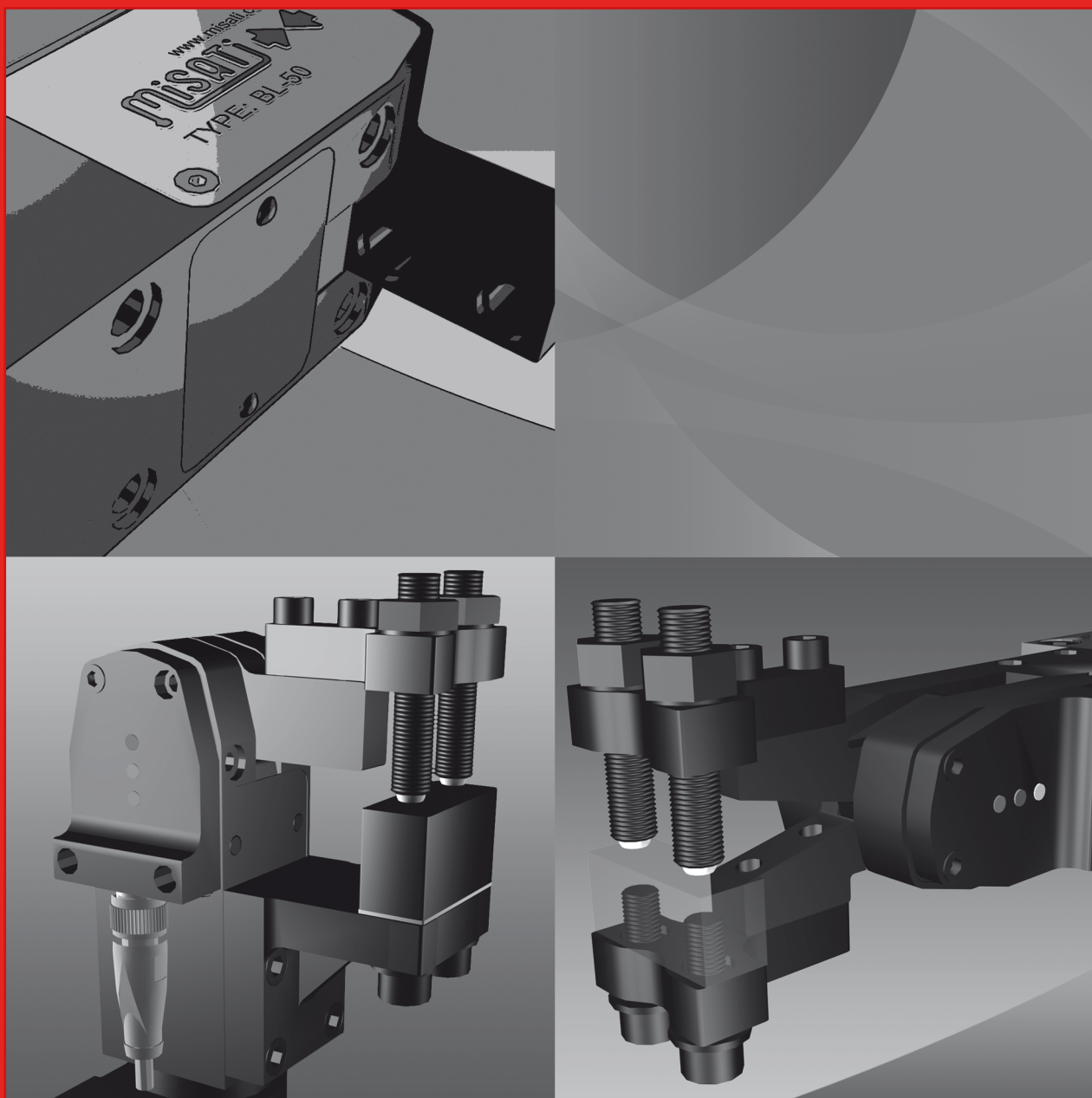


OPERATING INSTRUCTIONS FOR MINICLAMPS FOR FASTENING CLAMPS

Operating instructions



INDEX

Which miniclamp should I use?

OPERATION PRINCIPLE	04
TYPES OF CLAMPS	05
BALL-ENDED SCREW	06
SHIM KIT	07
JAW BLOCK	08

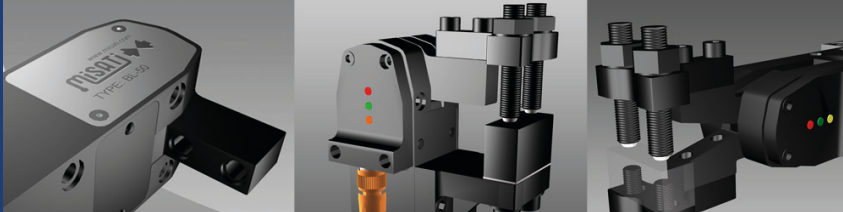
Use

HOW TO ADJUST THE FORCE OF A MINICLAMP	10-13
NON-REVERSIBLE MINIPINCER	14
FORCE / “ α ” ANGLE	15
FORCE / LENGTH OF THE ARM	16
WEIGHT / ARM RADIUS RELATIONSHIP	17
RETENTION FORCE	18
MAXIMUM LATERAL FORCE	19
GUARANTEE	20

Maintenance

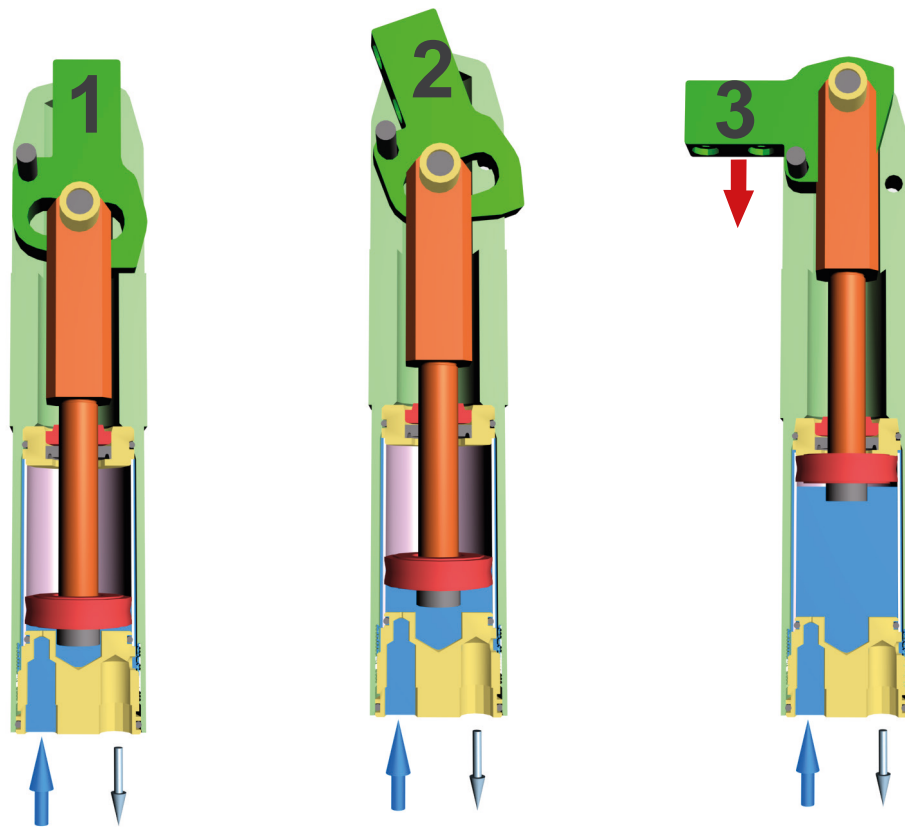
MAINTENANCE: FORCE MECHANISM	22
MAINTENANCE: PNEUMATIC CYLINDER	23
MECHANICAL KIT	24
PNEUMATIC KIT	25
CHANGE OF THE ARM	26-27

Range: Which Miniclamp Should I Use?

