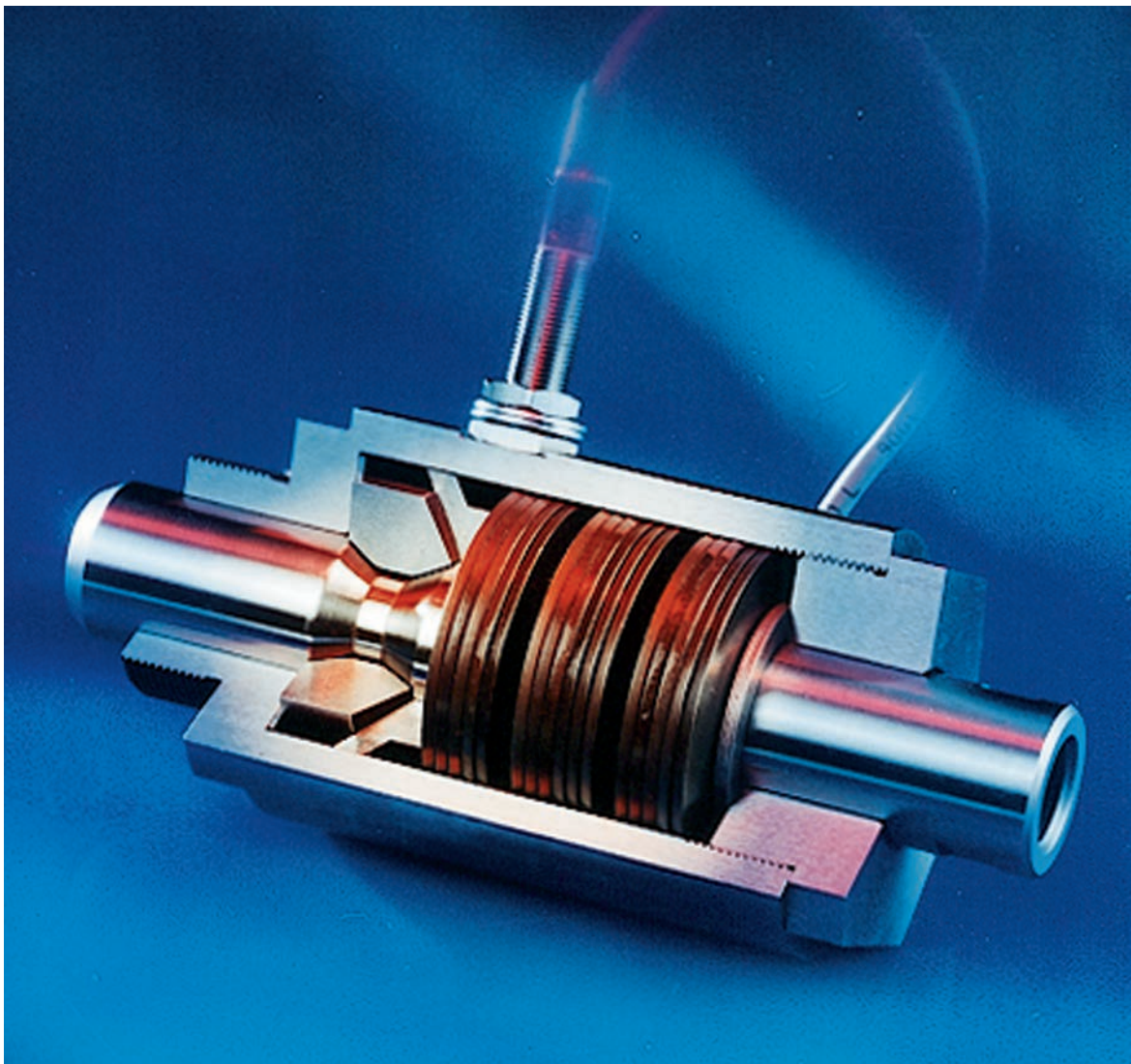


# Force Limiters

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# Why RINGSPANN Force Limiters?

## Why RINGSPANN Force Limiters?

There are many ways of transmitting forces and torques in machines, installations and vehicles. The advances in constructional engineering are marked by components which run faster and are of a lighter construction. Therefore it has become necessary to provide for safety elements at the critical points. Until now these were usually in the shape of overload clutches on rotating shafts which, once the maximum torque was exceeded, would either slip, stop, or automatically cut out.

