

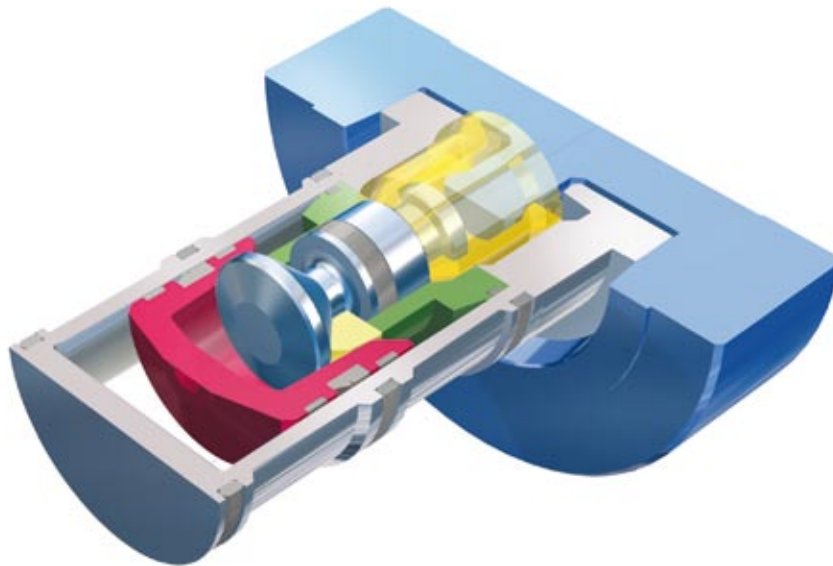
20/04/04

CyTab

Clamping Unit

CyTab Clamping Unit

Type: STP-90



Operating and Maintenance Manual

CYTEC
SYSTEMS

CyTec Zylindertechnik GmbH

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1 Introduction

1.1 General Discription

The demand for short set-up times with high flexibility and precision, increases more and more in car body manufacturing. The reduction of interchange times plays a central role here.

The CyTab clamping system was especially developed for precise docking of side wall frames and roof elements to the car body. Travelling clamping frames operated by linear units are taken over by the clamping unit and docked to the framing station.

This applies inversely also for the docking to the linear unit. Depending on size and weight 2 to 8 clamping units per frame are used.

By means of its extraordinary properties, the CyTab achieves a noticeable reduction of design and material efforts. This guarantees cost reductions and high operational safety.

Self locking:

In its clamped position the CyTab is self-locked, i.e. it can be disconnected from energy.

Integrated indexing:

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

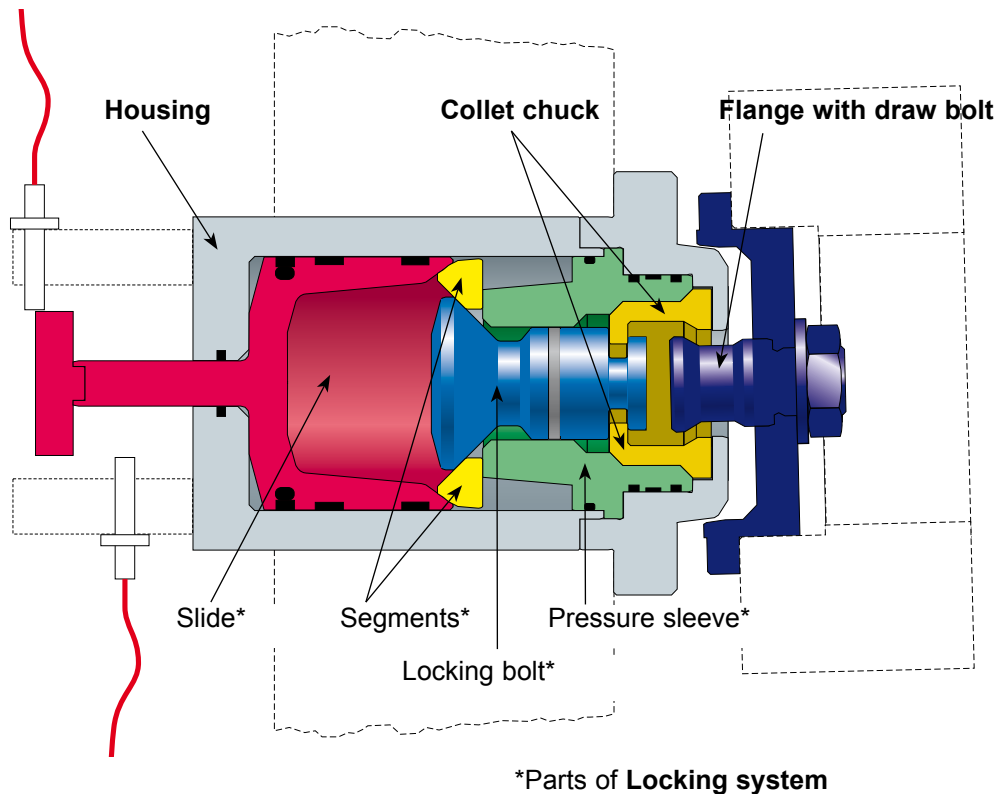
Indexing - coupling - clamping - locking,

CyTab does it all in a single pass. This type of the CyTec pallet clamping system is based on the design of the mechanical collet chuck clamp.

