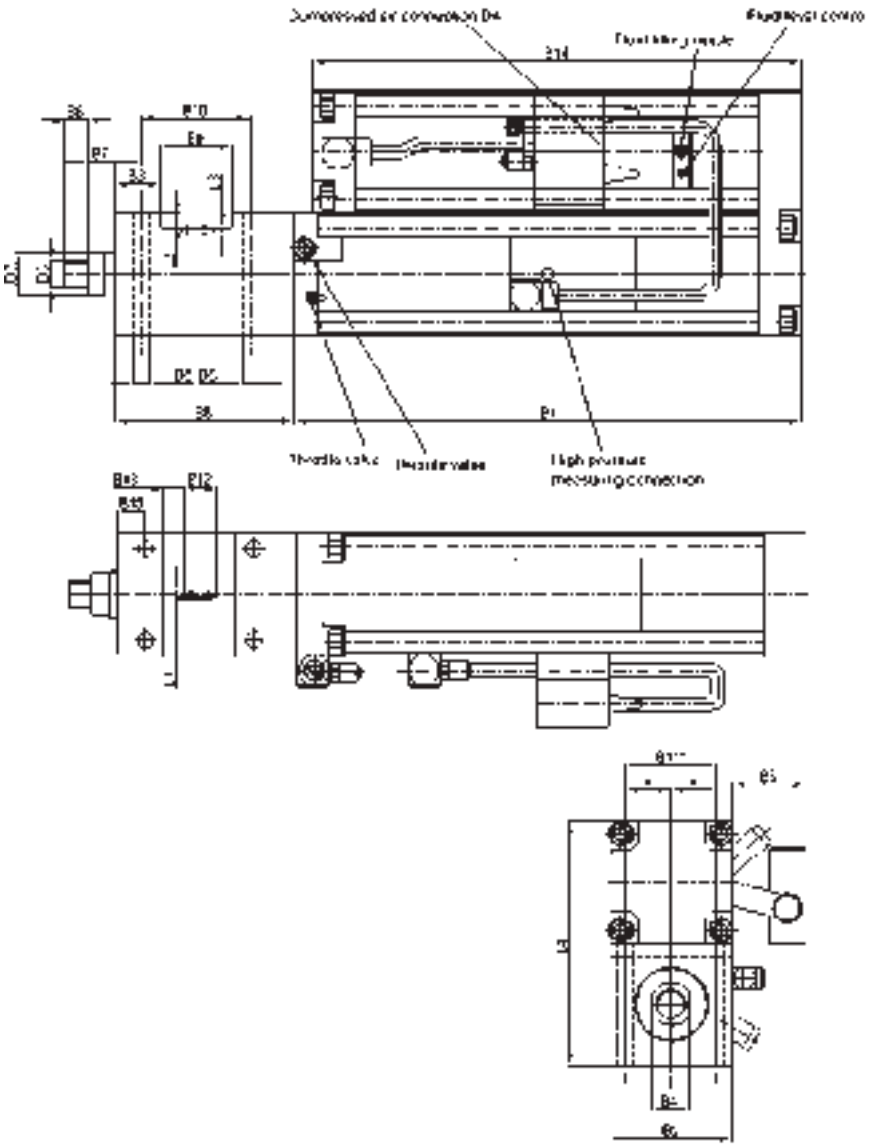
Total stroke length	50	100	150	200	250
Power stroke length	B1				
6	795	923	1069	1189	-

Type	Nominal force at 5 bar (kN)	Nominal force at 6 bar (kN)
HAZG 65	65 kN	80 kN
HAZG 110	110 kN	137 kN
HAZG 240	240 kN	290 kN

Type	B2	B3	B4	B5	B6 ±0,2	B7	B8	B9	B10 H7	B11* ±0,2	B12	B13	D1	D2 f7	D3	D4	D5	L1 P9	L2	L3 ±0,1	L4
HAZG 65	110	50	36	60	25	35	170	60	100	85	36	12	30	45	M30x2	G1/2	13	10	10	5	110
HAZG 110	135	50	41	60	35	36	200	80	120	100	36	22	30	50	M39x2	G1/2	17	10	15	5	135
HAZG 240	175	60	50	85	35	47	273	80	180	136	36	22	30	56	M42x2	G1/2	22	10	15	5	175

Subject to technical modifications.

HydroAir Cylinder HAZU 65 . . 240



- Main body in high-strength aluminum material with integral piston rod guide
- Hydraulic and pneumatic stages arranged in parallel, in U-form
- Pneumatic drive mechanism with circular-section cylinder
- Operating pressure 4 to 6 bar
- Power transmitted via hydraulic / pneumatic transducer
- Stroke 50 to 250 mm

Type	Nominal force at 5 bar (kN)	Nominal force at 6 bar (kN)
HAZU 65	65 kN	80 kN
HAZU 110	110 kN	137 kN
HAZU 240	240 kN	290 kN

Ordering example:

HAZU 65 50 6

→ Power stroke length
→ Stroke
→ Nominal force kN (5 bar)
→ Type

Type HAZU 65						
Total stroke length	50	100	150	200	250	300
Power stroke length		B1/B14				
6	597/578	646/629	699/680	750/731	801/782	852/833
Type HAZU 110						
Total stroke length	50	100	150	200	250	300
Power stroke length		B1/B14				
6	645/621	703/679	761/737	819/795	877/853	935/911
Type HAZU 240						
Total stroke length	50	100	150	200	250	300
Power stroke length		B1/B14				
6	857/820	942/905	1022/985	1107/1070	1187/1150	1267/1230

Type	B2	B3	B4	B5	B6 ±0,2	B7	B8	B9	B10 H7	B11* ±0,2	B12	B13	D1	D2 f7	D3	D4	D5	L1 P9	L2	L3	L4 ±0,1
HAZU 65	110	50	36	60	25	35	170	60	100	85	36	12	30	45	M30x2	G1/2	13	10	10	5	222
HAZU 110	135	50	41	60	35	36	200	80	120	100	36	22	30	50	M30x2	G1/2	17	10	15	5	274
HAZU 240	175	60	50	85	35	47	273	80	180	136	36	22	30	56	M39x2	G1/2	22	10	15	5	354

Subject to technical modifications.

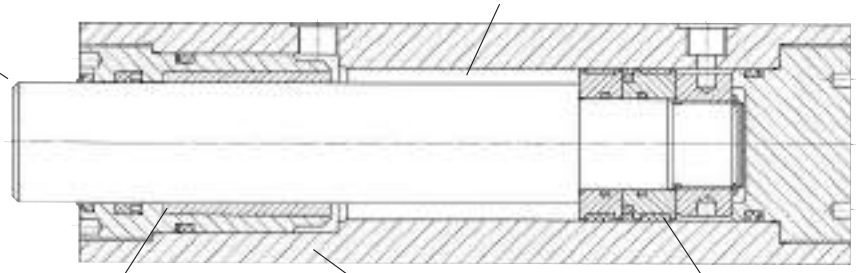
These drive units are special cylinders produced by us, which are designed to meet the extreme requirements of forming tasks. Large-size piston rods guided by a long precision bushing are used to accommodate lateral forces. The housings in block design allow for easy flanging to the C-frame systems.

The high-performance range of TÜNKERS hydraulic cylinders are conceived for a range of 20 to 200 kN. We would be pleased to manufacture customised sizes upon request.

Construction principle

Large-dimensioned piston rod, hard chrome plated and ground

Internally polished cylinder barrel



Long high-quality guide bushings provide for secure movement of the piston rod

Solid steel housing in block and round design

Piston with seal and driving band

Application examples

Cylinder in monoblock-design, 80 mm stroke, for clinching operations

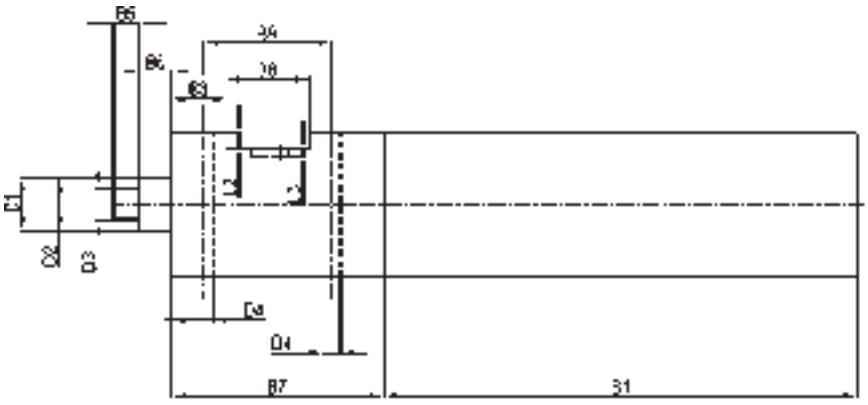
Cylinder in round design 150 mm stroke, for hole punching operations

Block cylinder with guide, 50 mm stroke, for seaming operations

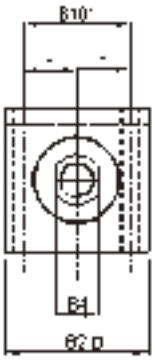
Cylinder in tie rod version, 40 mm stroke, for cutting operations

Hydraulic Cylinder HYZ...

– Main body made of steel
– Adapter block with integral guide
– Operating pressure 100 bar
– Stroke 50 to 200 mm



Stroke lengths: 50; 100; 150; 200



Type	Operating pressure bar	Compression force (kN)	Dependent on piston dia. (mm)	Medium
HYZ 63	100	30	63	Hydraulic oil
HYZ 80	100	50	80	Hydraulic oil
HYZ 100	100	78	100	Hydraulic oil
HYZ 140	100	150	140	Hydraulic oil

Ordering example:

HYZ 100 50
- 50 → Stroke
- 100 → Piston dia.
- HYZ → Type

Type	B2 □	B3	B4	B5	B6	B7	B8 H7	B9 ±0,2	B10	B11	B12	B15	D1	D2 f7	D3	D4	L1 P9	L2	L3 ±0,1
HYZ 63	110	50	36	25	35	170	60	100	85	36	12	30	55	50	M30x2	13	10	10	5
HYZ 80	135	50	41	35	36	200	80	120	100	36	22	30	55	50	M30x2	17	10	15	5
HYZ 100	175	60	50	35	47	273	80	180	136	36	22	30	60	56	M39x2	22	10	15	5
HYZ 140	175	60	50	35	47	273	0	180	136	36	22	30	60	56	M42x2	55	10	15	5

Stroke	50 B1	100 B1	150 B1	200 B1
HYZ 63	200	250	300	350
HYZ 80	200	250	300	350
HYZ 100	200	250	300	350
HYZ 140	200	250	300	350

Subject to technical modifications.

All forming processes are fraught with risk. That is why TÜNKERS forming clamps are extremely rugged on principle and designed for load cycles of over 3 million. The simple mechanical construction of the drive with pneumatic or hydraulic cylinders or power transfering units, ensures that the required forming forces are repeatable at all times. Moreover, all clamps are equipped with limit switches for precise reporting of the working position to the control.

Despite this, disruptions in the production cycle cannot be excluded, e. g. by:

– missing material / component

– wrong material / component (e. g. double sheet layer)

– Tool fracture of stamp or die

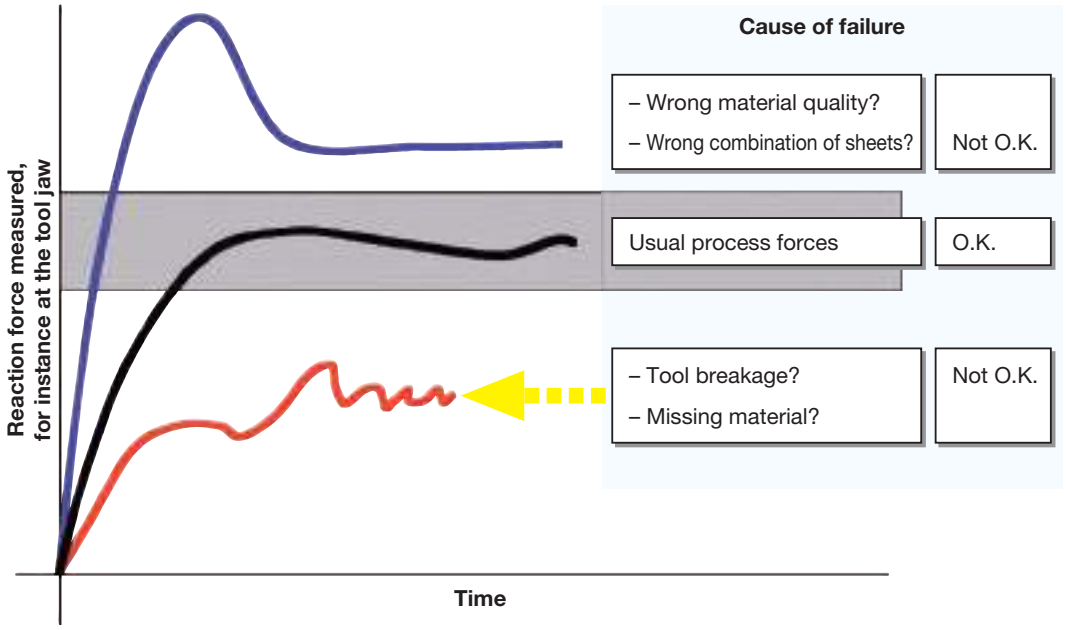
The installation of additional system monitoring devices is therefore especially advisable as to automated systems, for instance robotic clamps, without direct operator control.

1. Monitoring of the process force

Verification of the process forces in defined time windows

– Measuring of the reaction forces within the clamp by a force sensor, preferable at the side opposite of the drive (mostly the die).

– Comparison of the process forces with the determined set values.



Process Monitoring

2. Quality monitoring

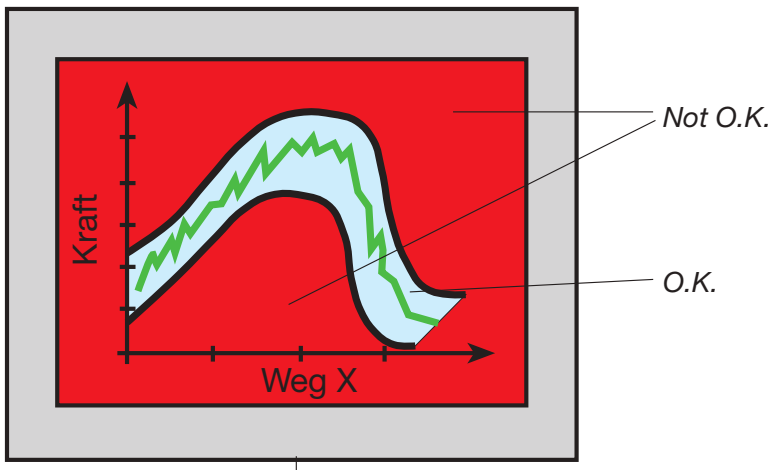
Analysis of the forming process via mapping of the force / displacement diagram

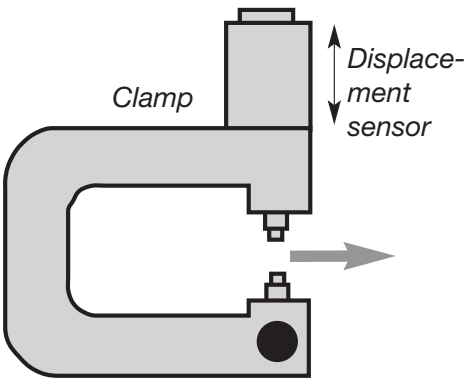
– Equipment of the clamps with a force and displacement sensor for computation of the actual process trajectory (force/displacement diagram).

– Definition of an envelope curve which reflects flawless forming quality.

– Comparison of the actual process trajectory with the envelope curve, allowing for determination of the forming quality.

Quality analysis based on envelope curve





Force sensor installed at the clamp side opposite the drive

Monitoring system Example Brankamp PK 6000 – Kistler – HIE

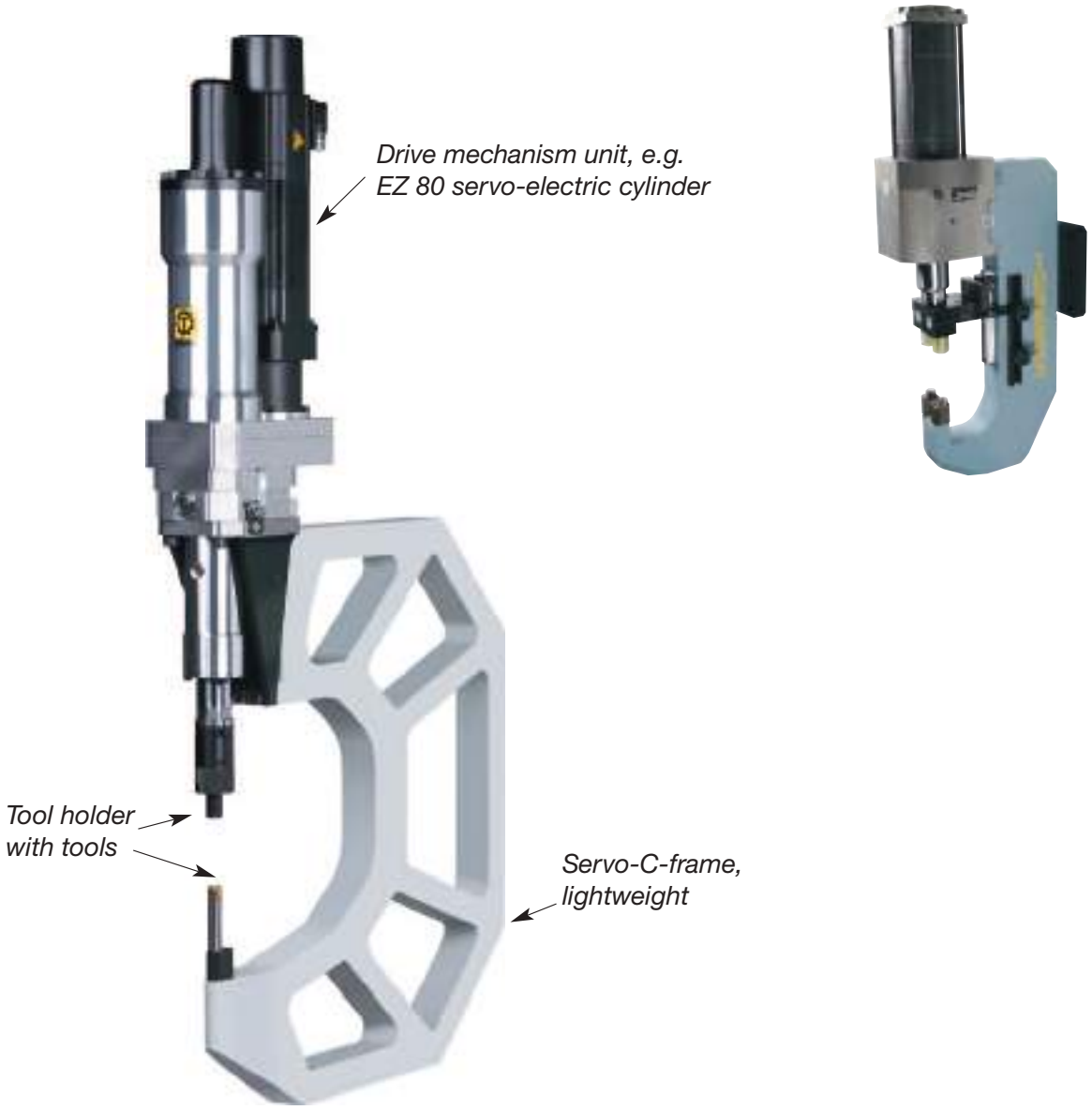
Central computer PLC

A compact press ready for use, constructed of the 3 basic elements
– C-frame;
– drive;
– tools.

This simple assembly is possible due to the integration of the drive unit which houses the tool guide, end position sensing system and anti-rotating device, if required, next to the actual drive cylinder. Moreover, the mating flange surfaces on the sides allow for a very simple C-frame design.

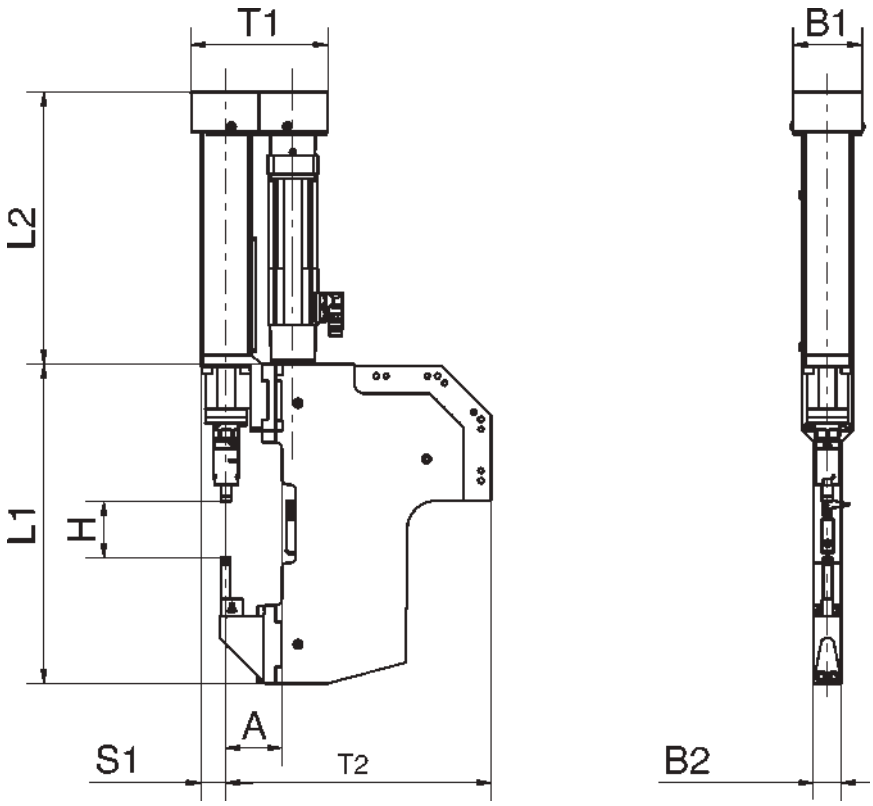
The hydraulic, multi-force or HydroAir cylinders, described in the chapter on drives, can be optionally used as drives. The C-frames in steel construction are weight-optimised according to the Fenite Element Method and adjusted to the relevant application and process forces. In addition to the standards described in the catalogue, we aslo supply C-frame systems tailored to meet the requirements of your specific application case – for punching, stamping, joining, nut piercing, crimping . . .

Maximum strokes lengths of 300 mm and maximum throat depths of approx. 800 mm, allow for the realisation of large-sized clamp windows on the basis of the simple C-frame construction and therefore a broad field of standard forming applications.



C-frame System CBEZ

- Solid steel C-frame
- Adapter plate to suit customer's specification
- Drive unit with electric servo cylinder
- Ready for operation with tools for forming processes such as punching, stamping and joining
- Options:
  - end position sensing
  - spring-centred bracket
  - process monitoring



Type	Cylinder force (kN)	Throat depth (A)	Stroke (H)
CBEZ 30	30	140 200 300	100-200
CBEZ 60	60	140 200 300	100-200
CBEZ 80	80	140 200 300	100-200
CBEZ 150	150	235	360
CBEZ 250	250	235	360

Type	L1	L2	B1	B2	T1	T2	H	A	S1
CBEZ 30	678	572	100	50	210	600	200	300	40
CBEZ 60	678	572	130	50	244	600	200	300	45
CBEZ 80	678	572	130	50	244	600	200	300	45
CBEZ 150	1330	700	268	120	500	650	360	235	113
CBEZ 250	1330	900	238	120	500	650	360	235	135

Subject to technical modifications.

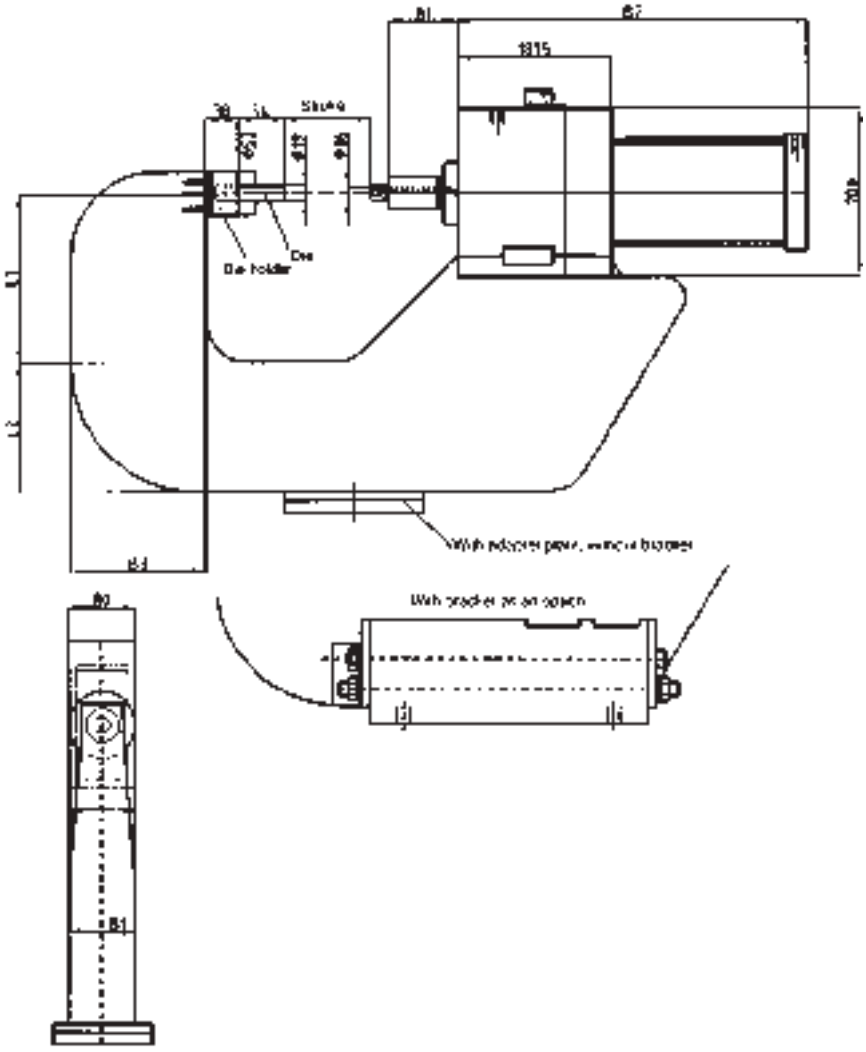
Ordering example:

CBEZ80-140-100 **80** **140** **100**

- **80** → Force (kN)
- **140** → Throat depth (mm)
- **100** → Stroke (mm)

Please note:
The dimensions indicated here are standard sizes and can be altered if required.

– Drive unit: Multi-force cylinder with integrated piston rod guide
– Adaptor plate according to customer specifications
– Ready for operation with insert tools for forming, punching, marking, joining processes
– Optional
  - End position sensing
  - Spring-centred bracket
  - Anti-rotating device
  - Process monitoring system



Type	Cylinder force ~ (kN)	Cylinder dia.	Stroke	Power stroke (mm)
CBMZ 10...	10	63	50-150	6
CBMZ 25...	25	80	50-150	6
CBMZ 45...	45	100	50-150	6
CBMZ 60...	60	120	50-150	6

Type	L1	L2	B1	B2	B3
CBMZ 10 ...	50	100	50	Stroke + 340	100
CBMZ 25 ...	100	150	50	Stroke + 340	150
CBMZ 45 ...	150	250	60	Stroke + 340	200

Subject to technical modifications.

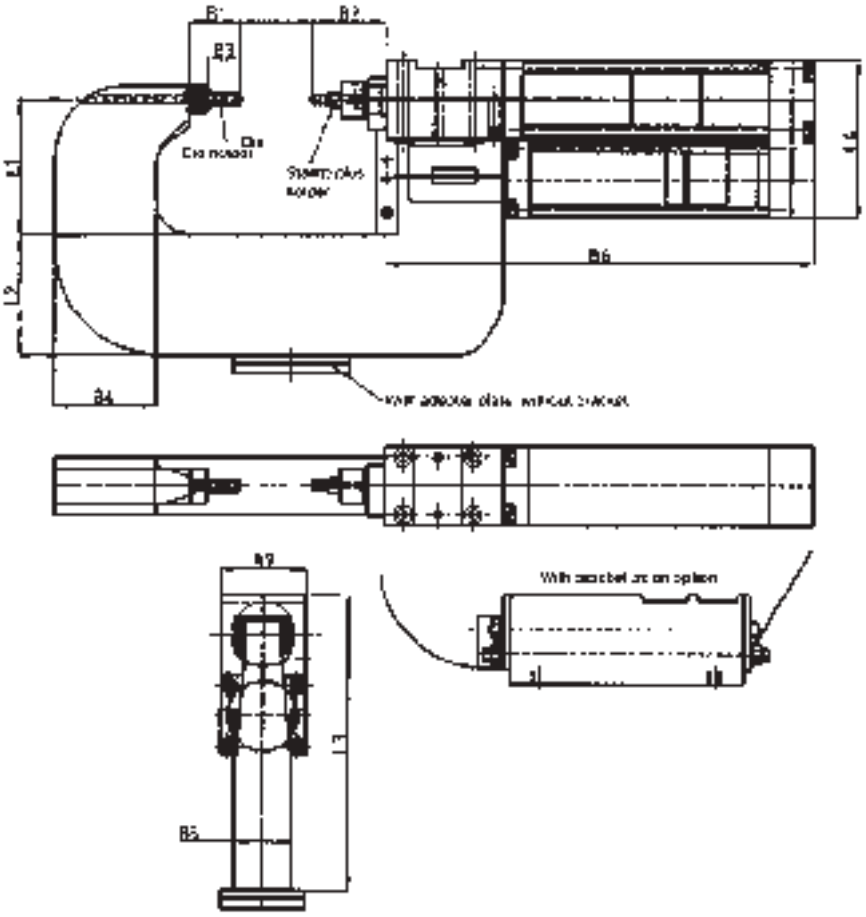
Ordering example:

CBMZ10 100 100 F
- F → Joining
- 100 → Stroke
- 100 → Throat depth (L1)
- 10 → Force (kN) / frame size

Please note:
The dimensions indicated here are standard sizes and can be altered if required.

C-frame System CBHA

– Drive unit: HydroAir cylinder with integrated piston rod guide
– Adaptor plate according to customer specifications
– Ready for operation with insert tools for forming, punching, marking, joining processes
– Optional
  - End position sensing
  - Spring-centred bracket
  - Anti-rotating device
  - Process monitoring system



Ordering example:

CBHA 15 50 100 F
- F → Joining
- 100 → Stroke
- 50 → Throat depth (L1)
- 15 → Force (kN)

Please note:
The measurements stated here are reference values which are adjusted as required.

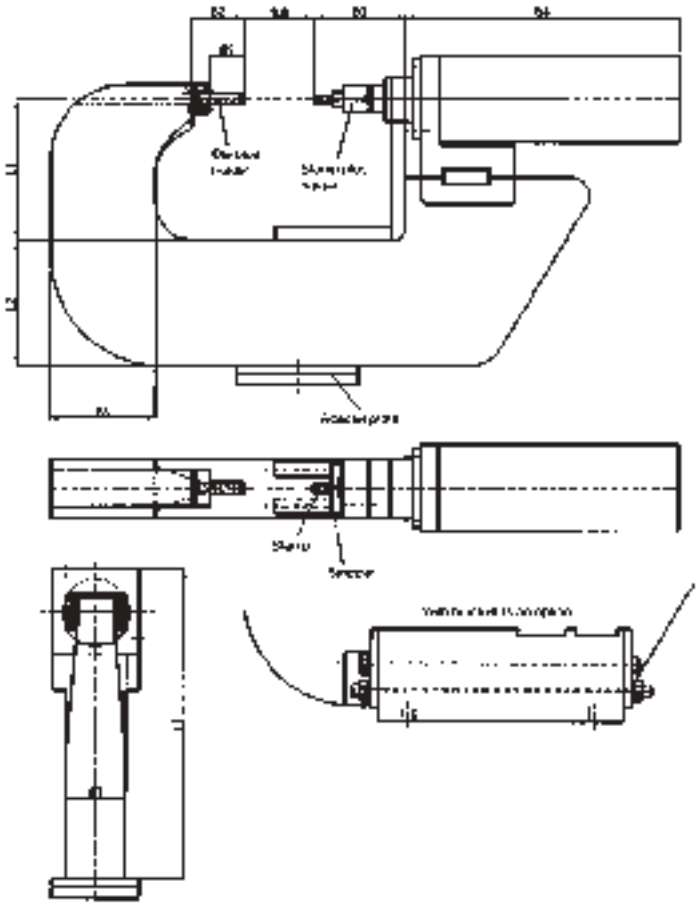
Type	Cylinder force ~ (kN)	Cylinder dia.	Stroke	Power stroke (mm)
CBHA 65	65	80	50-150	6
CBHA 110	110	100	50-150	6

Type	L1	L2	L3	L4	B1	B2	B3	B4	B5	B6	B7
CBHA 65	50	100	317	222	67	150	15	100	80	559+Stroke	110
CBHA 65	100	150	417	222	67	150	15	150	80	518+Stroke	110
CBHA 65	200	300	667	222	67	150	15	300	80	507+Stroke	110
CBHA 110	50	100	357	274	67	150	15	100	120	626+Stroke	135
CBHA 110	100	150	457	274	67	150	15	150	120	594+Stroke	135
CBHA 110	200	300	707	274	67	150	15	300	120	562+Stroke	135

Subject to technical modifications.

Other variants on request.

– C-frame in solid steel construction
– Adaptor plate according to customer specifications
– Drive unit: Hydraulic cylinder with integrated piston rod guide
– Ready for operation with insert tools for forming, punching, marking, joining processes
– Optional
  - End position sensing
  - Spring-centred bracket
  - Anti-rotating device
  - Process monitoring system



Type	Cylinder-Force ~ (kN)	Cylinder dia.	Stroke
CBHZ 30	30	63	50-200
CBHZ 50	50	80	50-200
CBHZ 80	80	100	50-200
CBHZ 150	150	140	50-200
CBHZ 300	300	160	50-200

Type	L1	L2	L3	B2	B3	B4	B5	B6	B7
CBHZ 30	50	100	188	36	98	Stroke x 2,5	15	100	50
CBHZ 30	100	150	288	36	98	Stroke x 2,5	15	150	50
CBHZ 30	200	300	538	36	98	Stroke x 2,5	15	300	50
CBHZ 50	50	100	200	36	98	Stroke x 2,5	15	100	60
CBHZ 50	100	150	300	36	98	Stroke x 2,5	15	150	60
CBHZ 50	200	300	550	36	98	Stroke x 2,5	15	300	60
CBHZ 80	50	100	210	67	100	Stroke x 2,5	15	100	80
CBHZ 80	100	150	310	67	100	Stroke x 2,5	15	150	80
CBHZ 80	200	300	560	67	100	Stroke x 2,5	15	300	80
CBHZ 150	50	100	235	67	100	Stroke x 2,5	15	100	120
CBHZ 150	100	150	335	67	100	Stroke x 2,5	15	150	120
CBHZ 150	200	300	585	67	100	Stroke x 2,5	15	300	120
CBHZ 300	200	300	585	67	100	Stroke x 5	15	300	120

Subject to technical modifications.

Ordering example:

CBHZ 30 50 50 F
- 30 → Force (kN)
- 50 → Throat depth (L1)
- 50 → Stroke
- F → Joining

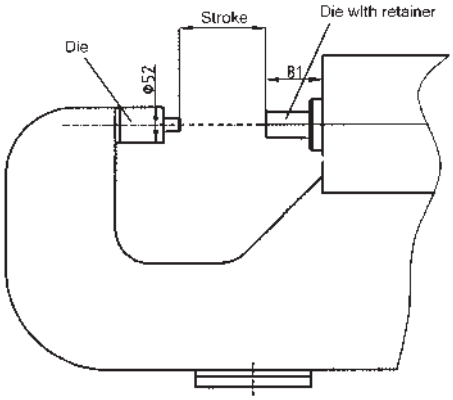
Order code TÜNKERS position sensing systems:
T12 Inductive proximity switch, 24 V
resistant to fluid pressur
Operating pressure: 100 bar
Medium: Hydraulik fluid

Please note:
The dimensions indicated here are standard sizes and can be altered if required.
Other variants on request.

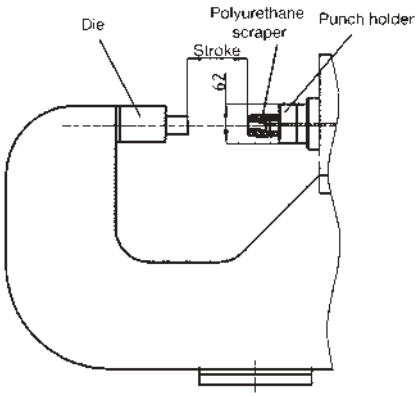
Application Example C-frame Systems CB

Our C-frame systems are individually adjusted to the relevant application. Therefore, the technical dimensioned drawings serve as guidelines for your pre-design.

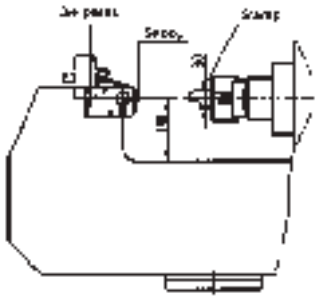
CBMZ series for joining operations



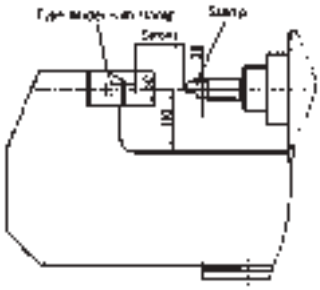
CBMZ series for punching operations



CBMZ series for marking operations



CBMZ series for marking operations (with type holder)



Subject to technical modifications.

CB MZ 25 140 100 S T12

TYPE: CB

Drive mechanism: MZ
PZ = Pneumatic cylinder
MZ = Multi-force cylinder
HA = HydroAir cylinder
HZ = Hydraulic cylinder
EZ = Electric cylinder

Frame size/joining force in kN: 25

Throat depth: 140
140 = 140 mm (140, 200, 300)

Stroke: 100
100 = 100 mm (100, 200)

Process: S
F = Joining
S = Punching
P = Stamping; with supplementary identification

T12

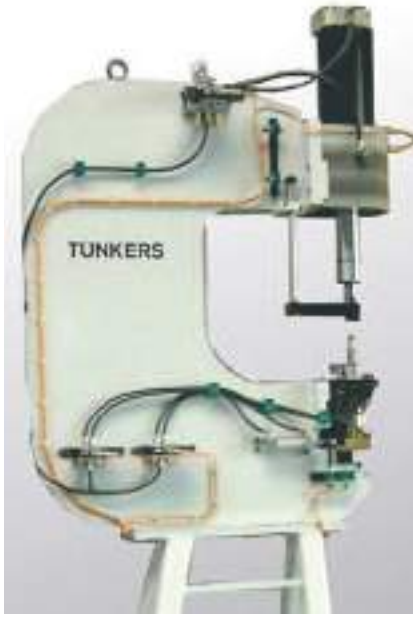
Position sensing:
T00: None
T02: 24 V inductive position sensing, 2 outputs
T10: Pneumatic sensing
T12: 24 V inductive position sensing, 1 output

P TH 6 - 4
- 4 = Type height
- 6 = Digits
- TH = Type holder
- P = Stamping process

P U 6 - 5 A3
- A3 = A incl. 3 automatically-incrementing positions; M = manual adjustment
- 5 = No. of digits (5)
- 6 = Type height in mm
- U = Stamping mechanism; u = Bottom, mounted on the jaw; o = Top, mounted on the cylinder side
- P = Stamping process

Subject to technical modifications.

Design Variants



C-frame mounted to pedestal for stationary applications with customer specific base frame

Adapter plate flanged to the back or base for connection to automation robots or quick-change systems

The installation of an additional external guide and anti-rotating device is recommended with extreme stroke lengths and the use of multiple tools. This can be realised in the form of a linear guide on the inside of the C-frame, or an external column guide.

