

# CYPULL



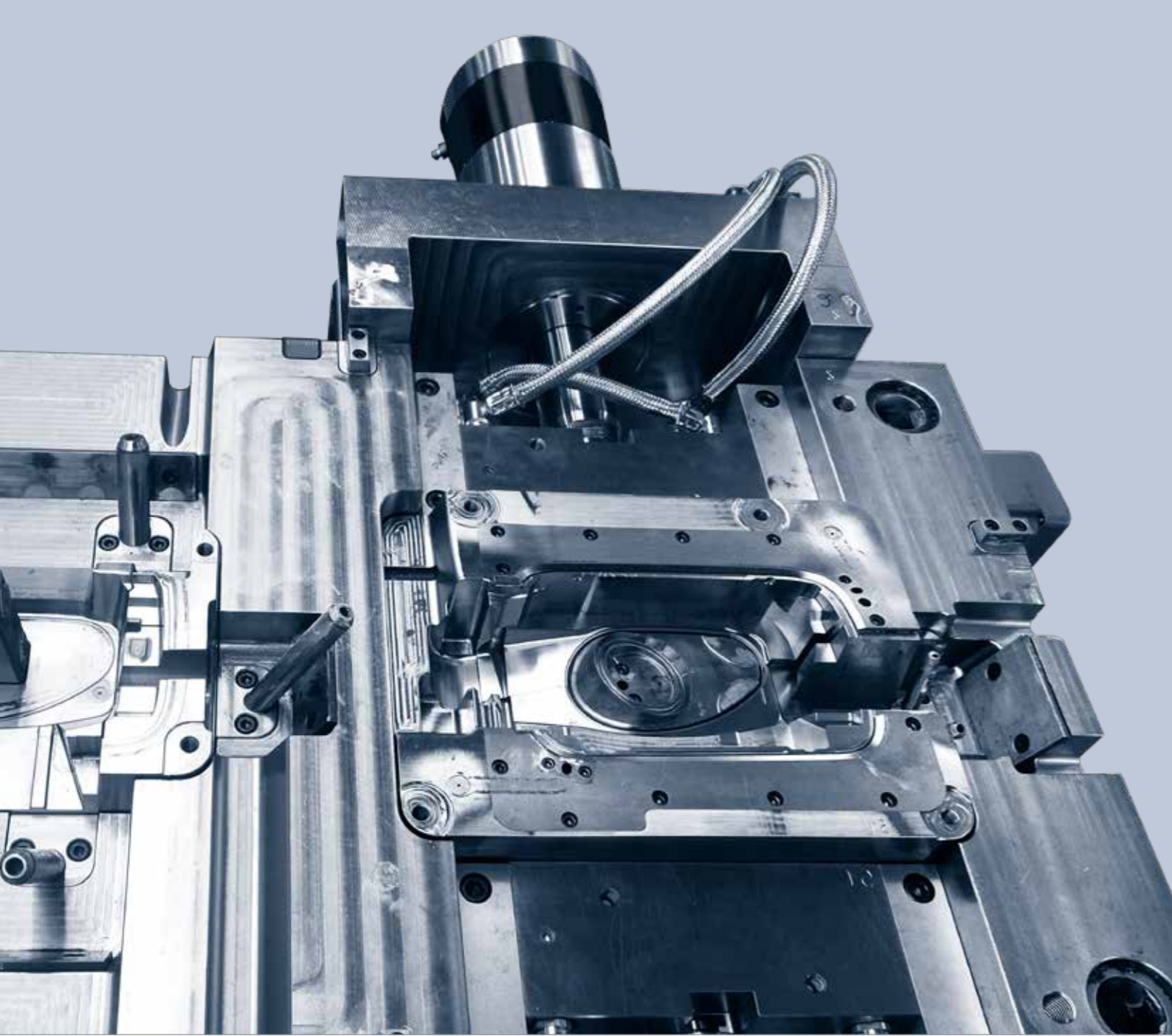
LOCKING CORE-PULLING CYLINDERS  
SHORT STROKE BLOCK CYLINDERS

COMPONENTS  
PERFECTION.



MADE IN GERMANY





## CYPULL... SIMPLIFIES COMPLEX MOULD DESIGN



CYTEC locking core pulling cylinders are a result of profound product know-how gained over many years by CYTEC Zylindertechnik GmbH. They have been used successfully for decades in the plastics processing industry. The latest generation sets new benchmarks for economic production of complex and highly specialised solutions in the mould design and construction.

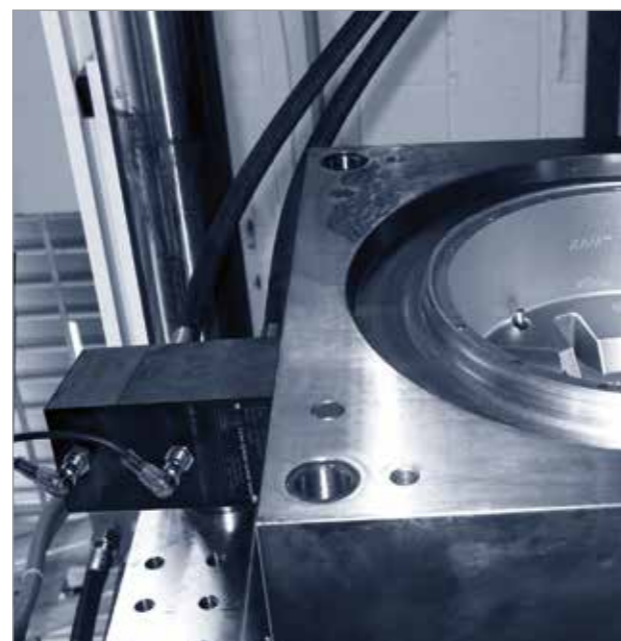
CyPull cylinders enable technically elegant and simplified concepts, combining high forces with compact structural shape. Significant advantages for the production process: reduced construction, cost and manufacturing effort, minimised susceptibility to trouble and longer production cycles.