1.2 Short technical description

- clamping unit ready for installation
- pneumatically operated locking
- standard housing with threaded fixing or cartridge housing for direct installation
- media supply by connective threads or circulating flutes with O-ring sealing
- any installation position possible

2 Design



2.1 Housing

The housing can be executed as standard or cartridge housing.

The standard housing is cylindrical and has radially arranged pneumatic connections. On the collet chuck side the housing is equipped with an external thread for screwing into the fixing flange.

The cartridge housing is also cylindrical. For supply with compressed air, it has circulating flutes with O-ring sealing on its outer diameter. It is inserted to the boring and fixed axially with a cap.

2.2 Locking device

The clamping unit uses a locking system with positive locking.

It consists in its general design of the following elements:

- **pneumatically operated slide**
- **locking bolt**
- **pressure sleeve**
- **segments**

2.3 Collet chuck

The collet chuck grips the inserted draw bolt. At the same time the clamping unit is locked and the draw bolt clamped by the collet chuck. The resulting clamping force is transmitted safely by the chuck.

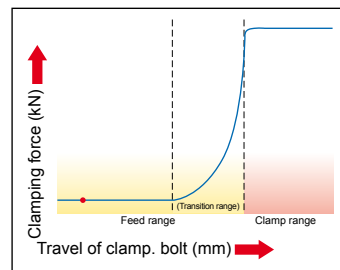
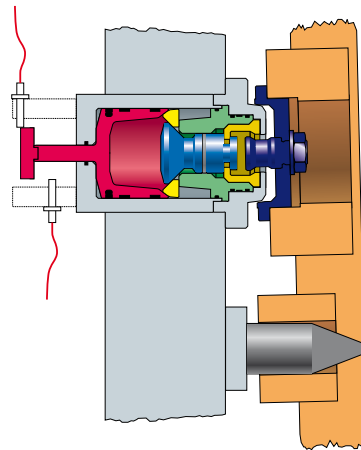
2.4 Flange

The flange is mounted directly into the machine part resp. the frame. During the clamping process the flange is inserted into the clamping unit and is clamped by the collet chuck which starts the force transmission.

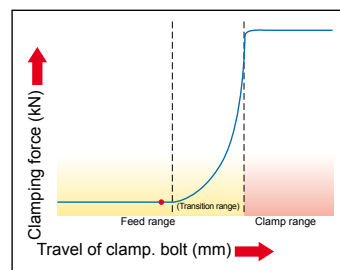
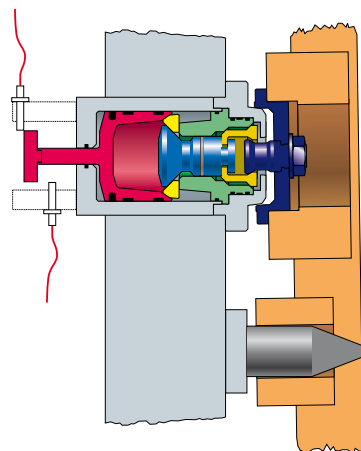
3 Function

3.1 Functional process

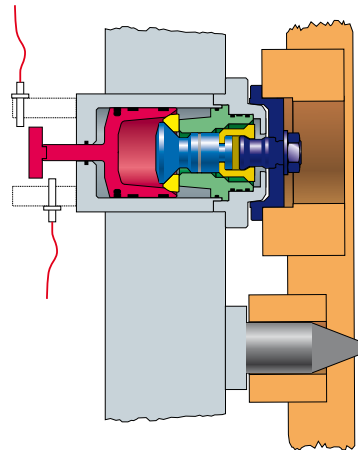
The CyTab clamping unit works based on the principle of positive lock. During the clamp and release functions the unit is operated pneumatically. When the clamped position is reached, the positive lock comes into effect. The pressure supply can be interrupted now because the clamping force is maintained mechanically by the self-locking.



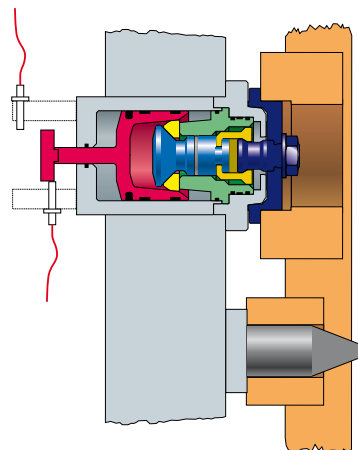
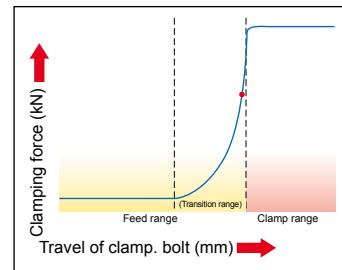
1. completely opened position, draw bolt in feed position



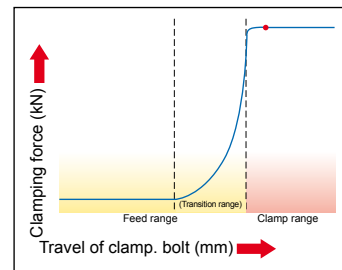
2. opened position, draw inserted to the housing



3. start of clamping process



4. clamped position



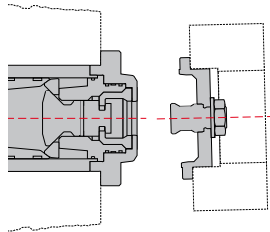
At the beginning of the clamping process, the clamping unit is in released position with opened collet chuck. With pressurising the clamping space the slides travel forward and push the segments inwards. They lie with their backside on the fixed pressure sleeve and can only move radially.

