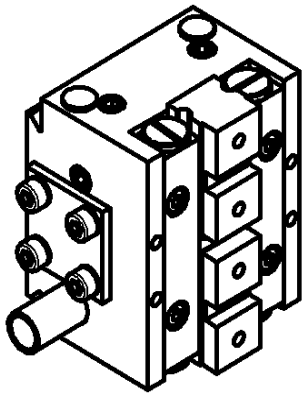
MONTECH



USER MANUAL

HANDLING COMPONENTS

Gripper GPP

BA-100035

starting from serial number 425533

english, edition 06/2007

Operating instructions
Handling Components gripper GPP

Table of contents

1. Important Information

EC Declaration of Conformity (see MRL Appendix II A)

1.1. Manufacturer explanation

Rules and standards complied with:
Machinery guidelines 89/392/EWG, 91/368/EWG

Manufacturer:
Montech AG, Gewerbestrasse 12 CH-4552 Derendingen
Tel. +41 32 681 55 00, Fax +41 32 682 19 77

1.2. Purpose

GPP grippers are used where workpieces have to be regularly gripped internally or externally, for material handling purposes.
Under all circumstances attention must be paid to the performance limits, as given in the technical data in these instructions.

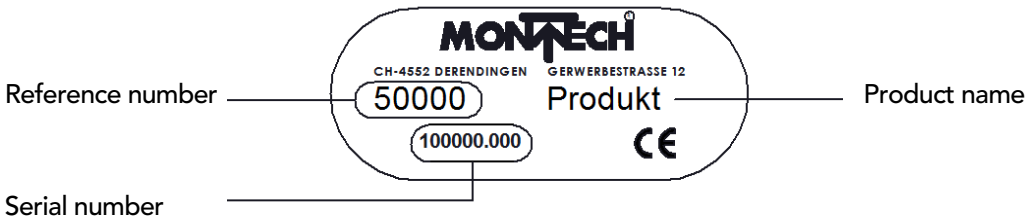
1.3. Hazards

The use of GPP grippers in an installation is only permissible when they are guarded by MOVING, ISOLATING PROTECTIVE DEVICES as per EN 292-2, para.4.2.2.3. Failure to comply with this protective measure can result in injury due to fingers being squeezed, for example.

1.4. Additional information

The aim of the present User Manual is to enable users to employ gripper GPP correctly and safely. Should further information be required in relation to your particular application, please contact the manufacturer. When reordering User Manuals, it is essential to quote the reference number, the product name and serial number.
This document can be obtained from our homepage www.montech.com.

Nameplate



Montech AG
Management

U. D. Wagner

C. Wullschleger

1.5. Validity of the User Manual

Our products are continually updated to reflect the latest state of the art and practical experience. In line with product developments, our User Manuals are continually updated.
Every User Manual has an order number (e.g. BA-100035) and an edition number (e.g. 06/2007). The order number and the addition number are shown on the title page.

2. Technical Data

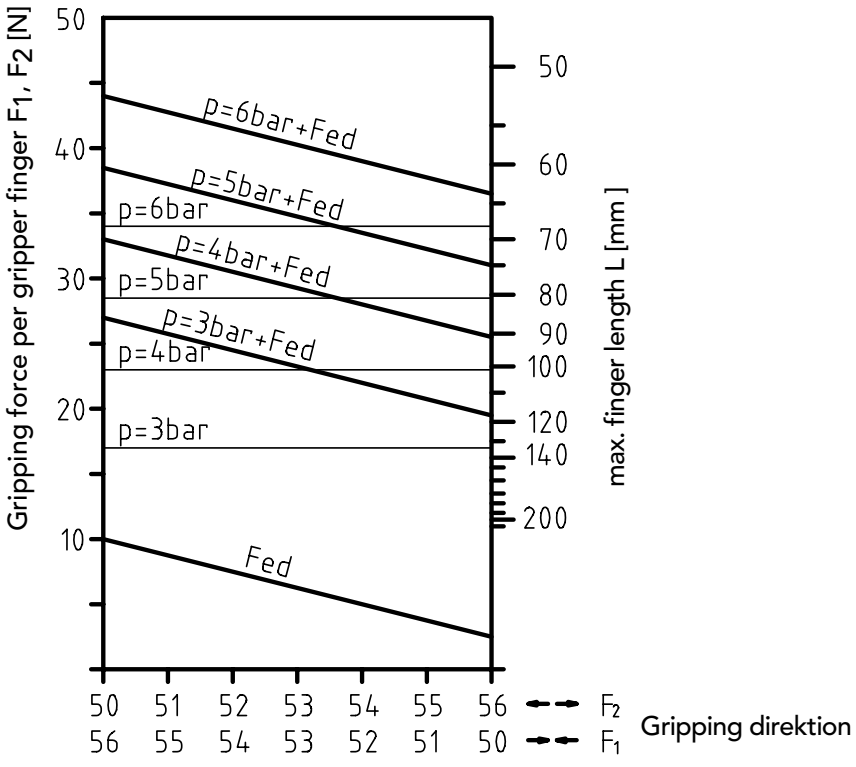
2.1. Technical data for gripper GPP-1 / GPPI-1 / GPP-ISO-1

				GPP	GPPI	GPP-ISO
Gripping distance = stroke Gripping distance (total travel of jaws)			[mm]	6	6	6
Gripping distance adjustable opening / closing				yes	yes	yes
Piston diameter			[mm]	12	12	12
Gripping force F_1, F_2			[N]	see gripping force diagram		
Mass moment of inertia J_z			[kgcm2]	0.87	0.87	0.87
Repetability		1)	[mm]	±0.005	±0.005	±0.005
Operating pressure			[bar]	3-6		
Weight			[kg]	0.25	0.26	0.28
Operating medium				air,oiled or unoiled,filtered to 5µm, dew point <6°C		
Pneumatic connection		2)				
Check on end position open / closed		3)		détecteur de proximité inductif		
Opening / Closing time		4)	[s]	0.015	0.015	0.015
Thread for mounting positioners				4xM3	4xM3	4xM3
Ambient:	Temperatue		[°C]	10–50		
	Rel. humidity			5% - 85% (without condensation)		
	Air purity			atmosphère d'atelier normale		
Warranty				2 ans à partir de la date de livraison		
Maintenance				see maintenance		
Mounting position				any		
Material				aluminium, steel, bronze, plastic		
Noise level			[dBA]	<60		

1) Variation of the gripped end position in 100 successive strokes without the effect of additional, external forces
2) GPP M5 (supply see accessories
   GPPI pneumatic connection via Quick-Set® clamping collar
   GPP-ISO with adjustable M5 exhaust throttles, pluggable, Ø 4 mm hose included in the scope of supply
3) See accessories
4) Measured at maximum stroke, between 3 and 6 bar, without spring

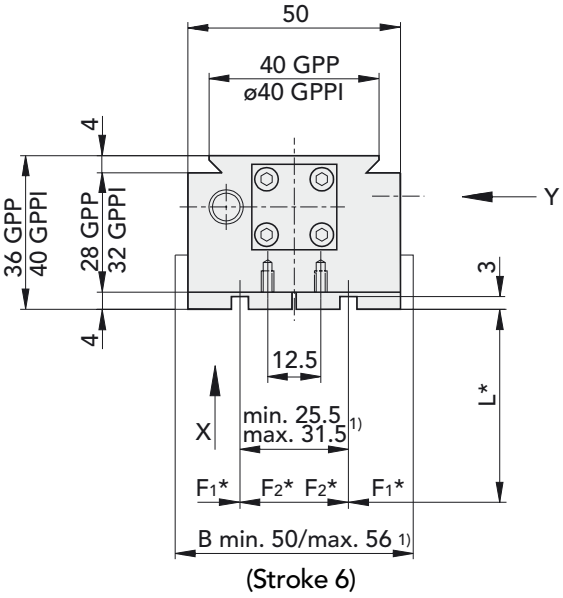
Accessories:
- Inductive proximity switch PNP, 6.5 mm dia. with LED, proof against short circuit and wrong polarity, with a switching clearance of 2 mm and a cable 2 m long, Ref.No. 508842; plug-in Ref.No. 508843.
- M5 "straight" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 504928
- M5 "angle" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 506319
- Adapter for finger attachment, Ref. No. 39025

