

Expansion Units



Traditional skilled craftsmanship, technical innovation and commercial foresight have made us successful. Motivated personnel with a high standard of qualifications and training, guarantee our customers the highest possible quality and maximum flexibility in the execution of standard and special orders.

With reliability in planning, production and assembly we have gained an excellent reputation within our sector, which we also maintain in the handling of subcontract work. Here the use of modern CNC technology, know-how and rationality



during production are key elements of our efficiency. We are proud of the worldwide application of Neuenhauser products and installations.

Mechanical Engineering

- Special purpose machines and plant in accordance with clients requirements

neuenhauser

- Production of individual prefabricated parts
- Assembly of individually machined components through to complete machines

Subcontract Work

- High productivity by means of CNC machining, flexibility within production and many years of experience in the working of almost all metals and synthetic materials.
- Highest requirements are met for shape and position tolerances as well as surface quality.
- Consistent Quality Control

Textile machines

- Cleaner, Blow off & Suction plants
- Batchwinders
- Conveying automation

Complete solutions

 Development, design, PLC (Memory Programmed) Control, fabrication, assembly, commissioning as well as subsequent servicing and maintenance of production plants

Certified to DIN ISO 9001



Vorwald Expansion Units from Neuenhaus

With the production of Vorwald expansion units in Neuenhaus we maintain the status of a world-wide recognised brand. The complete combination of Vorwald Know-How in the consultation, design and production of expansion units, together with the personnel and our modern machine plant have merely changed location. Neuenhauser's capacity and flexibility in personnel and machinery, guarantee our customers the fastest possible handling of quotations, planning, design, engineering and fabrication as well as fastest reaction times on maintenance and repairs world-wide.



We meet todays requirements with innovative development, new ideas for

modern technology and effective production methods. In this regard, our competitive prices are as important as the high quality of our expansion units, ensuring that our customers continue to remain completely satisfied in the future.





Vorwald

Vorwald Expansion Units

Through many years of experience, continual further development and improvement, Vorwald have since 1920 developed the widest product range in this sector.

We are continually developing and implementing the special requirements of our customers in all areas of Winding Technology.

With our international connections, continual exchange of information and experiences, we achieve the optimal adaptation of our expansion units on the World market.

Vorwald expansion units can be utilised in many different winding processes, for winding and unwinding machines in coreless and shaftless winding as well as in cutting sections. They offer a wide range of combination possibilities and fulfil the highest requirements in quality and productivity.

Vorwald Expansion Shafts

PNEUMATIC

Light but robust expansion shafts with central or flat tubing for use in all areas of the Paper or Synthetic Materials Processing Industries.

MECHANICAL

For particularly high demands with regard to winding. Absolute true running and concentricity as well as low maintenance assembly.

PNEUMATIC-MECHANICAL

A combination of the light pneumatic handling and the precise mechanical expansion. Absolute concentric tensioning as well as fast tensioning and releasing.

Vorwald Expansion Chucks

PNEUMATIC, MECHANICAL OR PNEUMATIC-MECHANICAL

The Vorwald expansion chucks for axle free winding and unwinding. For every application, we can produce and supply the matching expansion chuck from our product range.





Vorwald

Vorwald Adapters

MECHANICAL

For sliding onto existing expansion shafts or expansion chucks to increase winding core diameter. Independent pneumatic adapters are also available.



Vorwald Shaft Delivery and Withdrawing Devices

For when the expansion shafts become too heavy for normal handling. Automated delivery & extraction devices in many variations and special designs.

Vorwald Expansion Chucks

PNEUMATIC, MECHANICAL

Expansion chucks have been found useful on many processing machines. The expansion chucks are mounted onto a shaft and expand pneumatically or mechanically.



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Vorwald Safety Chucks

For increased safety during winding and unwinding through the non-rotating safety locking mechanism.

To open, a slight manual turning movement or pneumatic operation is sufficient. Vorwald safety chucks close automatically when turning begins.

The shaft cannot fall out. These can be supplied in all normal required sizes, in flange or pedestal bearing execution. Optionally with \pm 25 mm axial movement.





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1 Pneumatic Expansion Shafts

TYP 403, with a central bladder system

TYP 409, with flat bladder system

TYP 703, with central bladder and continuous leaf tensioning



The Pneumatic Expansion Shaft Type 403 with a central bladder system



This Vorwald expansion shaft with its central air bladder is an exceptionally light but robust expansion shaft. It is suitable for all applications in the paper-, plastic-, foil- or textile converting industry. The expansion shaft is manufactured for all type of cores with inside diameters of 50 mm, 70 mm, 3", 100 mm, 120 mm, 150 mm, 6", 250 mm and 300 mm. Special dimensions are available on request.

Characteristics and Advantages

- Cost effective due to use of Standard Components
- Light weight available in steel-, aluminium- or carbon fibre tubes (steel covered)
- Quick expansion and release by quick venting valves
- Very low maintenance
- Quick and simple replacement of the expansion tube made possible by the simple shaft design
- Shaft journals can be supplied to suit any type of equipment
- Wide range of applications
- Tensioning elements withdrawn by internal spring system
- Tensioning elements surface material available in rubber, aluminium or steel depending on the core material (easily changeable)
- Bladder protection through spacer sleeves

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with a central bladder system



Construction and Function

Compressed air is injected by use of a special air gun into the bladder via an air valve which is positioned either axially in the journal bearing or radially in the shaft body. The inflation of the bladder expands the tensioning elements resulting in a quick gripping of the core or roll of material. When the shaft has to be withdrawn from the core, the air is released through the quick venting valve, the tensioning elements retract with the help of internal leaf springs permitting the shaft to be easily removed from the reel core.

- 1 Carrier tube
- 2 Journal
- 3 Journal
- 4 Valve
- 5 Tensioning element
- 6 Bladder
- 7 Bladder coupling
- 8 Bladder coupling
- 9 O Ring
- 10 Grub Screw
- 11 Distance bush
- 12 Grub Screw



with flat bladder system



This Vorwald expansion shaft with individual flat bladders is an **exceptionally light and robust expansion shaft** suitable for paper foil, plastic and textile applications.

Its continuous expansion elements are gentle on cores and are particularly suitable for very narrow cores. Additional centralising elements, both fixed or expanding, are available on request.

Characteristics and Advantages

- Expansion elements can be made of aluminium, polyurethane, rubber or synthetic resin depending on application
- Separate long-life expansion bladders embedded between a protective foil and a cover band
- Lightweight expansion shaft with formed aluminium profile and hard wearing surface.
- Steel version is also available for heavy loads
- Fast tensioning and de-tensioning through high speed valves
- Low maintenance
- Simple construction enables quick changing of the bladders
- · Journals can be adapted to suit any equipment
- Very flexible, many different applications, suitable for narrow cores
- Spring release of the tensioning elements
- Available with pre-centralising to suit your cores

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with flat bladder system



Construction and Function

Compressed air is introduced either axially through a valve in the journal or radially through the body of the shaft into the bladders. Their inflation expands the tension elements effecting a fast tensioning of the cores or reel. At the end of the process the air is released though quick release valves. The tensioning elements are retracted by internal springs so that the shaft can be easily withdrawn from the core.

- 1 Carrier tube
- 2 Journal
- 3 Journal
- 4 Valve
- 5 Tension element
- 6 Flat bladder
- 7 Clamp, large
- 8 Insulation plate
- 9 Countersunk screw
- 10 Clamp, small
- 11 Protective foil
- 12 Spring
- 13 Cover band



with central bladder and continuous leaf tensioning



This Vorwald expansion shaft with central bladder and continuous tensioning elements is especially suitable for **winding narrow reels** in paper, plastic and aluminium conversion applications. It can be supplied for cores of all types with internal diameters of 50 mm, 70 mm, 3", 100 mm, 120 mm, 150 mm, 6", 250 mm and 300 mm. Specific dimensions are, of course, also available.

Characteristics and Advantages

- Low price due to use of standard components
- Lightweight due to the thin steel or aluminium tubing
- Fast tensioning and release because of quick release valves
- Low maintenance
- Ouick and easy bladder replacement due to simple construction
- · Journals can be adapted to suit any equipment
- Many applications, especially for narrow reels
- Sprung tensioning elements for quick release
- · Can be used for core-less winding
- Available with a reel start clamp for core-less winding
- Bladder is protected by distance rings

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with central bladder and continuous leaf tensioning



Construction and Function

Compressed air is introduced axially via a valve in the journal or radially through the body of the shaft into the expansion bladder. The inflation of the bladder expands the tensioning elements, which quickly tensions the cores or the reel of material. At the end of the process, the air is released via a quick release valve and the tensioning elements are drawn into the shaft by internal springs, so that the shaft can be easily removed from the core(s).

- 1 Carrier tube
- 2 Journal (valve side)
- 3 Journal (back side)
- 4 Valve
- 5 Tensioning bar
- 6 Bladder
- 7 Bladder fixing
- 8 rings
- 9 Grub screw
- 10 Distance ring
- 11 Clamping piece
- 12 Tensioning element



2 **Pneumatic Cantilever Expansion Shafts**

TYP 303, with central bladder system

TYP 309, with individual flat bladders



Pneumatic Cantilever Expansion Shaft Type 303

with central bladder system



This Vorwald cantilever expansion shaft with a central air bladder is an **unusually lightweight and robust shaft** suitable for all paper film plastic and textile converting applications. It is supplied for cores with internal diameters of: 50, 70, 3^{*t*}, 100, 120, 150, 6^{*t*}, 200, 250 and 300 mm. Special dimensions are also available.