As a result, the collet chuck which is hung into the clearance of the clamping bolt moves also backwards. The clamping bevels of the chuck head now grasp the flange and so transmit the clamping force. The elements are connected now with pre load.

The clamping system is now in its clamped position. The slide covers the segments in the area of its locking bevel and the system is locked positively. It can not release by itself but only by supplying pressure to the release side of slide.

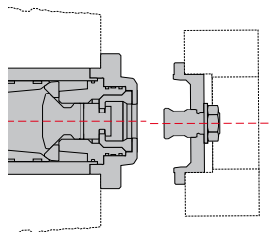
For releasing, the clamping space is pressurised pneumatically. So the slide is pushed back and the clamber released. Simultaneously the clamping bolt moves together with the chuck forward and executes the release stroke. When the chuck heads reaches the housing clearance, the chuck opens and releases the flange.

3.2 Angular offset of the flanges



The flange can be inserted to the clamber with an angular offset of 2° . Just before the clamping process the distance between flange and face area must be $\leq 9,5\text{mm}$. It must be movable relatively to the clamber axially. Not until now can the clamping process start.

3.3 Radial offset of the flanges



The flanges can be inserted to the clamber with a horizontal and vertical offset of $\pm 1,5\text{ mm}$. Just before the clamping process the distance between flange and face area must be $\leq 9,5\text{mm}$. The segment flange allows a maximum horizontal offset between flange and clamber of $\pm 1,5\text{ mm}$.

3.4 **Adjusting the proximity switches**

The proximity switches are mounted and adjusted by the manufacturer. The inquiry is made for the clamped and released condition of the clasper. The adjustment of the switches is executed by radial displacement. An adjustment of the switches on location is only allowed with consultation of the manufacturer. It must be taken care with installation of the clamping system that the switches and their cables must not be damaged.

4 Technical Data

4.1 Flange

Tool interface:	Short cone 1:4, similar to DIN 55026 with face contact support, integrated face contact control and air blast cleaning
Tools:	Cone, segment and cylinder flange
Connections:	Clamping/Releasing/Air blast: G1/4"

4.2 Clamper

Clamping force:	12,5 kN (6 bar), 10,5 kN (5 bar)
Releasing force:	750 N (6 bar), 625 N (5 bar)
Grasping force:	4 kN (6 bar) ab 4,5 mm before face contact
Holding force:	max. 25 kN
permissible pressure:	max. 10 bar
Radial offset with feeding:	± 1,5 mm
Angular offset with feeding:	2°
Clamping stroke:	9,5 mm
Clamping reserve:	2,0 mm
max. area pressure on contact area:	F=23 kN
max. perm. radial force:	F=25 kN
Clamping/releasing cycles:	1.000.000 at least
Flange backlash min.:	0,13 mm
Flange backlash max.:	0,17 mm

