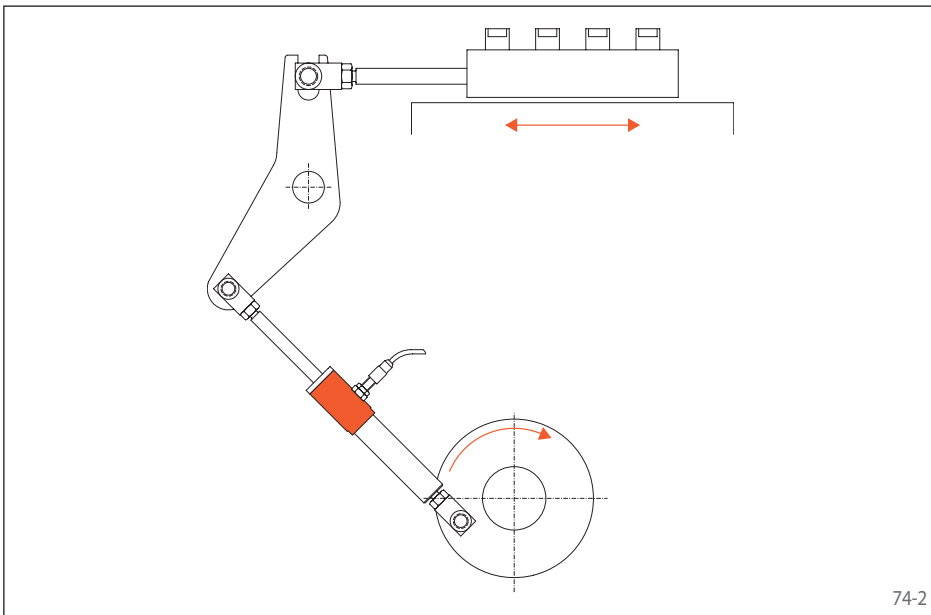


74-1

Features

- 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



74-2

Application Example

Shown in figure 74-2 is the operation of the feeding equipment for workpieces on an inter-linked 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 figure 74-2.

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 preset limit it disengages and, through the non-contact proximity switch, a signal is given to switch off the drive.

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 pre-set 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.