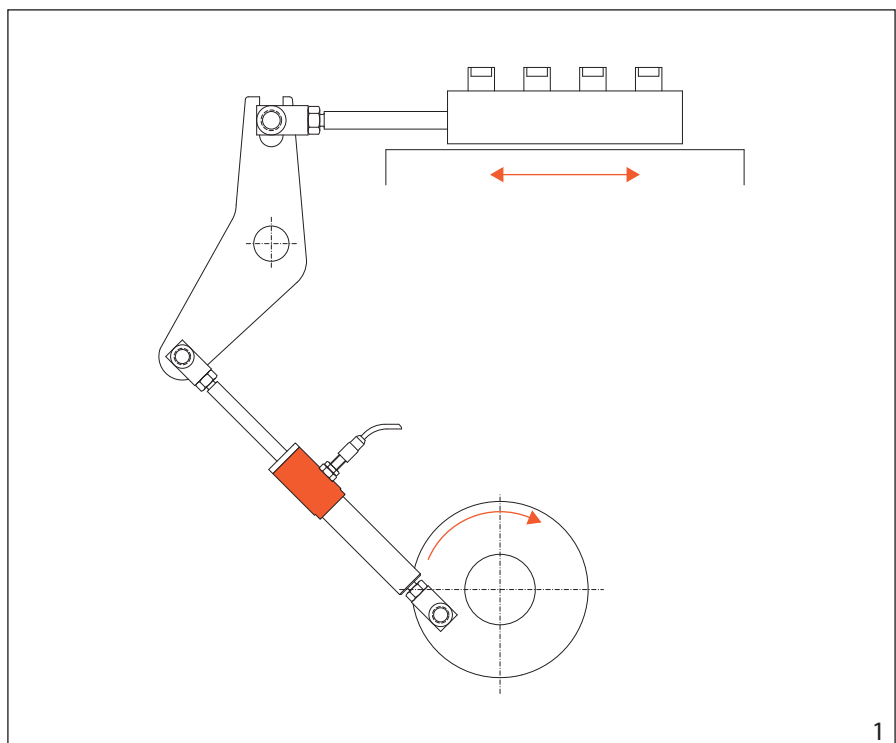
However, many machines and installations have elements which transmit longitudinal forces. To prevent damage and breakdowns a solution for limiting the amount of these forces has to be found. RINGSPANN has designed a series of Force Limiters, outstanding in that forces up to a certain size can be transmitted in both directions completely free of play and rigid. On exceeding the preset disengaging force  $F_A$  the power of the force is interrupted and the output part is no longer driven.

After the overload has been cleared the driving part and the driven part are aligned towards each other and the Force Limiter re-engages automatically. The Force Limiter can be fitted with non-contact proximity switch to give early warning of reaching a certain force, or disengaging signal.

## Application Example

Shown in ill. 1 is the operation of the feeding equipment for workpieces on an interlinked installation. The feeding equipment is driven by a crankshaft pin on the output shaft via a connecting rod and a lever. The Force Limiter with non-contact proximity switch is built into the connecting rod as shown in ill. 1.

If the material jams the force in the connecting rod increases considerably, causing extensive damage in the machine if there is no safety installation available. The Force Limiter ensures that no excessive high forces reach the feed mechanism. If the force in the Force Limiter exceeds its present limit it disengages and, through the non-contact proximity switch, a signal is given to switch off the drive.