4.3**Air**

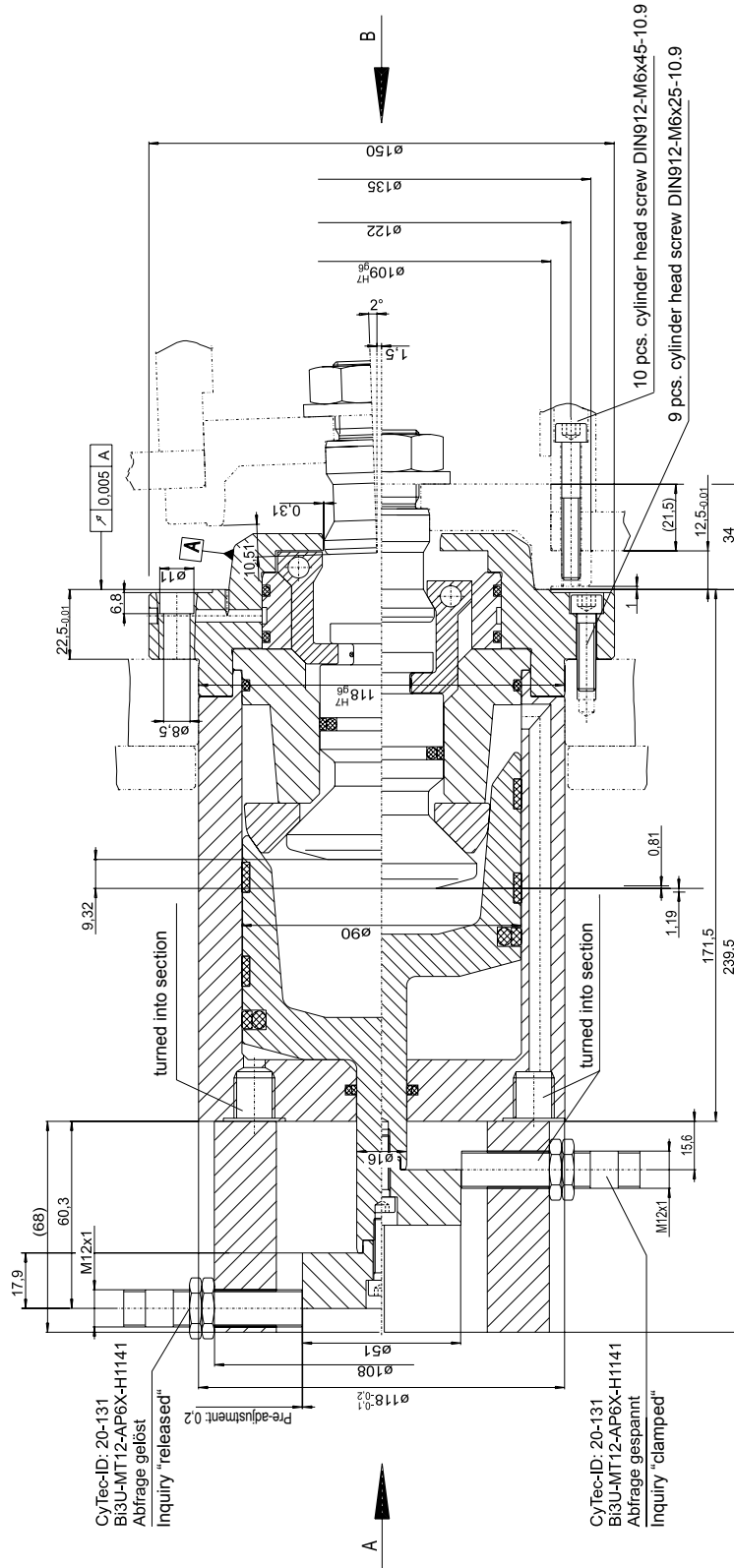
Min. pressure:	5 bar
Max. pressure:	8 bar
Air conditioning:	depending on application, see chap. 11.5

4.4**Lubricant**

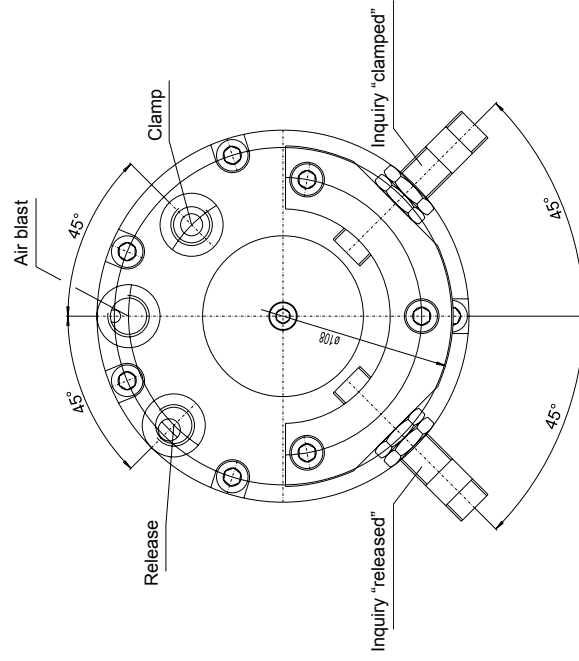
Type:	Microlube GL 261 (Klüber, see chap. 11.4)
Density (20°C):	0,89 g/cm ³
Basic oil viscosity (40°C):	260 mm ² /s
Basic oil viscosity (100°C):	18,5 mm ² /s
Drop point DIN ISO 2176:	> 220°C
Application temperature:	-30 bis +140°
dynamic viscosity:	3000 to 4500 mPa*s with 25°C and a velocity incline of 300s ⁻¹