### Typical features:

- Extremely rigid structure
- Integrated locking
- Maximum process security
- Holding forces are a multiple of the stroke forces
- Exact locking point
- Simple installation
- Compact design
- Revised series
- Maintenance-free
- Wide range of accessories

The cylinder structure, optionally available as round or block design, is extremely rigid. This guarantees constantly high workpiece quality and maintenance-free operation along with reliable productivity.

For almost every application an appropriate CyPull is available, supported by a wide range of options and accessories (function and status monitoring, mounting solutions etc.).

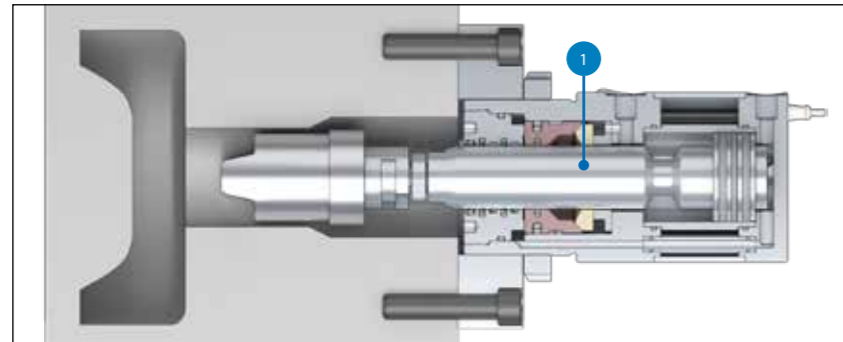




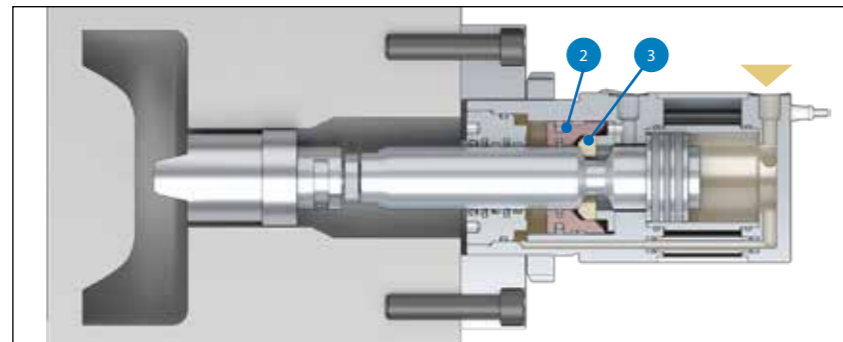
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Series CyPull	Round cylinder		Block cylinder	
	without preload	with preload	without preload	with preload
Locking principle:	without preload	with preload	without preload	with preload
Locking position:	in end position with extended piston rod			
Nominal sizes (Piston Ø) [mm]:	20 - 200		20 - 80	
Rod Ø [mm]:	14 - 140		14 - 56	
Stroke length standard [mm]:	20 - 200, depending on the particular series			
Holding forces [kN]:	32 up to 3.300 max., depending on the particular series and locking principle			
Locking inquiry:	inductive sensors (on rod side or piston side)			
Optional accessories:	Mounting components (flanges, lock nuts, pressure screws)			

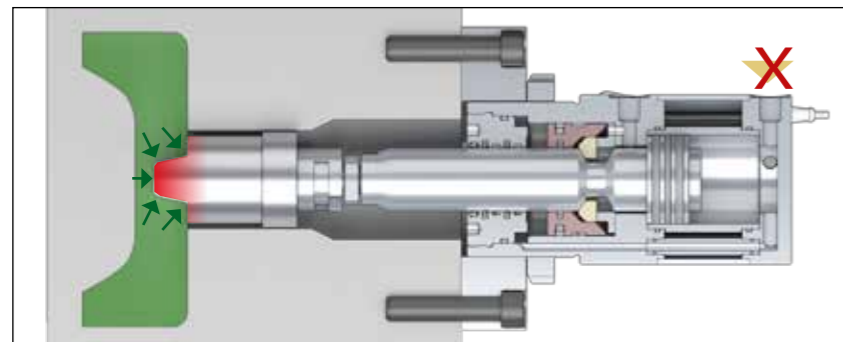
# FUNCTION WITHOUT PRELOAD



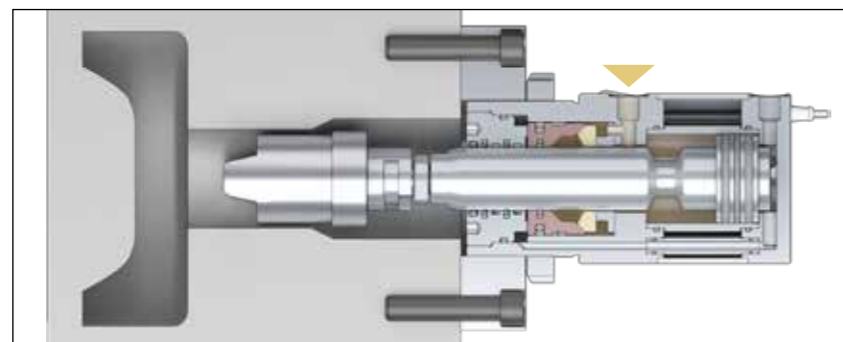
Phase 1



Phase 2

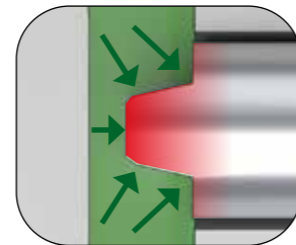


Phase 3



Phase 4

Function example of a cylinder with locking without preload,



completely exposed core, not touching core (series CP-H...-L)