# Force Limiters PA

## Assembly and Operation

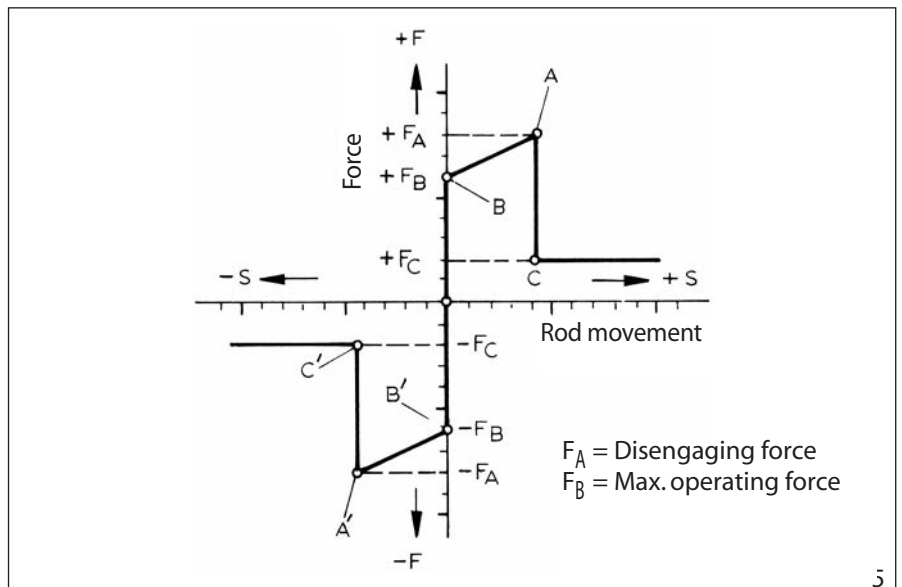
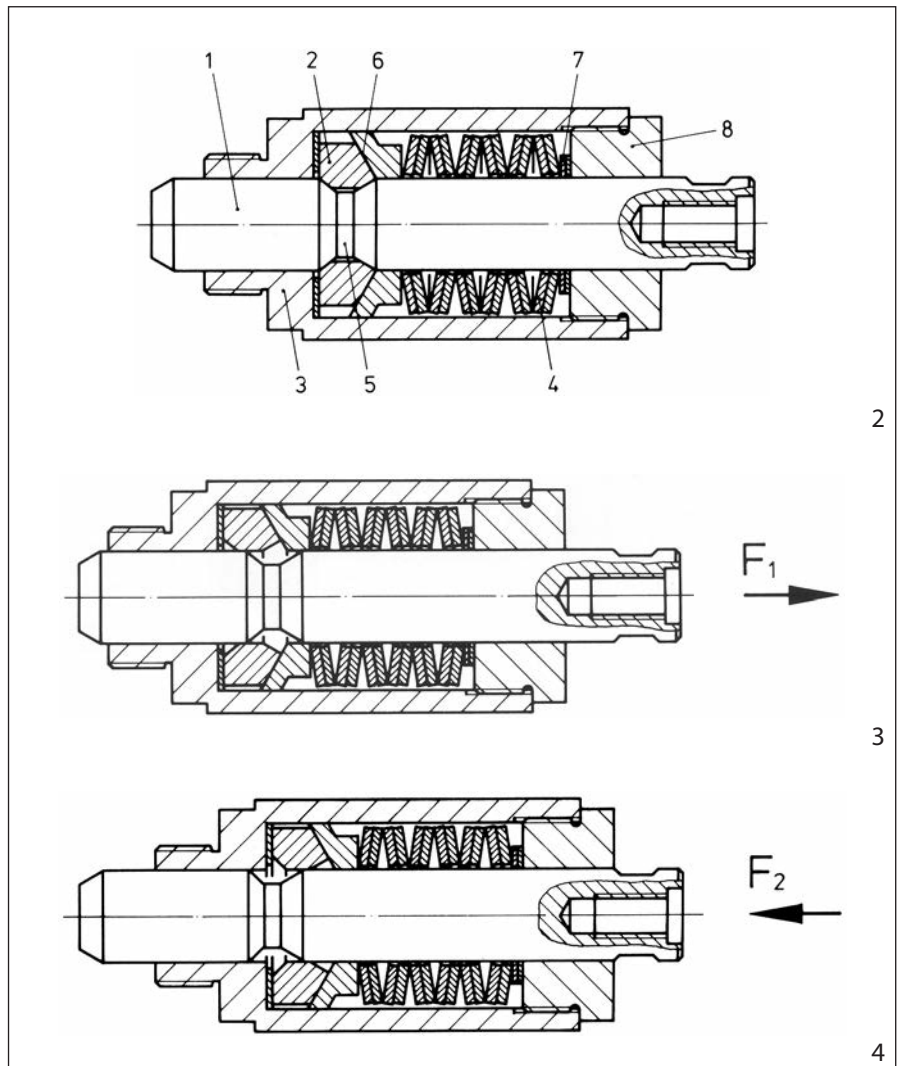
Assembly and operation of the RINGSPANN Force Limiter PA can be seen in illustrations 2 and 5. The sectional drawing in ill. 2 shows the standard type of basic unit. The rod 1 is connected with the housing 3 via locking segments 2. The locking segments 2 are pressed into the groove 5 of the rod and against the conical surface 6 of the slide ring via the disc spring pack 4. If a force is effective between the rod and the housing, then, according to ill. 5, up to force  $F_B$  no movement takes place between the two parts. If the force is increased the rod moves relative to the housing until the disengaging force  $F_A$  is reached. The force then drops to the value  $F_C$ . The loss of force down to  $F_C$  is effected according to the direction C. The maximum possible operating force should always be less than  $F_B$  and considerably more than  $F_C$ . With the RINGSPANN Force Limiter  $F_B$  is always larger than  $0,7 \times F_A$  and  $F_C$  is ca.  $0,2 \times F_A$ .