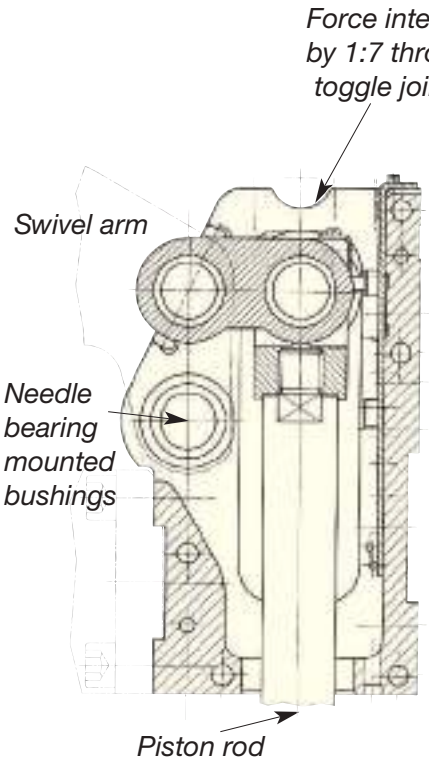
Horizontal or vertical clamp adjustment, ensures that process forces cannot affect the workpiece directly during forming and cause deformation. Alternatively spring-loaded or pneumatically controlled.

Type	Drive	Force (KN)	Stroke (mm)	Throat depth (mm)
CBMZ 10	Multi-force	10	50-200	50-600
CBMZ 25	Multi-force	25	50-200	50-600
CBMZ 45	Multi-force	45	50-200	50-600
CBMZ 60	Multi-force	60	50-200	50-600
CBHA 60	HydroAir	60	50-200	50-600
CBHA 110	HydroAir	110	50-200	50-600
CBHZ 50	Hydraulic	50	50-200	50-600
CBHZ 80	Hydraulic	80	50-200	50-600
CBHZ 150	Hydraulic	150	50-200	50-600
CBHZ 300	Hydraulic	300	50-200	50-60
CBEZ 60	Electric	60	50-200	50-600
CBEZ 80	Electric	80	50-200	50-600
CBEZ 150	Electric	150	50-200	50-600
CBEZ 250	Electric	250	50-200	50-600

Power Press Unit

Compact forming clamp generating high press forces of up to 75 KN (7.5 tons) via a toggle mechanism integrated into the tool housing. The force intensified at a ratio of approx. 1:7, is applied in end position. Therefore, standard pneumatic cylinders with 5 bar operating pressure are sufficient as drives.

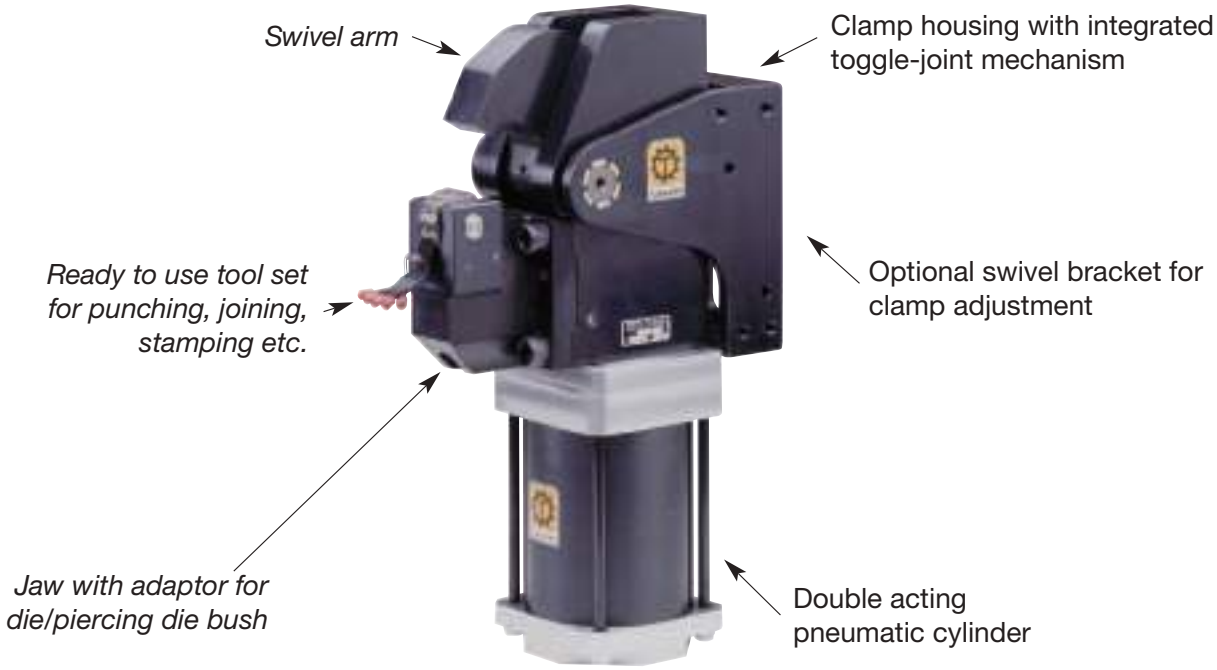
Contrary to the C-frame system, the forming force is applied to the workpiece via a pivoted swivel arm.



The stamp is guided by the swivel arm and practically rotates into the die – without any quality or tool life losses - as proven by more than 1,000 automotive applications.

Special advantage:
The swivel arm opens fully and completely releases the component for horizontal removal. There is no need for installation of an additional linear unit, as is the case with standard C-frame systems.

Toggle unit structure



Application examples

Power press unit with hydraulic drive as double punching unit

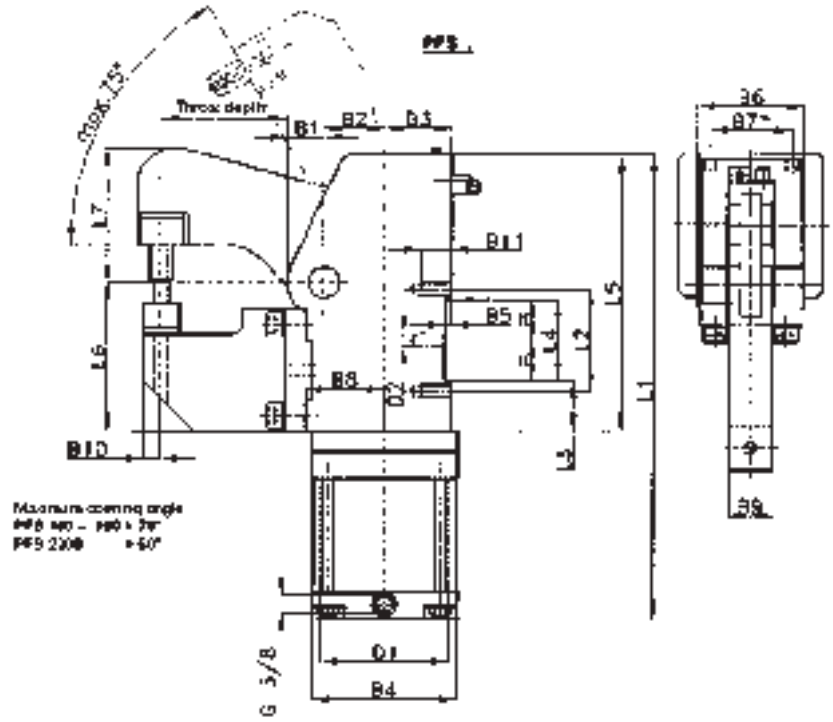
Power press unit with hydraulic cylinder and swivel bracket for clinching tasks

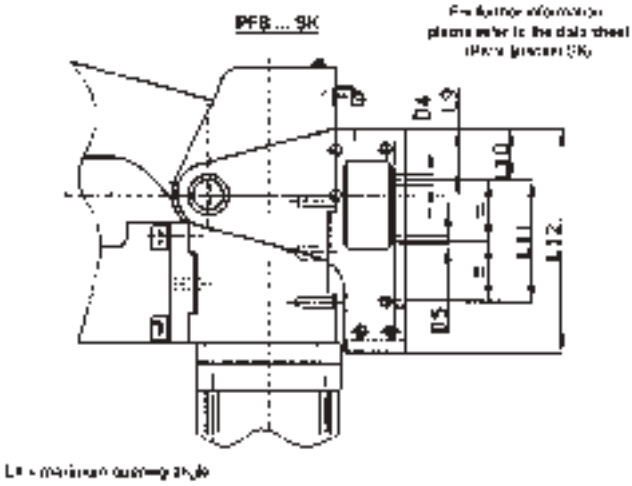
Product range overview

Type	Drive*	Force at 60 mm throat depth (KN)	max. opening angle (mm)	Throat depth (mm)
PFS 100	Pneumatic	10	75°	60-200
PFS 200	Pneumatic	40	75°	60-200
PFS 400	Pneumatic	50	75°	60-200
PFS 900	Pneumatic	75	75°	60-250

*All our toggle-joint clamps are optionally available with hydraulic cylinder of the HFS series

Power Press Unit PFS





- Housing and toggle mechanism in rugged steel construction
- Drive unit: Pneumatic cylinder
- Operating pressure: 5 bar
- Jaw and swivel arm adapted to tool geometry
- Ready for operation with tools for forming, punching, stamping, joining processes
- Optional:
  - End position sensing
  - Spring-centred bracket
  - Hydraulic cylinder (HFS series)
  - Process monitoring

Ordering example:

PFS 400 60 SK F T12

- T12 → Sensing system
- F → Model for joining operations
- SK → with swivel bracket
- 60 → Throat depth (standard size)
- 400 → Size
- PFS → Type

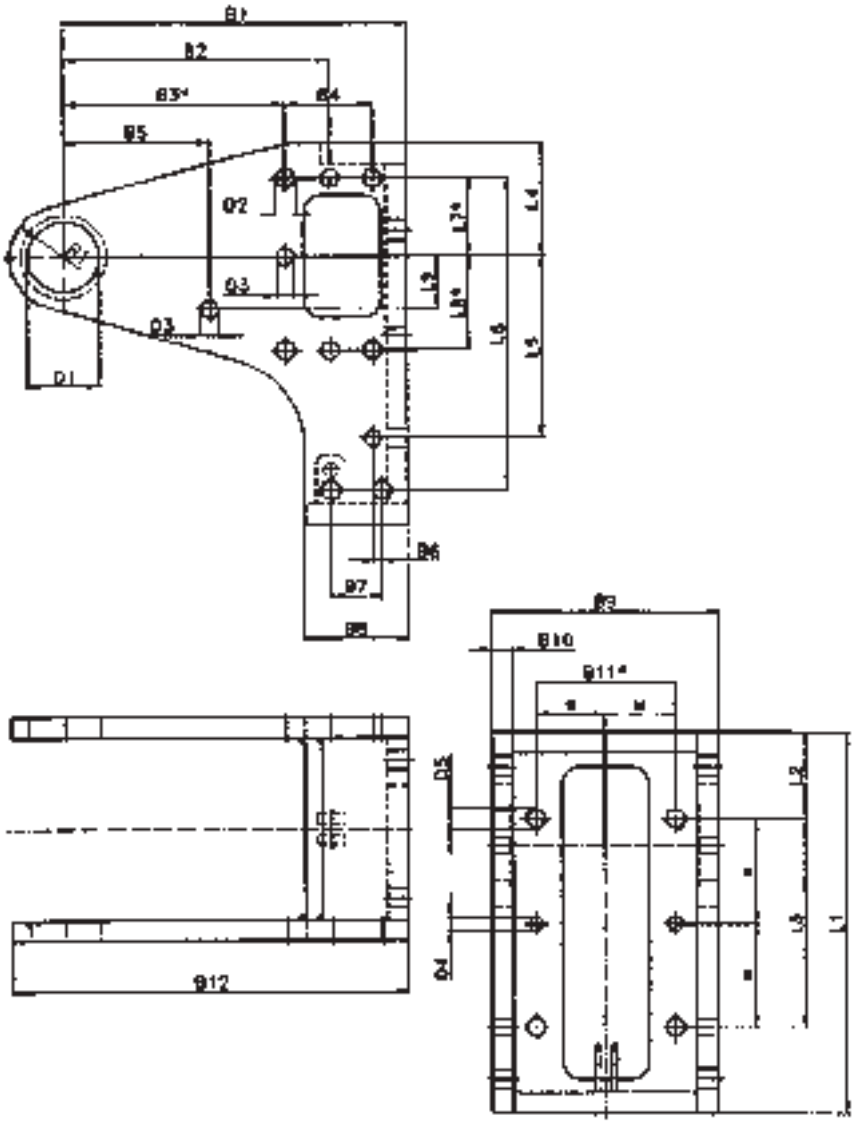
Order code TÜNKERS position sensing systems:
...T12 24 V inductive position sensing, 1 output 3 LED's
...T08 Pneumatic sensing system

Type	Compression force (kN) Throat depth (mm) 60	90	120	Torque (Nm)	B1	B2	B3	B4 □	B5	B6	B7*	B8	B9 min	B10 min	D1	D2 H7	D3	D4	D5 H7	L1 max.	L2	L3
PFS 100	10	6	3,5	600	30	40	68	94	9	62	40	70	32	25	80	10	M10	M10	8	418	40	35
PFS 200	21	12,8	7	2000	25	50	70	145	7,5	72	52	75	32	35	125	10	M10	M10	8	433	125	25
PFS 400	35	22,8	13,3	4000	40	60	65	145	6	100	80	78	40	35	125	10	M12	M12	8	504	105	50
PFS 900	80	51,5	30	9000	40	60	65	145	6	100	80	78	40	35	125	10	M12	M12	8	671	105	50

Type	L4	L5	L6	L7	L8	L9	L10	L11 +0,2	L12
PFS 100	80	228	165	95	15	71	20	150	190
PFS 200	100	225	142	110	15	66	51	125	233
PFS 400	80	272	147	120	18	65	50	120	220
PFS 900	80	272	147	120	18	65	50	120	220

Subject to technical modifications.

for PFS/HFS toggle unit



Ordering example:

SK 400

→ Toggle unit type

→ Bracket type

*Tolerance for pin bores ±0.02, for threaded holes ±0.1

Type	B1	B2 ±0,02	B3*	B4 ±0,2	B5 ±0,02	B6	B7 ±0,2	B8	B9	B10	B11*	D12	D1 H7	D2	D3 H7	D4 H7	D5	L1	L2	L3	L4	L5 +0,02	L6 ±0,2
SK 100	178	-	-	-	-	-	-	62	86	10	50	203	30	-	-	8	M10	190	20	150	71	-	-
SK 200	182	147	127	40	85	-	-	52	96	10	60	210	35	M10	10	8	M10	233	51	125	66	-	-
SK 400	195	-	125	50	-	5	30	60	130	12	80	225	40	M12	10	8	M12	220	50	120	65	105	180
SK 900	195	-	125	50	-	5	30	60	130	12	80	225	40	M12	10	8	M12	220	50	120	65	105	180

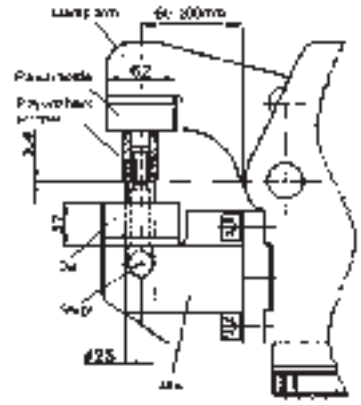
Type	L7*	L8*	L9 ±0,02	R1
SK 100	-	-	-	25
SK 200	36	54	21	28
SK 400	45	-	-	30
SK 900	45	-	-	30

Subject to technical modifications.

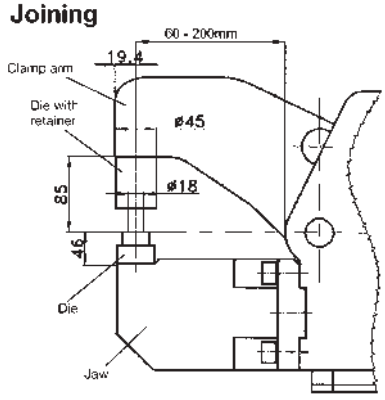
Application Example: PFS Toggle Unit

Our power press units are individually adjusted to every case of application. Therefore, the technical dimensioned drawings serve as guidelines for your pre-design.

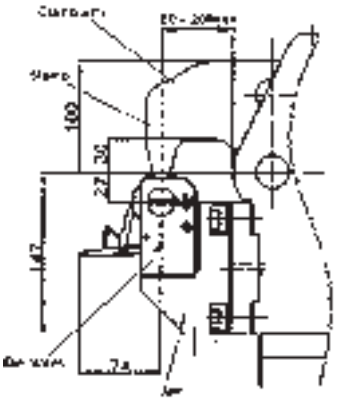
Punching



Joining

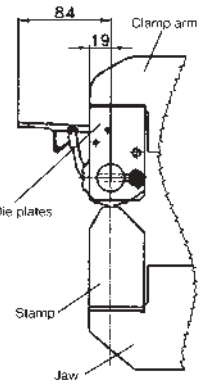


Marking



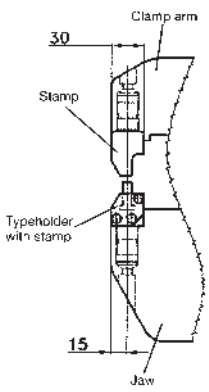
Marking

Die plates mounted to clamp arm



Marking

with type holder



Subject to technical modifications.

PFS 400 60 P TH8-6 70° T12

TYPE:

Sizes:
100
200
400
900

Throat:
60-200 mm

Process / Application:
F = Joining
S = Piercing
P = Stamping

PTH8 - 6
- 6 = Character height in mm
- 8 = Digits
- TH = Typeholders
- P = Stamping process

PU6 - 5A3
- 3 = 3 digits automatically changing, M = manual adjustment
- 5 = Digits (5)
- 6 = Character height in mm
- U = Stamping mechanism, u = Bottom / mounted on the jaw, o = Top / mounted on the arm
- P = Stamping process

Opening angle:

Query:
T00: without
T08: Pneumatic control
T12: Inductive sensor 24 V, 1 output

Subject to technical modifications.

FORMING

Fixtures

TÜNKERS®
Ingenuity in series.

Fixtures

Turnkey solutions

As a mechanical engineering company based in Ratingen near Düsseldorf, we have the know-how and capacities to produce customer-specific tools and clamps, including turnkey solutions.

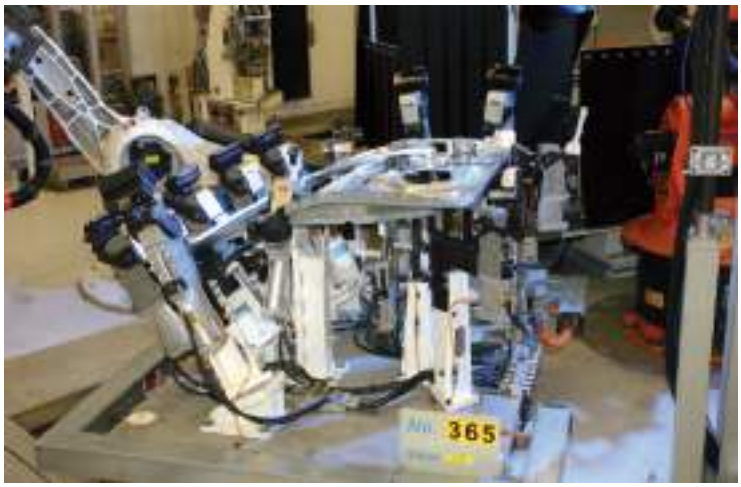
The following applications will provide you with a relevant overview. We would also be happy to supply your application in the form of a stand-alone system.

Fixture construction infrastructure

We have all the capacities required for the production of small-size fixtures available at our main plant:

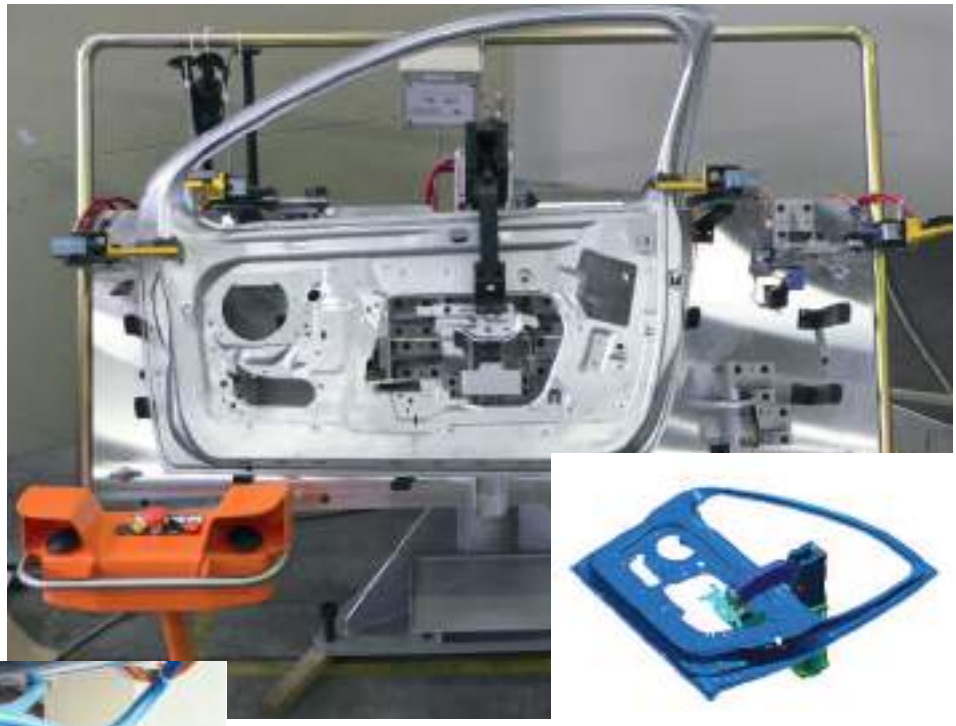
– CAD construction
– Project planning
– Contour block production
– Assembly
– Electric and pneumatic installation
– Measurement technology

Application examples



Fixture for press forming of dimples /beading with pneumatic power press clamps into door body sheet. Preparatory working step to ensure a degassing slot for laser-welding.

Combination fixture for right/left door for punching operations on the reinforcing sheet



Clinching fixture for base plate of an exhaust manifold

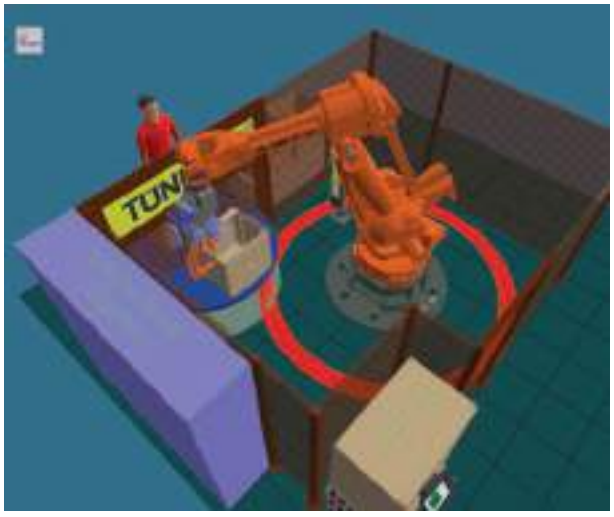
Fixtures

Fixture for bolt punching and cutting of the component “door“

4 die heads for punch bolts

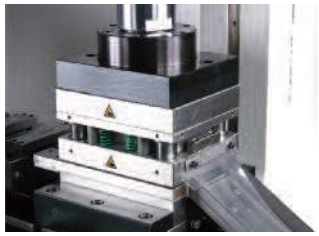
Power press unit for cutting of the component

Linear unit for positioning of parts in the fixture



Robot cell for spot welding operations on stainless steel tank

Small press for the production of small sheet parts with multi-stage tool directly from a coil



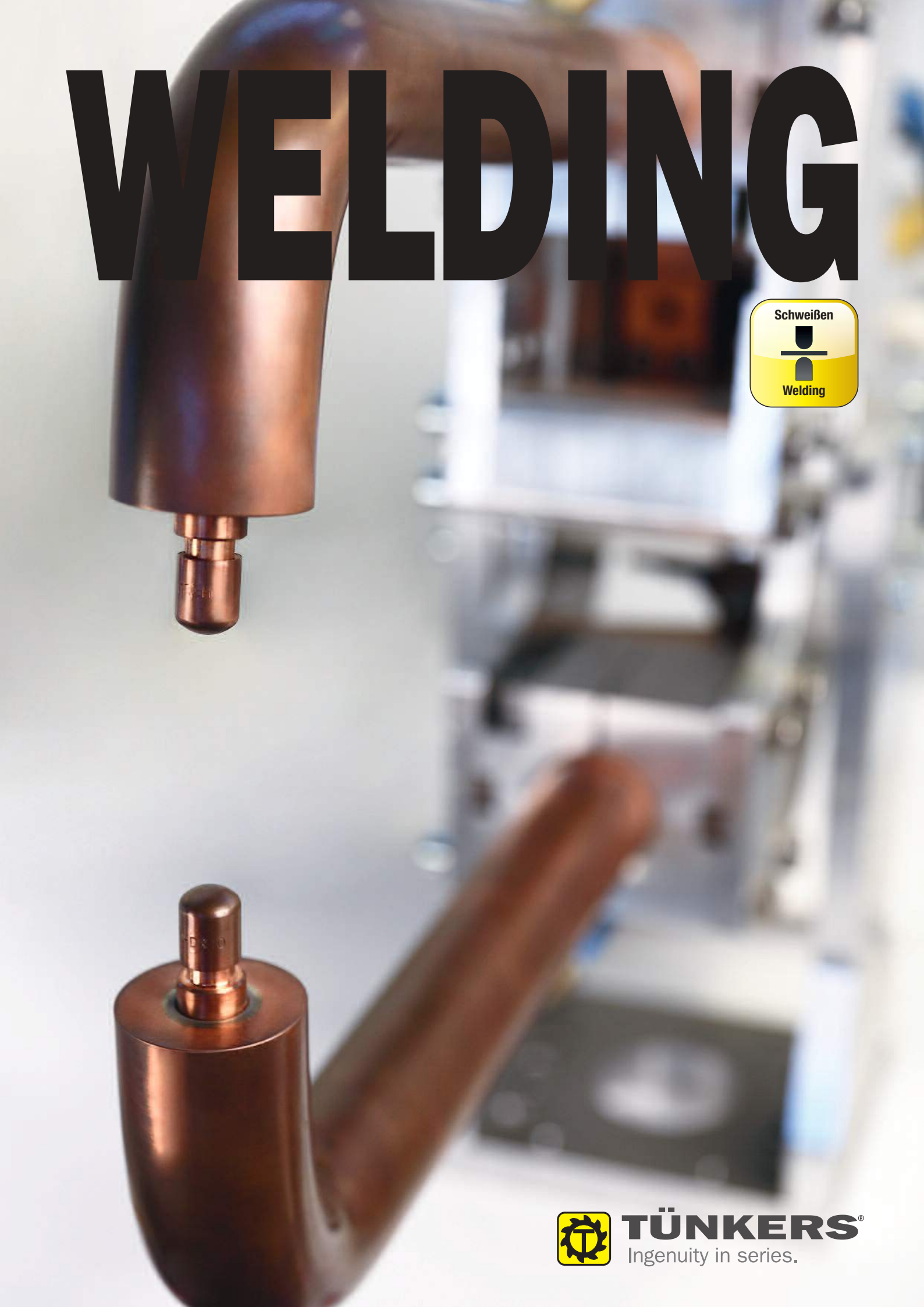
Wheelhouse crimping

Set device for knobs embossing and nuts piercing

Manual workplace for tube piercing

4x tailgate piercing

WELDING



TÜNKERS®
Ingenuity in series.

Welding

Welding is the most frequently used process for joining components in sheet metal fabrication. By far the largest application for welding is in car body manufacture. Typical applications include the permanent joining of inner and outer skin panels or securing joining elements such as weld nuts.

High precision and repeatability are also requirements for modern welding technology, as are long service life and speed. Decisive factors in obtaining the best results are the correct intensity, the duration and the optimum pressure during the welding process. For this reason, a high-performance power source is essential. In order to satisfy these requirements, TÜNKERS and HELU have developed a wide range of products. The TÜNKERS and HELU portfolio of welding technology ranges from weld clamps to manual weld guns to lightweight modular weld guns.

Weld clamps

The weld clamp is the smallest element in the series of welding tools and it has been specially designed to satisfy the requirements of high-volume production in sheet metal fabrication. The core element of the weld clamp is a double-acting pneumatic cylinder made of high-strength aluminum. The electrode arm is moved by means of the knee-lever principle. TÜNKERS weld clamps are compact units and are characterised by their small size and high welding force in the end position, where the full knee-lever transmission has its effect.

Resistance weld guns

In automation technology, robot weld guns are mostly used: these are indexed toward the component, where the components are joined together. The robot weld gun features a modular construction. A core element of the gun is the power source. For rapid and smooth attachment-type welding processes, servo technology is applied, in the form of servo-pneumatic or servo-electric motive power.

OEM weld guns

OEM weld guns represent a special group of robot weld guns. The individual modules, including the basic gun and the gun mounting bracket, are designed and manufactured to the relevant company standards. This results in the maximum possible uniformity and high levels of reliability.

Manual weld guns

Manual weld guns are taken to the component by the operator and then positioned. Even relatively inaccessible positions can be reached in this way. A decisive factor for satisfactory handling is low weight and an optimally located centre of gravity.

Weld machines

Weld machines are stationary installations. Components are either manually or automatically fed into them. Cylinders move the electrodes to the component under either pneumatic or electrical power. During the joining process, material differences can be compensated by adjusting the drive unit to the optimum setting. A special form is the C-frame welding unit, which incorporates a stable and compact C-frame.

In addition to spot welding, resistance projection welding is a related type of welding process.

Technical calculation principles

The welding force is proportional to the throat clearance and to the operating pressure

– As the throat clearance (L) increases, the weld load declines

– As the operating pressure (P) increases, the weld load increases

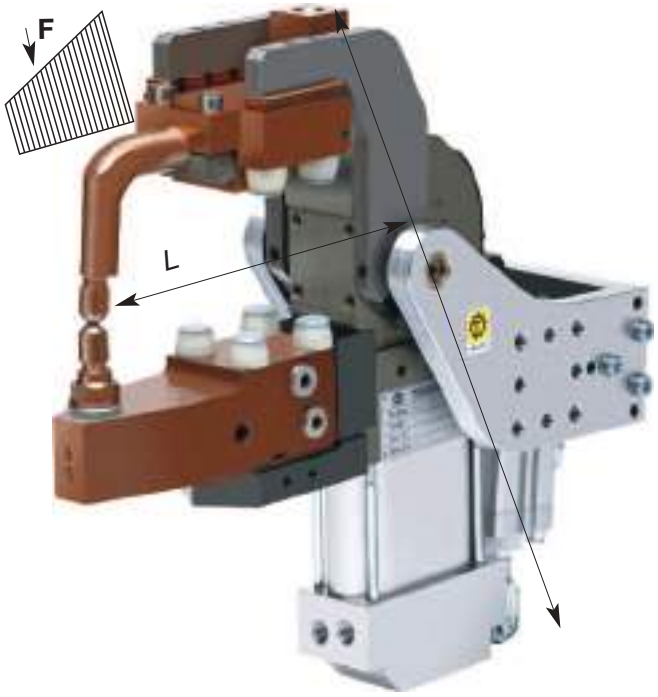
The weld load formula:

$$F = \frac{P}{6} \cdot \frac{M_b}{L}$$

P = Operating pressure (0-6 bar)

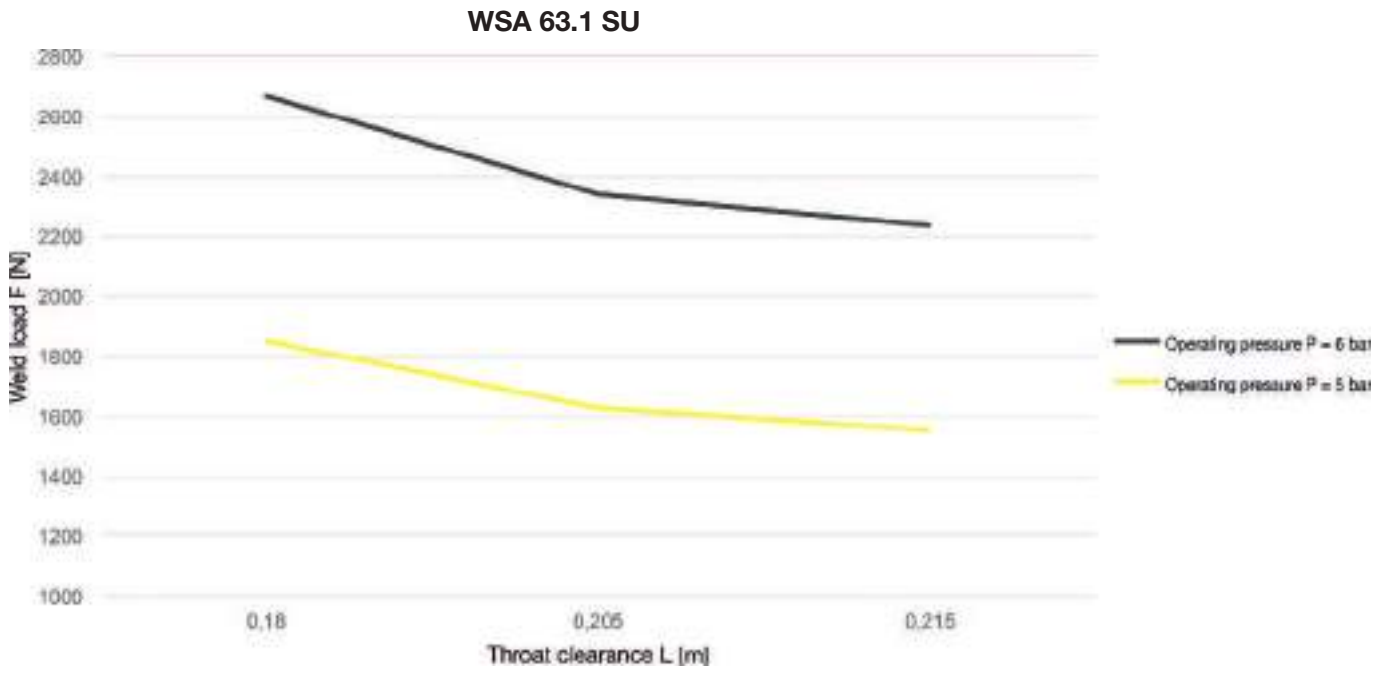
M_b = Weld gun torque (Nm)

L = Throat clearance (m)



Example: weld load as a function of throat clearance

(Guideline values for design purposes)

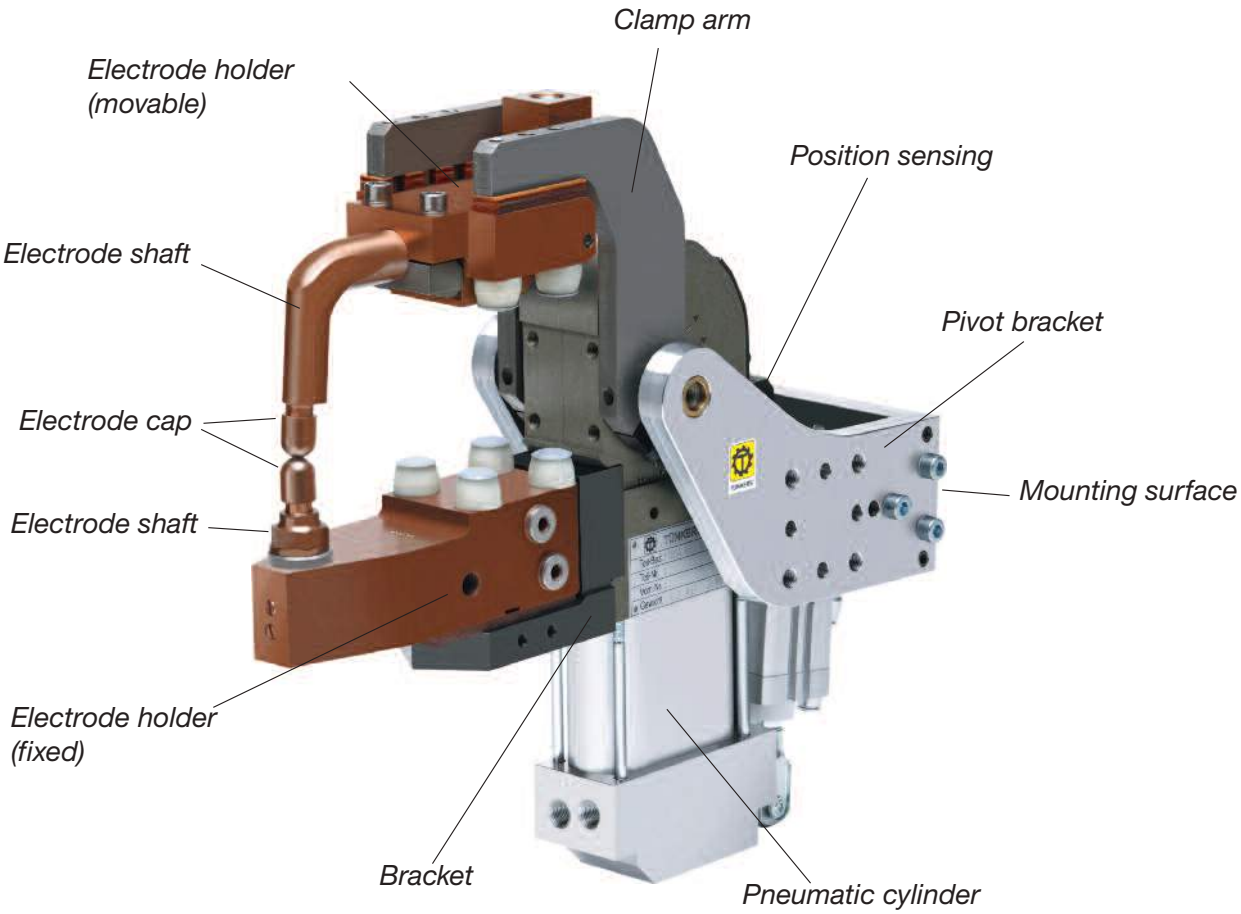


Basic Configuration for Weld Clamps

The weld clamp is a tooling system that has been specially designed to satisfy the requirements of high-volume production in sheet metal fabrication. As part of the installation, the weld clamp, in combination with a pneumatic control unit, can be expanded to form a fully functional system.

The weld clamp comprises the following subassemblies:

1. Double-acting pneumatic cylinder with integral knee-lever mechanism and position sensing system
2. Pneumatically-controlled pivot bracket or linear unit, used for tolerance equalising (electrode burn-up/ component tolerance), simplified component changeover and, at the same time, mounting to the fixture
3. Insulated pivot arm with electrode holder and electrode
4. Insulated jaw/bracket with electrode holder and electrode

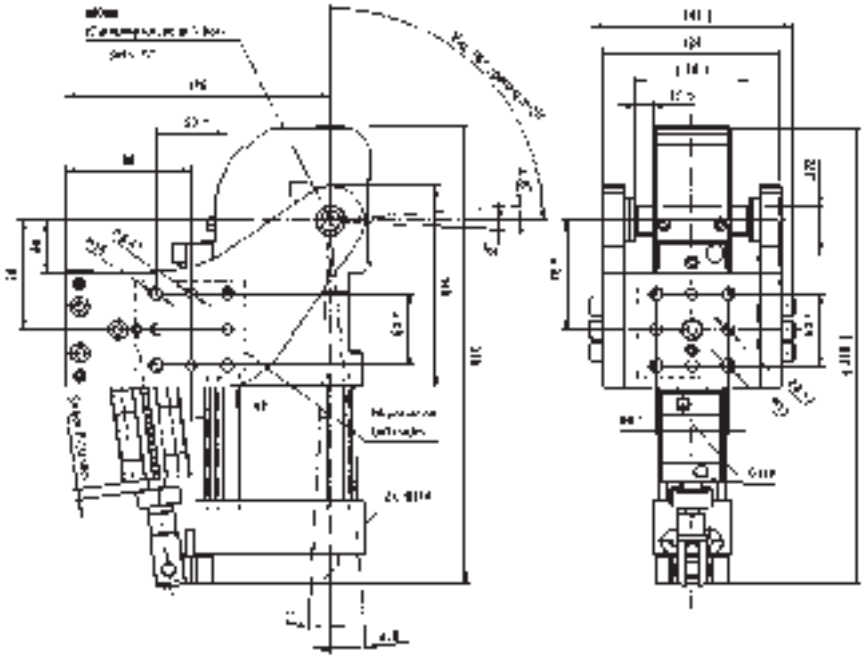


Method of operation:

Pressure, generated by the pneumatic cylinder, activates a knee-lever mechanism incorporated into the cylinder housing and this powers the pivot arm. A high degree of force is transmitted in the end position of the mechanism, thus generating the clamping force required for welding. The return stroke is initiated by pressure in the piston ring side of the cylinder. The position is controlled by integral sensors.