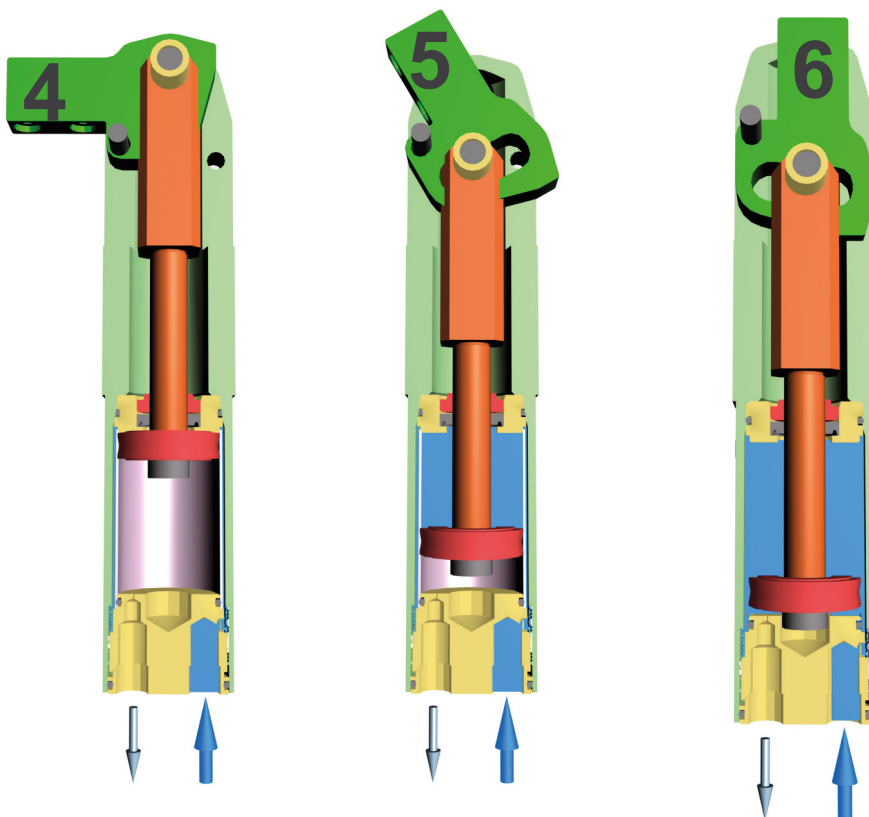


OPERATION PRINCIPLE	04
TYPES OF CLAMPS	05
BALL-ENDED SCREW	06
SHIM KIT	07
JAW BLOCK	08

OPERATION PRINCIPLE



CLOSING MINICLAMP



OPENING MINICLAMP

The miniclamp has a double effect pneumatic cylinder which transmits a turning movement to the clamping arm along the shaft. Thanks to the special shape of the oblong hole, the miniclamp makes a big force.

TYPES OF CLAMPS



BL-20
BL-32
BL-40
BL-50



BI-20
BI-32
BI-40
BI-50



BC-20
BC-32
BC-40



The clamping component can be parallel (BL type) or perpendicular (BI, BC types) with regard to the body. The clamp can be applied on any spatial position.

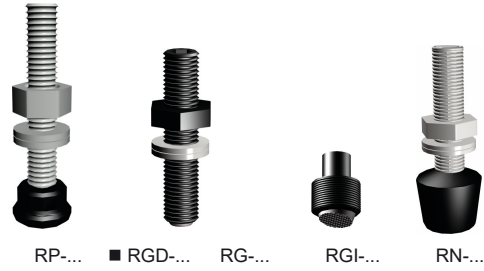
BALL-ENDED SCREW

FLAT SURFACE:

■ RP-... ■ RGD-...

RIBBED SURFACE:

■ RG-... ■ RGI-...

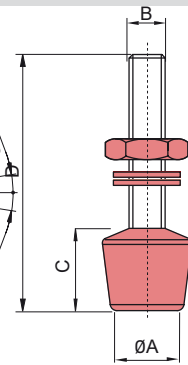
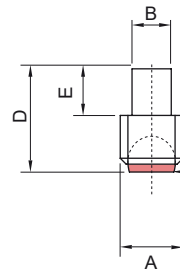
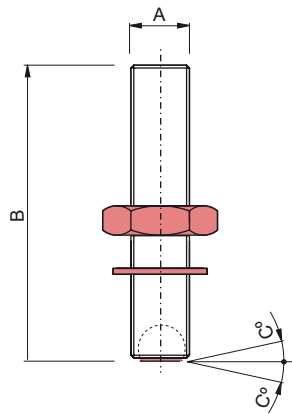
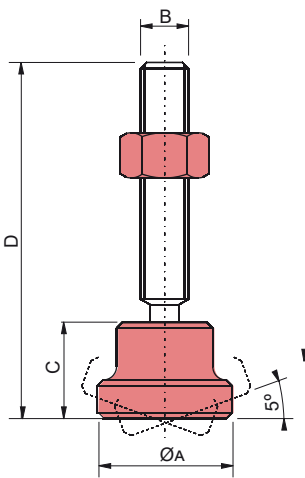


■ RP-...

■ RGD-... ■ RG-...

■ RGI-...

■ RN-...



► Bolts included

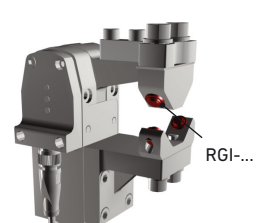
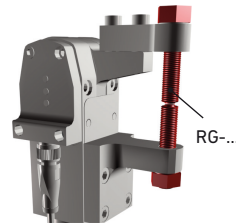
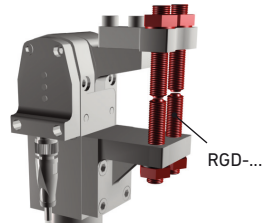
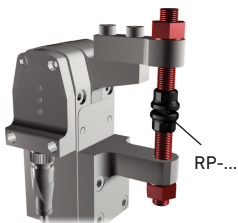
- Material: hardened steel & Delrin (RGD-...)
- Material: hardened steel (RP-..., RG-..., RGI-..., RN-...)
- Material: neoprene (RN-...)

■ For very delicate pieces, it is recommended to use the Flat Ball-Ended Screw RP-... or RGD-...

Weight (kg)

RP-08/D	0,030-0,034
RP-10/D	0,063-0,072
RGD-20	0,011
RGD-32	0,021
RG-20	0,012
RG-32	0,022
RG-20-30	0,01
RG-32-40	0,02
RGI-20	0,01
RGI-30	0,02
RN-08/D	0,030-0,034

Examples of applications



RP				
TYPE	A	B	C	D
RP-08/D	16	M8	9	48 63
RP-10/D	20	M10	11	54 64 84

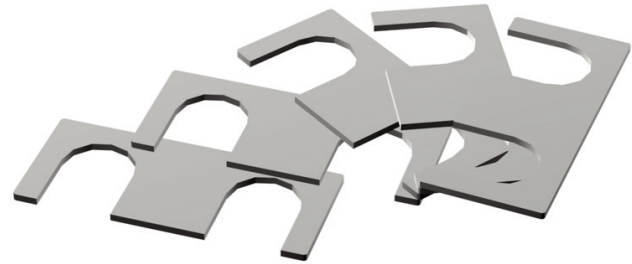
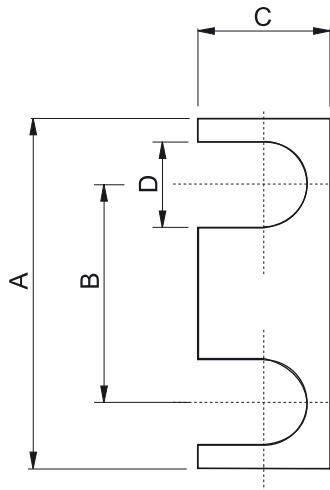
RGD			
TYPE	A	B	C
RGD-20	M8	41,6	0
RGD-32	M10	51,9	0

RG			
TYPE	A	B	C
RG-20	M8	40	9
RG-32	M10	50	9
RG-20-30	M8	30	9
RG-32-40	M10	40	9

RGI					
TYPE	A	B	C	D	E
RGI-01	13	M8	9	21	8
RGI-02	12	M3	9	11	

RN				
TYPE	A	B	C	D
RN-08/D	16	M8	18	63

SHIM KIT

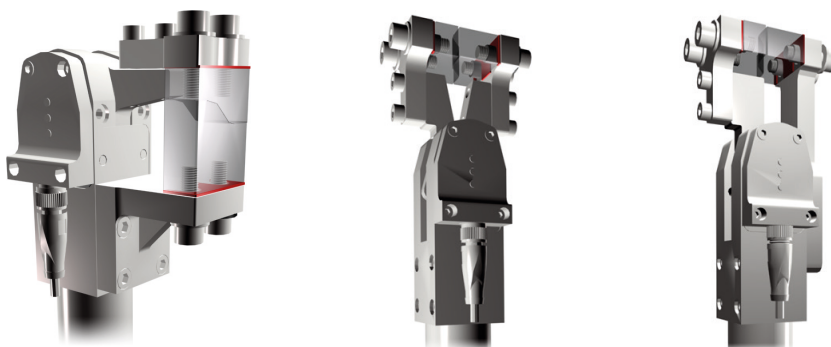


GBK-20 GBK-32 GBK-40



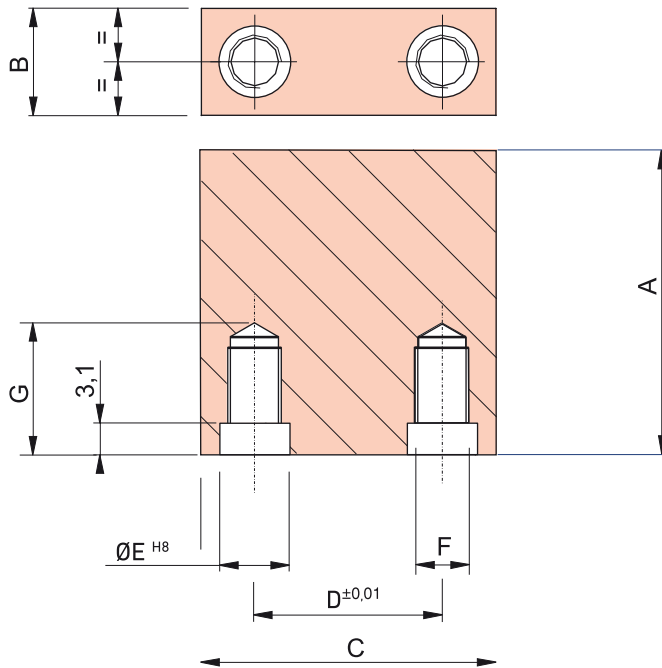
- Adjustment of 0 to 2mm can be made on jaw blocks SC-... with the shims in this kit (GBK-...).

