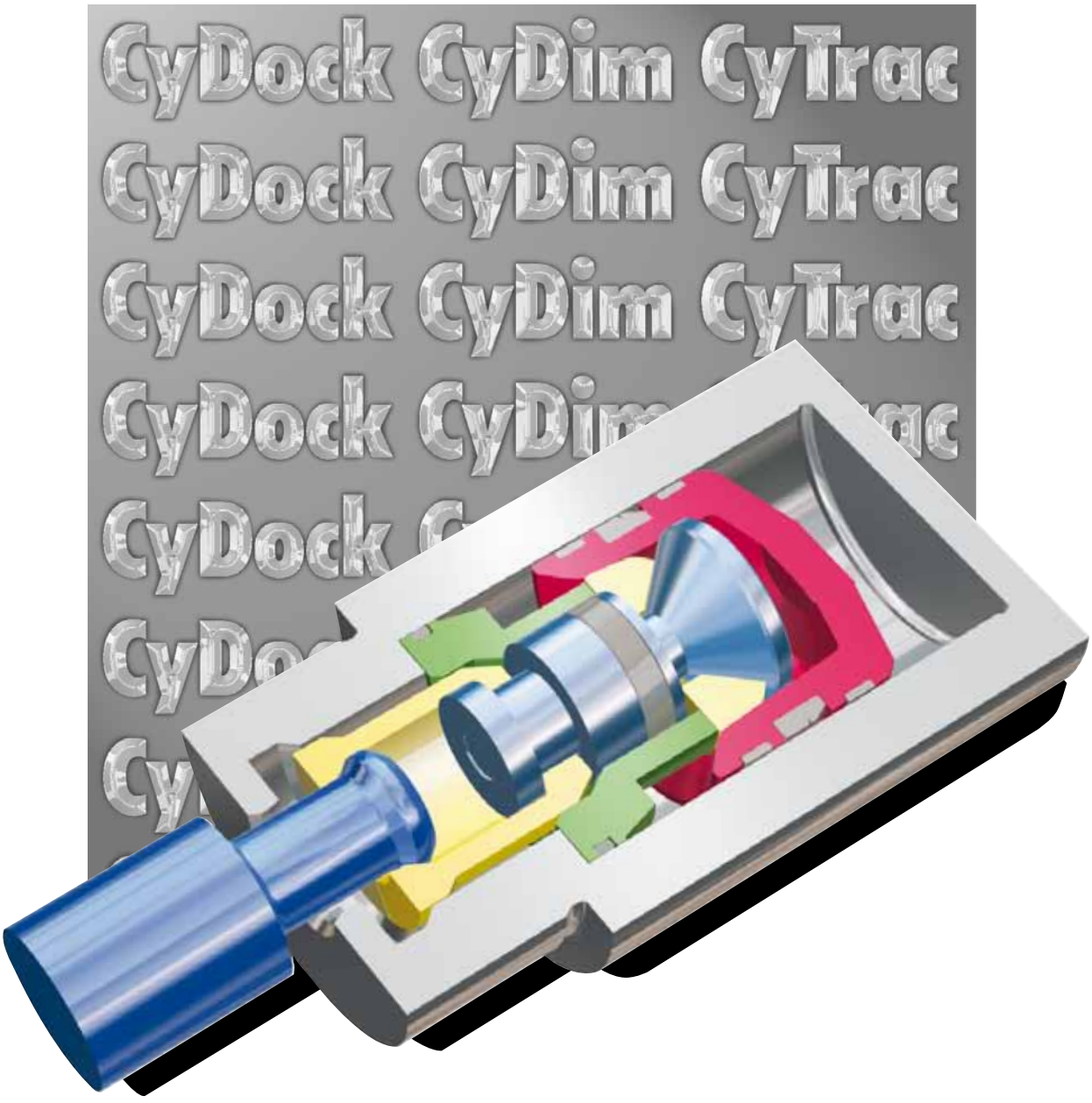
BNC COMPONENTS LTD

ClampingTechnology

CyDock · CyDim · CyTrac



CYTEC SYSTEMS

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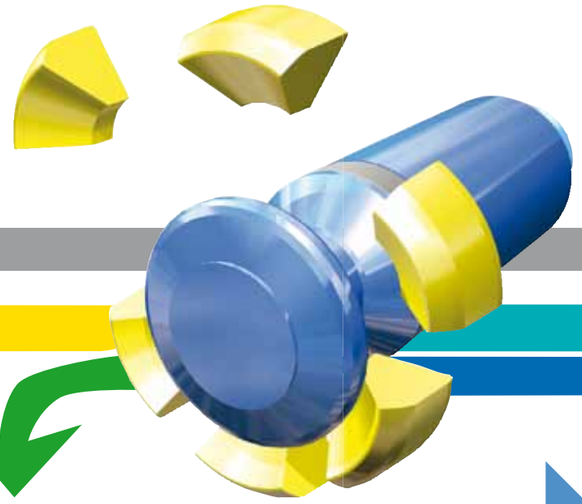
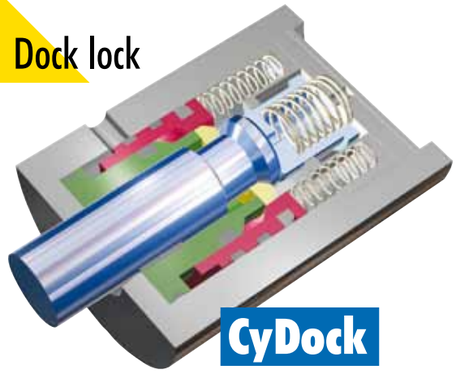
Edition 11/2014

The CyTec clamping and locking systems

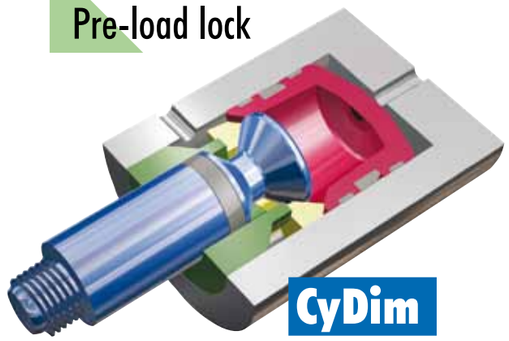


Dock lock

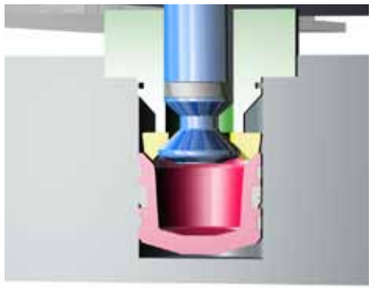


CyDock

Pre-load lock



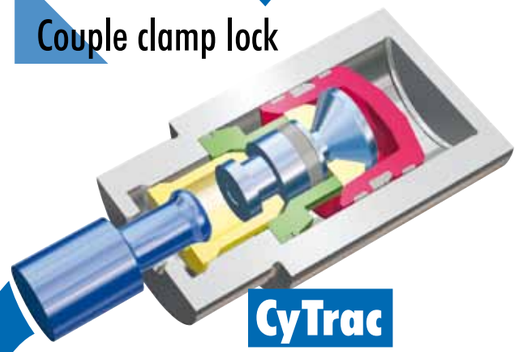
CyDim



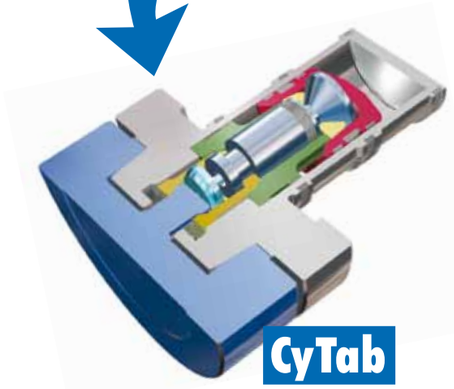
CyDim

Special clamping system

Couple clamp lock

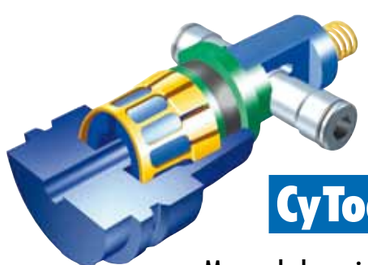


CyTrac



CyTab

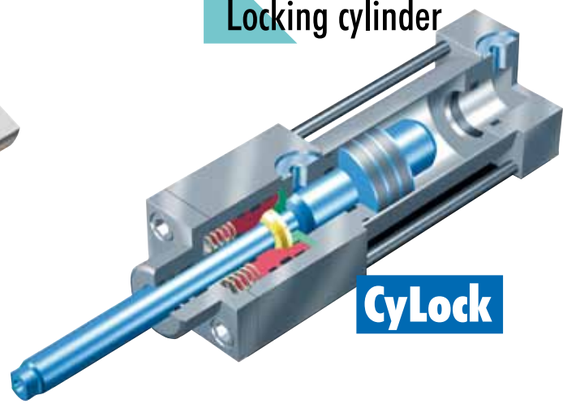
Clamping system with collet chuck and indexing



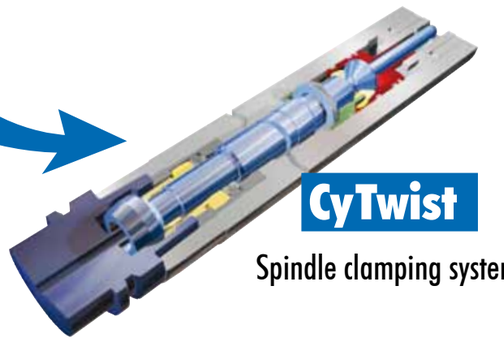
CyTool

Manual clamping system

Locking cylinder

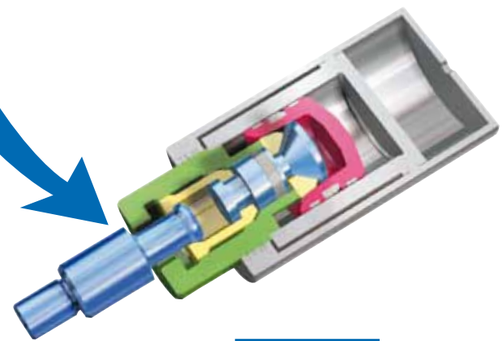


CyLock



CyTwist

Spindle clamping system



CyTrac

Type Scope

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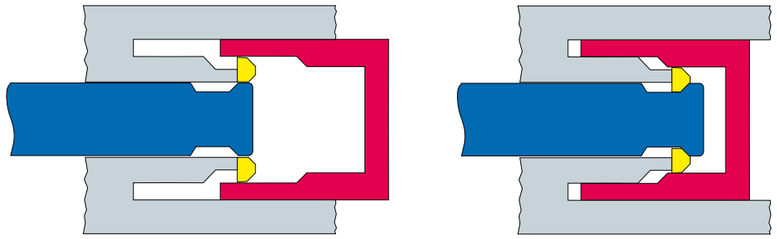
Clamping and locking - but how?

Modern production systems require modular construction so that they can adapt quickly to the growing flexible demands of modern manufacturing.

Workpiece rest and changeover times need to be minimised. Motor spindles demand rapid tool changing and whole machine assemblies have to be separated and connected automatically.

The choice of a system for each specific purpose is only possible if all the operating requirements have been carefully analysed and the needs clearly defined.

Dock Lock

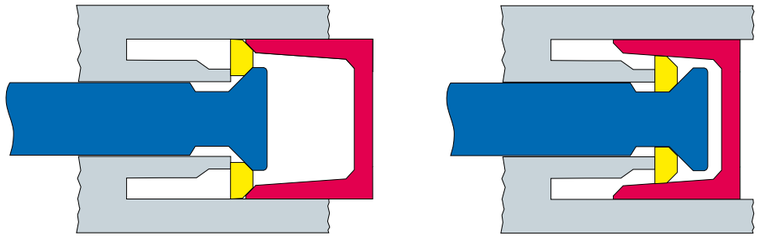


unlocked locked

The CyTec locking coupling, mechanically connects and positively locks two parts, with low backlash as required but, however, without preload.

CyDock

Pre-load Lock

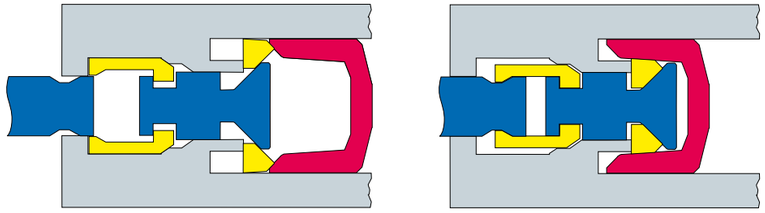


unlocked locked

The CyTec units pre-load and positively lock without the coupling function

CyDim **CyTab**

Couple clamp lock

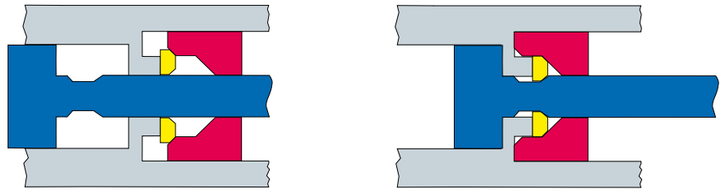


unlocked locked

The CyTec units automatically clamp and lock with pre-load.

CyTrac **CyTab** **CyTwist** **CyTool**

Locking cylinder



unlocked locked

The CyTec locking cylinder mechanically positively locks the piston rod to the desired end position (also with pre-load).

CyLock

Force

The strength of a system is dependent on the strength and type of material used and the component contours. The tension force, however, is dependent upon the pressure available of the operating medium and the piston size. Depending upon the application a pneumatic pressure of between 5 and 10 bar or a hydraulic pressure of between 20 and 80 bar is recommended. Other pressures are available on request.

Environmental conditions

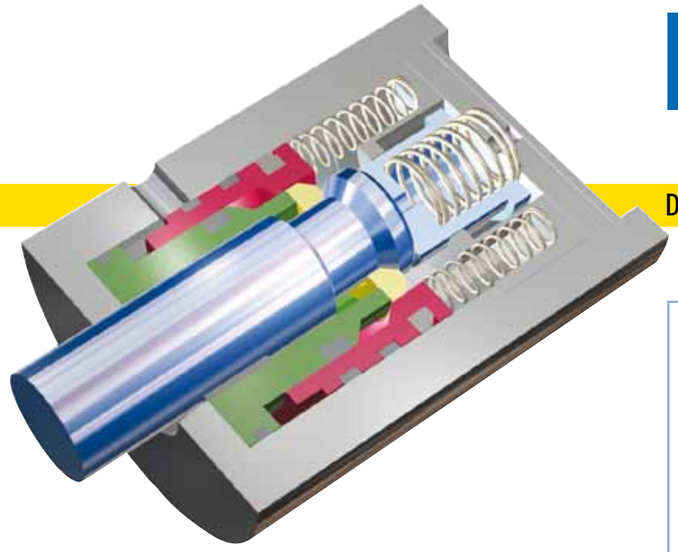
Due to the special geometry of the three dimensional system, a secure positive lock is guaranteed even under the influence of knocks and vibration. Even with temperatures of up to 60°C and the typical humidity values found in production halls no special measures need to be taken. When using heat resistant Viton seals it is possible to operate at an ambient temperature of 180°C.

Special constructions

Housing alterations for each product line to meet customer requirements are possible. Electrical lock sensors, interior coolant feeding, rotary unions and electronic monitoring systems are available.

CyDock

Docking system with safety lock



The **CyDock** docking system guarantees the ultimate in precision and safety using simple technology. A coupling bolt is automatically positively locked by means of radially operating locking segments. On request this is done free from play. The coupling is released by applying hydraulic or pneumatic force. Holding forces of up to several hundred tons can be achieved. As an optional extra safety check electrical sensors can be fitted to check locking. **CyDock** is suitable whenever secure connections have to be made and released as easily as possible.