Characteristics and Advantages

- · Low cost due to use of standard components
- Lightweight due to use of aluminium, steel or carbon fibre tubing
- Fast tensioning and release though quick air release valves
- Very low maintenance
- Ouick and easy bladder replacement because of simple construction
- The journal or flange can be adapted to any equipment
- Suitable for many different applications
- Tensioning elements are withdrawn by springs and have a surface of rubber, aluminium or steel depending on the core material.
- Available with continuous elements for narrow reels
- Also available with clamp for core-less winding

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Pneumatic Cantilever Expansion Shaft Type 303

with central bladder system



Construction and Function

Compressed air is introduced into the bladder either axially through a valve in the journal or radially through a valve in the body of the shaft. The pressure causes the bladder to expand which in turn forces the tension elements to extend resulting in a quick gripping of the cores or the reel of material. At the end of the process the air is released through "quick release valves", the tensioning elements are withdrawn by internal leaf springs into the body of the shaft, so that the core can easily be removed.

- 1 Support tube
- 2 Journal
- 3 Flange
- 4 Valve
- 5 Tensioning element
- 6 Bladder
- 7 Bladder fixing
- 8 Bladder fixing
- 9 O ring
- 10 Grub screw
- 11 Distance ring
- 12 Grub screw



Pneumatic Cantilever Expansion Shaft Type 309 with individual flat bladders



This Vorwald cantilever expansion shaft with individual flat bladders is suitable for all paper, film, plastic or textile converting applications. The continuous expansion elements, which are gentle on cores are especially suited to gripping narrow cores. If required additional centralising bars can be supplied, either fixed or expanding for centralising the cores.

Characteristics and Advantages

- Tensioning elements of aluminium, polyurethane, rubber or plastic depending on application
- Separate long life flat expansion bladder embedded between a protective foil and a cover band
- Lightweight cantilever expansion shaft made from strong formed aluminium with a hard wearing surface
- Also available in steel for heavy loading
- Fast gripping and release due to quick release valves
- Very low maintenance
- Simple construction means quick and easy bladder changes
- Journals or flanges can be adapted to suit any equipment
- Many and varied applications, suitable for narrow cores
- Tensioning elements are retracted by springs
- Available with pre-centralising adapted specifically for your cores

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Pneumatic Cantilever Expansion Shaft Type 309

with individual flat bladders



Construction and Function

Compressed air is forced into the expansion bladders either axially via a valve in the journal or radially through the body of the shaft. The inflation of the bladders causes expansion of the tensioning elements resulting in fast gripping of the cores or the reel of material. At the end of the process the air is released through the "quick release" valve, the tensioning elements are pulled back into the body of the shaft by springs so that the core can easily be removed from the shaft.

- 1 Support body
- 2 Journal
- 4 Valve
- 5 Tensioning element
- 6 Bladder
- 7 Clamp, large
- 8 Stud
- 9 Countersunk screw
- 10 Clamp, small
- 11 Protective foil
- 12 Spring
- 13 Cover band



3 **Pneumatic Knife Shafts**

TYP 405, with flat bladder system



Pneumatic Knife Shaft Type 405

with flat bladder system



This pneumatic expansion shaft enables quick locking of knives. No tools are required. After the compressed air has been released the knives can be quickly re-positioned on the shaft. As soon as all the knives are in the correct position they are simultaneously locked in position by apply the air pressure. The repositioning can be made manually or with an automatic system.

Secure positioning without any slipping or lateral movement is assured by the special tensioning elements. The air can injected into or released from the shaft axially via a rotary union.

Characteristics and Advantages

- Available in many different executions to suit your special requirements
- Absolute concentricity due to precision guidance dependant on the diameter of the knife.
- Very low maintenance
- Fast and exact positioning of the bottom knives
- Polyurethane tensioning strip with a steel insert to protect the bladder from damage
- Durable expansion bladder sandwiched between a cover band and low friction band to ensure long life
- Tensioning elements released by springs
- Fast bladder changes due to simple construction
- The surfaces are chrome or nickel plated and machined
- Suitable for very high slitting speeds due to the very high concentricity and precise dynamic balancing.

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Pneumatic Knife Shaft Type 405

with flat bladder system



Construction and Function

Either automatically or by use of an air pistol, compressed air at a pressure of 6 bar is injected into the expansion bladders via a valve which is either located axially in the journal or radially in the body of the shaft. The inflation of the bladders forces the tensioning elements outwards resulting in a quick gripping of the bottom knives. At the end of the process the compressed air is released via the valve and the tensioning elements are withdrawn by springs so that the bottom knives are free and can easily be repositioned on the shaft.

- 1 Carrier
- 2 Journal
- 3 Journal
- 4 Valve
- 5 Tensioning element
- 6 Flat Bladder
- 7 Clamp, large
- 8 Plug
- 9 Countersunk screw
- 10 Clamp, small
- 11 Protective foil
- 12 Spring
- 13 Cover band

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4 Pneum. Friction Shafts / Differential Shafts

TYP 404, with friction rings, concentric tensioning friction shaft with pneumatic adjustment

TYP 409, with friction rings, concentric tensioning and pneumatically adjustable friction shaft



Friction Shaft Type 404 with friction rings

concentric tensioning friction shaft with pneumatic adjustment



This Vorwald differential shaft with friction elements is recommended for the winding of narrow reels on slitting and rewinding machines with centre drives for the converting of plastic, aluminium foil, paper and laminated materials. The friction shaft ensures exact control of the tension even for the narrowest webs and the most difficult materials. The friction action takes place between the shaft and the hardened inner ring of the friction element. At the same time the outer ring of the friction element automatically tensions the core via the web tension. As the cardboard cores have no relative movement (slipping) there is very little "paper dust" using this system. The choice and distribution of the friction elements is according to customer specification and the shaft is delivered ready to install.

Characteristics and Advantages

- Short reset times when changing slitting width
- Web tension controlled pneumatically via the friction segments
- Very low maintenance
- Journals can be fitted to suit any equipment
- Variable distribution of the friction elements
- The expansion shaft is chromium plated and polished, or hardened and polished
- The friction rings are centrally tensioned and various types are available, depending on the application.
- No paper dust due to friction action
- Very little distortion of the steel roll.

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Friction Shaft Type 404 with friction rings

concentric tensioning and pneumatically adjustable friction shaft



Construction and Function

The Vorwald Friction shaft Type 404 is manufactured for cores with internal diameters from 70 mm. The friction rings are arranged on the carrier tube according to the torque to be transfered. If required, smooth spacer rings can be fitted between the friction rings. During winding the friction elements are pressed against the friction rings from the inside by a pneumatic bladder. In this way each individual friction ring is under exactly the same pressure depending on the angular momentum. This pressure can be calculated depending on the shaft diameter and can be supplied via a continuous air supply. The cores are centrally tensioned on the friction rings and held firm until the full reel diameter has been reached. The finished reels are released by a short reversal of direction and can easily be removed.

Suitable cores (4–5 mm) with a high inner hardness must be used for this friction shaft in order to eliminate damage to the cores when rewinding and to ensure easy reel removal. An overspeed of approx 5% is recommended.

- 1 Carrier tube
- 2 Tension ring
- 3 Spacer ring
- 4 Valve
- 5 Friction element
- 6 Bladder
- 7 Clamp
- 8 Insulator plate
- 9 Countersunk screw
- 12 Friction ring

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Expansion Shaft Type 409 for direct friction pneumatically controlled using a flat bladder system



This friction shaft is recommended **for slitting and winding machines** with a central drive for the converting of plastic, aluminium foil, paper and laminates. Its use is particularly recommended if the material to be wound would otherwise have different tensons, or has different thicknesses and/or is to be wound in various core widths. For narrow web applications we would recommend type 404 with friction rings.

Characteristics and Advantages

- · Short reset times when changing web widths
- Web tension controlled pneumatically by the expansion elements
- Very low maintenance
- Fast and easy bladder change because of simple design
- Journals can be fitted to suit any equipment
- Friction is directly between the expansion leaves and the core
- Pre-centering on cores is also available
- Reel release easily automated

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Expansion Shaft Type 409 for direct friction pneumatically controlled using a flat bladder system



Construction and Function

The Vorwald expansion shaft type 409 is manufactured for cores with an internal diameter from 70 mm. The friction elements are arranged on the shaft according to the web width and the torque to be transfered. The friction elements are pressed pneumatically onto the core by inflating the bladders. Friction elements with various friction values are available to match the required web tension. Pressure and torque are controlled by the diameter. The finished reels are easily removed following a quick release of the air pressure. When using friction shafts it is necessary to use suitable cores (4–5 mm) with a high inner hardness, in order to avoid possible damage when rewinding and to ensure easy reel withdrawal. An overspeed of 5% as well as good core quality is recommended.

