CYLOCK

LOCKING CYLINDERS

CyStop

BRAKING CYLINDERS

CYTEC SYSTEMS

COMPONENTS PERFECTION.

CYTEC SYSTEMS TECHNOLOGY INSIDE COMPONENTS PERFECTION

MADE IN GERMANY

CyLock CyStop the cylinder concept that's different

Locking, arresting, holding, braking, securing, pressing, positioning, clamping ...

CyTec is specialise in the development of special cylinders which reduce the technical expenditure on the construction.

The cylinders are based on two basic ideas:Grundideen:

1. A cylinder that positively locks in its final position

2. A cylinder that offers friction locking at variable positions

The CyTec products are of multifunctional significance, that means:

- Effective in the field of lifting and material handling. Cylinders remain positively locked or friction locked even when power is disconnected.
- The high forces and the integrated safety function and simplify costly work intensive constructions.
- A reduction of components decrea ses the costs and increases the reliability.

Positive locking

Typical features

- integrated locking device
- maximal operation security
- holding force up to several hundred tons
- no additional control
- exact locking point
- very simple installation
- compact design

The CyLock locking cylinder holds movable loads in one or both of the final positions and **locks positively**.

Frictional connection

Typical features

- high holding forces
- compact design
- self-locking when energy supp ly is interrupted
- locking in any intermediate position
- short reaction times

The CyStop braking cylinder brakes movable loads in every desired position with **frictional connection.**

Content

CyLock, **CyStop** - the cylinder concept that's different			2
CyLock, Product overview			4
	Function		6
	Planning tips		8
	Operating advice		9
	Locking types		10
	Indication of final stroke position		11
	Stroke indication with Reed switches		12
	Wiring diagram of proximity switches		13
CyLock, hydraulic locking cylinder	Exemplary applications		14
	Technical data:	Type HA - 00	16
		Type HA/HB - 01	17
		Type HA/HB -02	18
		Type HA/HB - 03	19
		Type HW - 00	20
		Type HW/HY - 01	21
		Type HW/HY - 02	22
		Type HW/HY - 03	23
	Fixtures for hydraulic model lines		24
CyPull, core pulling cylinder with positive lock			28
CyLock, pneumatic locking cylinder	Practical applications		30
	Overview, pneumatic model lines		31
	Technical data	Type PV - 00	32
		Type PV - 01	33
		Type PV - 02	34
		Type PV - 03	35
	Series PH and PT		36
	Technical data	Type PT - 01	37
	Fixtures for pneumatic model lines		38
CyStop, pneumatic braking cylinder:	Function		42
	Operating advice		43
	Practical applications		44
	Overview		45
	Technical data	Type KP	42
	Fixtures		43

CyLock The locking cylinder

pneumatic
stroke force up to 30 kN/10 bar

hydraulic
stroke force up to 245 kN/200 bar

Locking cylinder hydraulic

Locking cylinder pneumatic

Application examples

- Safety cylinder in presses
- Counter bearing in punching machines
- Closing cylinder on gates
- Clamping devices for structural components
- Closing devices
- Shutter of rollers in the paper industry
- Reshaping industry (beading, riveting, wobbling)

Locking cylinder with pre-load

Application examples

- Locking core pull cylinder on die and mould tools
- Tool clamping system on die casting machines

Cylinder with tolerance locking

Application examples

- Containers with elastic and non-elastic seals
- Clamping devices for wide toleranced components

Locking cylinder with power stroke

Application examples

- Automatic adjustment to various film thicknesses (packaging industry)
- Automatic power stroke for punching, embossing and welding

CyLock

Function

Hydraulic and pneumatic cylinder with an internal positive-locking device

The CyLock Locking cylinder makes it possible to achieve technically elegant and simplified constructions in a cost effective way. In former times an additonal cylinder with valve and respective sensors were required to fulfil a determined performance profile. Today only one CyLock cylinder with a simple control device is needed.

That means for the production process:

- **Reduced construction-, cost and fabrication effort**
- **Reduction of constructive elements and of susceptibility to interference**
- **Longer production cycles**
- **High security**

The positive-locking automatically becomes effective with no additional control when the cylinder reaches a final position. One precondition here is that the pressure connection on the locking side is depressurised, though this is normally the case in a standard circuit.
Since the holding force in the locked position is many times that of the cylinder's hoisting power, high counterforces can also be absorbed safely.

The guaranteed failsafe system and rigidity under load with multiple counterforces are the most important features of the cylinder.

Locking:

By applying pressure to the piston side the piston rod reaches its final position and becomes positively locked by the segments which are pressed into the annular groove.

Unlocking:

The reverse travel pressure releases the piston rod and it can return to the initial position.

Characteristics

- integrated locking
- fail-safe by means of positive-locking
- holding forces up to several hundreds of tons
- exact locking point
- very simple installation
- small installation space
- high operational reliability
- reduced control effort
- reduced construction costs
- simplified machine construction

The **CyLock** is extended in the same manner as a conventional double-action cylinder by applying pressure to the piston side. When the final position is reached-locking segments are pressed into an annular groove in the piston rod.
This is effected by a spring-operated slide which passes over the segments and secures them radially so that they cannot disengage from the piston rod.
This creates a positive-locking joint.
The pressure supply can now be interrupted. The cylinder's holding force in this locked position is a multiple of the stroke force.
The locking system ensuresthat the cylinder can be moved to a defined position millions of times, even under the effect of maximum loads and impact loads, and can be maintained in this position without hydraulic or pneumatic pressure.

The piston rod retracts by applying pressure to the rod side of the piston face. This reverse travel pressure simultaneously raises the slide from its locking position so that the segments can be pushed out of the annular groove by the returning piston rod.
Cylinders with double sided or bottom locking function work according to the same principle.

Options

- mechanical/electrical locking indication
- adjustable final position damping
- magnetic piston
- Reed switches
- Viton seals
- power stroke in final position
- tolerance locking
- pre-load force

Load case after Euler

The most important criteria when determining the piston diameter are the stroke and holding forces. Our system permits much higher values than conventional solutions. Normally smaller cylinders can be used. However, even our design is unable to overcome certain physical conditions. We thus recommend to verify a cylinder size on the basis of the Euler diagram. The intersections of straight lines of the effective length L and diameter curves show the permissible column load.

Fundamentally the following points are always important:

- The intersection of the parallels to the abscissa and ordinate through the effective column length L and the maximum load result in the required piston rod diameter
- The intersections of straight lines through the effective column length with the diameter curves results in the permissible column load.

One end free, one end fixed:
L = 2 x l

two ends articulated:
L = 1 x l

One end articulated, one end fixed
L = 0,7 x l

Two ends fixed
L = 0,5 x l

Critical load on column according to Euler

Control system

The **CyLock** requires no additional control elements compared to a normal cylinder. Once the cylinder reaches its lockable final position the lock is automatically triggered. One precondition here is that the pressure connection on the locking side is depressurised. This is carried out in any case with a standard circuit.

If a heavy load is raised and locked care must be taken to ensure that the pressure is applied to the piston space on the stroke side before being released so as to bear the load since otherwise an uncontrolled downwards movement can occur.
This circuit avoids dangerous movements when the lock is released.

Overview locking types

CyLock Type 01, locks with extended rod

CyLock Type 02, locks with retracted rod

CyLock Type 03, locks with extended and retracted rod

Indication „End of stroke/ Locked position“

Locking indication with proximity switches

The final position of the cylinder can be indicated with proximity switches. With cylinders with locking function not primarily the final position is inquired but the locked condition. The final position arises from that inevitably. With the three types (00 - 03) the following conditions must be distinguished:

Type 00:
- Piston rod extended or retracted, without locking

Typ 01:
- Piston rod extended and locked
- Piston rod retracted

Typ 02:
- Piston rod extended
- Piston rod retracted and locked

Typ 03:
- Piston rod extended and locked
- Piston rod retracted and locked

All sensors require no further adjustments once fitted.