The integral pivot equaliser ensures that, when a component is changed, there is no collision between the electrodes and the component.

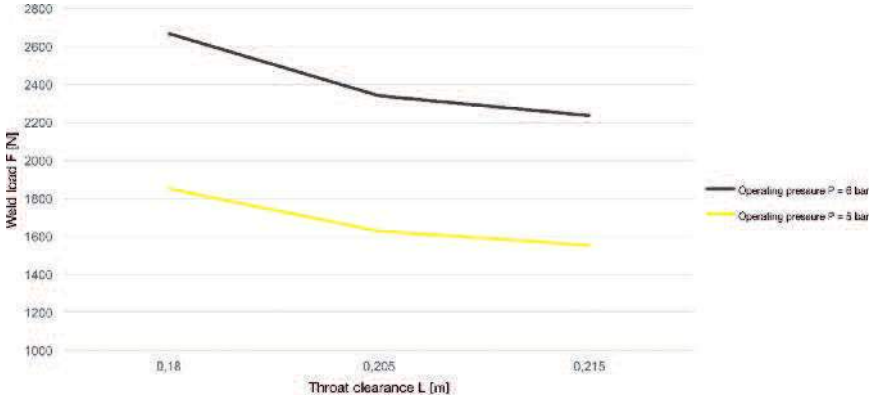
In addition, the equaliser produces a consistent, reproducible process force in the welding area.



Weld clamp base unit with universal pivot bracket

– Weld clamp base unit consisting of one APH 63.1 BR3 subassembly and one SU63 universal pivot bracket
– Client-specific electrodes and electrode holders
– Available as options:
Electrode holder (standardised)
Electrodes (standardised)
Mountings (standardised)

Weld load as a function of throat clearance



Ordering example:

WSA 63.1 A180 T12 45° SU 5° 423051

- 423051 → TÜNKERS Article Number
- 5° → Bracket pivot angle
- SU → Type of pivot bracket mounting
- 45° → Opening angle
- T12 → Position sensing system
- A180 → Electrode throat clearance
- 63.1 → Piston dia., Version
- WSA → Type

Order code TÜNKERS position sensing systems:

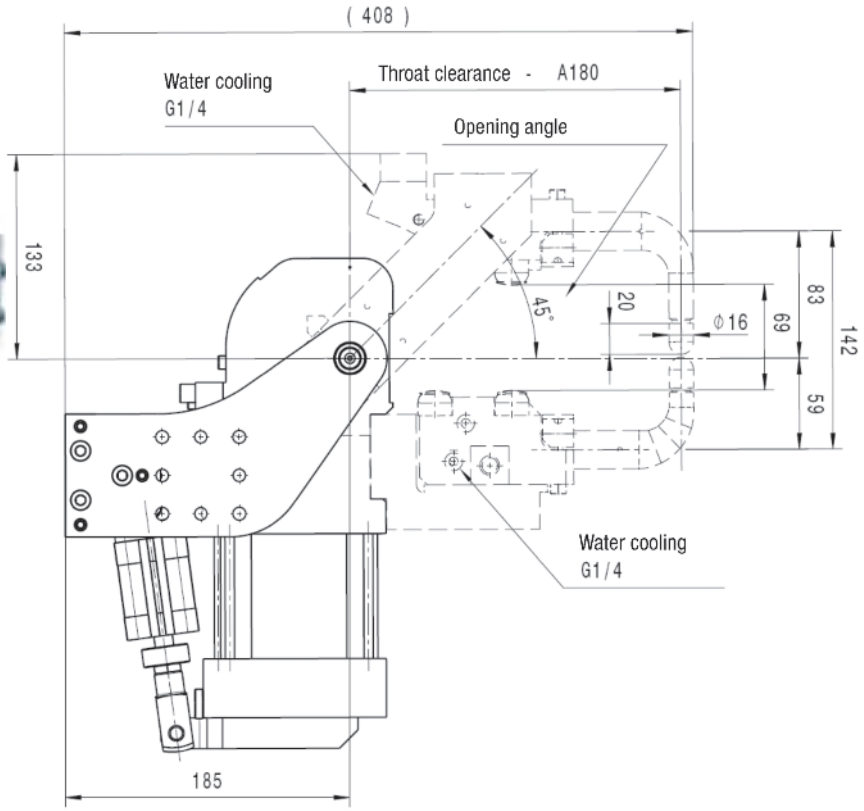
...T12 24 V inductive position sensing,
1 output with integral LEDs

Technical Data:

Clamping torque:	at 5 bar M_b = 400 Nm
Operating pressure:	max. 6 bar
Medium:	Compressed air, can be operated with oil-free air
Clamp opening angle:	max. 90°
Readjustment angle:	max. 5°
Pivot equalising angle:	max. 7°
Connection to basic clamp:	G1/4"
Weight:	approx. 20 kg varies according to version

Subject to technical modifications.

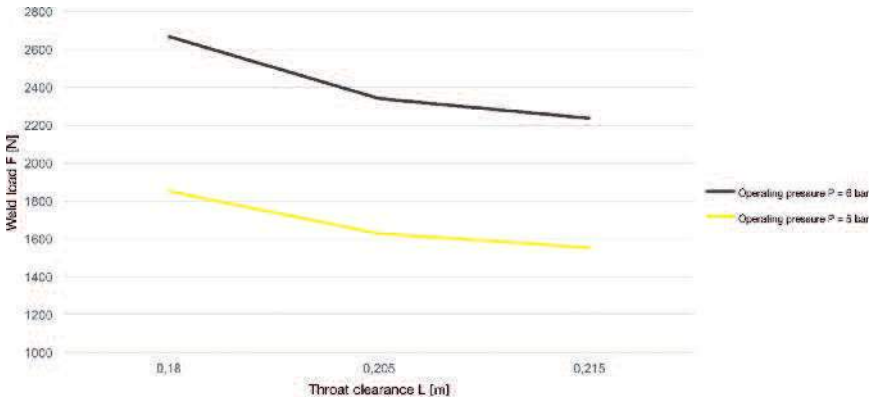
Weld Clamp WSA 63.1 SU

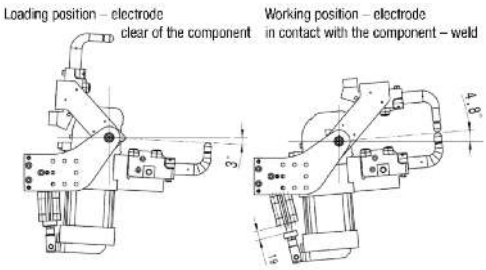


Weld clamp with universal pivot bracket

– Weld clamp base unit consisting of one APH 63.1 BR3 subassembly and one SU63 universal pivot bracket
– Client-specific electrodes and electrode holders
– Available as options:
Electrode holder (standardised)
Electrodes (standardised)
Mountings (standardised)

Weld load as a function of throat clearance



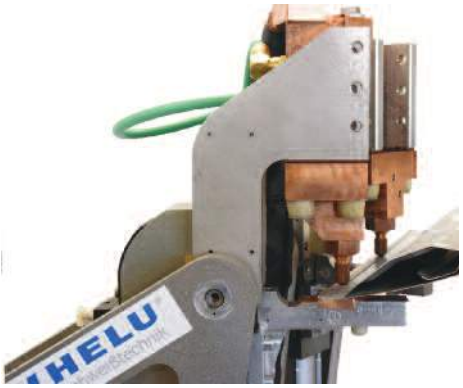


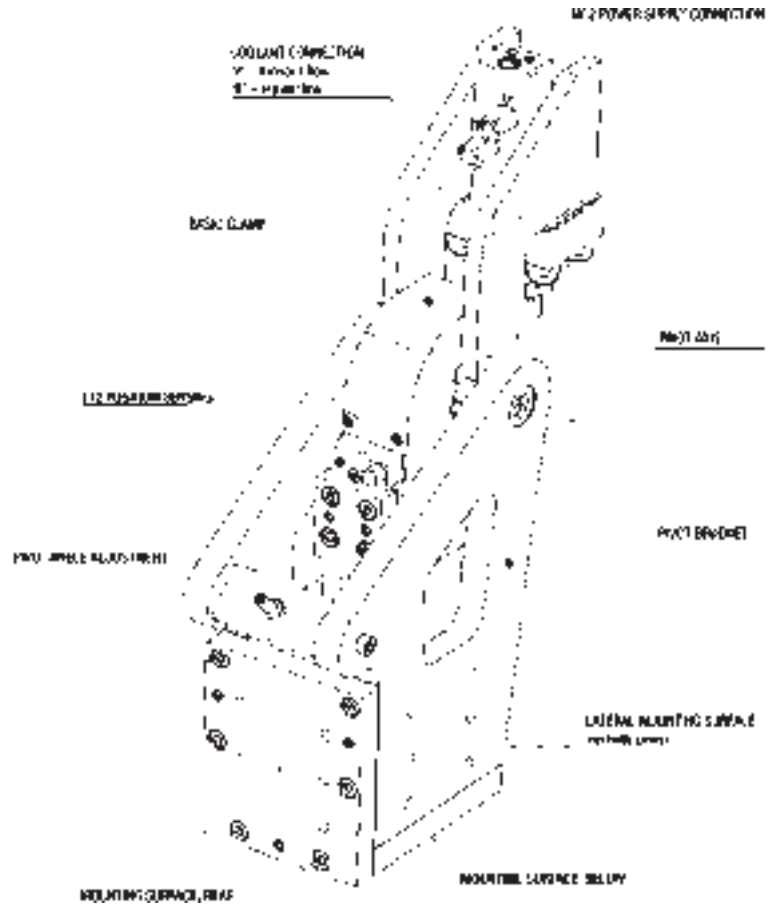
Technical Data:

Medium:	Compressed air, can be operated with oil-free air
Operating pressure:	max. 6 bar
Clamping torque:	at 5 bar M_b = approx. 400 Nm
Clamping/Weld load:	at 5 bar F = approx. 1,8 kN; at 6 bar F = approx. 2,1 kN
Clamp opening angle:	45°
Setting angle, pivot equaliser:	+3°
Water cooling:	cooled
Rate of flow:	4 l/min
Cap version:	F16x20 (Tünkers works standard)
Electrode shaft version:	D28 (Tünkers works standard)
Connection to basic clamp:	G1/4“
Pivot bracket connection:	G1/8“
Power supply connection:	M12
Weight:	approx. 3 kg, varies according to version

Subject to technical modifications.

Resistance Tack Weld Clamp RTW 63.1





Resistance tack weld clamp
- For use in pairs for volume production welding operations
- For welding in bonding applications in body framework construction
- Due to the use of 10 kHz technology, welding operations are possible in viewpoint quality
- Welding directly on the folding bed is possible

Ordering example:

RTW 63.1 A100 T12 75° 423051

- 423051 → TÜNKERS Article Number
- 75° → Opening angle
- T12 → Position sensing system
- A100 → Electrode throat clearance
- 63.1 → Piston dia., Version
- RTW → Type

Order code TÜNKERS position sensing systems:
...T12 24 V inductive position sensing, 1 output with integral LEDs

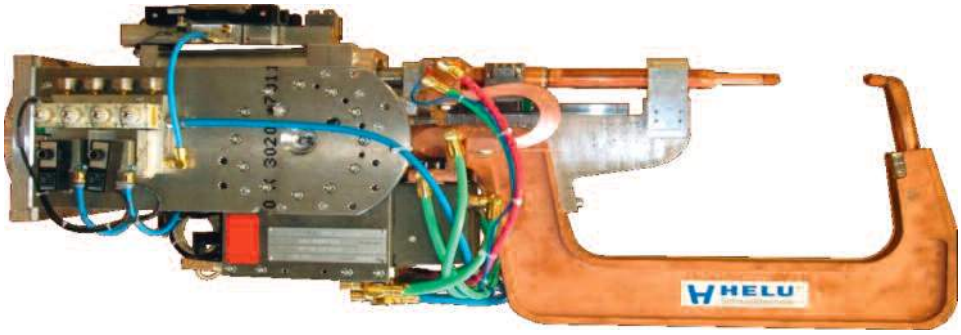
Technical Data:

Clamping torque:	at 5 bar M_b = 400 Nm
Clamping/Weld load:	at 5 bar F = approx. 3 kN
	at 3 bar F = approx. 1,2 kN
Clamp opening angle:	75° (at A100 approx. 8 mm)
Pivot equalising angle:	± 5°
Weight:	approx. 25 kg
	varies according to version

Subject to technical modifications.

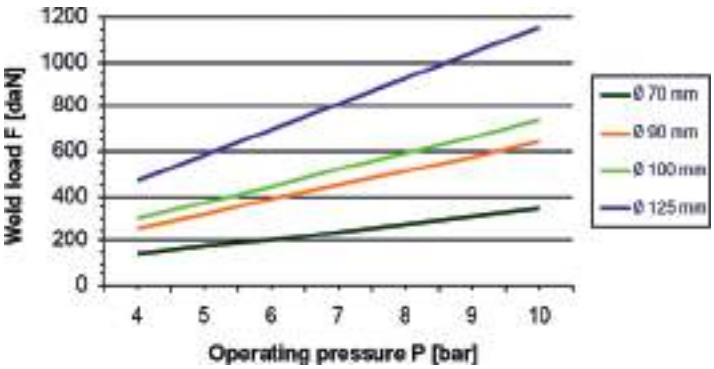
HELU Robot Weld Gun – C-Type

– Pneumatic or servo-electric
– AC or MF-DC transformers
– Pneumatic clamp equalisation
– Aluminum or copper fittings

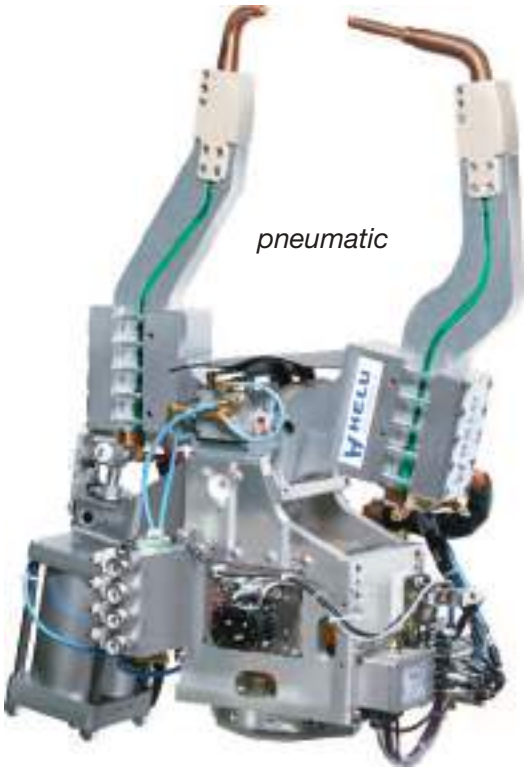


Technical Data

– Arm mounting:	dia. 45 mm or dia. 50 mm
– Throat clearance:	max. 650 mm
– Width:	max. 500 mm (larger clamping aperture [throat clearance x width] on request)
– Pitch, 40 mm dia. electrode arm:	75 mm
– Pitch, 50 mm dia. electrode arm:	90 mm
– Type of power source:	Pneumatic Servo-pneumatic (max. operating pressure 10 bar) Servo-electric
– 50 mm dia. equaliser:	max. 20 mm programming distance
– Transformer in safety cage	



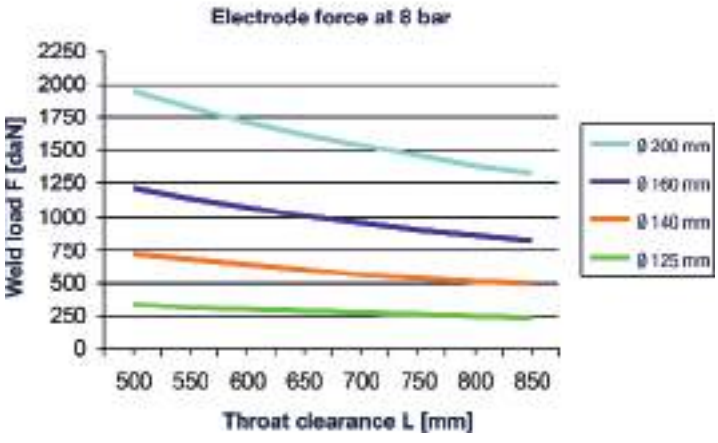
– Pneumatic or servo-electric
– AC or MF-DC transformers
– Pneumatic clamp equalisation
– Aluminum or copper fittings



Technical Data

– Arm mounting:	40 mm dia. to 60 mm dia. 40 mm x 90/100 mm, 50 mm x 100/120 mm
– Throat clearance:	max. 950 mm
– Clear width, above:	100 mm to 220 mm
– Clear width, below:	100 mm to 370 mm
– Type of power source:	Pneumatic (max. operating pressure 10 bar)
– Equaliser:	2 x 50 mm dia., can be rotated 180°
– Servo-motor:	F_{max} = 150 daN Stroke 150 mm

– Transformer can be mounted transversely or upright
– Secondary connection, left or right

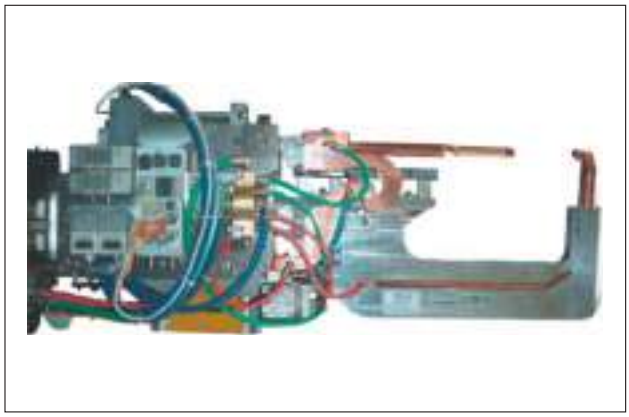


WELDING

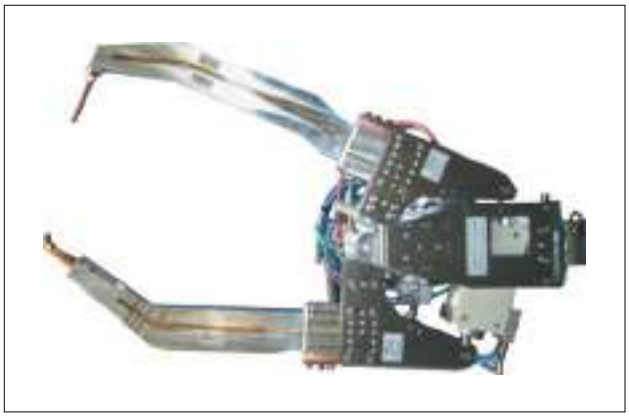
OEM-Standard Weld Guns

– Compatible with OEM standard
– X- or C-Type
– ISO or medium-frequency transformer
– Servo-electric, pneumatic or servo-pneumatic

VW

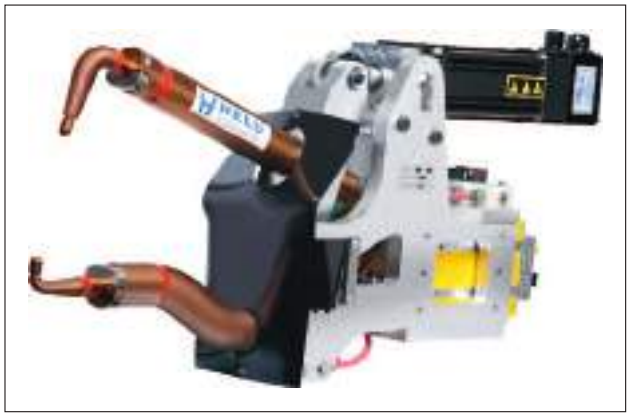


C 8000

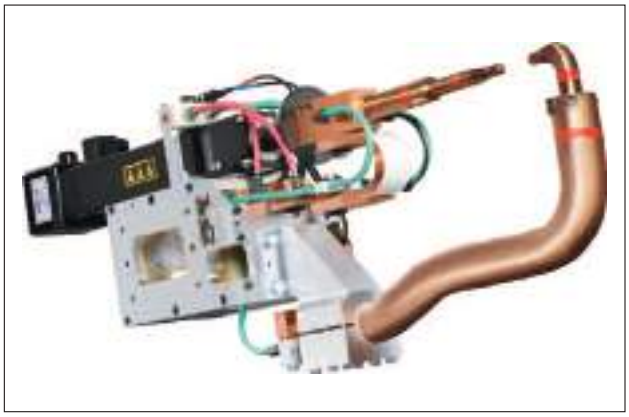


X 100

Opel

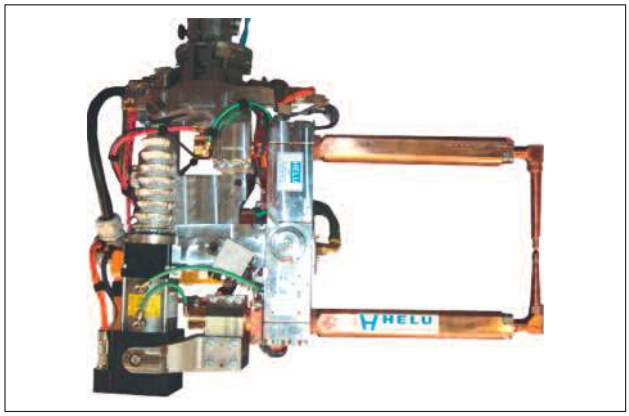


Global Gun Generation 3 (X-Type)

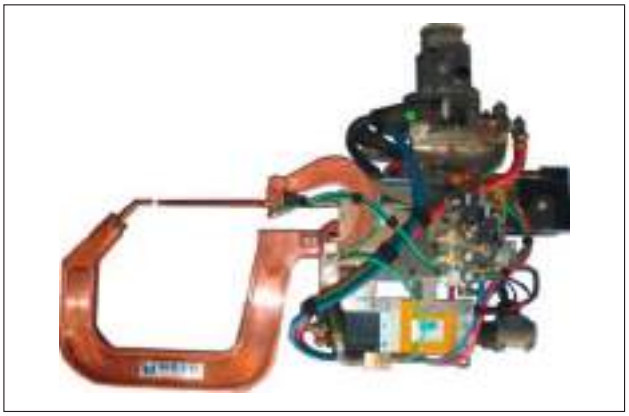


Global Gun Generation 3 (C-Type)

Daimler



X 50



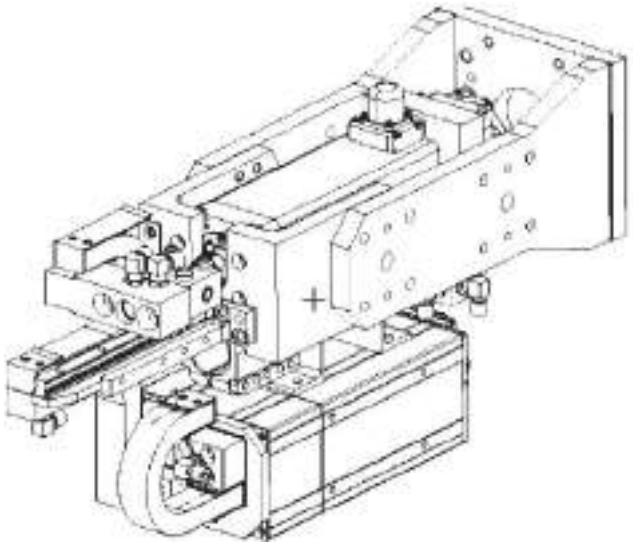
C 45

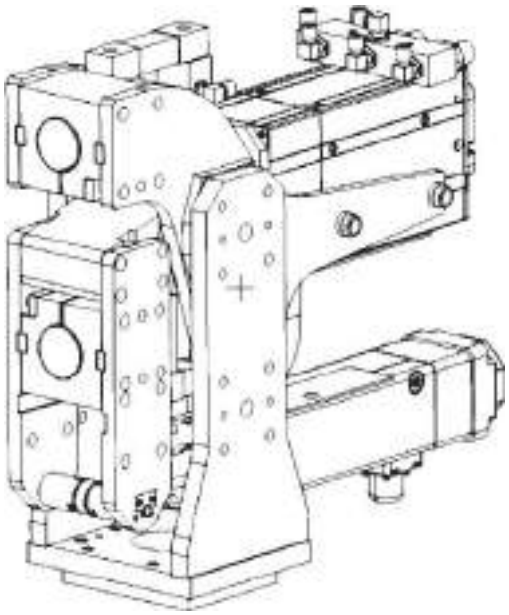
– Pneumatic or servo-electric
– MF-DC transformer
– Aluminum or copper fittings

– C- or X-Type
– Robot or manual gun

C-Type

X-Type





Technical Data

– F_{max}:	5000 N
– Arm fitting:	D45
– Pitch:	75 mm
– Servo-motor:	GSWA33-N05
– Transformer:	MF100
– Weight excl. fitting:	approx. 50 kg

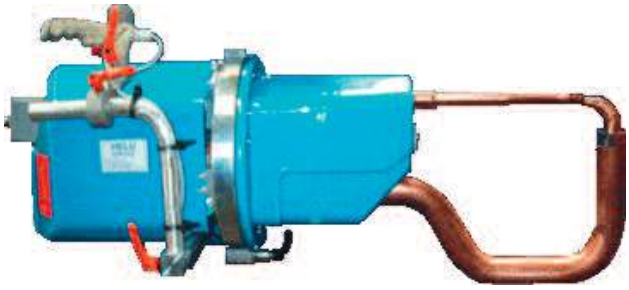
Technical Data

– L = 250 mm / aperture: approx. 86 mm / F_{max} = 5,000 N
– L = 300 mm / aperture: approx. 103 mm / F_{max} = 5,000 N
– L = 350 mm / aperture: approx. 120 mm / F_{max} = 5,000 N
– L = 400 mm / aperture: approx. 137 mm / F_{max} = 5,000 N
– L = 450 mm / aperture: approx. 154 mm / F_{max} = 5,000 N
– L = 500 mm / aperture: approx. 171 mm / F_{max} = 4,500 N

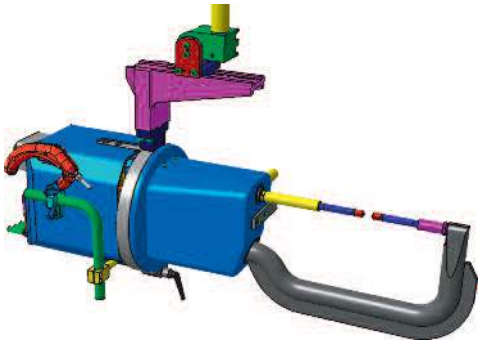
– Arm fitting:	D50
– Pitch:	100/100 mm; 100/160 mm
– Servo-motor:	GSWA33-N04
– Transformer:	MF100
– Weight excl. fitting:	approx. 58 kg

Manual Weld Guns – C-Type

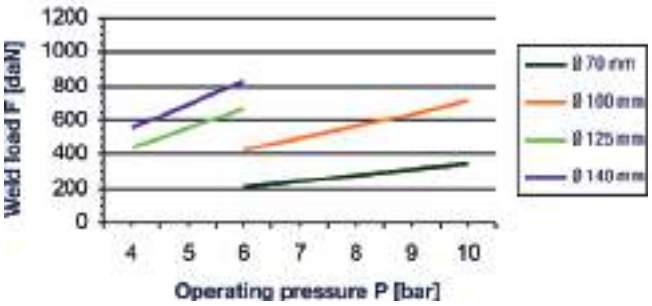
– Pneumatic
– AC or MF-DC transformers
– Aluminum or copper fittings
– Optional HD (heavy-duty) version

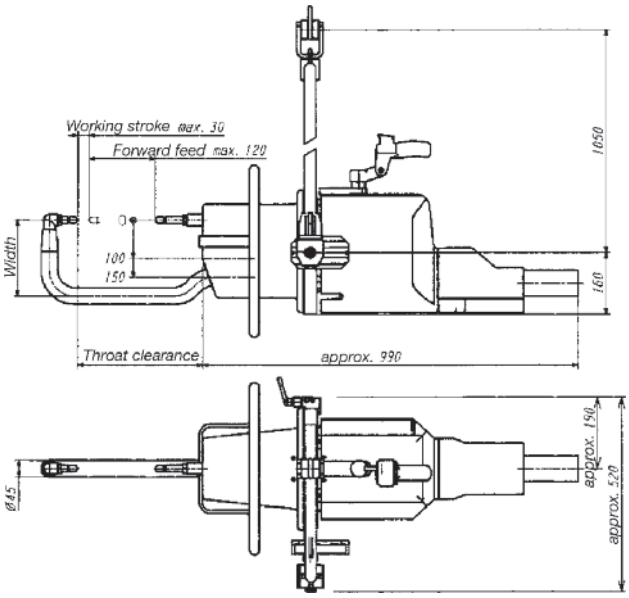


Standard transformer manual weld guns



HD transformer weld guns





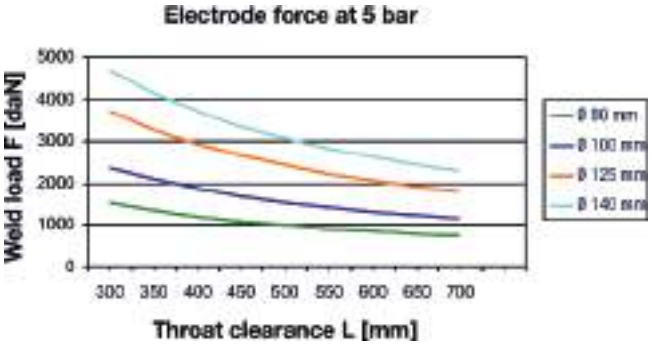
Technical Data

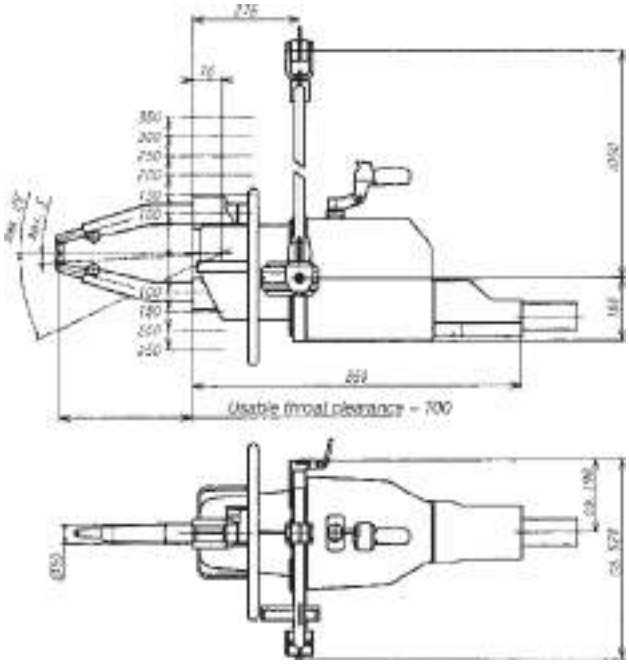
– Arm fitting: 45 mm dia.
– Throat clearance: max. 600 mm
– Width: max. 500 mm
– Pitch: 100 mm or 150 mm
– Type of power source: Pneumatic
– P_{max} = 10 bar (for 70 mm dia. cylinder + 100 mm dia.)
– P_{max} = 6 bar (for 125 mm dia. cylinder + 140 mm dia.)
– Limit stops for pivoting area (optional)

– Pneumatic
– AC or MF-DC transformers
– Aluminum or copper fittings
– Optional HD (heavy-duty) version

Standard transformer manual weld guns

HD transformer weld guns





Technical Data

– Scissor-action pliers
– Arm mounting: 45 mm dia. or 50 mm dia.
– Throat clearance: max. 700 mm
– Pitch, above 100 mm to 350 mm
– Pitch, below 100 mm to 250 mm
– Type of power source: Pneumatic
– P_{max} = 6 bar (for 125 mm dia. cylinder + 140 mm dia.)
– P_{max} = 10 bar (for 80 mm dia. cylinder + 100 mm dia.)
– Limit stops for pivoting area (optional)

Special Weld Guns

Tunnel weld gun (GM - Opel)

Roll seam weld gun (AEG)

Dual weld gun (Benteler - Mini)

Special weld gun (AEG)

– With structural modifications, standard products can be prepared and used for the widest variety of applications, with no adverse effects on reliability and weld quality.

– Based on the welding task, the optimum solution can be devised.

– Compact configuration
– Available with AC or MF-DC transformers
– A wide variety of design options, based on the TÜNKERS modular system

Single C-frame weld unit

Dual C-frame weld unit

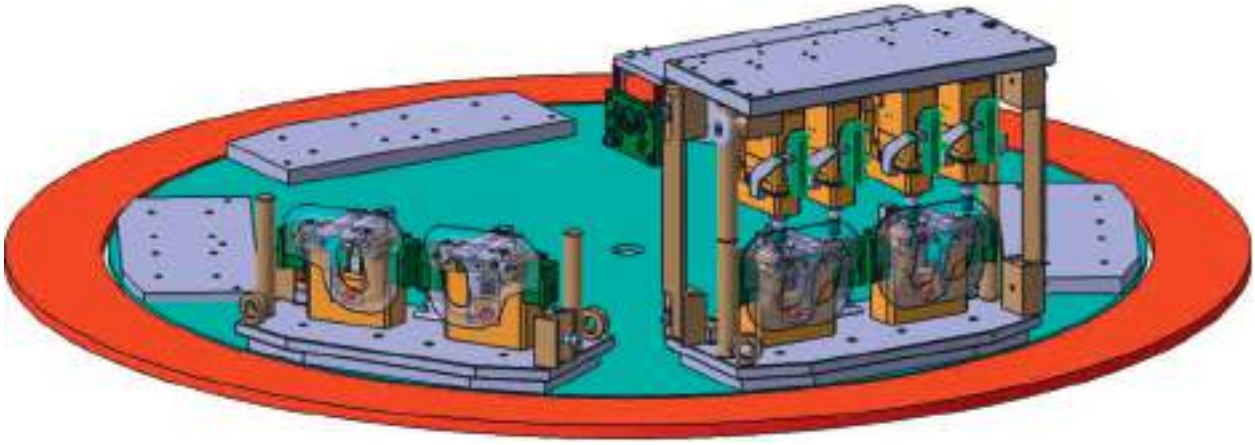
Technical Data

– Solely pneumatic type of power source, with TÜNKERS Multi-Force Cylinder (also servo-electric on request)
– Weld load up to 40 kN
– MF-DC transformer (also AC on request)
– Cooling water circuits via distributors with individually-controllable float-type flow meters
– Individually adjustable working height
– Also suitable for multiple welding tasks due to the narrow configuration
– Process monitoring by means of a position sensing system
– Automatic infeed system can be used, to client's specification
– Short maintenance periods due to good accessibility to parts subject to wear (open configuration)
– Media deactivation via HIP

Active Press-Welder Fixtures

– Active press-welder fixtures are used for stationary or rotary table applications during spot welding or projection welding.
– Different welding operations in cascade sequence are possible in one stroke of the machine.

Active press-welder fixtures



Technical Data

– Active welding elements 25 mm dia. to 50 mm dia.
– Type of power source: oil or water-hydraulic at up to 150 bar operating pressure
– Tool size dependent on the number of welding positions
– Pneumatic ejectors
– Process monitoring via position sensing system
– Version as single-stroke or cascade tool
– Rapid tool changeover due to fast media coupling

DOSING

Dosieren

Dosing

TÜNKERS®
Ingenuity in series.

Dosing

In recent years, the dosing of adhesives, sealing compounds, filling materials or even grease has gained increasing significance.

Not only in automobile manufacture but also in machinery and plant construction, dosing systems are always facing new challenges.

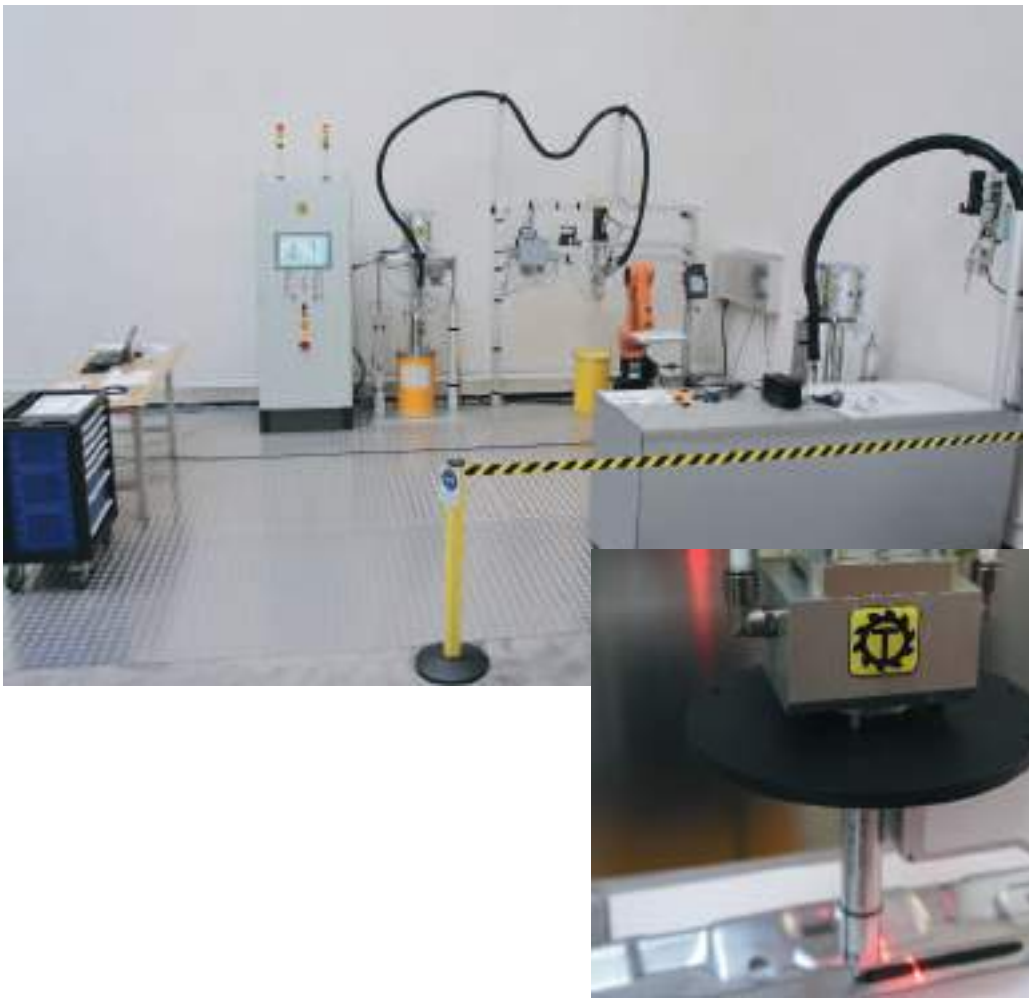
When dosing such materials onto the widest variety of components, the following parameters are of prime importance: **precision, speed1 of application and accuracy of repetition.**

However, the **ease of maintenance and repair** of dosing systems are equally essential requirements. For this reason, in developing our TÜNKERS Dosing Systems we have paid particular attention to these factors.

With our product portfolio, we cover a very wide range of the dosing applications that the market demands.

The product portfolio described here can be adapted to satisfy your requirements. The TÜNKERS Team will be pleased to respond to your new challenges.