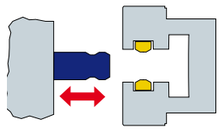
The docking systems operation is easy to explain:

Couple mechanically,
release hydraulically or pneumatically

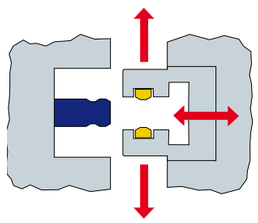
Geometry

When coupling two parts the following design arrangements are available to suit the application:

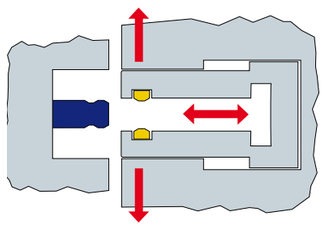
The bolt head protrudes, the feed motion is external and axial.



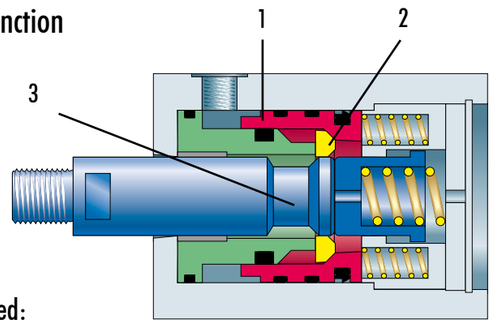
Undesirable for the bolt head to protrude. Self centering desired, active part protrudes.



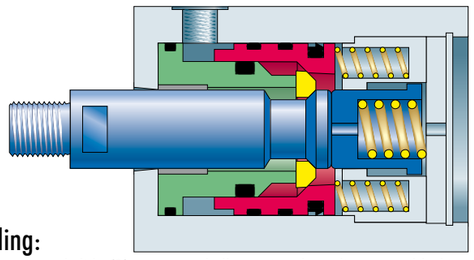
No parts may protrude, parallel movement in the unlocked position is possible.



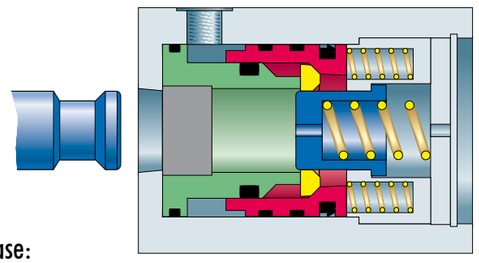
Function



Feed:
The pre-centered bolt is pushed into the coupling housing



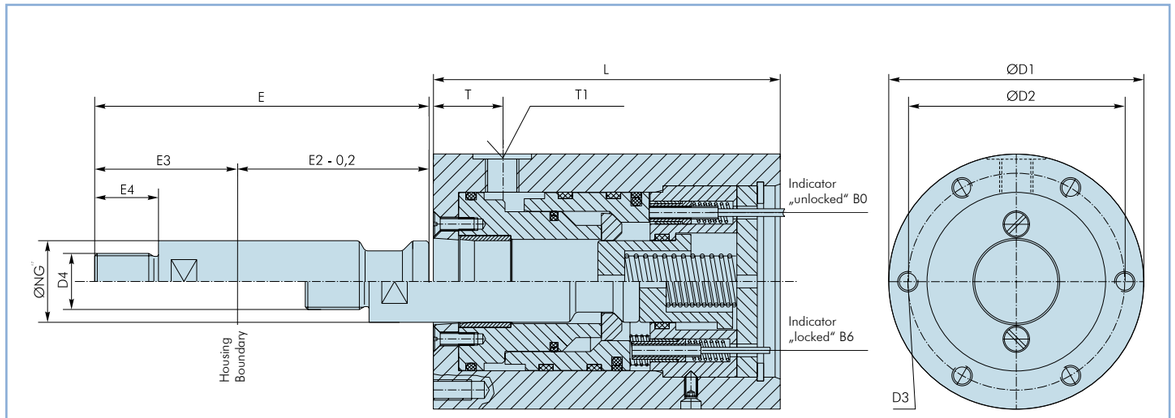
Coupling:
A spring operated slide (1) presses radially moving three dimensional locking segments (2) into the annular groove (3) of the coupling bolt, and creates a positive lock.



Release:
Pressure is introduced into the ring surface of the slide. This is then forced against the springs allowing the segments to disengage from the annular groove.

CyDock

Dimensions and forces for series VKH/VKP



Locking coupling

Nom. size	L	D1	D2	D3	D4	T	T1	E	E2	E3	E4	Holding forces (kN)
16	68	50	42	M5; 8 mm tief	M12 x 1,25	16	G 1/8"	70,5	40	30,5	15	20
25	106	78	67	M6; 15 mm tief	M20 x 1,5	23	G 1/8"	110	63	47	25	64
32	136	100	85	M8; 15 mm tief	M22 x 1,5	27	G 1/4"	131	81	50	25	113
45	191	140	119	M10; 20 mm tief	M35 x 1,5	38	G 3/8"	174	114	60	35	214
56	249	175	148	M14; 24 mm tief	M45 x 1,5	40	G 1/2"	211	141	70	50	347
70	282	210	180	M16; 27 mm tief	M58 x 1,5	44	G 1/2"	242	162	80	50	530
90	359	260	228	M20; 33 mm tief	M65 x 1,5	53	G 3/4"	318	228	90	50	855

B0, B6: Proximity switches for locking indication; Measure „L" can change with application of proximity switches;
other sizes on request

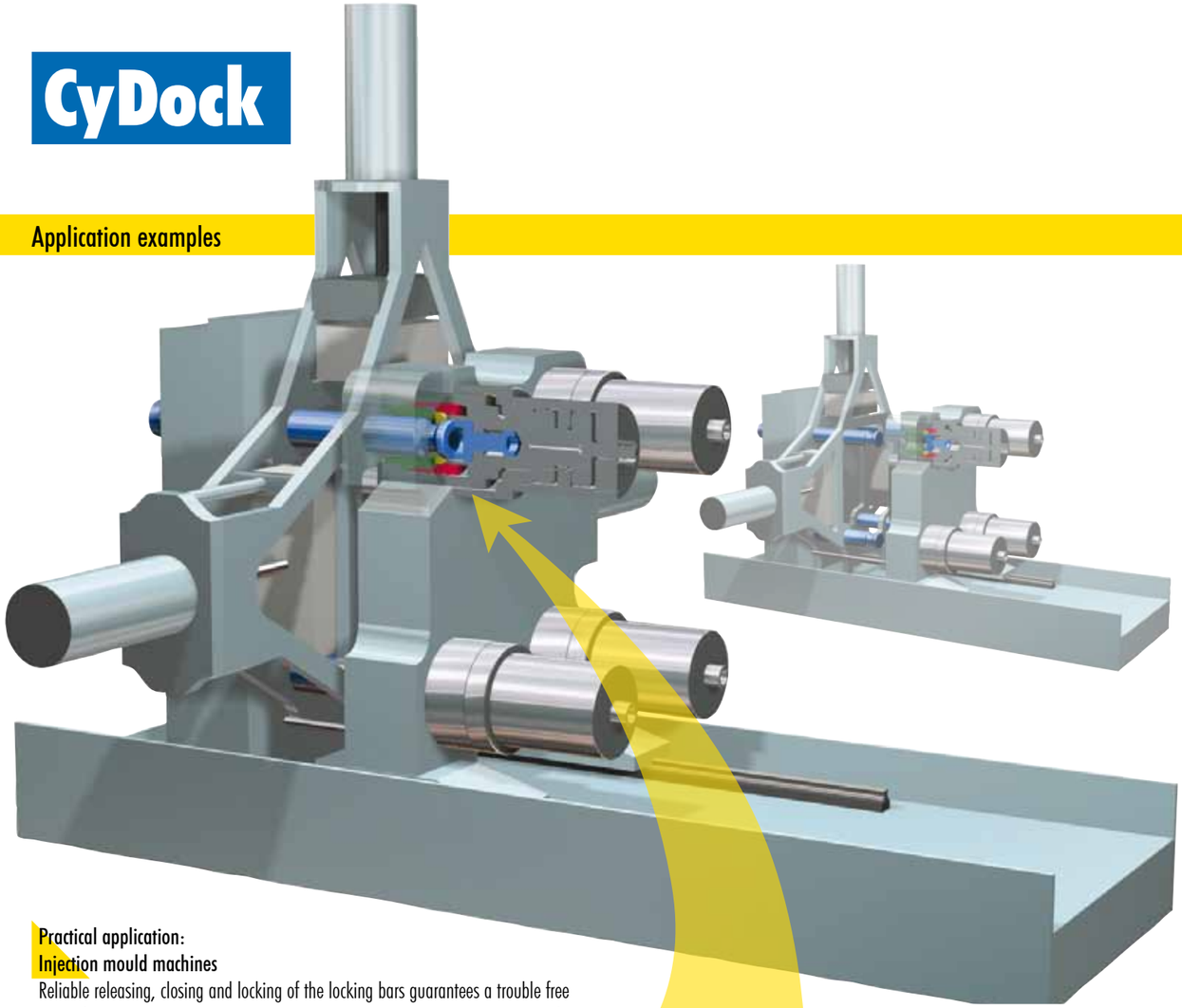
Ordering codes (example):

VKH 016 - DR - B...

- B1 = locked indicator
  B2 = unlocked indicator
- Through bar (optional)
- Diameter
- **CyDock, H = hydraulic, P = pneumatic**

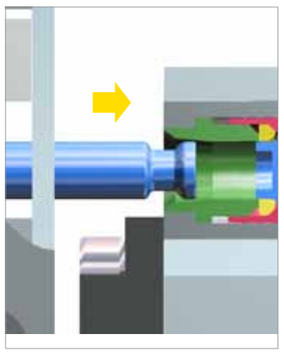
On www.cytec.de you find installation drawings as DXF in the submenu "Downloads".

Application examples

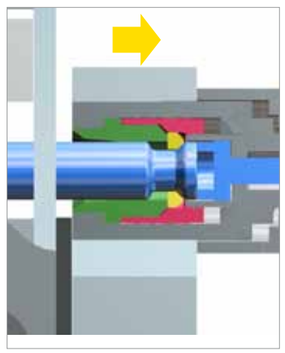


Practical application:
Injection mould machines

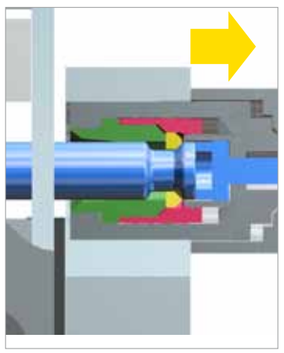
Reliable releasing, closing and locking of the locking bars guarantees a trouble free and safe porduction process shown as an example on a injection mould machine for plastic palletts.
In this particular application an additional power stroke enables a safe locking even under high counterforces.



Feed position

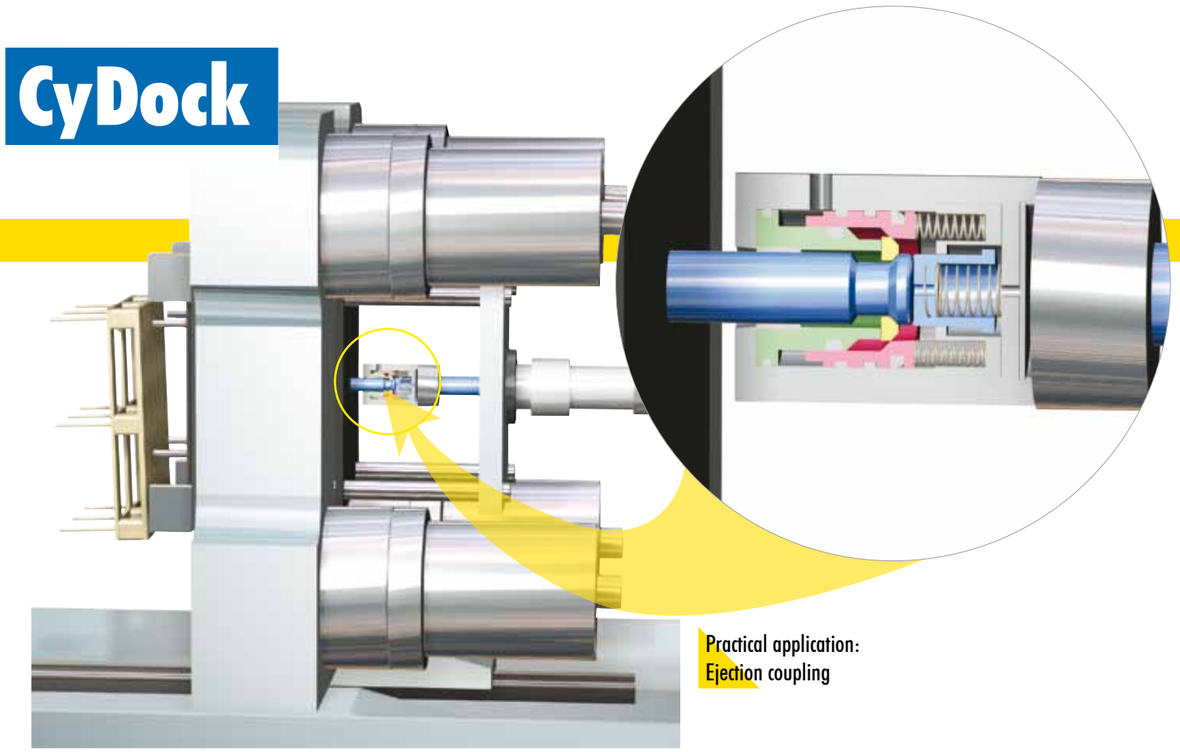


Locked position



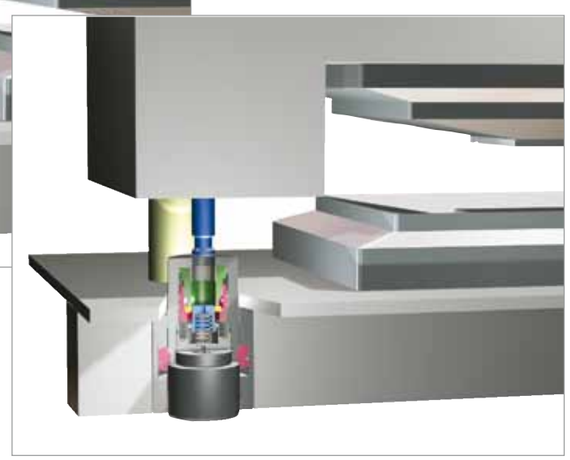
Locked position with additional power stroke

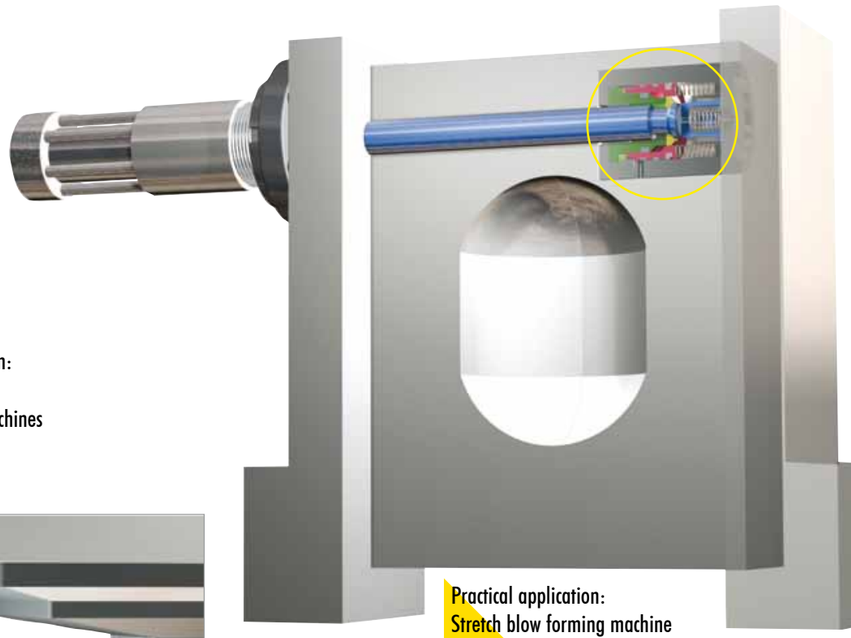
CyDock



Practical application:
Ejection coupling

Practical application:
Mould locking on thermoforming machines

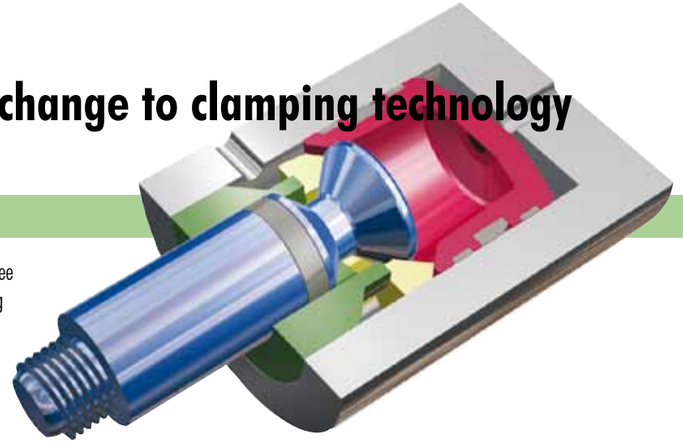




Practical application:
Stretch blow forming machine

CyDim

A principle change to clamping technology



Three dimensional clamping system

The success of a design lies in its simplicity. A fine example of this is the three dimensional clamping system **CyDim**. As a universally applicable connecting element it is capable of meeting nearly all the demands of flexible production systems.