Two types are available:
- **NAMUR** sensor as a two wire inductive sensor
- **PNP** sensor as a three wire inductive sensor

NAMUR Sensor

The Namur sensor is designed to be used in hazardous areas and is “intrinsically safe”. These sensors are supplied with an amplifier which is mounted by the control panel of the moulding machine (see page 13 of catalogue for wiring diagram).
Amplifiers are normally supplied to work fromm 220 V AC, but can also be supplied for 110 V AC or 24 V DC.

PNP Sensor

Three wires are wired directly into the machine and require a DC voltage of 10 - 30 V. Please see below for detailled informations in which position the sensors are mounted to the cylinder, i. e. axially or radially.

The following table shows in which position the sensors are mounted to the cylinder.

NAMUR sensors	
B3	radial on rod side
B4	radial on piston side

PNP sensors	
B8	radial on rod side
B9	radial on piston side

Position of sensors (NAMUR and PNP)

Stroke indication with Reed sensors (pneumatic series only)

Pneumatic cylinders work with significantly less operating pressure than hydraulic
ones. That is the reason why the cylinder tube normally is made of aluminium. This allows additionally to the locking indication with proximity switches the use of Reed switches which react to magnetic pulses. The piston is equipped with a permanent magnet on which the Reed switch responds from outside and so indicates the position. By axial positioning of the switch, any desired stroke position can be indicated. Therefore it is mounted to the tie rod of the cylinder with direct contact with the cylinder tube.

Position of Reed sensors (example, pneumatic series only)

In this stroke position of the magnetic piston, the switch does not react.

Here the magnetic piston and the switch are in contact - the pulse is indicated.

Wiring diagram
2-wire NAMUR sensors
(example, cylinder type 01)

Wiring diagram
3-wire-PNP-sensors
(example, cylinder type 01)

CyLock

Series HA/HB, HW/HY

Exemplary applications

Due to the failsafe function in locked position and the the high stroke and holding forces you will find applications of the CyLock cylinders particularly in applications of reshaping industry, clamping units, safety devices on workplaces and closing systems.

Practical application:
CyLock with rod-sided locking as counter bearing on presses

Due to the high holding forces in the locked position the **CyLock** is suited especially for presses.

If a **CyLock** with piston-sided locking is used it will meet all security demands because of its self-retention.

Practical application:
Safety cylinders on printing rollers in the paper industry

One cylinder locking on the piston side and one locking on the rod side ensure optimal operational security whilst roller supply to the machine.

Practical application:
Elevating device for hovercrafts for repairing and maintenance purposes

Practical application:
CyLock with rod- and piston-sided locking for the adjustment of idlers in Kaplan-turbines

The self retention in the locked position ensures the safe closure even when the energy is disconnected.

Overview hydraulic series

Series	HA	HB	HW	HY	HS*
Design	screw construction		tie rod version with square cross-section		tie rod version with round cross-section
Piston diameter	25 - 250 mm				25 - 200 mm with pre-load
Stroke length	free choice				
Holding forces		double clamping force in locked position		double clamping force in locked position	
Pressure	up to 250 bar				
Final pos. damping	optional				
Locking inquiry	optional, electronic or mechanical				
Seals	stepseals in double arrangement, glydrings				
Guides	metal-free				

*This type is offered as a separate series, CyPull (see separate catalogue)

Order codes (example):

HA/ 040 / 028 / 0050 - 02 - OD - G - _

- rear swivel mount
- without damping
- piston-side locking
- stroke
- rod diameter
- piston diameter
- **CyLock**, hydraulic

CyLock

Series HA - 00

double-action hydraulic cylinder

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	T	T1	T2	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	66	66	30	35	65	1/4″	26	26	142	152
32	20	M 16 x 1,5	20	12	74,5	74,5	30	40	75	3/8″	28	28	149	161
40	28	M 22 x 1,5	23	15	84	84	30	55	98	1/2″	37	35	174	189
50	36	M 28 x 1,5	24	21	90,5	90,5	30	63	112	1/2″	38	38	177	198
63	45	M 35 x 1,5	25	25	96	96	35	75	125	3/4″	41	41	193	218
80	56	M 45 x 1,5	44	28	99,5	99,5	35	90	150	3/4″	42	42	205	233
100	70	M 58 x 1,5	40	33	113,5	113,5	45	110	180	1″	45	45	229	262
125	90	M 65 x 1,5	52	33	108	108	50	132	200	1″	41	41	223	256

Further piston diameters on request

Piston Ø	Stroke force (kN)			Retraction force (kN)		
	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	4,9	7,4	9,8	2,9	4,4	5,8
32	8,0	12,0	16,0	4,9	7,4	9,8
40	12,6	19,0	25,2	6,4	9,6	12,8
50	19,6	29,4	39,2	9,5	14,3	19,0
63	31,2	46,8	62,4	15,3	23,0	30,6
80	50,3	75,5	100,6	25,6	38,4	51,2
100	78,5	117,8	157,0	40,1	60,2	80,2
125	122,7	184,1	245,4	59,1	88,7	118,2

CyLock

Series HA/HB - 01

Hydraulic cylinder with rod-side locking

Locking with extended piston rod

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	T	T1	T2	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	125	66	30	35	65	1/4″	62	26	201	211
32	20	M 16 x 1,5	20	12	142,5	74,5	30	40	75	3/8″	95	28	217	229
40	28	M 22 x 1,5	23	15	142	84	30	55	98	1/2″	92	35	232	247
50	36	M 28 x 1,5	24	21	149,5	90,5	30	63	112	1/2″	98,5	38	236	257
63	45	M 35 x 1,5	25	25	163	96	35	75	125	3/4″	85	41	260	285
80	56	M 45 x 1,5	44	28	194,5	99,5	35	90	150	3/4″	138	42	300	328
100	70	M 58 x 1,5	40	33	257,5	113,5	15	110	180	1″	190	45	343	376
125	90	M 65 x 1,5	52	33	221	108	50	132	200	1″	151	41	336	369

Further piston diameters on request

Piston Ø	Holding force		Stroke force (kN)			Retraction force (kN)		
	HA	HB	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	10	20	4,9	7,4	9,8	2,9	4,4	5,8
32	30	60	8,0	12,0	16,0	4,9	7,4	9,8
40	44	88	12,6	19,0	25,2	6,4	9,6	12,8
50	70	140	19,6	29,4	39,2	9,5	14,3	19,0
63	112	224	31,2	46,8	62,4	15,3	23,0	30,6
80	180	360	50,3	75,5	100,6	25,6	38,4	51,2
100	282	564	78,5	117,8	157,0	40,1	60,2	80,2
125	440	880	122,7	184,1	245,4	59,1	88,7	118,2

CyLock

Series HA/HB - 02

Hydraulic cylinder with piston-side locking

Locking with retracted piston rod

Piston Ø	A	A1	A2	E	E3	E4	F	D1	D2	T	T3	T4	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	66	130	30	35	65	1/4″	26	88	206	216
32	20	M 16 x 1,5	20	12	74,5	141,5	30	40	75	3/8″	28	94	216	228
40	28	M 22 x 1,5	23	15	84	162	30	55	98	1/2″	37	112	252	267
50	36	M 28 x 1,5	24	21	90,5	175,5	30	63	112	1/2″	38	124,5	262	283
63	45	M 35 x 1,5	25	25	96	203	35	75	125	3/4″	41	145	300	325
80	56	M 45 x 1,5	44	28	99,5	234,5	35	90	150	3/4″	42	178	340	368
100	70	M 58 x 1,5	40	33	113,5	260,5	45	110	180	1″	45	193	376	409
125	90	M 65 x 1,5	52	33	108	256	50	132	200	1″	41	186	371	404