Contact: www.tuenkers-nickel.de and info@tuenkers-nickel.de



Doser

Sizes: 10, 80 and 150

The seal package and the quides of the TÜNKERS-doser are mounted together as one block. Therefore the complete block can be taken out very easy and uncomplicate in the case of maintenance.

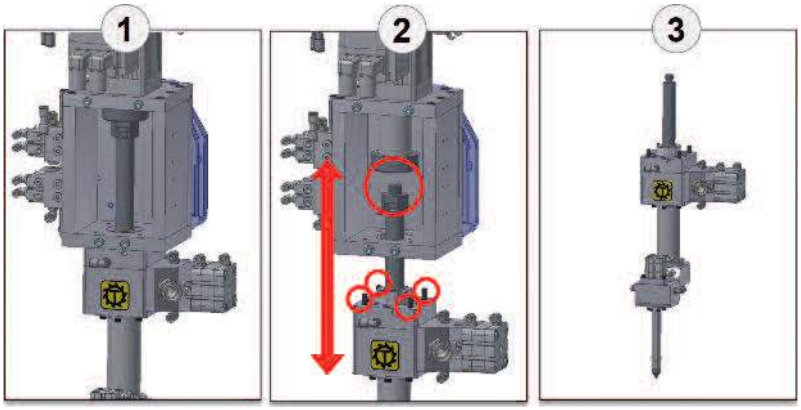
Based on the FIFO concept, the TÜNKERS doser is designed according to a compact and module way of construction. The maintenance-friendly design of the doser allows uncomplicated and structured workflows.

As well the TCP does not change when the dosing chamber is changed toanother standard volume-size. Furthermore there are special dosers for 300 ccm as well as a compact application head for mounting on robots with ~10 kg payload.

Cost reduction due to the interchangeability concept:

With only 5 screws the material-carrying part of the doser can be dismounted from its fixture. Changing the doser in case of a maintenance therefore can be done very fast and without a cran, because the carrying plates, the motor and the electronic parts will stay in the manufacturing station.

This concept leads to a significant cost reduction because in total less spare parts are needed to kept on stock.

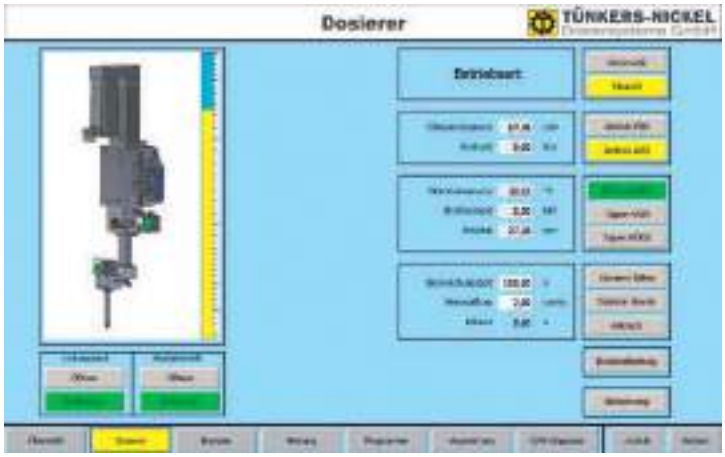


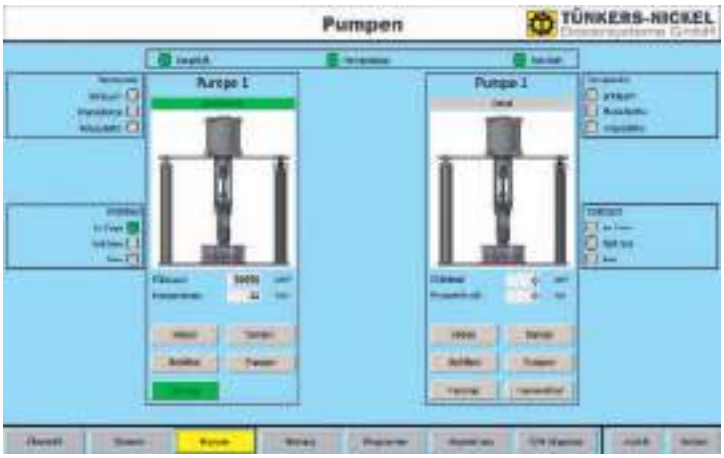
The TÜNKERS dosing controller is designed in a very compact way, but still able to be adapted to individual needs. The controller rack itself needs very little floor space. All connectors are located on the backside of the controller. The socket of the rack has a separate drawer. In this drawer all pneumatic components are mounted very neatly. All the processes itself are controlled by a Siemens SIMOTION.

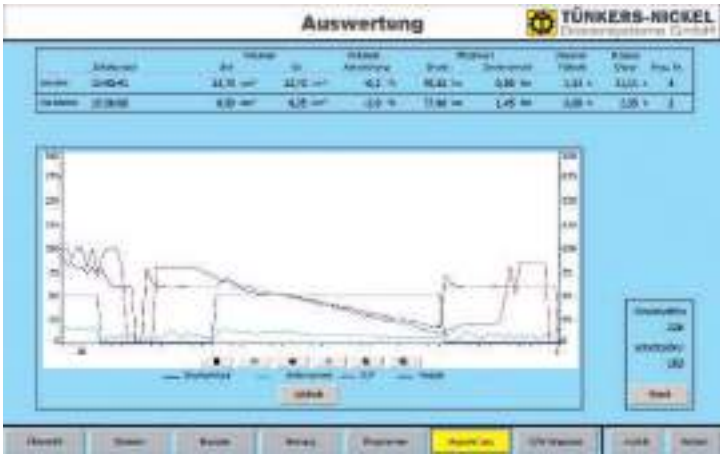
This platform was enhanced together with the support of SIEMENS to run as well the complete dosing process on it.

Furthermore still the PLC-functions are available. Therefore this concepts allows customized adaptations, even afterwards at the customer. At the touchpanel monitor differnet user levels can be settled up.

Control/Display Unit







The TÜNKERS barrel pump stations are designed in a very modular way to allow a maintenance-friendly usage as well. There is a robust displacement encoder mounted on the cylinder to get a permanent reliable signal about the filling level of the barrel.

The TÜNKERS piston pump is very robust, durable and easy to dismount. The seal package of the piston pump itself is easily to replace as well. The straight and cylindrical design allows a very close and therefore energy-efficient fixing of the heating sleeve on the pump.

Sizes:
30, 50 and 200 litres

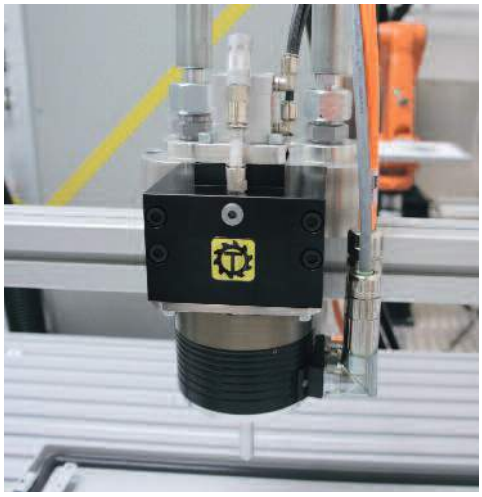
Pump stand with FW01
drum changing system

Applicator Heads

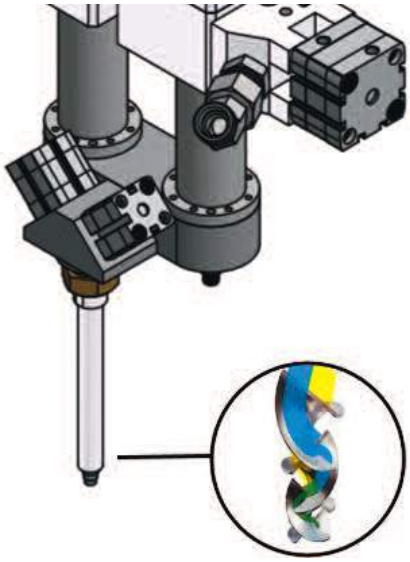
With TÜNKERS dosing systems several different application methods are possible.

Next to the 1-component dosing heads, like for example the adjustable, electrical swirl head for very accurate application pictures, there are 2-components heads available.

The 2-components heads can be choosen between static and dynamic mixing heads.

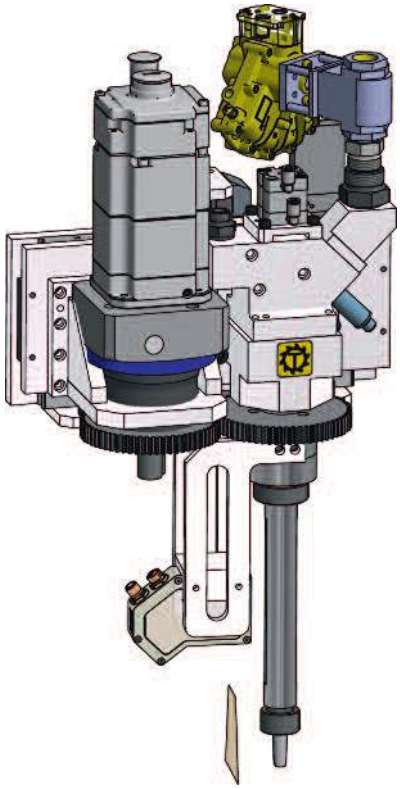


2K Dynamic Mixer



2K Static Mixer

eSwirl Applicator Head



Windscreen bonding (7th axis)

All-electric Dosing System

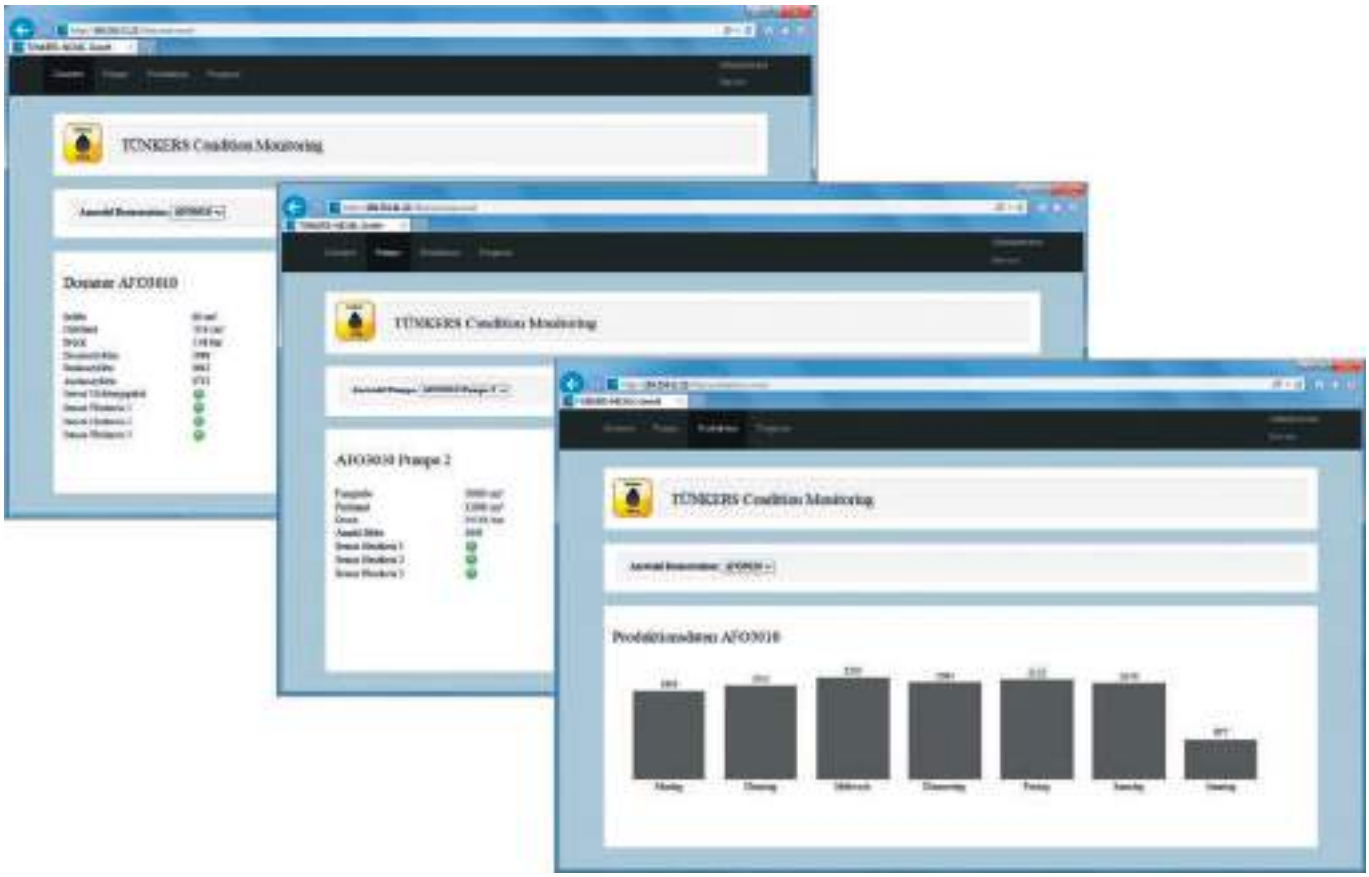
TÜNKERS-NICKEL has developed the worldwide first fully electrical dosing system that reaches the same price level as a pneumatic dosing system. Above that the fully electrical dosing system saves costs during operation due to that there is no air consumption by cylinders.

Furthermore the barrel changing process can partly be automized due to the usage of electical components. This automatization helps to prevent potential accident risks for the operator.

TÜNKERS Condition Monitoring

Based on the concept of Industry 4.0 the TÜNKERS-dosing contoller has been enhanced with a webserver functionality. Depending on different user levels, several process and sensor datas can be collected via the network by a central software. With these datas a complex picture of the performance in production can be created.

Especially in combination with the TÜNKERS leckage sensor a upcomming maintenance case can be predicted in a very early stage.



Configure your own flexible dosing system

The 4 modules (barrel pump station, system/dosing controller, doser and handling unit) of the TÜNKERS ApplicationMaster allow for a very flexible and easy way of building up a dosing workstation. The modules themselves are freely configurable and can be changed by the customer in line with new tasks.

Collaborative Version

Classic Version

ROTATING

TÜNKERS®
Ingenuity in series.

Rotating

Rotating is an established process used in automated production lines. To be exact, it involves incremental rotating and positioning in manufacturing installations. Typical applications include feeding in workpieces by means of a 180° movement and circular indexing table, whereby work sequences are arranged in circular form. High acceleration and braking functions are also requirements of rotary tables, as the precise positioning for the operating positions and the dwell period. The product range offered by EXPERT-TÜNKERS and SOPAP includes standard rotary tables with performance figures up to 150,000 Nm at dimensions of up to 10 metres diameter. All the systems features maximum accuracy of processing and are therefore suitable for use in high volume series production plants.

ROTATING

Rotary Index Tables

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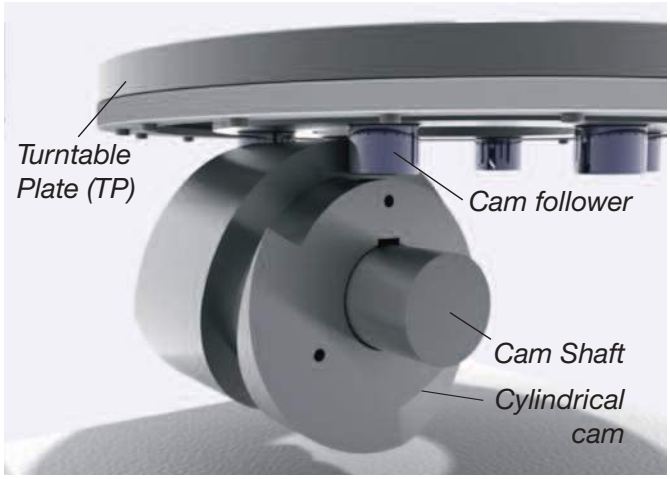
Ingenuity in series.

Rotary Index Tables



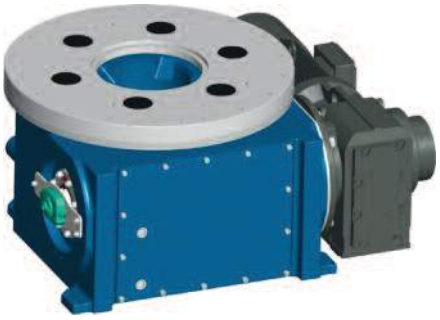
Rotary index tables are circular indexing drive mechanisms in which the torque generated by the geared motor is transferred to the turntable plate via an index cam, using cam follower.

Features of this type of construction include the transfer of extremely high power combined with compact dimensions.

The optimum meshing between the cam and cam follower ensures a nearly zero-backlash positioning of the rotary table.

The EDX Series of rotary tables incorporate indexing drive mechanisms for rotary movements with more stringent demands in terms of precision and repetitive accuracy. The complete motion profile, with acceleration, decleration and output angle, is achieved by means of an individually-manufactured index cam. For this reason, efficient conventional AC drive mechanisms with constant rotational speed can be used as the power source.

The EDX Series of rotary tables are not only suitable for conventional use as rotary tables but also as trunnion drive units with a horizontal axis of rotation.



Minimum free play in the operating position due to the cam drive principle

A characteristic of EDX Series rotary tables is the fact that the dial plate is continuously driven by two cam followers. In addition, this double meshing of the roller pins ensures virtually zero-backlash locking of the turntable plate in the operating position. Alternatively, this can be achieved by widening the zero position.

SMARTTURN: rotary position sensor instead of mechanical switchgear

As an option, the current generation of fixed-position rotary tables can be equipped with the specially-developed TÜNKERS 'SmartTurn' control unit. This compact control unit with suitable inductive rotary position sensor replaces the previous electromechanical switchgear.

This combination of modern control unit and the proven precision of the EDX Series results in a reliable and future-proof product for a wide range of applications:

– Self-learning system

– Commissioning via the first motion cycle

– No readjustment required

– Monitoring of the braking distance and wear

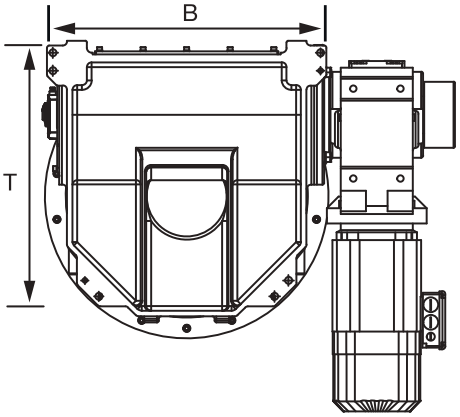
– Warning signal to replace brake discs and safety cut-off

Standard stops

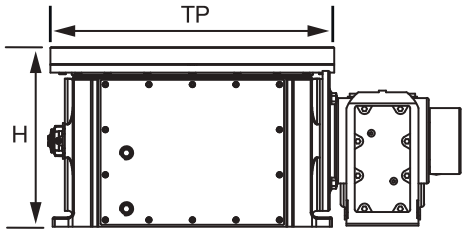
The indexing positions of the rotary table are defined in the motion profile specified in the indexing cam. Most common, partitions are 2-stop = 180°, 3-stop = 120° and 4-stop = 90°.

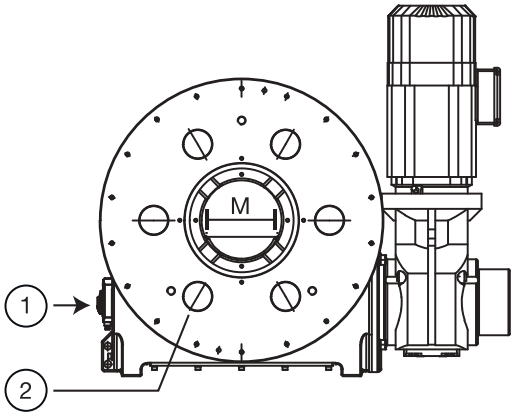
Individual solutions are available on request.

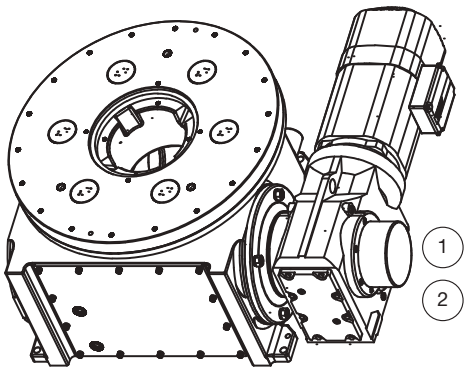
Fixed-position Rotary Tables – EDX Series



- Precision indexing drive with fixed position and energy-efficient 3-phase AC geared motor
- Smooth and impact-free motion sequence due to specific law of motion on the cylindrical index cam
- Low backlash, positive lock position without any additional locking devices in the operating position
- Optimised power transmission and emergency stop safety due to multiple cam follower principle
- Can be used as table and trunnion drive unit







1 Standard SMART-TURN control unit

2 Position of the cam follower in the basic setting

Type	TP Turntable plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
EDX 610	360	80	250	378	416	180
EDX 700	450	100	310	508	466	230
EDX 810	560	150	360	620	564	380
EDX 960	710	200	450	700	650	720
EDX 1170	920	280	550	890	895	1375
EDX 1370	1120	380	620	1090	1085	2150
EDX 1600	1350	464	720	1300	1315	3750

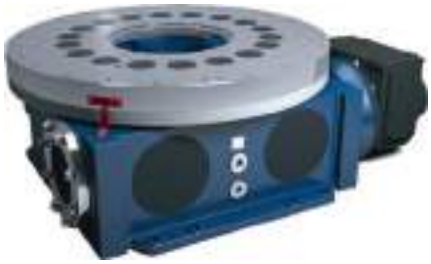
Subject to technical modifications.

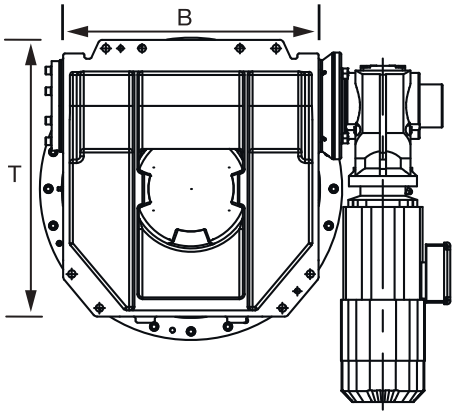
In addition to fixed-position rotary table, flexible rotary tables are equipped with an index cam with a constant pitch: resulting in an unchanged reduction ratio between the motor and the turntable plate. The partition is exclusively determined by the correspondence control unit of the servomotor.

The flexible rotary tables can be adapted to almost any load by individual programming. In this case, the flexible servo geared motor not only enables the free setting of the output angle, but also an optimized acceleration response for the particular load.

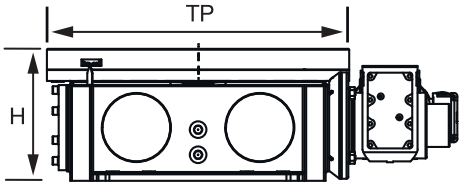
Being flexible in use, the rotary tables of this type are particularly suitable for drive tasks in which the movement sequence has to be adpated in production process, for example by new loads, new positions/end positions or travel directions. A typical example is the production of different vehicles on a production line, which makes flexible modification necessary in the prodction cycle.

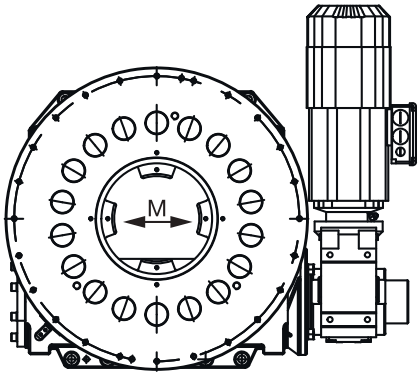
Flexible Rotary Tables – EDH Series

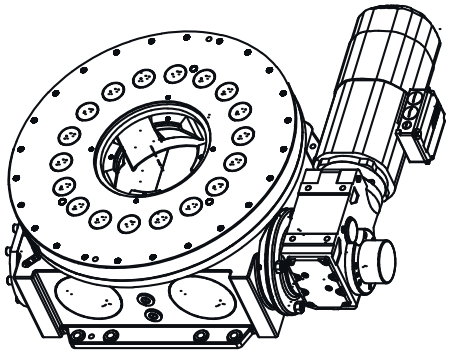




- High performance indexing power unit with flexible positioning and individually programmable servo-motor
- Smooth and impact-free motion sequence due to the special motion profile of the servo-motor
- Optimised power transmission and emergency safety stop due to multiple cam follower principle
- Compact design with high performance
- Can be used as table and trunnion drive unit

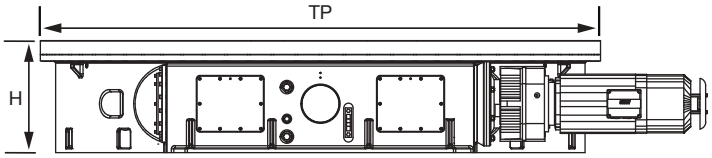




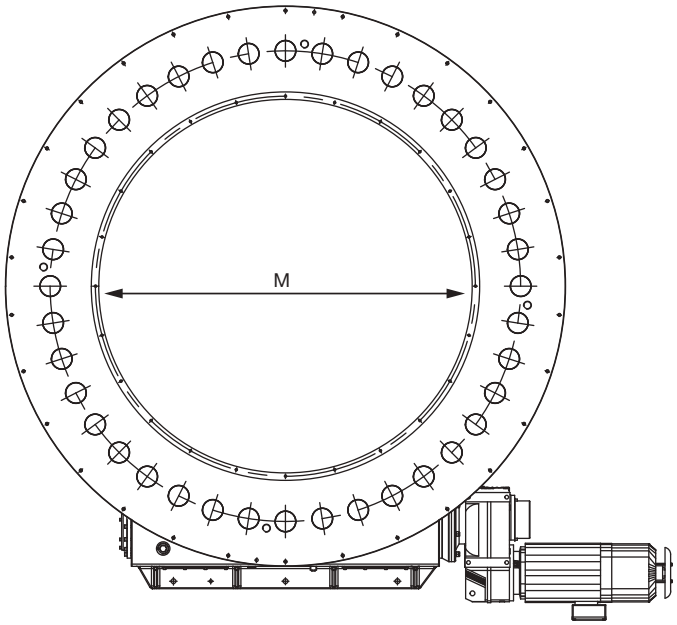


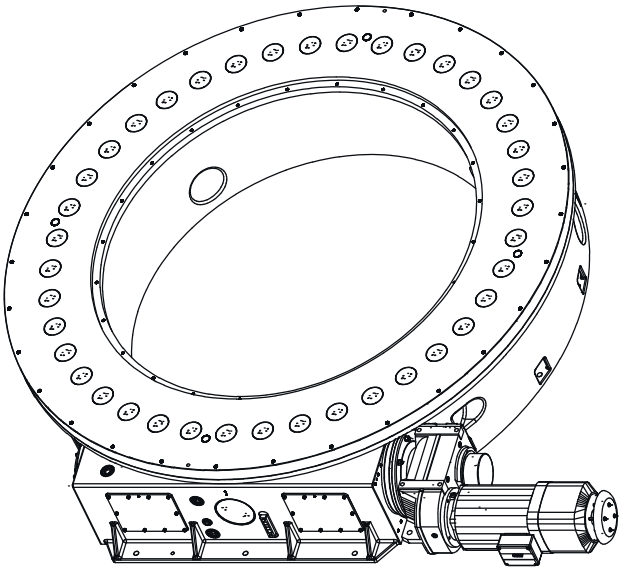
Type	TP Turntable plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Number of cam followers	Weight without motor (kg)
EDH 610	360	80	190	300	347	12	110
EDH 700	450	90	240	380	435	16	200
EDH 810	560	140	280	480	535	16	320
EDH 960	710	200	310	600	650	18	500
EDH 1170	920	300	360	800	870	20	700
EDH 1370	1120	380	420	1000	1065	20	1550
EDH 1600	1350	500	480	1220	1320	20	2350

Subject to technical modifications.



- Heavy-duty rotary table with flexible positioning and individually programmable servo-motor
- Smooth and impact-free motion sequence due to the special motion profile of the servo-motor
- Optimised power transmission and emergency safety stop due to multiple cam follower principle
- Flat ring construction with large center passage





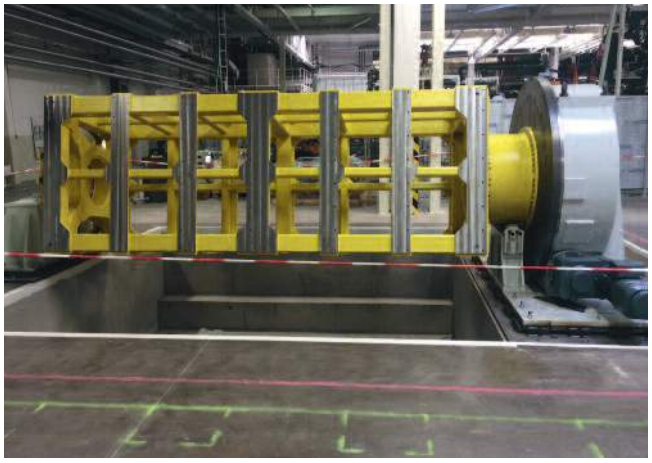
Type	Turntable plate outside dia. (mm)	Turntable plate inside dia. (mm)	H Overall height (mm)	Number of cam followers	Weight (kg)
EDH 2050	1800	900	480	30	3100
EDH 2550	2300	1300	450	48	4000
EDH 3250	3000	1700	600	40	6800

Subject to technical modifications.

Typical applications

EXPERT Heavy-duty Rotary Lifting Unit, 4-stop positioning

EXPERT Rotary Table, 2-stop positioning



EXPERT Heavy-duty Trunnion, during installation (for 4 tools)

EXPERT Trunnion Drive Unit, 4-stop positioning

EXPERT Trunnion Drive Unit with maintenance looking divice

EXPERT Giant Trunnion with EDH 2550, 6-stop positioning

ROTATING

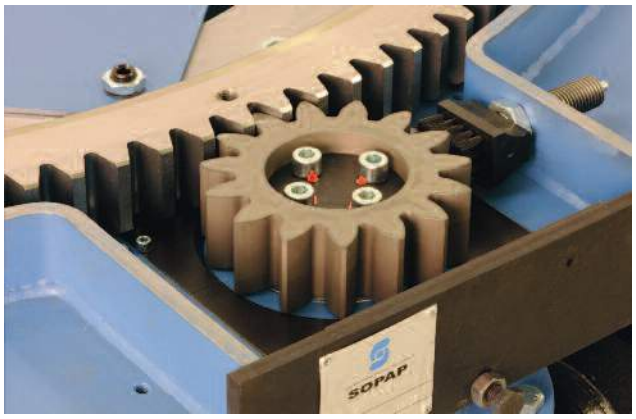
Simplex Rotary Tables

TÜNKERS®
Ingenuity in series.

Simplex Rotary Tables

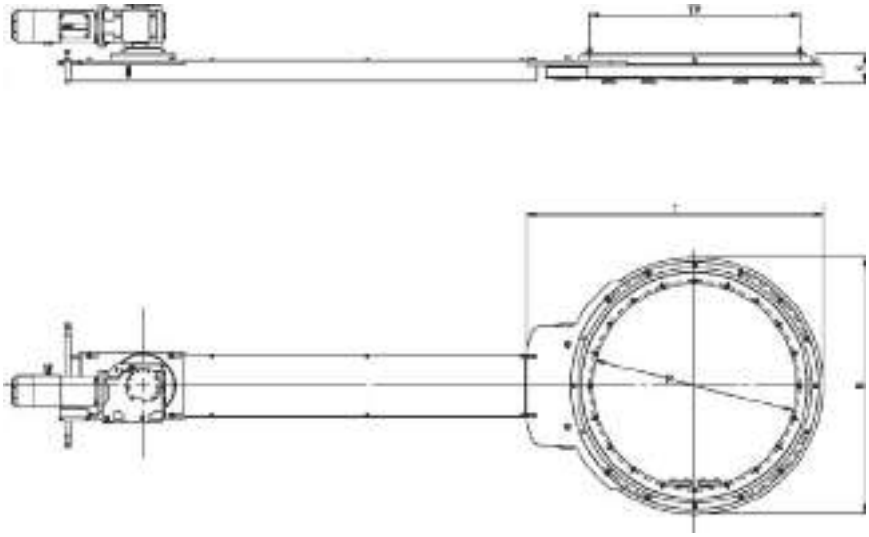
Simplex means ‘simple’ and that term accurately describes this series of rotary tables, constructed using a smaller number of basic components. The rotary motion from the geared motor is transmitted to the dial plate by means of a sprocket wheel or a toothed belt. This configuration is a simplified form of precision power unit and, in turn, an inexpensive system, also equipped with a position release unit.

Example: TXE Rotary Table with rack-and-pinion drive

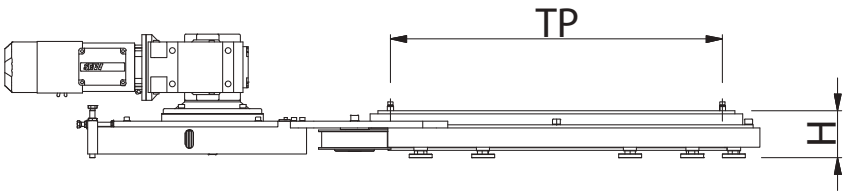


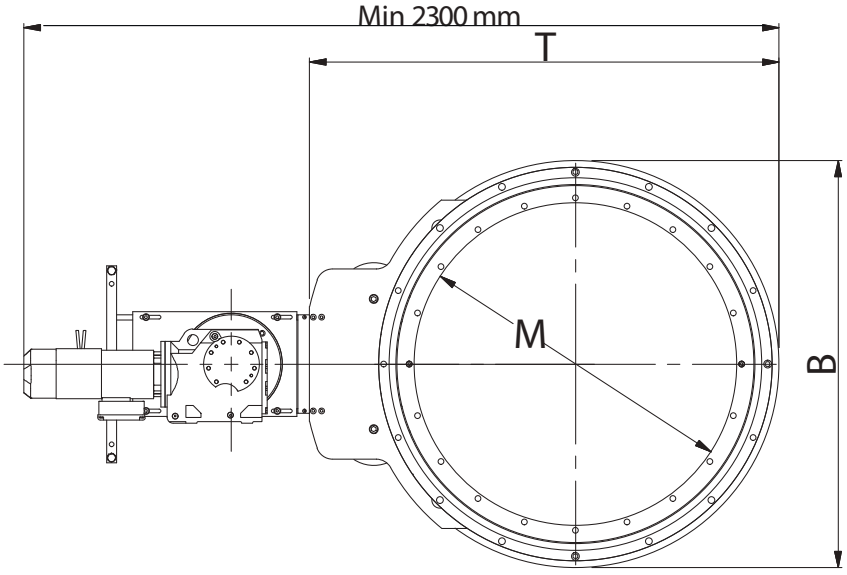
Detail of the drive unit

Due to the simple structure and the optional components, this system is particularly suitable for logistical tasks, such as use with bin changeover systems or fixture stations.



- Rotary table with toothed belt drive
- Drive reversible through 270°
- Exceptionally low-profile configuration
- Optional precision release unit
- Motor can be mounted externally
- Rugged drive unit
- Low-profile construction is ideally suited to bin changeover systems, for example

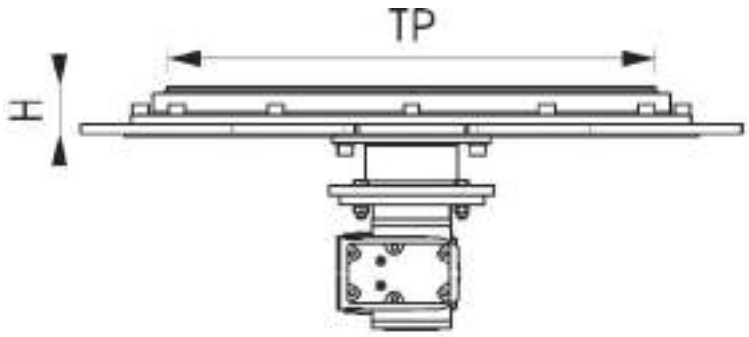




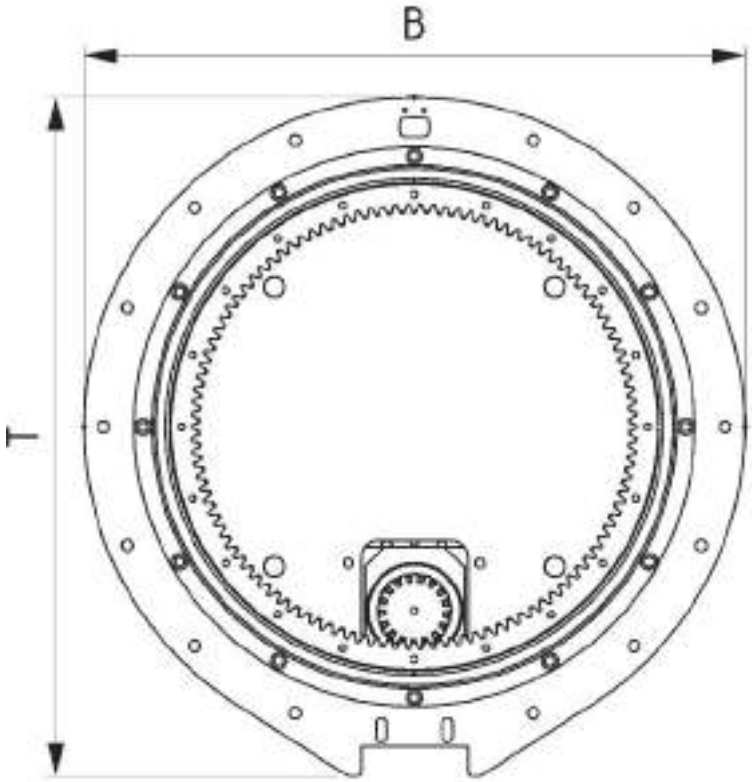
Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight without motor (kg)
TXR 400	332	304	140	560	750	120
TXR 750	662	634	140	890	1080	200
TXR 1100	1012	984	140	1240	1430	250

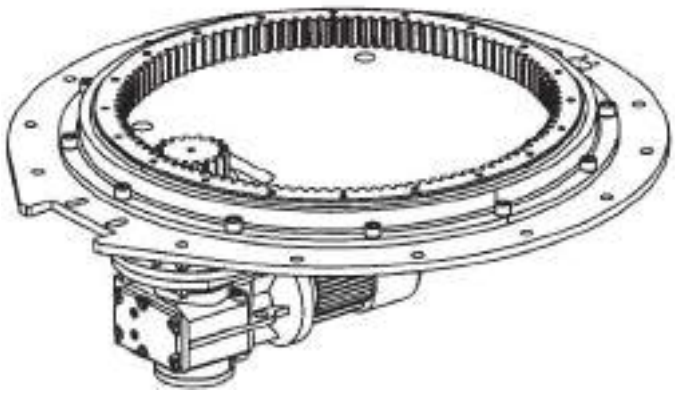
Subject to technical modifications.