RINGSPANN Force Limiter PAG as overload clutch in a filling plant

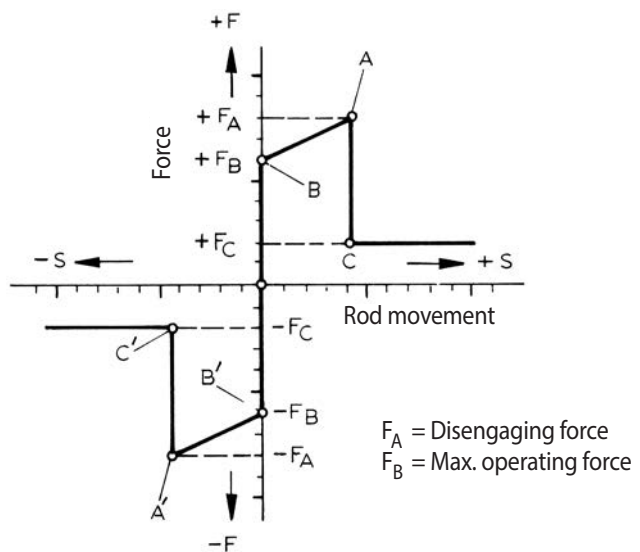
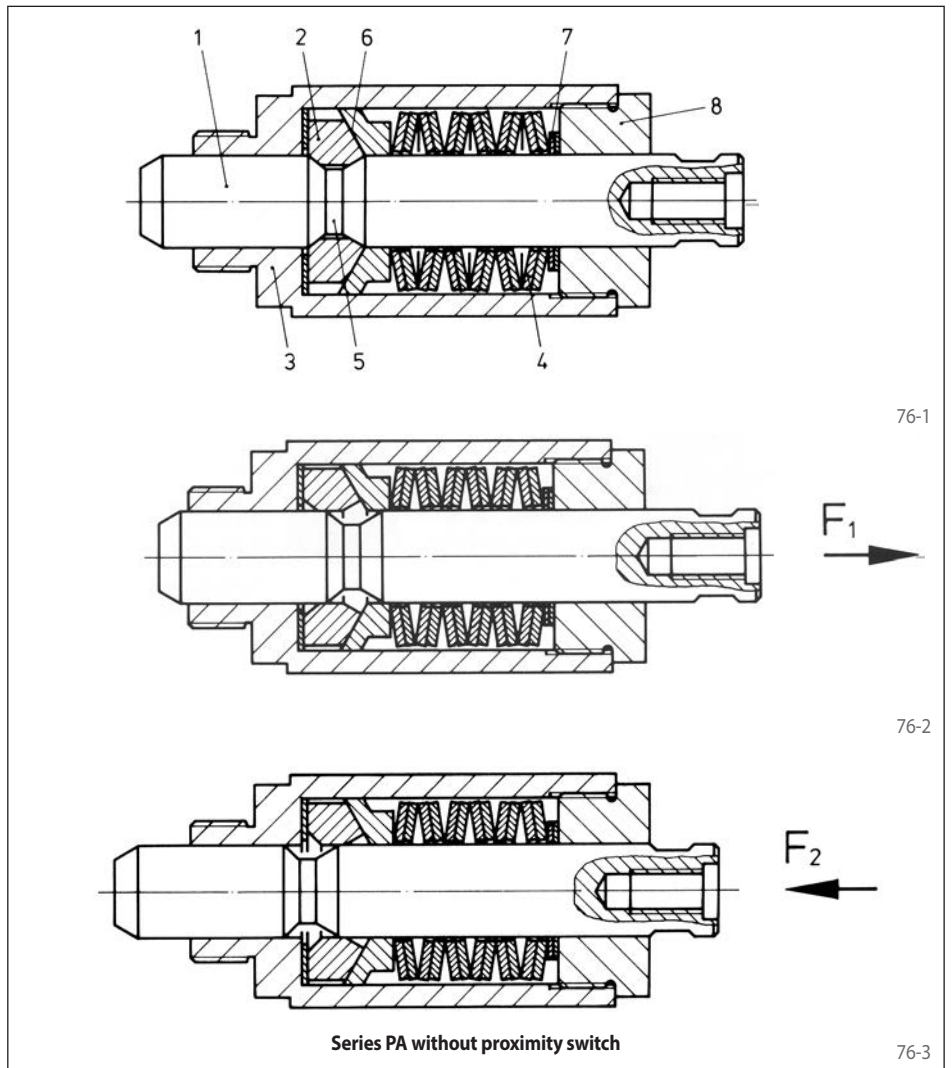
75-1