- 1 carrier tube
- 2 bearing journal
- 3 bearing journal
- 4 valve
- 5 friction elements
- 6 bladder
- 7 clamping plate, large
- 8 insulator plate
- 9 countersunk screw
- 10 clamping plate, small
- 11 Protective foil
- 12 Spring
- 13 Cover strip

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5 Pneumatic Expansion Couplings + Adapters

TYP 404, with central bladder TYP 605, with polyurethane expansion collar TYP 609, with flat bladder system



Pneumatic Expansion Coupling Type 604 with central bladder



The expansion couplings are pushed on to a support shaft and fixed with a clamp. The Type 604 with a central bladder is of particularly light and robust construction. It can grip cores of all kinds with internal diameters of 76, 3^{*t*}, 100, 120, 150, 6^{*t*}, 200, 250, and 300 mm. Special dimensions are also available to suit individual requirements.

Characteristics and Advantages

- Lightweight
- Fast grip and release via a high speed valve
- Any number of couplings per shaft connected via a spiral hose
- Gripping surface of rubber, aluminium or steel depending on the core material
- The lugs are withdrawn by springs
- Maintenance free and economical
- Available with stop collet
- Internal drilling to suit customer's requirement



with central bladder



Construction and Function

The expansion coupling is positioned on the shaft according to reel width and fixed with screws in the clamp ring so that it cannot move axially or slip on the shaft. Compressed air is fed into the bladder from an air-gun via the valve which is positioned either radially or axially in the coupling. The expansion of the bladder activates the gripping elements and causes a quick clamping of the core. At the end of the winding process the compressed air is released via the high speed valve. The gripping elements are withdrawn by springs into the body of the coupling and are returned to the zero position. Now the shaft with the coupling can be easily withdrawn from the core.

- 1 Support tube
- 2 Insert (valve side)
- 3 Insert (back side)
- 4 Valve
- 5 Bladder
- 6 O-ring
- 7 Clamp ring

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with polyurethane expansion collar



These expansion couplings are designed to fit on a support shaft or smaller winding shaft. This coupling with a polyurethane expansion collar is of particularly light and robust construction. It can grip cores of steel aluminium or board with internal diameters of 150 mm and 6". Internal boring is to suit your requirements.

Characteristics and Advantages

- Lightweight
- Easy handling
- High torque transfer (500 Nm per coupling)
- Very low maintenance
- Available with stop collet
- Any number of couplings per shaft
- Internal boring to suit customer requirement (max. 76 mm/3")
- Any number of couplings can be connected in series with a spiral hose



with polyurethane expansion collar



Construction and Function

The expansion coupling is positioned on the shaft to suit reel width and fixed with screws in the clamp ring so that it cannot move axially or slip on the shaft.

Compressed air is fed into the bladder from an air pistol via the axially positioned valve in the coupling. The expansion of the bladder quickly grips the core. At the end of the winding process the compressed air is released via the high-speed valve. The polyurethane collar now returns to its original size. The shaft and coupling can now be withdrawn from the core.

- 1 Support body
- 2 Ring
- 3 Clamp ring
- 4 Valve
- 5 Expansion collar
- 11 Pneumatic connection



with flat bladder system



These couplings are fixed to the carrier shaft. The expansion coupling type 609 with the flat bladder system is an exceptionally light, yet robust design. It has separate expansion elements and can in addition be fitted with either fixed or expanding centralising elements. Cores of all types with internal diameter of

75, 3", 100, 120, 150, 6", 200, 250 and 300 mm can be tensioned. Special dimensions are available.

Characteristics and Advantages

- The required quantity of expansion couplings per shaft are connected by a spiral air hose
- Expansion elements are available in aluminium, polyurethane, rubber or hard plastic depending on application
- Separate long-life expansion bladders embedded between a protective foil and a cover band to ensure a long life
- Light weight by using aluminium with a wear resistant surface
- Rapid release valve ensures quick tensioning and release
- Very low maintenance
- Simple construction enables quick changing of the bladders
- Spring release of the tensioning elements
- Available with pre-centralising to suit your cores
- Available also with core stop collet
- Internal drilling to suit customers' requirement

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with flat bladder system



Construction and Function

The expansion coupling is positioned on the carrier shaft to suit the individual reel width and is fixed in place by tightening the screws in the clamp ring to prevent any twisting or axial shifting. Compressed air is fed into the bladder using an air gun via the valve, which is positioned either radially or axially in the coupling. The expansion of the bladders activates the expansion elements and causes a quick clamping of the cores. After completion of the winding process the compressed air is released via the high-speed valve. The expansion elements are returned to the zero position. The main shaft with the coupling is now easily removable from the core.

- 1 Shaft Body
- 4 Valve
- 5 Expansion Elements
- 6 Flat Bladder
- 7 Clamping Plate, large
- 8 Insulator Plate
- 9 Countersunk Screw
- 10 Clamping Plate, small
- 11 Protective Foil
- 12 Spring
- 13 Cover Band
- 14 Clamping Ring



6 Mechanical Expansion Shafts

TYP 412, for perfect concentricity with a radial tensioning nut TYP 416, for perfect concentricity with a axial tension screw TYP 441, for perfect concentricity with radial tensioning screw Mechanical Differential Shaft,

perfect concentricity with independent expansion of elements



Mechanical Expansion Shaft Type 412

for perfect concentricity with a radial tensioning nut



The Vorwald expansion shaft is activated manually by using a hooked spanner. The reels are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. The very smooth running of the reels allows extremely high rotational speeds.

Characteristics and Advantages

- high load capacity
- Absolute concentric tensioning ensuring the smooth running of the reels at extreme high speeds
- High torque transmission
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- · Easy to operate
- Very low maintenance
- Radial tensioning nut

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Mechanical Expansion Shaft Type 412

for perfect concentricity with a radial tensioning nut



Construction and Function

The tensioning nut is tightened by gripping the grooves of the nut with the hooked spanner and turning it clockwise. The tensioning nut is positioned axially at the end of the journal. This moves the connecting rod and activates the expansion mechanism. The cones that are fitted to the continuous connecting rod are shifted axially. The inside thread of the cones enables precise control of the height of the expansion elements. The result is an even expansion of the elements, which guarantees a totally concentric tensioning of the core. The amount of pressure, which the tightening of the tensioning nut produces, may be varied to achieve the required torque transmission. After completion of the winding process, turning the tensioning nut anti-clockwise loosens it and the expansion mechanism is released. The internal parts are forced back by the pressure spring opposite the tensioning nut. The individual elements are returned to the zero position by the built-in spring clips. The expansion shaft is now easily removable from the core.

- 1 Carrier Tube
- 2 Journal Bearing
- 3 Journal Bearing
- 4 Tensioning Nut
- 5 Expansion Elements
- 6 Cone
- 7 Threaded Rod
- 8 Pressure Spring

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for perfect concentricity with an axial tension screw



The Vorwald expansion shaft, with an internal tension screw, is activated manually by using a socket spanner. The reels are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. The ultra smooth running of the reels means that extremely high rotational speeds can be achieved.

Characteristics and Advantages

- Very high load capacity
- Absolutely concentric tensioning ensuring the smooth running of the reels at extreme high speeds
- High torque transmission
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- Easy to operate
- Very low maintenance
- Axial tension screw

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for perfect concentricity with a axial tension screw



Construction and Function

The clock-wise turning of the socket spanner tightens the tension screw, which is positioned axially in the journal bearing. This process presses the tension screw against the connecting rod and activates the expansion mechanism. The cones that are fitted to the continuous connecting rod are shifted axially. The existing inside thread of the cones enables a precise control of the height of the expansion elements. The result is a totally even expansion of the elements, which guarantees an absolutely concentric tensioning of the core. The amount of pressure, which the tightening of the tension screw produces, may be varied to achieve the required torque transmission. After completion of the winding process the tension screw is loosened by turning it anti-clockwise and the expansion mechanism is released by the pressure spring which is positioned opposite the tension screw. The individual elements are returned to the zero position by the built-in spring clips. The expansion shaft is now easily removable from the core.

- 1 Carrier Tube
- 2 Journal Bearing
- **3 Journal Bearing**
- 4 Tension Screw
- 5 Expansion Element
- 6 Cone
- 7 Threaded Rod
- 8 Pressure Spring

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for perfect concentricity with radial tensioning screw



The Vorwald expansion shaft, with a radial tension screw, is activated manually by using a socket spanner. The reels are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. The ultra smooth running of the reels means that extremely high rotational speeds can be achieved.

Characteristics and Advantages

- Very high load capacity
- Absolutely concentric tensioning ensuring the smooth running of the reels at extremely high speeds
- High torque transmission
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- · Easy to operate
- Very low maintenance
- Radial tension screw

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for perfect concentricity with radial tensioning screw



Construction and Function

The clock-wise turning of the socket spanner tightens the tension screw, which is positioned radially on the expansion shaft. This moves the connecting rod and activates the expansion mechanism. The cones that are fitted to the continuous connecting rod are shifted axially. The thread inside the cones ensures precise control over the height of the expansion elements. The result is a totally even expansion of the elements, which guarantees an absolutely concentric tensioning of the core. The amount of pressure, which the tightening of the tension screw produces, may be varied to achieve the required torque transmission. After completion of the winding process the tension screw is loosened by turning it anti-clockwise and the expansion mechanism is released by the pressure spring which is positioned opposite the tension screw. The individual elements are returned to the zero position by the built-in spring clips. The expansion shaft is now easily removable from the core.