Gripping force diagram gripper GPP-1 / GPPI-1 / GPP-ISO-1



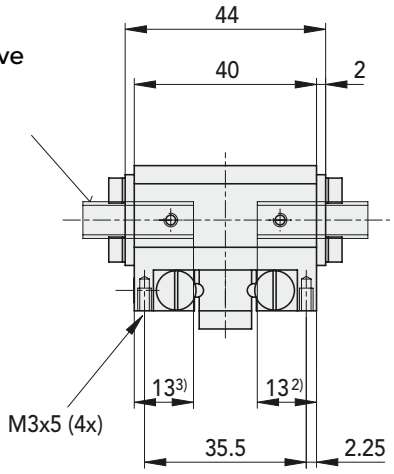
B in gripped state (mm)
p = pneumat. Pressure
Fed = Spring

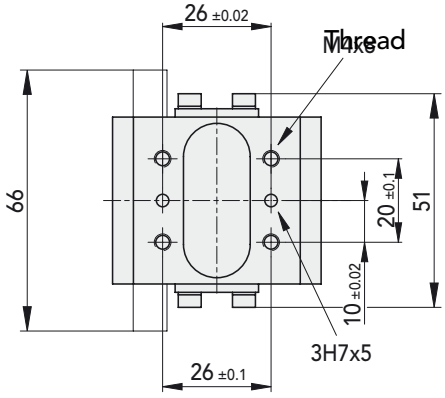
2.2. Dimension diagram GPP-1 / GPPI-1



(Stroke 6)

Clamping sleeve for proximity switch Ø 6.5

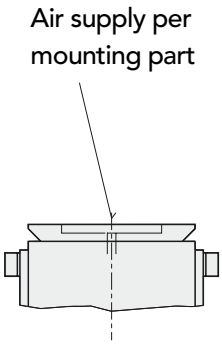




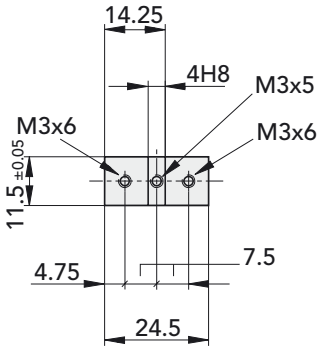
Hole

* See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

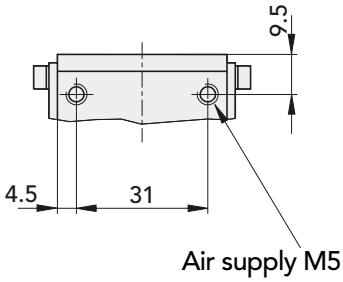
View Y
GPPI



View X
Gripping jaw

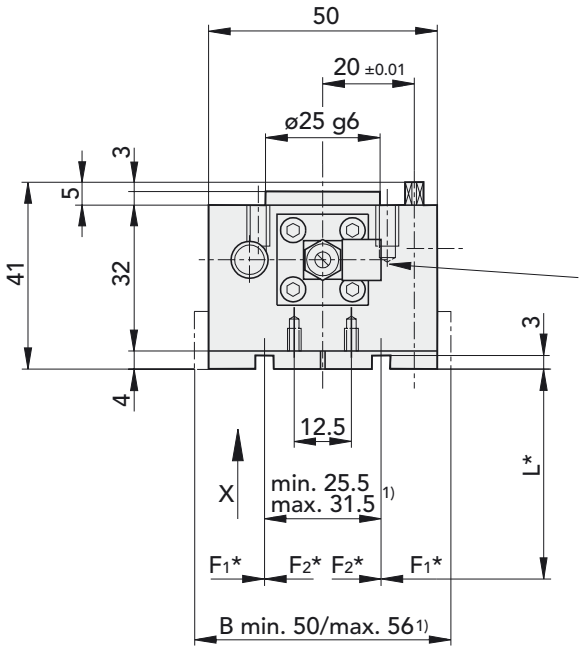


View Y
GPP



Ref.No. GPP-1 41357
Ref.No. GPPI-1 41358

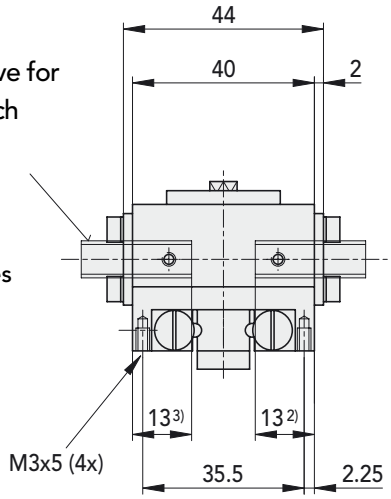
GPP-1-ISO



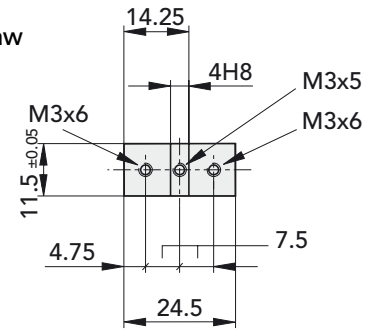
(Stroke 6)

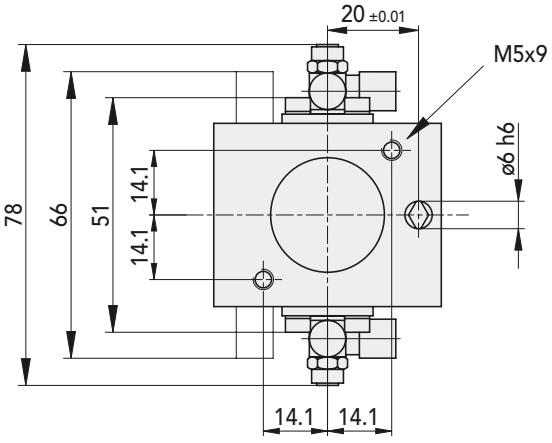
Clamping sleeve for proximity switch Ø 6.5

Air supply
Exhaust throttles with plug Ø 4



View X
Gripping jaw





* See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

Ref.No. GPP-1-ISO 39814

2.3. Technical data for gripper GPP-2 / GPPI-2 / GPP-ISO-2

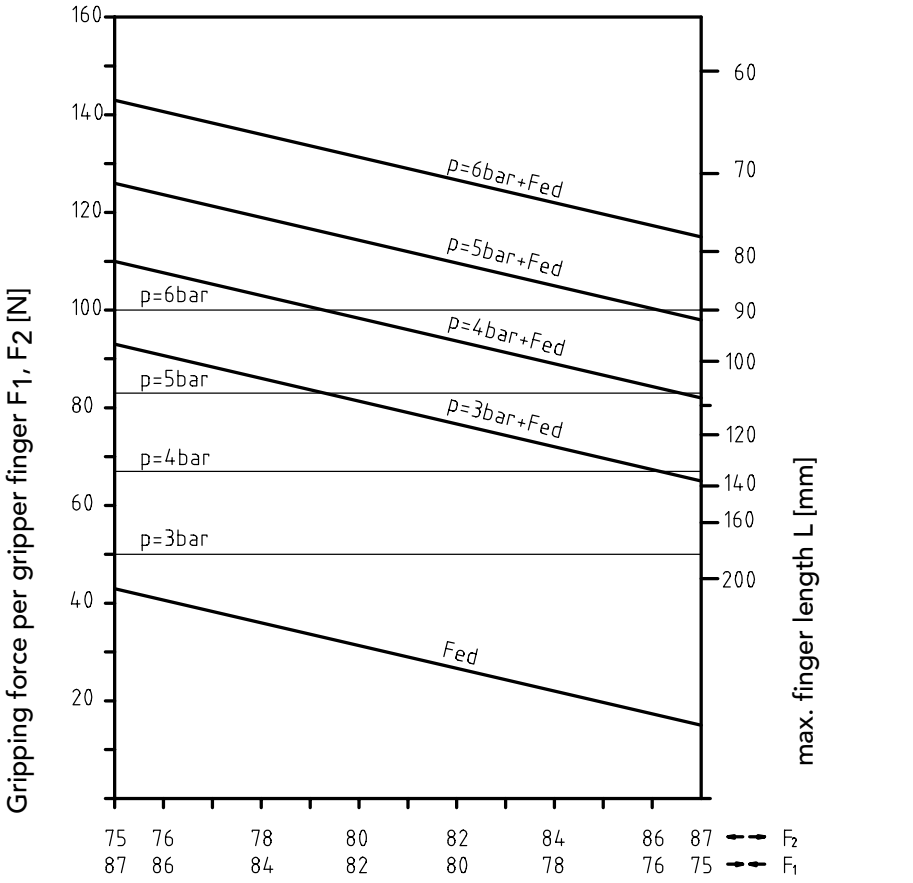
				GPP	GPPI	GPP-ISO
Gripping distance = stroke Gripping distance (total travel of jaws)			[mm]	12	12	12
Gripping distance adjustable opening / closing				yes	yes	yes
Piston diameter			[mm]	20	20	20
Gripping force F_1, F_2			[N]	see gripping force diagram		
Mass moment of inertia J_z			[kgcm2]	4.3	4.3	4.3
Repetability		1)	[mm]	±0.02	±0.02	±0.02
Operating pressure			[bar]	3-6		
Weight			[kg]	0.68	0.68	0.72
Operating medium				air,oiled or unoiled,filtered to 5µm, dew point <6°C		
Pneumatic connection		2)				
Check on end position open / closed		3)		Induktive proximity switches		
Opening / Closing time		4)	[s]	0.045	0.045	0.045
Thread for mounting positioners				4xM3	4xM3	4xM3
Ambient:	Temperatue		[°C]	10–50		
	Rel. humidity			5% - 85% (without condensation)		
	Air purity			Normal workshop atmosphere		
Warranty				2 years from the date of delivery		
Maintenance				see maintenance		
Mounting position				any		
Material				aluminium, steel, bronze, plastic		
Noise level			[dBA]	<60		