**Phase 1:**  
In the initial position the piston rod 1 is retracted.

**Phase 2:**  
The piston rod is extended by applying hydraulic pressure on the piston side. As soon as the piston reaches the final position, the locking slide moves axially over the three-dimensional locking segments 2 and pushes them into the annular groove of the rod 3. So the segments are fixed in radial and axial direction.

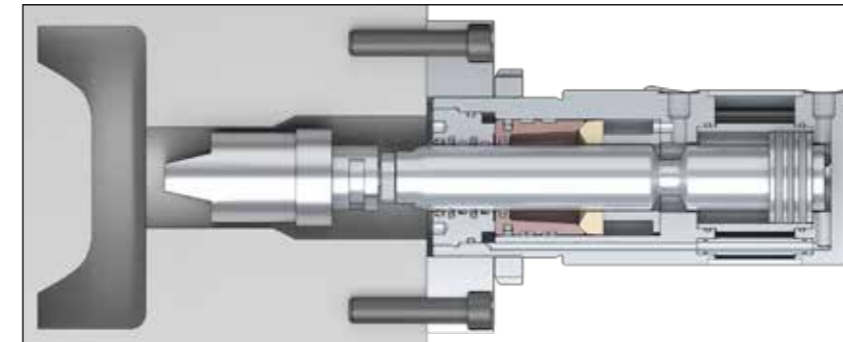
**The piston rod is clamped with positive lock.**

The hydraulic pressure is switched off, providing a maximum of operational safety.

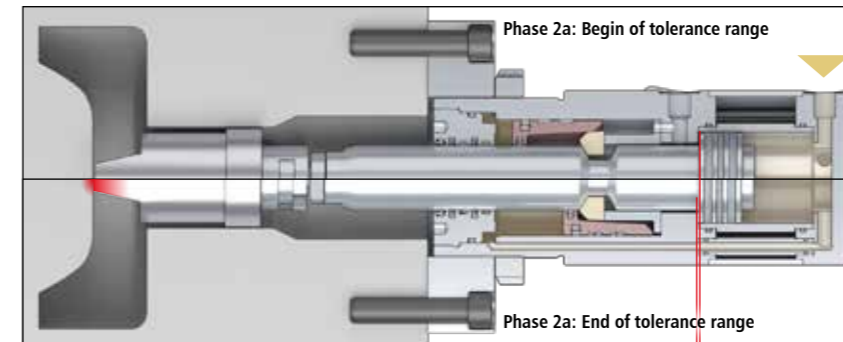
**Phase 3:**  
During the injection process the core is pressurised, but it doesn't recede in any case. The piston rod always reaches the defined final position. The hydraulic pressure is branched off with a by-pass drilling from the main supply ports for extending and retracting, enabling very fast stroke cycles.

**Phase 4:**  
The release port is pressurised, the piston rod unlocks and moves back to the initial position.

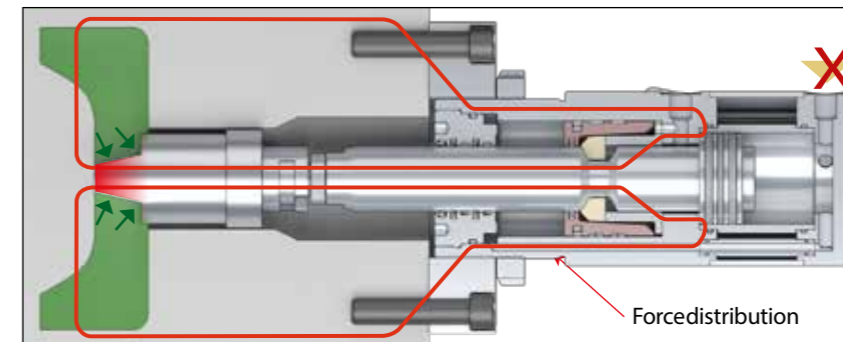
# FUNCTION WITH PRELOAD



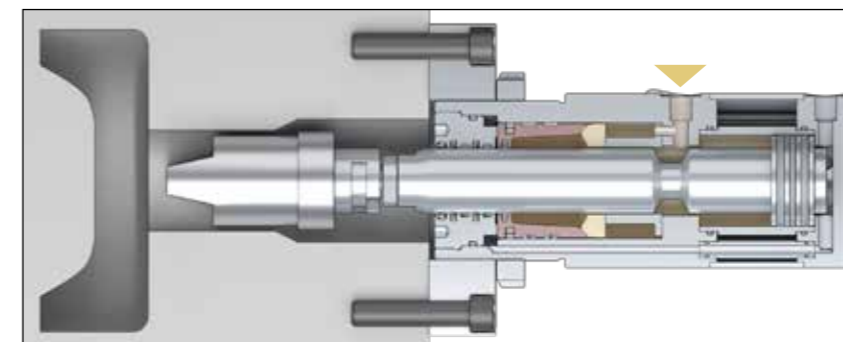
Phase 1



Phase 2

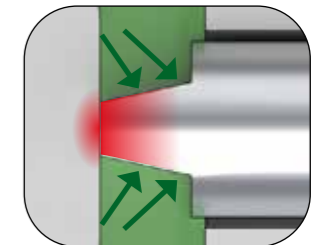


Phase 3



Phase 4

Function example of a cylinder with locking and preload,



touching core (Series CP-H...-P)

**Phases 1 to 4:**  
The mode of operation is similar to series CP-H...-L, but here the segments create an additional preload to provide that the core touches the mould surface reliably.