5 Sectional Drawings

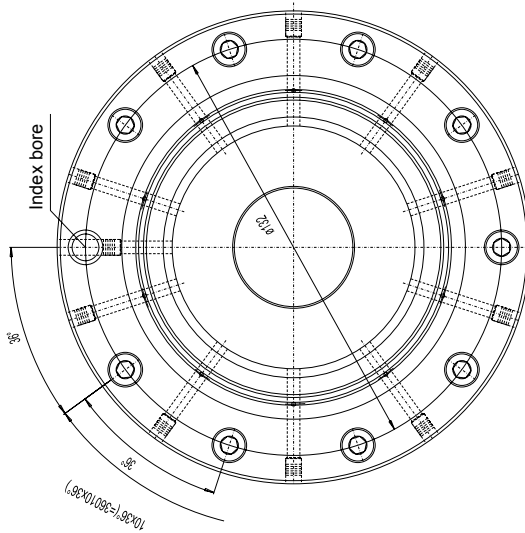
5.1 Measures locking unit



View A

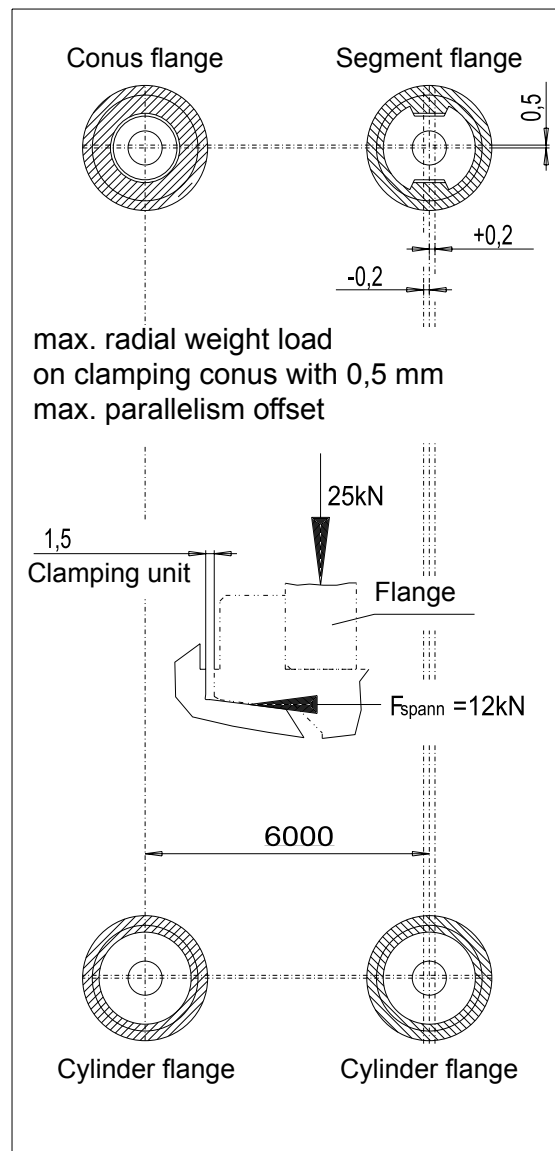


View B: only flange

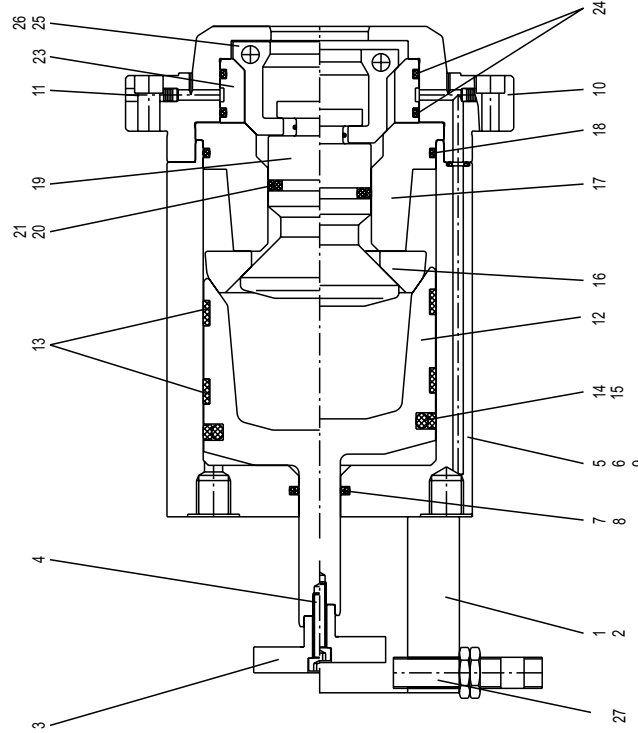


5.2 Flange arrangement

Arrangement with 4 Clampers



5.3 Spare parts list locking unit



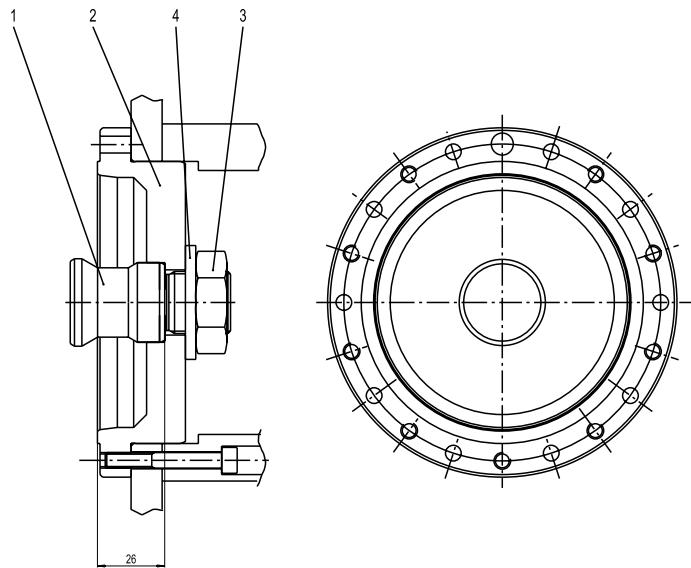
Order number:
STP-090-4
(formerly: STP-090-NO-4)