Further piston diameters on request

Piston Ø	Holding force		Stroke force (kN)			Retraction force (kN)		
	HA	HB	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	8	16	4,9	7,4	9,8	2,9	4,4	5,8
32	16	32	8,0	12,0	16,0	4,9	7,4	9,8
40	23	46	12,6	19,0	25,2	6,4	9,6	12,8
50	33	66	19,6	29,4	39,2	9,5	14,3	19,0
63	54	108	31,2	46,8	62,4	15,3	23,0	30,6
80	92	184	50,3	75,5	100,6	25,6	38,4	51,2
100	138	276	78,5	117,8	157,0	40,1	60,2	80,2
125	228	456	122,7	184,1	245,4	59,1	88,7	118,2

CyLock

Series HA/HB - 03

Hydraulic cylinder with locking on both sides

Locking with extended and retracted piston rod

Piston Ø	A	A1	A2	E	E1	E4	F	D1	D2	T	T1	T4	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	125	130	30	35	65	1/4″	62	88	265	275
32	20	M 16 x 1,5	20	12	141,5	142	30	40	75	3/8″	95	94	284	296
40	28	M 22 x 1,5	23	15	142	162	30	55	98	1/2″	92	112	310	325
50	36	M 28 x 1,5	24	21	149,5	175,5	30	63	112	1/2″	98,5	124,5	321	342
63	45	M 35 x 1,5	25	25	163	203	35	75	125	3/4″	85	98	367	392
80	56	M 45 x 1,5	44	28	194,5	234,5	35	90	150	3/4″	138	178	435	463
100	70	M 58 x 1,5	40	33	257,5	160,5	15	110	180	1″	190	193	490	523
125	90	M 65 x 1,5	52	33	221	256	50	132	200	1″	151	186	484	517

Further piston diameters on request

Piston Ø	Holding force		Stroke force (kN)			Retraction force (kN)		
	HA	HB	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	8	16	4,9	7,4	9,8	2,9	4,4	5,8
32	16	32	8,0	12,0	16,0	4,9	7,4	9,8
40	23	46	12,6	19,0	25,2	6,4	9,6	12,8
50	33	66	19,6	29,4	39,2	9,5	14,3	19,0
63	54	108	31,2	46,8	62,4	15,3	23,0	30,6
80	92	184	50,3	75,5	100,6	25,6	38,4	51,2
100	138	276	78,5	117,8	157,0	40,1	60,2	80,2
125	228	456	122,7	184,1	245,4	59,1	88,7	118,2

CyLock Series HW - 00

Double-action hydraulic cylinder

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	T	T1	T2	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	56	56	30	35	50	1/4″	26	26	142	152
32	20	M 16 x 1,5	20	12	59,5	64,5	30	40	55	3/8″	28	33	154	166
40	28	M 22 x 1,5	23	15	69	69	30	55	75	1/2″	37	35	174	189
50	36	M 28 x 1,5	24	21	70,5	70,5	30	63	85	1/2″	32,5	38	177	198
63	45	M 35 x 1,5	25	25	76	76	35	75	90	3/4″	41	41	193	218
80	56	M 45 x 1,5	44	28	80	80	35	90	120	3/4″	42	42	205	233
100	70	M 58 x 1,5	40	33	89	89	45	110	140	1″	45	45	229	262
125	90	M 65 x 1,5	52	33	83	83	50	132	160	1″	41	41	223	256

Further piston diameters on request

Piston Ø	Stroke force (kN)			Retraction force (kN)		
	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	4,9	7,4	9,8	2,9	4,4	5,8
32	8,0	12,0	16,0	4,9	7,4	9,8
40	12,6	19,0	25,2	6,4	9,6	12,8
50	19,6	29,4	39,2	9,5	14,3	19,0
63	31,2	46,8	62,4	15,3	23,0	30,6
80	50,3	75,5	100,6	25,6	38,4	51,2
100	78,5	117,8	157,0	40,1	60,2	80,2
125	122,7	184,1	245,4	59,1	88,7	118,2

CyLock Series HW/HY - 01

Hydraulic cylinder with rod-side locking

Locking with extended piston rod

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	T	T1	T2	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	115	56	30	33	50	1/4″	86	26	201	211
32	20	M 16 x 1,5	20	12	127,5	64,5	30	40	55	3/8″	100,5	33	222	234
40	28	M 22 x 1,5	23	15	127	69	30	55	75	1/2″	92	35	232	247
50	36	M 28 x 1,5	24	21	129,5	70,5	30	63	85	1/2″	94,5	38	236	257
63	45	M 35 x 1,5	25	25	143	76	35	75	90	3/4″	105	41	260	285
80	56	M 45 x 1,5	44	28	175	80	35	90	120	3/4″	138	42	300	328
100	70	M 58 x 1,5	40	33	203	89	45	110	140	1″	160	45	343	376
125	90	M 65 x 1,5	52	33	196	83	50	132	160	1″	151	41	336	369

Further piston diameters on request

Piston Ø	Holding force (kN)		Stroke force (kN)			Retraction force (kN)		
	HW	HY	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	10	20	4,9	7,4	9,8	2,9	4,4	5,8
32	30	60	8,0	12,0	16,0	4,9	7,4	9,8
40	44	88	12,6	19,0	25,2	6,4	9,6	12,8
50	70	140	19,6	29,4	39,2	9,5	14,3	19,0
63	112	224	31,2	46,8	62,4	15,3	23,0	30,6
80	180	360	50,3	75,5	100,6	25,6	38,4	51,2
100	282	564	78,5	117,8	157,0	40,1	60,2	80,2
125	440	880	122,7	184,1	245,4	59,1	88,7	118,2

CyLock

Series HW/HY - 02

Hydraulic cylinder with piston-side locking

Locking with retracted piston rod

Piston Ø	A	A1	A2	E	E3	E4	F	D1	D2	T	T3	T4	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	56	120	30	35	50	1/4″	26	91	206	216
32	20	M 16 x 1,5	20	12	59,5	126,5	30	40	55	3/8″	28	94	216	228
40	28	M 22 x 1,5	23	15	69	147	30	55	75	1/2″	37	112	252	267
50	36	M 28 x 1,5	24	21	70,5	155,5	30	63	85	1/2″	38	120,5	262	283
63	45	M 35 x 1,5	25	25	76	183	35	75	90	3/4″	41	145	300	325
80	56	M 45 x 1,5	44	28	80	215	35	90	120	3/4″	42	178	340	368
100	70	M 58 x 1,5	40	33	89	236	45	110	140	1″	45	193	376	409
125	90	M 65 x 1,5	52	33	83	231	50	132	160	1″	41	186	371	404

Further piston diameters on request

Piston Ø	Holding force (kN)		Stroke force (kN)			Retraction force (kN)		
	HW	HY	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	8	16	4,9	7,4	9,8	2,9	4,4	5,8
32	16	32	8,0	12,0	16,0	4,9	7,4	9,8
40	23	46	12,6	19,0	25,2	6,4	9,6	12,8
50	33	66	19,6	29,4	39,2	9,5	14,3	19,0
63	54	108	31,2	46,8	62,4	15,3	23,0	30,6
80	92	184	50,3	75,5	100,6	25,6	38,4	51,2
100	138	276	78,5	117,8	157,0	40,1	60,2	80,2
125	228	456	122,7	184,1	245,4	59,1	88,7	118,2