1) Variation of the gripped end position in 100 successive strokes without the effect of additional, external forces
2) GPP M5 (for connection, see accessories)
   GPPI pneumatic connection via Quick-Set® clamping collar
   GPP-ISO with adjustable M5 exhaust throttles, pluggable, Ø 4 mm hose included in the scope of supply
3) See accessories
4) Measured at maximum stroke, between 3 and 6 bar, without spring

Accessories:

- Inductive proximity switch PNP, 6.5 mm dia. with LED, proof against short circuit and wrong polarity, with a switching clearance of 2 mm and a cable 2 m long, Ref.No. 508842; plug-in Ref.No. 508843.
- M5 "straight" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 504928
- M5 "angle" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 506319
- Adapter for finger attachment, Ref. No. 39026

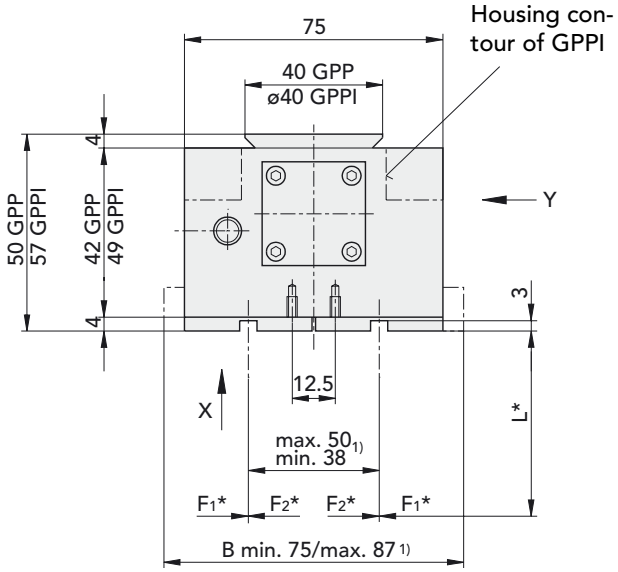
Gripping force diagram gripper GPP-2 / GPPI-2 / GPP-ISO-2



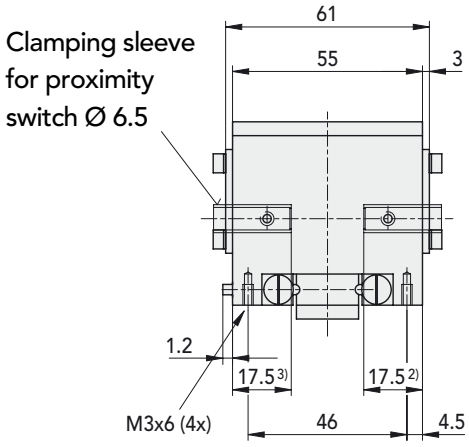
B in gripped state (mm)
p = pneumat. Pressure
Fed = Spring

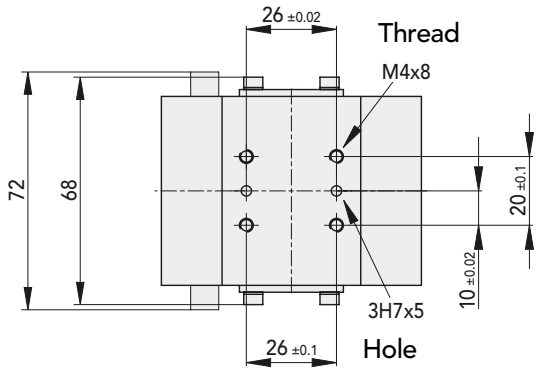
Gripping direction

2.4. Dimension diagram GPP-2 / GPPI-2



(Stroke 12)

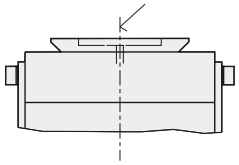




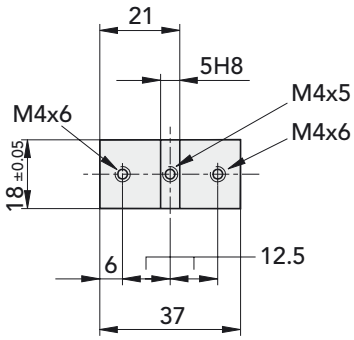
* * See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