Examples of applications

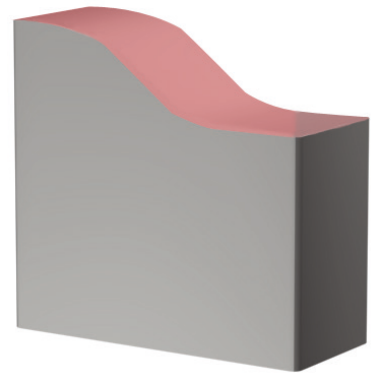


TYPE	A	B	C	D	THICKNESS				
GBK-20	30	17	13	9.2	0.1	0.2	0.3	0.5	1
GBK-20	40	23	17	11.2	0.1	0.2	0.3	0.5	1
GBK-40	50	30	20	13.2	0.1	0.2	0.3	0.5	1

JAW BLOCK

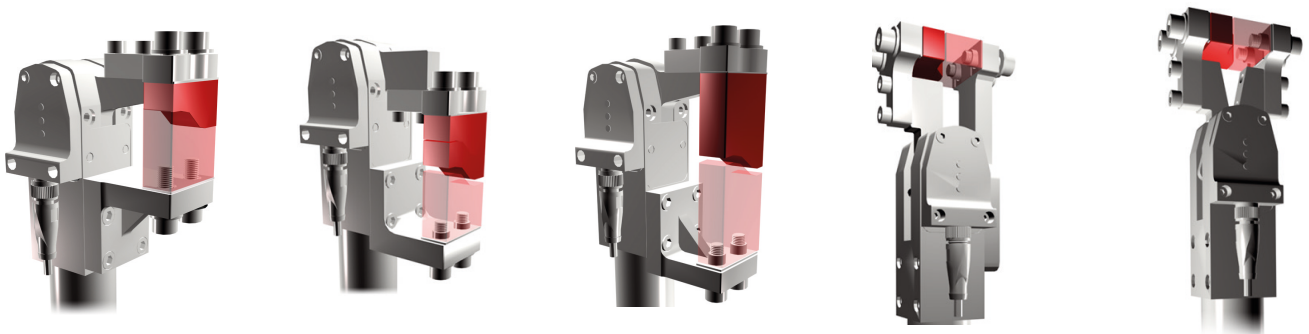


Area to be machined by the customer according to the surface to fasten.



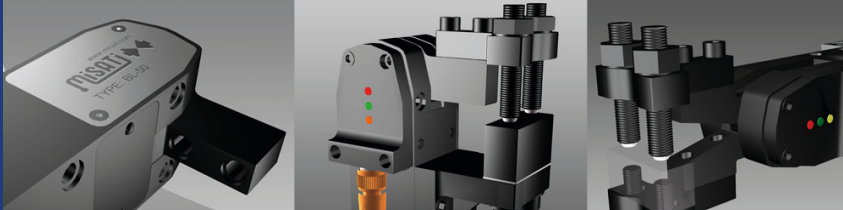
- **Material:** steel
- **Recommended treatment:** quenching & tempering

Examples of applications



TYPE	A	B	C	D	ØE	F	G
SC-A-20	25	13	30	17	9	M6	13
SC-A-32	35	17	40	23	11	M8	17
SC-A-40	45	20	50	30	13	M10	20
SC-A-50	50	20	60	40	13	M10	20
SC-AL-20	50	13	30	17	9	M6	13
SC-AL-32	70	17	40	23	11	M8	17
SC-AL-40	80	20	50	30	13	M10	20
SC-AL-50	85	20	60	40	13	M10	20

Use

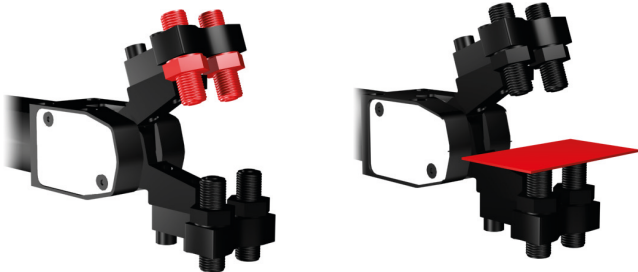


HOW TO ADJUST THE FORCE OF A MINICLAMP	10-13
NON-REVERSIBLE MINIPINCER	14
FORCE / "α" ANGLE	15
FORCE / LENGTH OF THE ARM	16
WEIGHT / ARM RADIUS RELATIONSHIP	17
RETENTION FORCE	18
MAXIMUM LATERAL FORCE	19
GUARANTEE	20

HOW TO ADJUST THE FORCE OF A MINICLAMP

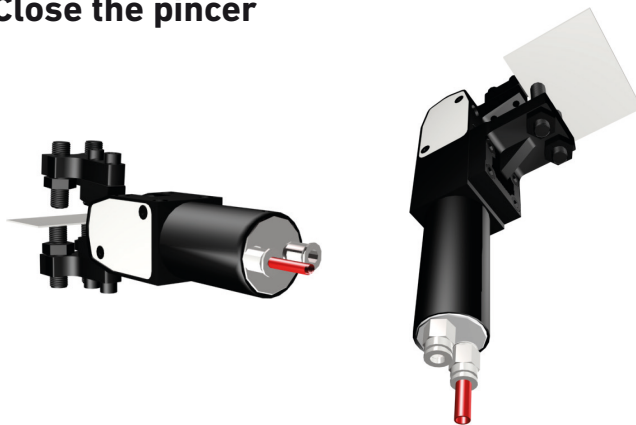
BCP-... / BC-... / BL-... MINICLAMP

1 Open the pincer and place the sheet



- With the mobile arm open, you have to loosen the nuts that hold the ribbed ball-ended screws (orange colour).
- Turn the screws up until there is enough space to place a sheet between them and the lower gripper finger or the static arm of the miniclamp.

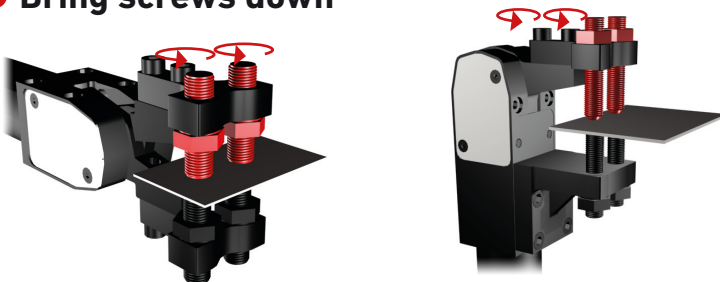
2 Close the pincer



To close the miniclamp, you'll need to inject some compressed air into the hole with a "+" mark on.

- Close the minipincer until it reaches the final position. In this position, the minipincer is non-reversible, i.e., it will not open unless any compressed air is injected in it.

3 Bring screws down



- With the arm closed, bring both screws over to the sheet until they contact it without pressure.
- In case of using Jaw Blocks (SC or SCL), we will need to use different thickness shims (GBK-...) until the jaw block contacts the sheet.

4 Adjust the force

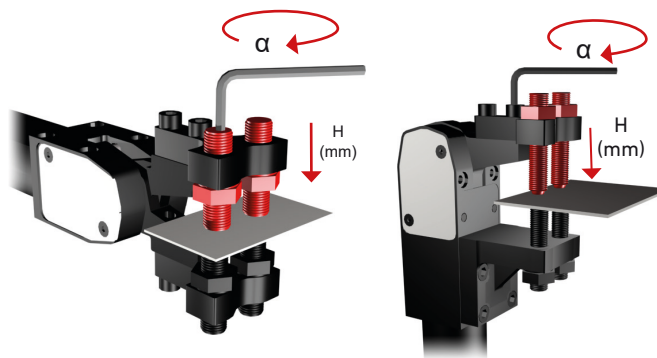
- We will begin by deciding the force we'd like to obtain. This force should be enough to fasten the sheet correctly during the transfer process.
- Next, we will look for this value in the tables enclosed, taking the type of miniclamps that we are using and the minimum working pressure into

For example:

If we usually work at a pressure of 6 bar that sometimes falls to 5 bar, then we will look for a force to work at 5 bar.

HOW TO ADJUST THE FORCE OF A MINICLAMP

- Take the sheet out carefully so that you don't turn the screws. Then, with an Allen key, turn the screws clockwise the value from the table, assembling high security washers at a 35 Nm torque. The turn can be measured in degrees (α) or in height (H), i.e. the number of millimeters that the screw is moving, as you think best.