Many applications require more than two parts to be simply coupled. To prevent movement between the individual elements a connection with pre-load is required. The **CyDim** can be operated hydraulically or pneumatically. Using simple methods it fulfils the 3 most important functions of clamping technology:

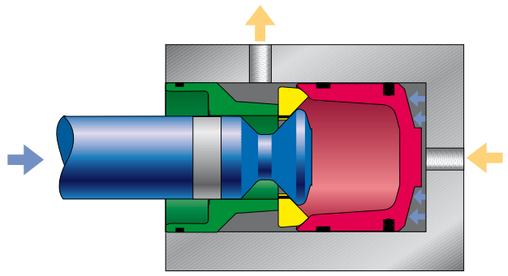
- Very high forces whilst using minimum space
- Self retention of the clamping force without maintaining pressure
- Low clamping and release pressure

With only a few component parts the formula: Force=pressure x surface area is qualified. Here the clamping force is increased by means of the three dimensional wedge system and is, additionally, self locked in the clamped position. Three times the force transmitted can be achieved along a linear characteristic curve. Therefore, with a piston diameter of 40 mm and 60 bar oil pressure more than 20 kN can be produced.

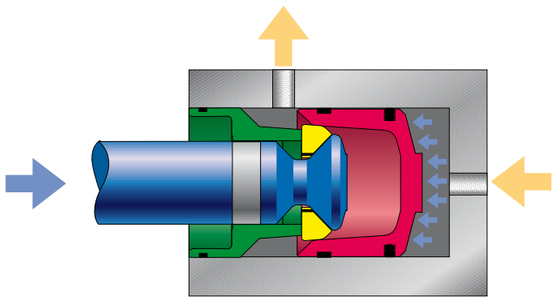
Compared to the known toggle clamp system, the **CyDim** offers an increase in force in a neutral position at the same time allowing mechanical self locking. This opens up completely new possibilities in clamping technology.

The positive lock of the three dimensional clamping system also guarantees the highest degree of safety enabling the clamping force to be maintained without maintaining pressure. Clamping tasks of every kind can be fulfilled with a system that is elegant and cheap and uses the minimum of building space.

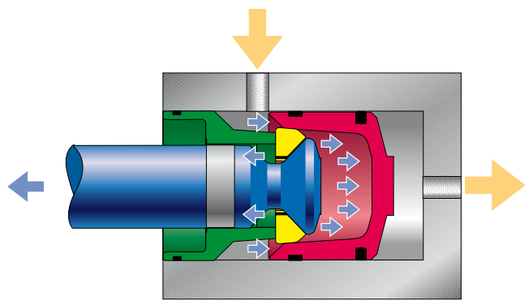
Function



Feed process:
The force produced by the piston is transferred into a pulling motion without any increase in force. The distance ratio is 1:1.



Clamping process:
After a transitional phase the force increases 3 fold due to the altered angle of the locking slide and remains constant until the end of stroke. During the total clamping process self locking prevails. Pressure does not have to be maintained.

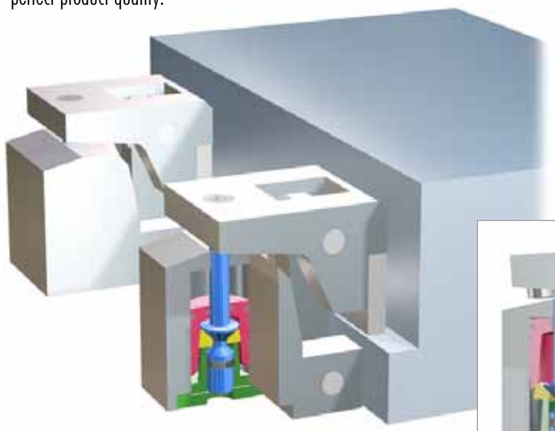


Release process:
By applying pressure to the second port the lock is released ejecting the bolt at the same time. The useable release force is calculated from force x projected surface area of the sealed diameter.

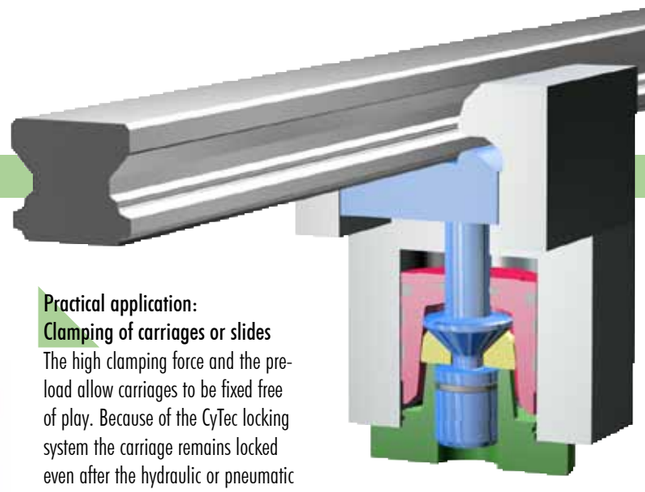
CyDim

The **CyDim** clamping system has found many uses where precise joining of component parts within an automatic production process is required.

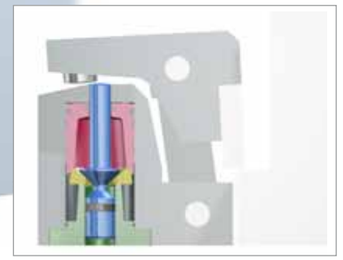
Its use in the machine tool industry should be emphasised. Through its ability to clamp tools or workpieces precisely and free of play the **CyDim** guarantees perfect product quality.

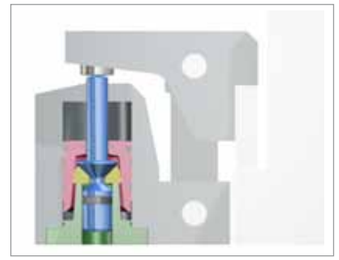


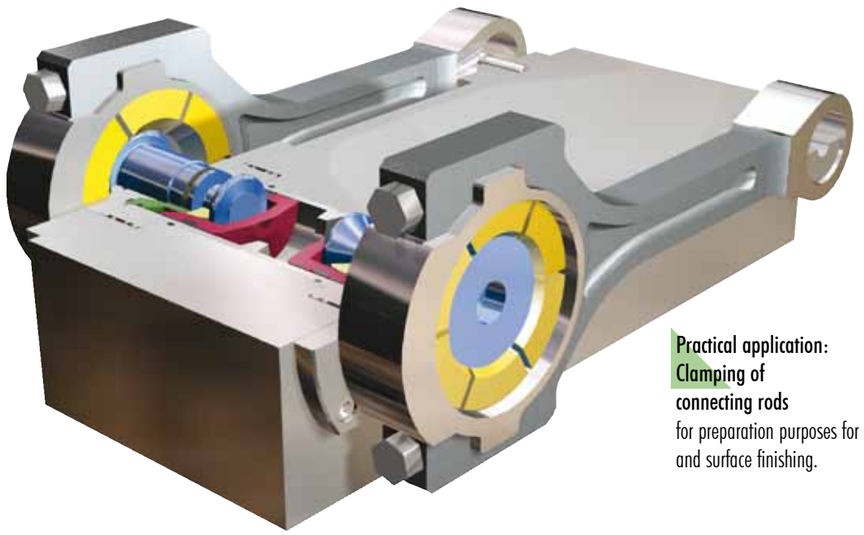
Practical application:
Block clamping system
With narrow conditions in injection mould machines the use of the block clamping system is recommended which enables the clamping with a stroke movement. The system guarantees highest forces with optimal system rigidity.



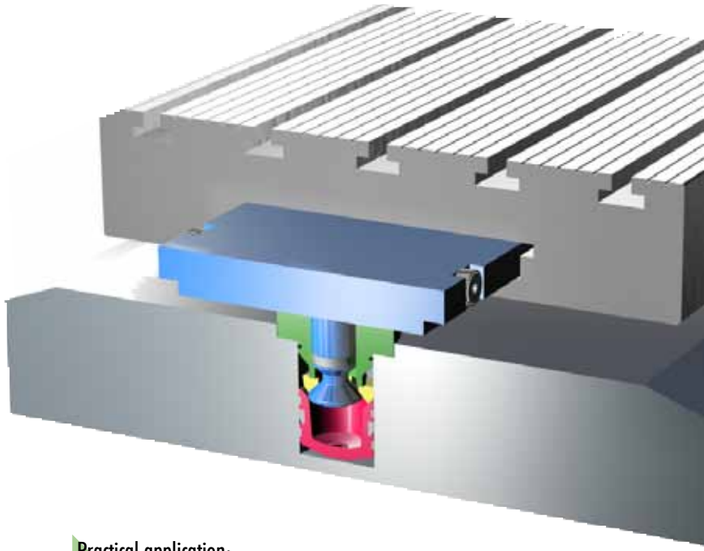
Practical application:
Clamping of carriages or slides
The high clamping force and the pre-load allow carriages to be fixed free of play. Because of the CyTec locking system the carriage remains locked even after the hydraulic or pneumatic supply is shut off.





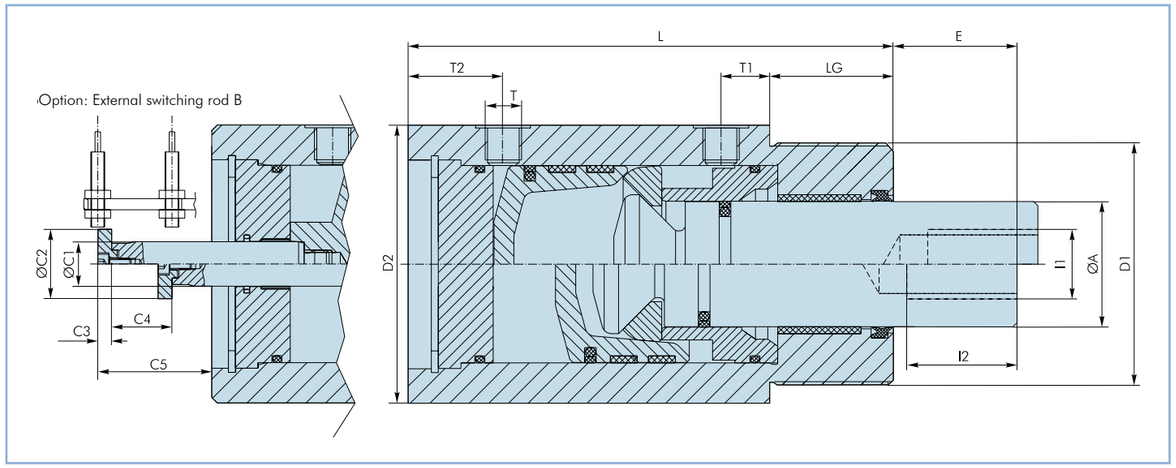


Practical application:
Clamping of connecting rods
for preparation purposes for grinding and surface finishing.



Practical application:
Pallet clamping system
For transit or insert pallets in accordance with DIN 55201 or similar, we offer the **CyTab** pallet clamping system. This modification of the three dimensional clamping system is a simple cost effective system that offers high clamp forces and self locking. These units are used with suitable T bolt or double T bolt clamps. The integrated pre-load guarantees fixing of the pallet free of play. On request a lifting function and a transport lock can be integrated.

Dimensions, forces and clamping stroke



Dimensions standard housing

Nom. size	A	I1	I2	E	T	T1	T2	D1	D2	L	LG	C1	C2	C3	≈C4	≈C5
25	15	M10	15	4	1/8"	16	29	M 35x1,5	50	116	19	10	20	5	17,5	28
35	18	M14	21	10,5	1/8"	16	31	M 45x1,5	60	138	28	12	20	5	13	30
40	20	M14	30	12	1/8"	16	31	M 55x2	70	143	31	12	20	5	15	31
50	27	M22	33	15	1/8"	18	32	M 65x2	80	166	39	16	25	5	19	38
60	24	M24	36	18	1/4"	19,5	43,5	M 75x2	90	192	46	16	25	5	22	39
70	45	M30	45	14	1/4"	19,5	43,5	M 85x2	100	196	52	16	25	5	19,5	41
100	53	M45	90	30	3/8"	20,5	49,5	M 125x2	130	253	72	20	30	5	29	47
125	66	M60	90	38	3/8"	20,5	49,5	M 150x2	160	310	95	20	30	5	31	63

Intermediate sizes on request

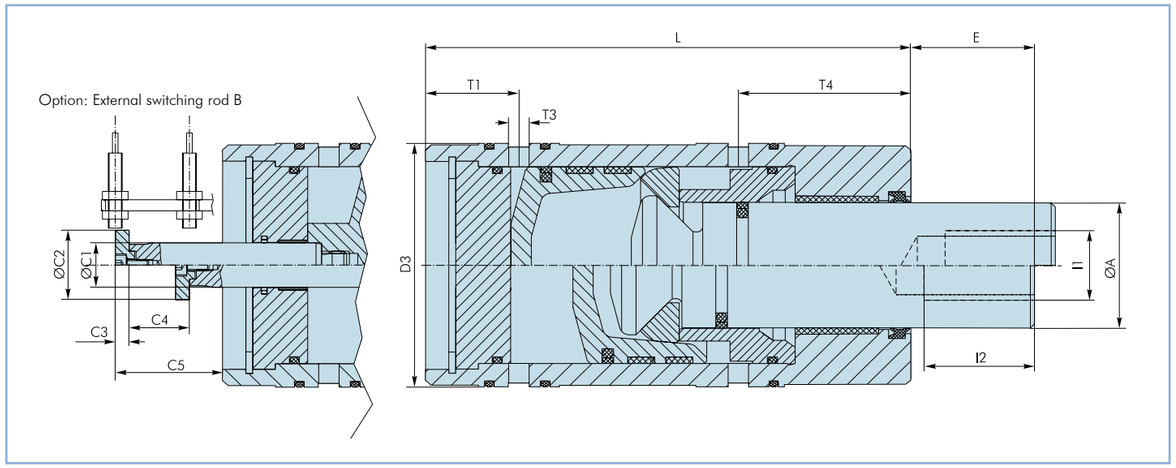
Order codes (example):

SVH 035 / 000 / 0050 - 0,8 - P - B - _

- Other details
- Locked indicator (external sensing possible)
- S = standard housing / P = cartridge housing
- Self locking, tolerance field e. g. 0.8 mm
- Clamp stroke, e. g. 5 mm
- 000 = without extra piston/ e. g. 030=with ejector piston ∅
- Nom. size = working piston ∅
- CyDim, H = hydraulic, P = pneumatic

On www.cytec.de you find installation drawings as DXF in the submenu "Downloads".