- 1 Carrier Tube
- 2 Flange
- **3 Journal Bearing**
- 4 Radial Tension Screw
- 5 Expansion Element
- 6 Cone
- 7 Threaded Rod
- 8 Pressure Spring
- 9 Mounting for the Tension Screw

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Mechanical Differential Shaft

perfect concentricity with independent expansion of elements



This Vorwald expansion shaft expands mechanically with independent (but concentric) expansion of each element to cater for large tolerances on the inside diameter of the core.

This special differential mechanism is suitable for all mechanical expanding Vorwald shafts of the 400 range from a 70 mm core diameter onwards.

Characteristics and Advantages

- · Very high load capacity
- Absolutely concentric tensioning ensuring smooth running of the reels at extreme high speeds
- Able to adjust for high tolerances in the core inside diameter by independently expanding elements
- High torque transmission
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- Easy to operate
- Very low maintenance



TYPE 302, concentric mechanical expansion, pneumatically actuated TYPE 316, for perfect concentricity, mechanically actuated



concentric mechanical expansion, pneumatically actuated



The Vorwald cantilever expansion shaft is actuated either by an air pistol or by continuous air supply. As with Vorwald's pure mechanical shafts, the reels are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. The ultra smooth running of the reels means that extremely high rotational speeds are achievable.

Characteristics and Advantages

- Absolutely concentric tensioning
- High torque transmission
- Smooth running of the reels even at high speeds and weights
- Easy pneumatic operation of the expansion mechanism
- Quick tensioning and release as only small amounts of air are required
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- Very low maintenance



concentric mechanical expansion, pneumatically actuated



Construction and Function

Compressed air is injected into the cylinder via an air pistol or a continuous air supply. The compressed air acts on the pneumatic piston inside the cylinder. The piston rod moves the connecting rod, which in turn pushes the cones of the expansion mechanism. The result is an even expansion of the elements, which guarantees totally concentric tensioning of the core and a high torque transmission. After completion of the winding process, the cylinder is decompressed through the air valve and the expansion mechanism is released with the assistance of the pressure spring, which is positioned opposite the cylinder. The reel can now easily be removed from the expansion shaft.

- 1 Carrier Tube
- 2 Connecting Rod
- 3 Cover
- 5 Expansion Element
- 6 Cone
- 8 Pressure Spring
- 13 Cylinder
- 16 Pneumatic piston

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for perfect concentricity, mechanically actuated



The Vorwald cantilever expansion shaft with an internal expansion screw is activated manually by using a socket spanner. The reels are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. As a result of the especially smooth running of the reels extremely high rotational speeds can be achieved.

Characteristics and Advantages

- Very high load capacity
- Absolute concentric tensioning ensuring the smooth running of the reels at extremely high speeds
- High torque transmission
- Rotational precision +/-0,1 mm
- Robust construction ensures low deflection
- · Easy to operate
- Very low maintenance
- For the tensioning of thin reels this cantilever expansion shaft (Type B) is equipped with continuous leaves

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for perfect concentricity, mechanically actuated



Construction and Function

The clockwise turning of the socket spanner tightens the tension screw, which is either positioned axially at the front or inside the journal bearing. This process presses the tension screw against the connecting rod and activates the expansion mechanism. The cones that are fitted to the continuous connecting rod are shifted axially. The inside thread of the cones ensures an exactly controlled raising of the height of the expansion elements. The result is an even expansion of the elements, which guarantees a totally concentric tensioning of the core. The amount of pressure, which the tightening of the tension screw produces, may be varied to achieve the required torque transmission. After completion of the winding process the tensions screw is loosened by turning it anti-clockwise and the expansion mechanism is released by the pressure spring, which is positioned opposite the tension screw. The individual elements are returned to the zero position by the built-in spring clips. The reel can now easily be removed from the expansion shaft.

- 1 Carrier Tube
- 2 Journal
- 3 Cover
- 4 Tension Screw
- 5 Expansion Element
- 6 Cone
- 7 Threaded Rod
- 8 Pressure Spring

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8 Mechanical Expansion Shafts with Pneumatic Actuation

TYPE 401, concentric mechanical tensioning, pneumatically actuated

TYPE 410 Multicore[®], centrally tensioned, pneumatic actuation with mechan. centralising elements and pneum. expansion elements

TYPE 745, concentric mechanical tensioning, pneumatically actuated, with expansion leaves



concentric mechanical tensioning, pneumatically actuated



The classic mechanical expansion shaft with Vorwald's robust and tried and tested technology has proved itself in the world's best winding machines, where the demand is for the highest standards of rotational precision, weight uptake and torque transfer. Operation is always by compressed air. If required, a pneumatic-hydraulic pressure amplifier can be built into the shaft to achieve the required high gripping forces. These precision shafts are used in all areas of the paper, film and foil converting industry.

Characteristics and Advantages

- Absolutely concentric expansion
- Rotational precision +/- 0.1mm
- Smooth running even at high speeds and with heavy reels
- Simple pneumatic operation
- Fast expansion and release as only small amounts of air are needed
- Robust construction so very low deflection
- Journals according to customer requirement, also complete bearings, engaging bells etc can be supplied
- For multipurpose use the distribution of the elements must be considered
- Expansion elements can be of steel or with a rubber or polyurethane surface

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concentric mechanical tensioning, pneumatically actuated



Construction and Function

Compressed air is injected into the cylinder either radially by an air pistol though the valve in the journal or axially through the valve in the body of the shaft. The air pressure moves the pneumatic piston in the cylinder. The piston rod transfers the force to the hydraulic chamber. Increased pressure on the hydraulic fluid moves the hydraulic piston and initiates the expansion process. Cones mounted on the central pushing rod are moved axially. The resulting even expansion of the jaws ensures concentric gripping of the cores. At the end of the process the air is released though the valve. The expansion mechanism is released by a spring opposing the expansion cylinder. Now the expansion shaft can be easily withdrawn from the core.

- 1 Supporting Shaft
- 2 Journal
- 5 Expansion elements
- 6 Cone
- 7 Pushing rod
- 8 Pressure Spring
- 13 Cylinder
- 16 Pneumatic piston
- 19 Guide cover
- 21 Hydraulic cylinder



Mechanical Expansion Shaft Type 410 Multicore®

centrally tensioned, pneumatic actuation with mechanical centralising elements and pneumatic expansion elements



The multicore expansion shaft is an innovative development for modern reel slitting or similar applications. The multicore expansion shaft permits concentric clamping of many small cores with total flexibillity of core positioning.

The mechanical concentric bars expand via a robust and precise mechanism which ensures optimum centralising. The pneumatic tensioning elements guarantee high torque transfer to each core, because of their flexible fit. Even with increasing load during winding the elements remain in position and ensure smooth running and good winding.

At the same time the design permits machine builders considerable flexibility with regard to the concentricity, weight take up and the torque transfer requirements. For cores inside dimensions from 4" up to 500 mm.

Characteristics and advantages

- Absolutely concentric tensioning for even the narrowest webs
- Accuracy of concentric running +/- 0.1 mm
- Smooth running even at the highest speeds and heaviest weights
- Simple pneumatic operation
- Easy expansion and release due to the small air content needed
- High moment of inertia means min distortion
- Any journal design including flange mounted if required
- At least 2 air lines required
- Max. torque transfer for each individual core even with variable sizes
- Continuous elements that do not require a fixed loading pattern
- Low maintenance
- · Good value.

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Mechanical Expansion Shaft Type 410 Multicore®

centrally tensioned, pneumatic actuation

with mechanical centralising elements and pneumatic expansion elements



Construction and Function

Compressed air is injected causing the cylinder to move axially. This in turn moves the central cone resulting in an even expansion of the centralising rods, and ensuring a totally concentric tensioning of the cores. Once the cores have been centralised the bladders under the polyurethane tensioning elements inflate. This acts as an "air cushion" giving uniform torque transfer on even the narrowest core. It also compensates for any slight variations in the cores.

On completion of winding the load is taken off the centralising rods by the cylinder. This results in controlled deflation of the bladders and gentle load reduction. The reels can then be removed from the shaft.

- 1 Carrier tube
- 2 Flange
- 3 Bearing journal
- 5 Tensioning Element
- 6 Bladder
- 7 Clamping plate, large
- 10 Clamping plate, small
- 11 Protective foil
- 13 Cover band
- 14 Tensioning (Centralising) Rods
- 15 Centralising Elements
- 16 Cylinder
- 20 Cone
- 26 Throttle valve

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concentric mechanical tensioning, pneumatically actuated, with expansion leaves



The classic mechanical expansion shaft with continuous leaves is based on the proven construction of the Vorwald expansion shaft type 401. Because of the continuous leaves, which can also be coated with rubber or polyurethane, this shaft is especially suitable for winding narrow reels. If you require precision winding, good torque transfer, flexible applications or have heavy reels, then you should consider this shaft. Very many successful installations prove the effectiveness of this shaft. Operation is always by compressed air. If required, a pneumatic – hydraulic pressure amplifier can be incorporated in the shaft construction in order to achieve the required high gripping forces.