This disengaging force  $F_A$  can easily be adjusted by changing the number of washers 7. The nut 8 is always tightened against the housing to prevent unauthorised increase of the disengaging force.

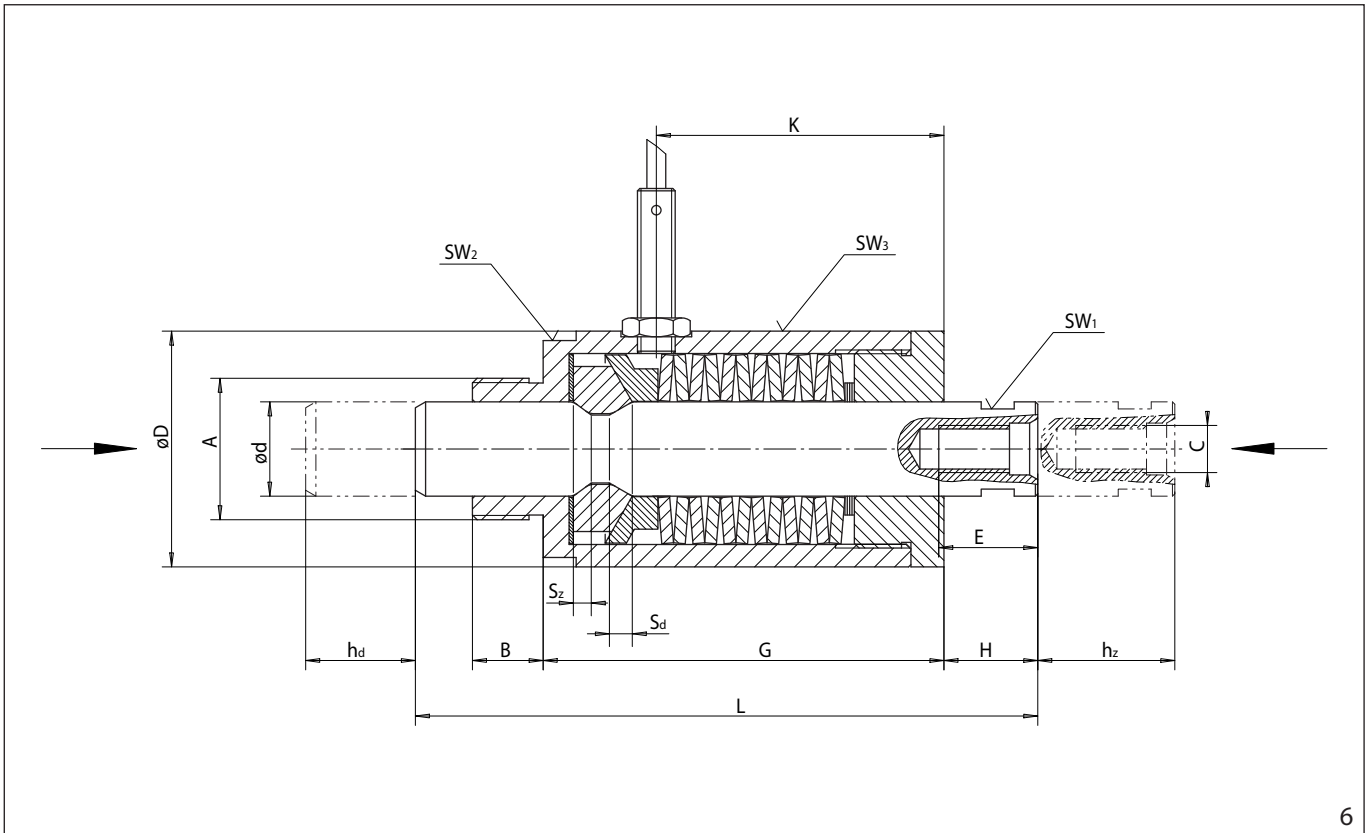
Ill. 3 and 4 show the Force Limiter in the disengaged position with the force effective towards the right and left respectively. In both cases one can see clearly that in this position the locking segments are clear of the groove in the rod, the springs are at maximum pressure.