CyDim Series SVH/SVP



Dimensions cartridge housing

Nom. size	A	I1	I2	E	T1	T3	T4	D3	L	C1	C2	C3	≈C4	≈C5
25	15	M10	15	4	29	6	35	40	116	10	20	5	17,5	28
35	18	M12	21	10,5	31	5	44	50	138	12	20	5	13	30
40	20	M14	30	13	31	6	47	60	143	12	20	5	15	31
50	27	M22	33	15	32	6	57	70	166	16	25	5	19	38
60	29	M24	36	18	43,5	8	65,5	80	192	16	25	5	22	39
70	37	M30	45	21	43,5	8	71,5	90	196	16	25	5	20	41
100	53	M45	90	31	49,5	10	94,5	120	253	20	30	5	29	47
125	66	M60	90	38	49,5	10	116,5	150	310	20	30	5	31	63

Intermediate sizes on request

Forces and clamping strokes

Nom. size	max. poss. clamping force* (kN)	Clamping force (kN)	Clamping tolerance** (mm) (Standard)	Total stroke (mm)	Clamping stroke (mm)
	Hydraulics 70 bar	Pneumatics 6 bar			
25	12	1,2	0,8	3,3	2,8
35	23	2,3	0,8	5,0	4,4
40	30	3,2	0,8	6,0	5,4
50	45	4,9	1,0	6,5	5,9
60	68	7,1	1,0	8,5	7,8
70	90	10	1,0	7,5	6,8
100	190	20	1,0	11,0	10,3
125	300	31	1,5	12,6	11,5

* equal to the max. possible holding force (only hydraulics); **Changes possible on request

CyTrac Collet clamp lock

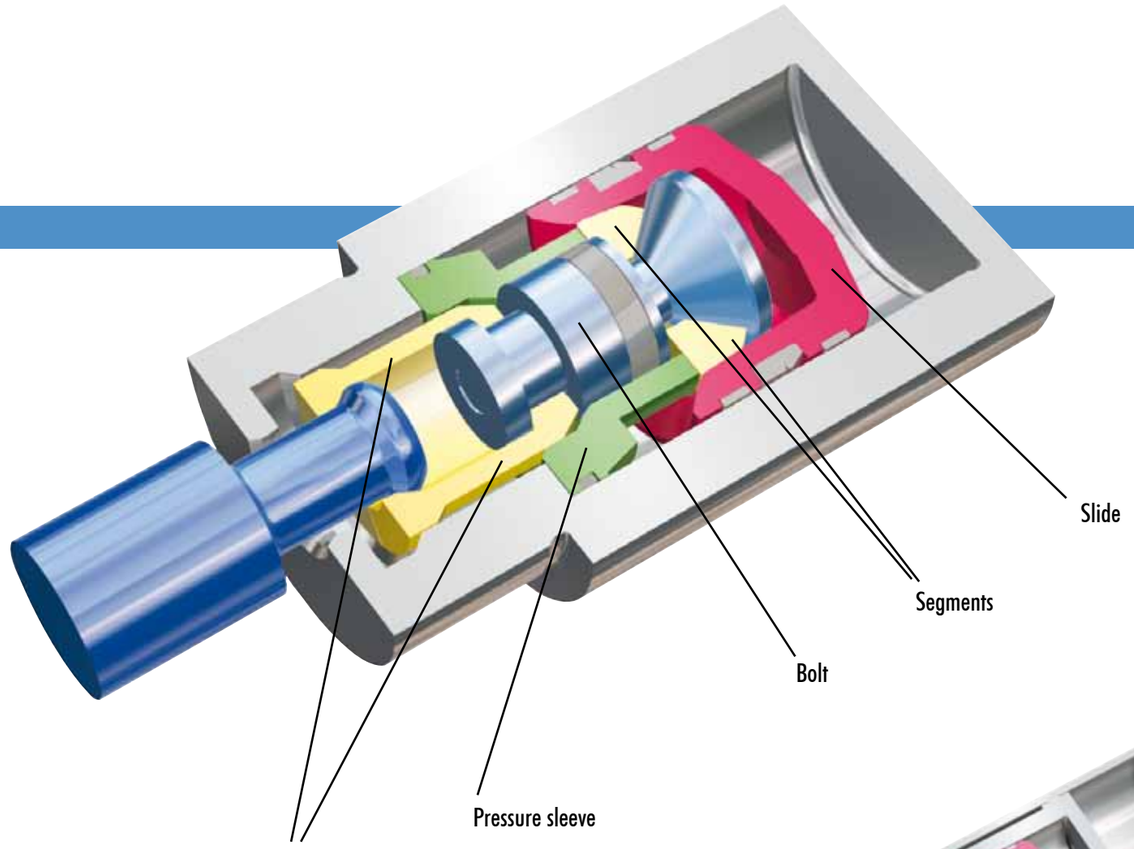
The previously described advantages of the **CyDim** are excellently enhanced by the actions of a positively locked collet coupling making it possible to realise the total functions

Couple - clamp - lock

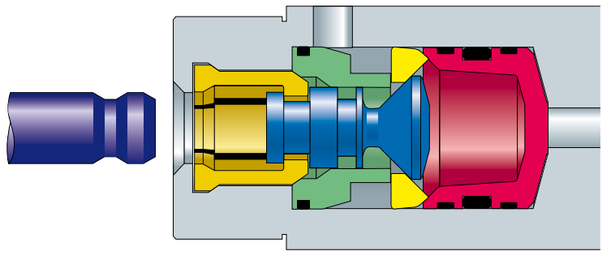
with only one element without any need of additional control requirements.

The jaws self open automatically by means of the rubber elements that are vulcanized between them. The closing motion occurs by means of a double connecting link that allows the jaws to close in parallel. This prevents early wear and fatigue of the clamping unit.

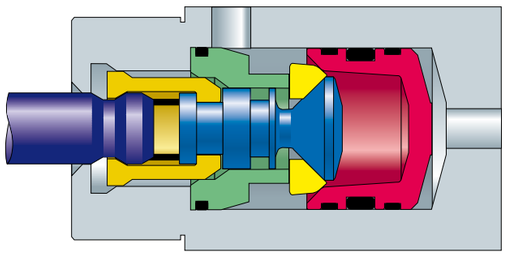
Self locking remains intact without maintaining pressure even under the influence of vibration.



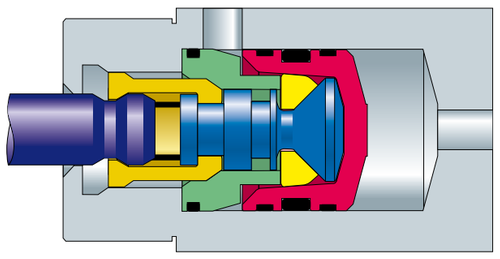
Function



The CyTrac is open and relaxed when the tool bolt is introduced.



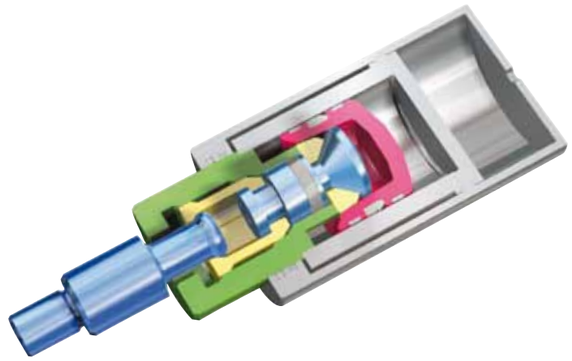
As the bolt is introduced the clamping jaws grip the rear groove of the bolt and draws it into the housing. During this phase the ratio between the feed and the pulling motion is 1:1. Pressure is introduced through the right hand port.



Here the system is locked with the bolt positively held by the clamping jaws under pre-load. The lock is released by putting pressure to the port at the top of the housing which allows the clamping jaws to return to their starting position.

In the past complicated constructions were rquired to move a passive coupling generally by using two additional cylinders. This task is easily achieved by a **CyTrac** unit -"the automatic srew".

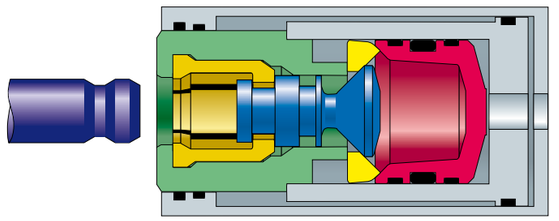
Further options include locking sensors, viton seals for high temperature applications and the use of silicone for vulcanization.



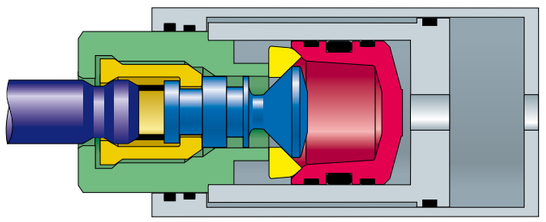
CyTrac-Scope

The **CyTrac-Scope** is a variation to the basic **CyTrac** design whereby the housing of the **CyTrac** itself carries out an additional axial lifting motion, therefore, considerably expanding the clamping stroke. This occurs automatically during the clamping process.

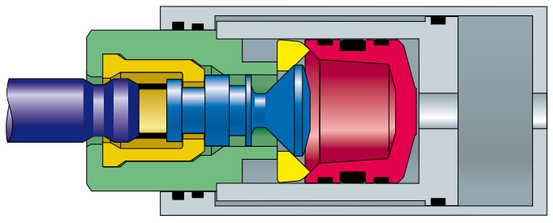
The coupling bolt is released simultaneously with the lock release. There is no need for additional control elements like valves etc. despite the enhanced function of the unit. The **CyTrac Scope**, as does the basic **CyTrac** unit, requires only two pressure connections.



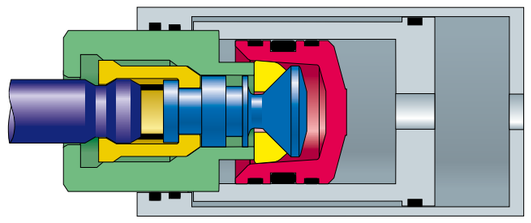
Phase 1



Phase 3



Phase 2



Phase 4

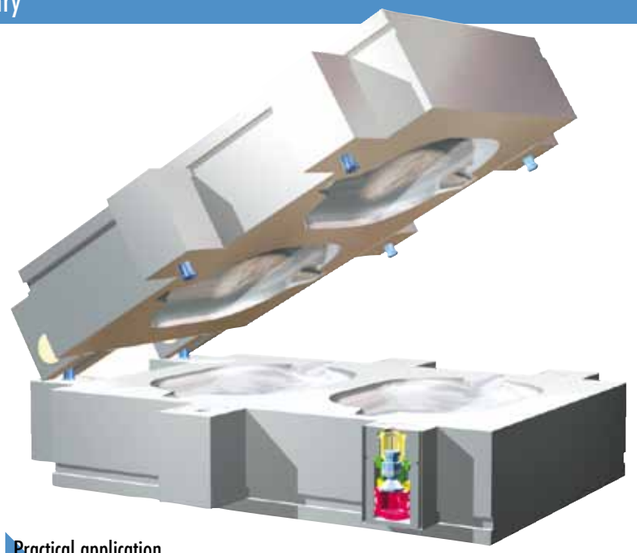
CyTrac

Innovative clamping technology for the plastic moulding industry

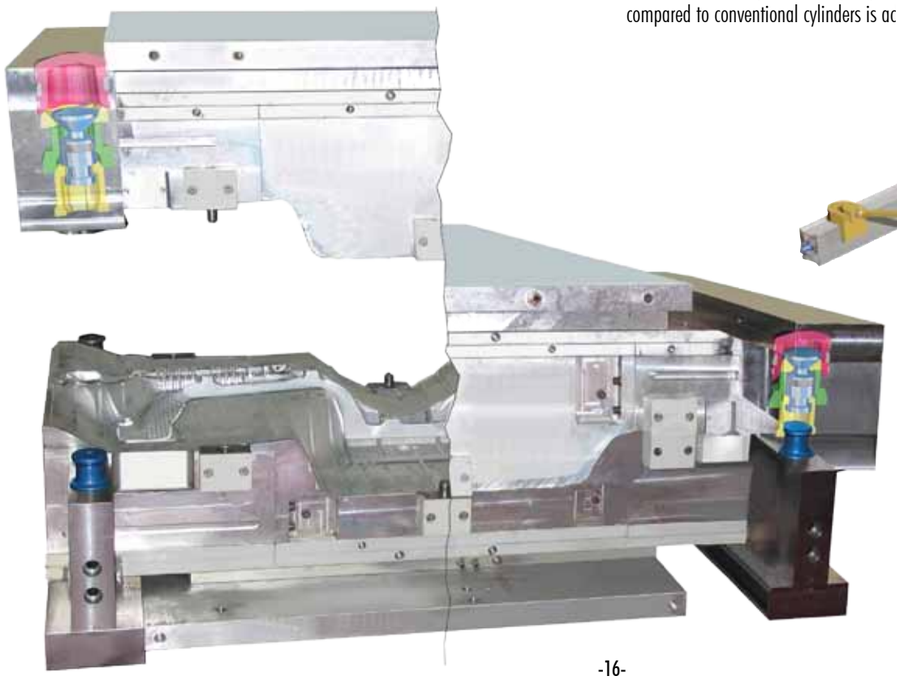
Typical applications

- Quick release tapers or hollow shaft retainers
- Tool clamping systems
- Workpiece straps
- Closing and locking of foaming tools
- Coupling of milling heads
- Clamping of milling heads in serrations
- Coupling milling machine tables
- Coupling extruder heads
- Locking of container lids
- Locking of multi couplings

CyTrac is a universally applied connecting element that fulfils most of the demands made by flexible production systems. It is suitable for use where easy but precise coupling of component assemblies is required within an automatic production process.
Typical applications for the **automatic screw** are to be found in the plastic manufacturing or machine tool building industries.



Practical application
Closing systems for foaming and blow forming machines
Clamping the two halves of the frame in foaming and blowform tools plays an important role in product quality. Because of this, oversize support frames are often used to absorb the pressure in the tool.
CyTrac units make things much easier. They allow the force to be transferred directly via the clamping plates so that the closing frame is only responsible for the motion. The pre-loaded locking mechanism allows the active pulling together of both parts with subsequent self locking. A symmetrical bolt is mounted on the fixed half and a **CyTrac Scope** with fluid couplings on the moving half.
In addition to the CyTrac´s ability to positively lock, a significant increase in force compared to conventional cylinders is achieved.



Practical application
Mould locking on blow forming machines
To reduce downtimes to a minimum the use of the „automatic screw" is recommended which guarantees a fast and safe locking of both mould halves even with high counter pressure.