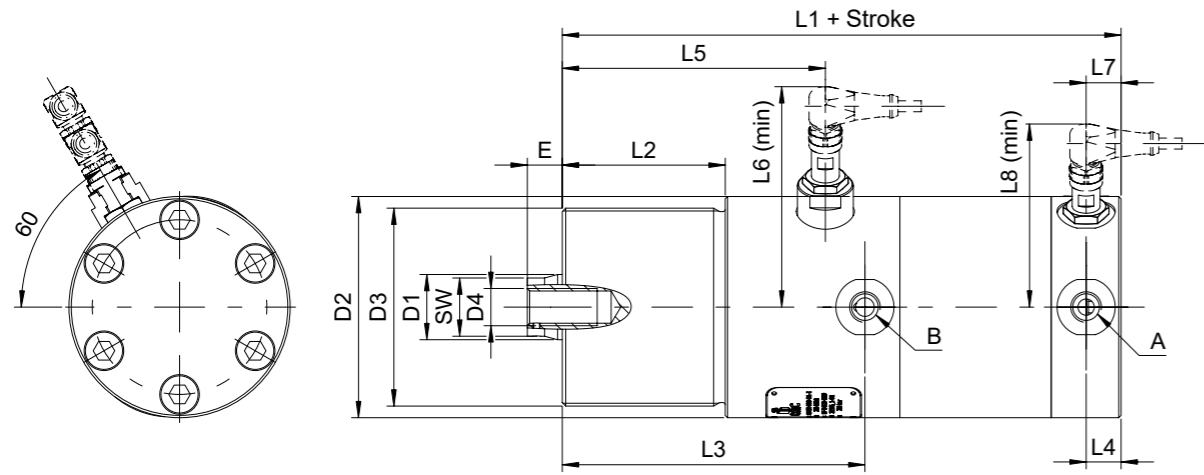
The locking slide and segments have a characteristic cone shaped contour which enables the piston rod to lock within a defined tolerance range. Elasticities which can occur commonly in the mould construction are compensated.

**This tolerance range in the final position can reach up to 1 mm stroke.**

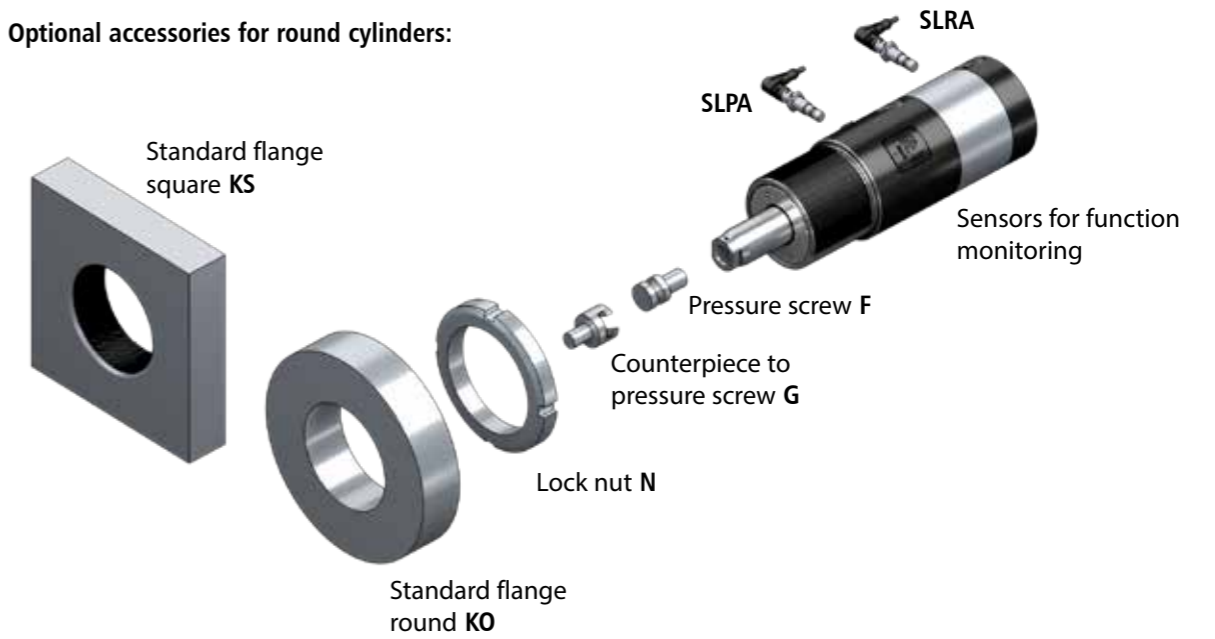
The self-inhibiting locking is maintained permanently and as a result the pressure supply is not necessary. In this range a preload is generated that guarantees reliable operational process and high work-piece quality.