Characteristics and Advantages

- Absolutely concentric expansion
- Rotational precision =/- 0.1mm
- Smooth running even at high speed with heavy reels
- Simple pneumatic operation
- Fast gripping and release as only small amounts of air are necessary
- Robust construction
- Journal design to suit customer requirements
- Gripping leaves can be coated with steel, aluminium, rubber or polyurethane
- To cope with variable core tolerances wear resistant elastic coatings can be supplied
- Continuous leaves make variable core distribution
 patterns possible

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concentric mechanical tensioning, pneumatically operated, with expansion leaves



Construction and Function

The integrated pneumatic cylinder is filled with compressed air either by means of a rotary connection or by a filler valve. This moves the pneumatic piston in an axial direction into the hydraulic chamber. A greater force is then exerted by the hydraulic piston one to the reduced surface area. This increased force ensures simultaneous our precisely equal mechanical expansion of all the expansion elements. Exchangeable leaves are screwed to the expansion element. These leaves also make thin walled oval cores completely round so that avery good circularity is achieved from the start of the winding process. When the air is released from the pneumatic cylinder the tensionin the whole mechanism is released by the action of the pressure spring which returns the expansion elements to their zero position. The finished rolls can now be removed or alternatively the shaft can be removed.

- 1 Carrier tube
- 2 Journal
- 5 Expansion elements
- 6 Cone
- 7 Connecting rod
- 8 Pressure spring
- 13 Cylinder
- 16 Pneumatic piston
- 19 Guiding cover
- 20 Hydraulic piston
- 28 Expansion leaves



9 Mechanical Expansion Chucks

TYPE 811, for perfect concentricity

TYPE 831, with high concentricity using axial force and a fixed centering cone

TYPE 832, with highly concentric tensioning using axial force without a fixed centering cone

TYPE 841, perfect concentricity using a radial tensioning screw



for perfect concentricity



The Vorwald expansion chuck type 811 is used for gripping cores on shaftless unwinding- and rewinding machines. With the robust Vorwald expansion mechanism high torque- and load capacities can be achieved. The expansion chuck centers itself automatically in every core. The expansion chuck is operated by an external push rod and can be supplied for all currently available core diameters up to 500 mm.

Characteristics and Advantages

- Can be used for all the different external expansion systems (pneumatic, mechanical or hydraulic)
- Quickly exchangeable for use with different core diameters
- Solid construction, therefore high load capacity
- High torque transmission
- Rotational precision +/-0,1 mm, therefore smooth running of the reels even at high speeds.
- Quick tensioning and release
- Low maintenance
- The flange can be adjusted to suit every type of installation
- According to the required torque, the expansion chucks can be equipped with any type of element or leaf

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for perfect concentricity



Construction and Function

Depending on the application, the expansion chuck is either fixed to the main bearing flange or directly to the pneumatic cylinder. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. A push rod is actuated by injecting compressed air either into an external cylinder mounted on the bearing shaft or into a cylinder fitted directly to the chuck. This push rod moves the cone axially forcing the elements to expand outwards. The result is an even expansion of the elements or leaves which guarantees a totally concentric tensioning of the core. The thrust, which the push rod requires, depends on the torque to be transmitted by the expansion chucks. After completion of the winding process the push rod moves back to its initial position when the cylinder is deflated by means of the vent valve. As the air is released from the cylinder, the expansion mechanism relaxes due to pressure from the spring, which is situated opposite the cylinder. Additionally, the built in spring clips in the expansion elements ensure that the elements retract into the chuck. The expansion chuck can now be easily withdrawn from the core.

- 1 Casing
- 2 Cover
- 5 Expansion element
- 6 Cone
- 8 Pressure Spring

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with high concentricity using axial force and a fixed centering cone



This self-actuating expansion chuck is designed for use with unwind and rewind machines where an axial force is present. It is this axial force which actuates the expansion chuck. It is equipped with a fixed centering cone, which prevents the premature expansion of the tensioning elements when picking up the reel. During insertion into the core (cardboard, steel or synthetic), the collar of the expansion chuck presses against the core and as a result of this force the tensioning lugs expand concentrically and produce the required tension.

Characteristics and Advantages

- High torque transmission
- Rotational precision ± 0,1mm, ensuring smooth running of the reels even at high speeds
- Quick tensioning and release
- Low maintenance
- The expansion chucks can be equipped with any type of element or leaf to suit the torque required
- The flange can be adapted to suit every type of equipment
- Self activating tensioning using the existing axial force

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with high concentricity using axial force and a fixed centering cone



Construction and Function

The expansion chuck is fixed to the shaft flange in way of the bearing. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. The fixed centering cone guarantees a perfect insertion of the expansion chuck into the cardboard core, even when it is slightly deformed. By inserting the chucks a little further the tensioning elements are expanded over the angled surface of the internal cone. The result is an even expansion of the elements or leaves which guarantees a totally concentric tensioning of the core. The amount of gripping pressure, which this procedure produces, may be varied to achieve the required torque transmission. After completion of the winding process the expansion chucks are removed easily from the core simply by moving the axial shifting device. The elements are returned to the zero position by the built-in spring clips and the axial pressure spring.

- 1 Cover
- 2 Centering cone
- 3 Flange with cone
- 4 Adjusting spring
- 5 Tensioning elements
- 8 Pressure Spring

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with highly concentric tensioning using axial force without a fixed centering cone



This self-activating expansion chuck is designed for use with unwind and rewind machines where an axial force is present. The expansion chuck is activated by using this axial force. During insertion into the core (cardboard, steel or synthetic core), the collar of the expansion chuck presses against the core and as a result of this force the tensioning elements expand concentrically and produce the required tension.

This expansion chuck is very versatile due to its small length (without a centering cone).

Characteristics and Advantages

- Quickly exchangeable when using different core diameters
- High torque transmission
- Rotational precision +/-0,1mm, ensuring smooth running of the reels even at high speeds
- Quick tensioning and release
- Very low maintenance
- The expansion chucks can be equipped with any type of element or leaf to suit the torque required
- The flange can be adapted to suit every type of equipment
- Self activating tensioning using the existing axial force

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with highly concentric tensioning using axial force without a fixed centering cone



Construction and Function

The expansion chuck is fixed to the flange on the bearing. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. By inserting the chucks a little further the tensioning elements are expanded over the angled surface of the internal cone. The result is an even expansion of the elements or leaves which guarantees a totally concentric tensioning of the core. The amount of gripping pressure, which this procedure produces, may be varied to achieve the required torque transmission. After completion of the winding process the expansion chucks are removed easily from the core simply by moving the axial shifting device. The elements are returned to the zero position by the built- in spring clips and the axial pressure spring.

- 1 Casing
- 2 Cover
- 3 Flange with cone
- 4 Adjusting spring
- 5 Expansion elements
- 8 Pressure Spring

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perfect concentricity using a radial tensioning screw



The expansion chuck type 841 is designed for the tensioning of reel-cores on shaftless unwinding and winding machines. The Vorwald expansion chuck with radial tensioning screw is operated manually by using a socket wrench. The cores are tensioned absolutely concentrically by the mechanical force of the expansion mechanism. The mechanical tensioning part can be fitted with various interchangeable expansion chucks.

Characteristics and Advantages

- Quickly interchangeable when using different core diameters
- High torque transmission
- Rotational precision +/-0,1mm, ensuring smooth running of the reels even at high speeds
- Quick tensioning and release
- Low maintenance
- The expansion chucks can be equipped with any type of element or leaf to suit the torque required
- The flange can be adapted to suit every type of equipment

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perfect concentricity using a radial tensioning screw



Construction and Function

The expansion chuck is fixed to the shaft flange. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. Turning the socket wrench to the right tightens the tensioning screw, which is positioned radially on the expansion chuck. This forces the wedge to move inwards and power is then transmitted through an angle of 90 degrees on to the cone in the expansion chuck. The cone shifts axially so the tensioning elements are expanded over the angled surface of the cone. The result is an even expansion of the elements or leaves which guarantees a totally concentric tensioning of the core. The amount of pressure, which the tightening of the tension screw produces, may be varied to achieve the required torque transmission. After completion of the winding process, the tensioning screw is loosened by turning it to the left. This process releases the expansion mechanism with the assistance of a pressure spring that is situated opposite the tension screw. The elements are returned to the zero position by the built- in spring clips. The expansion chuck is now easily removed from the core.

- 1 Casing
- 2 Cover
- 3 Housing for the tensioning screw
- 4 Radial tension screw
- 5 Expansion element
- 6 Cone
- 7 Pressure Spring



10 Mechanical Expansion Chucks with Pneumatic Actuation

TYPE 860, perfect concentricity, pneumatic actuation

TYPE 861, perfect concentricity, pneumatic actuation with pressure amplifier



perfect concentricity, pneumatic actuation



The expansion chuck type 860 is designed for the tensioning of reel cores on shaftless unwind and rewind machines. The expansion chuck is connected to the flange on the bearing. The pneumatic cylinder is integrated in the main body. It is actuated either by an air gun or by continuous air supply. With this robust Vorwald expansion mechanism high torque- and load capacities can be achieved. The expansion chuck centers itself automatically in the core. This expansion shaft is available for core diameters up to 500 mm and is easily modified for special requirements.