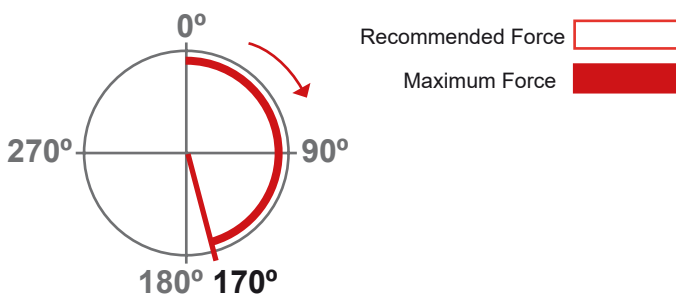


MINICLAMP BCP, BC

	MINICLAMP Ø20			MINICLAMP Ø32		
	TURN SCREW (α)	H (mm)	FORCE (daN)	TURN SCREW (α)	H (mm)	FORCE (daN)
4 BAR	156°	0,54	60	240°	0,90	100
	180°	0,63	69	300°	1,10	136
5 BAR	196°	0,68	75	300°	1,25	135
	225°	0,78	86	360°	1,5	170
6 BAR	235°	0,81	90	360°	1,50	170
	270°	0,93	103	420°	1,75	205

MINICLAMP BL

	MINICLAMP Ø20			MINICLAMP Ø32		
	TURN SCREW (α)	H (mm)	FORCE (daN)	TURN SCREW (α)	H (mm)	FORCE (daN)
4 BAR	128°	0,40	81	197°	0,82	146
	149°	0,52	108	247°	1,03	195
5 BAR	170°	0,60	102	222°	0,92	182
	192°	0,67	135	271°	1,13	243
6 BAR	192°	0,67	122	247°	1,02	219
	213°	0,74	162	296°	1,24	292



	MINICLAMP Ø40			MINICLAMP Ø50		
	TURN SCREW (α)	H (mm)	FORCE (daN)	TURN SCREW (α)	H (mm)	FORCE (daN)
4 BAR	224°	1,08	258	262°	1,27	325
	274°	1,33	330	309°	1,50	433
5 BAR	224°	1,08	323	293°	1,42	407
	299°	1,45	413	355°	1,72	543
6 BAR	274°	1,33	388	324°	1,57	488
	324°	1,57	496	401°	1,95	651

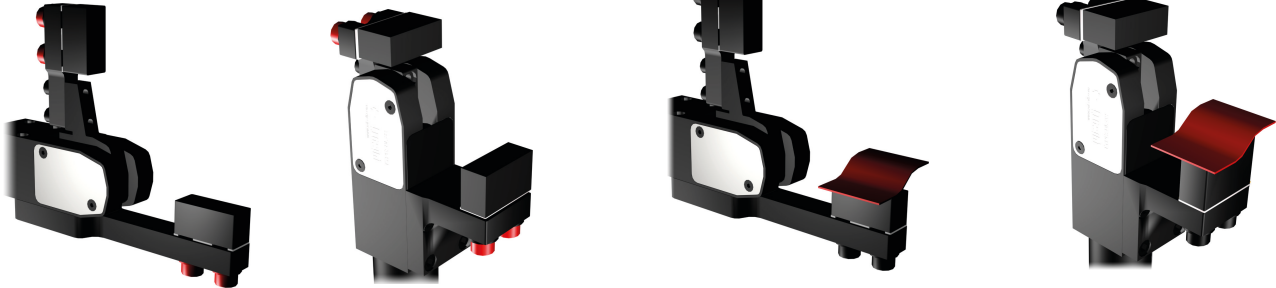
Example:

To obtain 102 daN force with a BL-20-30 pincer that works at a minimum pressure of 5 bar, we should turn the screws 170°, or until they go down 0.60 mm.

HOW TO ADJUST THE FORCE OF A MINICLAMP

MINICLAMP BL...SC / SCL, BI ...SC / SCL

1 Open the pincer and place the sheet



- With the mobile arm open, you have to loosen the nuts that hold the ribbed ball-ended screws (orange colour).
- Turn the screws up until there is enough space to place a sheet between them and the lower gripper finger or the static arm of the miniclamp.

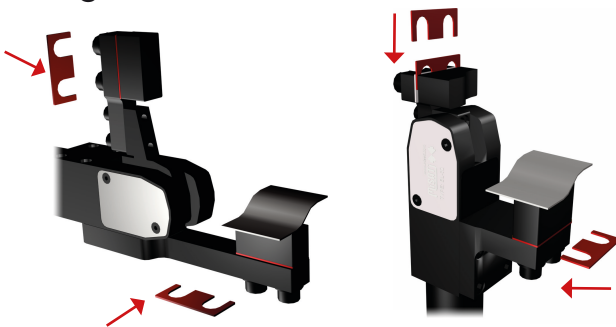
2 Close the pincer



- Close the minipincer until it reaches the final position. In this position, the minipincer is non-reversible, i.e., it will not open unless any compressed air is injected in it.

To close the miniclamp, you'll need to inject some compressed air into the hole with a "+" mark on.

3 Bring screws down



- With the arm closed, bring both screws over to the sheet until they contact it without pressure.
- In case of using Jaw Blocks (SC or SCL), we will need to use different thickness shims (GBK-...) until the jaw block contacts the sheet.

4 Adjust the force

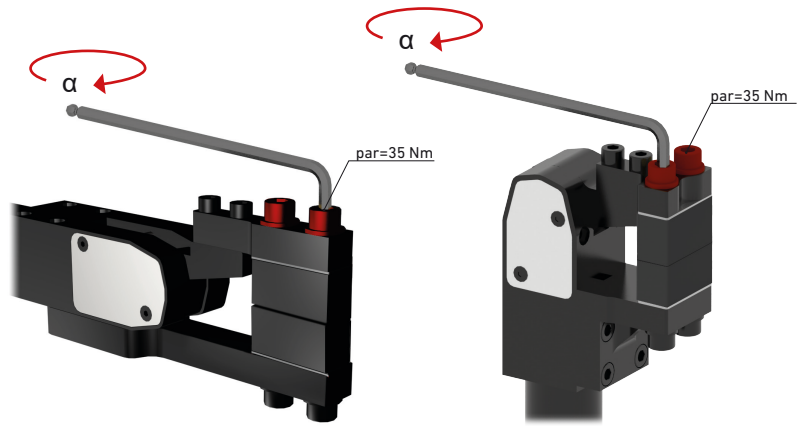
- We will begin by deciding the force we'd like to obtain. This force should be enough to fasten the sheet correctly during the transfer process.
- Next, we will look for this value in the tables enclosed, taking the type of miniclamps that we are using and the minimum working pressure into

For example:

If we usually work at a pressure of 6 bar that sometimes falls to 5 bar, then we will look for a force to work at 5 bar.

HOW TO ADJUST THE FORCE OF A MINICLAMP

- Take the sheet out carefully so that you don't turn the screws. Then, with an Allen key, turn the screws clockwise the value from the table, assembling high security washers at a 35 Nm torque. The turn can be measured in degrees (α) or in height (H), i.e. the number of millimeters that the screw is moving, as you think best.



MINICLAMP BL...SC Y SCL

	Ø20		Ø32	
	TURN SCREW (mm)	FORCE (daN)	TURN SCREW (mm)	FORCE (daN)
4 BAR	0,3	54	0,7	97
	0,4	81	0,8	146
	0,5	108	1,0	195
5 BAR	0,4	67	0,8	122
	0,6	102	0,9	182
	0,7	135	1,1	243
6 BAR	0,5	81	0,9	146
	0,7	122	1,0	219
	0,8	162	1,2	292

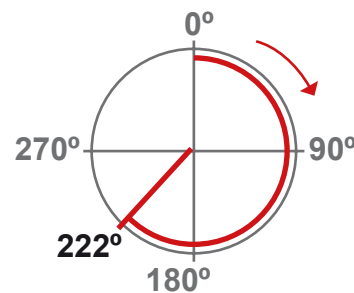
MINICLAMP BL...SC Y SCL

	Ø20		Ø32		Ø40		Ø50	
	TURN SCREW (mm)	FORCE (daN)	TURN SCREW (mm)	FORCE (daN)	TURN SCREW (mm)	FORCE (daN)	TURN SCREW (mm)	FUERZA (daN)
4 BAR	0,3	54	0,7	97	1,0	187	1,1	217
	0,4	81	0,8	146	1,1	258	1,3	325
	0,5	108	1,0	195	1,3	330	1,5	434
5 BAR	0,4	67	0,8	122	1,0	234	1,1	271
	0,6	102	0,9	182	1,1	323	1,4	407
	0,7	135	1,1	243	1,5	413	1,7	542
6 BAR	0,5	81	0,9	146	1,1	281	1,3	325
	0,7	122	1,0	219	1,3	388	1,6	488
	0,8	162	1,2	292	1,6	496	2,0	651

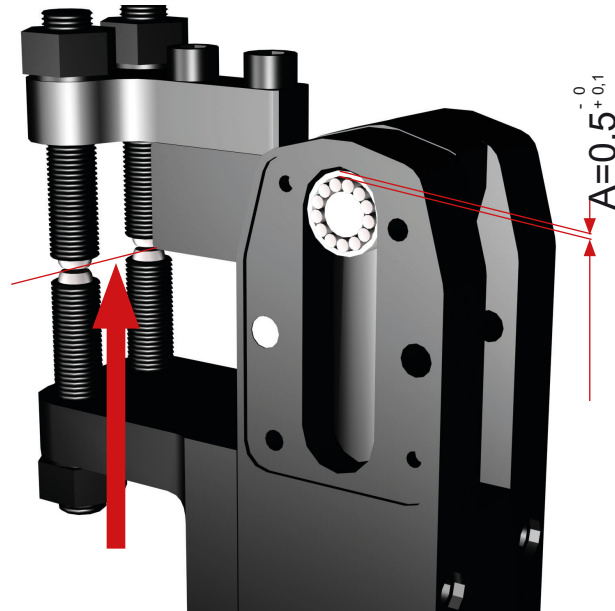
Esfuerzo mínimo Esfuerzo aconsejable Esfuerzo máximo

Ejemplo:

Para obtener un esfuerzo de 102 daN con una mibrida BL-20-30 que trabaja a un mínimo de 5 bar de presión, deberíamos girar los pisadores 170° o hasta que hubieran bajado 0,60 mm.