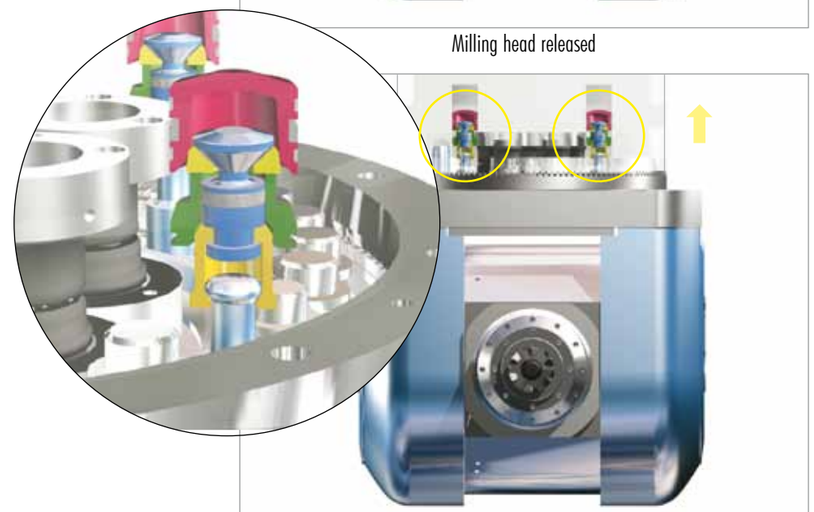
CyTrac

Innovative clamping technology for the machine tool industry

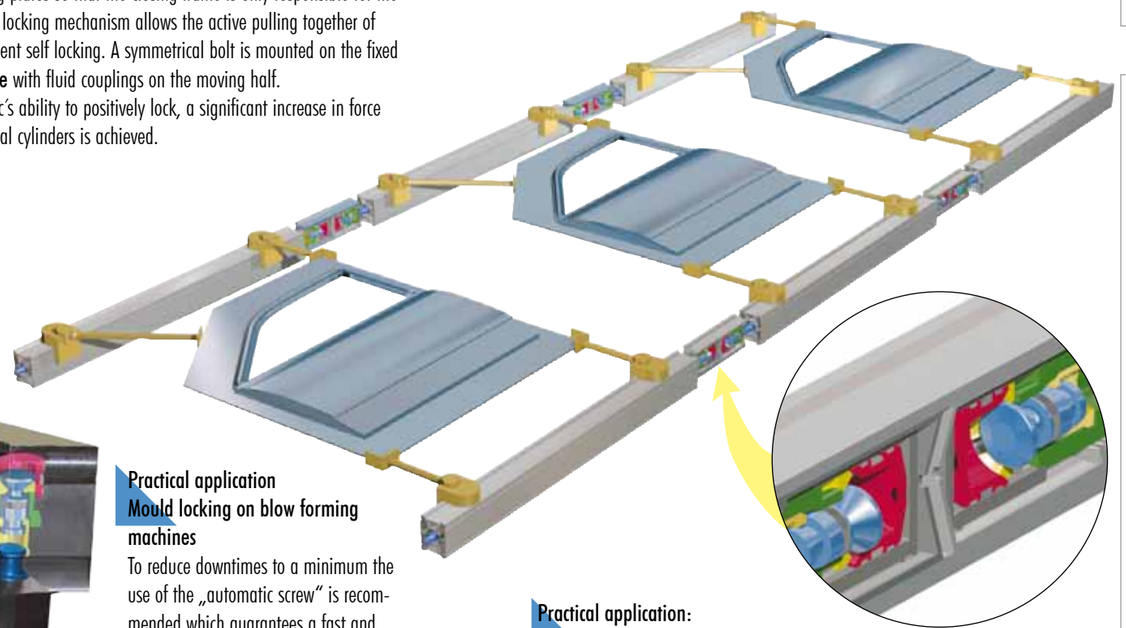
In the machine tool industry many applications for tool clamping and workpiece support present themselves.
For tool clamping with special interfaces the **CyTwist** (automatic spindle clamping system) and the **CyTool** (manual clamping system) are available (Page 24/25).

Milling head released

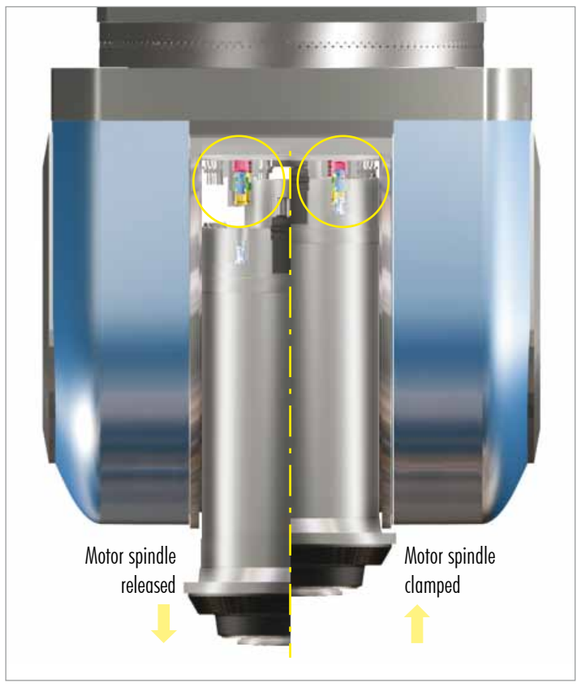
Practical application
Automatic changing of milling heads
An optimal machine utilization is released with the option of automatic head or spindle exchange. CyTrac enables safe docking and locking of head or spindle. The system is integrated in the ram refl. the spindle housing and grabs the corresponding clampingb bolt whilst feeding. So head and spindle can be adapted to the appropriate milling demand of the workpiece simply and precisely.



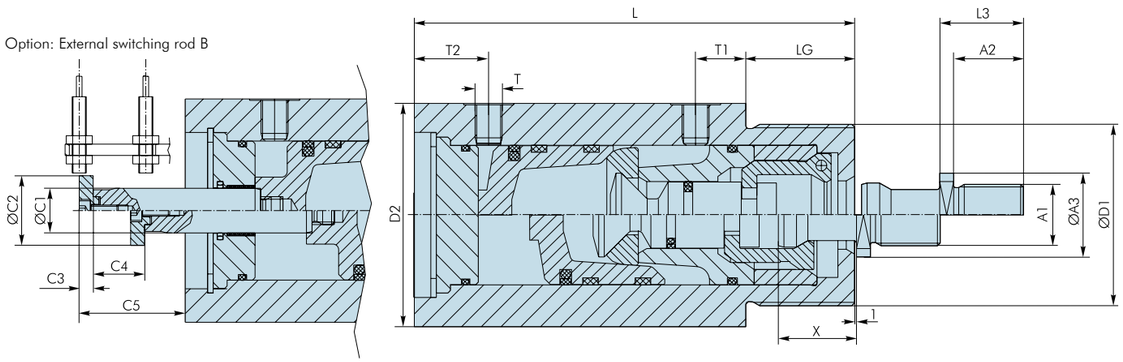
Milling head clamped



Practical application:
Coupling of walking beams
in transfer systems on single presses of press lines.



Dimensions, forces and clamping stroke



Dimensions standard housing

Nom. size	A1	A2	ØA3	L3	T	T1	T2	D1	D2	L	LG	C1	C2	C3	≈C4	≈C5	X
25	M 12x1,25	13	15	18	1/8"	16	29	M 35x1,5	50	116	19	10	20	5	11	28	15
35	M 16x1,5	18	20	23	1/8"	16	31	M 45x1,5	60	138	28	12	20	5	13	30	20
40	M 16x1,5	18	20	23	1/8"	16	31	M 55x2	70	143	31	12	20	5	15	31	20
50	M 22x1,5	25	30	30	1/8"	18	32	M 65x2	80	166	39	16	25	5	18	38	27
60	M 35x1,5	35	36	40	1/4"	19,5	43,5	M 75x2	90	192	46	16	25	5	22	39	26
70	M 35x1,5	45	55	50	1/4"	19,5	43,5	M 85x2	100	196	52	16	25	5	20	41	43,5
100	M 65x1,5	65	75	70	3/8"	20,5	49,5	M 125x2	130	253	72	20	30	5	29	47	47
125	M 65x1,5	65	75	70	3/8"	22,5	49,5	M 150x2	160	310	95	20	30	5	31	63	53,5

Intermediate sizes on request

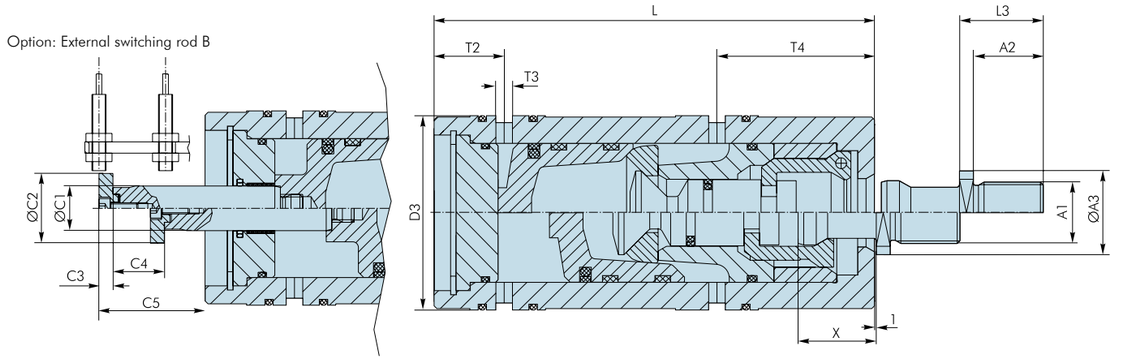
Order codes (example):

STH 035 / 0050 - 0,8 - P - B - _

- Other details
- Locked indicator (external sensing possible)
- S = standard housing / P = cartridge housing
- Self locking tolerance field e. g. 0.8 mm
- Clamp stroke, e. g. 5 mm
- Nom. size = working piston ∅
- CyTrac, H = hydraulic, P = pneumatic

On www.cytec.de you find installation drawings as DXF in the submenu "Downloads".

CyTrac Series STH/STP



Dimensions cartridge housing

Nom. size	A1	A2	ØA3	L3	T2	T3	T4	D3	L	C1	C2	C3	≈C4	≈C5	X
25	M 12x1,25	13	15	18	29	6	35	40	116	10	20	5	11	28	15
35	M 16x1,5	18	20	23	31	5	44	50	138	12	20	5	13,5	30	20
40	M 16x1,5	18	20	23	31	5	47	60	143	12	20	5	15	31	20
50	M 22x1,5	25	30	30	32	6	57	70	166	16	25	5	18,5	38	27
60	M 35x1,5	35	36	40	43,5	8	65,5	80	192	16	25	5	21,5	38,5	26
70	M 35x1,5	45	55	50	43,5	8	71,5	90	196	16	25	5	19,5	41	43,5
100	M 65x1,5	65	75	70	49,5	10	94,5	120	253	20	30	5	29	47	47
125	M 65x1,5	65	75	70	49,5	10	116,5	150	310	20	30	5	31	63	54,5

Intermediate sizes on request

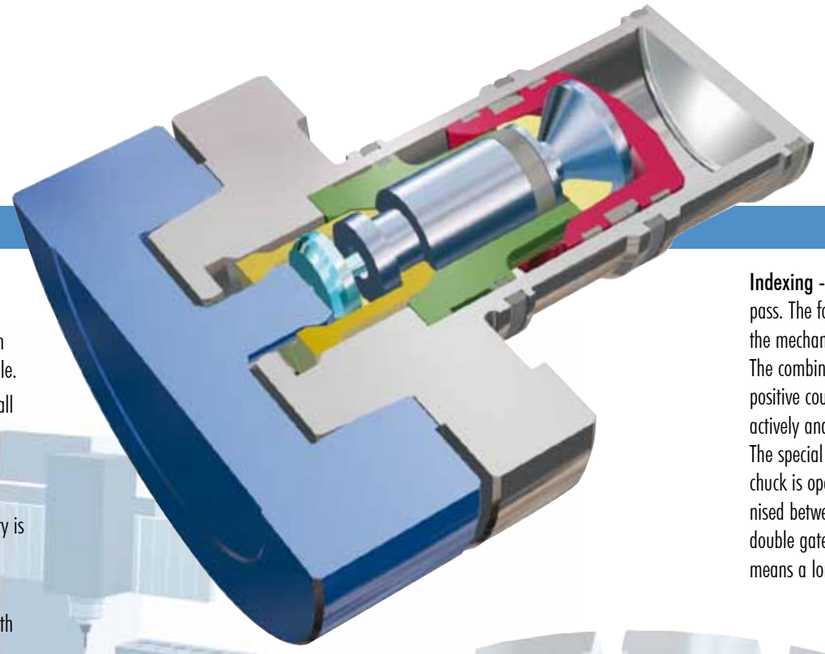
Forces and clamping strokes

NG	max. poss. clamping force* (kN)	Clamping force (kN)	Clamping tolerance** (mm) (Standard)	Total stroke (mm)	Clamping stroke (mm)
	Hydraulics 70 bar	Pneumatics 6 bar			
25	11	1,1	0,8	3,3	2,8
35	20,5	2,1	0,8	5,0	4,4
40	27	2,9	0,8	6,0	5,4
50	40,5	4,5	1,0	6,5	5,9
60	-***	6,4	1,0	8,5	7,8
70	81	9,0	1,0	7,5	6,8
100	171	18	1,0	11,0	10,3
125	270	28	1,5	12,6	11,5

* equal to the max. possible holding force (only hydraulics); **Changes possible on request; ***only available as pneumatic version

CyTab

Clamping system with collet chuck and indexing



Short set-up times and high flexibility are the most important sales arguments in the machine tool sector. Reducing workpiece changeover times plays a central role.

The **CyTab** pallet clamping system sets new perspectives which conform fully to all possible requirements laid down by machine tool designers.

The excellent features of the **CyTab** enable a clear reduction in design and material expense of the pallet. Along with the savings, high operational reliability is guaranteed.

Self-locking:
In its clamped position the **CyTab** is self-locked, i.e. it can only be uncoupled with energy. This makes it unnecessary to install rotary transmission leadthroughs.

Integrated indexing:
The **CyTab** links indexing and clamping in a single element. Susceptibility to faults is considerably reduced.

External clamp monitors:
As an option, the controller **CyCon** K11 can be used externally outside the machine table for the query "Pallet clamped or unclamped" and for monitoring the tool face contact.

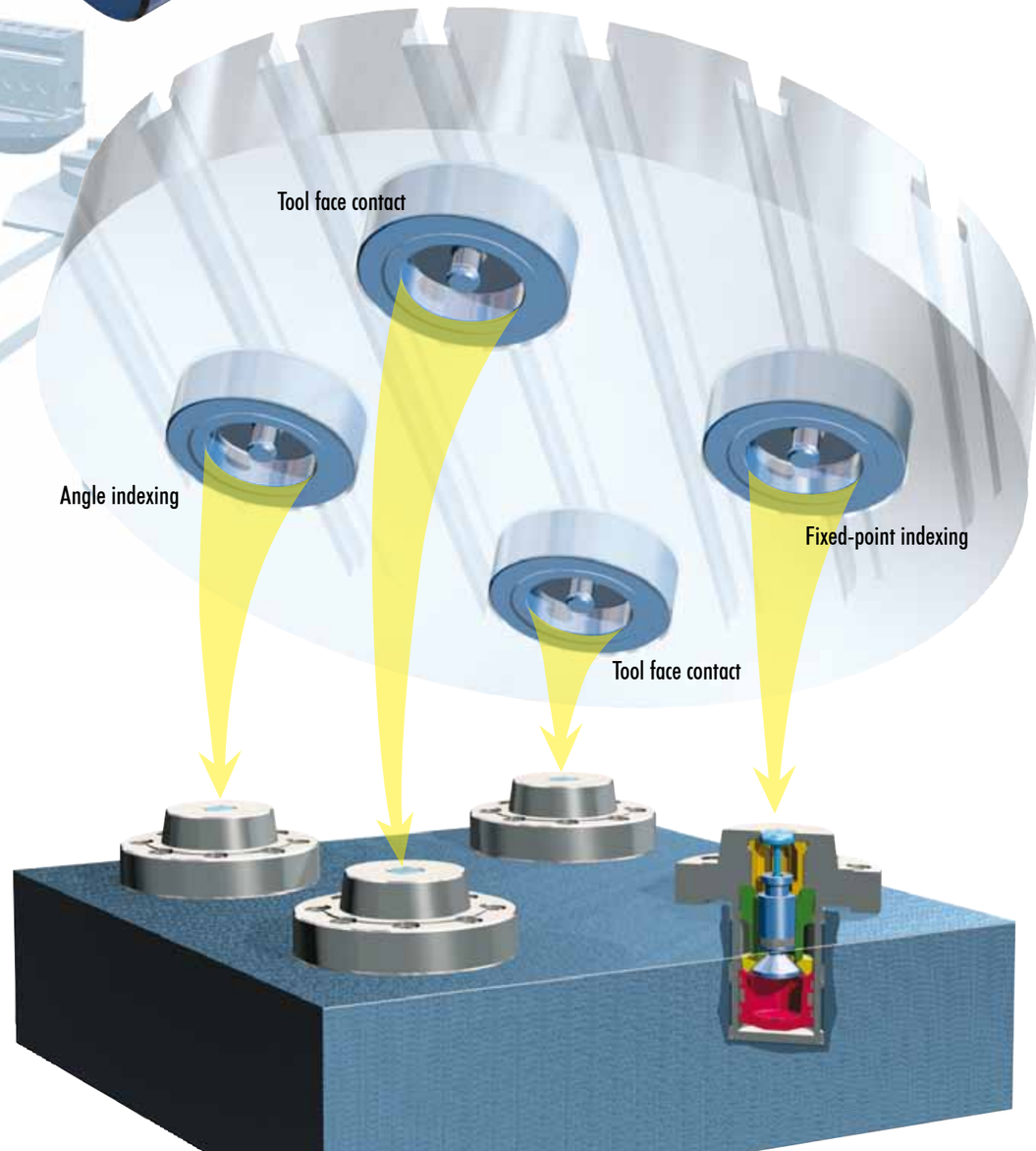
Modular variety

Whether standard pallet or customised workpiece bearer, with the **CyTab** pallet clamping system designs for transfer units and single machines with pallet changing are simplified.