CyLock

Series HW/HY - 03

Hydraulic cylinder with locking on both sides

Locking with extended and retracted piston rod

Piston Ø	A	A1	A2	E	E1	E4	F	D1	D2	T	T1	T4	La Stroke +	Lg Stroke +
25	16	M 12 x 1,25	15	10	115	120	30	33	50	1/4″	86	91	265	275
32	20	M 16 x 1,5	20	12	127,5	126,5	30	40	55	3/8″	95	94	284	296
40	28	M 22 x 1,5	23	15	127	147	30	55	75	1/2″	92	112	310	325
50	36	M 28 x 1,5	24	21	129,5	155,5	30	63	85	1/2″	94,5	120,5	321	342
63	45	M 35 x 1,5	25	25	143	183	35	75	90	3/4″	105	145	367	392
80	56	M 45 x 1,5	44	28	175	215	35	90	120	3/4″	138	178	435	463
100	70	M 58 x 1,5	40	33	203	236	45	110	140	1″	160	193	490	523
125	90	M 65 x 1,5	52	33	196	231	50	132	160	1″	151	186	484	517

Further piston diameters on request

Piston Ø	Holding force (kN)		Stroke force (kN)			Retraction force (kN)		
	HW	HY	100 bar	150 bar	200 bar	100 bar	150 bar	200 bar
25	8	16	4,9	7,4	9,8	2,9	4,4	5,8
32	16	32	8,0	12,0	16,0	4,9	7,4	9,8
40	23	46	12,6	19,0	25,2	6,4	9,6	12,8
50	33	66	19,6	29,4	39,2	9,5	14,3	19,0
63	54	108	31,2	46,8	62,4	15,3	23,0	30,6
80	92	184	50,3	75,5	100,6	25,6	38,4	51,2
100	138	276	78,5	117,8	157,0	40,1	60,2	80,2
125	228	456	122,7	184,1	245,4	59,1	88,7	118,2

Central swivel mount: M

Piston Ø		25	32	40	50	63	80	100	125	160	200
b		69	79	102	116	129	154	184	204	on request	
b1		109	119	142	156	169	204	244	284		
Ød1 e8		25	25	30	30	35	40	50	60		
r		1,5	1,6	1,6	1,6	2,0	2,0	2,0	2,5		
w		65	75	98	112	125	150	180	200		
y		30	30	35	35	40	45	55	65		
t= 1/2 Stroke+	"01"	170	184,5	189,5	198	223	260	308	311,5		
	"02"	111	116,5	131,5	139	156	165	194	198,5		
	"03"	170	184,5	189,5	198	223	260	308	311,5		

Base flange: B

Piston Ø		25	32	40	50	63	80	100	125	160	200
e		80	100	115	135	150	170	210	235	on request	
b		100	120	130	160	180	200	250	280		
Øs		9	9	9	14	14	14	18	22		
y		25	25	25	25	30	30	40	45		
t= Stroke+	"01"	211	229	247	257	285	328	376	369		
	"02"	216	228	267	283	325	368	409	404		
	"03"	275	296	325	342	392	463	523	517		

CyLock Series HA/HB

Fixtures for hydraulics

Tangential foot: T

Tangential foot possible for strokes over 300mm!

Piston Ø		25	32	40	50	63	80	100	125	160	200
b		100	110	140	155	180	210	250	290	on request	
h		82	92	120	132	150	178	215	245		
g-0,2		37	42	54	61	67	80	95	105		
Ø d1		15	15	18	18	20	16	32	38		
c		21	24	30	34	38	45	53	60		
Ø s		9	9	11	11	14	18	22	26		
m		20	25	30	35	40	55	60	65		
t	"01"	165	182	187	198	223	265	310,5	311,5		
	"02"	106	114	129	139	156	170	196,5	198,5		
y= Stroke+	"01", "02, and "03"	-20	-25	-24	-29	-34	-44	-53	-58		

Top flange: K

Piston Ø	25	32	40	50	63	80	100	125	160	200
e	80	100	115	135	150	170	210	235	on request	
b	100	120	130	160	180	200	250	280		
s	9	9	9	14	14	14	18	22		
y	25	25	25	25	30	30	40	45		
t	15	17	20	26	30	33	38	38		

Swivel mount - base: G

Bolts have to be made with ISO-fitting g6!
Lubrification of joint and socket carried out through bolt;
cone grease nipple on request

Piston Ø		25	32	40	50	63	80	100	125	160	200
a		38	45	51	61	69	88	100	115	on request	
b		16-0,12	20-0,12	22-0,12	25-0,12	28-0,12	35-0,12	44-0,15	49-0,15		
c		19	23	28	30	35	40	50	55		
s		20-0,12	25-0,12	30-0,12	35-0,12	40-0,12	50-0,12	60-0,12	70-0,12		
r		25	27,5	32,5	41,5	50	61,5	70	82		
w		63	72,5	83,5	102,5	119	149,5	170	197		
δ°		9°	7°	6°	6°	7°	6°	6°	6°		
t= Stroke+	"01"	249	274	298	318	354	416	476	484		
	"02"	254	273	318	344	394	456	509	519		
	"03"	313	341	376	403	461	551	623	632		

CyLock Series HA/HB, HW/HY

Fixtures for hydraulics

Piston rod - eye: GA

Piston Ø	25	32	40	50	63	80	100	125	160	200
Ø s	20	25	30	35	40	50	60	70	90	110
Tolerance	-0,01	20-0,12	-0,01	-0,01	-0,012	-0,012	-0,012	-0,015	-0,02	-0,02
M	M 16 x 1,5	M 16 x 1,5	M 22 x 1,5	M 28 x 1,5	M 35 x 1,5	M 45 x 1,5	M 58 x 1,5	M 65 x 1,5	M 100 x 2	M 120 x 3
a	25	25	30	38	45	55	65	75	90	115
b	19	23	28	30	35	40	50	55	65	80
b1	16-0,12	20-0,12	22-0,12	25-0,12	28-0,12	35-0,12	44-0,15	49-0,15	60-0,2	70-0,2
C	36	36	40	50	60	72	90	100	156	195
D	56	56	64	78	94	116	130	150	210	265
Ø d	25	25	32	40	49	61	75	86	124	152
t	17	17	23	29	36	46	59	66	101	125
y	50	50	60	70	85	105	130	150	210	265
W	80	80	94	112	135	168	200	232	323	407,5
δ°	9°	7°	6°	6°	7°	6°	6°	6°	5°	6°

CyPull

Locking core pull cylinder

Series HX
as standard

Series HS
with pre-load

Series HD/HDD
for very quick locking

For further information please ask for our brochure CyPull locking core pull cylinder

Developed to meet the needs of mould manufacturers

CyPull is a special product developed to meet the needs of mould manufacturers. It is a hydraulic cylinder with an integrated positive locking device. The cylinder has been used since the early 80's extensively in the German mould making industry. It was specially suited to the more complex mould designs where considerable cost reductions can be made.

HIgh mould pressure means that regular cylinders require additional locking mechanism. The **CyPull** incorporates an automatic positive locking device which eliminates the need for expensive external locking systems. By incorporating an internal locking device a considerable space saving is achieved. The design of the **CyPull** is extremely rigid. Once adjusted the designs allows the cylinder to repeat the cycle accurately every time, eliminating the need to further maintenance, increasing the productivity.

Optional integrated limit switches are available to provide a perfect link between the cylinder and the injection mould machine.

The function of that cylinder is the same as the **CyLock** locking cylinder. The cylinder extends by applying pressure to back port of the cylinder. We have an extensive range of products to meet every application. The very robust model line was specially developed for the use in aluminium die cast moulds. In special applications we recommend the use of a cylinder with preload. This allows compensation for elasticity and tolerances at the end of the stroke.