Sealing kit:
DSTP-090-4

ID-Nr.:	Designation	Wear parts
1	Fixing block for switches	
2	Cylinder screw	
3	Switching disc	
4	Cylinder screw	
5	Housing	
6	O-Ring	DSTP-090-NO-4
7	Seal ring housing	DSTP-090-NO-4
8	ARP-Ring	DSTP-090-NO-4
9	Cylinder screw	DSTP-090-NO-4
10	Flange	
11	Keenig Expander	
12	Slide	
13	Guide band	
14	ARP-Ring Viton	DSTP-090-NO-4
15	Seal ring slide	DSTP-090-NO-4
16	Segment	
17	Pressure sleeve	
18	O-Ring	DSTP-090-NO-4
19	Clamping bolt	
20	ARP-Ring	DSTP-090-NO-4
21	Seal ring clamping bolt	DSTP-090-NO-4
23	Spacer	
24	O-Ring	DSTP-090-NO-4
25	Segmented collet chuck	
26	Pressure spring	
27	Proximity switch Fa.Turck BI3U-M12-AP6X-H	

5.4 Spare parts list flanges

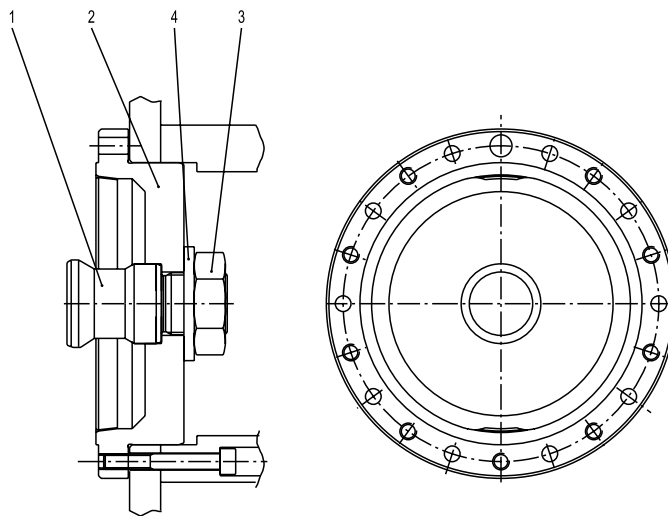
5.4.1 Cone flange



	Designation	ID-Nr.:
1	Draw bolt	93-205
2	Flange	48-521
3	Nut	81-032
4	Washer	91-019

Order number:
STP-090-01

(formerly: STP-090-NO-1)

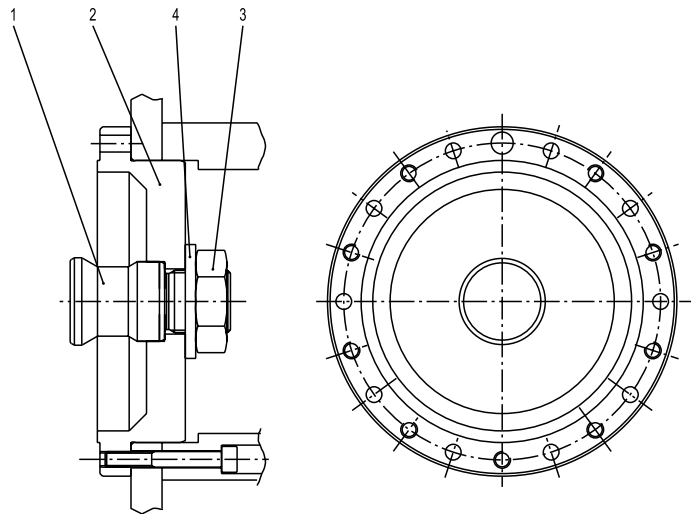
5.4.2 Segment flange

	Designation	ID-Nr.:
1	Draw bolt	93-205
2	Flange	48-551
3	Nut	81-032
4	Washer	91-019

Order number:
STP-090-02

(formerly: STP-090-NO-2)

5.4.3 Cylinder flange

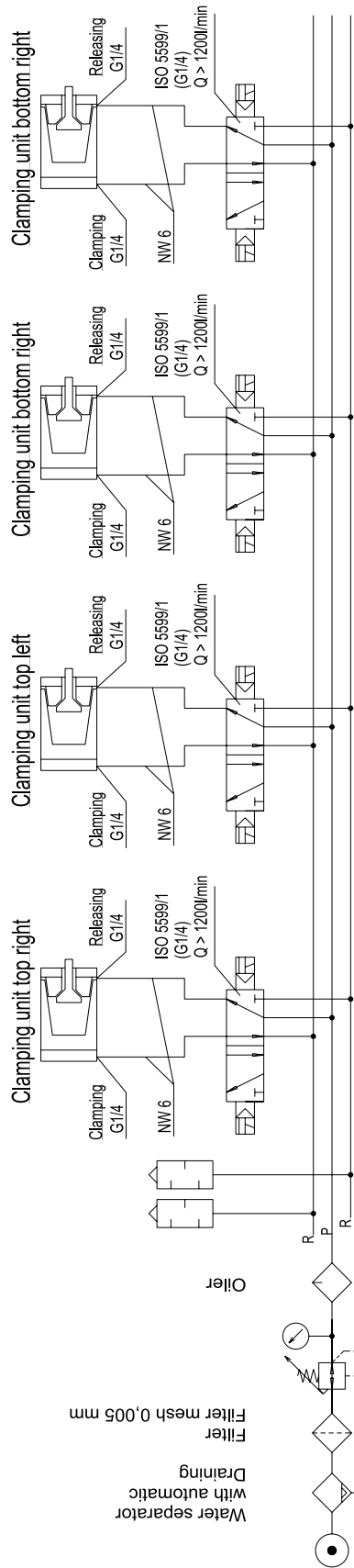


	Designation	ID-Nr.:
1	Draw bolt	93-205
2	Flange	48-520
3	Nut	81-032
4	Washer	91-019