Simplex Rotary Tables – TXE/TXI Series



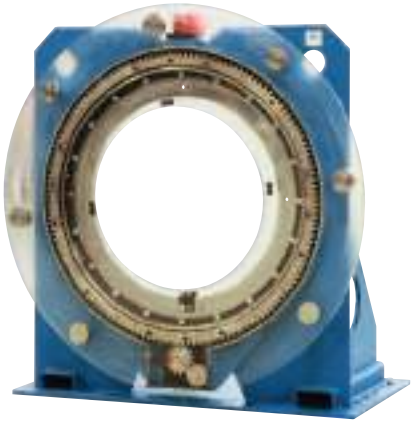
- Servo-Rotary Table, reduced to the basic essentials
- Robust cross roller bearings
- Powered by servo-motor and rack-and-pinion
- Simple robust configuration
- Low overall height
- Optional precision release unit
- E = externally-mounted motor
  I = internally-mounted motor
- Optional: basic frame, release unit, dial plate



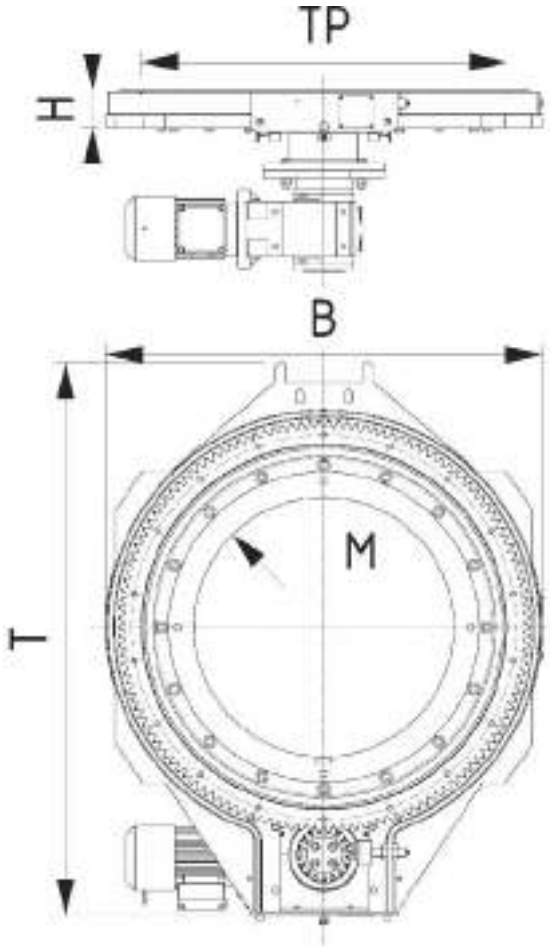


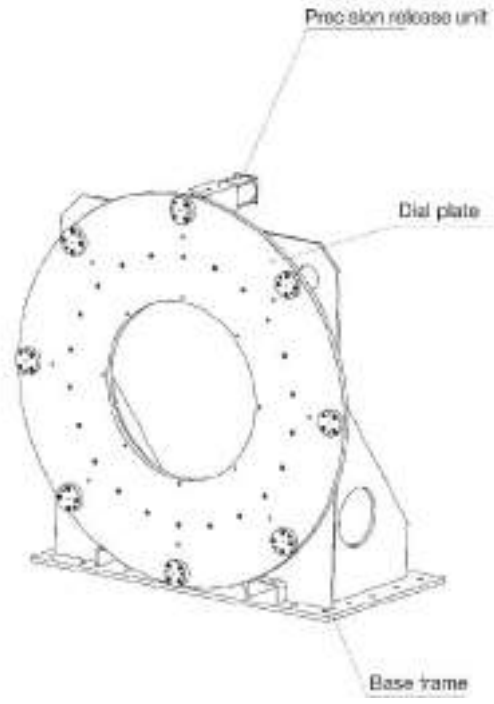
Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
TXI/TXE 400	412,5/415,5	nc/250	71/75,5	680/560	710/770	160/130
TXI/TXE 750	736,5/745,5	nc/530	71/75,5	1000/890	1030/1130	200/220
TXI/TXE 1100	1094/1095,5	nc/830	71/75,5	1400/1253	1430/1498,5	430/300

Subject to technical modifications.



- Servo-Rotary Table for trunnion drive
- Robust cross roller bearings
- Powered by servo-motor and rack-and-pinion
- Simple robust configuration
- Optional: basic frame, release unit, dial plate





Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
TXT 400	415,5	250	75,5	560	770	95
TXT 750	745,5	530	75,5	890	1130	155
TXT 1100	1095,5	830	75,5	1253	1498,5	235

Subject to technical modifications.

Typical applications

SOPAP TXE 750 – ultra-low profile rotary table for Topometric rotating/lifting unit, used in a fully-automated robot-controlled metrology cell (registered utility model by Topometric GmbH)

SOPAP Low-profile bin changeover system based on the TXR 1100, shown here for 2 bins

SOPAP TXE 1100 Tool unit in car body construction, flexible rotating fixture for tools

ROTATING

Compact Rotary Tables

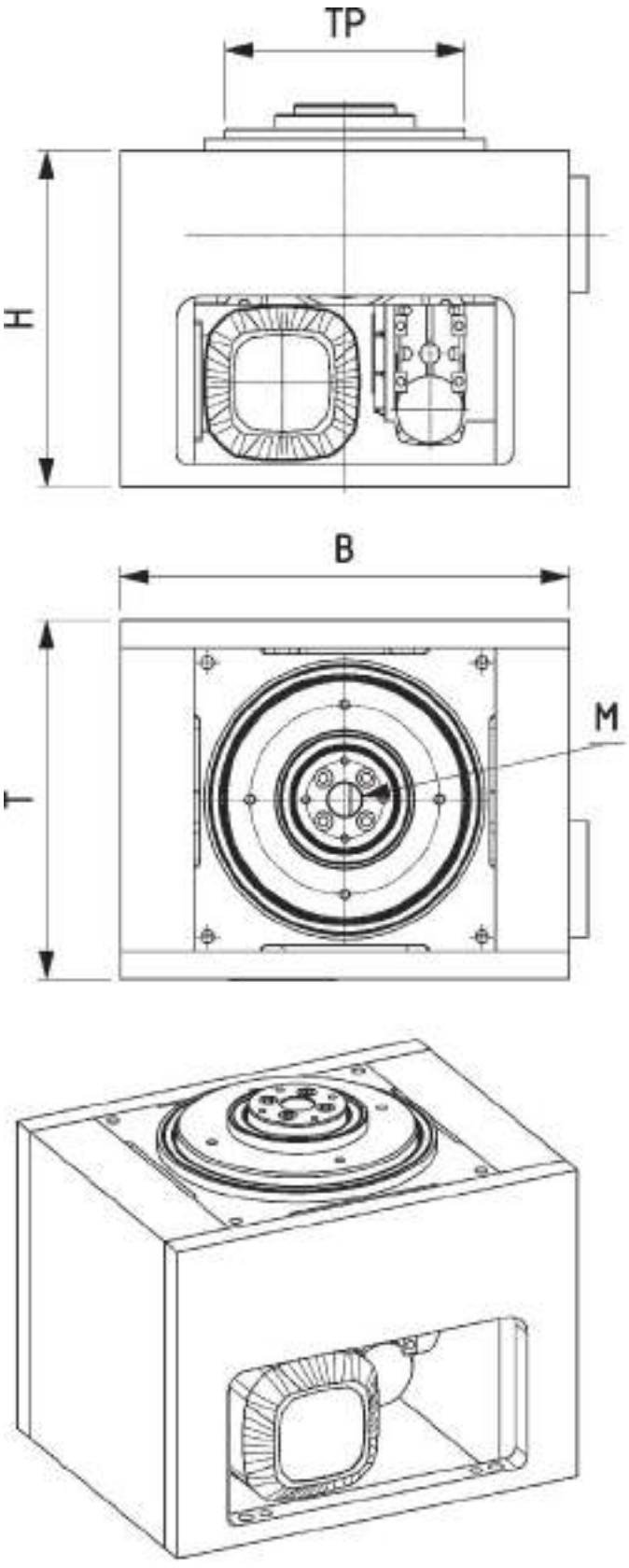
TÜNKERS®
Ingenuity in series.

Compact Rotary Tables

The principal characteristics of compact rotary tables are small size combined with precision. As with cam driven rotary tables, the torque generated by the attached geared motor is transmitted to the dial plate by means of roller and roll pin. Typical applications for compact rotary tables include installations in which high speed movement with precision in relatively confined areas are deciding factors. Examples include areas such as materials handling or medical technology, as well as the packaging industry. In addition to high performance, compact rotary tables are characterised by long service life and ease of maintenance.

Cube-type compact rotary table

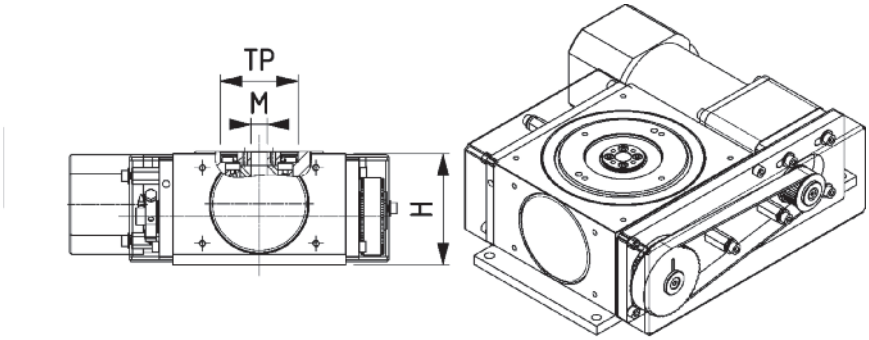
Cube-Rotary table
– Drive unit integral with housing for optimum, virtually cubic installation capacity
– Lower overall height
– Inductive position sensing cassette for end position feedback
– 25% more power torque due to optimised gear ratios
– Option: version with 24 V motor



Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
C 100	120	15H8	150	240	180	20
C 300	215	30H8	300	400	320	70
C 500	320	60H8	430	570	410	150

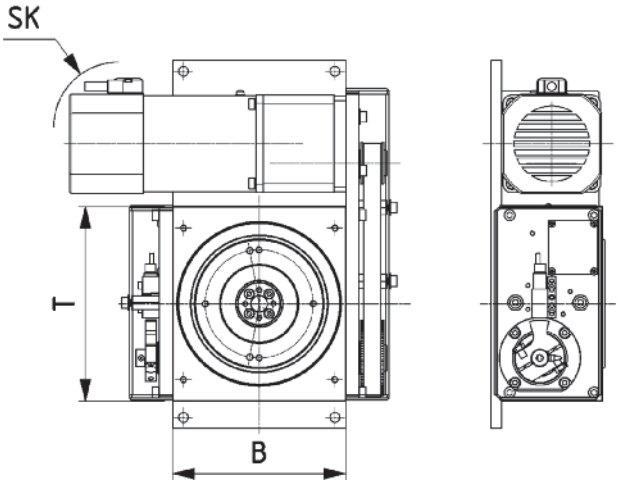
Subject to technical modifications.

TS Series 100



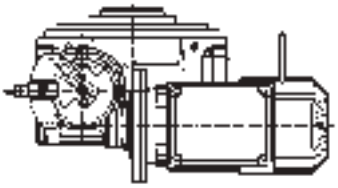
Compact rotary table

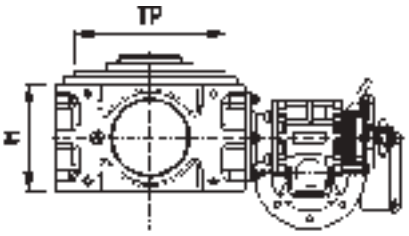
– Compact precision rotary table
– Fixed partitioning with dwell periods of 45°, 60°, 90° and 180°
– Pre-stressed precision cross roller bearings for high loadings and precise synchronisation
– High power density
– Multiple mounting variants
– Optional: Flex version with servo drive, 24 V version



Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
TS 100	120	15H8	103	160	180	20

Subject to technical modifications.





Compact rotary table

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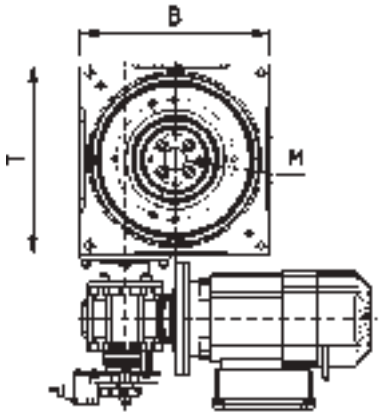
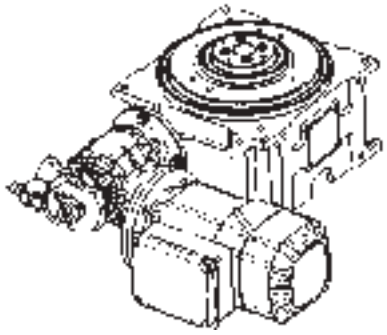
– Multiple mounting variants
– Optional: Flex-Version with servo drive



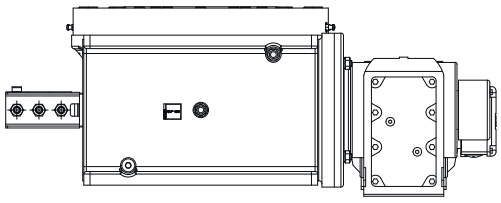


Type	TP Dial plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
TS 200	160	25H8	120	200	200	25
TS 300	215	30H8	150	270	270	50
TS 400	250	50H8	170	320	320	80
TS 500	320	60H8	230	410	410	125

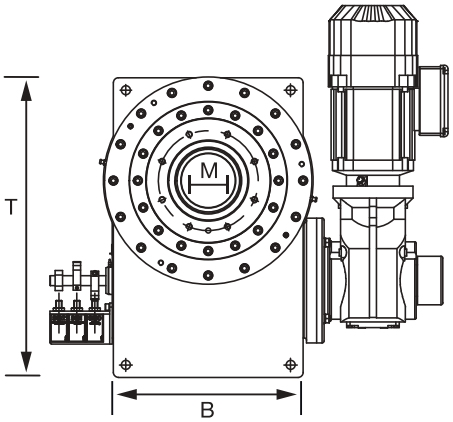
Subject to technical modifications.

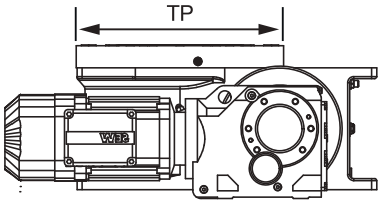
Typical applications

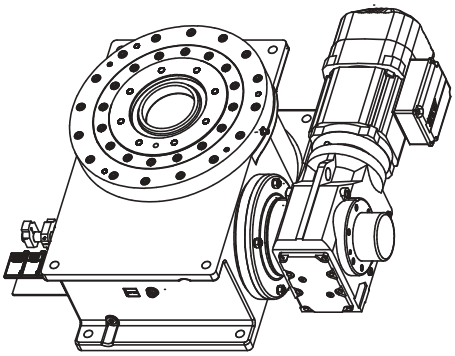
SOPAP TS 200 Illustration of TS Series in use, nailing machine for applications in the mechanical engineering industry



- Low backlash indexing drive unit with globoidal cam
- Hardened and ground precision components
- Quality bearings with high load capacities
- Low overall height







Type	TP Rotating Turntable plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
EGD 80	76	36	126	140	235	30
EGD 100	100	50	150	200	310	50
EGD 125	122	60	191	240	375	80
EGD 160	212	80	190	280	430	150
EGD 200	247	110	290	380	600	275
EGD 250	445	145	355	405	670	400

Subject to technical modifications.

Typical applications

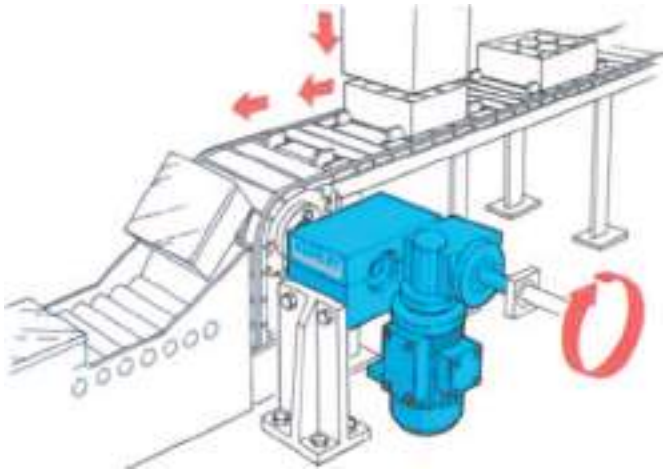
EXPERT 'Windmill' globoidal index drive with precision locking for floor clamping technology on transport tasks

ROTATING

Indexing Drive Units

TÜNKERS®
Ingenuity in series.

Indexing Drive Units

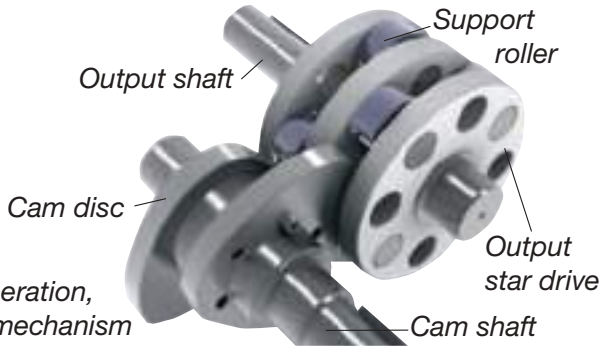


Typical application: parallel shaft index drive in a conveyor installation

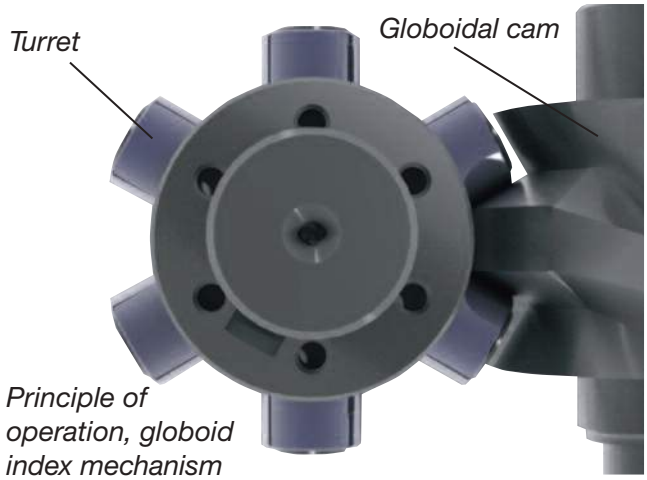
The core element of an indexing system is an indexing drive mechanism. In addition to all the indexing systems, Expert-Tünkers and SOPAP also supply index drive units as a component for customer to integrate in their plant systems.

Parallel Shaft mechanism

Implementation of the indexing mechanism by means of cam discs, which engages with the output flange via support rollers to produce the desire output. In the holding position; the dwell period, zero-backlash and positive-locking position of the output shaft is achived.



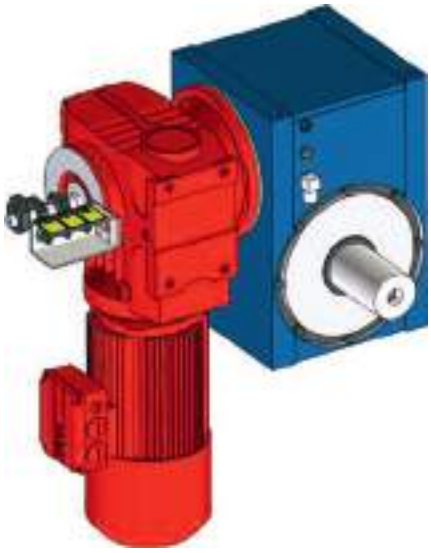
Principle of operation, parallel index mechanism

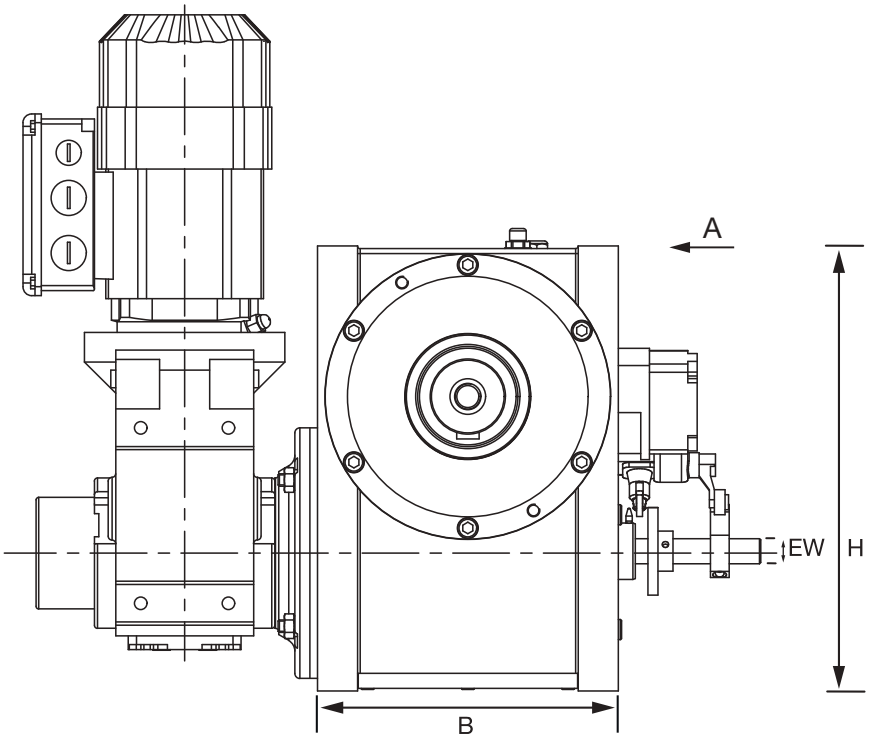


Principle of operation, globoid index mechanism

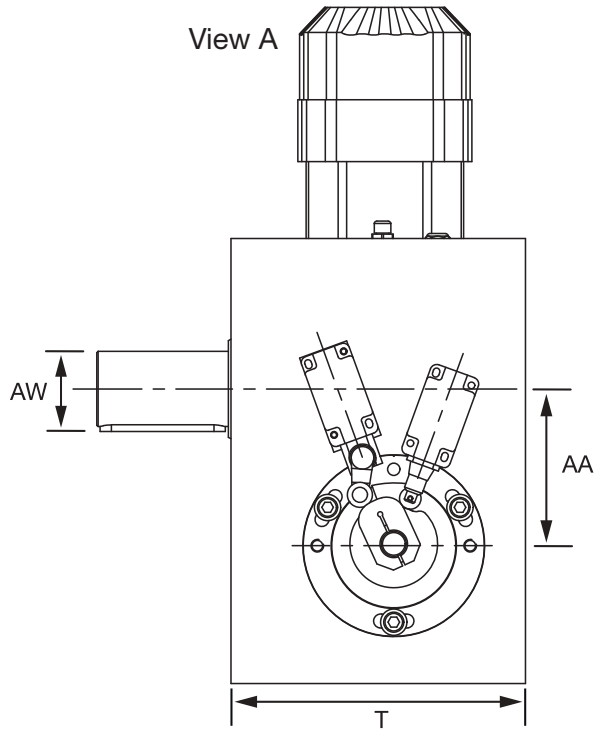
Globoidal Index Drive

Indexing motion obtained via a globoidal cam, which engages with a turret fitted in the support rollers. Vertical arrangement of the input and output shafts. Virtually zero-backlash mechanism due to eccentric mounting of the index cam. Globoidal index drives can also be supplied as rotary tables with dial plates.





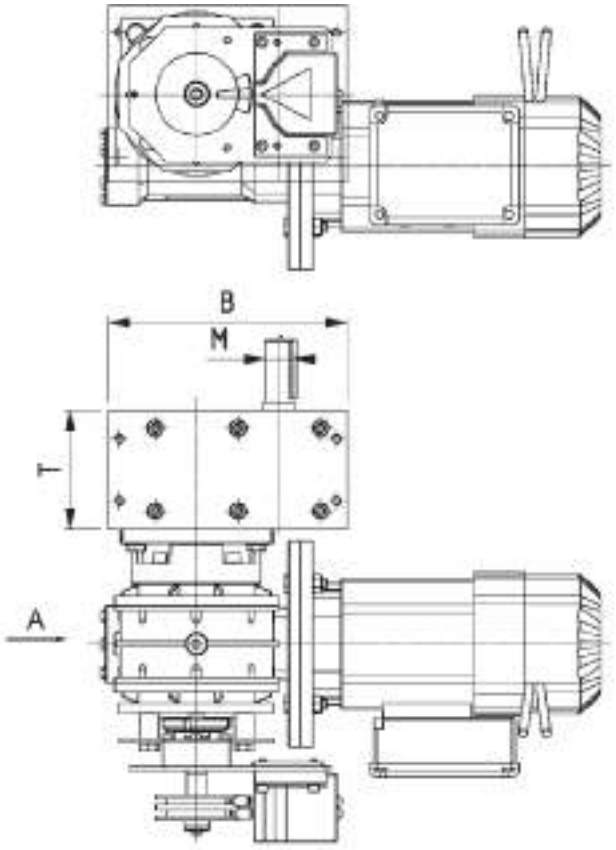
– Index drive unit with right-angled alignment of the input and output shaft
– Backlash mechanically reduced by eccentric mounting of the globoided cam
– Ideal for oscillating movements with maximum precision demand



Type	AA Shaft center distance (mm)	H Height (mm)	B Width (mm)	T Depth (mm)	EW Input shaft dia. (mm)	AW Output shaft dia. (mm)	Weight (kg)
EG 50	50	100	140	90	15	28	9
EG 63	63	130	180	120	25	45	14
EG 80	80	160	230	160	40	60	25
EG 100	100	185	280	180	40	65	38
EG 125	125	210	365	220	50	80	63
EG 160	160	270	450	290	50	100	110
EG 200	200	330	550	360	50	130	195
EG 250	250	390	720	500	60	140	385

Subject to technical modifications.

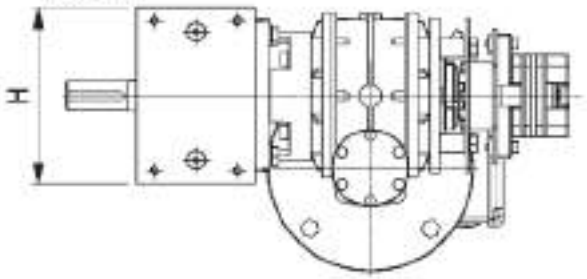
PA Series

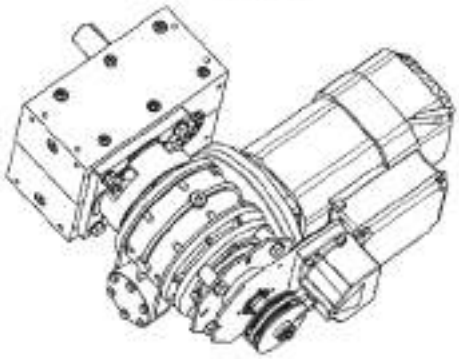


Parallel transmission

– Parallel shaft index drive
– Parallel arrangement of input and output shaft
– Zero backlash in the locking position
– Typical use: indexing conveyors with oscillating movements
– Optional: second output shaft
– Motor mounting on the same side as the output shaft

View A





Type	H Height (mm)	B Width (mm)	T Depth (mm)	M Output shaft dia. (mm)	Weight (kg)
PA 65	180	90	130	19	7
PA 80	230	115	170	28	15
PA 105	290	140	200	30	25
PA 130	360	170	250	42	52
PA 165	450	210	320	65	102
PA 200	540	240	390	80	172
PA 250	690	290	490	100	320
PA 315	870	390	630	125	570

Subject to technical modifications.

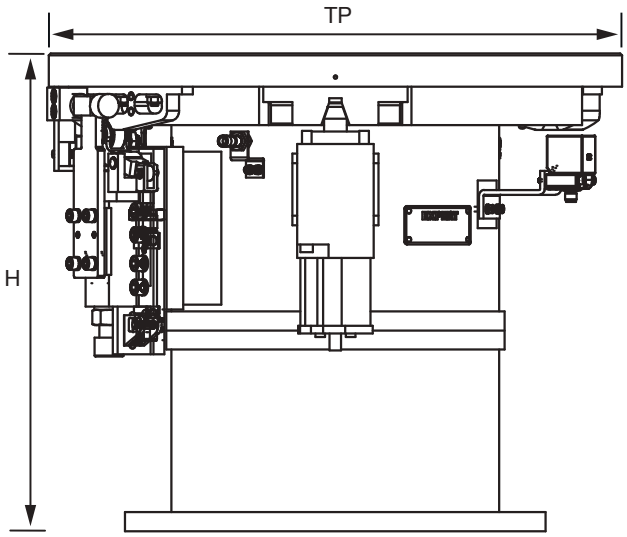
ROTATING

Manual Rotary Tables

TÜNKERS®
Ingenuity in series.

Manual Rotary Tables

Manual turntables are robust and mounted with cost-effective dial plates. The scope of supply is optional with manual jumper: brake activated by a foot switch, as well as end position switches. For simple applications with al low clock speed, these simplest roatating devices are recommended.



- Robust mounted dial plate, which can be used as a fixture for a manually operated device
- Pneumatic positioning
- Individual height
- Optional with positioning, footswitch activable break, as well as limit switch

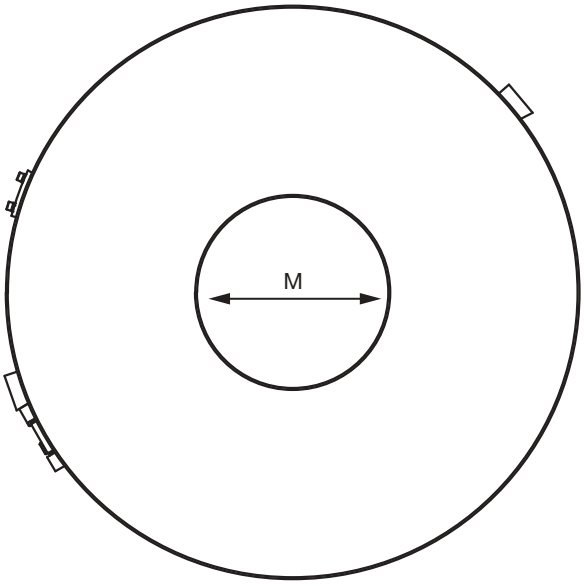


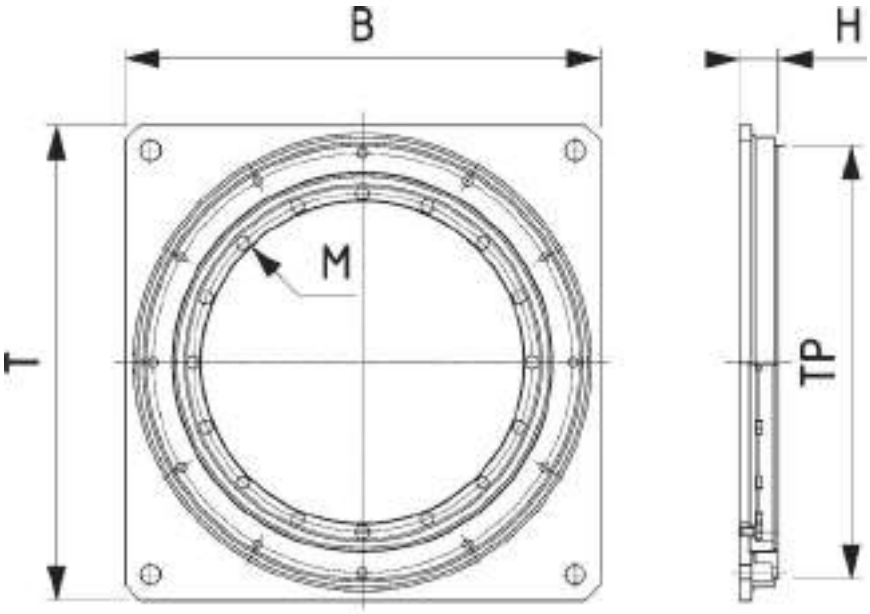
Illustration showing release unit and end position switch

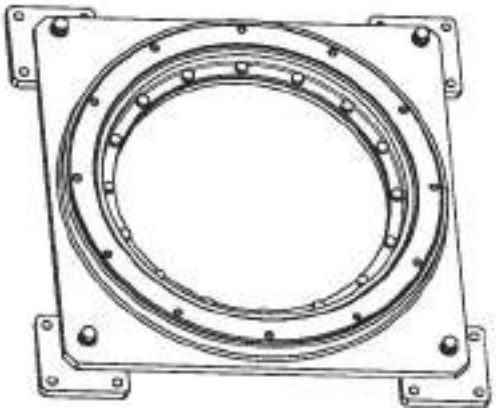
Type	TP turntable plate outside dia. (mm)	M Media access dia. (mm)	H Height (mm)	Weight (kg)
EDM 850	600	200	at least 500	170

Subject to technical modifications.

Manual Dial Plate – TXM

– Robust mounted dial plate
– Extremely flat design
– Modular extension: footrests, limit switches, crank handle, dial plate





Type	TP turntable plate dia. (mm)	M Media access dia. (mm)	H Overall height (mm)	B Housing width (mm)	T Housing depth (mm)	Weight (kg)
TXM 400	518	300	77	600	600	80
TXM 750	848	630	77	930	930	160
TXM 1100	1198	980	77	1280	1280	250

Subject to technical modifications.

CONVEYING

TÜNKERS®
Ingenuity in series.

Conveyor Technology – the main artery of automated body-in-white

A glance at a production layout reveals that the conveyor lines may be likened to the main arteries of the automation organism, beating in time with each robot cell.

Taking parts A to B – put simply, that is the task of a conveyor system. In the highly-automated car body production systems, conveyor systems are not only a connecting link, at the same time they are also intelligent buffering sections which decouple the individual processes and, in doing so, make them more flexible.

As ‘main artery’ in the chain of processes, conveyor technology assumes a high degree of responsibility in terms of availability. The malfunction of just one section will have an immediate effect on the total process. For this reason, robustness and a high level of availability are the primary criteria in determining the design of TÜNKERS conveyor technology.

The increasingly flexible nature of body-in-white represents new challenges for conveyor technology. The explosion in the multiplicity of components required for this purpose has also caused overloading of conveyor belt operations, resulting in competition for space. One of the solutions to this problem is the vertical chain conveyor, or paternoster, which makes use of height to buffer the components.

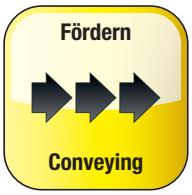
The APM ‘Dragon’ conveyor is beating a completely new path which, in conjunction with distributor stations, is equalising the entire logistical concept within the production lines by supplying via central workstations. To a certain extent, the TÜNKERS ‘Dragon’ conveyor embodies functions that, at present, can only be accomplished by complex electrically-operated overhead conveyors.

The current TÜNKERS product range can provide you with a technically tailor-made solution for virtually any conveyor application in body-in-white, as well as for the associated production lines, such as the power train and final assembly.

CONVEYING

Accumulating Conveyors

– AFS Accumulating Pallet Conveyors
– LFS Belt-driven Pallet Conveyors



TÜNKERS®
Ingenuity in series.

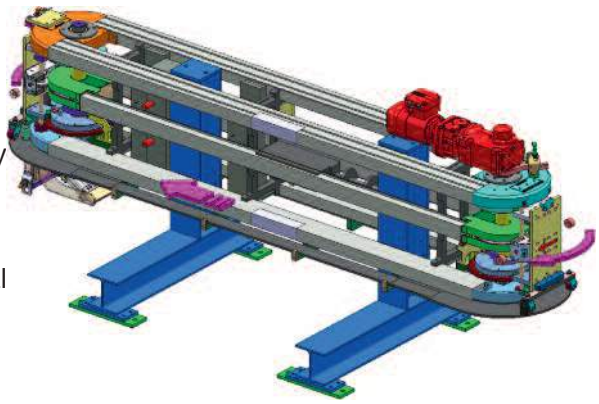
Accumulating Conveyors

Conveying lines with which the component pallet is uncoupled from the drive chain. Regardless of the loading cycle, components can be removed provided that the buffering section is full. From a technical standpoint, there is a difference between conventional chain-driven accumulating conveyors and belt-driven accumulating conveyors for lighter applications. A typical application is the interconnection of production cells.

AFS Accumulating Pallet Conveyors

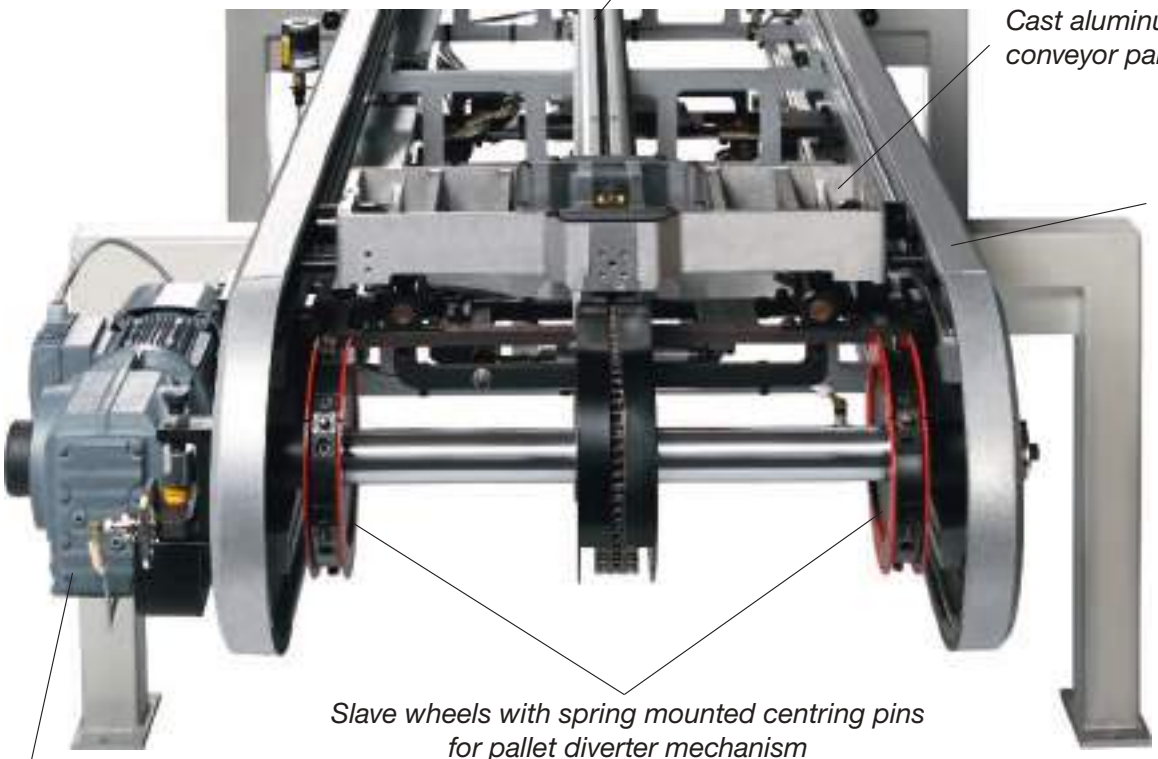
– Robust pallet conveyor with chain drive
– Max. pallet load (component + carrier) 130 kg
– Suitable for medium- to large-size components up to approx. 3,000 mm wide
– Option: Stop button in the diverter

AFS 90° Accumulating Pallet Conveyors



– 90° transverse conveyor for space-saving transport
– No protective housing required as pallets are only driven with function
– Stop button in the curve from 0 to 180°
– All-round pallet support in Z direction with additional guide rail

System configuration



Detail view of the geared motor with overload switch

– If the load torque is exceeded, due to a pallet crash for example, the drive mechanism is switched off.