NON-REVERSIBLE MINIPINCER



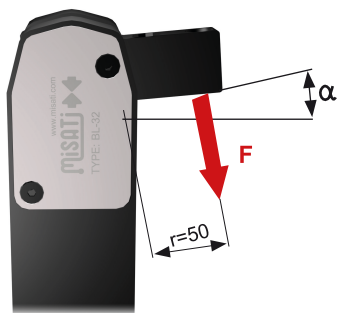
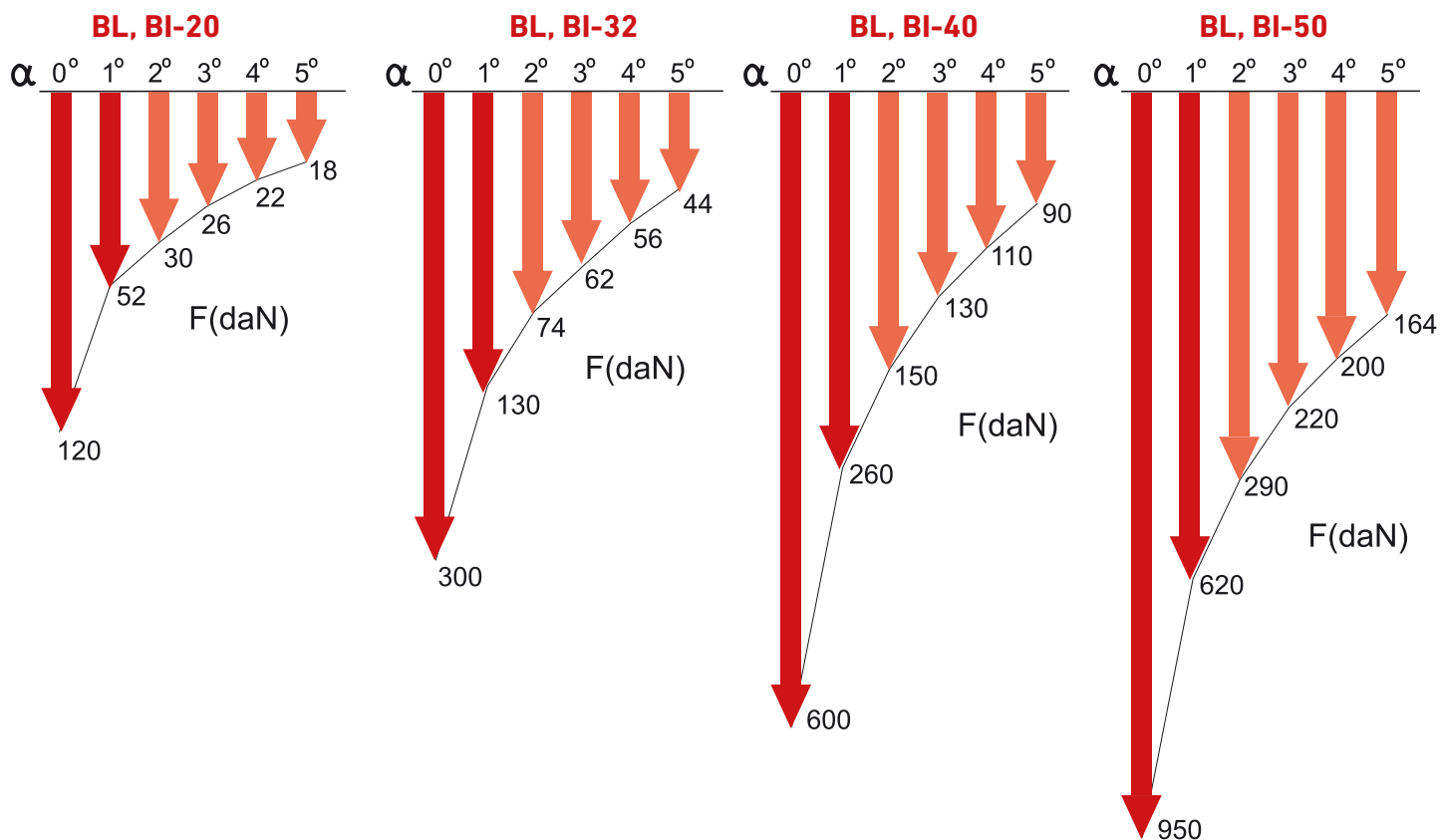
One of the main characteristics of our fastening element is its non-reversibility.

When the minipincer is making force and it's in a non-reversible position, no external force F_E can turn the arm, even though air pressure is missing; this way, the clamping force achieved is kept.

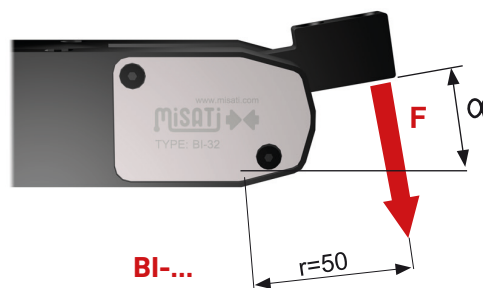
In order to check if the miniclamp is in a non-reversible position, we will first adjust the desired force according to the information on the back of this page. Next, dimension A has to be checked according to the drawing to guarantee the non-reversibility of the arm.

FORCE / "α" ANGLE

Depending on the angle of the arm at the clamping position, the force changes.

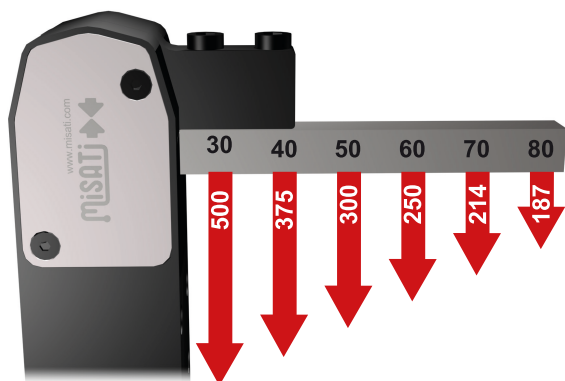


BL-...



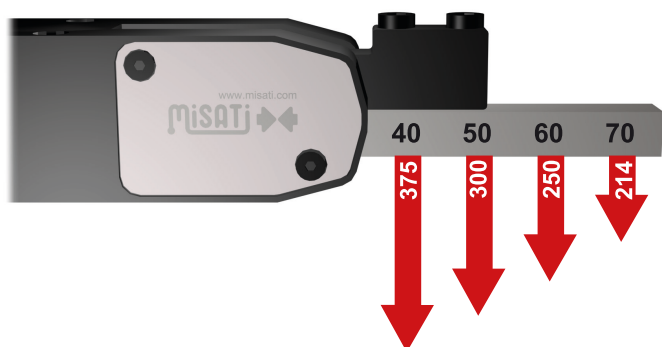
BI-...

FORCE / LENGTH OF THE ARM



DISTANCE TO THE TURNING SHAFT	FORCE (daN)			
	BL-20	BL-32	BL-40	BL-50
30	200	500	1000	1583
40	150	375	750	1187
50	120	300	600	950
60	100	250	500	792
70	85	214	428	678
80	75	187	375	595

$\alpha=0^\circ$ P=6bar



DISTANCE TO THE TURNING SHAFT	FORCE (daN)			
	BI-20	BI-32	BI-40	BI-50
40	150	375	750	1187
50	120	300	600	950
60	100	250	500	792
70	85	214	428	678
80	75	187	375	594