## Advantages

- Forces limited in both directions
- High response accuracy
- Automatic re-engagement
- Maintenance-free
- Robust construction
- Uncomplex design
- Easy to build on
- For disengaging forces up to 140 000 N
- Disengaging force finely adjustable



# Force Limiters PA



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## Technical Data and Dimensions

Type	Max. Disengaging Force $F_A$ N	d mm	A	B mm	C	D mm	E mm	G mm	H mm	K mm	L mm					
PA 12	PAG 12	3600	12	M20 x 1,5	10	M6	32	10	61	16	16	20	38	95	3,5	2,7
PA 20	PAG 20	10000	20	M30 x 1,5	15	M10	50	16	85	20	20	25	57	132	4,3	3,4
PA 30	PAG 30	22000	30	M45 x 1,5	20	M16	75	25	120	24	24	40	78	180	6,9	5,4
PA 50	PAG 50	62000	50	M70 x 2,0	28	M24	132	40	212	36	36	63	150	300	11,3	8,8
PA 75	PAG 75	140000	75	M100 x 2,	40	M36	200	60	315	57	57	100	215	450	17,3	13,6

## Accessories

- Non-contact proximity switch to stop the drive motor
- Non-contact proximity switch to signal excess force

## Ordering

Please indicate the required disengaging force on your order. The Force Limiter can be supplied with preset disengaging force on request.

Other rod lengths and -connections available as special types.

We shall be pleased to advise you on the correct choice and dimension of a suitable Force Limiter.



# Questionnaire for the selection of RINGSPANN Force Limiters

please photocopy

Company: .....	Departament/Contact: .....									
Address: .....	Name: .....									
.....	Enquiry no.: .....									
Telephone: .....	Date: .....									
Telefax: .....	e-mail: .....									
<b>1. Type of machine into which the Force Limiter is to be installed</b>	..... ..... .....									
<b>2. Force Limiter use</b>	In the case of overload the force limiter must: <input type="checkbox"/> Disengage <input type="checkbox"/> Only follow a particular path without disengaging <input type="checkbox"/> Trigger an electrical signal									
<b>3. Force Limiter function</b>	In the case of overload the force limiter must: <input type="checkbox"/> Operate or disengage in both directions <input type="checkbox"/> Only operate or disengage if there is compressive load <input type="checkbox"/> Only operate or disengage if there is tensile load									
<b>4. Manifestation of force?</b>	<input type="checkbox"/> Non-recurrent or occasional adjustment of disengaging force: Disengaging force $F_A$ :.....N <input type="checkbox"/> Frequent change in disengaging force required: Disengaging force $F_A$ adjustable from ..... to .....N  <table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: center;">Upon pull</td> <td style="text-align: center;">Upon pressure</td> </tr> <tr> <td>Operating force [N]</td> <td style="text-align: center;">.....</td> <td style="text-align: center;">.....</td> </tr> <tr> <td>Disengagement path [mm]</td> <td style="text-align: center;">.....</td> <td style="text-align: center;">.....</td> </tr> </table> <ul style="list-style-type: none"> <li>• Operating force is the force which the Force Limiter has to transmit without disengaging or following a particular path.</li> <li>• Disengagement path is the maximum change in length of the Force Limiter when it disengages.</li> </ul>		Upon pull	Upon pressure	Operating force [N]	.....	.....	Disengagement path [mm]	.....	.....
	Upon pull	Upon pressure								
Operating force [N]	.....	.....								
Disengagement path [mm]	.....	.....								
<b>5. Connection</b>	<input type="checkbox"/> Standard types as per catalogue 49 <input type="checkbox"/> With rod connection as per sketch <input type="checkbox"/> With housing connection as per sketch									
<b>6. Installation conditions</b>	<input type="checkbox"/> In enclosed machine housing <input type="checkbox"/> Exposed, but in enclosed space <input type="checkbox"/> Oil bath or oil fog <input type="checkbox"/> Outside, ambient temperature from .....°C to .....°C Other (e.g. accessibility, dust and other environmental factors which may be significant): ..... .....									
<b>7. Non-contact proximity switch</b>	<input type="checkbox"/> Non-contact proximity switch <input type="checkbox"/> Complete with installed and adjusted non-contact proximity switch <input type="checkbox"/> With location borehole for non-contact proximity switch									



### Freewheels

#### Backstops

Automatic protection against reverse running of conveyor belts, elevators, pumps and fans.