Accessories

A complete mounting system is available, that makes it simple to adapt the **CyPull** to existing moulds

- Alignment screws with core slide coupling studs
- Counterpiece for alignment screws
- Flanges
- Groove nuts

Options

- Two types of integrated limit switches are available:
  Namur type with external amplifier
  3 - wire sensor (PnP)
- Viton seals for high temperature applications
- double rod ends for external limit switches

Characteristics

- no external mechanical locking
- small installation space
- holding forces up to several hundred tons
- high repetition accuracy
- no additional control equipment
- exact locking position
- easy set-up
- operation, free of maintenance
- also with pre-load
- free choice of stroke length
- non metallic guides

Series	HX	HD/HDD	HS
Design	tie rod version with round cross-section		
Piston diameter	25 -125 mm	25 -200 mm	25 -200 mm with pre-load
Stroke	free choice		
Holding forces	double clamping force in locked position		
Pressure	up to 200 bar		
Locking	spring operated	hydraulic with by-pass	hydraulic with by-pass
Locking inquiry	optional, electronic or mechanical		
Seals	optional, Viton seals in the range of high temperatures		
Accessories	Mounting flanges • Groove nuts • Alignment screws with coupling studs • Counterpiece for alignment screw		

CyLock

Practical application:
CyLock in forming technique

Forming technique uses the positive lock as a counter bracket in beading and rivet making machines and in swash plate systems.

Pneumatic cylinder with tolerance positive locking

Here the positive lock is already activated shortly before reaching the end position. This field of tolerance can be up to 1mm. During this process a unintentional retreat is impossible. Against it the move up automatically takes place with reaching the stud.
These cylinders are the right solution whenever different thicknesses of foil have to be compensated in packing industry. Besides they are idael clamping devices for rough toleranced components.

Practical application
counter bracket at punching presses, embossing- and welding machines

An optional technique enables a force enhancing during the process of punching, pressing, embossing and welding. This superelevated force is definite determinable and follows the ideal nominal line.

Application examples:

- Closing cylinders
- Clamping device for wide toleranced components
- Automatic adjustment to various film thicknesses (packaging industry)
- Shaping technique

Overview pneumatic series			
Series	PV	PT	PH
Special design		with tolerance locking	with hydrailic power stroke
Design	tie rod version with square cross-section		
Piston diameter	40 -250 mm		
Stroke	free choice		
Pressure	up to 10 bar		
Guides	metal free		
Magnetic piston	on request		
Locking inquiry	optional, electronic or mechanical		
Final position damping	on request		

Order codes (example):

PV/ 040 / 016 / 0050 - 03 - OD - L - _

- rear swivel mount
- without damping
- locking on both sides
- stroke
- rod diameter
- piston diameter
- **CyLock**, pneumatic

CyLock Series PV - 00

Double-action pneumatic cylinder

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	D3	4 x D4 thread depth	T	T1	T2	LW* +Stroke	LG* +Stroke	C
40	16	M 12 x 1,25	24	8	33	28	24	35	54	37	M 6 x 15	1/4″	16	14	125	133	4
50	20	M 16 x 1,5	32	10	30	30	29	40	64	45	M 8 x 17	1/4″	16	16	131	141	4
63	20	M 16 x 1,5	33	9	38	29	30	40	74	54,5	M 8 x 17	3/8″	19	15	147	156	4
80	25	M 20 x 1,5	40	13	44	35	33	45	94	69	M 10 x 20	3/8″	22	18	161	174	5
100	32	M 20 x 1,5	40	15	47	33	36	56	114	86	M 10 x 20	1/2″	24	17	174	189	6
125	32	M 27 x 2	48	20	47	55	45	60	140	110	M 12 x 28	1/2″	24	27	205	225	6
160	40	M 36 x 2	72	22	51	45	58	65	180	140	M 16 x 31	3/4″	25	22	224	246	6
200	40	M 36 x 2	70	28	63	48	67	75	220	175	M 16 x 31	3/4″	43	24	258	286	6

*For magnetic piston + 10 mm

Piston Ø	Stroke force (kN)			Retraction force (kN)		
	4 bar	6 bar	10 bar	4 bar	6 bar	10 bar
40	0,50	0,76	1,26	0,43	0,64	1,06
50	0,78	1,18	1,96	0,66	0,98	1,64
63	1,25	1,87	3,12	1,12	1,68	2,80
80	2,00	3,01	5,02	1,81	2,72	4,53
100	3,14	4,71	7,85	2,82	4,22	7,04
125	4,91	7,36	12,27	4,58	6,88	11,46
160	8,04	12,05	20,09	7,53	11,30	18,83
200	12,56	18,85	31,41	12,06	18,10	30,15

CyLock Series PV - 01

Pneumatic cylinder with rod-side locking

Locking with extended piston rod

Piston Ø	A	A1	A2	E	E1	E2	F	D1	D2	D3	4 x D4 thread depth	T	T1	T2	LW* +Stroke	LG* +Stroke	C
40	16	M 12 x 1,25	24	8	68	28	24	35	54	37	M 6 x 15	1/4″	58	14	160	168	4
50	20	M 16 x 1,5	32	10	70	30	29	40	64	45	M 8 x 17	1/4″	59	16	171	181	4
63	20	M 16 x 1,5	33	9	78	29	30	40	74	54,5	M 8 x 17	3/8″	66	15	187	196	4
80	25	M 20 x 1,5	40	13	89	35	33	45	94	69	M 10 x 20	3/8″	78	18	206	219	5
100	32	M 20 x 1,5	40	15	97	33	36	56	114	86	M 10 x 20	1/2″	80	17	224	239	6
125	32	M 27 x 2	48	20	97	55	45	60	140	110	M 12 x 28	1/2″	80	27	255	275	6
160	40	M 36 x 2	72	22	125	45	58	65	180	140	M 16 x 31	3/4″	107	22	298	320	6
200	40	M 36 x 2	70	28	113	48	67	75	220	175	M 16 x 31	3/4″	93	24	308	336	6

*For magnetic piston + 10 mm

Piston Ø	Holding force (kN)	Stroke force (kN)			Retraction force (kN)		
		4 bar	6 bar	10 bar	4 bar	6 bar	10 bar
40	12,6	0,50	0,76	1,26	0,43	0,64	1,06
50	19,6	0,78	1,18	1,96	0,66	0,98	1,64
63	31,2	1,25	1,87	3,12	1,12	1,68	2,80
80	50,2	2,00	3,01	5,02	1,81	2,72	4,53
100	78,5	3,14	4,71	7,85	2,82	4,22	7,04
125	122,7	4,91	7,36	12,27	4,58	6,88	11,46
160	200,9	8,04	12,05	20,09	7,53	11,30	18,83
200	314,1	12,56	18,85	31,41	12,06	18,10	30,15

CyLock Series PV - 02

Pneumatic cylinder with piston-side locking

Locking with retracted piston rod

Piston Ø	A	A1	A2	E	E3	E4	F	D1	D2	D3	4 x D4 thread depth	T	T3	T4	LW* +Stroke	LG* +Stroke	C
40	16	M 12 x 1,25	24	8	33	83	24	35	54	37	M 6 x 15	1/4″	16	73	180	188	4
50	20	M 16 x 1,5	32	10	30	90	29	40	64	45	M 8 x 17	1/4″	16	79	191	201	4
63	20	M 16 x 1,5	33	9	38	89	30	40	74	54,5	M 8 x 17	3/8″	19	77	207	216	4
80	25	M 20 x 1,5	40	13	44	105	33	45	94	69	M 10 x 20	3/8″	22	94	231	244	5
100	32	M 20 x 1,5	40	15	47	113	36	56	114	86	M 10 x 20	1/2″	24	96	254	269	6
125	32	M 27 x 2	48	20	47	135	45	60	140	110	M 12 x 28	1/2″	24	118	285	305	6
160	40	M 36 x 2	72	22	51	149	58	65	180	140	M 16 x 31	3/4″	25	131	328	350	6
200	40	M 36 x 2	70	28	63	165	67	75	220	175	M 16 x 31	3/4″	43	145	375	403	6