$\alpha=0^\circ$ P=6bar



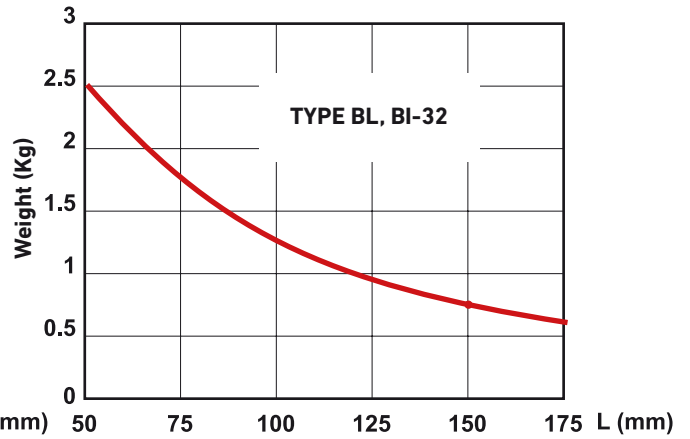
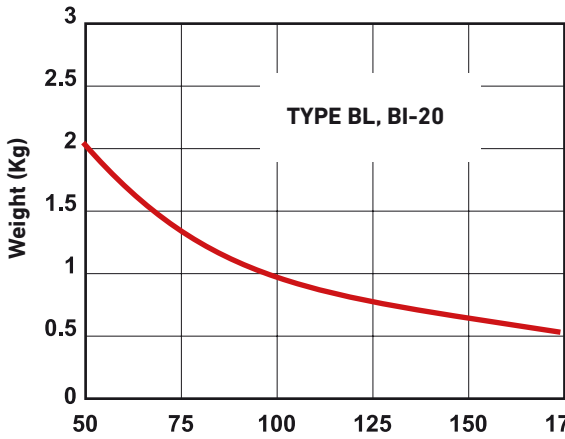
DISTANCE TO THE TURNING SHAFT	FORCE (daN)		
	BC-20	BC-32	BC-40
50	60	150	300
60	50	125	250
70	42	107	214
80	37	93	187

$\alpha=0^\circ$ P=6bar

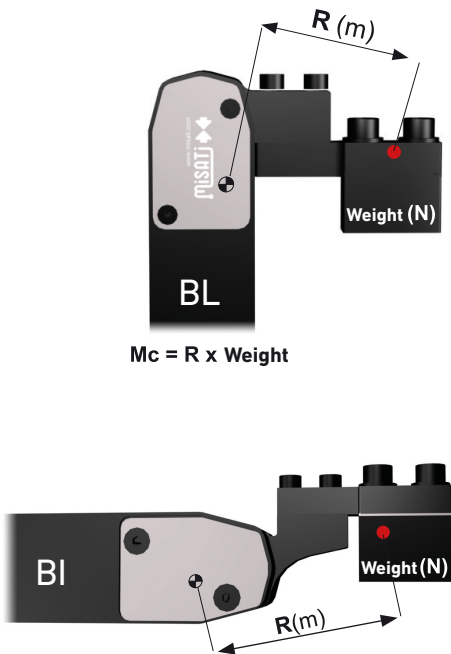
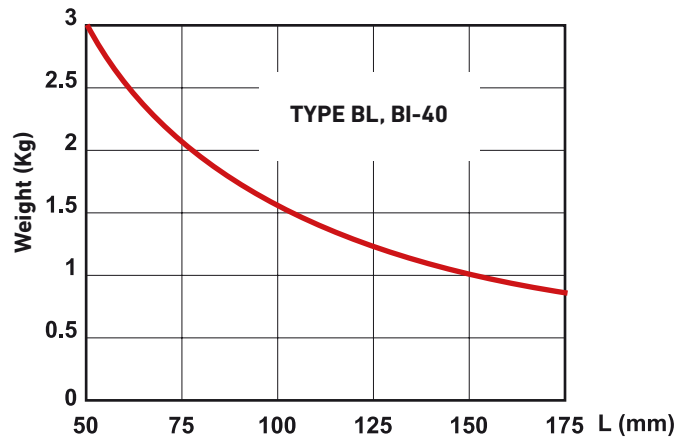
The clamping force is determined by the distance between the turning centre and the point of contact. The length and mass of the arm should be as small as possible. Apart from standard couplings, pneumatic cushioning will be necessary.

WEIGHT / ARM RADIUS RELATIONSHIP

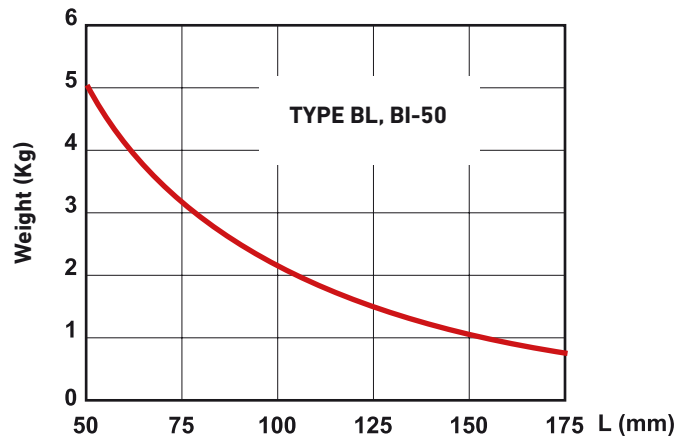
In order to limit the impact of the arm due to kinetic energy, the application of special couplings with an excess length or mass requires a system of pneumatic cushioning and flow regulators. We would advise to respect the weight/ length relationships, according to the following graphs:



TYPE	Maximum Load Torque	Cushioned Load Torque
BL, BI-20	1Nm	0.15 Nm
BL, BI-32	1.25 Nm	0.33 Nm
BL, BI-40	1.5 Nm	0.5 Nm
BL, BI-50	2.5 Nm	1Nm

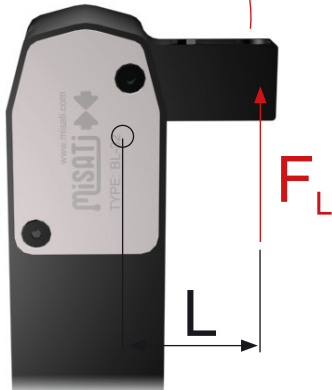


● Centre of mass



RETENTION FORCE

$$M_L = F_L \times L$$



TYPE	F _L (daN)	M _L (Nm)	L
BL-20	703	190	27
BL32	1287.6	470	36.5
BL-40	1694.3	753.9	44.5
BL-50	2266.6	1189.9	52.5

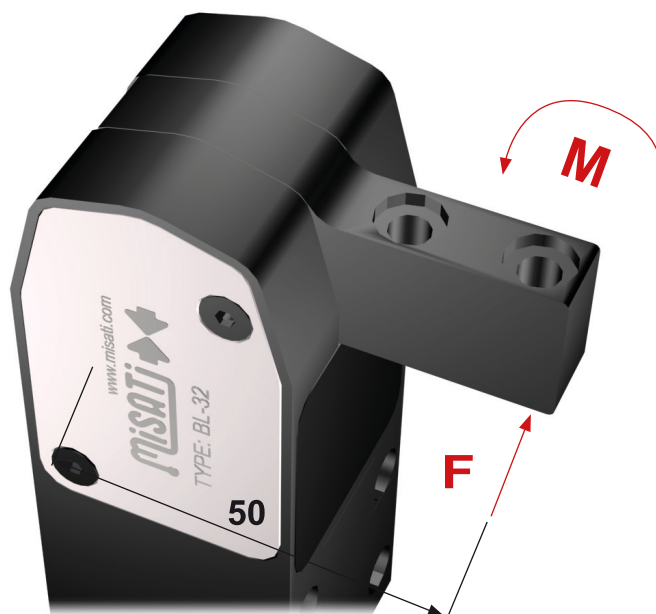
$$M_I = F_I \times I$$



TYPE	F _I (daN)	M _L (Nm)	I
BI-20	400	190	47.5
BI-32	696.2	470	67.5
BI-40	913.9	753.9	82.5
BI-50	1233.1	1189.9	96.5

Loads and momentums appearing in these tables are in constant service. Values are higher with specific loads.

MAXIMUM LATERAL FORCE



TYPE	F_L (daN)	M_L (Nm)
BL / BI-20	440	220
BL / BI-32	1184	592
BL / BI-40	2007	1003
BL / BI-50	3318	1659

Loads and torques appearing in these tables are in constant service. Values are higher with specific loads.

GUARANTEE



LIFE

MINICLAMPS are guaranteed by MISATI, S.L. for 7 YEARS against any manufacturing defect affecting their correct operation.

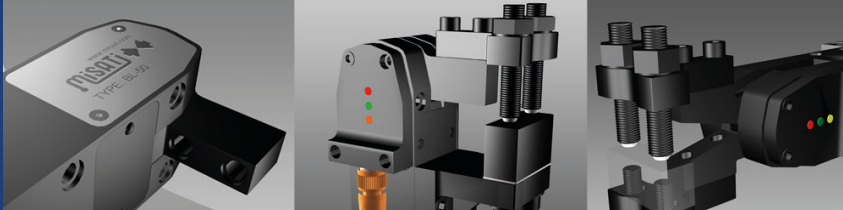
SCOPE

The guarantee covers all faulty parts and labour required for their repair in our workshops during the guarantee period.

GUARANTEE DOES NOT INCLUDE:

- Any possible damages occasioned by mishandling, inappropriate use, negligence, overloading or abandonment of the miniclamp, pressure increases, faulty installations and other external causes.
- Any repairs or adjustments carried out by people not connected with or expressly authorized by MISATI, S.L.
- Any parts prone to wear and tear.
- Damages caused by any machine downtime.