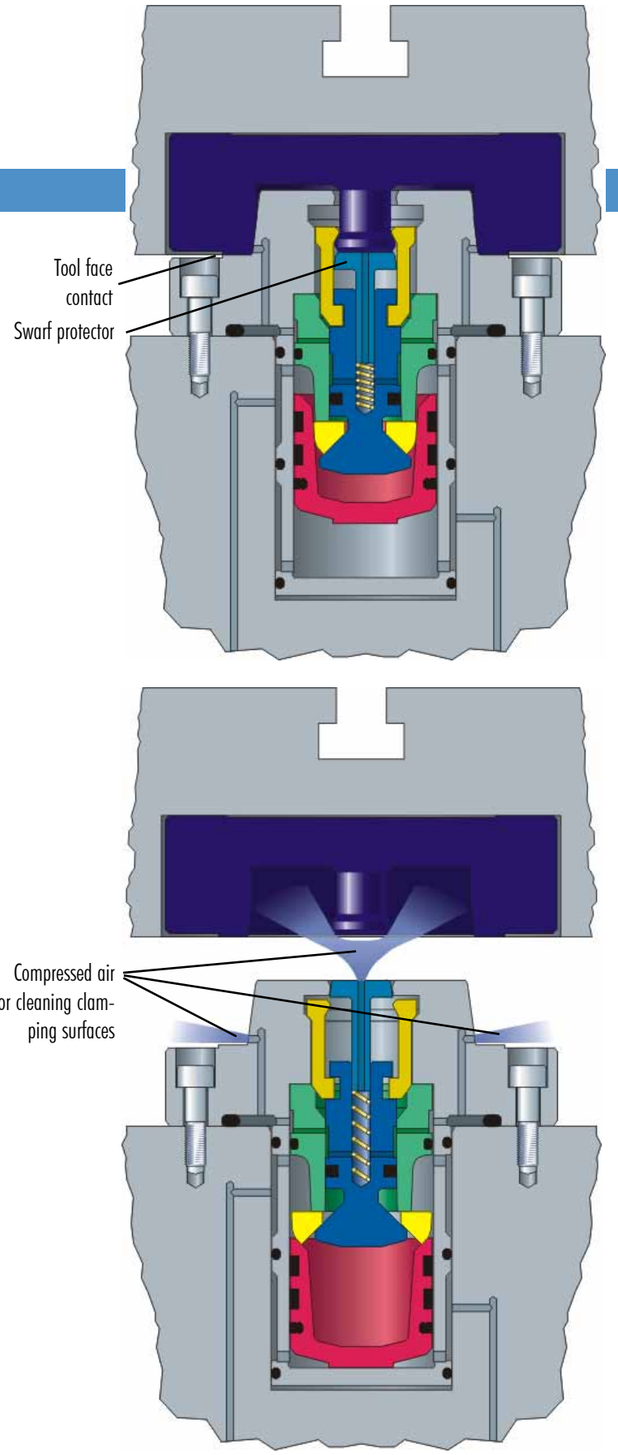
For through or rack pallets as per DIN 55201 or similar we offer a simple and low-cost installation system with high clamping forces and self-locking. The assembly is suitable for use as a T-slot or double T-slot clamp. The integrated pre-load system guarantees an absolute fixing of the pallet free from play. On request the lifting function and a transport lock can be integrated.

For pallets with clamping bolts and indexing in rotary machines we offer a multifunctional system ready for installation.

The clever part of this form is found in the holder flange. This has been conceived as a short taper with face contact (DIN 55026). The contour is orientated towards the drilled shank interface. Indexing and clamping take place in the pallet clamp via the patented **CyTab** locking system in combination with a collet chuck. During pallet indexing the contact surfaces are cleaned with compressed air. The high flow speed when the pallet is inserted in the holder piston ensures optimum cleaning. The combination of the initial stress generated by the clamping system with the special holder flange guarantees high repeatability and system rigidity.



Indexing - coupling - clamping - locking, CyTab does all this in a single pass. The form of the CyTec pallet clamping system is based on the design of the mechanical collet chuck clamp.
The combination of the hydro/pneumomechanical clamping element with a positive coupling collet chuck enables two coupling halves to be drawn together actively and self-locking in a compact system.
The special geometry of the chuck transfers the high clamping forces safely. The chuck is opened automatically by means of rubber elements which are vulcanised between the chuck segments. The closing movement is carried out via a double gate so that the collet chuck closes in a pure parallel movement. This means a long tool life.

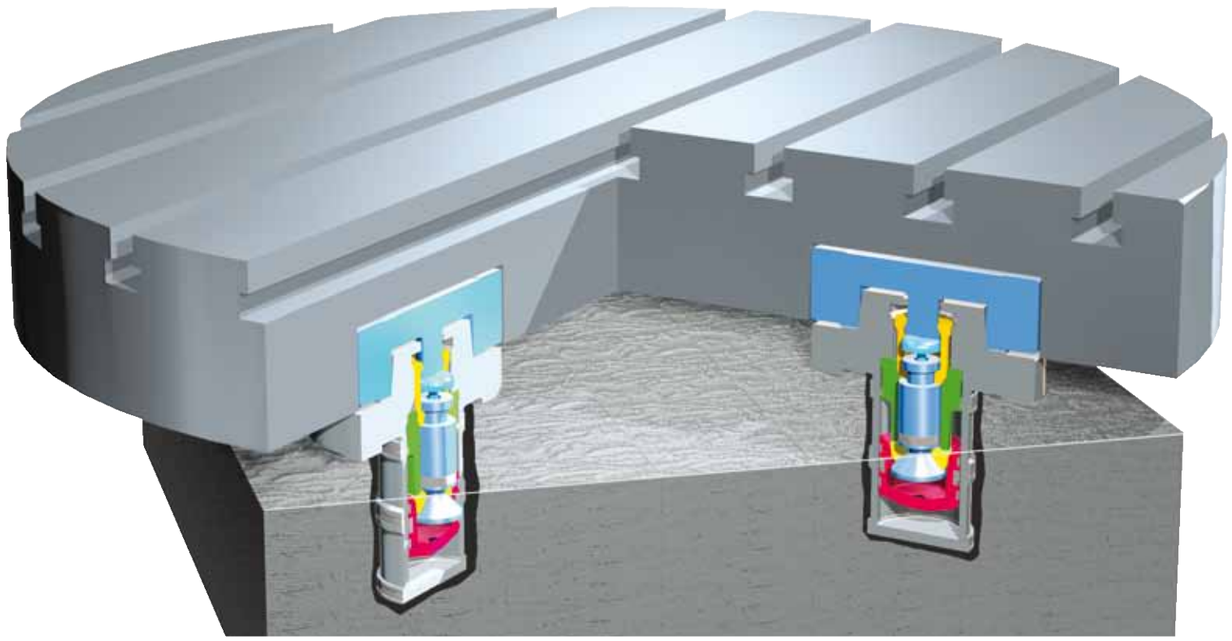


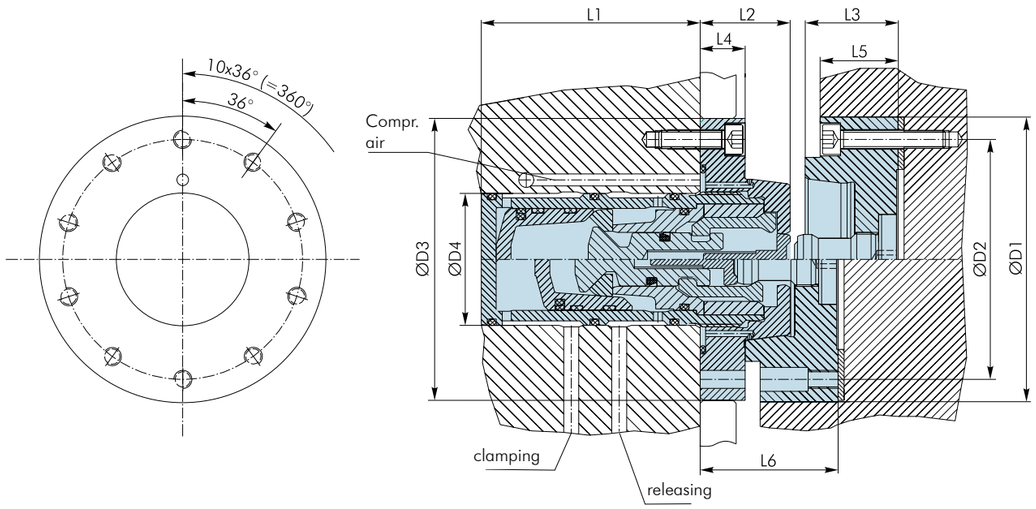
Highest interchange accuracy

A clever arrangement of 4 **CyTab** clamps guarantees 100% fixing and positioning of standard pallets in the machining centres. Round fixed-point centring and angle indexing ensure highest interchange accuracy which is not even affected to any great extent by temperature effects.

CyTab

Dimensions pallett clamping system

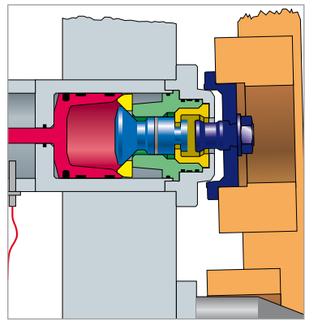


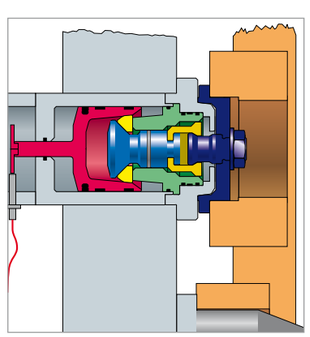


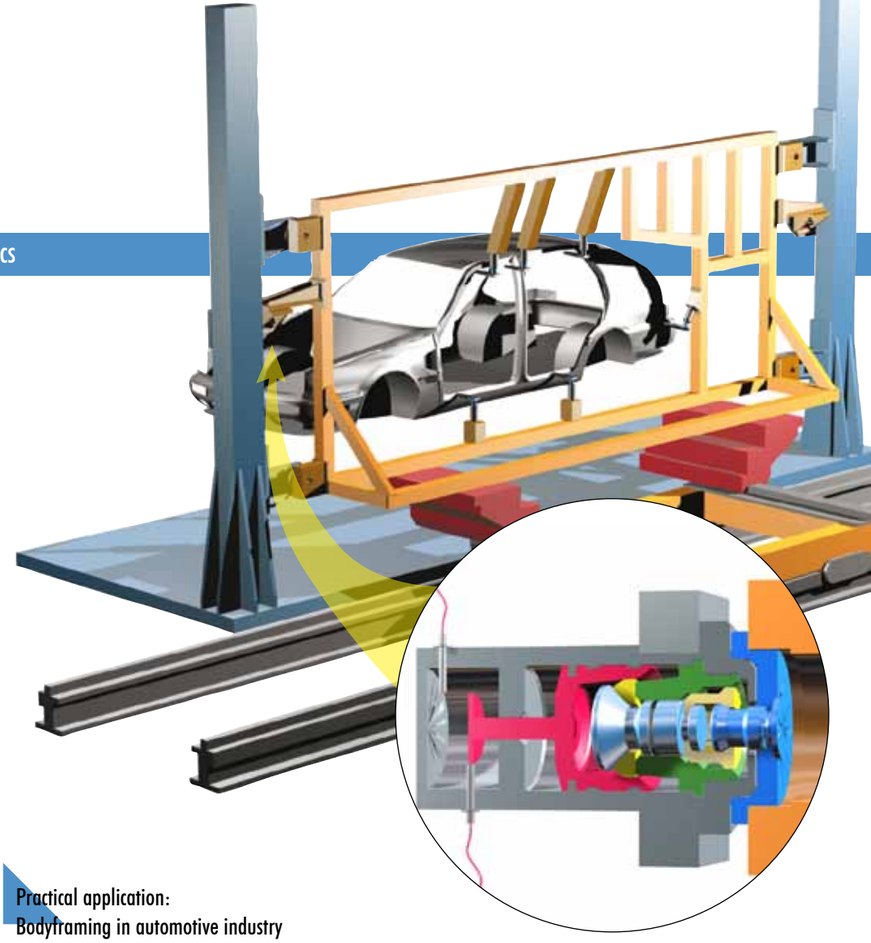
Type	D1	D2	D3	D4	L1	L2	L3	L4	L5	L6	Clamping force (kN)/80 bar
STH 26	76	65	76	35	57	28	25	14	21	39	7,5
STH 35	95	80	94	44	73	30	30	15	26	46	12
STH 40	110	93	110	50	78	36	34	18	33	52	20
STH 50	110	93	110	64	73	41	34	23	33	57	35

CyTab

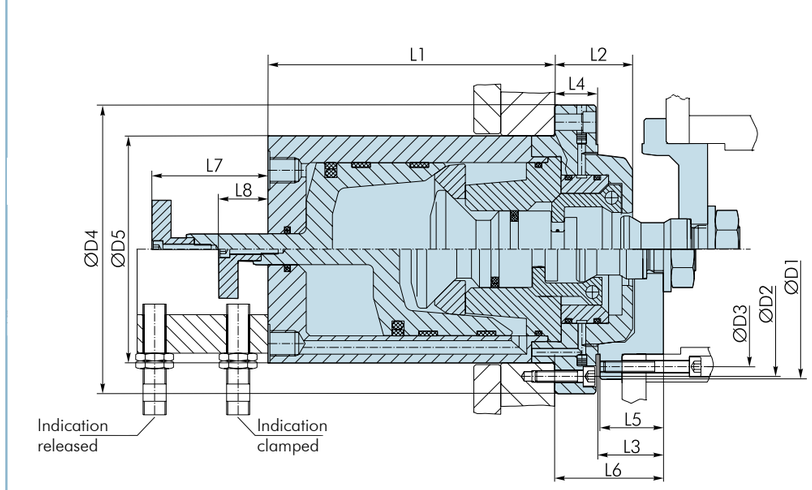
Dimensions special type for Pneumatics

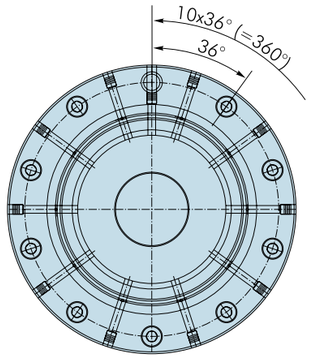






Practical application:
Bodyframing in automotive industry





Type	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5	L6	L7	L8
STP 90	135	132	122	150	118	149	42	34	23	33	57	60	25,6

Type	Grasping stroke (mm)	Clamping stroke (mm)	Grasping force	Clamping force	max. holding force
STP 90	9,5	1,5	4 kN (6 bar)	12 kN (6 bar)	40 kN (6 bar; Overload)

CyTwist

Automatic spindle clamping system

The three-dimensional clamping system optimises the interface between machine and tool

The trend towards higher flexibility, productivity and precision in modern production machines has led to a lot of new developments within the field of the interface between machine and tool. The clamping system assumes a particularly important role as it greatly affects the system rigidity. The special CyTec spindle clamping systems are based on the principle of three-dimensional positive locking and guarantee that the required curve characteristic for force displacement is maintained.