Characteristics and Advantages

- Through the proven mechanical Vorwald tensioning system an absolutely concentric tensioning is guaranteed and the transmission of very high torque levels is achieved, ensuring smooth running of even very large reels at high speeds
- Easy pneumatic operation of the tensioning mechanism
- Quick tensioning and release as only small amounts of air are required
- Rotational precision +/- 0,1 mm
- Very low maintenance
- The expansion chucks can be equipped with any type of element or leaf to suit the torque required (steel, aluminium, rubber, polyurethane)
- The flange can be adapted to suit every type of equipment

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perfect concentricity, pneumatic actuation



Construction and Function

The expansion chuck is fixed to the flange on the bearings. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. Compressed air is injected at 6 bar through the valve into the cylinder via an air gun. The valve is radially positioned in the cylinder. The compressed air moves the pneumatic piston inside the cylinder. The piston rod of the pneumatic piston forces the cone in an axial direction, and the tensioning elements are expanded over the angled surface of the cone. The result is an even expansion of the elements or leaves, which guarantees a totally concentric tensioning of the core. The necessary force in the cylinder depends on the torque transmission required. After completion of the winding process, the compressed air is released through the valve. As a result, the expansion mechanism returns to its original position due to pressure from the spring that is situated opposite the cylinder. The elements are withdrawn by the built-in spring clips, and the expansion chuck can now easily be removed from the core.

- 1 Casing
- 2 Cover
- 3 Cylinder
- 5 Expansion Elements
- 6 Cone
- 7 Pneumatic piston
- 8 Pressure spring
- 9 Guide bush



perfect concentricity, pneumatic actuation with pressure amplifier



The expansion chuck type 861 is designed for the tensioning of reel cores on shaftless unwind and rewind machines. It is based on the reliable expansion chuck type 860, but features an additional integrated pneumatic/hydraulic pressure amplifier to ensure a high tension load (gripping power) where only the smallest areas are available. It is actuated either via an air gun or via a continuous air supply. With this robust Vorwald expansion mechanism high torque- and load capacities can be achieved. The expansion chuck centers itself automatically in the core.

Characteristics and Advantages

- Through the proven mechanical Vorwald tensioning system an absolutely concentric tensioning is guaranteed and very high levels of torque transmission achieved, ensuring smooth running of even very large reels at high speeds
- Easy pneumatic operation of the tensioning mechanism
- Quick tensioning and release as only small amounts of air are required
- Rotational precision +/- 0,1 mm
- Very low maintenance
- The expansion chucks can be equipped with any type of element or leaf to suit the torque required (steel, aluminium, rubber, polyurethane)
- The flange can be adapted to suit every type of equipment
- High torque transmission possible by using a pneumatic/hydraulic pressure amplifier

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perfect concentricity, pneumatic actuation with pressure amplifier



Construction and Function

The expansion chuck is fixed to the flange on the bearings. The expansion chucks are inserted simultaneously from both sides into the core up to the stop collet by the axial movement of the bearings. Using an air gun compressed air is injected at 6 bar via the valve into the cylinder. The valve is radially positioned in the cylinder. The compressed air moves the pneumatic piston inside the cylinder. In doing so, the piston rod transmits the pressure of the pneumatic piston into the hydraulic chamber. With an increase of pressure the hydraulic fluid shifts the hydraulic piston and sets the expansion mechanism in motion. The piston rod of the hydraulic piston moves the cone in an axial direction, and the tensioning elements are expanded over the angled surface of the cone. The result is an even expansion of the elements or leaves which guarantees a totally concentric tensioning of the core. The force in the cylinder can be adjusted to suit the level of torque transmission required. After completion of the winding process, the cylinder is decompressed through the valve. As a result, the expansion mechanism is released with the assistance of a pressure spring that is situated opposite the cylinder. The elements are returned to the zero position by the built-in spring clip. The expansion chuck can now be easily removed from the core.

- 1 Casing with flange
- 2 Cover
- 3 Cylinder
- 5 Expansion Elements
- 6 Cone
- 8 Pressure spring
- 16 Pneumatic piston
- 19 Guide Cover
- 21 Hydraulic piston

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11 Mechanical Expansion Chucks with Torque Actuation

TYPE 834 Rollmatic[®], torque actuated, concentric tensioning



Mechanical Expansion Chuck Type 834 Rollmatic®

torque actuated, concentric tensioning



This Vorwald Expansion Chuck utilises the power in shaftless unwinders which is available from the web tension. No additional power or energy is required. The tension mechanism ensures an absolutely concentric tensioning of the reels.

Characteristics and Advantages

- quickly exchangeable so easily adaptable for use with all core diameters
- low maintenance
- The proven mechanical Vorwald Expansion system ensures an absolutely concentric tensioning, thereby guaranteeing smooth running reels, even with heavy reels and high web speed
- High torque transfer
- operates in both directions, i.e. suitable for both drives and brakes, and can be installed either on the left or the right side.
- no additional force or energy is required
- the flange can be adapted to suit every installation
- Protects the core through large tensioning surfaces and automatic tension adjustment
- Options core kicker
 - self neutralization

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Mechanical Expansion Chuck Type 834 Rollmatic®

torque actuated, concentric tensioning



Construction and Function

The expansion chuck is fixed to the shaft flange of the bearings. The expansion chucks are inserted simultaneously from both sides into the reel core up to the stop collet, by utilising the axial movement of the bearings. The tension in the web actuates the expansion chuck. The web tension ensures that the cylinder rollers expand over the profiled hub in the centre of the chuck. The result is an even expansion of the tension leaves. This guarantees a concentric tensioning of the reel core. The tension increases in proportion with the torque. This prevents the core from splitting open. After completion of the winding process, the expansion chucks are withdrawn from the reel core by the axial movement of the bearings.

- 1 Flange
- 2 Casing
- 3 Guide Ring
- 4 Expansion Leaf
- 5 Cylinder Rollers
- 6 Profiled Hub
- 7 Cover
- 8 Thrust Washer
- 9 Cylinder Screw
- 10 Pin

Please note:

This torque activated expansion chuck functions only if a minimum torque from the brake or drive is present. Do not use excessive sidearm pressure during winding process

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Mechanical Expansion Couplings + Adapters TYPE 260, for perfect concentricity TYPE 601, for perfect concentricity, pneumatically actuated

TYPE 900, for perfect concentricity



Mechanical Expansion Coupling Type 260 for perfect concentricity



The Vorwald expansion couplings have a proven track record on many different types of processing machines. The expansion couplings are fixed to a shaft. The position is adjustable to match the width of the reel. The expansion couplings are operated manually by using a Spanner.

Characteristics and Advantages

- Many different designs with different diameters and sleeve lengths
- For core inside diameters from 70 mm upwards
- Easy to operate
- Very low maintenance
- Clamping cores in steel, aluminium and plastics
- Clamping cores are exchangeable different core diameters
- Very attractive price / performance ratio

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Mechanical Expansion Coupling Type 260 for perfect concentricity



Construction and Function

The expansion coupling is positioned on the carrier shaft to suit individual reel widths. It is fixed with a grub screw inside the shaft groove to prevent axial movement. Torque is transmitted via screw mechanism, which is located in the bore of the expansion coupling. By turning the tensioning nut clockwise with a spanner the cone on the inner tube is moved by the tightening action.

This movement of the cone forces the three-part clamping sleeve to expand. The result is an even expansion of the clamping sleeves, which guarantees total concentric tensioning of the core. The amount of pressure, which the tightening of the tensioning nut produces, may be varied to achieve the required torque transmission. After completion of the winding process the tension is relieved by turning the nut anti-clockwise. The cone and the three-part clamping sleeve then return to their zero position. The carrier shaft with the expansion coupling can now be withdrawn from the core.

- 1 Outer Cover
- 2 Cone
- 3 Tensioning Nut
- 4 Expansion Leaves
- 5 Circular Spring

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Mechanical Expansion Coupling Type 601

for perfect concentricity, pneumatically actuated



The Vorwald expansion couplings type 601 are fixed to the carrier shaft. The internal mechanical expansion mechanism is actuated pneumatically. Concertricity is guaranteed even with very heavy reels and at high speeds. The Type 601 is particularly suitable for use with heavy reels, as the deflection, which can occur when using purely pneumatic couplings , is avoided. There are no internal bladders to wear out. The expansion couplings can be supplied for cores with an inside diameter from 150 mm to 500 mm. Special dimensions and designs are also possible.

Characteristics and Advantages

- Absolutely concentric tensioning
- Pneumatically actuated
- No internal bladders
- Robust mechanical expansion mechanism
- Rotational precision +/-0,1 mm
- Smooth running of the reels, even with very heavy reels and at high speeds
- Very low maintenance
- Expansion elements can be steel or coated with rubber or polyurethane



Mechanical Adapter Type 900

for perfect concentricity



This Vorwald Adapter is suitable for fitting on to existing expansion chucks for the tensioning of cores with larger inner diameters. The adapter can be adjusted to fit all expansion chucks. The adapter is actuated by the existing expansion chuck.