The red curve displays the force distribution as it is achieved in the locked position with positive lock. Core and piston rod withstand the high counter pressure during the following injection cycle definitely. **The core does not recede!**

# TECHNICAL DATA ROUND CYLINDER



Optional accessories for round cylinders:



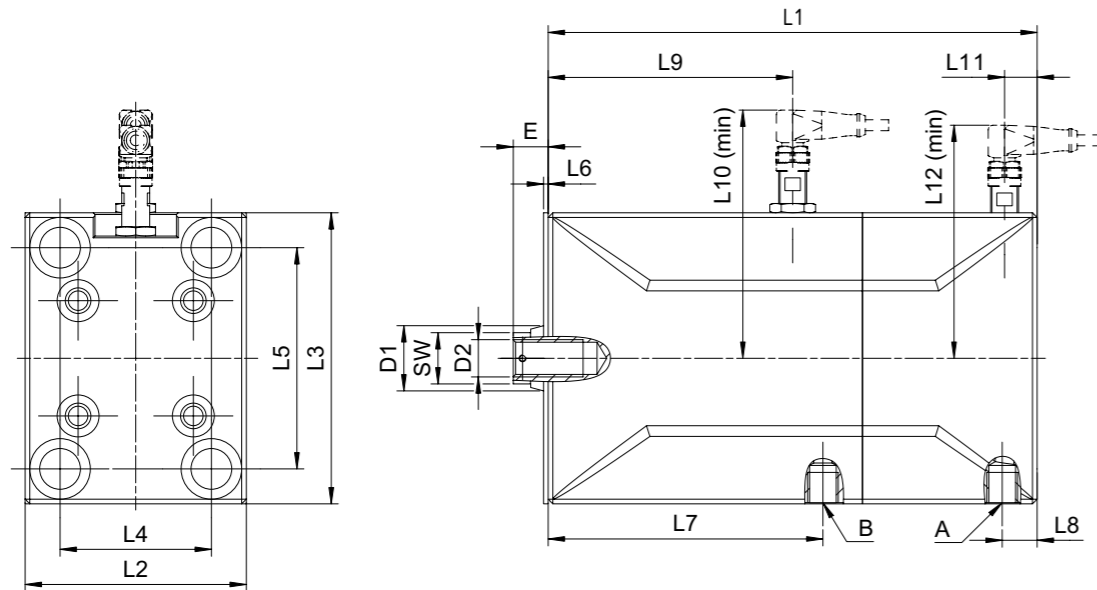
Dimensions and forces series CYPULL CP-HR-P / CP-HR-L

	Nominal size Piston Ø	Type of locking*	D1	L1	Ø D2	L2	D3	E	D4	SW	L3	L4	Pressure ports A/B	L5										
Standard	20	P	14	140	55	40	M50x1,5	8	M6x15	11	90	15	G1/4	78										
		L		110		30						60			49									
	25	P	16	150	60	50	M55x2	10	M8x20	13	100	15		86										
		L		120		40					70			58										
	32	P	20	180	75	60	M70x2	12	M10x20	17	120	15		105										
		L		145		55					85			73										
	40	P	28	190	95	70	M85x2	15	M16x25	22	130	15		113										
		L		160		70					100			83										
	50	P	36	225	100	80	M90x2	21	M20x35	27	160	15		144										
		L		175		80					110			94										
	63	P	45	235	120	90	M110x2	25	M27x45	36	170	15		151										
		L		180		80					115			99										
	80	P	56	275	150	100	M140x2	28	M30x45	46	200	17,5		182										
		L		210		100					135			117										
100	P	70	290	170	110	M160x3	33	M42x45	60	215	17,5	195												
	L		220		110					145		128												
Option	125	P	90	on request	on request	M190x3	33	M56x50	70	on request	on request	G3/4	on request	182										
		L												117										
	160	P												210	150	100	M140x2	28	M30x45	46	135	17,5	117	182
		L												210	150	100	M140x2	28	M30x45	46	135	17,5	117	182
	200	P												290	170	110	M160x3	33	M42x45	60	215	17,5	195	182
		L												220	170	110	M160x3	33	M42x45	60	145	17,5	128	182

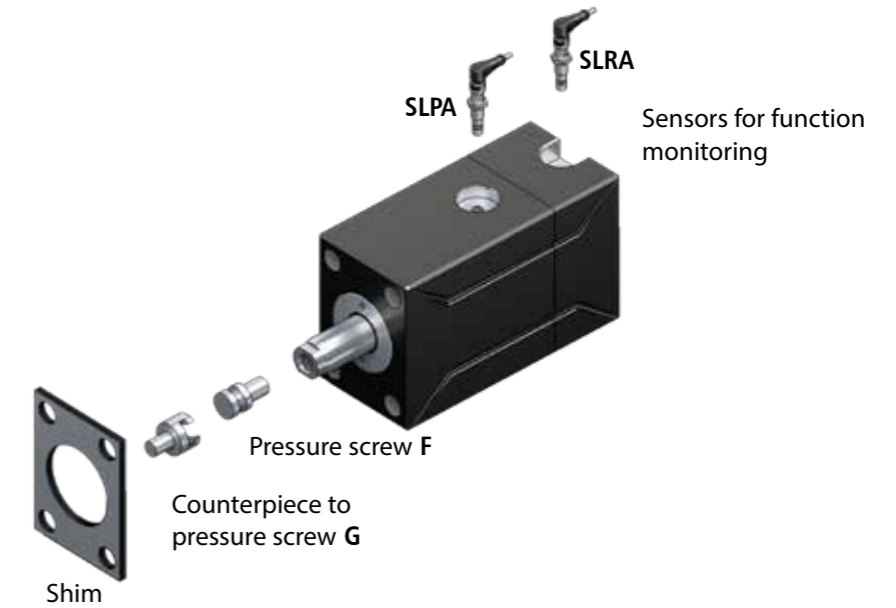
\*P: with preload | \*L: without preload | Designations in mm respectively Inch