Order number:
STP-090-03

(formerly: STP-090-NO-3)

5.4.4 Pneumatics plan



6 General Security advice

The CyTab clamping unit can be installed in any desired position. It is a state of the art design. It is fail-safe in use according to the regulations. If it is used by untrained personnel, danger to the user, the environment around the clamping unit and third parties cannot be excluded.

Each person which is assigned with installation, set-up, operation, maintenance or repair must have read and understood the manual completely. It must have adequate qualification for the respective function. Work on the pneumatic equipment must only be made by authorised personnel.

All workings concerning installation, set-up, operation, maintenance and repair of the clamping unit must only be made with switched-off machine. If workings on the pneumatic systems are necessary, the pressure has to be switched off. All parts or elements which come in contact with lubricants are potential causes of risk.

Everything must be avoided that affects the security of the operator, the clamping unit, the near or farther environment or third parties.

The operator must take care that only authorised personnel handles the clamping unit. He is obliged to check the unit at least once per shift for visible damages or defects. Faults that affect the operational security must be reported immediately.

The clamping unit must only be operated in faultless conditions. Any changes or rebuildings on one's own authority are not allowed in terms of security.

7 Installation

When handling the clamping unit, absolute care must be taken that the collet chuck and the clamping bolt are not pushed into the housing. This may happen when the clamping unit is in opened or completely clamped position without inserted draw-bolt/flange, and the system is depressurised. This may cause a tilting of the segments and a damage of the whole clamping unit which can only be fixed by the manufacturer. With mounting the flange to the concerning frame care must be taken for correct axial adjustment between clamping unit and flange. It must be provided that the flange is inserted in alignment to the clamping unit. A center or angular offset should be avoided. Should that not be possible, pre-centring is recommended. The following values must not be exceeded:

- **max. angular offset 2°**
- **max. radial offset 1,5mm**

In retracted condition the position of the clamping frames must be in X/Y alignment to the clamping units. As recommended a value of +/- 0,05 mm should not be exceeded. In case of increased deviations wear can occur on the clamping unit, precise repeatability cannot be guaranteed any more. The Z-position must be prepared in that way that the clamping distance is at least 0-1 mm and the grasping distance does not exceed 5 mm. In general the 0-position should be reached when the frame is inserted.

8 Pneumatic circuit

The pneumatic circuit should be equipped with direction control valves. The valves must be in accordance to the required security standards so that an unintended release is avoided in any circumstance. Whilst “clamped”-condition no pressure has to be provided to maintain the clamping force. The pneumomechanical clamping system only needs pressure for operation of the clamping elements. With inserting the frame it is important that the “release”-line is pressurised.

In inserted condition, “release” can be switched over to “clamp”. This procedure is necessary that the collet chuck always is in completely opened condition and that the flange/frame cannot clash with the collet.

Especially when using the cleaning connection, this procedure is necessary.

Connections :

- Clamping G1/4” Item: SP
- Release G1/4” Item: LO
- Cleaning G/14” Item: BL

With clamping and releasing it must be assured that the pneumatic pressure is present sufficiently lasting until the clamping system has reached the respective end position. Otherwise with clamping it is possible that the clamping system has not reached the locked position yet and the flange is not locked properly. With releasing it may occur that the chuck has not released the flange yet, and that the frame cannot be removed. The set up of the clamping unit must happen with sufficient pressure, but must not exceed the max. operation pressure of 12 bar.

Standard operational pressure is 6 bar. In case of higher pressure, a pressure reduction must be integrated between clamp- and release-line. Clamping pressure is always a bit lower than release pressure.

Example:

System pressure: 12 bar = release pressure,

Clamping pressure: max. 10 bar

9 Setting-up

After connecting the pneumatic supply, the clamping unit should be operated several times without flange to check the proper function and the tightness.

If unexpectedly an operational fault seems to have occurred the manufacturer must be informed and it must be proceeded according to his advice. It is self-evident that the setting-up is executed with sufficient operational pressure. Normally the air which is in the clamping system is uncritical because it will be displaced with several clamp- and release processes.

In terms of control it must be provided that the flange is inserted to the clamping unit only when the chuck is completely opened.

10 Maintenance

The clamping unit is designed in that way that if in a correctly installed and connected condition a number of 1.000.000 cycles (clamping/releasing) at least can be reached without problems. Generally after each of these intervals the unit should be relubricated. In case of unexpected defects some measures can become necessary which are described as follows:

10.1 Checking stroke geometry

The most important stroke measurements can be checked by measuring the distance between face area of the housing and the clamping bolt. The total stroke can be detected by measuring the distance between clamping bolt and face area both in the completely released and completely clamped position. The difference between the two values is the total stroke. The theoretic value is indicated in the sectional drawing.