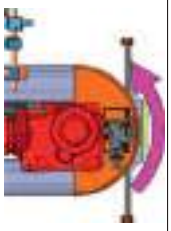
Motor running in torque support bearings with overload switch

Configuration of the conveying pallet

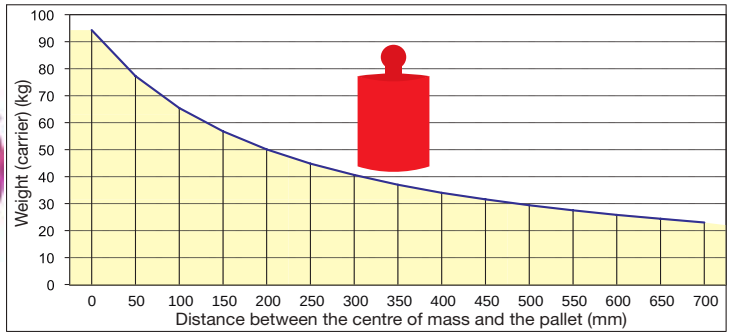
Plastic roller with concave running surface

Steel tube guide rail fitted into the profile

Accumulating Conveyors – AFS System

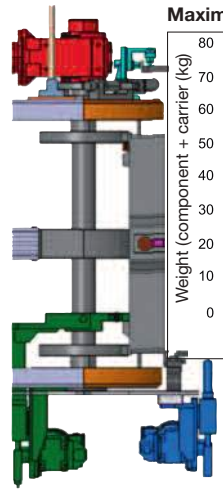


Maximum load of the component carrier as a function of the pallet spacing

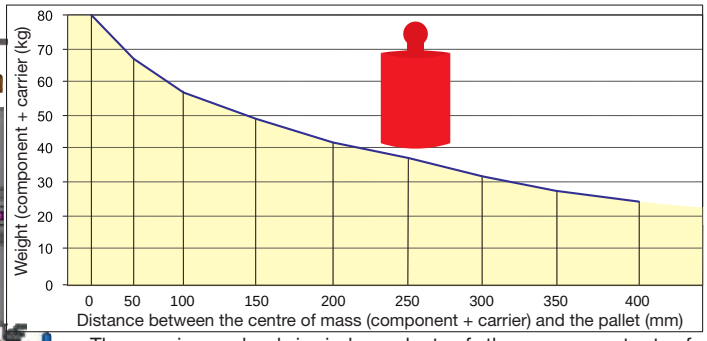


The maximum weight only relates to the component mounting

Accumulating Conveyors – AFS 90° System

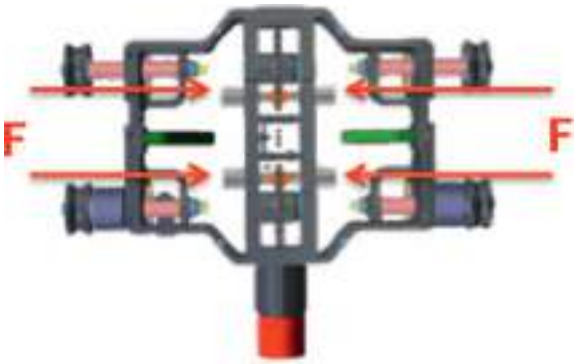


Maximum load as a function of the pallet spacing



The maximum load is independent of the power output of the motor. The maximum load is the sum of the component mounting and the component.

Structural Variants: DS Product Range



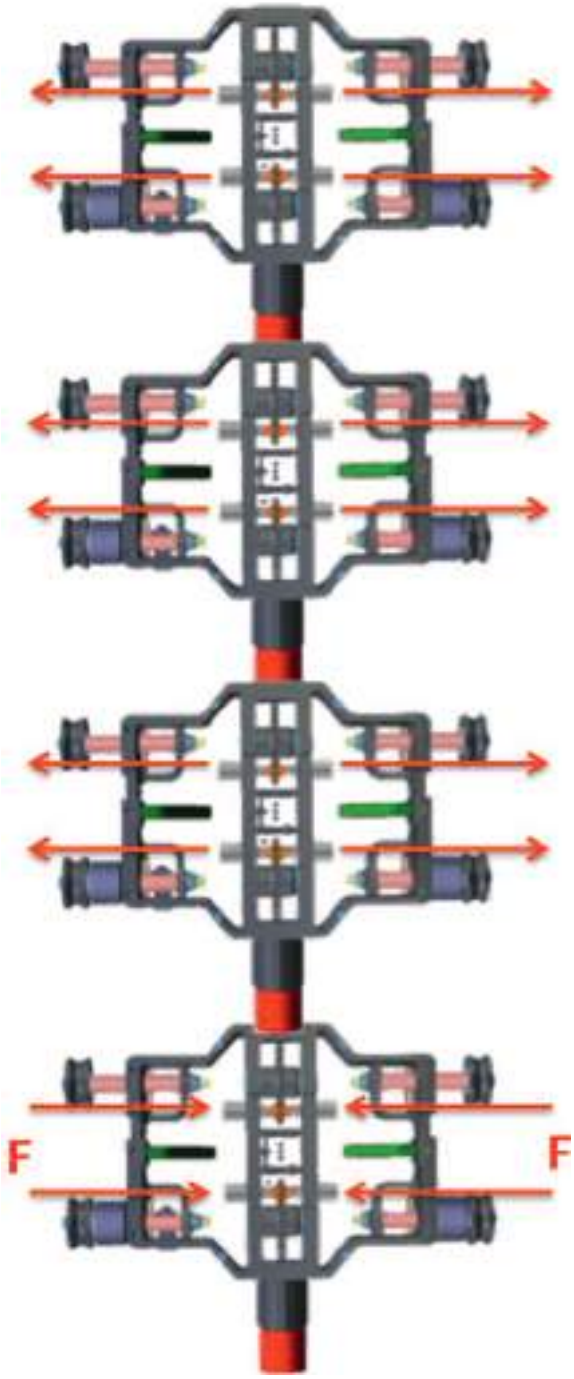
Sum of friction F: 42 N x 1
instead of 42 N x 5 = 210 N
as is the case with conventional systems

Pallet for the workpiece carrier, with which the friction generated by indexing toward the next pallet in the buffering section is decoupled.

The innovative integral coupling system reduces energy consumption as well as the wear on the friction elements.

Advantages:

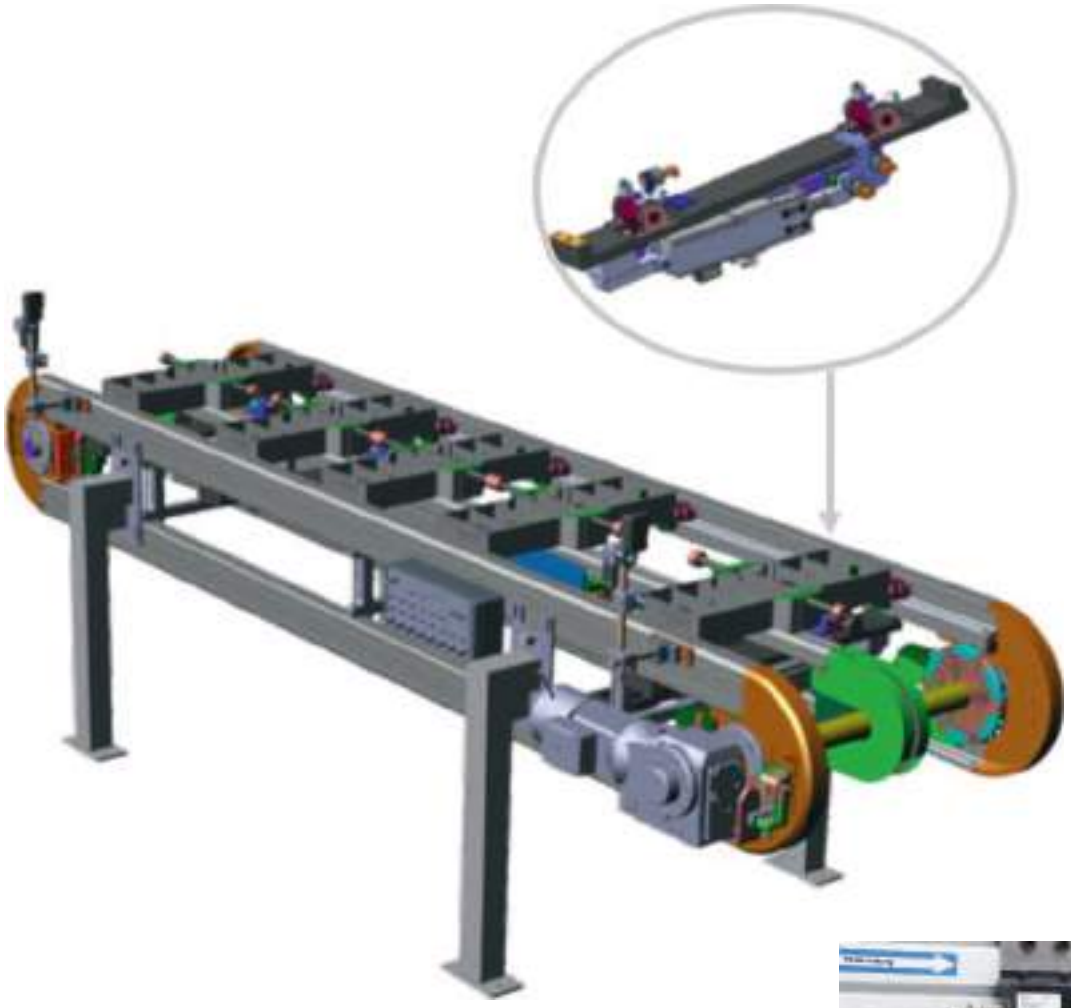
– No need for dynamic pressure stoppers
– Reduction of motor power output
– Reduction of friction-related wear
– Reduction in current consumption by the drive mechanism
– Suitable for use in all APM accumulating conveyor systems



Structural Variants: Compressed Air-free Belt-driven Conveyors

Accumulating conveyor in which the usual compressed air-powered elements are replaced by electric drive mechanisms.

Characteristics
– Unaltered drive motor with 400 V AC power supply
– All other actuators, stoppers/fine positioning units with 24 V DC power supply
– Central motor module TMI8 or modular TDM1 elements replace valve module



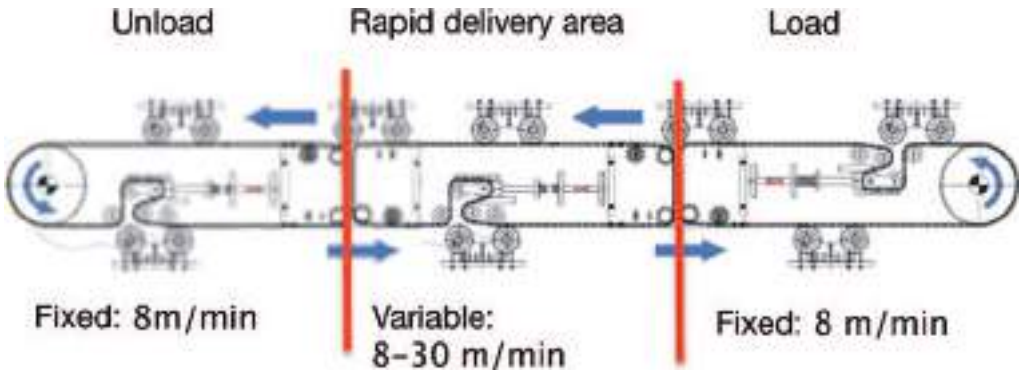
Motor control module TMI8

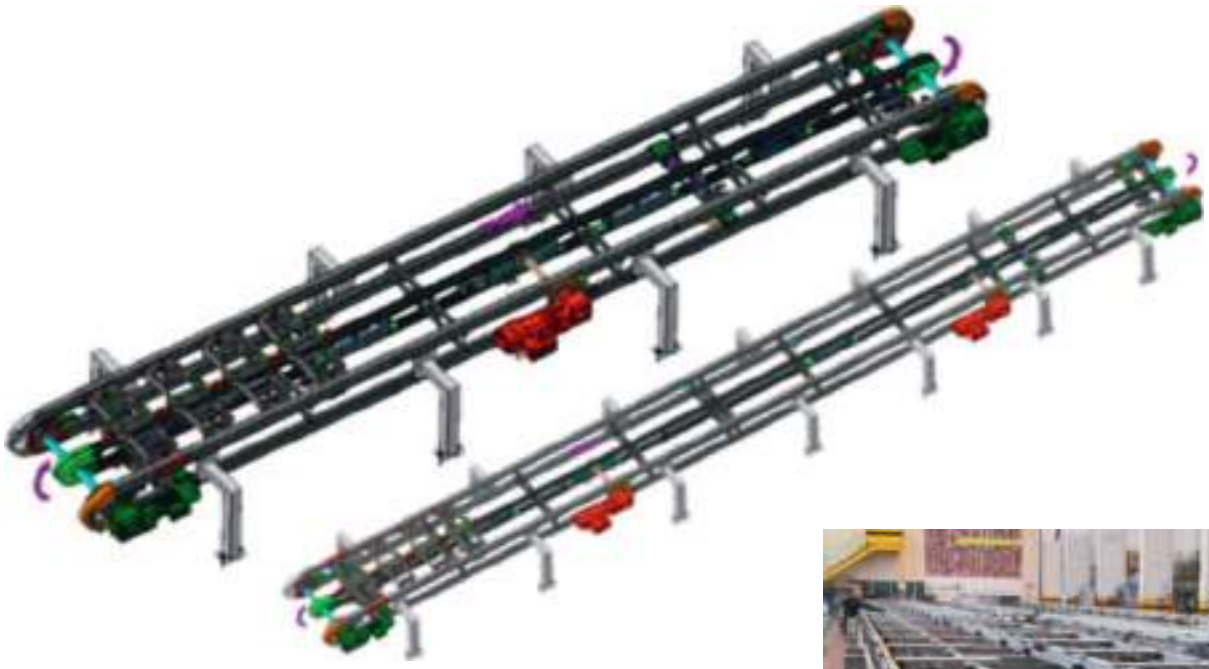
Structural Variants: XXL Belt-driven Conveyors

The AFS conveyor in XXL form with dual speeds, facilitated by independent modular sections. Configuration lengths up to 100 m.

– Different speeds are possible in each zone.

– With a higher speed in the middle segment, it is possible to span large sections in a short time.



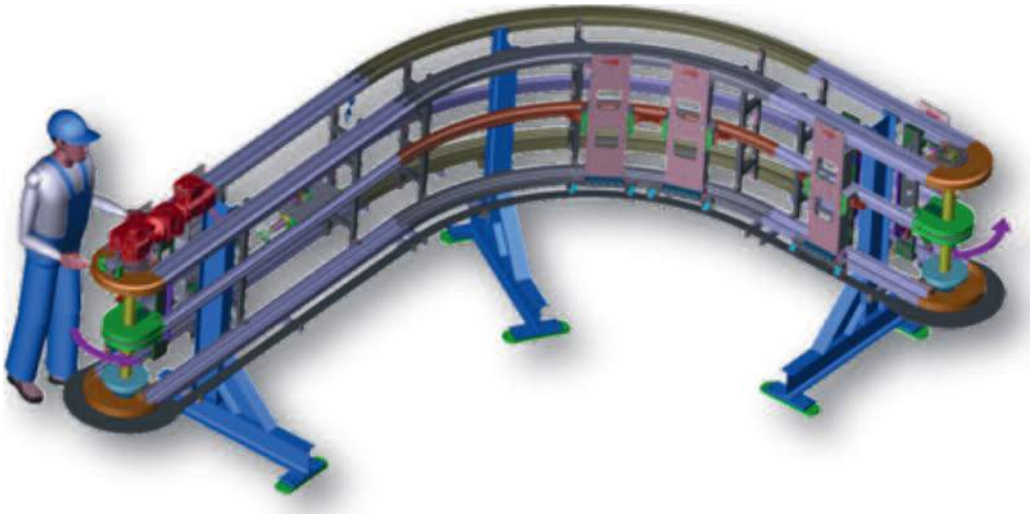


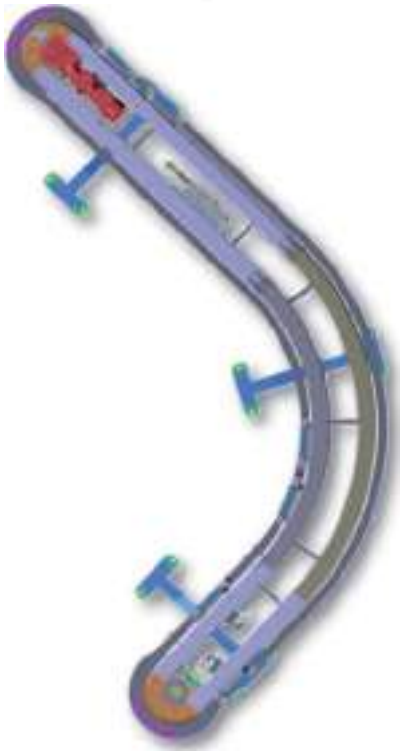
Curved Conveyor

New module for the AFS 90° Accumulating Conveyors in the form of a curved element.

– The new curved module allows the layout of current production systems to be arranged in a more efficient manner while making the best use of space in the production cells

– The technique is broadly based, without changes, on the proven AFS 90° Accumulating Conveyor elements





Basic data

– Maximum length of the pallets in the feed direction: 350 mm

– Operator-safe diverting possible

– Stop in the curve possible

Typical applications

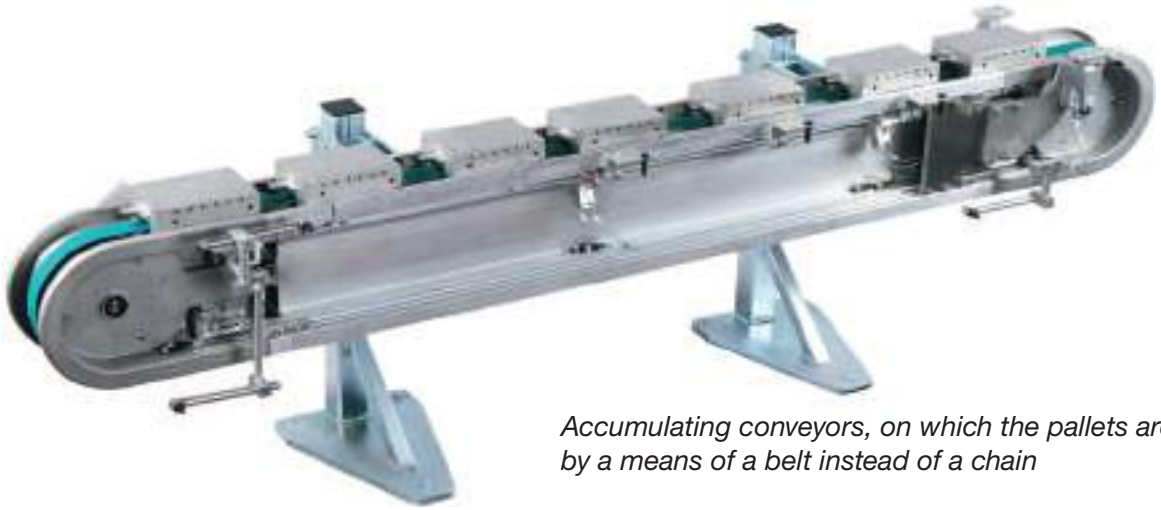
AFS 90° Conveyor for transporting rear floor pan

AFS Conveyor as infeed conveyor in a production cell with protective housing

AFS 90° Conveyor as manual loading station for longitudinal parts

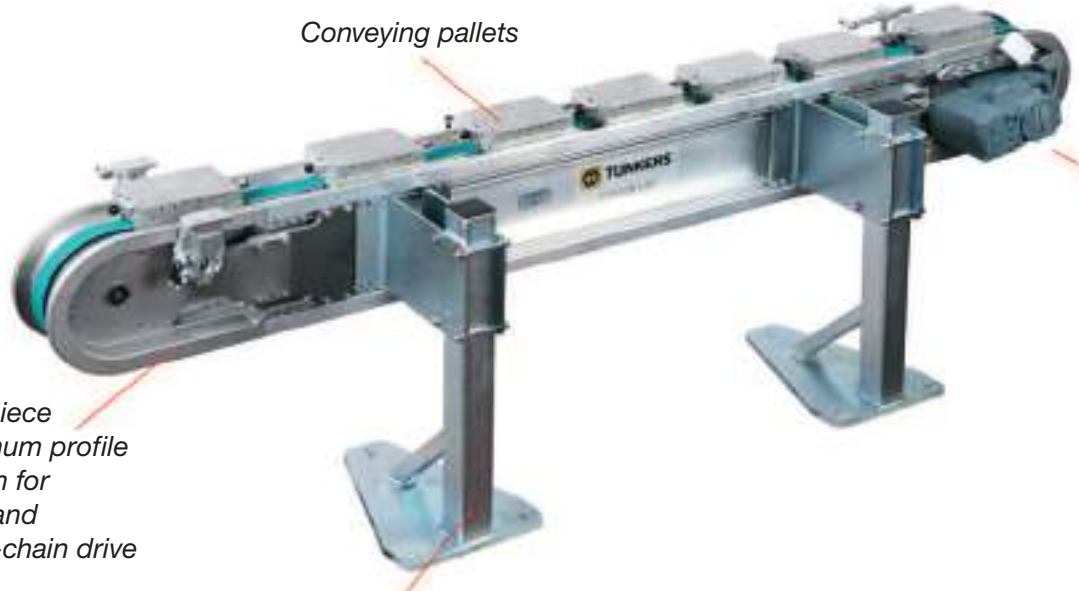
LFS Belt-driven Pallet Conveyors

– Compact belt-driven conveyor
– Max. pallet load (component + carrier): 60 kg
– Suitable for smaller to medium-sized components up to approx. 1,500 mm width
– Operator protection as standard, since there is no positive fit between the belt and the pallet
– Can be loaded from the front, as a protective housing is not required



Accumulating conveyors, on which the pallets are transported by a means of a belt instead of a chain

System configuration



Advantage 1: Operator protection as standard

– In contrast to conventional accumulating conveyors, the pallets are transported by means of a belt –> friction fit instead of positive fit.

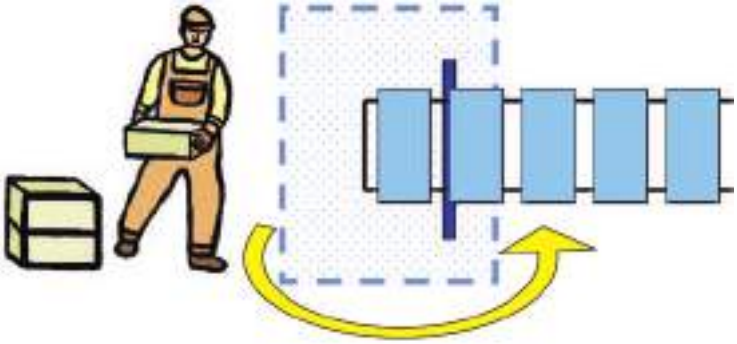
– In the diverter, the friction fit precisely matches the weight of the pallet and the workpiece carrier.

– As a result, the pallet can be stopped by the operator in any position.

– Special safety devices, such as housings, light curtains or pressure mats, are not required.

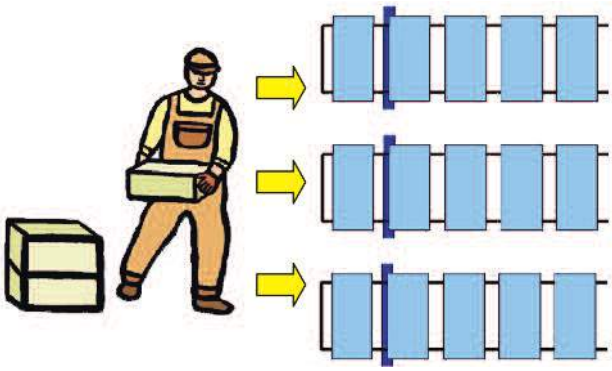
Front-loading, as a protective housing is superfluous

– Loading from the side



Conventional accumulating conveyors: high space requirement and loss of conveying length

– Loading from the front



TÜNKERS Belt-driven Conveyors: space-saving, battery-form arrangement

Advantage 2: Minimal energy requirements

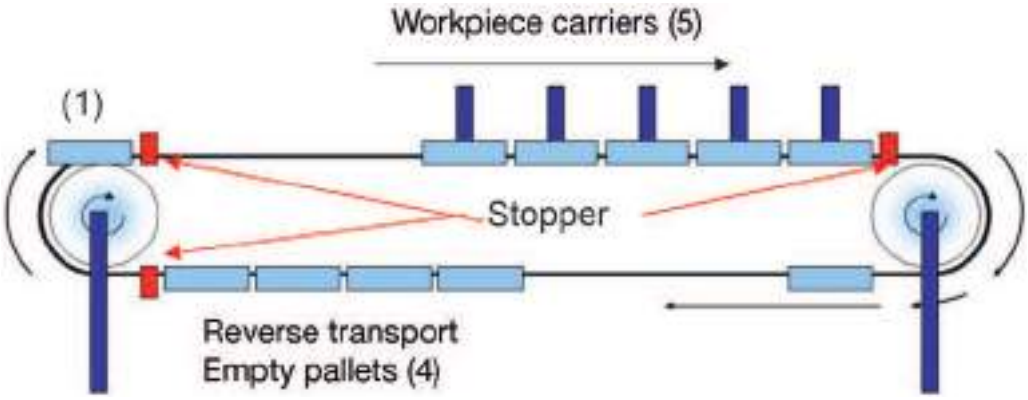
– **Conventional accumulating conveyors: energy wasters!**
Each pallet is equipped with a friction device. The output from the motor must be compatible with the sum of the pallet friction devices accumulating before the stop positions.

– With TÜNKERS Belt-driven Conveyors, as they accumulate, the pallets are mechanically decoupled from the belt, while only one remains in friction contact at each stop point.

– Motor configuration
= one type of motor for every application (approx. 180 Watt)

– No dynamic pressure stopper required

– No limit to the length of the queue



Patented pallet decoupling system

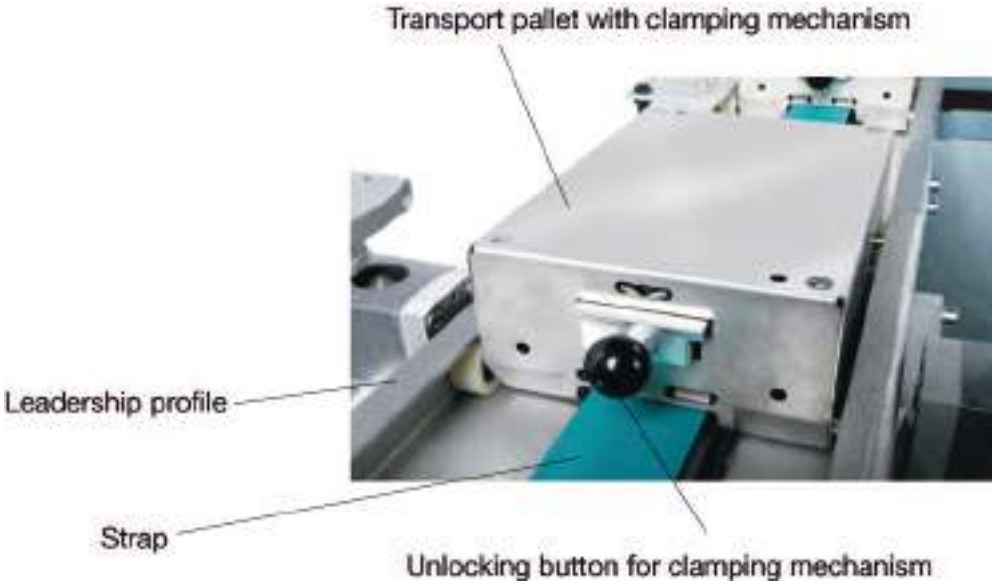
(Patented by Leiritz Automation Tools)

Working principle:

– Using a spring-loaded mechanism, the pallet is clamped against the belt

– Friction fit, not form fit

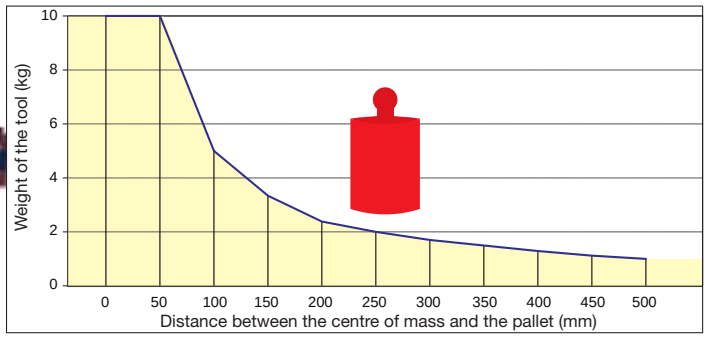
– The clamping mechanism can be released by pressing the decoupling knob



Belt-driven Pallet Conveyors: Configuration Guidelines

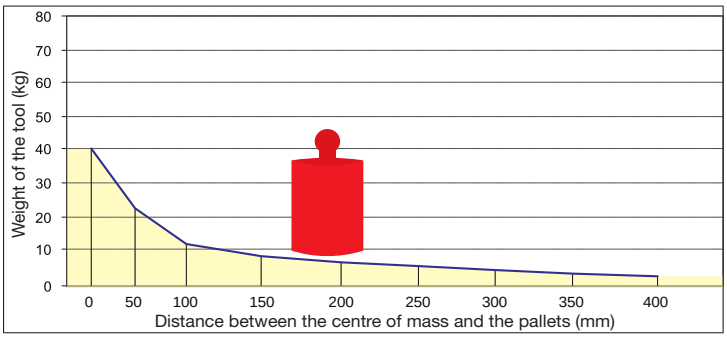
Belt-driven Accumulating Conveyors – LFS System

Maximum load of the component carrier as a function of the pallet spacing



Belt-driven Accumulating Conveyors – LFS 90° System

Maximum load of the carrier and the component as a function of the pallet spacing



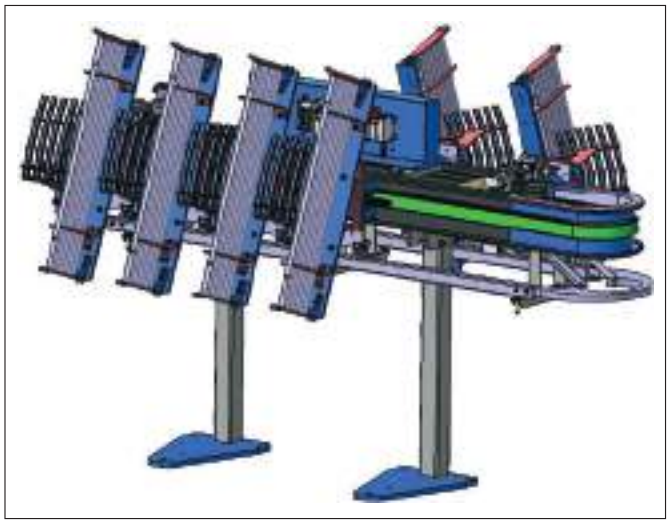
Typical applications

Multi-chain system with front loading

Conveying latch storage systems for multiple placement

'Double-decker' in the configuration phase

Front end infeed with lateral support

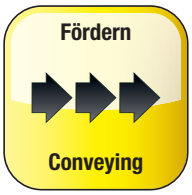


LFS 90° conveyor with pallets arranged transversely

CONVEYING

Indexing Conveyors

– AFT Indexing Chain Conveyors
– AFTV Vertical Chain Conveyors
– AFP Paternosters



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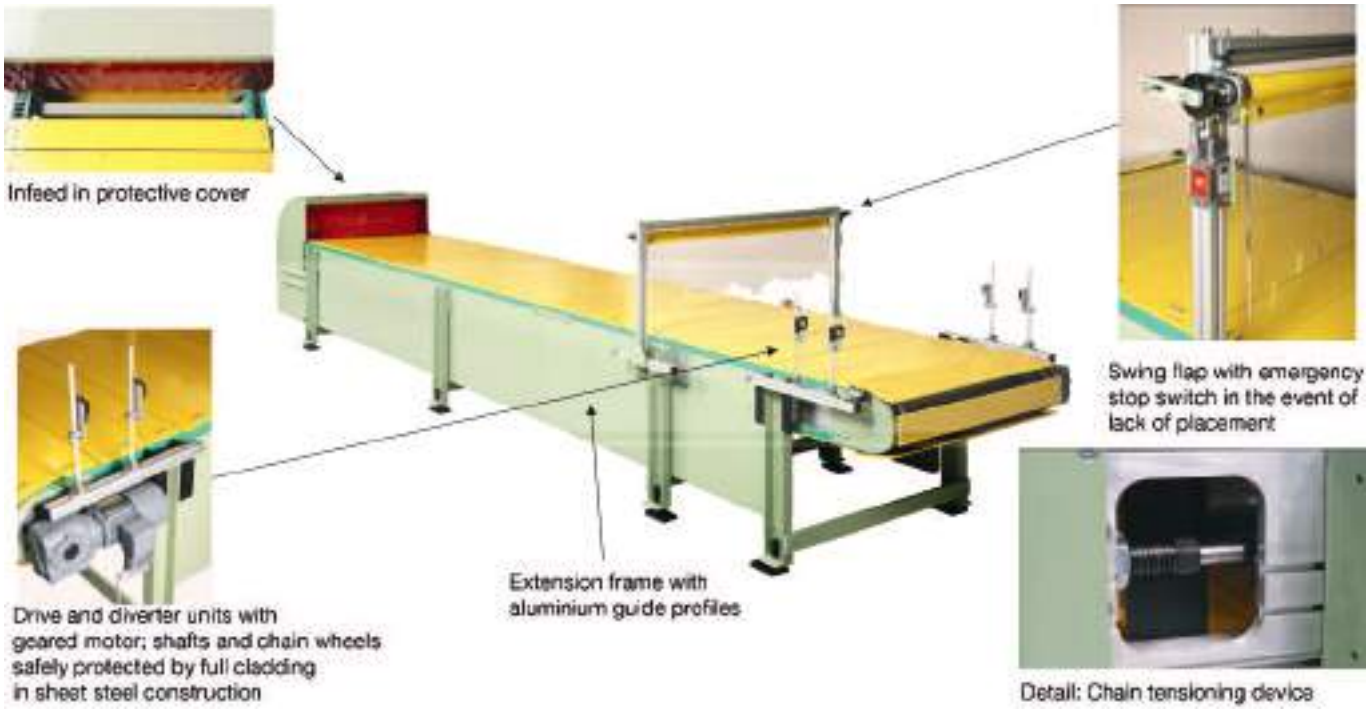
Indexing Conveyors

Conveyor systems in which the pallets or the component carriers are fixed to the drive chain or drive belt. Loading and unloading operations are performed in fixed, linked cycles. By virtue of the system, if the loading or removal station is shut down, the flow of components is interrupted.

System configuration



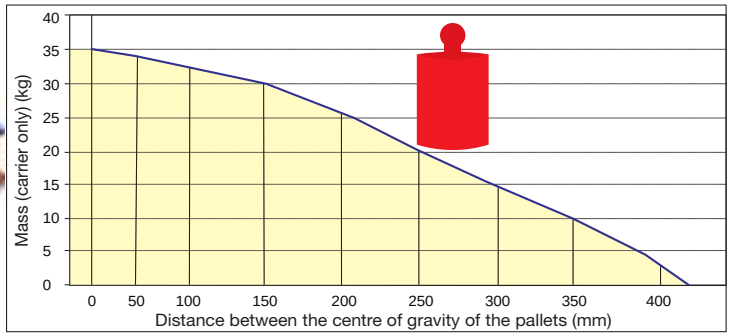
Options

– Overhead transport
– Sideways transport
– Personal protection devices, such as housings, light curtains or pressure mats, as required
– Swing flap for protection against lack of placement
– Sensors for component and workpiece carrier detection
– Workpiece carrier aligned with the configuration of the tool geometry

Configuration Guidelines for Indexing Conveyors

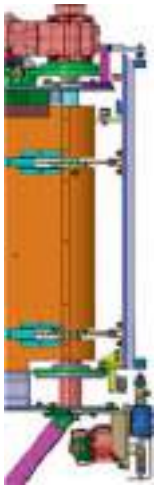
Indexing conveyors – AFT System

Maximum load of the component carrier as a function of the pallet spacing

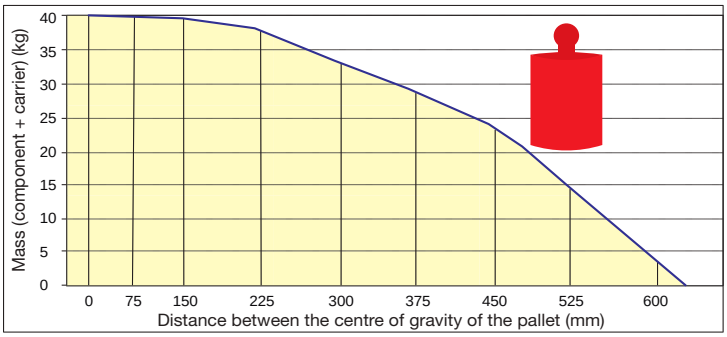


The maximum weight only relates to the component mounting.

Indexing conveyors – AFT 90° SystemSystem

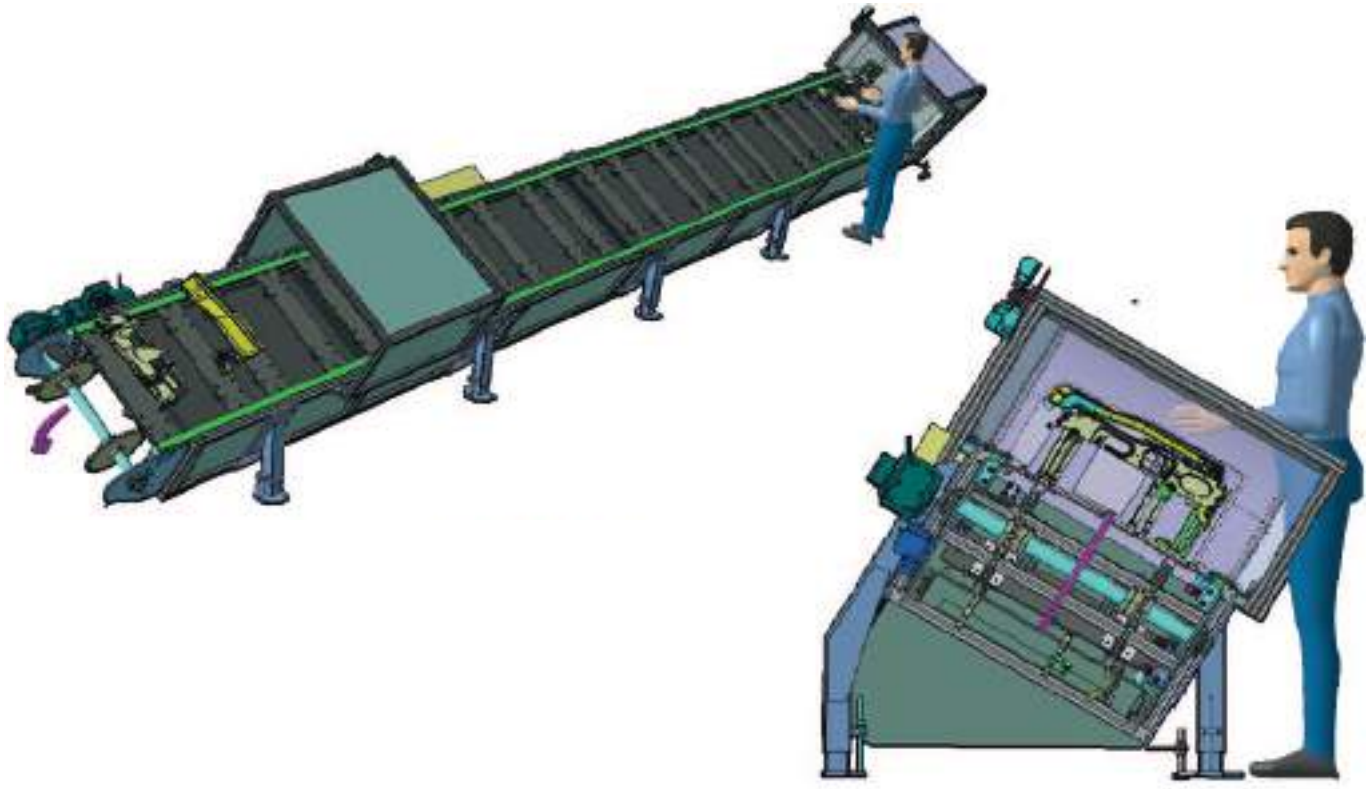


Maximum load of the carrier and the component as a function of the pallet spacing



With the 90° System, the maximum load is the sum of the component mounting and the component.
The maximum load is independent of the power output of the motor.