Characteristics and Advantages

- Ouickly exchangeable for use with all core diameters
- Very low maintenance and light-weight
- Cost-effective enlargement of the expansion diameter, suitable for nearly all types of expansion chucks
- Quickly changed by easily sliding over existing expansion chuck, quick change-over
- Depending on the core material and the required torque, the adapter is furnished with different expansion elements or leafs (steel, aluminium, rubber or polyurethane coated)
- Casing in steel, aluminium or synthetic

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Mechanical Adapter Type 900

for perfect concentricity



Construction and Function

The positioning of the adapter on the expansion chuck is determined by an adjusting spring, which is screwed to the main body of the adapter. The adapter slides over the expansion chuck and the adjusting spring of the adapter is guided by the adjusting spring groove of the expansion chuck. When the adapter has been fitted over the expansion chuck, it is secured by two grub screws, which are positioned in the adjusting spring. The adapters together with the existing expansion chucks are inserted simultaneously from both sides into the core up the stop collet by the axial movement of the bearings. The expansion of the adapter occurs concentrically over the elements that are positioned in the expansion chucks. The expansion of the adapter is identical to that of the existing expansion chuck. After completion of the winding process the carrier expansion chuck is released and the built-in elements of the adapter are returned to the zero position by the spring clips. The adapter together with the carrier expansion chuck is now easily removable from the core.

- 1 Casing
- 2 Cylinder screw
- 3 Adjusting spring
- 4 Shell
- 5 Expansion elements
- 8 Spring clip

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13 Safety Chucks (Sliding Disks/Pivoting Disks)

Mechanical Safety Chucks (Sliding Disks), Flange- and Pillar Block Application

Installation Dimensions or Safety Chucks (Sliding Disks) Safety Chucks *without* axial adjustment

Installation Dimensions or Safety Chucks (Sliding Disks) Safety Chucks *with* axial adjustment

Chuck Dimensions for Safety Chucker (Sliding Disks) PKV 1-7 Take-ups interchangeable with one another

Safety Chucks (Pivoting Disk), flange- and self supporting versions



Mechanical Safety Chucks (Sliding Disks)

Flange- and Pillar Block Application



These Vorwald-safety chucks offer greater reliability when winding and unwinding because of the nonrotating locking mechanism. To open, a small rotary motion on the handle is sufficient. They close automatically when shaft rotation starts. The expansion shaft can not fall out. Available in all current sizes, in pillar block design and axial lateral adjustment, with cross adjustment and constant axial air supply. We are also happy to offer an optimum solution of a combined safety chuck and expansion shaft tailored to your requirements.

Characteristics and Advantages

- Safety chucks, lock automatically when rotation starts
- Locking mechanism does not rotate
- High load capacity
- High torque transmission
- Hardened wear parts are exchangeable
- Robust, adjustable conical roller bearings for high rotational speed
- Pillar block or flange chuck
- Many types of shaft installations available
- If required with manual cross adjustment
- No problems of "fit" as the safety chucks and expansion shafts are available from one source

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Installation Dimensions or Safety Chucks (Sliding Disks) Safety Chucks without axial adjustment



Please take the detailed chuck dimensions from the datasheets for the profiler PKV 1-7.

Please take furder dimensions from the relerant individual datasheets.



| Тур | reel weight (max. kg) | torque (max. Nm) | v | w | I | EF | ES | х | Y |
|-------|--------------------------|---------------------|----|-----|----|-------|-------|----|----|
| 25/40 | 1800 | 600 | 25 | T-1 | 30 | T+310 | T+280 | 0 | 70 |
| 40/55 | 3200 | 1200 | 27 | T-1 | 32 | T+316 | T+246 | 80 | 75 |



Installation Dimensions or Safety Chucks (Sliding Disks) Safety Chucks with axial adjustment



Please take the detailed chuck dimensions from the datasheets for the profiler PKV 1-7.

Please take furder dimensions from the relerant individual datasheets.

| Typ ± 25 mm | reel weight (max. kg) | torque (max. Nm) | v | w | I | EF | ES | x | Y |
|----------------|--------------------------|---------------------|----|-----|------|-------|-------|-----|----|
| 25/40 | 1800 | 600 | 25 | T-1 | 24.5 | T+370 | T+370 | 90 | 70 |
| 40/55 | 3200 | 1200 | 27 | T-1 | 26.5 | T+366 | T+342 | 114 | 75 |

| Typ ± 50 mm | reel weight (max. kg) | torque (max. Nm) | v | w | I | EF | ES | x | Y |
|----------------|--------------------------|---------------------|----|-----|------|-------|-------|-----|----|
| 25/40 | 1800 | 600 | 25 | T-1 | 24.5 | T+420 | T+420 | 90 | 70 |
| 40/55 | 3200 | 1200 | 27 | T-1 | 26.5 | T+416 | T+392 | 114 | 75 |

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Chuck Dimensions for Safety Chucker (Sliding Disks) PKV 1-7

Take-ups interchangeable with one another

| PKV-1 | 15 | Туре | 25/40 | 40/55 |
|-------|--|------|-------|-------|
| | | e | 45.5 | 58 |
| | | D | 55 | 70 |
| | | d | 36 | 46 |
| | | 1 | 23 | 25 |
| | | Х | = d | = d |
| PKV-2 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | $\{ \cdot \langle \cdot \rangle \neq \rangle \} \rightarrow \times [+ \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow $ | D | 55 | 70 |
| | | d | 36 | 46 |
| | | l l | 23 | 25 |
| | | Х | = d | = d |
| PKV-3 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | | D | 55 | 70 |
| | | d | 36 | 46 |
| | | I | 23 | 25 |
| | | Х | = d | = d |
| PKV-4 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | $\{\cdot - \sqrt{2} \\ 2 \\ - 1 \\ $ | D | 55 | 70 |
| | | d | 36 | 46 |
| | | 1 | 23 | 25 |
| | | Х | = d | = d |
| PKV-5 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | $(\cdot ()))) \rightarrow \times (-) \times (-)) $ | D | 55 | 70 |
| | | d | 36 | 46 |
| | | | 23 | 25 |
| | | Х | = d | =d |
| PKV-6 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | $(-+) \rightarrow (-+) \rightarrow $ | D | 55 | 70 |
| | | d | 36 | 46 |
| | | l | 23 | 25 |
| | | Х | = d | = d |
| PKV-7 | | Туре | 25/40 | 40/55 |
| | | е | 45.5 | 58 |
| | ┉┋╶{╵╼╣═┊╼╠╾╵}╴═╽╶──┝╳╎═┽╽╶┼┥╵╟╫ | D | 55 | 70 |
| | | d | 36 | 46 |
| | | | 23 | 25 |
| | | Х | = d | = d |

additional executions available to suit customer requirements

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Safety Chucks (Pivoting Disk)

flange- and self supporting versions



These Safety Chucks provide safety when winding and unwinding. The locking device can only be opened when at the top for the removal of the shaft. Shaft insertion via the angled hand disk is also very easy. For simple applications these safety chucks offer a very economic solution for the bearing support of expansion and winding shafts. For higher demands and higher rotational speed, the safety chucks can be supplied with exchangeable wear parts. We are happy to offer the optimum solution of safety chuck / expansion shaft combination tailored to your requirements.

Characteristics and Advantages

- Safety bearings with automatic, self activating locking when rotation starts
- Self supporting or Flange mounted, with or without shafts
- Grooved Ball Bearings for robustness
- Many different journal shapes available
- Locking mechanism (Hand wheel) rotates
- Very economical high price / performance ratio
- Optional with exchangeable wear parts
- Optional with special equipment like brakes, cross- and longitudinally adjustment
- No problems of "fit" when purchasing safety chucks and expansion shafts from one source

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Standard Chucks



Pillar block

without shaft



with shaft



Range chuck without shaft



Range chuck with shaft

| Type Square bar opening | | | Beam | weight | | Torque | | |
|-------------------------|-----------|-------------|--------|-----------|--------|---------------|--|--|
| | [mm] | ⊠ [inch] | [kg] m | ax. [lbs] | [Nm] m | nax. [ft lbs] | | |
| 14 - 20 | 14 - 20 | .551 – .787 | 150 | 330 | 40 | 29 | | |
| 19 - 25 | 19 - 25 | .75 – 1. | 400 | 880 | 120 | 85 | | |
| 22 - 30 | 20 - 30 | .787 – 1.25 | 800 | 1740 | 180 | 130 | | |
| 30 - 40 | 25 - 40 | 1. – 1.57 | 1600 | 3520 | 350 | 250 | | |
| 40 - 50 | 30 - 50 | 1.25 – 2. | 2800 | 6200 | 1100 | 800 | | |
| 50 - 80 | 50 - 80 | 2. – 3.15 | 7000 | 15400 | 2350 | 1700 | | |
| 80 – 120 | 80 – 120 | 3.15 - 4.73 | 12000 | 27600 | 10000 | 7230 | | |
| 120 – 180 | 120 – 180 | 4.73 - 7.1 | 22000 | 48400 | 20000 | 14500 | | |
| 170 – 200 | 170 – 200 | 6.7 – 7.87 | 32000 | 70400 | 25000 | 18125 | | |
| 170 – 230 | 200 – 230 | 6.7 - 9.06 | 64000 | 140800 | 41000 | 29725 | | |

Optionen

Clutches and Brakes







Double disc brake

Replaceable – insert chucks

By introducing the replaceable insert chuck we have been able to cut down customers down times nearly to zero.