10.2 Exchange of locking system

Careless handling of the clamping unit or single elements of it can potentially cause functional faults with severe damages. Exchange and adjustment of the unit require much experience and must only be executed by instructed personnel or the manufacturer.

First the flange must be removed from the unit. Before the clamping unit can be dismantled, it must be pressurised and brought into the completely clamped position. Then the system must be completely depressurised before the further dismantling proceeds. Otherwise the system is in danger to become damaged.

Then the cap of the housing must be dismantled. Here it must be provided that no single parts get lost.

Now the defect clamping unit should be exchanged with the new pre-mounted one. To do that, the new unit is inserted to the housing from backwards and pushed forward with a tube until the spacer's face area is in contact with the housing. The cap can now be mounted.

The check of the stroke geometry must be repeated. It must be regarded that the stroke of the slide in released condition is not too big. Otherwise it could cause a tilting of the segments and a damaging of the clamping unit. If the stroke is too small, the collet will not open wide enough and the flange cannot be inserted. The adjustment of the slide's stroke takes place at the housing cap. The stroke adjustment must be executed with great care, so it is recommended to be carried out by the manufacturer.

10.3 Exchange of the collet chuck

First the complete clamping unit including the collet chuck must be dismantled. Now the clamping bolt can be displaced from the pressure sleeve in direction to the collet, and can be hung out of the groove of the clamping bolt.

The new collet chuck must be moved through the spacer so far that it protrudes the spacer in direction to the pressure sleeve. Then the collet chuck must be hung into the groove of the clamping bolt. The pressure sleeve is inserted to the housing with contact to the spacer. The segments are inserted with a bit of lubricant, then the slide, finally the whole assembly is mounted to the housing including the collet chuck.

10.4 Disruptions during operation

Symptom	possible reason
Air exhaust on collet chuck side:	defect sealing
	tilted segments
	radial offset between flange- and housing axis
no function of clamping unit:	no clamp-/releasing pressure
	overflow between clamp and release line
	tilted segments
	defective collet chuck
Flange not clamped:	pressure too low
	air flow too low
	distorsion in X/Y
too low clamping force:	wear on the system

10.5 Lubrication

- The clamping unit is delivered with an appropriate grease amount which is sufficient for at least 1.000.000 cycles.
- The lubricant used for the first filling must be used further on. If this is not possible a product should be used with the same characteristic data (see technical data).
- The lubricant must be emulsion resistant and ageing resistant. It must not affect the basic material of the sealing elements. Used lubricant must be disposed according the environment protection regulations.

10.6

Air

- The compressed air must be free of condensations to avoid corrosion and malfunctions of the clamping unit.
- A filter cartridge of 5µm should be used to clean the air to avoid wear on slide and sealing surfaces.

MICROLUBE® GL 261 / GL 262
Special lubricating greases for boundary friction conditions and tribo-corrosion



Description

MICROLUBE GL 261/GL 262 greases are special lubricating greases on a mineral hydrocarbon base. They also contain special lithium soap and the MICROLUBE additive package which ensures a wear-free surface finish. Running-in wear is reduced to a minimum. In addition, the MICROLUBE additive package provides protection in the boundary friction regime, thus preventing tribo-corrosion. MICROLUBE GL 261/GL 262 greases have the capacity to absorb high pressures, and they have good anti-corrosion properties.

Application

MICROLUBE GL 261/GL 262 greases are particularly suitable for low to medium-speed rolling bearings, and for swivel movements and vibrations. They can be used in friction points subject to micro-sliding movements, especially in serrated teeth elements, spline shafts, sliding components and plain bearings. They are also generally suitable for all machine elements potentially subject to tribo-corrosion.

Application notes

MICROLUBE GL 261/GL 262 greases can be applied by brush, spatula, grease gun, and through centralized lubrication systems.

Storage

The storage period is approx. 3 years if the product is stored in the original closed container in a dry place.

Pack sizes

1 kg can
25 kg bucket
180 kg drum (only MICROLUBE GL 261)

MICROLUBE GL 261 / GL 262

- Greases for plain and rolling bearings
- Also for low speeds, vibrations and swivel movements
- Protection against tribo-corrosion
- Good pressure absorption capacity
- Good antiwear properties
- Good corrosion protection
- Good pumpability
- Free from solid particles

Product data

MICROLUBE	GL 261	GL 262
Colour	yellowish-brown	yellowish-brown
Service temperature range, °C, ≈	-30 – 140	-25 – 140
Drop point, DIN ISO 2176, °C	> 220	> 250
Worked penetration, DIN ISO 2137, at 25 °C; 0.1 mm	310 – 340	265 – 295
Consistency grade, DIN 51 818, NLGI	1	2
Density, DIN 51 757, at 20 °C, g/cm ³	0.89	0.89
Flow pressure, DIN 51 805, mbar	at -30 °C < 1400	at -25 °C approx. 1400
Water resistance, DIN 51 807, 3 h/90 °C, rating	1 – 90	0/1 – 90
Corrosion protection behaviour, DIN 51 802, Emcor test (1 week, dist. water), corrosion rating	1	1
Speed factor (d _m · n), approx.	300,000	300,000