*For magnetic piston + 10 mm

Piston Ø	Holding force (kN)	Stroke force (kN)			retraction force (kN)		
		4 bar	6 bar	10 bar	4 bar	6 bar	10 bar
40	10,6	0,50	0,76	1,26	0,43	0,64	1,06
50	16,46	0,78	1,18	1,96	0,66	0,98	1,64
63	28,06	1,25	1,87	3,12	1,12	1,68	2,80
80	45,3	2,00	3,01	5,02	1,81	2,72	4,53
100	70,47	3,14	4,71	7,85	2,82	4,22	7,04
125	114,67	4,91	7,36	12,27	4,58	6,88	11,46
160	188,34	8,04	12,05	20,09	7,53	11,30	18,83
200	301,54	12,56	18,85	31,41	12,06	18,10	30,15

CyLock Series PV - 03

Pneumatic cylinder with locking on both sides

Locking with extended and retracted piston rod

Piston Ø	A	A1	A2	E	E1	E4	F	D1	D2	D3	4 x D4 thread depth	T	T1	T4	LW* +Stroke	LG* +Stroke	C
40	16	M 12 x 1,25	24	8	68	83	24	35	54	37	M 6 x 15	1/4″	58	73	215	223	4
50	20	M 16 x 1,5	32	10	70	90	29	40	64	45	M 8 x 17	1/4″	59	79	231	241	4
63	20	M 16 x 1,5	33	9	78	89	30	40	74	54,5	M 8 x 17	3/8″	66	77	247	256	4
80	25	M 20 x 1,5	40	13	89	105	33	45	94	69	M 10 x 20	3/8″	78	94	276	289	5
100	32	M 20 x 1,5	40	15	97	113	36	56	114	86	M 10 x 20	1/2″	80	96	304	319	6
125	32	M 27 x 2	48	20	97	135	45	60	140	110	M 12 x 28	1/2″	80	118	335	355	6
160	40	M 36 x 2	72	22	125	149	58	65	180	140	M 16 x 31	3/4″	107	131	402	424	6
200	40	M 36 x 2	70	28	113	165	67	75	220	175	M 16 x 31	3/4″	93	145	425	453	6

*For magnetic piston + 10 mm

Piston Ø	Holding force (kN)		Stroke force (kN)			Retraction force (kN)		
	pressure	traction	4 bar	6 bar	10 bar	4 bar	6 bar	10 bar
40	12,6	10,6	0,50	0,76	1,26	0,43	0,64	1,06
50	19,6	16,46	0,78	1,18	1,96	0,66	0,98	1,64
63	31,2	28,06	1,25	1,87	3,12	1,12	1,68	2,80
80	50,2	45,3	2,00	3,01	5,02	1,81	2,72	4,53
100	78,5	70,47	3,14	4,71	7,85	2,82	4,22	7,04
125	122,7	114,67	4,91	7,36	12,27	4,58	6,88	11,46
160	200,9	188,34	8,04	12,05	20,09	7,53	11,30	18,83
200	314,1	301,54	12,56	18,85	31,41	12,06	18,10	30,15

with tolerance locking and power stroke

The following types of the pneumatic locking cylinder were developed especially for the areas of shaping technique and packaging industry.

Pneumatic cylinder with tolerance locking

Pneumatic locking cylinders in "PV" series have an exactly defined and reproducible locking point in the final position. For constructions where the desired locking point can change from stroke to stroke "PT" series was developed. Here the locking system comes into effect shortly before reaching the final position and passes through a tolerance field up to the absolute final position in which an undesired return movement is impossible.

Pneumatic locking cylinder with power stroke

With many applications of linear drive technology the force requirement isn't constant during the whole movement. So traditional technology has to design the machine with the maximum required force. Mechanical auxiliary constructions like toggle levers produce a force enhancement in the final position which is generally required in punching processes. Unfortunately the nominal line of these systems is not identical with the real requirements. Especially the exponential course doesn't allow the force enhancement to be controlled.
This special **CyTec** technology enables an increase in power during the punching process. Complicated constructions can be replaced by only one element. The increase of the force can be calculated precisely which is due to an additional working piston to which oil pressure is applied immediately after the locking process. This determines the power stroke.

Typical features:

- exact calculation of power stroke during punching, embossing, welding and clamping
- short clock times, low noise
- uniform punching process for film thicknesses up to 2 mm
- long service life of the cutting tools

Piston Ø	A	A1	A2	E	E1	E2	C	D1	D2	D3	4 x D4 thread depth	T	T1	T3	LW* +Stroke	LG* +Stroke
50	20	M 16 x 1,5	33	10	129,5	30	4	40	64	45	M 8 x 17	1/4"	118,5	16	230,5	240,5
63	20	M 16 x 1,5	33	9	140,5	29	4	40	74	54,5	M 8 x 17	3/8"	128,5	15	249,5	258,5
80	20	M 16 x 1,5	33	13	145,5	35	5	45	94	69	M 10 x 20	3/8"	131,5	18	262,5	275,5
100	28	M 20 x 1,5	40	15	170,5	33	5	56	114	86	M 10 x 20	1/2"	153,5	17	298,5	313,5
125	28	M 20 x 2	40	20	170,5	55	6	60	140	110	M 12 x 28	1/2"	153,5	27	328,5	348,5
160	36	M 27 x 2	48	22	232	45	4	65	180	140	M 16 x 31	3/4"	214	22	394	416
200	36	M 27 x 2	48	28	232	48	5	75	220	175	M 16 x 31	3/4"	214	24	433	461

*For magnetic piston + 10 mm

Piston Ø	Tolerance-way (mm)	Clamping force (kN)	Stroke force (kN)			Retraction force (kN)		
			4 bar	6 bar	10 bar	4 bar	6 bar	10 bar
50	0,5	31	0,78	1,18	1,96	0,66	0,98	1,64
63	0,5	31	1,25	1,87	3,12	1,12	1,68	2,80
80	0,5	31	2,00	3,01	5,02	1,88	2,82	4,71
100	0,5	78	3,14	4,71	7,85	2,89	4,34	7,24
125	0,5	78	4,91	7,36	12,27	4,66	6,99	11,65
160	1	140	8,04	12,05	20,09	7,63	11,45	19,09
200	1	140	12,56	18,85	31,41	12,16	18,24	30,39

Fork: GK

Piston Ø	40	50	63	80	100	125	160	200
l	48	64	64	80	80	110	144	144
L	62	83	83	105	105	148	188	188
h	24	32	32	40	40	54	72	72
D_{H11}	12	16	16	20	20	30	35	35
B	32	41,5	41,5	50	50	62	95	95
B1	24	32	32	40	40	55	70	70
b	12	15	16	20	20	30	35	35

Ball-and-socket joint: GA

Piston Ø	40	50	63	80	100	125	160	200
L	56	72	72	87	87	123,5	145	145
D_{H11}	12	16	16	20	20	30	35	35
D	32	42	42	50	70	80	80	90
b	16	21	21	25	25	37	43	43

CyLock Series PV, PT

Fixtures for pneumatics

Piston Ø	AK-40	AK-50/63	AK-80/100	AK-125
A	M 12 x 1,25	M 16 x 1,5	M 20 x 1,5	M 27 x 2
B	23	40	39	44
C	23	32	42	48
D	67	112	122	147
E	31	45	56	62
F	21,5	33,5	33,5	40,5
SW 1	12	19	19	24
SW 2	30	41	41	55
SW 3	30	41	41	55
SW 4	19	30	30	32
SW 5	19	30	30	36

AK 160 and AK-200 on request

Compensating couplers are mounted onpiston rods to compensate radial and angular deviation, which can occur when the piston is connected to the movable components.