Typical applications



Chain conveyor in ergonomic inclined position

90° chain conveyor for side loading by the operator

AFTV Vertical Chain Conveyors

Conveyors which, where space is confined, are able to efficiently transport specialised long components in an upright position

– Pallet guide via a single roller belt

– Chain conveyor in upright configuration

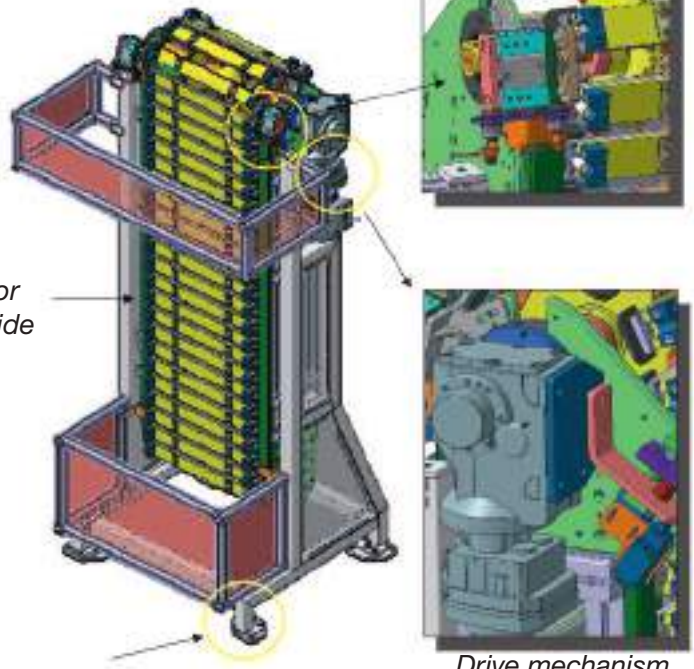
– Robust welded steel framework

– Max. component width 2,000 mm

– Max. component weight 10 kg

– Option: Paternoster system with component carrier in free-floating ‘gondola arrangement’

System configuration



Profile system for chain guide

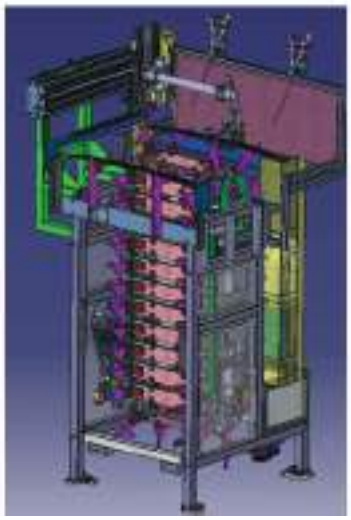
Welded steel base frame

Drive mechanism

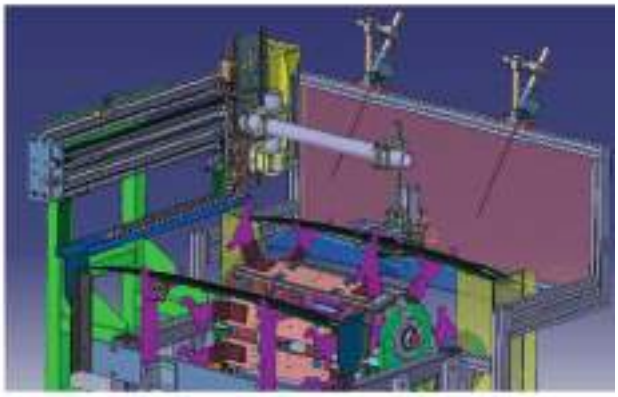
Fine positioning unit in transfer station for removal by robots

Typical applications

Front view

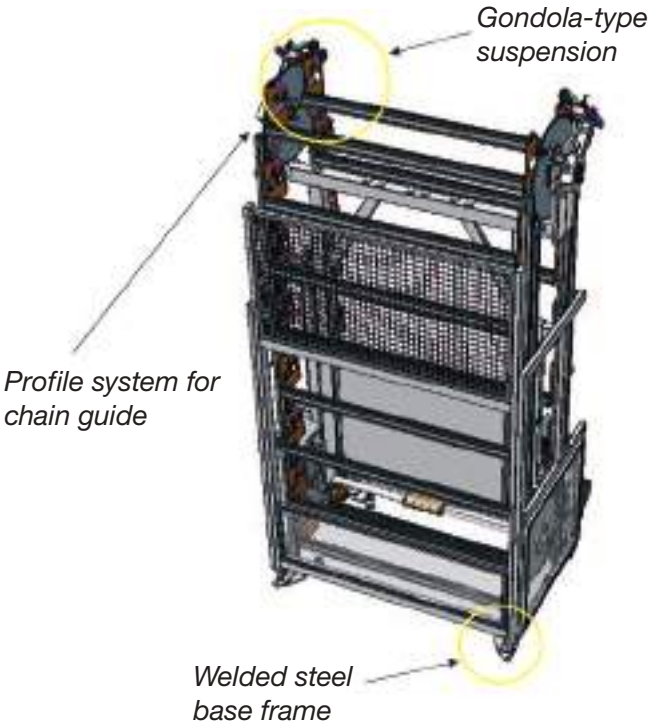


Rear view



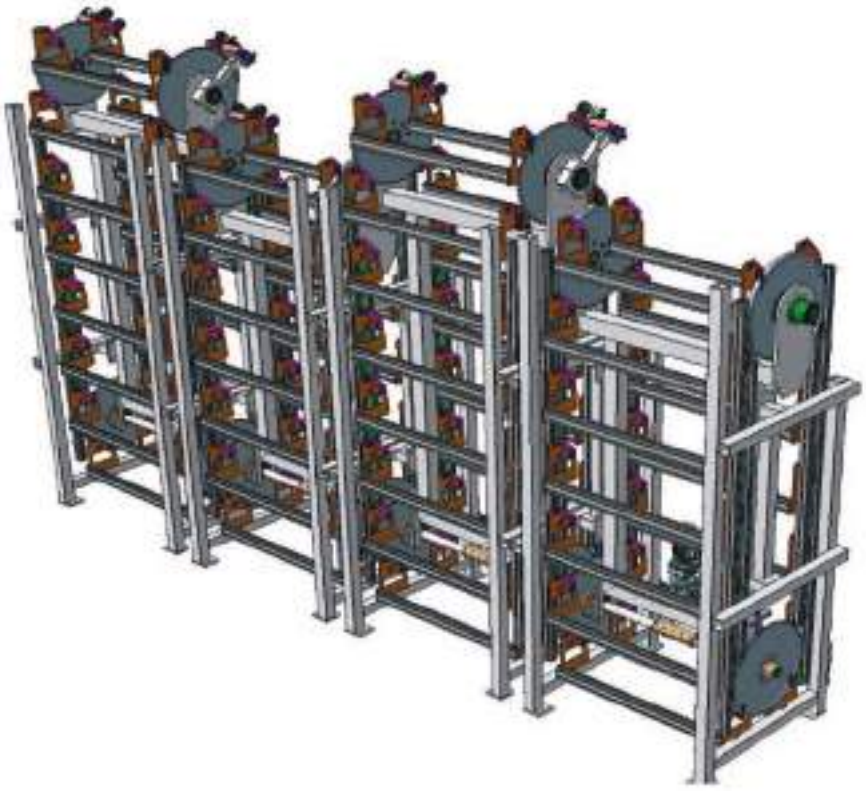
Detail view of the handling system for component removal and transfer to the robots

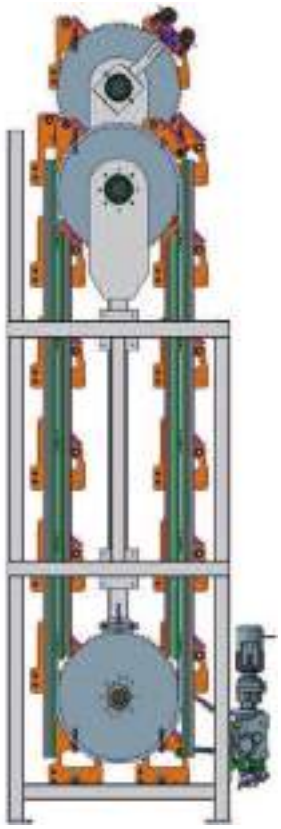
AFP Paternoster, APM Systems
System configuration



System in the configuration phase

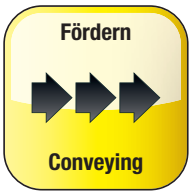
Typical applications





CONVEYING

Transfer System



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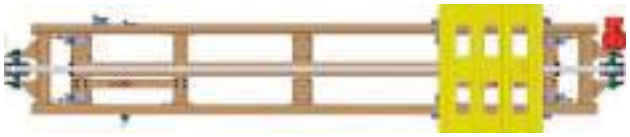
Transfer System

Transfer Systems are conveying units that are used to convey components on carrier systems over long distances. In contrast to accumulating conveyors, an active role is not played by the buffers but by rapid transport from A to B. A typical application for transfer systems is bridging longer paths between two physically separated processing lines.

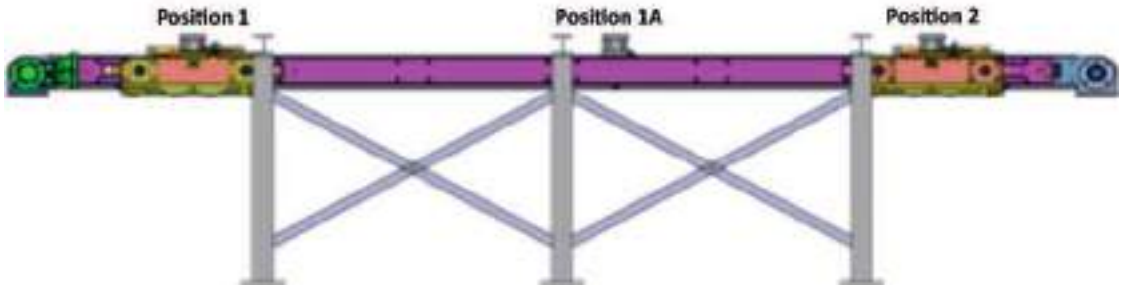
ATS Transfer System

– Systems for the rapid conveying of components (at 2 metres per second) over sections ranging from10 to 30 metres
– Compact rolling carriages for component products up to 250 kg
– Powered by low-wear belt-drive mechanism
– Fine positioning with locking unit in the end positions

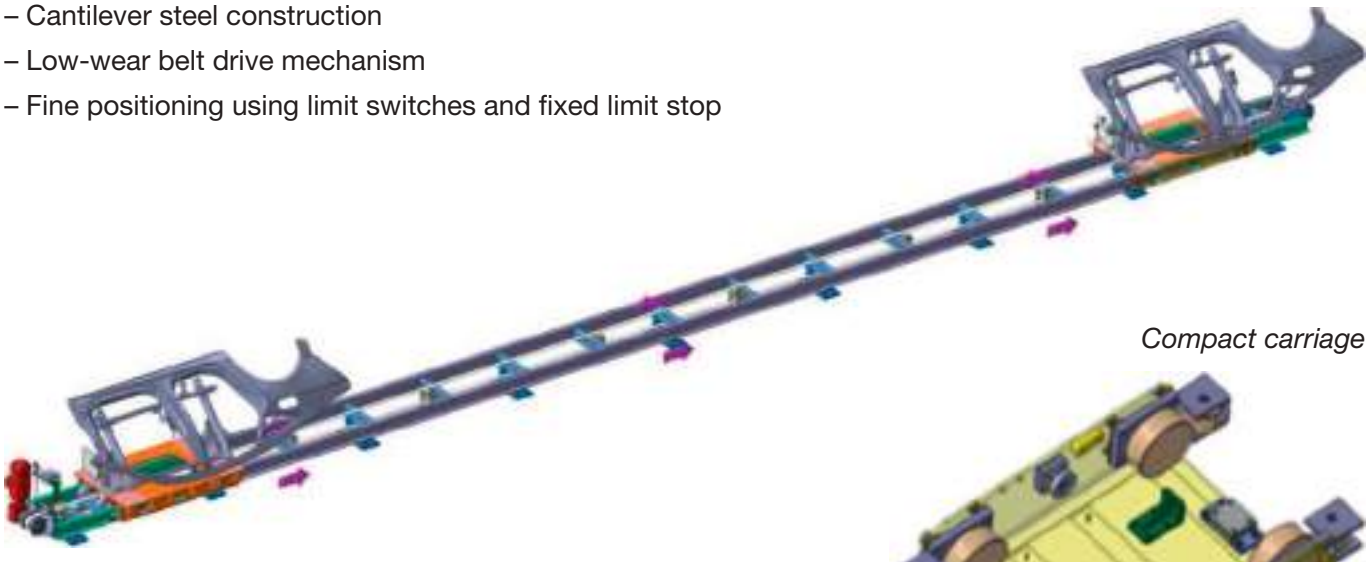


APM Transfer System

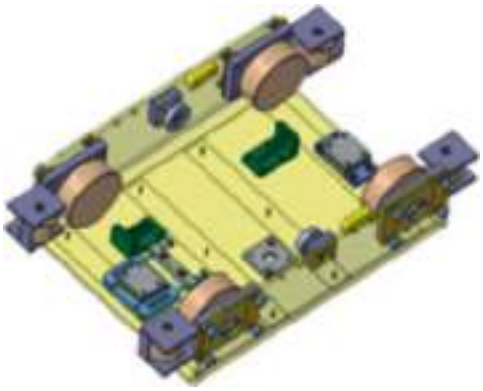
High speed shuttle system for heavy components



– Cantilever steel construction
– Low-wear belt drive mechanism
– Fine positioning using limit switches and fixed limit stop

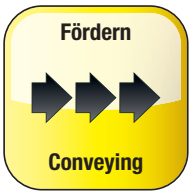


Compact carriage



CONVEYING

Belt-driven Conveyors



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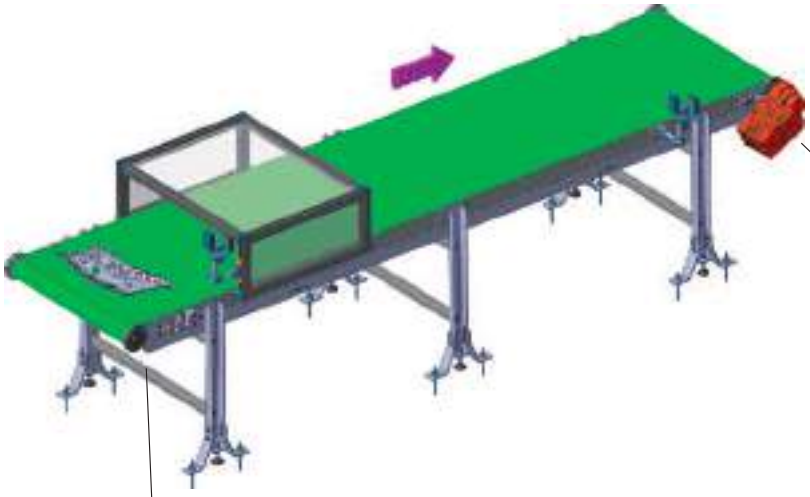
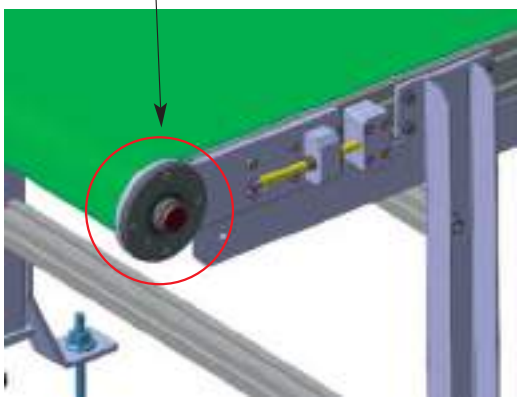
Belt-driven Conveyors

In applications for Body-in-white automation, for preference belt-driven conveyors are used for the removal of car bodywork components. The onward transfer of small parts from the robot cell - for possible reworking for example – is a typical application. However, the belt-driven conveyor is also a simple and cost-effective solution in the form of a buffer conveyor for manual removal and onward transport.

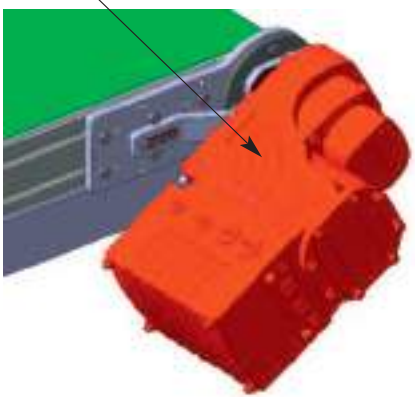
EFG Belt-driven Conveyors

– Robust basic chassis consisting of aluminum profiles
– Max. belt width approx. 2,000 mm
– Max. belt length approx. 20 m
– Option: dual belt for special component geometries
– Conveyor speed 1.5 to 10 metres per minute





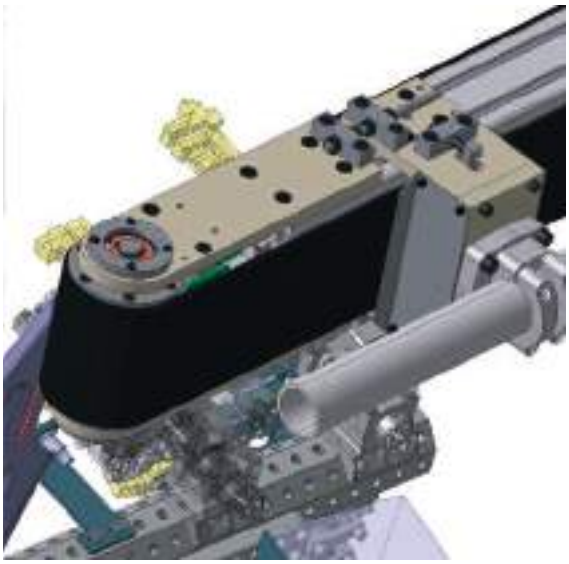
Detail view of the belt tensioning device



Detail view of the motor mounting

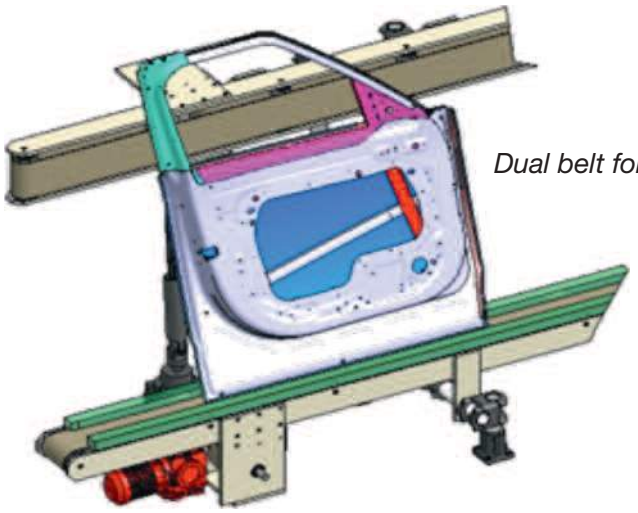
Special configuration: Dual Belt

– Flexible, modular adjustment of the conveyor chains based on the component geometry
– Chains synchronised by means of transmission shaft: alternatively, with twin motor concept, by frequency converter
– Conveyor speed adjustable from 0.5 to 10 metres per minute



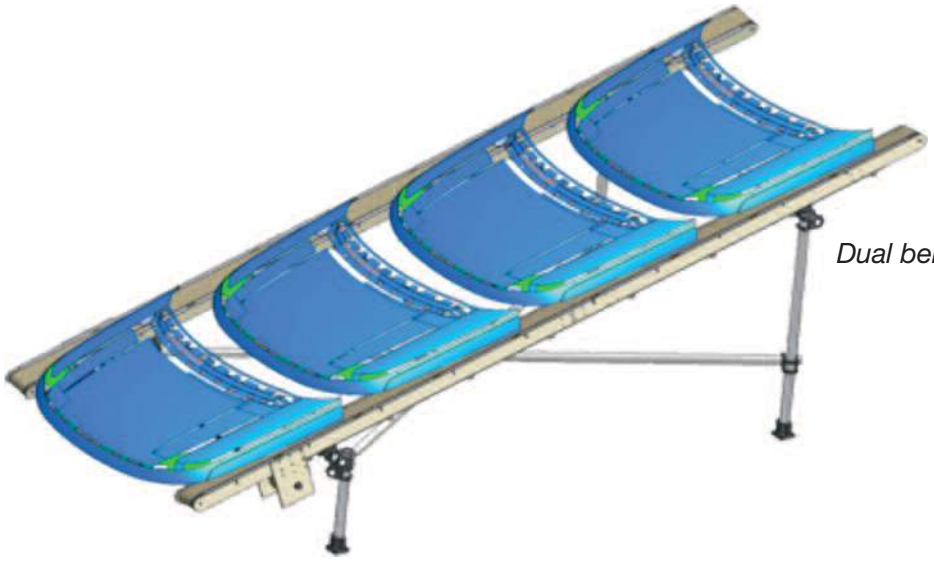
Detail view of the belt tensioning device

Typical applications



Dual belt for transporting a car door

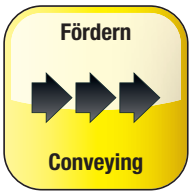
Inclined conveyor



Dual belt for transporting a car bonnet

CONVEYING

Gravity Conveyors



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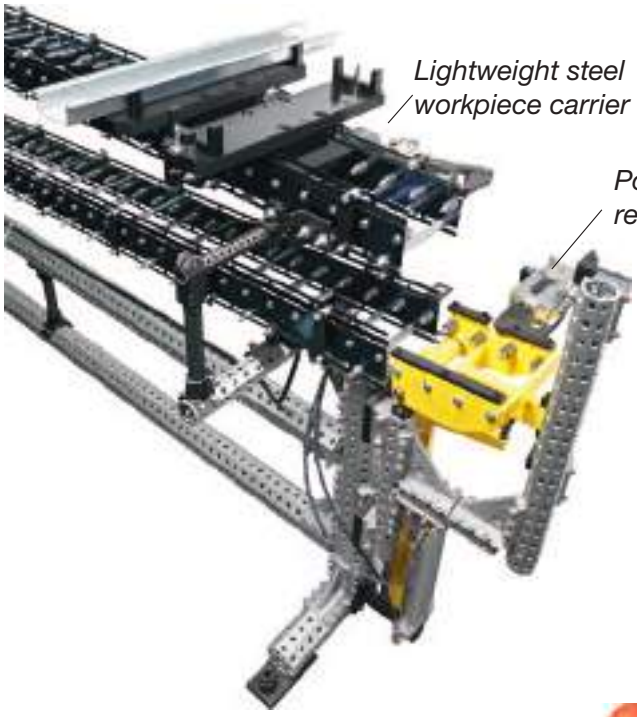
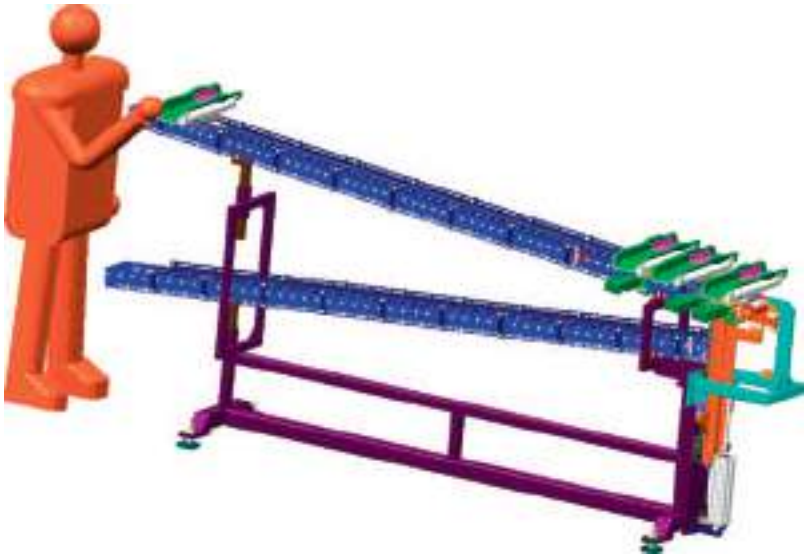
Gravity-driven Bin Conveyor

– Bin adjustment without drive mechanism
– Single infeed using rollers/gravity principle
– Base frame either in steel frame construction or with modular profile system
– Integral return guide
– Precise positioning with TÜNKERS clamping components



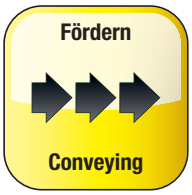
Lightweight steel workpiece carrier

Positioning station for removal by robots



CONVEYING

Heavy-duty Roller Conveyors



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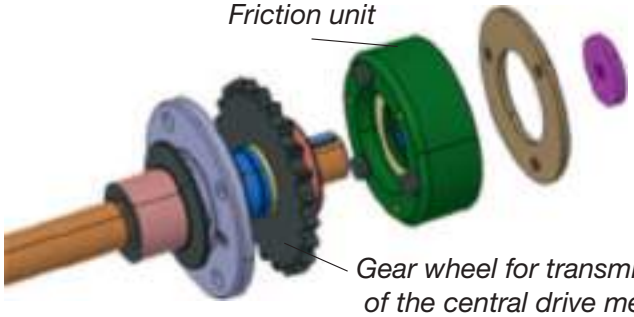
Heavy-duty Roller Conveyors

– Roller conveyor for loads up to 1,000 kg
– Roller drive via central chain strand
– Single-motor concept – one motor powers the entire conveying strand
– Each roller features the power-free function via a separate friction coupling

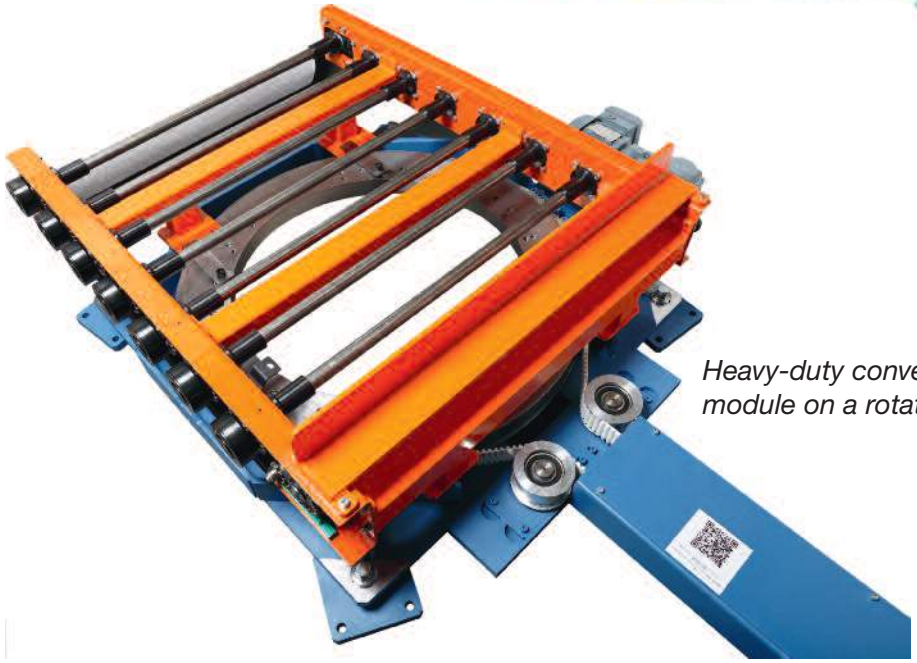
System configuration

Sheet steel framework, in which the central chain drives the rollers via individual friction derivates



Typical applications

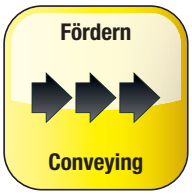
Heavy-duty conveyor for conveying transport containers



Heavy-duty conveyor as module on a rotating plate

CONVEYING

Container Systems



- Bin Rotating System
- Bin Changeover System
- LCA Component Tray
- Stacking Columns

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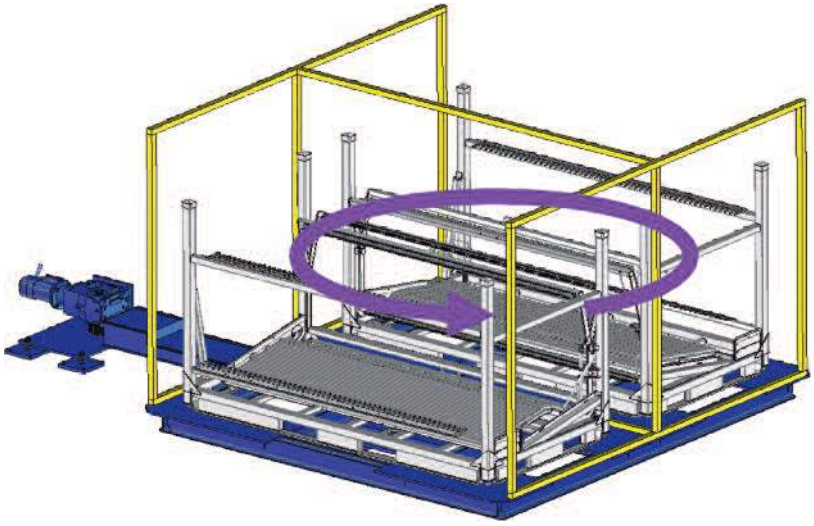
Component Bin System

Stacking bins and racks into which the individual components are accurately transported into their defined positions play an important part in the automated logistics of automobile manufacture.

With these precision bins, the components are automatically loaded and unloaded. This section of the catalogue contains information about component carriers, stacking columns, LCA Low Cost Automation trays and bin systems with which the carrier can be replaced in the cells.

– Bin Changeover System with integral rotating table for 180° reverse operation
– Simple, extremely slim rotation unit for loading and unloading bins
– External location of the motor for the SOPAP TXR optimises the assembly space and increases the ease of maintenance
– Optional guaranteed ram protection and position definition unit for increased safety during loading and unloading

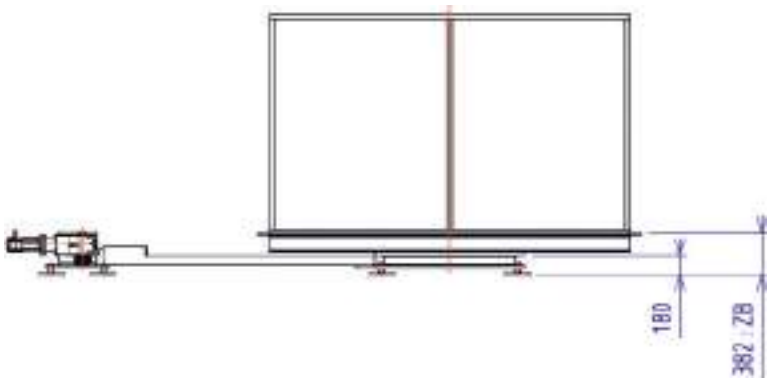


– Diameter: 3 to 6 metres
– Load capacity: up to 6,000 kg
– Cycle time: approx. 15 to 20 seconds

Basic rotating plate TXR for reverse operation (180°)

Slimline construction: < 200 mm

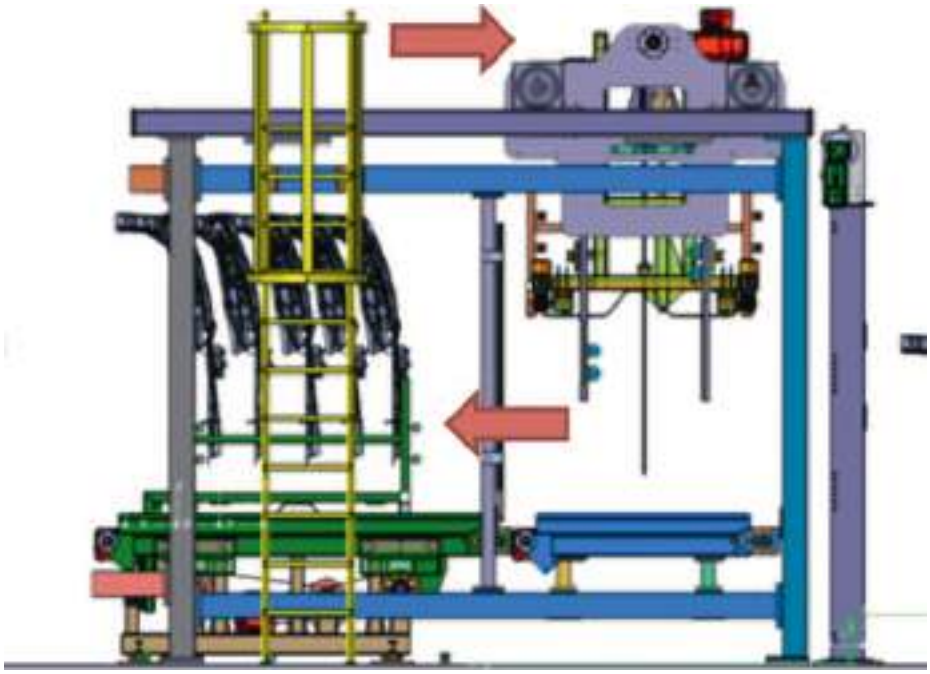
Typical application



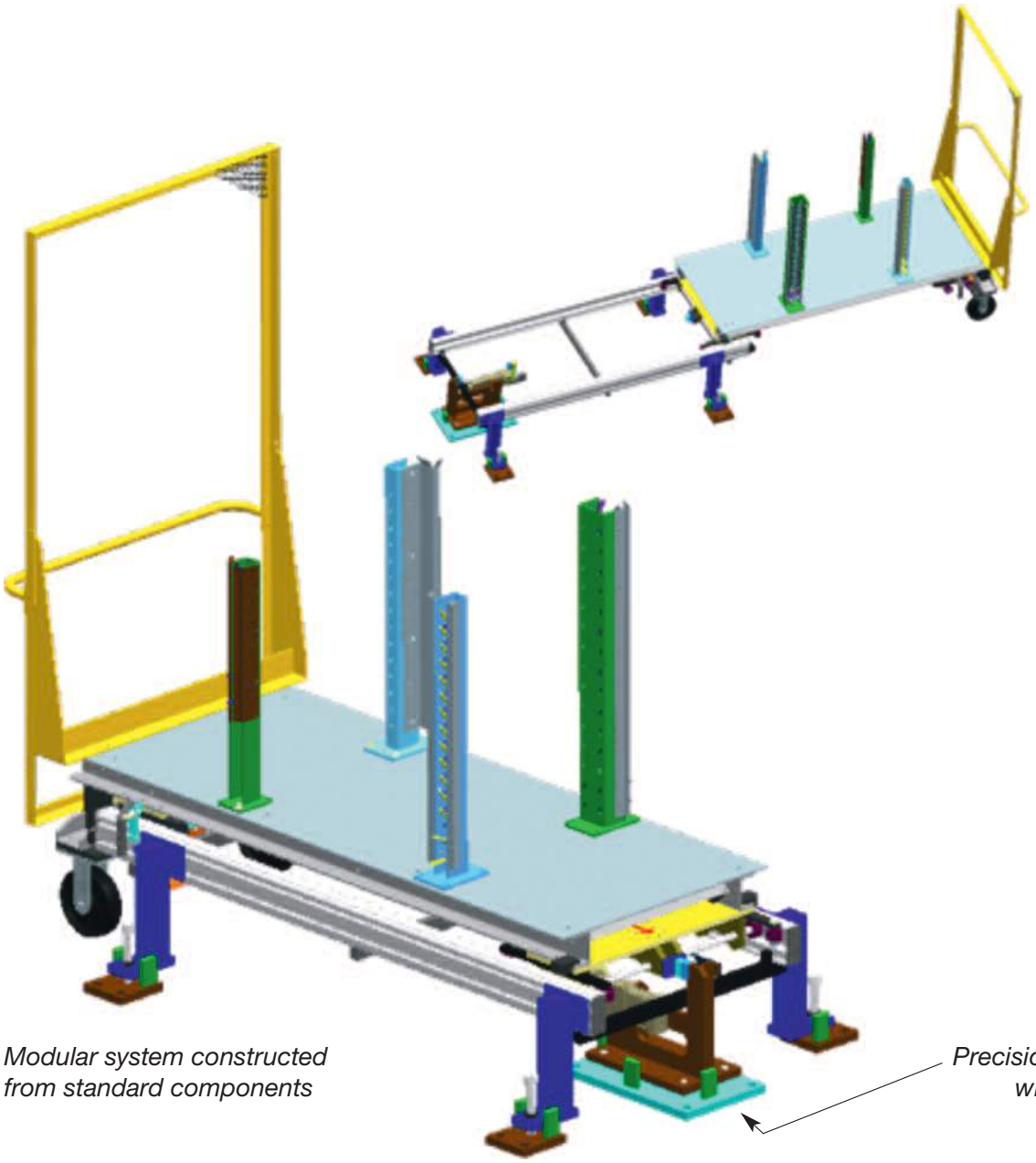
SOPAP TXR 1100 with basic framework and external motor mounting

Bin Changeover System

Changeover system with which the bins arranged in tandem and exchanged by means of a lifting and indexing system



– Stacking function for bins in all floor positions
– 3 bins per system, simultaneously
– Lifting units for the conversion function
– Can be configured to clients' specifications
– Typical application is loading using forklift vehicles, removal by the robot



Modular system constructed from standard components

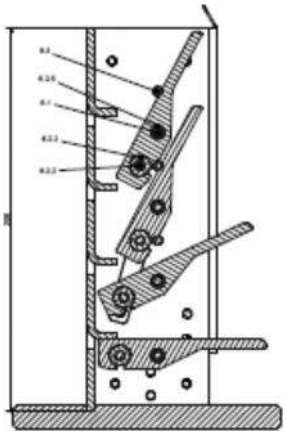
Precision XYZ referencing with position locking

– Ergonomic, lightweight square-section tube framework
– Precise carrier guide
– Precise end position
– Stacking columns
– Variable lengths and widths

Stacking Columns

New type of construction kit – Stacking column
Combine a standard foot with the column of your choice.

– Precision due to pinned mounting, no more welding
–> no temperature fluctuation
– Simple exchange for maintenance purposes
– Reproducible positioning
– Ideal for Body-In-White applications



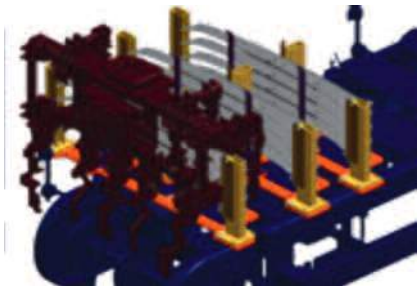
Profile latch

– Standard latch product
– High precision
– Available in steel with pivoting force or spring-loaded reset function
– Gravity reset function
– 10 and 20 mm width or dual latch configuration for stable component position

AL latch (K1)

Dual latch AL (K5)

Typical applications

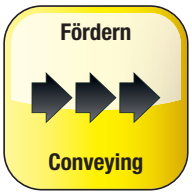


Latch store as accumulating conveyor pallet

Transport container with stacking towers

CONVEYING

Conveying Systems



– ‘Dragon’ Conveyors
– Distributor System
– Twin Conveyors

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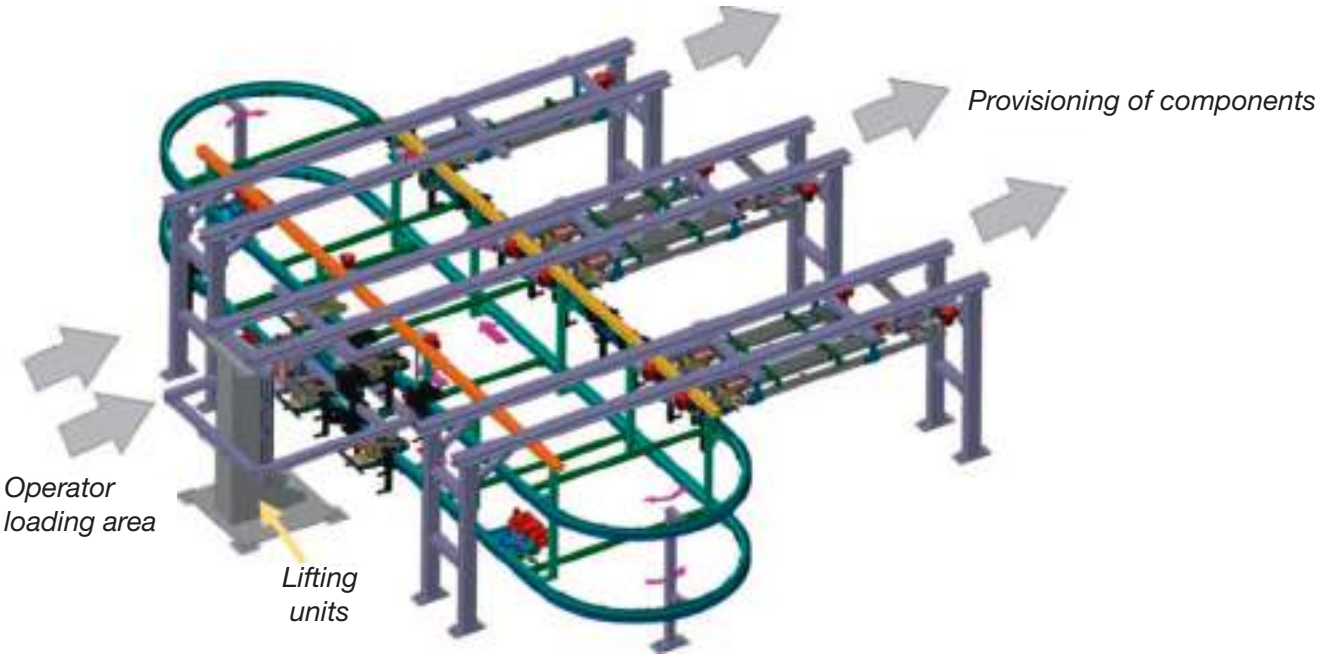
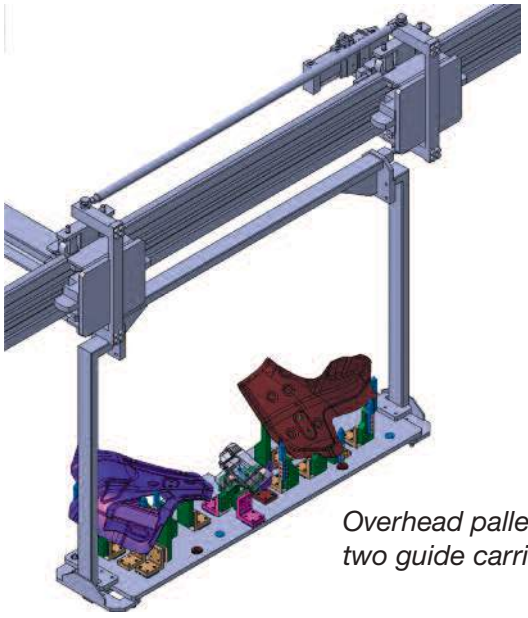
Conveying Systems

Complex conveying systems which, to some extent, are the alternative to conventional EHB systems. They do not only transport the components, they also distribute each individual component to different processing stations. An example of this is the ‘dragon’ conveyor, as well as the equally compact distributor system for three to four types.