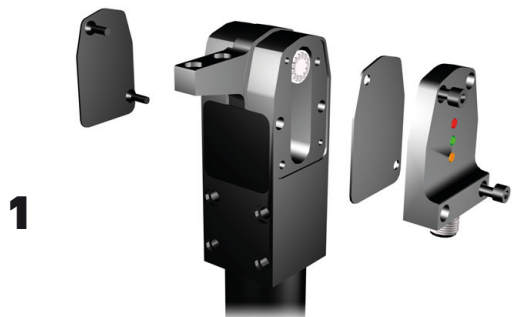
Maintenance



MAINTENANCE: FORCE MECHANISM	22
MAINTENANCE: PNEUMATIC CYLINDER	23
MECHANICAL KIT	24
PNEUMATIC KIT	25
CHANGE OF THE ARM	26-27

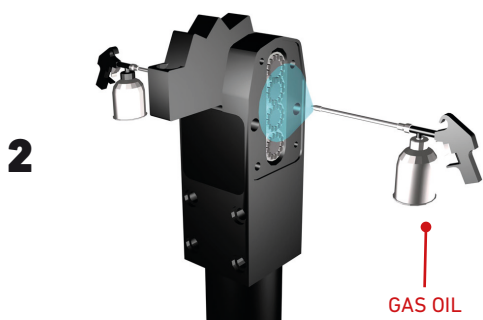
MAINTENANCE: FORCE MECHANISM

To guarantee a long life for our minipincers, it is essential to make a preventive maintenance, depending on the aggressiveness of the environment.



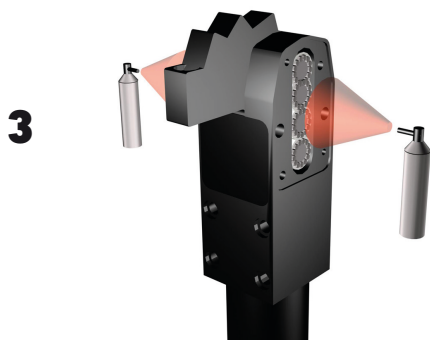
1 DISMANTLING

Dismantle both lateral covers.



2 CLEANING BLOWING

In order to free any foreign particle, project compressed air in all directions on the hole and in different positions of the arm.



3 LUBRICATION

Spray on the hole with a lubricant for bearings in different positions of the arm.



4 ASSEMBLY

Put both covers on the clamp.

MAINTENANCE: PNEUMATIC CYLINDER

Please, read carefully the following advices for a correct maintenance of the pneumatic cylinder.

1. AIR TREATMENT

It is recommended to use compressed air (filtered) prepared for preventing any dust particles, oil or water from damaging the internal components of the minipincers.

After the compression, air is pre-filtered, dehydrated by cold drying (pressure dew point + 2°C) and cleaned through very fine filters. Bigger particles than 40 µm should be removed with some specific filters.

2. GREASE FOR PNEUMATIC ELEMENTS

Our standard miniclamps use Klübersynth AR 34-402 grease. This adhesive lubricating grease can be used with a wide piston speed range. Other advantages are the low breakaway torque, even after longer periods of standstill and the low tendency to the stick-slip during slow piston speeds.

In case of high-temperature special applications (EE-xx9), Viton O-rings are lubricated with Barrierta L55/1 high-temperature long-term grease.

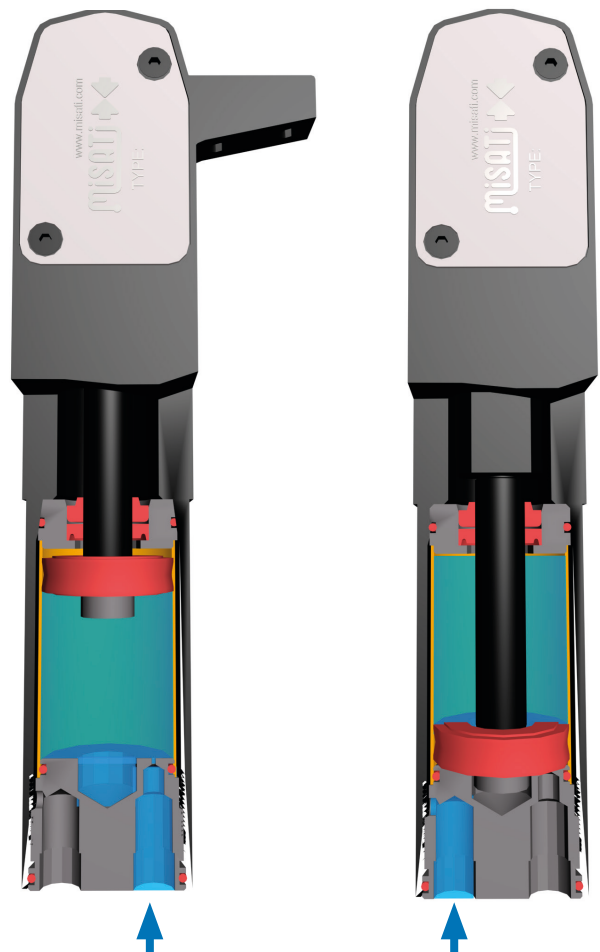
Both types of greases are from Klüber Lubrications (www.klueber.com). For further information, please contact the manufacturer directly. Misati supplies each spare Pneumatic Kit (KJ-...) with the enough quantity of grease to change the elements correctly.

Use ethanol to clean the pneumatic sealing elements.

3. AIR EQUIPMENT LUBRICATION

Compressed air can be lubricated or unlubricated. In case of using lubricated air, oil must be mineral or synthetic to prevent any incompatibilities with the grease used with the pneumatic seals.

If you begin using unlubricated air and then you change to use lubricated air, seals can dry up and crack, and so the miniclamp will lose air tightness.

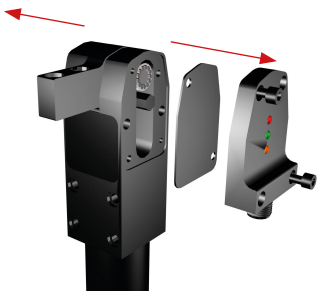


MECHANICAL KIT FOR MINICLAMPS BL, BI & BC

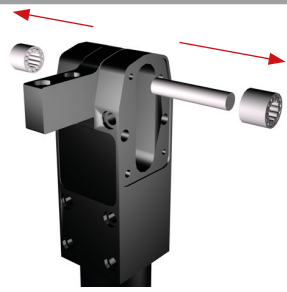
Dismantling the Mechanical Kit
 Assembling the Mechanical Kit

i The Mechanical Kit of GC miniclamps must be changed in MISATI workshops.


1
Dismantle both lateral covers
Allen keys 2,5 y 3



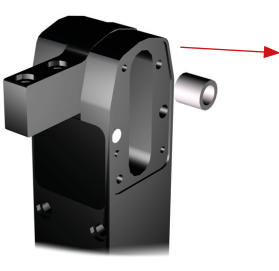
2
Take bearings & bolt out



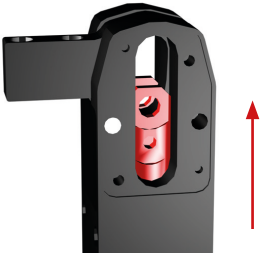
3
Push the shaft down to the end



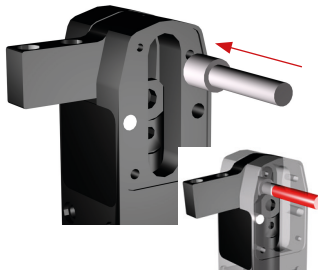
4
Take the internal bushing out of the arm



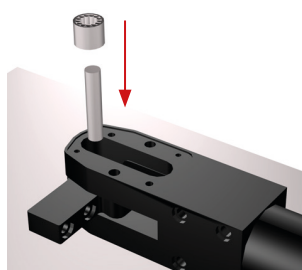
5
Push the shaft up to the halfway of the oblong hole of the body



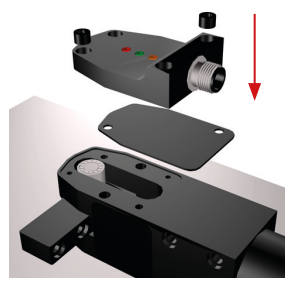
6
Assemble the internal bushing of the arm with the help of the bolt.