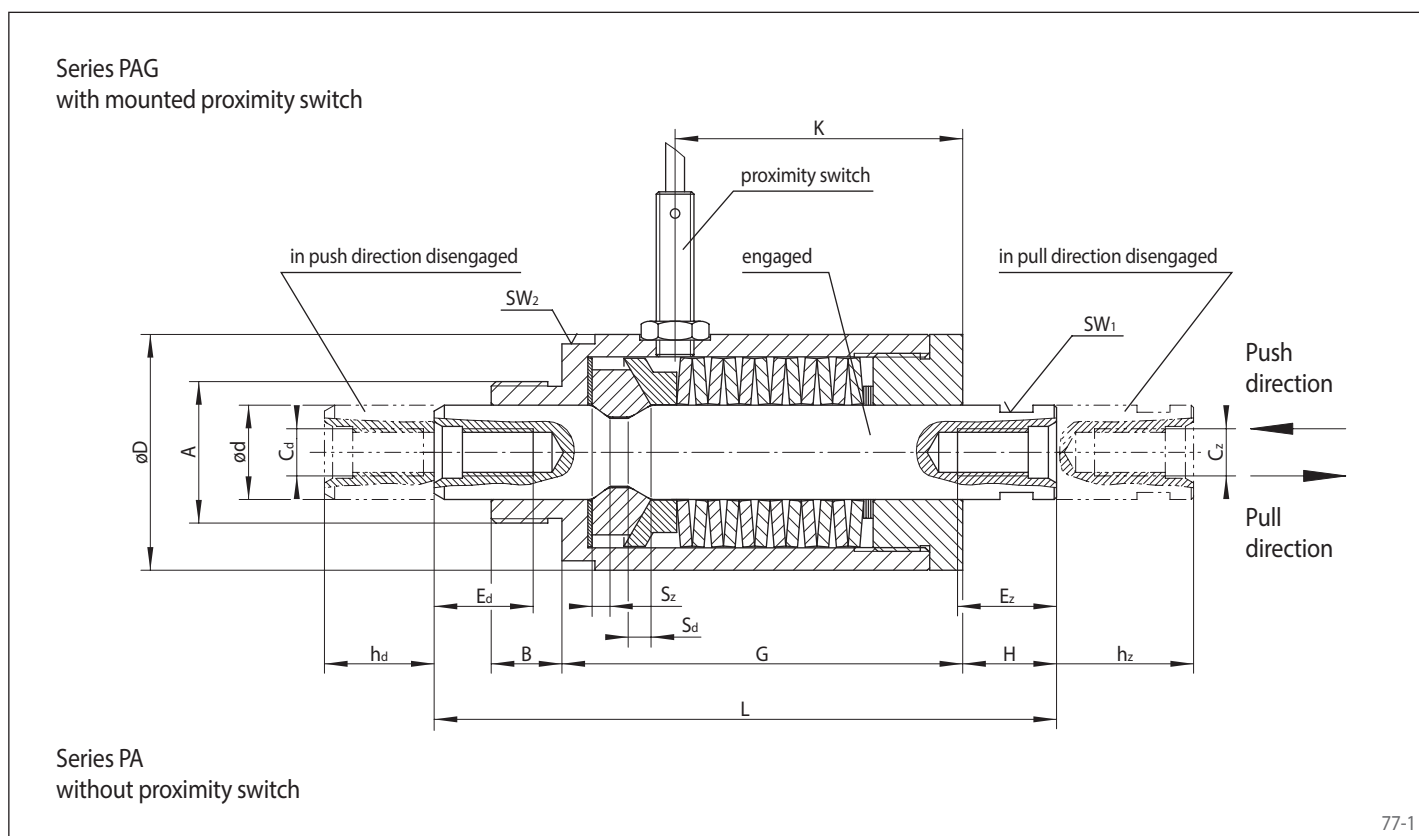
Assembly and Operation

Assembly and operation of the RINGSPANN Force Limiter can be seen in illustrations 76-1 and 76-4. The sectional drawing in figure 76-1 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 figure 76-4, 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 approx. $0,2 \times F_A$.

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.

Figure 76-2 and 76-3 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.





Technical Data and Dimensions

Type		Max. Disengaging Force F_A N	d mm	A	B	C_d	C_z	D	E_d	E_z	G	H	Stroke		K	L	Engagement travel		Across flats	
without proximity switch	with proximity switch												Pressure h_d mm	Tension h_z mm			Pressure S_d mm	Tension S_z mm	SW ₁	SW ₂
PA 12	PAG 12	3600	12	M 20 x 1,5	10	-	M 6	32	-	10	61	16	16	20	38	95	3,5	2,7	11	30
PA 20	PAG 20	10000	20	M 30 x 1,5	15	M 10	M 10	50	16	16	85	20	20	25	57	132	4,3	3,4	17	46
PA 30	PAG 30	22000	30	M 45 x 1,5	20	M 16	M 16	75	25	25	120	24	24	40	78	180	6,9	5,4	27	65
PA 50	PAG 50	62000	50	M 70 x 2,0	28	M 24	M 24	132	40	40	212	36	36	63	150	300	11,3	8,8	46	-
PA 75	PAG 75	140000	75	M 100 x 2,0	40	M 36	M 36	200	60	60	315	57	57	100	215	450	17,3	13,6	70	-

Accessories

- Proximity switch: signals excessive disengaging force for drive unit braking

Proximity switch

Operating voltage:	10-30 V DC
Output:	PNP transistor
Normal condition:	closed
Max. switching current:	200 mA
Domestic electricity requirement:	10 mA
Protection class:	IP 67
Ambient temperature:	-25° ... +75° C
Cable length:	2 m

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.