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Safety Chucks (Pivoting Disk)

Self supporting and flange executions



| Safety Chuck Type | Α | В | с | D | E _{f7} | E-F | ¹/₂D | H-G | К |
|----------------------|-----|----|----|----|-----------------|------|------|-----|-----|
| 14-20 | 38 | 8 | 3 | 15 | 14-20 | 0,1 | 7,5 | 0,5 | 1 |
| 19-25 | 54 | 9 | 3 | 24 | 19-25 | 0,1 | 12 | 0,5 | 1 |
| 22-30 | 61 | 8 | 4 | 28 | 22-30 | 0,15 | 14 | 0,5 | 1 |
| 30-40 | 73 | 13 | 5 | 30 | 30-40 | 0,2 | 15 | 0,5 | 1,5 |
| 40-50 | 81 | 13 | 5 | 32 | 40-50 | 0,3 | 16 | 0,5 | 2 |
| 50-80 | 106 | 16 | 6 | 40 | 50-80 | 0,4 | 20 | 0,5 | 3 |
| 80-120 | 145 | 18 | 16 | 60 | 80-120 | 0,5 | 30 | 0,5 | 4 |
| 120-180 | 175 | 24 | 20 | 70 | 120-180 | 0,6 | 35 | 1 | 5 |
| 170-200 | 216 | 24 | 30 | 90 | 170-200 | 0,8 | 45 | 1 | 6 |
| 170-230 | 230 | 18 | 32 | 96 | 170-230 | 0,8 | 48 | 1 | 6 |

We are happy to supply detailed dimensions datasheets if required.

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14 Shaft Handling Devices / Shaft Puller

Shaft Handling Device / Shaft Puller for Vorwald Shafts and other makes

Inquiry Data Sheet for the Shaft Puller with attached sketch for data entry



Shaft Handling Device / Shaft Puller

for Vorwald Shafts and other makes



The Vorwald Shaft Puller (EA) is suitable for all sectors of the paper, plastic, metal-foil and combined material processing industry and can be implemented in a variety of different ways.

The constant increase in the weight and dimensions of reels, automatic production processes and strict working regulations have led increasingly to the replacement of manual handling of the expansion shaft by automatic shaft pullers.

Shaft pullers are used for the removal of the expansion shaft from finished reels and for insertion into empty cores. Further features, i.e. the automatic core load from a core magazine or the pick-up and dispatch of the finished reel can be integrated into the design and delivered as one unit.

Characteristics and Advantages

- · Many years of experience in handling expansion shafts
- The modular approach ensures the correct requirement for the handling from small 50 kg expansion shafts up to shafts for paper machines weighing several tons
- Gentle hydraulic tensioning of the shaft journal, with support if necessary
- · Automatic release of the expansion shaft
- The hydraulic lift with its overload function protects the shaft journal of the expansion shaft from deformation
- The vertical column with its free moving linear bearing ensures completely horizontal withdrawal and insertion of the expansion shaft
- Continuous, smooth acceleration protects the expansion shaft and reduces the wear and tear of the machine
- Easy operation: manual / semi-automatic / fully automatic, according to customer requirements
- Perfect Integration with existing machinery possible through the installation of a SPS
- Economical as a result of short, reproducible work cycles
- The use of well-known quality components for hydraulics, drives and linear bearings ensures economic investment over the years and minimum down time
- Complete planning, production and assembly right up to acceptance by the customer in his works
- Produced to DIN ISO 9001
- Good service and quick supply of parts supported by the experienced Neuenhauser organisation

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Types of Construction

There are two standard types of shaft puller using the cantilever principle.

1. Moveable Shaft Puller

This consists of a machine bed with linear guidance. Attached to the bed is a moveable machine column. Built onto this column is the expansion shaft gripping plate. After the finished reel has been put down, the column moves towards the expansion shaft, clamps the shaft journals, releases the air and withdraws the shaft smoothly. Height adjustment can be effected either by the shaft puller or by the reel table. After the reel has been removed (for example by a prismatic carriage), the shaft is covered with a new core and the shaft puller returns the expansion shaft to the winding position or into the shaft magazine etc.

The main feature of this machine is that the shaft puller carries out the clamping function and the shaft movement.

2. Fixed Shaft Puller

This consists of a stationary machine column with an expansion shaft gripping plate. The finished reel is deposited on a prismatic carriage in front of the shaft puller. The height adjustment can be carried out by either the shaft puller or by a prismatic lifting carriage.

The shaft puller only grips the expansion shaft. The withdrawal of the shaft is carried out by the electric motor-driven reel carriage.

The decision concerning which of these two designs is economically more viable depends on the individual project. The solution is often obvious for reasons of available space or the material flow of the finished reels.

3. Special requirements

In specific cases or when very heavy shaft weights are involved, we are able to offer variations of the two standard machines already described.

Please ask for further information. We are pleased to offer you advice from the planning stage onwards.

Options for the Vorwald Shaft Puller

- Semi or fully automatic process through SPS
- Shaft gripping plate to suit customers requirements
- Shaft gripping plate for two expansion shafts (Alu-separator)
- Prismatic lifting table with or without drive

System Additions

- Automatic reel supply
- Automatic core magazine
- Automatic shaft take-over device
- Automatic prismatic lifting table / prismatic carriage
 with drive and reel kicker

Example of System Designs:

Special shaft puller design

- With automatic core transport
- With integrated lifting table
- Work cycle operated by SPS



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Inquiry Data Sheet for the Shaft Puller

with attached sketch for data entry

Your Details

| Company |
|------------------|
| Address |
| Town/post code |
| Telephone number |
| Fax number |
| E-mail number |
| Contactperson |
| Department |
| Date |

Design

- Construction 1: Moveable Shaft Puller
- Construction 2: Fixed Shaft Puller
- Construction 3: Special Requirements
- Options for Vorwald-Shaft Puller

Technical Requirements

| Expansion shaft weight (max) | kg |
|--|------------------|
| Expansion shaft length (max) | mm |
| Expansion shaft diameter (max) | mm |
| Reel diameter (max) | mm |
| Reel weight (max) | kg |
| Expansion shaft insertion height (min) | mm |
| Expansion shaft insertion height (max) | mm |
| Vertical Lift | mm |
| Time for reel change | min. |
| Electric connection voltage | V/ Hz |
| Control Voltage | V/DC |
| Compressed Air Supply | bar |
| Operation | manual 🔲 |
| | semi-automatic 🔲 |
| | fully-automatic |

Remarks _

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Moveable Shaft Puller Design 1

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Fixed Shaft Puller

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15 Enquiry Datasheet for Expansion Shafts

Enquiry Datasheet for Expansion Shafts

Enquiry Datasheet for Expansion Chucks and Adapters



Enquiry Datasheet for Expansion Shafts



Core Details

| core internal diameter: ± | |
|---------------------------|--|
| core external diameter: | |
| core material | |

Winding Method:



Rewind

Technical Requirements

| material | | |
|------------------------|-------|----------|
| web speed (max.) | | m/min |
| web tension (max.) | | N;(N/cm) |
| working width (max.) _ | | mm |
| working width (min.) _ | | mm |
| slit width (max.) | | mm |
| slit width (min.) | | mm |
| reel diameter | | mm |
| reel weight (max.) | | kg |
| reel weight (min.) | | kg |
| centrical expanding | 🔲 yes | 🛄 no |
| hardened journals | 🔲 yes | 🛄 no |

Your Details

| company |
|--------------|
| address |
| |
| telephone |
| fax |
| contact name |
| department |
| date |

| vertical shaft + twin backing roller | notes | Originator |
|---|-------|------------|
| centre drive | | |
| surface drive | | |

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Enquiry Datasheet for Expansion Chucks and Adapters



| Core Details: Chuck | Technical Requirements |
|--------------------------|------------------------|
| Core internal diameter : | material |
| Core external diameter: | web speed (max.) |
| Core material : | web tension (max.) |
| | working width (max.) |
| | working width (min.) |
| Core Detail: Adapter | slit width (max.) |

| Core internal diameter : | ± |
|--------------------------|---|
| Core external diameter: | |
| Core material | |
| | |

Unwind
 Centre Drive
 Rewind
 Surface Drive

| web speed (max.) | | m/mir |
|------------------------|-------|---------|
| web tension (max.) | | N;(N/cm |
| working width (max.) _ | | mr |
| working width (min.) _ | | mr |
| slit width (max.) | | mr |
| slit width (min.) | | mr |
| reel diameter | | mr |
| reel weight (max.) | | kç |
| reel weight (min.) | | kç |
| centrical expanding | 🔲 yes | 🔲 no |
| hardened journals | | no |

Your Details



| Remarks | Representation |
|---------|----------------|
| | |
| | |
| | |

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