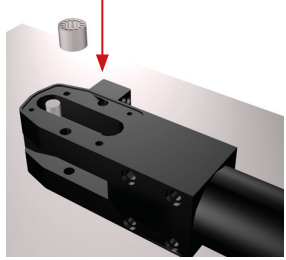
7
Lay the clamp down horizontally and place the shaft and bearings in it



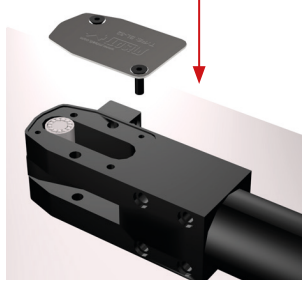
8
Put the Bakelite cover & sensor, or lateral cover, on the clamp
Allen keys



9
Turn the clamp and place the bearing in



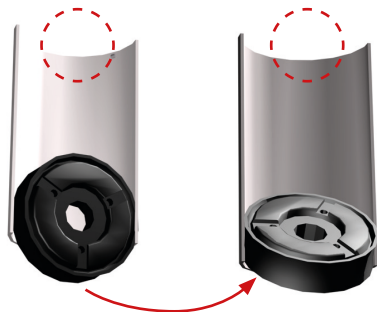
10
Turn the clamp and place the bearing in
Allen keys 2,5



PNEUMATIC KIT FOR MINICLAMPS BL, BI & BC

11

Place the piston & the cylinder bush according to the drawing



12

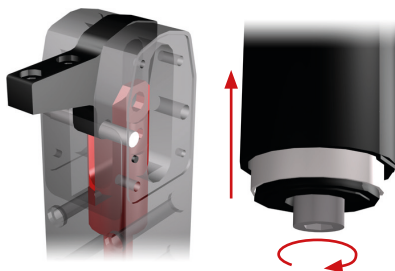
Place the piston & the cylinder bush according to the drawing



13

Approach the shaft to the arm and tighten the screw

Allen key



14

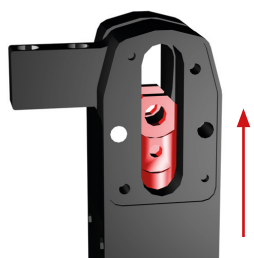
Screw the head in with the help of two Allen screws

Spanner



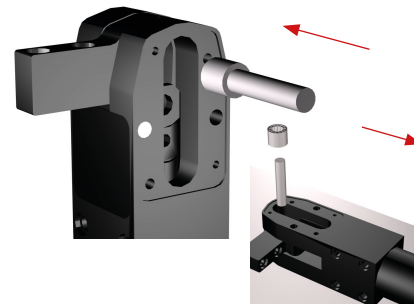
15

Push the shaft up to the halfway of the oblong hole of the body



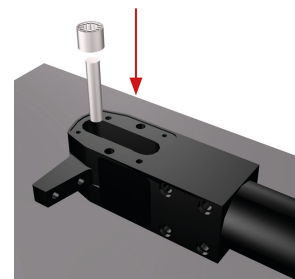
16

Assemble the internal bushing of the arm with the help of the bolt



17

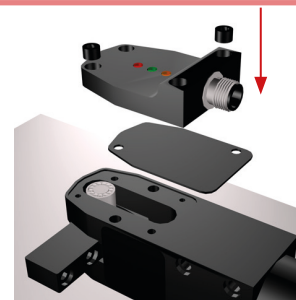
Lay the clamp down horizontally and place the shaft and bearings in it



18

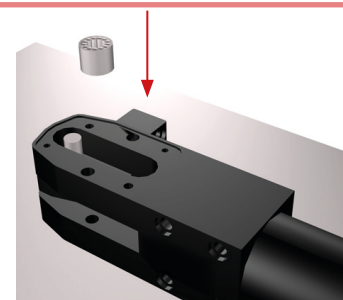
Put the Bakelite cover & sensor, or lateral cover, on the clamp

Allen key 3



19

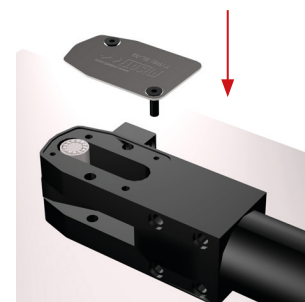
Turn the clamp and place the bearing in



20

Put the lateral cover on the clamp

Allen key 2,5



CHANGE OF THE ARM BL, BI

Dismantling the arm

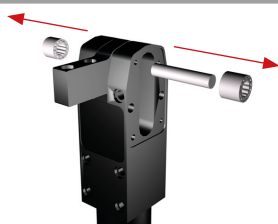
Assembling the arm

1
Dismantle both lateral covers

Allen keys 2,5 & 3



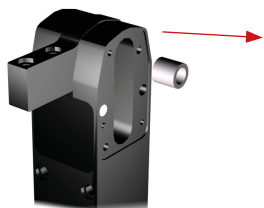
2
Take bearings & bolt out



3
Push the shaft down to the end

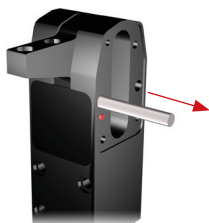


4
Take the internal bushing out of the arm



5
Take the bolt out

Centre punch & hammer



6
Take the arm out

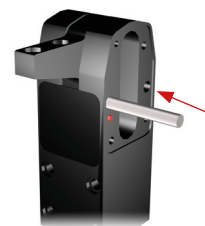


7
Assemble the arm



8
Assemble the bolt

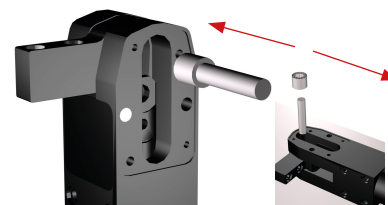
Centre punch & hammer



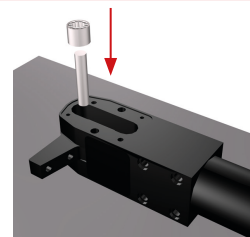
9
Put the shaft up to the halfway of the oblong hole of the body



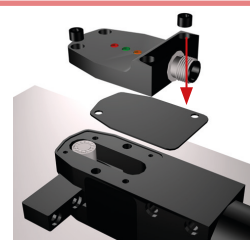
10
Assemble the internal bushing of the arm with the help of the bolt



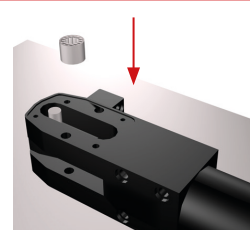
11
Lay the clamp down horizontally and place the shaft and bearings in it



12
Put the Bakelite cover & sensor, or lateral cover, on the clamp
Allen key 3



13
Turn the clamp and place the bearing in



14
Put the lateral cover on the clamp

Allen key 2,5



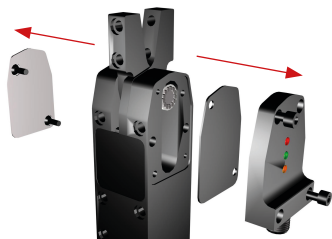
CHANGE OF THE ARM BC

Dismantling the arm

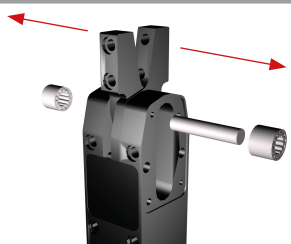
Assembling the arm

1
Dismantle both lateral covers

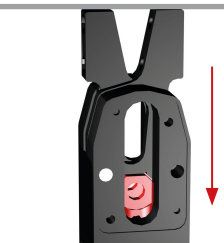
Allen keys 2,5 & 3



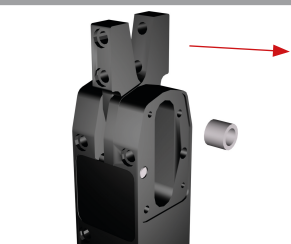
2
Take bearings & bolt out



3
Push the shaft down to the end

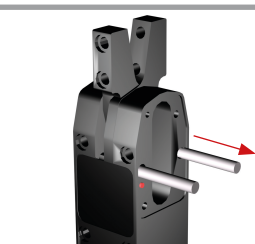


4
Take the internal bushing out of the arm



5
Take the bolt out

Centre punch & hammer



6
Take the arm out

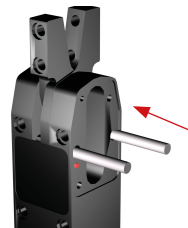


7
Assemble the arm



8
Assemble the bolt

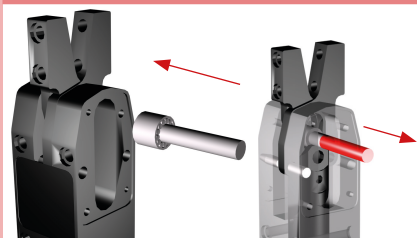
Centre punch & hammer



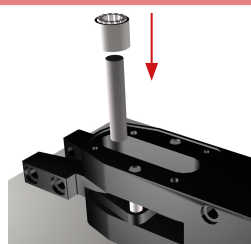
9
Put the shaft up to the halfway of the oblong hole of the body



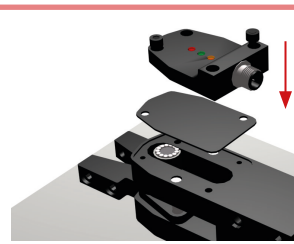
10
Assemble the internal bushing of the arm with the help of the bolt



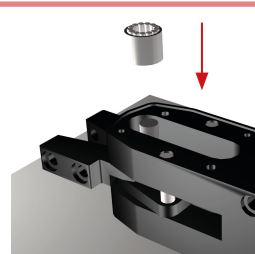
11
Lay the clamp down horizontally and place the shaft and bearings in it



12
Put the Bakelite cover & sensor, or lateral cover, on the clamp
Allen key 3

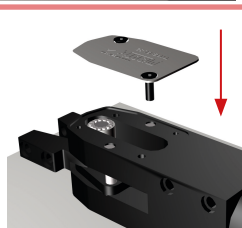


13
Turn the clamp and place the bearing in



14
Put the lateral cover on the clamp

Allen key 2,5





MISATI, S.L., Av. de la Riera 15, E-08960 Sant Just Desvern Barcelona - Spain
Tel. (+34) 93 440 47 27 - Fax. (+34) 93 448 05 75
misati@misati.com - www.misati.com