DKN Conveyor System

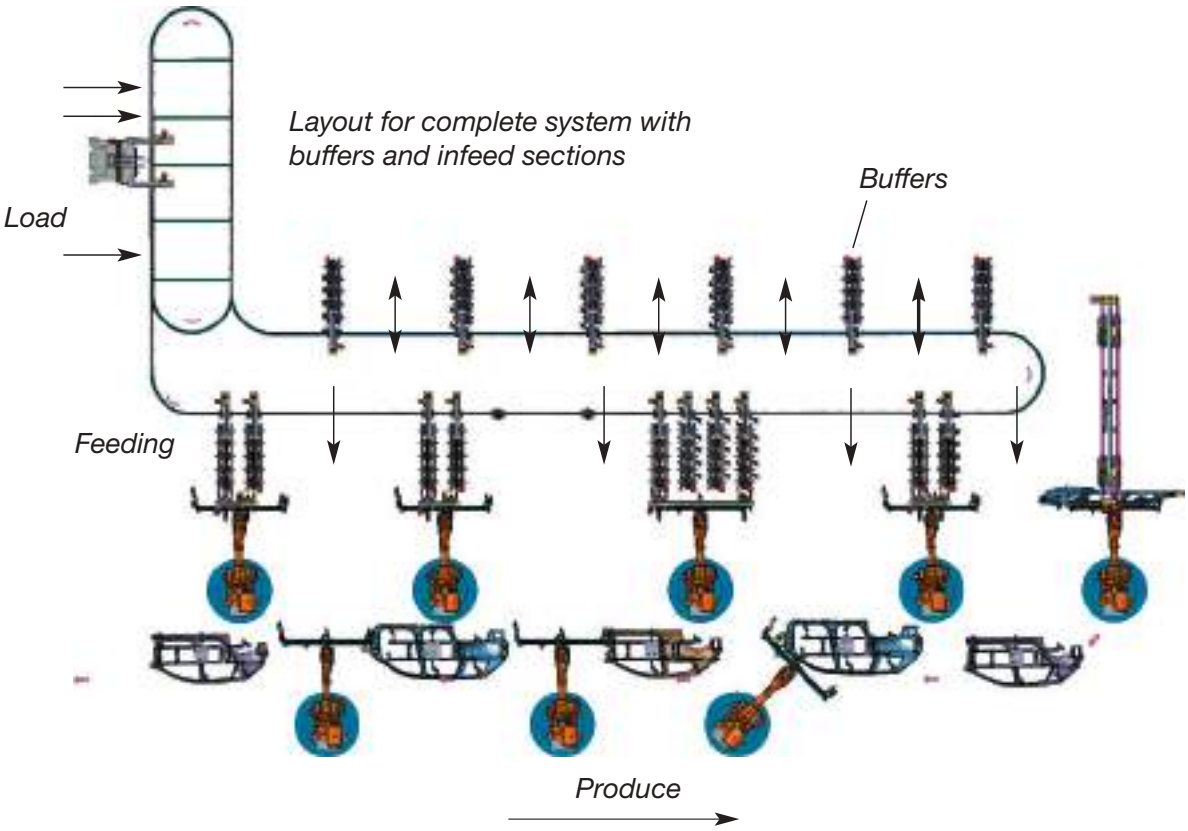
– Accumulating conveyor system in overhead configuration
– Single belt lengths with one drive mechanism up to 25 metres, coupled systems up to 250 metres
– Component pallets with loading capacities up to 80 kg
– Can be extended to include lifting units and vertical cross beams to make complex conveyor installations





Overhead pallet with two guide carriages

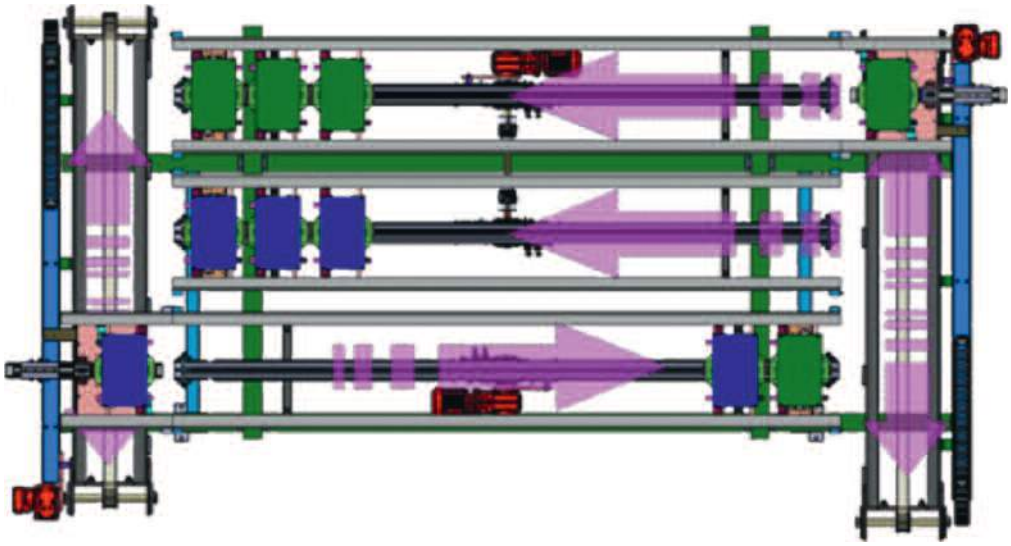
'Dragon' Conveyors



– Solution for floor-mounted intermediate storage and distribution of different types of component
– Decoupling over a small surface area (width instead of length)
– Distributor system replaces, for example, 3 separate accumulating conveyors

Advantages:

– All spare parts and parts subject to wear are based on the APM Accumulating Conveyor System
– Only one drive mechanism per direction of travel for all distributor sections
– Can also be used as an interconnection element



Type

A Type A

B Type B

C Type C

Twin Conveyors

Extension of the proven single linear AFS-Accumulating conveyors to include two (twin) additional free axes

– Rotating

– Lifting

– All components based on the AFS System

– No additional spare parts

– With the new Twin Module, many paths and special tasks can be reproduced with one classic accumulating conveyor.

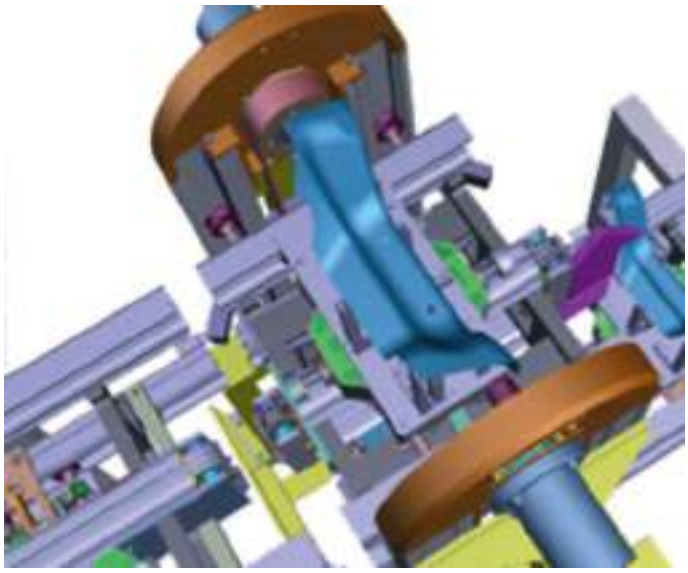
Rotary Module

– The segment is rotated, as with the pallet, in a friction-locked manner, so that no safety guard is required for the rotation.

– Due to the interconnection element developed in-house, the conveying module on the rotary segment does not require its own chain drive.

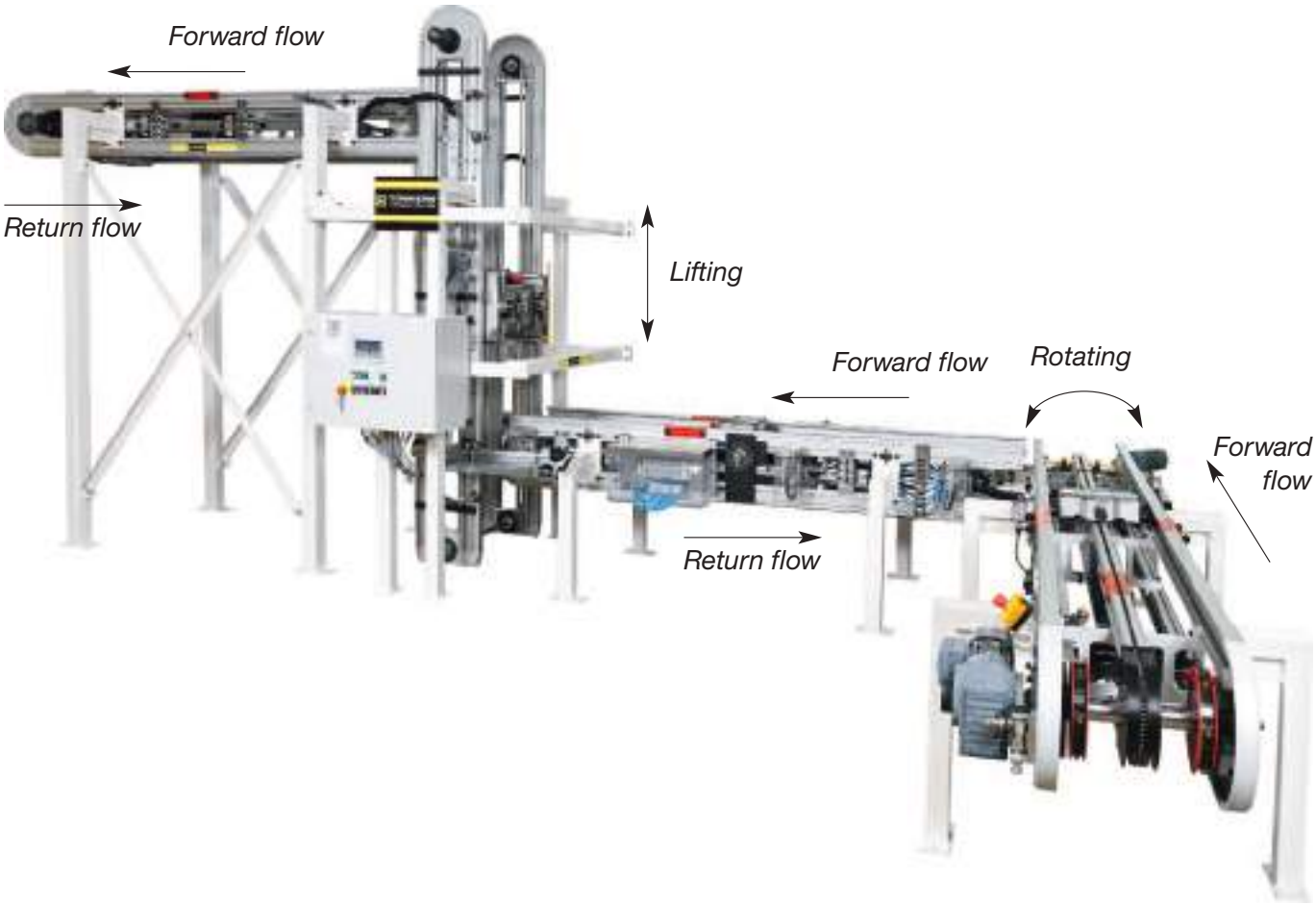
Lifting Module

Lifting system based on AFS accumulating conveyor components



– The conveying module does not require its own chain drive since it is powered by the corresponding linear sections.

Example of a complete conveyor system with rotary and lifting modules



TRANSPORTING

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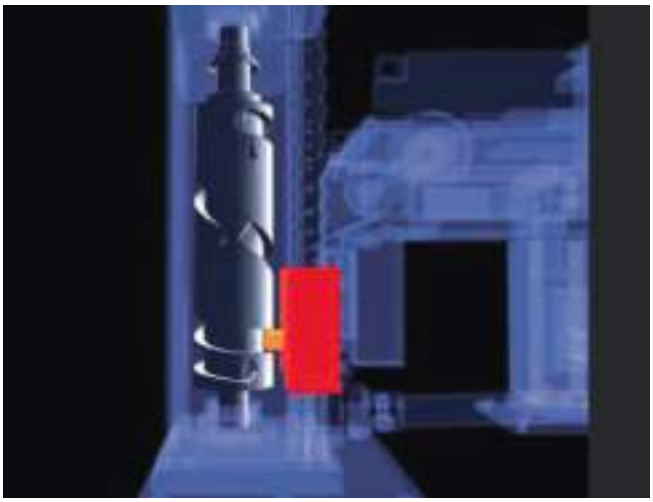
Transporting

Lift Powered Rollerbed Line (LPRB)

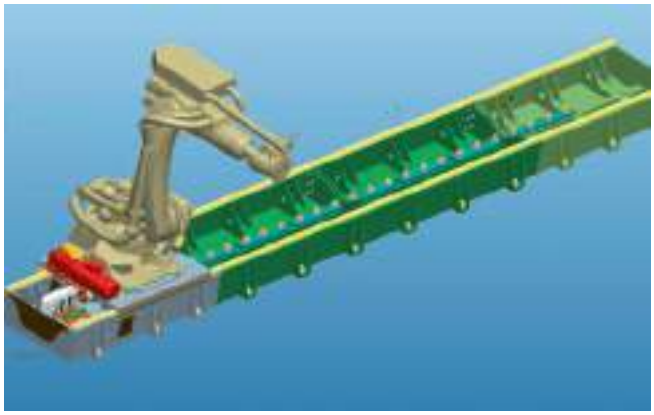
The transportation module comprises electromechanical systems suitable to transport complex assemblies such as doors, side panels or the complete chassis in BIW workshops. The transport sections installed in production lines are designed as lifting beam systems, also called as shuttle systems, with a central drive. These systems have two central drives which take care of the lifting motion and the horizontal transfer. A further development of the L+S systems are the Lift Powered Rollerbeds, featuring decentralized drive mechanism and offering a higher efficiency and more flexibility with regards to space availability and performance.

Cam lifter for optimum lifting profile

An essential feature of the LPRB systems used in body shops is the requirement for a gentle component pick-up in order to reduce the impact noise as well as the wear on the lifter and the component itself. This lifting profile is achieved with zero speed at the transfer point and with high acceleration and deceleration processes by means of the EXPERT TUNKERS indexing cam, which has a correspondingly milled motion profile. In the case of cams with a constant pitch, so-called flex cams, the desired lifting profile is achieved via the servo control.



Soft touch pick-up



7th axis for robots

Buffer / Cross Transfer and Alternative Transport Solutions

The transport lines are supplemented by appropriate components such as buffer / storage system, cross transfer conveyor, ring accumulating conveyor, lifting and rotating units and level elevator, which feeds the component into the upper level conveyor system. This technology is also used in the heavy duty applications such as transportation of complete tooling or robotic systems (7th axis).

Lift Powered Rollerbed

Customer Load (Skid and Body)	200-2.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 7 s

Lift Powered Rollerbed

Conveying system for automotive body plants for the safe and precise positioning of skids with car bodies or body parts in independent station design.

– Safe and fast transport
– Smooth component transfer
– Flexible determination of the pick-up position
– Compact design
– Extremely low maintenance
– Long life span
– Flexible positioning of the lifting columns for optimum accessibility of the robot to the component

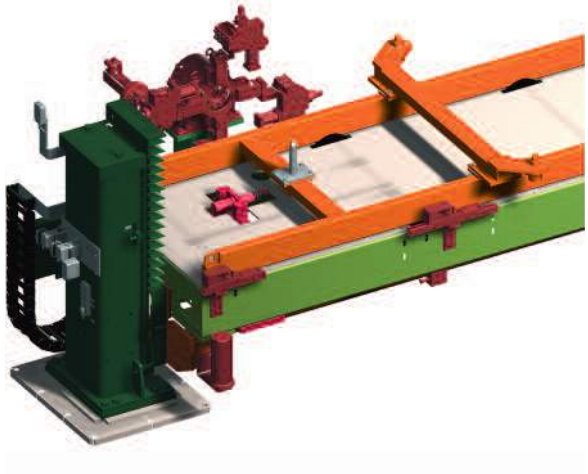
Lift column with cam and cam follower technology

The cam shaft and the robust linear rails are the core elements of the Expert Tünkers Lifter columns. The lifting station is formed by two lifting columns which are driven by a central gear motor and synchronized by means of a cardan shafts.

All-Electric Lift Powered Rollerbed

All Electric Lift Powered Rollerbed with laser positioning of the skid and flexible underbody clamping technology

– Time saving approx. 1 second
– Cycle time less than 7.5 seconds possible
– Accurate skid positioning via laser distance measurement
– Variable skid positioning on the rollerbed possible
– Electric stopper to prevent overrun
– Electrically operated skid locator
– No pneumatics, i.e. no valve unit



Customer Load (Skid + Body)	200-2.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 7 s

Rollerbeds

Frame made of metal sheet, incorporating the mechanically synchronized driven rollers, gear motor, skid locator and positioning devices. Optional with cover plates. Designed according to customer specification.

Customer Load (Skid + Body)	up to 1.500 kg
Length of rollerbed	up to 7.500 mm
Width of rollerbed	1.200 mm
Travel speed of the skid	max. 2,5 m/s

Lift powered rollerbed in upperbody line

Example of a complete welding line

Lift Powered Rollerbeds

EGV Flexible underbody clamping technology

Type	EGV 090	EGV 125
Max. permissible static tangential moment	800 Nm	2680 Nm
Max. permissible tilting moment	1000 Nm	3400 Nm
Rotating time for 90°	2 s	2 s
Repeatability at r = 400 mm	± 0,1 mm	± 0,05 mm

Index drive units EGV 90 / 125 with an integrated precision interlock for the flexible production of up to four different types of vehicles in one production line.

This extremely compact unit features a drive flange which is mechanically locked in the dwell position by means of an individually mounted latch. This design helps to absorb the high forces during the transfer of the body.

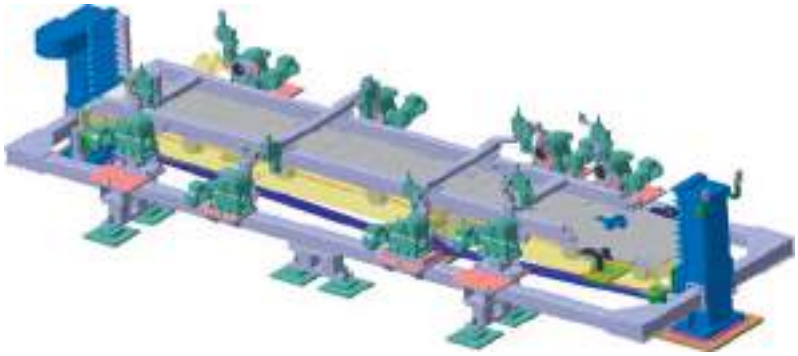
– Flexible production with up to four different types of vehicles

– High static load bearing capacity in the working position

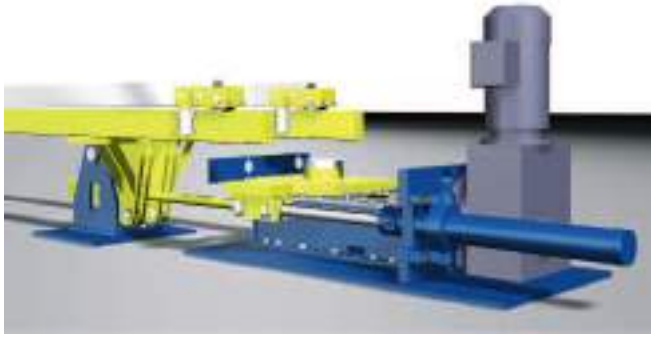
– No additional locking device required

EXPERT TÜNKERS Lift-Powered Rollerbed with integrated underbody clamping technology

EGV Tool Changing Device / “Windmill”



Application: LPRB with flexible underbody clamping technology



Customer load	50-500 kg/Station
Number of stations	3-15
Horizontal stroke	3.000-8.000 mm
Vertical stroke	300-1.200 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 10 s

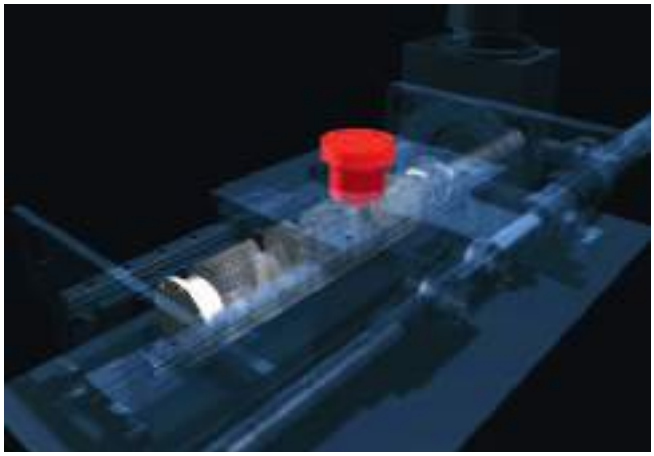
BIW conveying system for the safe and precise positioning of car bodies or body parts in interlinks operation.

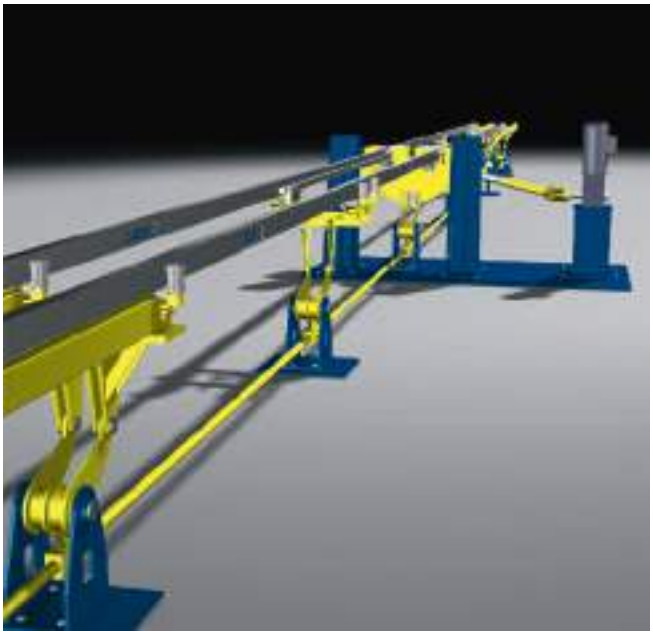
– Safe, accurate and fast transport system with lifting and traversing axis for large components
– Synchronous component transport across all stations
– Simple design, only one central drive for lifting and conveying each component
– Expert crank drive with mechanical locking-in at end position
– Overrun of the end position is not possible

Lift & Shift drive unit

The Indexing cam of the longitudinal drive unit is the core element of the shuttle system.

The high-performance cam follower transmits the power to the linear carriage. The mechanically synchronized connection to the lever mechanism of the lifting shuttle is effected via the pull rod.





Lift and Shift System

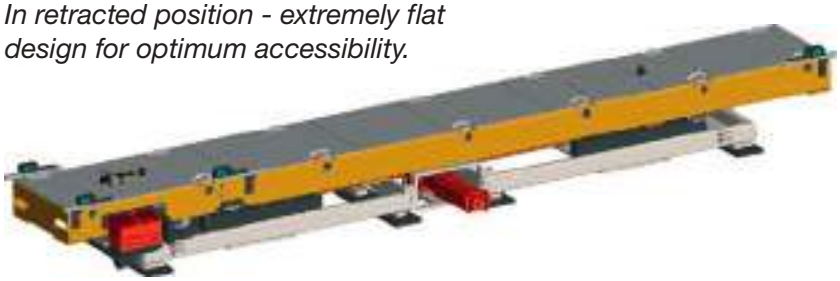
Dual Box Lifter

Low profile rollerbed lifter with integrated spring suspension system

– 30% less energy consumption by using the potential spring energy
– Minimum space requirement
– No interfering edges for robotic welding guns
– Smooth component transfer
– Flexible determination of the takeover position

Customer load (Skid + Part)	200-1.000 kg
Horizontal stroke	4.000-10.000 mm
Vertical stroke	200-800 mm
Cycle time (Lifting-Transporting-Lowering)	≤ 6 s

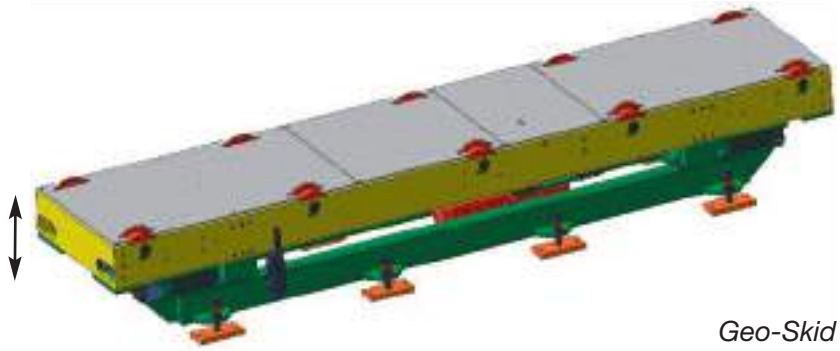
In retracted position - extremely flat design for optimum accessibility.



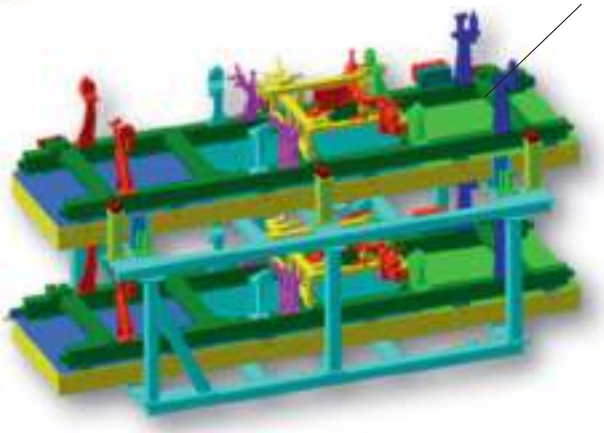
Eccentric Lifter

– Lifting system for short strokes at normal transport times

Customer load (Skid + Part)	200-2.000 kg
Vertical stroke	50-200 mm
Lifting time	≤ 2 s

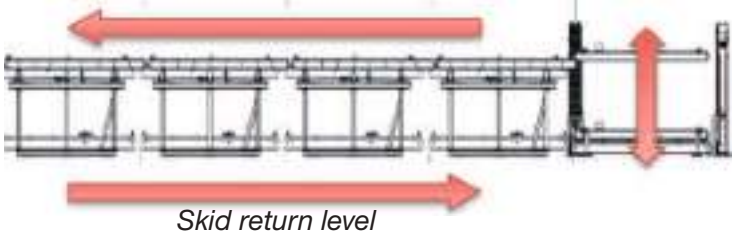


Geo-Skid



Skid conveyor system with eccentric lifters at the working level and rollerbeds at the skid return level

Upper working level – Transport direction *Lift station*

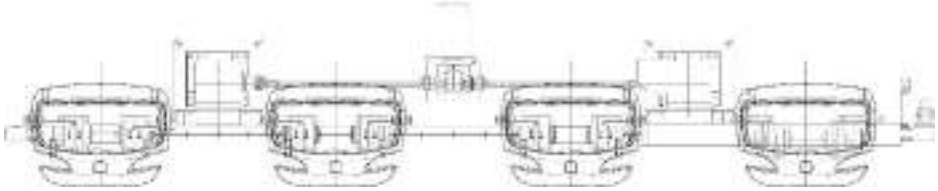


Skid return level

Conveyor line consisting of a horizontal linear axis and two synchronized lifting columns. Particularly suitable for transporting small components at low loads.

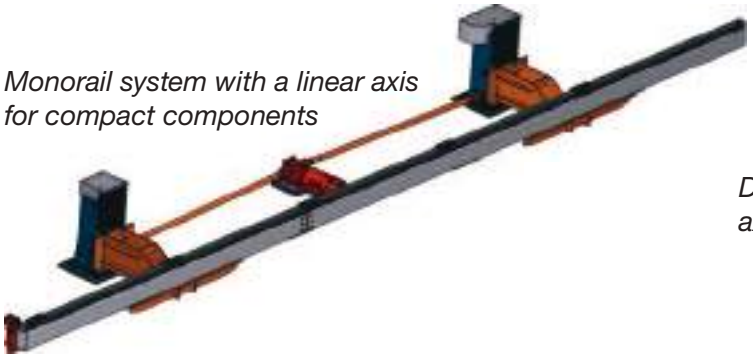
– Transport system for add-on components (e.g., doors and closures)
– Application: Gluing, clinching
– Modular and flexible construction
– Economical solution for the transport of small components

Customer load	10-250 kg
Horizontal stroke	1.000-5.000 mm
Vertical stroke	300-1.500 mm
Cycle time (Lifting-Transporting-Lowering)	≥ 5 s

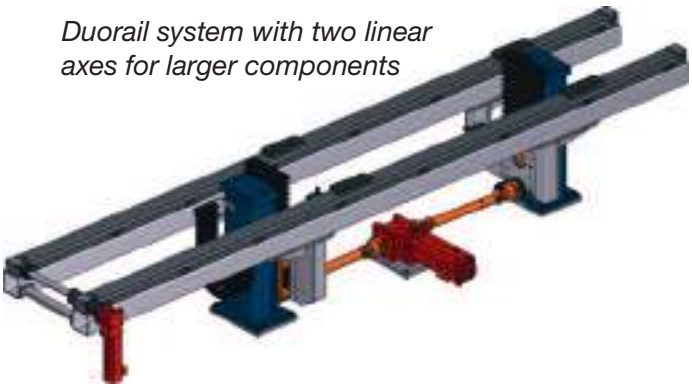


Monorail Shuttle for bonnets

Monorail system with a linear axis for compact components



Duorail system with two linear axes for larger components



Lift and rotate unit for manipulating car bodies

– Applications: Testing stations, rework stations, stud welding stations
– Modular design consisting of EXPERT standard components using cam lifters and trunnion system.
– Minimum space requirement

Customer load (body and frame)	50-3.000 kg
Vertical stroke	1.200-2.800 mm
Lifting time	3-10 s
Indexing angle	flexible

Example of a lift/rotate unit incorporated into a roller conveyor section

Skid Cross Transfer Conveyor

Cross transfer conveyor system for skid storage and separation.

– Modular horizontal storage unit for skids with car body
– Component storage for separation from production lines
– Flexible layout design

Customer load (skid + body)	200-2.000 kg
Horizontal stroke	2.000-10.000 mm
Vertical stroke	50-200 mm

Ring Buffer

Modular skid storage system based on the cross transfer conveyor system. Optimized to make the best use of available space on two levels.

– Modular horizontal/vertical storage for skid with car body
– Maximum storage capacity with minimum space requirements
– Component buffer for separation from production lines
– Flexible layout design

Customer load (skid + body)	200-2.000 kg
Horizontal stroke	2.000-10.000 mm
Vertical stroke	1.500-2.800 mm

Level Lifter

Lifting device for the transport of complete bodies from the welding plane to the second level of the conveyor system.

– Lifting device for loads up to max. 1500 kg

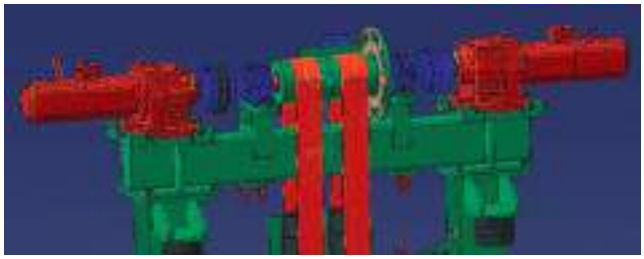
– Frame construction with I - Profiles

– Extremely narrow configuration due to the integration of roller guide and counter weights in profile frame.

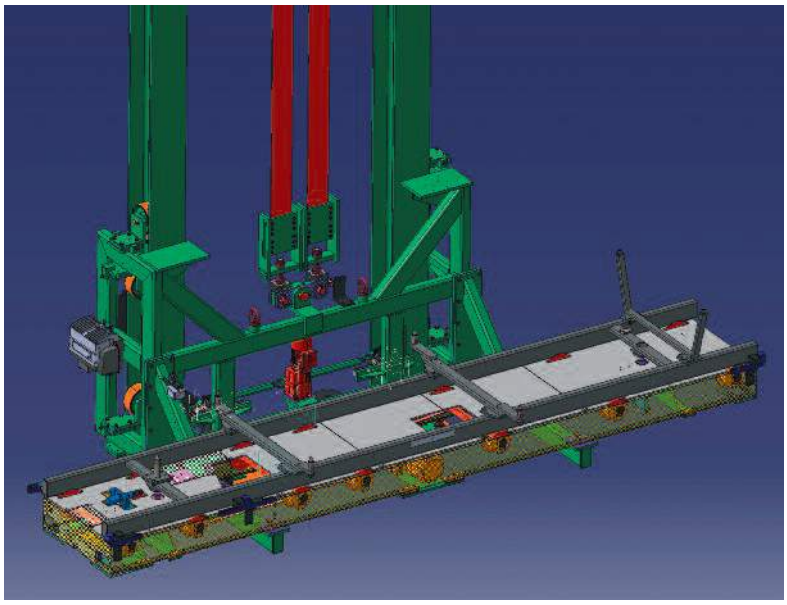
– Safety technology according to the current OEM regulations

– Typical application: Lifting complete car body to the upper level of the conveyor system.

Customer load (skid + body)	150-1.500 kg
Vertical stroke	4.000-8.000 mm



Drive unit with safety feature
Two gearmotors and two lifting belts



Lifting Carriage with rollerbed and skid

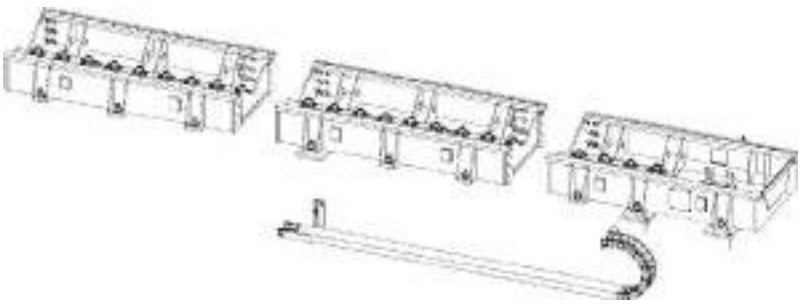
7th axis for robot redefined

Robot and Customer Load	max. 4000 kg
Length of axis	up to 30 m
Travelling Speed	1-2 m/s

– Linear transfer unit for robots
– Proven carriage drive by means of EXPERT-TÜNKERS cam and follower principle
– Precise cam engagement with the floor mounted cam followers
– Higher precision and performance than conventional rack & pinion systems
– Modular system
– Several robots on a single transverse axis possible

Floor mounted cam followers engaged in the drive cam

Evenly arranged cam followers

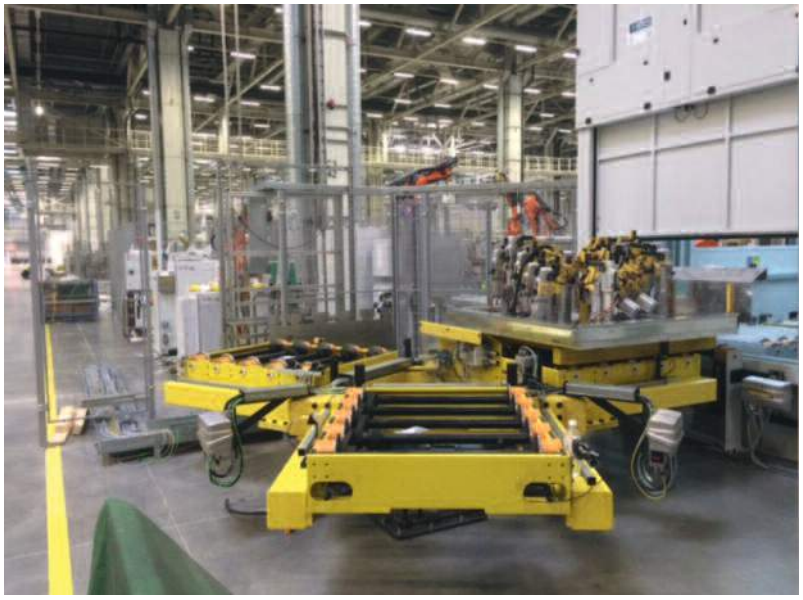


Tool changing system

Tool changing system based on Expert-Tünkers standard components such as rotary table, heavy duty rollerbeds and eccentric lifter.

– Workstation with eccentric lifter and tool locking system in work station
– EDH series rotary table as tool storage zone
– Compact design, optimum flexibility, reduced cycle times
– Individual customization possible

Customer load (skid and tooling)	up to 2.000 kg
Rotation speed	120° in 15 s
Total tool changing cycle	70 s



Tool storage zone on rotary table

Notes

Easy ordering with

https://shop.tuenkers.de

Easy ordering with the TÜNKERS E-SHOP

In addition to the usual ways of ordering our products, you can now use our new online shop to place your orders in a simple, fast and inexpensive manner. Because we manufacture a very wide variety of automation modules, we are now offering a selection of the more popular items in the Clamping and Rotating fields in the E-SHOP. Information about the complete range can be found on our website 9.tuenkers.de and our sales team will be pleased to give you further details. You can rely on receiving the item from our E-SHOP within three days.

The advantages of the TÜNKERS E-SHOP:
– Convenient ordering at any time
– Straightforward registration and navigation
– Fast delivery
– Uncomplicated payment as per invoice

Do you have anymore questions?
We will be glad to answer you: Phone 02102 4517-444.

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