Compensating coupling: AK

Tangential foot: C

Piston Ø		40	50	63	80	100	125	160	200
D2		53	65	75	93	113	140	180	220
H		36	45	50	63	75	90	115	135
d		9	9	9	12	14	16	18	22
t		4	4	5	5	5	9	8	9
s		36	45	50	63	71	90	115	135
L1*= Stroke+	01	226	232	257	303	318	340	400	441
	02	246	252	277	328	348	370	430	508
	03	281	292	317	373	398	420	504	558
L*= Stroke+	01	196	210	225	255	270	300	360	381
	02	216	230	245	280	300	330	390	448
	03	251	270	285	325	350	380	464	498

Swivel mount: D

Top-/bottom flange: B/G

Swivel mount: D

Piston Ø		40	50	63	80	100	125	160	200
l		27	29	34	36	41	50	55	60
l1		17	17	22	22	26	33	35	37
d_{G7}		12	12	16	16	20	25	30	30
t		28	32	40	50	60	70	90	90
w		12	12	15	15	20	25	30	30
L1*= Stroke+	01	195	210	230	255	280	325	375	396
	02	215	230	250	280	310	355	375	396
	03	250	270	290	325	360	405	479	513

Top-/bottom flange: B/G

Piston Ø		40	50	63	80	100	125	160	200
b1		72	90	100	126	150	180	230	270
B1		92	110	128	156	187	224	280	315
b2		36	45	50	63	75	90	115	135
B2		53	65	75	93	113	140	180	220
d		9	9	9	12	14	16	18	22
t		12	14	14	16	16	20	20	25
Lv		20	25	25	30	35	45	60	70
L= Stroke+	01	168	181	196	219	239	275	320	336
	02	188	201	216	244	269	305	350	403
	03	223	241	256	289	319	355	424	453

*These measures don't pply to the series PV/01, PV/02 and PV/03

CyLock Series PV, PT

Fixtures for pneumatics

Rear swivel mount: L

Central swivel mount: H

Rear swivel mount: L

Piston Ø		40	50	63	80	100	125	160	200
M		53	65	75	93	113	140	180	220
m		37	45	54,5	69	86	110	140	175
d		7	9	9	11	11	14	18	18
l1		27	29	34	36	41	50	55	60
l2		27	29	34	36	41	50	55	60
L= Stroke+	01	222	239	264	291	321	375	430	456
	02	242	259	284	316	351	405	460	523
	03	277	299	324	361	401	455	534	573

Central swivel mount: H

Piston Ø		40	50	63	80	100	125	160	200
K		95	107	130	150	182	210	264	314
l		16	16	20	20	25	25	32	32
d_{h9}		16	16	20	20	25	25	32	32
t		24	28	28	28	38	50	50	70
L= Stroke+	01	120	130	142	160	177	191	240	248
	02	85	90	102	115	127	141	166	198
	03	120	130	142	160	177	191	240	248

CyStop

Pneumatic cylinder with internal braking device

Modern technique of automatisation requires the advantages of pneumatics like quickness, long switching intervals and economy.

Characteristics

- high holding force through friction lock
- compact design
- intrinsically safe
- moderate price
- short reaction times

CyStop in retracted and braked position

CyStop in extended and released position

Whenever a frequent change of positions and a drop protection for a lifted load in any position is required the **CyStop** cylinder is the right solution. With it a stroke movement can be interrupted immediately and be locked in place in any required position. Frictional connection automatically takes place with pressure loss in one of the control connections.
Applications of this product are primary seen in safety function like closing or holding elements for doors, flaps and lifting tables. The system is used as well for automatisation and assembling techniques.
The holding system operates by pressure reduction in an auxiliary piston - the cylinder may also be used as an intrinsically safe element.
Applications are to be found especially in the security area where a movement has to be stopped immediately in case of pressure failure (e. g. doors, flaps, elevating devices etc.) as well as in the area of machine manufacturing where a fixed position must be holded reliably (e. g. supporting cylinders, manipulators etc.).

Function

The braking system is in the hollow piston rod of the pneumatic cylinder. It is composed of an expanding clamping element that is provided with friction linings on its outside diameter.

The cylinder functions as any other double-acting cylinder. By pressurising the rear piston chamber, the piston rod moves out, and it retracts if the front chamber is pressurised. This is, however, only possible if air pressure of at least 5 bar is applied at the control connection of the cylinder, in order to release the brake. Once the control pressure is removed, the brake automatically locks up and the rod cannot be moved any more.

Control suggestion CyStop

Control instructions

To let the cylinder move the braking connection BR becomes pressurised and one of the both sides of the working piston A or B depressurised. If the valve (3) is switched off the chamber of the braking piston becomes depressurised by the quick releasing valve (4), whereupon a spring pack draws a cone into the expanding clamping element. These clamping elements become pressed onto the inner surface of the piston rod and clamp the **CyStop** with frictional connection. By pressurising the braking piston the cone moves out of the clamping elements and releases the piston rod.
To ensure a soft initial movement of the cylinder the valves always should be controlled by exhausted air. To release the brake a constant pressure of at least 5 bar is necessary.

Positioning

If positioning precision is important, here too the two piston areas should remain under pressure at the state of rest. It must, moreover, be possible to reduce the pressure quickly in the chamber of the control piston. A quick relive valve should always be installed directly on the cylinder.

Application examples:

- drop protection for a lifted load in any position
- operating processes in security areas, which must be stopped immediately in case of failure (doors, flaps, etc.)
- holding intermediate positions stationary
- support by means of low moving power but high retaining power
- fastest interruption of a movement
- supply with constructive elements in assembly lines
- stack devices

Order codes (example):

KP / 040 / 025 / 0050 - OD - B

- Female clevis mounting
- without damping
- Stroke
- Rod diameter
- Piston diameter
- **CyStop**, pneumatic

CyStop

Exemplary applications

Practical application:
CyStop on presses

The integrated security function makes the CyStop an ideal closing device on protective grilles.

The complete system For further information please request our brochure CyLift, multifunctional lifting column

Practical application:
CyStop on foaming machines

The drop protection facilitates a safe opening of the upper mould half.

Application examples:

- drop protection for a lifted load in any position
- operating processes in security areas which must be stopped immediately in case of failure (doors, flaps etc.)
- holding intermediate positions stationary
- support by means of low moving power but high retaining power
- fast interruption of a movement
- ideal for building into construction elements in assembly lines
- stack devices

CyStop telescoping lifting element with **CyStop** braking cylinder

We offer the **CyLift** lifting column with integrated pneumatic cylinder and coresponding control as a directly applicable system for lifting and lowering of loads (hydraulic or electric operation also available, depending on application). The lifting element can be used universally not only in the classic lifting applications but also in special areas such as medical or laboratory etc.
This type uses the advantages of the **CyStop**: quickness, accurate positioning and intrinsic safety. Therefore it shows its extraordinary properties especially in pick-and-place or stack devices particularly in the field of food and drug industry.

CyLift as a stack device on a conveyor.