View Y
GPPI

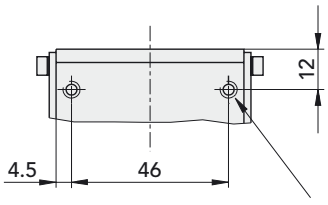
Air supply per mounting part



View X
Gripping jaw



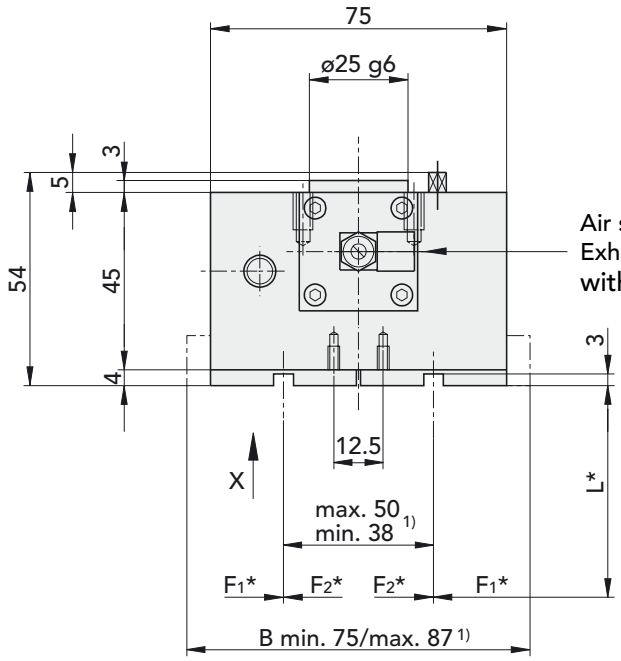
View Y
GPP



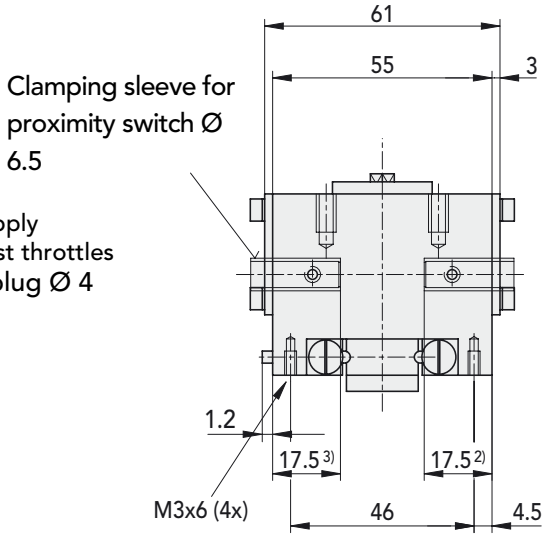
Air supply M5

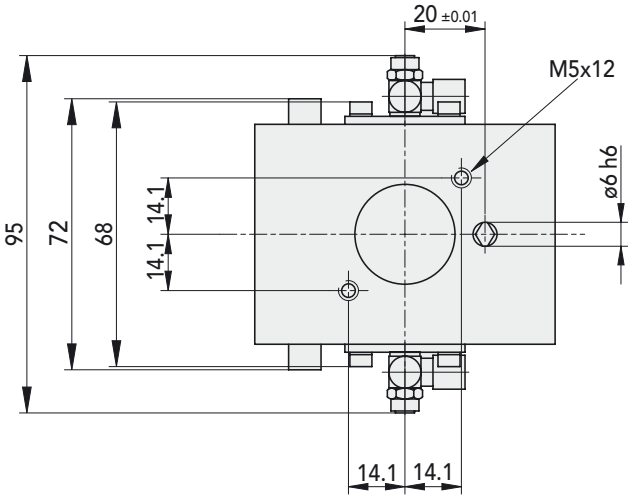
Ref.No. GPP-2 41359
Ref.No. GPPI-2 41361

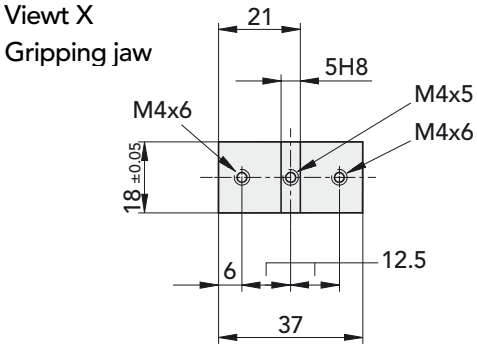
GPP-2-ISO



(Stroke 12)







* See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

Ref.No. GPP-2-ISO 39817

2.5. Technical data for gripper GPP-3 / GPPI-3 / GPP-ISO-3

				GPP	GPPI	GPP-ISO
Gripping distance (total travel of jaws)			[mm]	20	20	20
Gripping distance adjustable opening / closing				yes	yes	yes
Piston diameter			[mm]	25	25	25
Gripping force F_1, F_2			[N]	see gripping force diagram		
Mass moment of inertia J_z			[kgcm2]	14	14	14
Repeatability		1)	[mm]	±0.03	±0.03	±0.03
Opening pressure			[bar]	3-6		
Weight			[kg]	1.32	1.42	1.42
Operating medium				air,oiled or unoiled,filtered to 5µm, dew point <6°C		
Pneumatic connection		2)				
Check on end position open / closed		3)		induktive proximity switches		
Opening / Closing time		4)	[s]	0.12	0.12	0.12
Thread for mounting positioners				4xM4	4xM4	4xM4
Ambient:	Temperature		[°C]	10-50		
	Rel. humidity			5% - 85% (without condensation)		
	Air purity			normal workshop atmosphere		
Warranty				2 years from the date of delivery		
Maintenance				see maintenance		
Mounting position				any		
Material				aluminium, Steel, bronze, plastic		
Noise level			[dBA]	<60		

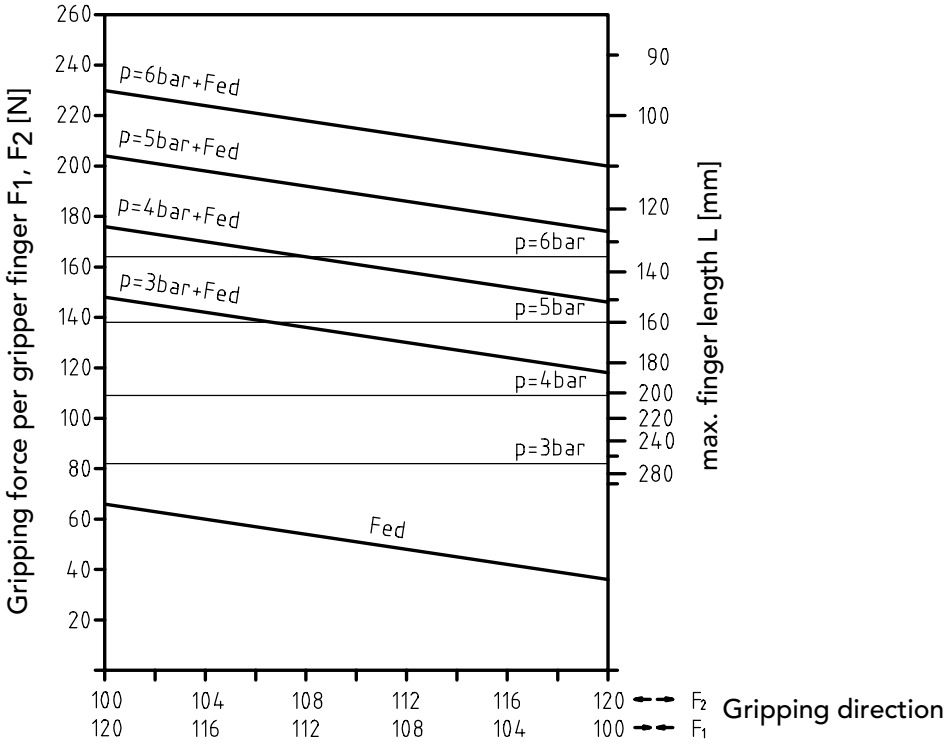
1) Variation of the gripped end position in 100 successive strokes without the effect of additional, external forces
2) GPP M5 connection, see accessories
   GPPI pneumatic connection via Quick-Set® clamping collar
   GPP-ISO M5 connection, see accessories
3) See accessories
4) Measured at maximum stroke, between 3 and 6 bar, without spring

Operating instructions
Handling Components gripper GPP

Accessories:

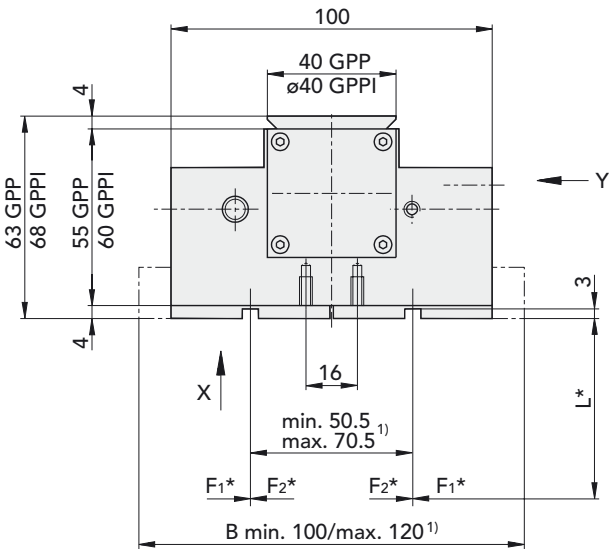
- Inductive proximity switch PNP, 6.5 mm dia. with LED, proof against short circuit and wrong polarity, with a switching clearance of 2 mm and a cable 2 m long, Ref.No. 508842; plug-in Ref.No. 508843.
- M5 "straight" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 504928
- M5 "angle" screw-in connection with plug-in connection for Ø 4 mm hose, Ref. No. 506319
- Adapter for finger attachment, Ref. No. 39027