Catalogue 84

#### Overrunning Clutches

Automatic engaging and disengaging of drives.



Catalogue 84

#### Indexing Freewheels

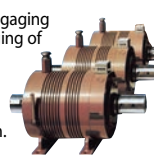
For gradual feed of materials.



Catalogue 84

#### Housing Freewheels

Automatic engaging and disengaging of multimotor drives for installations with continuous operation.



Catalogue 84

#### Freewheel Elements

Cage Freewheels, Sprag Sets and Freewheel Chains.

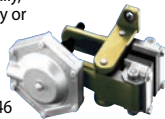


Catalogue 89

### Brakes

#### Industrial Disc Brakes

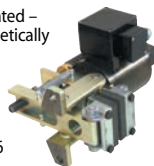
Spring activated – pneumatically, hydraulically or manually released.



Catalogue 46

#### Industrial Disc Brakes

Spring activated – electromagnetically released.



Catalogue 46

#### Industrial Disc Brakes

Pneumatically activated – spring released.



Catalogue 46

#### Industrial Disc Brakes

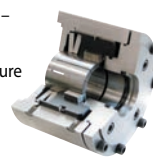
Hydraulically activated – spring released.



Catalogue 46

#### Safety Clamping Units

Spring actuated – hydraulically or pneumatically released. For secure and precise positioning of piston rods.



Catalogue 32

### Shaft-Hub-Connections

#### Two-part Shrink Discs

External clamping connection. Advantages: Simple, secure mounting even without torque wrench.



Catalogue 36

#### Three-part Shrink Discs

External clamping connection for the fastening of hollow shafts on solid shafts



Catalogue 36

#### Cone Clamping Elements

For shaft-hub connections. High torques with small dimensions.



Catalogue 36

#### Star and Clamping Discs

Ideal for shaft-hub-connection for frequent release.



Catalogue 36

#### Star Spring Washers

Axial spring element for preloading of ball bearings.



Catalogue 20

### Torque and Force Limiters

#### Torque Limiters with Screw Face

Reliable overload protection for tough operating conditions.



Catalogue 45

#### Torque Limiters with Rollers

With double or single Rollers. Through ratcheting or disengaging, also for 360° synchronous running.



Catalogue 45

#### Torque Limiters with Balls

Reliable overload protection with maximum response accuracy. Also backlash free.



Catalogue 45

#### Torque Limiters with Friction Linings

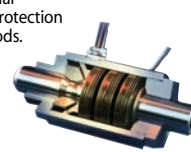
RIMOSTAT Torque Limiter for constant torque. Belleville Spring Torque Limiter for simple release.



Catalogue 45

#### Force Limiters

Reliable axial overload protection in piston rods.



Catalogue 49

### Couplings

#### Flexible Couplings

Large, allowed radial and angular misalignments. Minimum resiliency.



Catalogue 44

#### Flexible Couplings

Large, allowed radial and angular misalignments. Minimum resiliency.



Catalogue 44

#### Flange-Couplings

Rigid, easily removable shaft coupling with backlash free cone clamping elements.



E04.020

#### Rigid Couplings

Rigid, easily removable shaft coupling with backlash free cone clamping elements.



Catalogue 36

### Precision Clamping Fixtures

#### Standard Parts for Clamping Fixtures

The RINGSPANN-System for the manufacture of your own precision clamping fixtures.



Catalogue 14

#### Standard Clamping Fixtures

Standard program in high precision, ready manufactured chucks and mandrels.



#### Special Clamping Fixtures

Custom made solutions for specific clamping problems.



#### Collet Mandrels

Universal, cost effective standard series. Fast collet change to other clamping diameters.



Catalogue 15

#### Clamping Clutches

For the automatic coupling of rolls. Fast, safe and free from slipping connection.