High tool rigidity in the clamped position is the basic pre-requisite for perfect product quality.

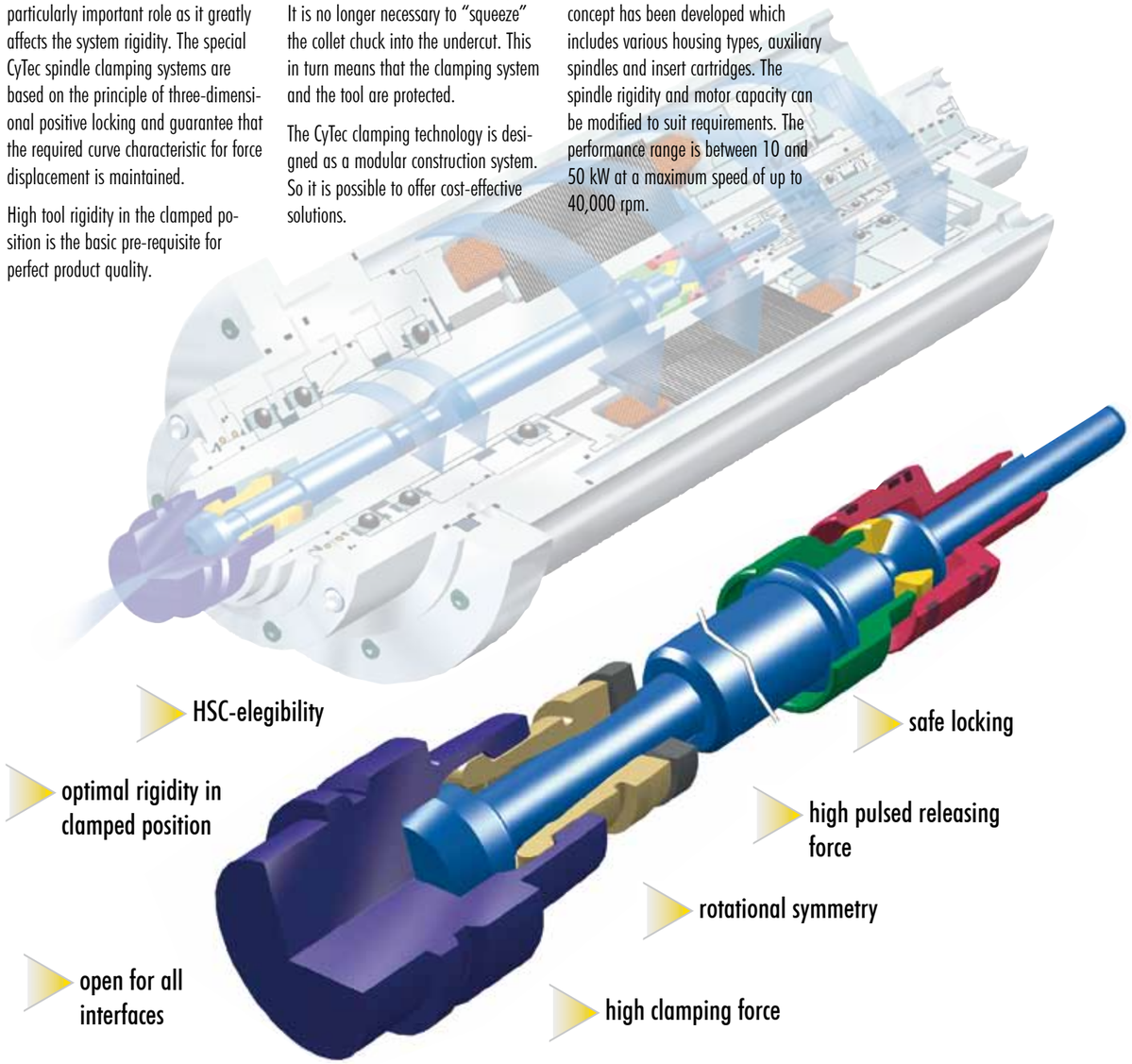
Tools which are driven even in high-frequency range can be cost effectively clamped with the higher precision and reliability. A precise drawing in of the tool is guaranteed: first the collet opens and after this the tool will be clamped. It is no longer necessary to “squeeze” the collet chuck into the undercut. This in turn means that the clamping system and the tool are protected.

The CyTec clamping technology is designed as a modular construction system. So it is possible to offer cost-effective solutions.

The rotational symmetry of the clamping system offers a high quality of spindle balance making it particularly suitable for use in high frequency motor spindles. As a result of customer demands for a total system, a modular concept has been developed which includes various housing types, auxiliary spindles and insert cartridges. The spindle rigidity and motor capacity can be modified to suit requirements. The performance range is between 10 and 50 kW at a maximum speed of up to 40,000 rpm.

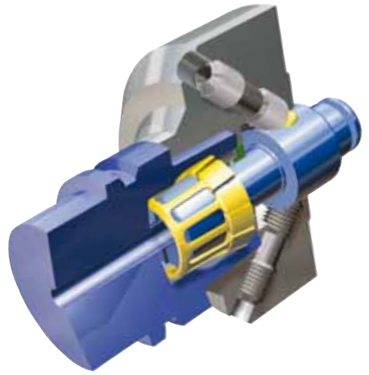
In addition to a variety of drives, different bearing layouts are also available.

For more information please request our special CySpeed brochures.



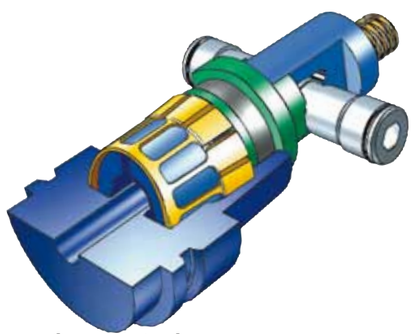
CyTool

Manual spindle clamping system



45°manual clamping

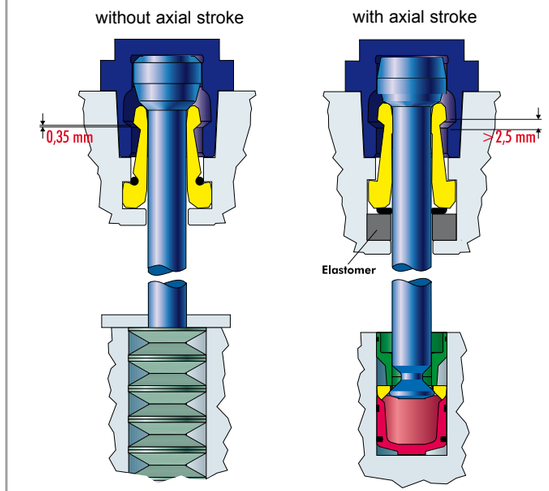
The main objectives when the manual clamping device was developed was the ergonomics and the reduction in set-up times. The complaints about the number of turns required to clamp and release the tool in the past were dealt with. Now only two turns are required to obtain a clamping force of up to 60 kN. This achieves a high level of rigidity in the connection.
As a result constant and precisely reproducible clamping forces can be applied. The core of the **CyTool** 45° manual clamping device is a patented clamping collet. This facilitates an even 360° support on the tools clamping surface and, due to the high drawing force, ensures a high system rigidity. The ergonomic 45° action with a hexagonal socket wrench produces a high torque and is easily accessible. The clamping unit is optionally available with an auxiliary flange or integrated directly onto the spindle.



Lever actuated eccentric clamp

A one third turn is sufficient to draw in position clamp and lock the tool. The clamping element can be activated from two sides and can be moved both clockwise and anticlockwise. As the lever actuated eccentric clamp does not have an internal limit stop resistance will be felt on the key if the full clamping effect is not achieved.
For reasons of compatibility, most users have found the HSK-A tool shape the best. This shape makes it possible to supply coolant internally via the centrally located hole. The entry distance of 2 mm and a spring-loaded alignment lug guarantee safe tool clamping in a reproducible cutting position. The reproducible accuracy is in the μ range.

Unique grasping safety



in comparison with HSK-63 interface

Grasping safety through axial stroke

Commonly available clamping systems have no axial stroke during tool change operations. Dry friction and high area pressure lead to strong wear on collet chuck and machine tool.

The movement:

Fold open first - then clamp

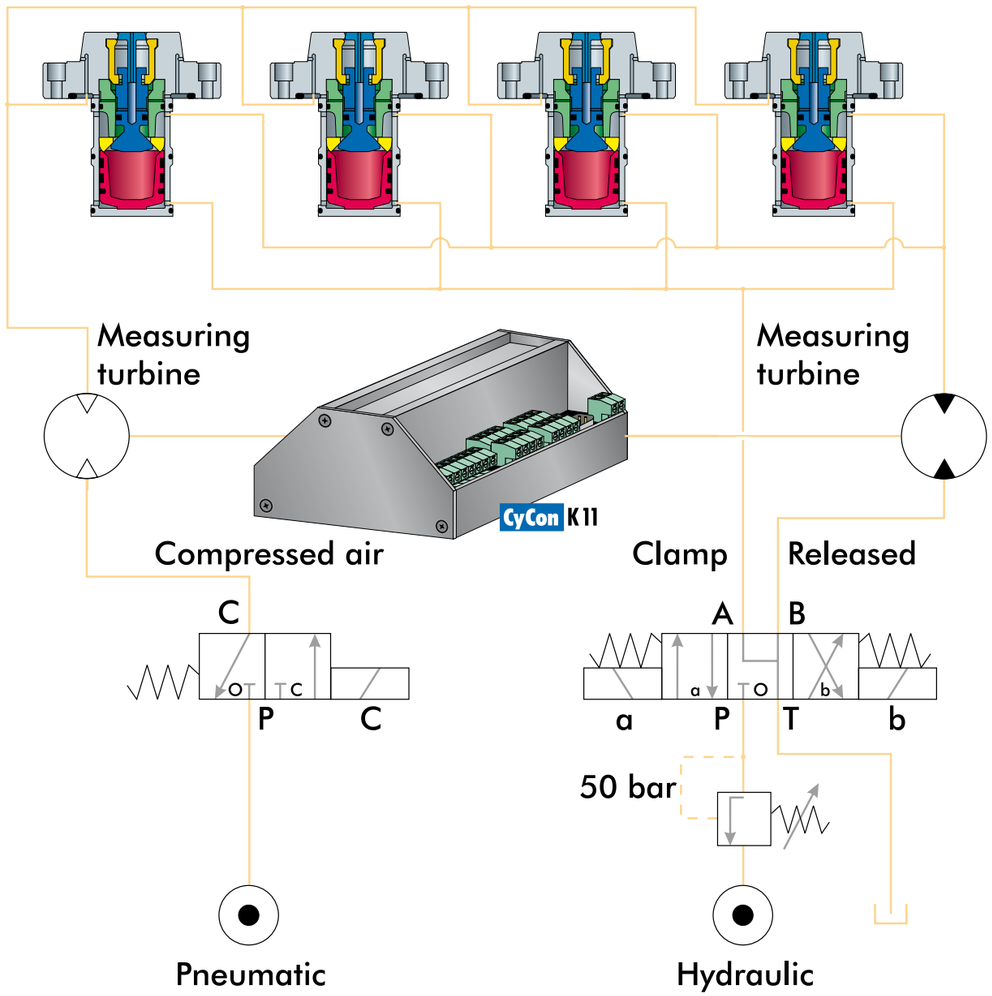
requires the precise grasping of the tool. It is no longer necessary to “squeeze” the chuck into the undercut. The special geometry of the CyTec clamping system enables an axial stroke of more than 2.5 mm. As a result, the grasping safety during tool change operations is five times higher.

The special contour of the collet clamp guarantees the following:

- an ideal tool face contact at the spindle nose.
- a safe radial positioning of the clamping segments.
- a central grasping of the machine tool while in the grinding position.
- the machine tool is protected first by the radial and then the axial stroke

CyCon

Controller for monitoring lock and tool face contact



External monitoring through CyCon K11

The query "Pallet clamped or released" and checking the tool face contact can be covered externally via measuring turbines that control the volume flow. The **CyCon K11** evaluates the values in combination with a standard industrial controller (programmable controller). The results are transmitted to the control system via digital outputs only.

Checking clamping:

With the clamped/released check the flow of oil in the hydraulic system is monitored by a measuring turbine. The revolutions of the measuring turbine are recorded by initiators and measured by the **CyCon K11** as a frequency. The pulse sequence is also counted.

Checking tool face contact:

With checks of the tool face contact a tool covers an air gap through which compressed air flows. If the tool is not even, air will flow through the gap and the turbines will rotate at a higher frequency.
Parameters are set using a PC with a serial interface.

CyFit

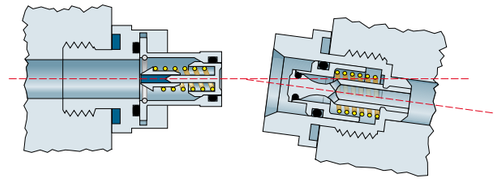
Quick-action couplers

Locking and coupling

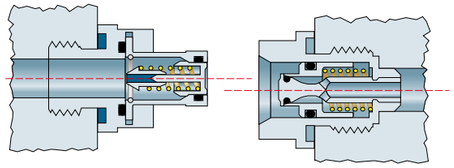
Because the **CyTab** is self-locking in the locked position, the energy can be decoupled. This means that it is not necessary to install rotary transmission leadthroughs or other expensive constructions. A reliable and precise system for energy coupling and decoupling with the lowest possible losses through leaks is the **CyFit** quick-action coupling system. This has a very compact construction and at the same time it guarantees extremely low flow-resistance with high through-flow speeds.
Thanks to the integrated offset and angle compensation system it is possible to compensate for production tolerances and inaccuracies during joining (see opposite). This usually means no need for additional tool holder screw threads, precentring devices and guides.

In addition, a special packing arrangement enables practically leakproof coupling and separating. Trapped air and impurities are avoided.

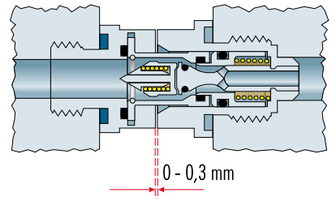
CyTab and **CyFit** represent the ideal combination of clamping and coupling systems. They guarantee trouble-free highly efficient working on modern machining centres with the shortest possible set-up times.