Gripping force diagram gripper GPP-3 / GPPI-3 / GPP-ISO-3



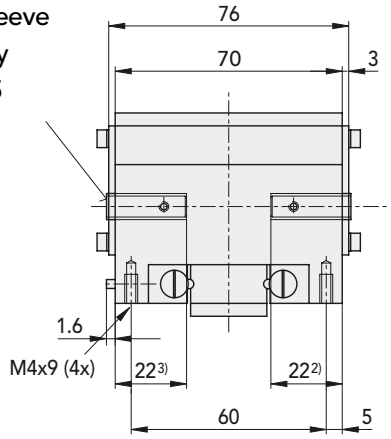
B in gripped state (mm)
p = pneumat. Pressure
Fed = Spring

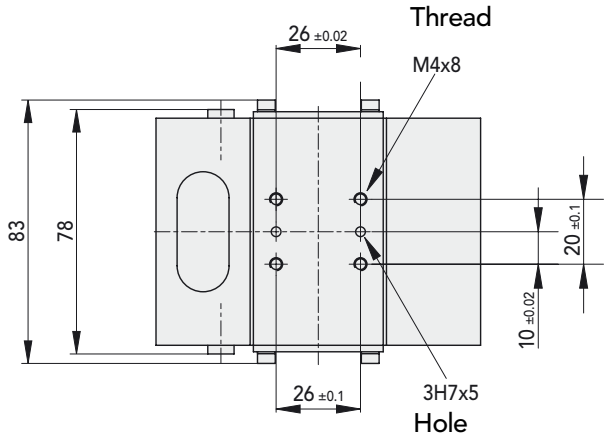
2.6. Dimension diagram GPP-3 / GPPI-3



(Stroke 20)

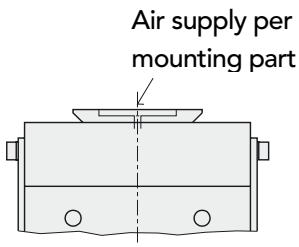
Clamping sleeve for proximity switch Ø 6.5



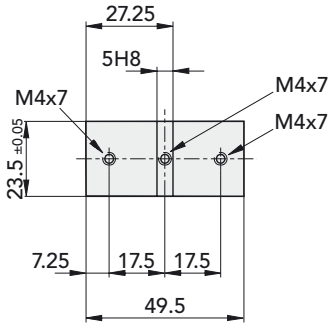


* See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

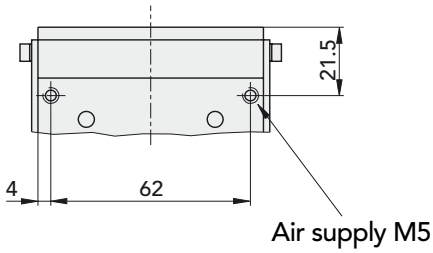
View Y
GPPI



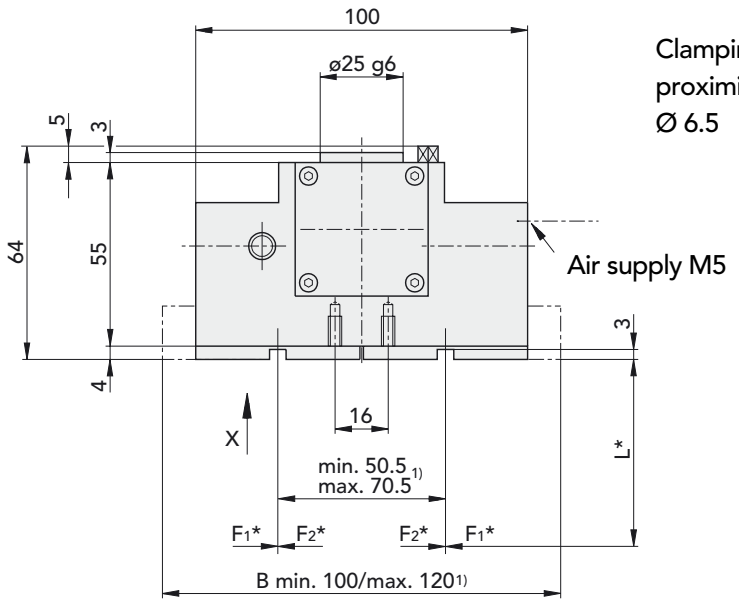
View X
Gripping jaw



View Y
GPP

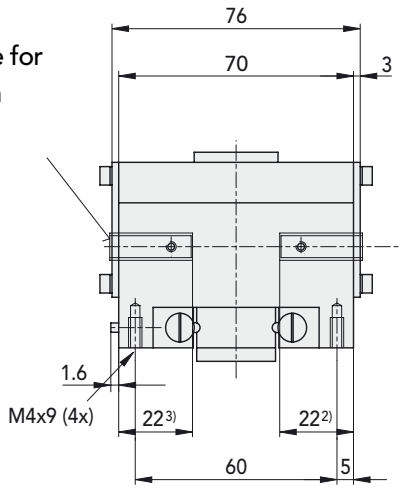


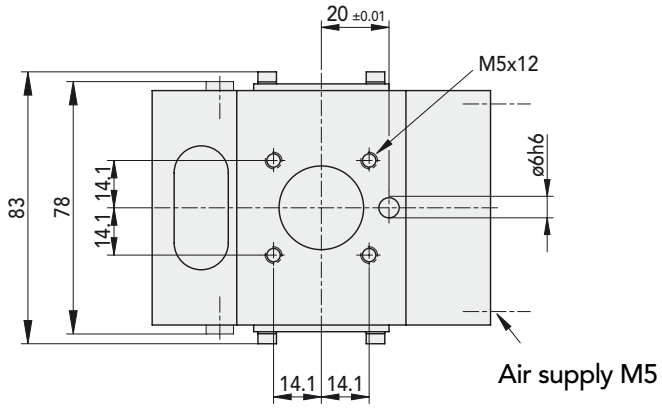
Ref.No. GPP-3 41363
Ref.No. GPPI-3 41365



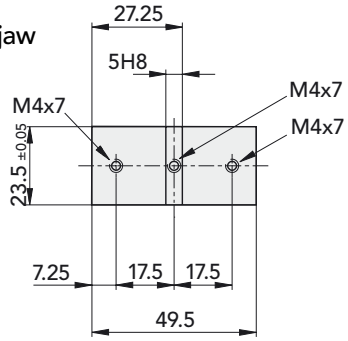
(Stroke 20)

Clamping sleeve for proximity switch Ø 6.5





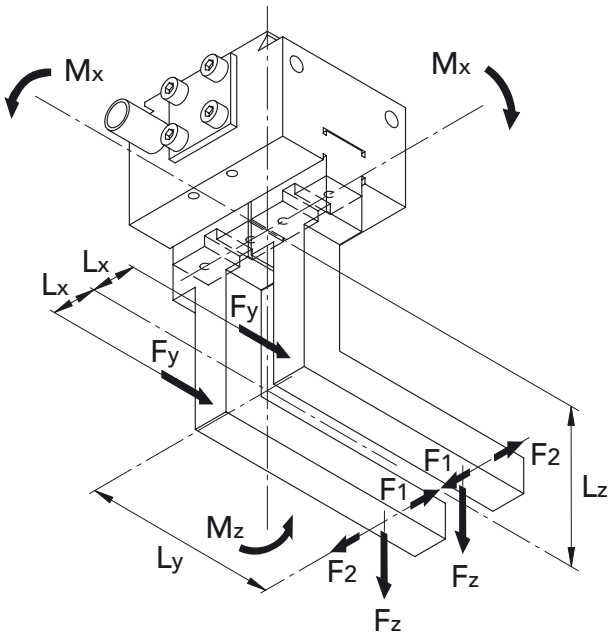
View X
Gripping jaw



* See gripping force diagram
1) Dimension of jaws closed (min.) and open (max.)
2) Position of proximity switch when jaws fully closed
3) Position of proximity switch when jaws fully open

Ref.No. GPP-3-ISO 45094

2.7. Definition and calculation



$$M_x = F_z \cdot L_y + F_y \cdot L_z$$

$$M_y = F_{1,2} \cdot L_z + F_z \cdot L_x$$

$$M_z = F_{1,2} \cdot L_y + F_y \cdot L_x$$

Combined loading

$$b = \frac{M_x}{K_1} + \frac{M_y}{K_2} + \frac{M_z}{K_3} \leq 1$$

	K_1	K_2	K_3
GPP-1	2.3	1.9	1.9
GPP-2	9	7.5	7.5
GPP-3	22	18	18

$F_{1, 2}$	:	Gripping force [N] (as gripping force diagram)
F_y, F_z	:	Forces acting [N]
L_x, L_y, L_z	:	Distances of force application [m]
M_x, M_y, M_z	:	Load moments [Nm]
K_1, K_2, K_3	:	Load limit constants
b	:	Load factor: MUST NOT EXCEED THE VALUE 1