L6	L7	L8	Standard strokes	max. preload distance	Holding force [kN]	Stroke force all series [kN]			Retraction force all series [kN]			
						100 bar	150 bar	200 bar	100 bar	150 bar	200 bar	
75	15	66	25/50/75/100 differing stroke lengths available on request	0,5	32	3,1	4,7	6,3	1,6	2,4	3,2	
78	15	66		0,5	50	4,9	7,4	9,8	2,9	4,3	5,8	
				-	80	8,0	12,1	16,1	4,9	7,4	9,8	
98	15	86		0,5		150	12,6	18,8	25,1	6,4	9,6	12,8
				-	19,6		29	39,3	9,5	14,0	18,9	
107	15	88		1,0	360	31,2	47	62,3	15,3	23,0	30,5	
				-		560	50,3	75	100,5	25,6	38,0	51,3
111	15	91		1,0	880		78,5	118	157,1	40,1	60,0	80,1
				-		customer specific	1,0	122,7	184	245,4	59,1	88,7
116	15	98		1,0	2.100		201,1	302	402,1	106,0	159,0	212,1
				-			3.300	314,2	471	628,3	160,2	240,3
125	19	105		1,0	-			-	-	-	-	-
137	19	112		1,0	-		-	-	-	-	-	-
on request	on request	on request		on request	on request		on request	on request	on request	on request	on request	on request

# TECHNICAL DATA BLOCK CYLINDER



Optional accessories for block cylinders:



## Dimensions and forces series CYPULL CP-HB-P / CP-HB-L

	Nominal size Piston Ø	Type of locking*	(Stroke 0 ≤ 25)				(Stroke 26 ≤ 50)				(Stroke 51 ≤ 75)				(Stroke 76 ≤ 100)			
			D1	L1	L1	L1	L1	L2	L3	L4	L5	L6	E	D2				
Standard	20	P	14	140	165	190	215	55	77	35	55	2	8	M6x15				
		L	110	135	160	185												
	25	P	16	155	180	205	230	63	85	40	63		10	M8x20				
		L	125	150	175	200												
	32	P	20	170	195	220	245	75	100	45	76		12	M10x20				
		L	140	165	190	215												
	40	P	28	185	210	235	260	95	125	65	95		15	M16x25				
		L	155	180	205	230												
	50	P	36	240	265	290	315	120	160	80	120		21	M20x35				
		L	190	215	240	265												
	63	P	45	250	275	300	325	150	200	108	158		25	M27x45				
		L	195	220	245	270												
Opt.	80	P	56	on request								28	M30x45					
		L																

SW	L7	L8	Pressure ports A/B	L9	L10	L11	L12	Standard strokes	max. preload distance	Holding force [kN]	Stroke force [kN]	Retraction force [kN]	
													150 bar
11	86	12	G1/4	78	74	8	68	25/50/75/100 differing stroke lengths available on request	0,5	32	4,7	2,4	
	56			49					-				
13	95	15		86	78	13	71		0,5	50	7,4	4,3	
	66			58					-				
17	105	15		93	97	13	91		0,5	80	12,1	7,4	
	75			61					-				
22	118	15		105	107	14	101		0,5	150	18,8	9,6	
	88			75					-				
27	160	20		G3/8	143	110	18		101	1,0	240	29	14
	110				94					-			
36	170	20			151	115	17		106	1,0	360	47	23
	115				99					-			
46	on request	G1/2	on request		on request		customer specific		1,0	560	75	38	
									-				

\*P: with preload | \*L: without preload | Designations in mm respectively Inch

## Dimensioning of the cylinder

Condition:  $F_{H,cylinder} > F_{process}$   
 ( $F_{H,cylinder} \gg \gg$  see technical data)

Calculation example for a touching core and following core situation:

$$A = \begin{cases} d \text{ (touching surface)} = 12 \text{ mm} \\ D \text{ (pressurised surface)} = 45 \text{ mm} \end{cases}$$

$p$  (injection pressure) = 1000 bar

Applied formula for the determination of the **required holding force**:

$$F_{process} \text{ [kN]} = p \text{ [bar]} \cdot A \text{ [mm}^2\text{]} \cdot 10^{-4}$$

$$= p \cdot \frac{\pi}{4} \cdot [D^2 - d^2] \cdot 10^{-4}$$

$$= 1000 \text{ [bar]} \cdot \frac{\pi}{4} \cdot [(45 \text{ mm})^2 - (12 \text{ mm})^2] \cdot 10^{-4}$$

$$= 147 \text{ kN}$$

### Conclusion:

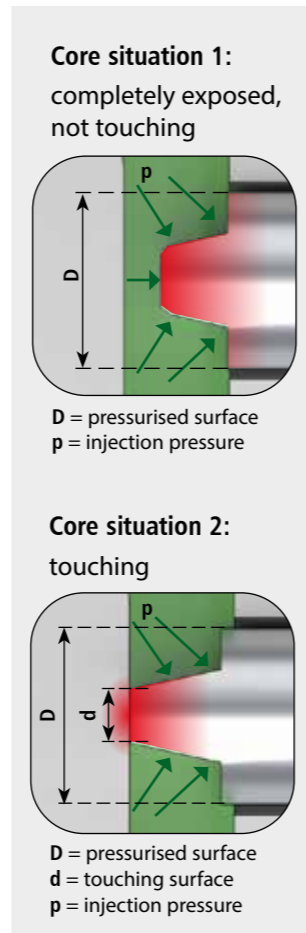
A cylinder with nom. size **40** (with max. holding force 150 kN) would be sufficient theoretically.