Overview pneumatic braking cylinder	
Series	KP
Design	tie rod version with round cross-section
Piston diameter	40 -300 mm
Stroke	free choice
Pressure	up to 10 bar
Magnetic piston	on request
Distance measure system	optional
Final position damping	on request up from piston diameter 50 mm

Order codes (example):

KP / 040 / 025 / 0050 - OD - B

- B — female clevis mounting
- OD — without damping
- 0050 — stroke
- 025 — rod diameter
- 040 — piston diameter
- KP — **CyStop**, pneumatic

Pneumatic cylinder with internal braking device

Piston Ø	A	B	C	D_{1e8}	D_2	D_3	E	F	G_1	D_4**	L_1	L_2	L_3	Lz*	R
40	25	24	4	40	54	40	32	20	M 12 x 1,25	M 6 x 10+4	131	13	13	233	1/4″
50	25	32	4	40	64	49	42	25	M 16 x 1,5	M 8 x 10+5	141	13	13	254	1/4″
63	30	32	4	45	74	59	42	25	M 16 x 1,5	M 8 x 10+5	153	20	14	283	3/8″
80	30	40	5	45	94	75	55	33	M 20 x 1,5	M 10 x 11+6,5	153	15	17	295	3/8″
100	40	40	5	65	114	90	55	32	M 20 x 1,5	M 10 x 11+6,5	167	24	17	332	1/2″
125	40	48	5	65	140	110	68	53	M 27 x 2	M 12 x 17+9	184	20	20	354	1/2″
160	40	72	6	65	180	140	94	58	M 36 x 2	M 16 x 17+9	195	26	20	403	3/4″
200	40	72	6	65	220	175	100	67	M 36 x 2	M 16 x 17+9	192	30	20	429	3/4″
250	70	65	6	110	280	220	111	95	M 48 x 5	M 20 x 28+18	209	45	34	488	1″
300	70	65	22	140	315	250	111	144	M 48 x 5	M 20 x 28+18	158	23	22	489	1/2″

*For magnetic piston + 10 mm; **Thread x thread depth + depth of the hexagonal head

Piston Ø	Stange Ø	Holding power ca. (kN)	Area (mm^2)	Lifting power		Area (mm^2)	Retraction power (kN)	
				6 bar	10 bar		6 bar	10 bar
40	25	0,7	1002	0,6	1,0	766	0,5	0,8
50	25	1,3	1709	1,1	1,7	1473	0,9	1,5
63	30	2,2	2863	1,7	2,9	2410	1,5	2,4
80	30	4,0	4772	2,9	4,8	4320	2,6	4,3
100	40	5,9	7238	4,3	7,2	6597	3,9	6,6
125	40	10,0	11656	7,0	11,7	11015	6,6	11,0
160	40	17,0	19490	11,7	19,5	18849	11,3	18,9
200	40	27,2	30800	18,5	31,0	30160	18,1	30,2
250	70	40,7	46712	28,0	46,7	45239	27,1	45,2
300	70	60,2	68310	41,0	68,3	66838	40,1	66,9

Fixtures

Foot mounting A

Flange mounting C/D

Foot mounting, consisting of two angle brackets: A

Cylinder Ø	A	A_1	A_2	B	B_1	E	E_1	L	L_1	Z
40	62	40	36	36	52	9	7,5	35	22,5	5
50	77,5	49	45	45	65	9	10	45	30	5
63	87,5	59	50	50	75	9	10	45	30	6
80	110,5	75	63	63	95	12	12	55	42,5	7
100	127	90	71	75	112	14	12	55	37,5	7
125	160	110	90	90	140	16	14	68	52,5	8
160	203	140	115	115	176	18	19	80	60	10
200	242,5	175	135	135	215	22	19	90	70	12

Flange mounting, front: C ; flange mounting, rear: D

Cylinder Ø	A	A_1	A_2	B	B_2	E	E_1	F	Z
40	60	36	40	90	72	7	9	11; 5 mm tief	8
50	75	45	49	115	90	9,5	9	15; 6 mm tief	10
63	85	50	59	125	100	9,5	9	15; 6 mm tief	10
80	105	63	75	150	126	11,5	12	18; 8 mm tief	18
100	120	75	90	180	150	11,5	14	18; 8 mm tief	22
125	145	90	110	210	180	14	16	20; 13 mm tief	28
160	180	115	140	280	230	19	18	26, 18 mm tief	30
200	220	135	175	320	270	19	22	26, 18 mm tief	35

Female clevis mounting B

Female clevis mounting, spherical UB

Female clevis mounting B

Cylinder Ø	A	B	B_1	D	E	H	H_1	K	Z
40	52	52	28	22,5	40	7,5	12	12	7
50	65	60	32	26	49	10	12	12	10
63	75	70	40	30	59	10	16	16	10
80	95	90	50	37,5	75	12	16	16	12
100	115	110	60	37	90	12	20	20	12
125	140	130	70	57	110	14	25	26	20
160	180	170	90	55	140	19	30	30	20
200	220	170	90	60	175	19	30	30	25

Female clevis mounting with spherical bearing UB

Cylinder Ø	A	B	D	E	F	H	H_{1H7}	K	Z	α
40	52	12	22,5	40	16	7,5	12	18	7	26
50	65	12	26	49	16	10	12	18	10	26
63	75	15	30	59	21	10	16	22	10	18
80	95	15	37,5	75	21	12	16	25	12	18
100	115	18	37	90	25	12	20	28	12	24
125	140	22	57	110	31	14	25	35	20	30
160	180	25	55	140	37	19	30	40	20	28
200	220	25	60	175	37	19	30	40	25	28

Counter bearing E

Counter bearing, spherical UE

Counter bearing E

Cylinder Ø	A	B	B_1	D	E	G_{d10}	H	J	Z
40	52	52	27	22,5	40	12	7,5	63	7
50	65	60	31	26	49	12	10	71	10
63	75	70	39	30	59	16	10	83	10
80	95	90	49	37,5	75	16	12	103	12
100	115	110	59	37	90	20	12	125	12
125	140	130	69	57	110	25	14	147	20
160	180	170	89	55	140	30	19	188	20
200	220	170	89	60	175	30	19	188	25

Counter bearing, spherical UE

Cylinder Ø	A	B	B_1	D	E	G_{d10}	H	J	Z	α
40	52	52	28	22,5	40	12	7,5	63	7	26
50	65	60	32	26	49	12	10	71	10	26
63	75	70	40	30	59	16	10	83	10	18
80	95	90	50	37,5	75	16	12	103	12	18
100	115	110	60	37	90	20	12	125	12	24
125	140	130	70	57	110	25	14	147	20	30
160	180	170	90	55	140	30	19	188	20	28
200	220	170	90	60	175	30	19	188	25	28

Fork GK

Piston Ø	40	50	63	80	100	125	160	200
C	48	64	64	80	80	110	115	115
F	62	83	83	105	105	140	140	140
D	24	32	32	40	54	40	40	40
N_{h11}	12	16	16	20	20	30	25	25
L	31	39	39	49	49	73	97	97
K	24	32	32	40	40	55	80	80
J	12	16	16	20	20	30	40	40
B	54	72	72	90	90	123,5	133	133

Ball-and-socket joint GA

Piston Ø	40	50	63	80	100	125	160	200
B	56	72	72	87	87	123,5	143	143
N_{H7}	12	16	16	20	20	30	35	35
M	30	38	38	46	46	70	80	80
J	12	15	15	18	18	25	28	28
D	16	21	21	25	25	37	43	43
α°	26	30	30	30	30	30	32	32
C	50	64	64	77	77	110	125	125

Piston Ø	AK-40	AK-50/63	AK-80/100	AK-125
A	M 12 x 1,25	M 16 x 1,5	M 20 x 1,5	M 27 x 2
B	23	40	39	44
C	23	32	42	48
D	67	112	122	147
E	31	45	56	62
F	21,5	33,5	33,5	40,5
SW 1	12	19	19	24
SW 2	30	41	41	55
SW 3	30	41	41	55
SW 4	19	30	30	32
SW 5	19	30	30	36

AK 160 and AK-200 on request

Compensating couplers are mounted onpiston rods to compensate radial and angular deviation, which can occur when the piston is connected to the movable components.

Compensating coupler AK

Central swivel mount H

Piston Ø	40	50	63	80	100	125	160	200
d	16	16	20	20	25	25	32	32
e	16	16	20	20	25	25	32	32
L=1/2 Stroke+	76	85	100	110	127	141	169	196
K	95	105	130	148	181	209	262	312
t	22	30	30	35	35	40	40	50

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