3. Commissioning

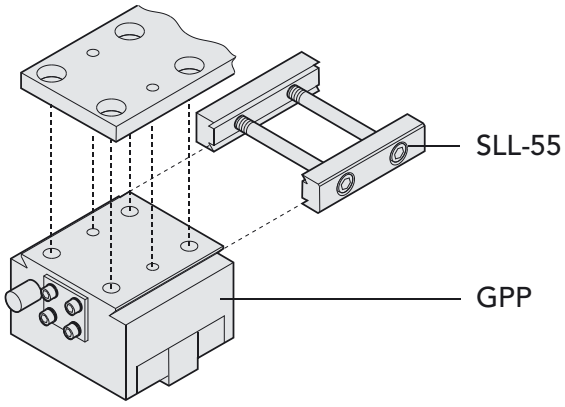
3.1. Installed position

GPP-grippers can be installed in any position.

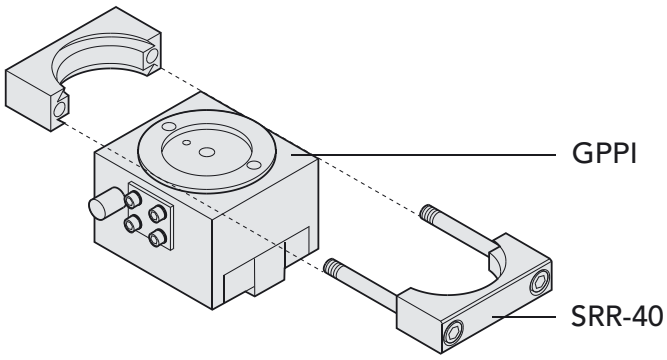
3.2. Mounting

The GPP/GPPI grippers can be mounted quickly and easily by QUICK-SET® components.
If no QUICK-SET® components are used, the GPP can be screwed on direct

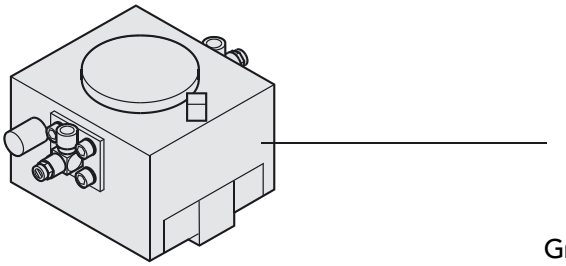
Attachment using bolts or QUICK-SET®



GPPI attachment using QUICK-SET® for internal compressed air feed



GPP-ISO attachment, gripper attachment in compliance with ISO-9409-1-A40

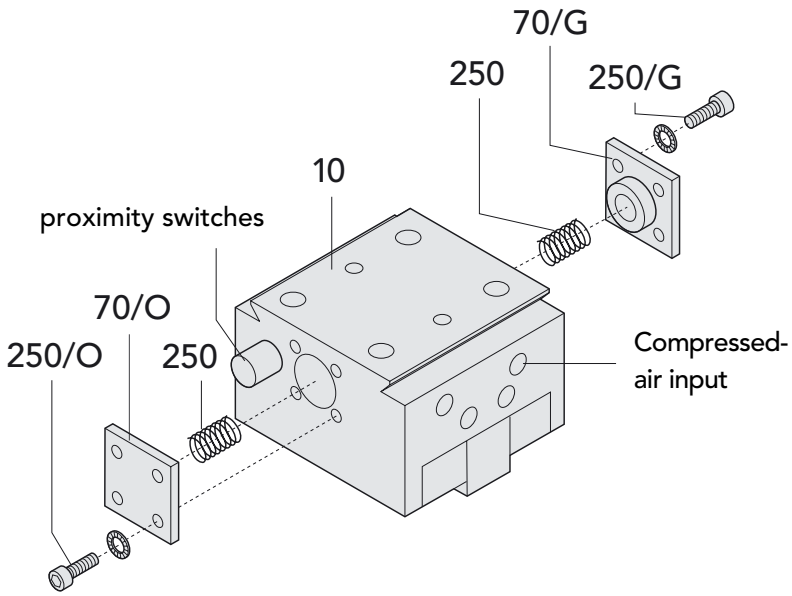


3.3. Operating modes closed / open depressurized

The spring is not installed, but is included with each gripper.

Conversion procedure to "Gripper depressurized when closed"
- Depressurize the gripper.
- Remove the four screws (250/G) and remove the cover (70/G).
- Insert the spring (250, supplied loose) in the bottom of the piston.
- Fix the cover (70/G) to casing (10) with the four screws (250/G).

Conversion to "Gripper depressurized when closed / open"

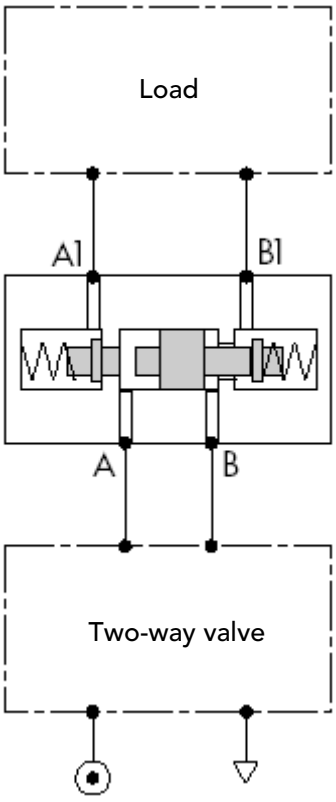


Conversion procedure to "Gripper depressurized when open"
- Depressurize the gripper.
- Remove the four screws (250/O) and remove the cover (70/O).
- Insert the spring (250, supplied loose) in the bottom of the piston.
- Fix the cover (70/O) to casing (10) with the four screws (250/O).

3.4. Maintenance of gripping force

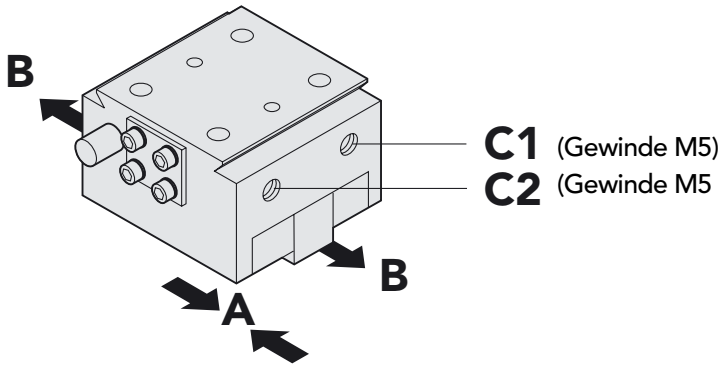
To secure the gripping force, e.g. in the event of an emergency stop, we recommend the use of the stop valve ref. no. 46582. Compared with the use of springs to secure the gripping force, this has the advantage of maintaining the gripping force at 100%.

Diagram of connections for non-return throttle valve

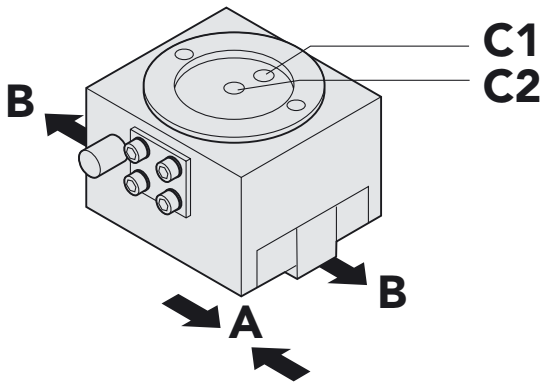


If a single-action load is fitted, the connection B1 must be closed.