The process force is very near to the maximum holding force of this series (see technical data pages 8 to 11). But it is recommended to provide a force reserve in terms of security reasons, and to choose the next larger series **50**. Thus the maximum preload cannot be exceeded even in case of a possible lift-off of the core.

Recommended cylinder choice as an example:

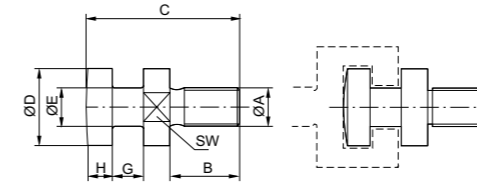
**CP - HR (HB) - P1E - 050 - 036 - ..... - SLPA - SLRA - ...**

For the inquiry of the locked position and the position of the retracted piston rod, the cylinders can be equipped with inductive proximity sensors, see page 14.



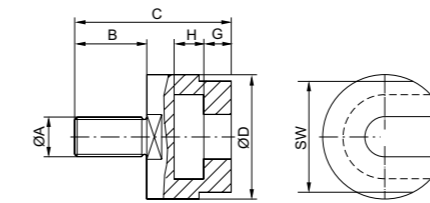
### Pressure screw F

with coupling cone for misalignment compensation



Cyl. nom.- Ø	20	25	32	40	50	63	80	100	125	160	200
A	M6	M8	M10	M16	M20	M27	M30	M42	M56	M64	M80
B	11	14,5	14,5	20	28	39	35	40	45	85	105
C	26	32	32	40	56	75	89	115	135	200	250
D	12	16	20	25	32	40	52	65	80	102	130
E	6	8	10	16	18	24	29,5	40	55	70	90
G	5	6,5	6,5	7	10	13	19	25	30	38	48
H	5	5,5	5,5	6	10	12	19	25	30	38	48
SW	10	14	17	22	27	36	46	55	70	90	110

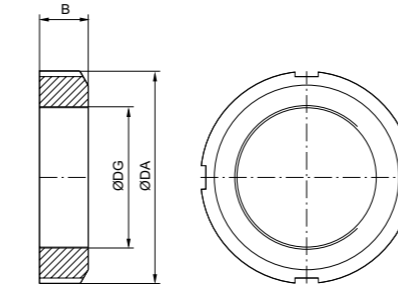
### Counterpiece to pressure screw G



Cyl. nom.- Ø	20	25	32	40	50	63	80	100	125	160	200
A	M6	M8	M10	M16	M20	M27	M30	M42	M56	M64	M80
B	11	14,5	14,5	20	28	39	35	40	45	85	105
C	26	31,5	31,5	41	58	79	92	120	135	200	249,5
G	5,2	5,5	5,5	6	9	12	18	24	29	37	46
H	6	6	6	6,5	10,5	12,5	19,5	25,5	30,5	38,5	49
D	20	25	31	37	47	57	76	92	108	137	173
SW	17	22	26	32	41	50	65	80	90	110	140

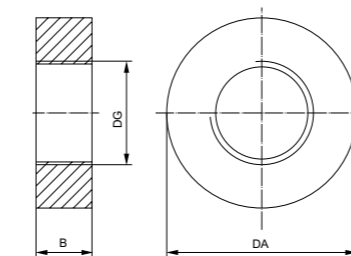
### Lock nut N

to secure the cylinder against torsion

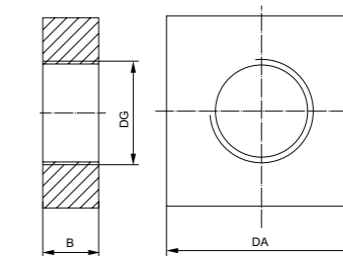


Cyl. nom. Ø	20	25	32	40	50	63
Ø DA	70	75	92	110	120	145
B	11	11	12	16	16	19
Ø DG	M50x1,5	M55x2	M70x2	M85x2	M90x2	M110x2

Cyl. nom. Ø	80	100	125	160	200
Ø DA	180	210	240	285	340
B	22	25	28	28	30
Ø DG	M140x2	M160x3	M190x3	M235x3	M290x3



Standard flange round KO



Standard flange square KS

Cylinder nominal Ø	20	25	32	40	50	63	80	100	125	160	200
DA	100	120	130	150	180	210	240	290	380	on request	on request
B	20	25	30	30	40	45	60	70	90		
Ø DG	M50x1,5	M55x2	M70x2	M85x2	M90x2	M110x2	M140x2	M160x3	M190x3		
rec. screw mounting	6xM10	6xM10	6xM12	6xM12	6xM16	8xM16	8xM20	8xM24	8xM30		
rec. pitch circle Ø for version KO	75	95	107	127	150	180	205	245	325		

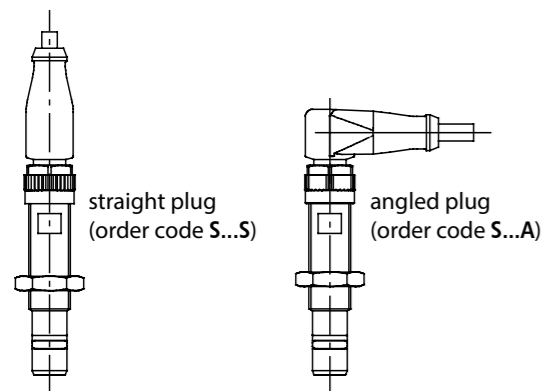


Inductive sensor: inquiry of locking and extended position of the piston rod (order code SL...)

Inductive sensor: inquiry of retracted position of the piston rod (order code SR...)

For the functional monitoring, inductive sensors in the cylinder housing are available, which detect reliably the actual condition of the locking system and the final position (extended, retracted) of the piston rod.