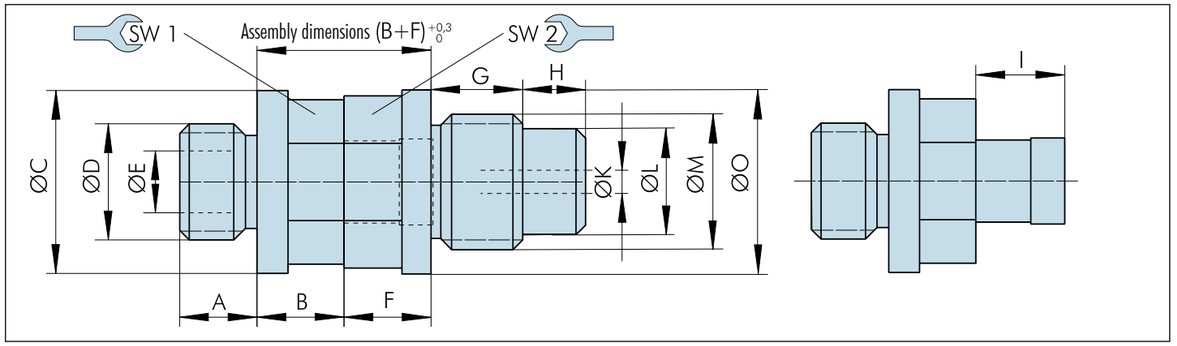
max. alignment fault 2°



max. center offset ± 0,5 mm



max. play 0 - 0,3 mm

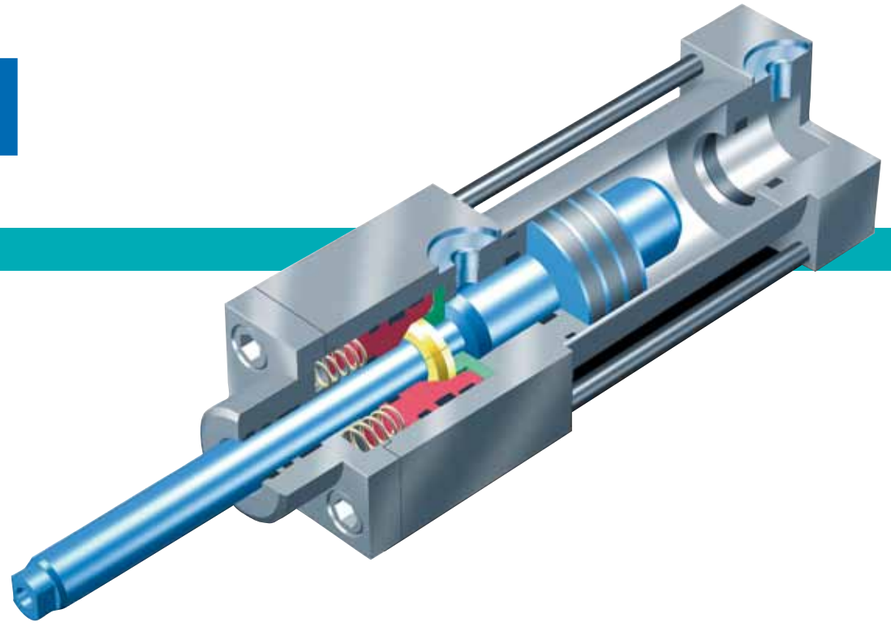


Coupling force under pressure: $F_K = 0{,}1 \cdot p \cdot Z_{hydr}$ [N] ; (p=operating pressure in bar)

Male fitting								Female connector									max. pressure	max. flow [l/min]	Z_{hydr} [mm²]
Order-no.	A	B	ØC	ØD	ØE	I	SW1	Order-no.	F	G	H	ØK	ØL	ØM	ØO	SW2			
QC/M06-N	8	9	17.5	M 12x1,5	6,4	8,8	16	QC/F06-N	9	10,5	3,5	2,4	7	M 14x1,5	19	16	80 bar	4	126
QC/M08-N	10	9	20.5	M 14x1,5	8,8	10,1	18	QC/F08-N	9	11	9	4	14,5	M 18x1,5	24	18	80 bar	12	133
QC/M10-N	10	9	24	M 18x1,5	10,8	13,7	22	QC/F10-N	9	16	10	5,4	17,5	M 20x1,5	25	22	80 bar	20	196
QC/M12-N	10	9	27	M 20x1,5	12,7	15,7	24	QC/F12-N	9	18	11	8,2	19,5	M 22x1,5	27	24	80 bar	30	243
QC/M14-N	12	10	32	M 22x1,5	15,9	17,9	28	QC/F14-N	8	20	17	11	24	M 27x2,0	32	28	80 bar	45	366
QC/M16-N	12	12	41	M 27x2,0	20,2	22,7	36	QC/F16-N	6	25	29	14	32	M 36x2,0	48	48	80 bar	68	585
QC/M06-H	8	9	19	M 12x1,5	6,4	9,2	17	QC/F06-H	9	12,5	3,5	2.4	7	M 14x1,5	19	16	200 bar	4	126
QC/M08-H	10	9	24	M 14x1,5	9	11,2	22	QC/F08-H	9	12	10	4	14,5	M 18x1,5	24	20	200 bar	12	133

CyLock

Locking cylinder



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

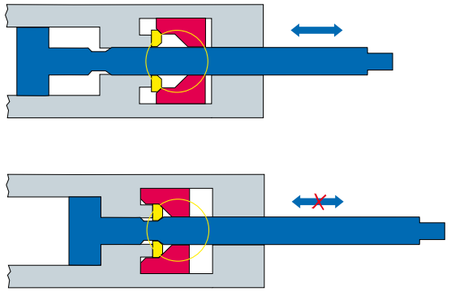
The cylinders are based on two basic ideas:Grundideen:

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

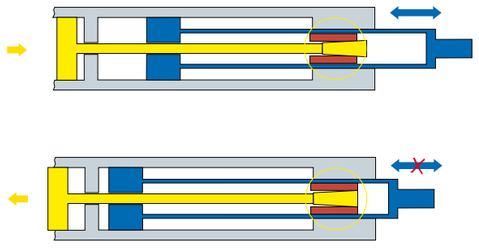


Typical features

- 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.**

CyLock

Locking cylinder

In some applications, particularly where a long lifting distance is needed, the use of **CyLock** cylinders with positive locking may be advantageous. These cylinders lock automatically without any additional controls in one or both of the end positions. Once the cylinder reaches the end stop position, the locking segments move into an annular groove in the piston rod (refer to **CyDim** system) and are positively locked by a locking slide (pre-load option).

In this position the system is self-restricting.

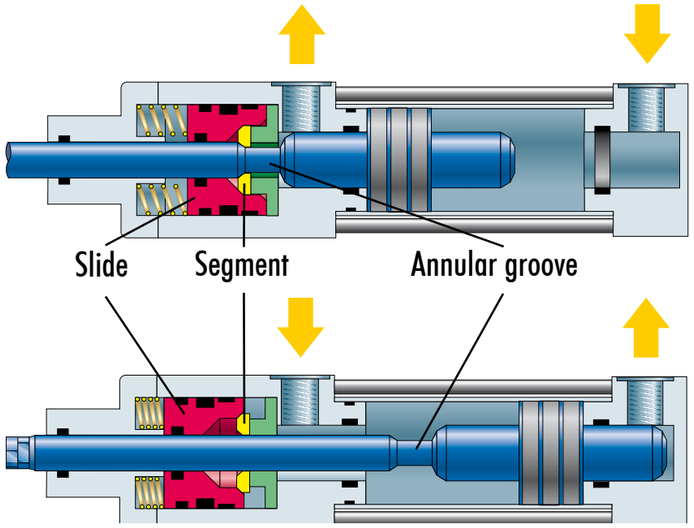
The guaranteed anti-crash feature and load rigidity for multiple counterforces are the most important features of the **CyLock** cylinder.

As the holding force is much higher than the lifting force, smaller structural sizes can be used than with conventional double acting cylinders.

For more information please request our CyLock brochure.

Application examples

- Safety cylinders on presses
- Pressure pads for punches
- Locking cylinder on containers and lids
- Locking cylinder on containers with elastic and non-elastic seals
- Clamping equipment for structural parts
- safe holding of components even in case of pressure drop



<u>Locking (on an example of Cylinder type 01):</u>

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.

<u>Unlocking:</u>

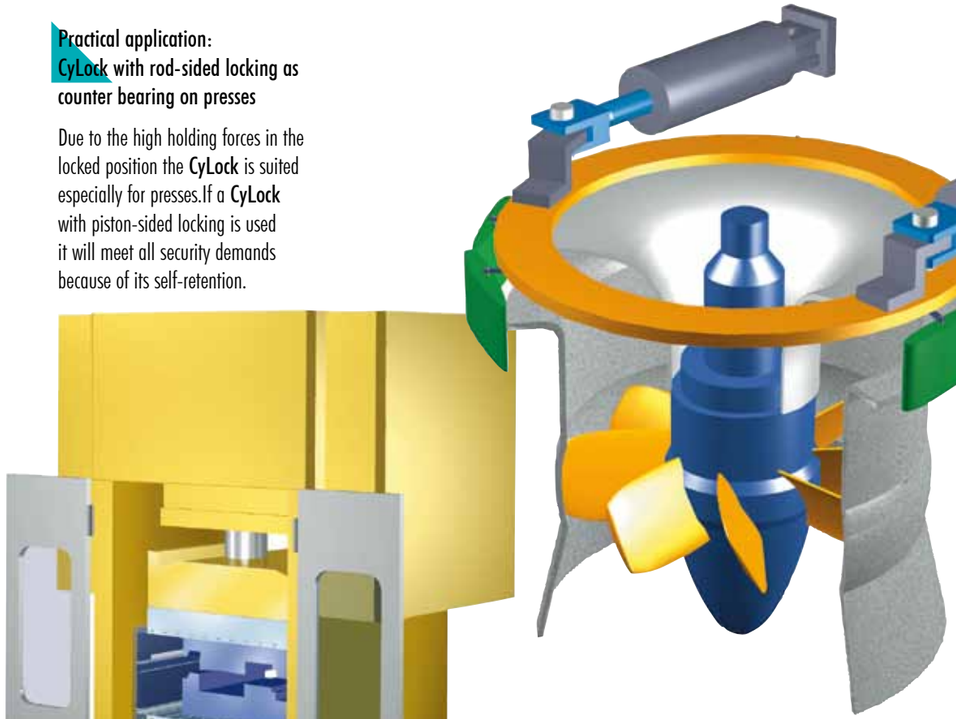
The reverse travel pressure releases the piston rod and it can return to the initial position.

Overview Cylinder Series						
	hydr. locking cylinders		pneum. locking cylinders			pneum. braking cylinder
Series	**HA**	**HB**	**PV**	**PT**	**PH**	**KP**
Design	screw construction		tie rod version with square cross section			tie rod version with round cross section
Piston ∅	25 - 250 mm		40 - 250 mm	50 - 200 mm	40 - 250 mm	40 - 300 mm
Stroke length	free choice					
Holding forces	up to 440 kN	up to 880 kN	up to 320 kN	up to 140 kN	up to 140 kN	up to 60 kN
Stroke forces	up to 245 kN		up to 31 kN			up to 68 kN

CyLock

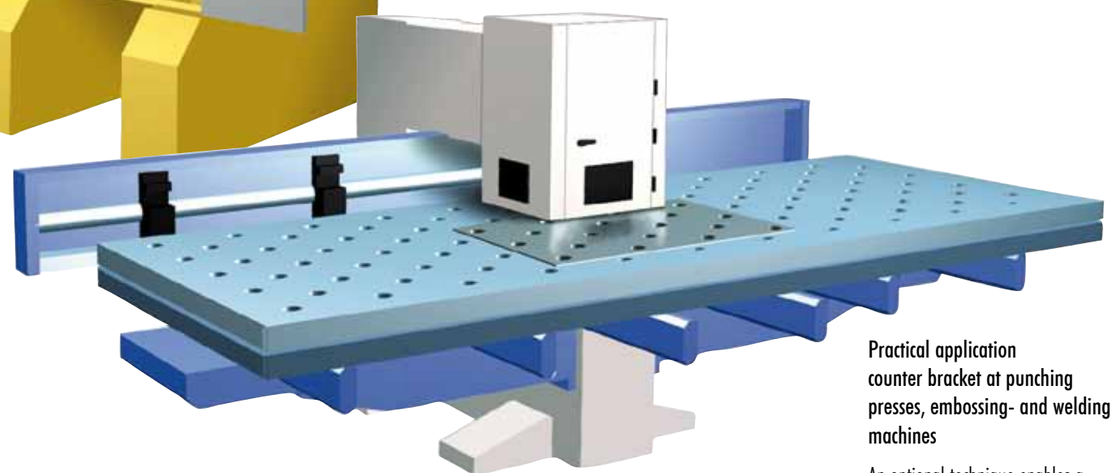
Practical application:
CyLock with rod-sided locking as counter bearing on presses

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

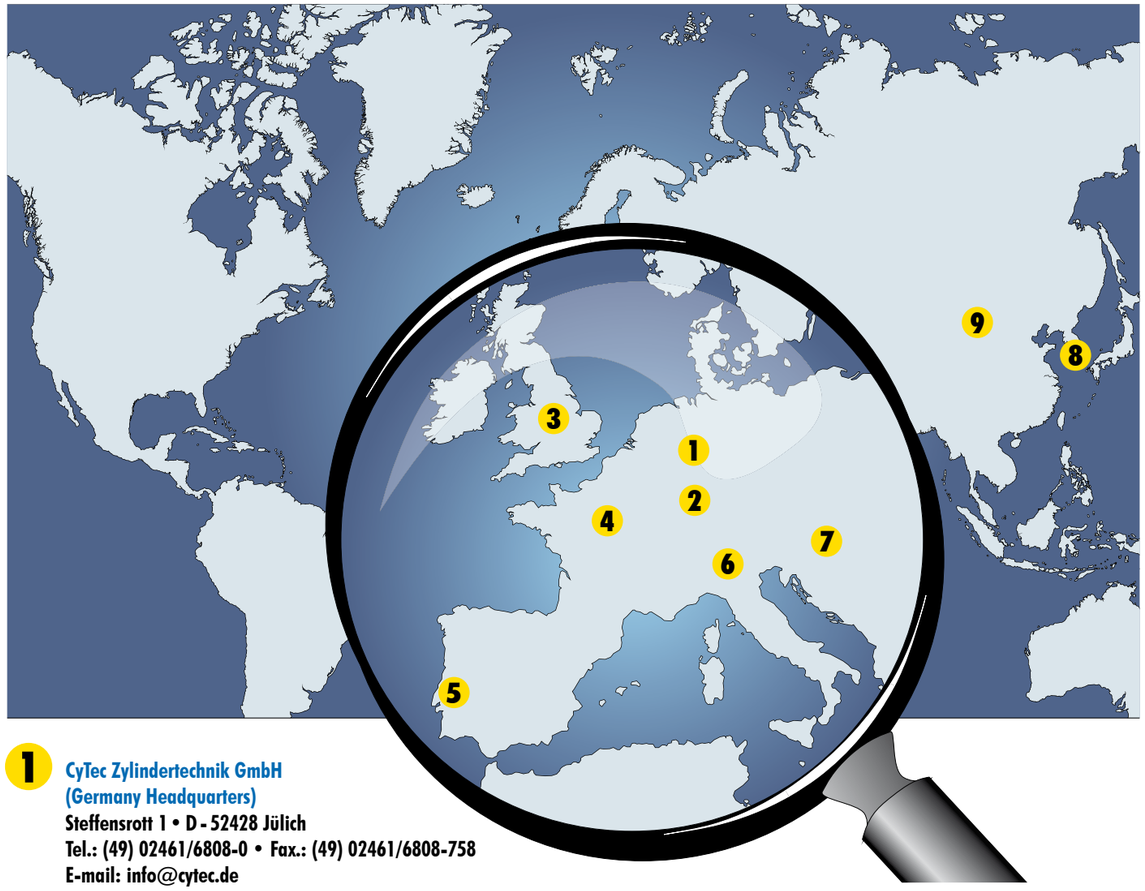
The self retention in the locked position ensures the safe closure even when the energy is disconnected.



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.

Your competent partners for innovative technical solutions



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