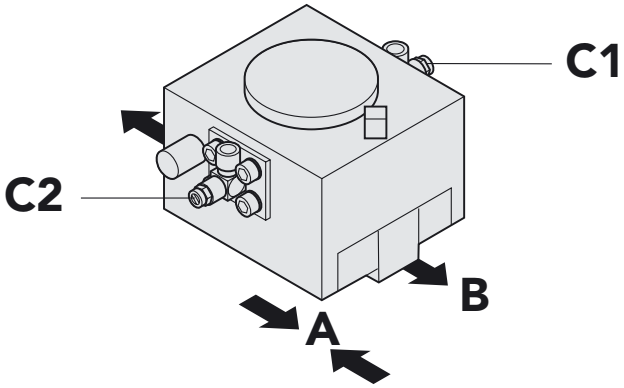
Internal air supply GPP-1 to GPP-3 and GPP-3-ISO



Internal air supply GPPI-1 to GPPI-3



Internal air supply GPP-1-ISO and GPPI-2-ISO



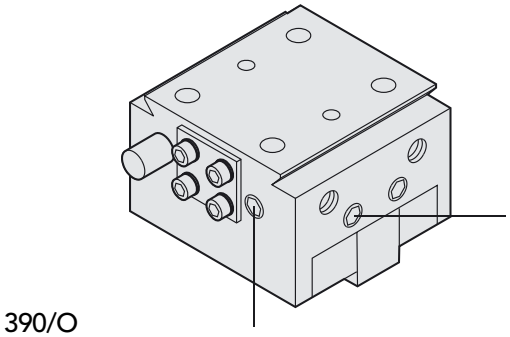
Do not use grippers without non-return throttle valve!

For all size
- If C1 is pressurized, the jaws move in direction A
- If C2 is pressurized, the jaws move in direction B

3.5. Stroke Limitation when Opening GPP / GPPI / GPP-ISO

Setting procedure
Setting should be carried out when the gripper is opened by pneumatic pressure and/or spring action.
– Open blocking screw 380/O by 360°.
– Turn the adjusting screw (390/O) to the desired position.
– Re-tighten the blocking screw 380/O.

Stroke Limitation when Opening



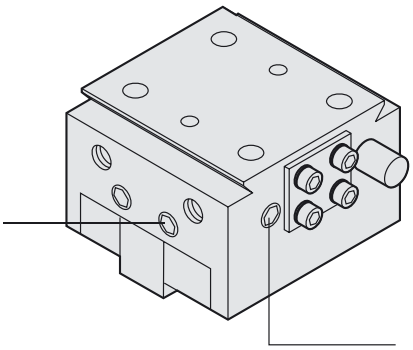
380/O
Innensechskant,
Socket-head, 2,5mm key

390/O
Socket-head, 2,5mm key

3.6. Stroke Limitation when Closing GPP / GPPI / GPP-ISO

Setting procedure
Setting should be carried out when the gripper is opened by pneumatic pressure and/or spring action.
– Open blocking screw 380/S by 360°.
– Turn the adjusting screw (390/S) to the desired position.
– Re-tighten the blocking screw 380/S.

Stroke Limitation when Closing



380/S
Socket-head, 2,5mm key

390/S
Socket-head, 2,5mm key

3.7. Opening and Closing Rate

The grippers GPP-1 to GPP-3, GPPI-1 to GPPI-3 and GPP-3 ISO contain internal throttle holes for safety. The integrated throttles protect the gripping jaws against abrupt opening and closing, are non adjustable , and eliminate the need for an external throttle.

The grippers GPP-1 ISO and GPP-2 ISO require a non-return throttle valve, which must be set so that the gripping jaws do not cause a hard impact either when opening or closing.

3.8. Shifting the gripper jaws in the X direction

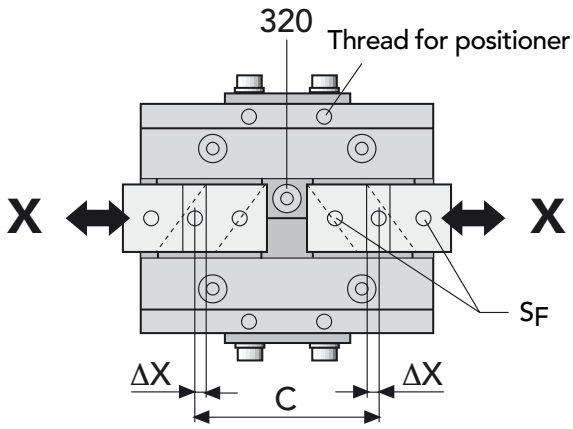
(The X direction is the axis of the opening or closing movement) For applications which demand exact concentricity between the axis of the gripped part and, for instance, the axis of rotation of a rotary unit, it may be necessary for the two gripping jaws to be corrected in the X direction.

Setting

- Undo screw (320).
- The two jaws can now be shifted synchronously in the X axis (the distance C and the Y direction are retained).
- When the exact position of the clamping fingers has been determined, tighten screw (320) with the torque M_d given in the following table.

	ΔX max.	M_d
GPP-1, GPPI-1, GPP-1 ISO	0,6 mm	2 Nm
GPP-2, GPPI-2, GPP-2 ISO	0,8 mm	4 Nm
GPP-3, GPPI-3, GPP-3 ISO	0,8 mm	4 Nm

Shifting the gripper jaws in the X direction

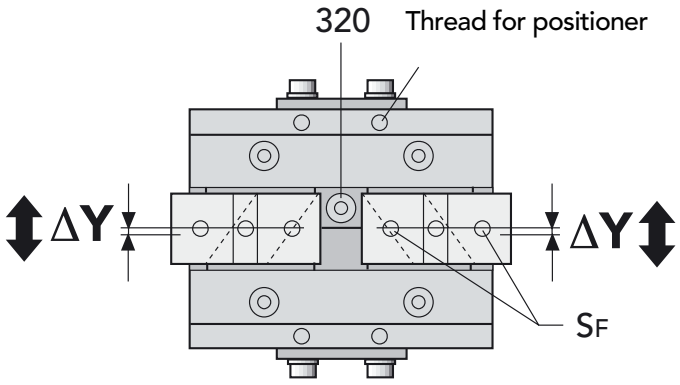


3.9. Shifting the Gripper Fingers in the Y Direction

(The Y direction is the axis perpendicular to the opening and closing movements)
For applications which demand exact concentricity between the axis of the gripped part and, for instance, the axis of rotation of a rotary unit, it may be necessary for the two gripping fingers to be corrected in the Y direction.

Procedure
- Undo the finger mounting screws (S_F)
- The fingers can now be shifted in the Y direction (the X direction is retained).
- $\Delta Y_{max.}$ represents the screw play in the through hole found in the attached finger.

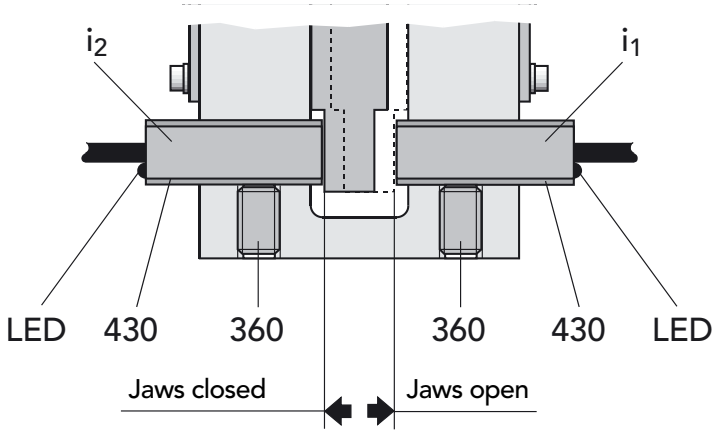
Shifting the Gripper Fingers in the Y Direction



3.10. Connecting and Setting the Proximity Switches

The inductive proximity switches may not be set before the stroke limitation has been finalized.
The proximity switches used must have a switching distance (S_n) of 2 mm, be intended for flush mounting and have a casing 6.5 mm in diameter.