They work contactless, are free of wear and durable.



CYTEC offers them with straight or angled plugs.

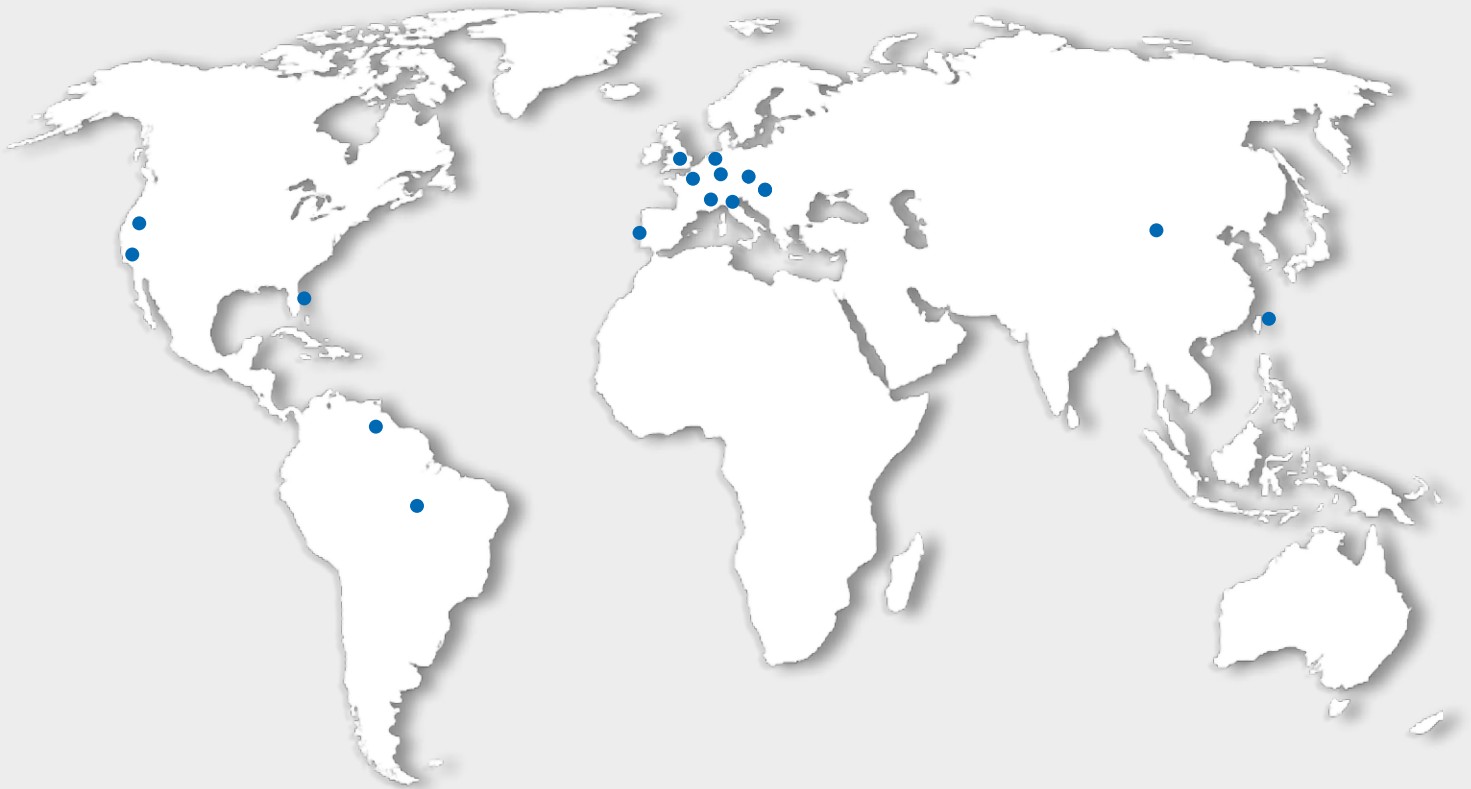
### Typical features:

- 3 different types:
  - PNP (up to 80°C)
  - PNP high temperature (up to 120°C)
  - NAMUR (up to 80°C)
- self-secure
- free of wear and enduring
- plug design straight or angled
- most simple exchange
- retrofit for all standard series

	Designation	Order code	CP - HR - P1E - 063 - 036 - 0075 - SLPS - SRPS - F - G - N - KS													
			B	L	M				NA	NA		KO				
Series	Locking core pulling cylinder	CP										X	X			
Pressure supply	hydraulic	H														
Structural design	Round cylinder	R														
	Block cylinder	B														
Locking principle	Locking with extended piston rod	1														
	without preload	L														
	with preload	P														
Wiper seal	metal	M														
	Elastomer	E														
Piston	Diameter in mm															
Rod	Diameter in mm															
Stroke	Length in mm															
Sensors	Sensor	S														
	Position rod side (inquiry rod extended/locked)	L														
	Position piston side (inquiry rod retracted/unlocked)	R														
	not used	X														
	PNP sensor	P														
	NAMUR sensor	N														
	high temperature type	H														
	no sensor	X														
	straight plug	S														
	angled plug	A														
no plug	X															
Accessories	Pressure screw	F														
	Counterpiece to pressure screw	G														
	Lock nut*	N														
	Mounting flange square*	KS														
	Mounting flange round*	KO														

\*only for round cylinders





## CYTEC WORLD WIDE

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CYPULL\_CYBLOCK\_02 | 10/2021 | english

We reserve the right to make technical modifications. The components/ machines shown here may include options, accessories and control variants.