Setting procedure (Jaws open/closed)



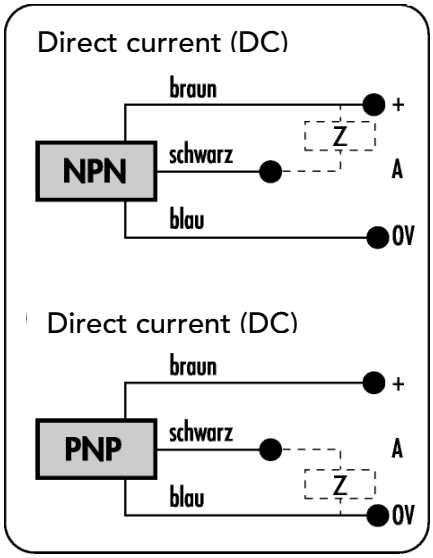
Setting procedure (Jaws open)
- Open the jaws.
- Insert proximity switch (i_1) in clamping sleeve (430) and together with the sleeve push in as far as the stop.
- Lightly secure the proximity switch with set-screw (360).

Setting procedure (Jaws closed)
- Close the jaws.
- Insert proximity switch (i_2) in clamping sleeve (430) and together with the sleeve push in as far as the stop.
- Lightly secure the proximity switch with set-screw (360).

Connecting and adjusting the inductive proximity switches

The proximity switches used must have a switching distance (S_n) of 2 mm, be designed for flush mounting, and have a hous-ing -Ø of 6.5 mm.

Connection diagram for inductive proximity switch



braun : brown
schwarz : black
blau : blue

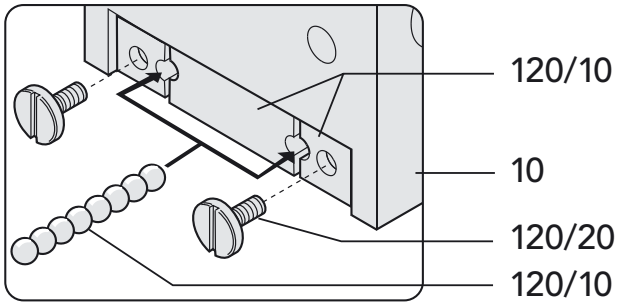
3.11. Replacing the GPP gripper guide system

Important: Always replace the complete guide system, incl. balls!

- Loosen grub screw (340); do not unscrew completely.
- Remove screws (120/60)
- Lift off complete guide system from the gripper. In the event of damage during the guarantee period, seal the guide system, incl. balls, in a bag and send to the Montech national agent.

  - Lubricate all individual parts of the new guide system with Paraliq P460 (Art. No. 504721) before installing. For the content of the new guide system,
  - Fasten inside end piece (120/30; assembly 1 or 120/20; assemblies 2 and 3) on the inside of the left and right gripping jaws.
- Temporarily fix rail guides (120/10) on the housing support surface (10). To do this, completely screw in the screws (120/60) and loosen by 0.5 a turn.
- Insert gripping jaw with end pieces (120/30 or 120/20) facing inwards. Ensure that the roller (60) comes to rest on the slide (30) in the oblique groove of the gripping jaw.
- Push gripping jaws by hand outwards to the open position so that the drive unit (piston slide, 30) also moves.
- Introduce balls and then mount the end pieces on the outside (120/20).

Replacing the GPP gripper guide system



– Push gripping jaws by hand a few times to the left and right and then to both end positions.
– Pretension guide system by screwing in the grub screws (340). The following tightening torques must be complied with exactly.

Gripper side	tightening torque
GPP-1	10 Ncm
GPP-2	12 Ncm
GPP-3	15 Ncm

– Tighten screws (120/60).

Note: If, during operation of the GPP gripper with compressed air, impacts or clearly audible impact noises occur, for example due to heavy gripping fingers and high opening and closing speeds, the straight screw connections should be replaced by exhaust throttles, by means of which the opening and closing speed can be somewhat reduced. The throttling is optimally performed only to such an extent that the impacts or impact noises disappear. This measure has only a slight effect on the opening and closing time but considerable effect on the service life.

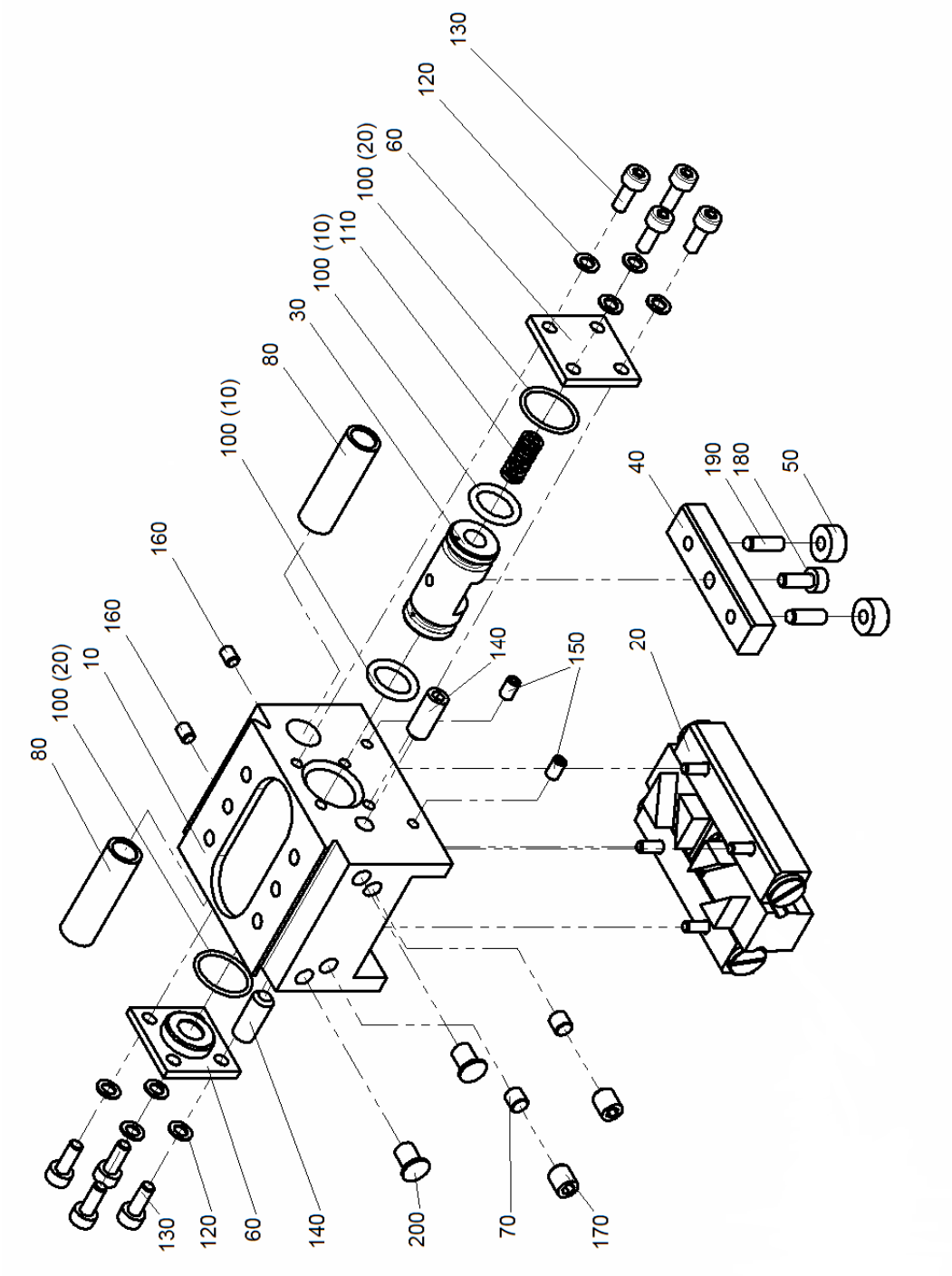
4. Maintenance

The gripper is generally maintenance-free up to 10 mio. cycles]. We recommend the following preventative maintenance to ensure optimum performance of the unit:
– Periodic cleaning of the unit, particularly the mechanical guide.
– Inspection of the seals, possible replacement
– Lubricate with Paraliq P460 (Montech article no. 504721), particularly the mechanical guide

For further information about our services, support and downloads, please visit our homepage at www.montech.com or contact your local representative.

5. Parts lists

5.1. Exploded view GPP

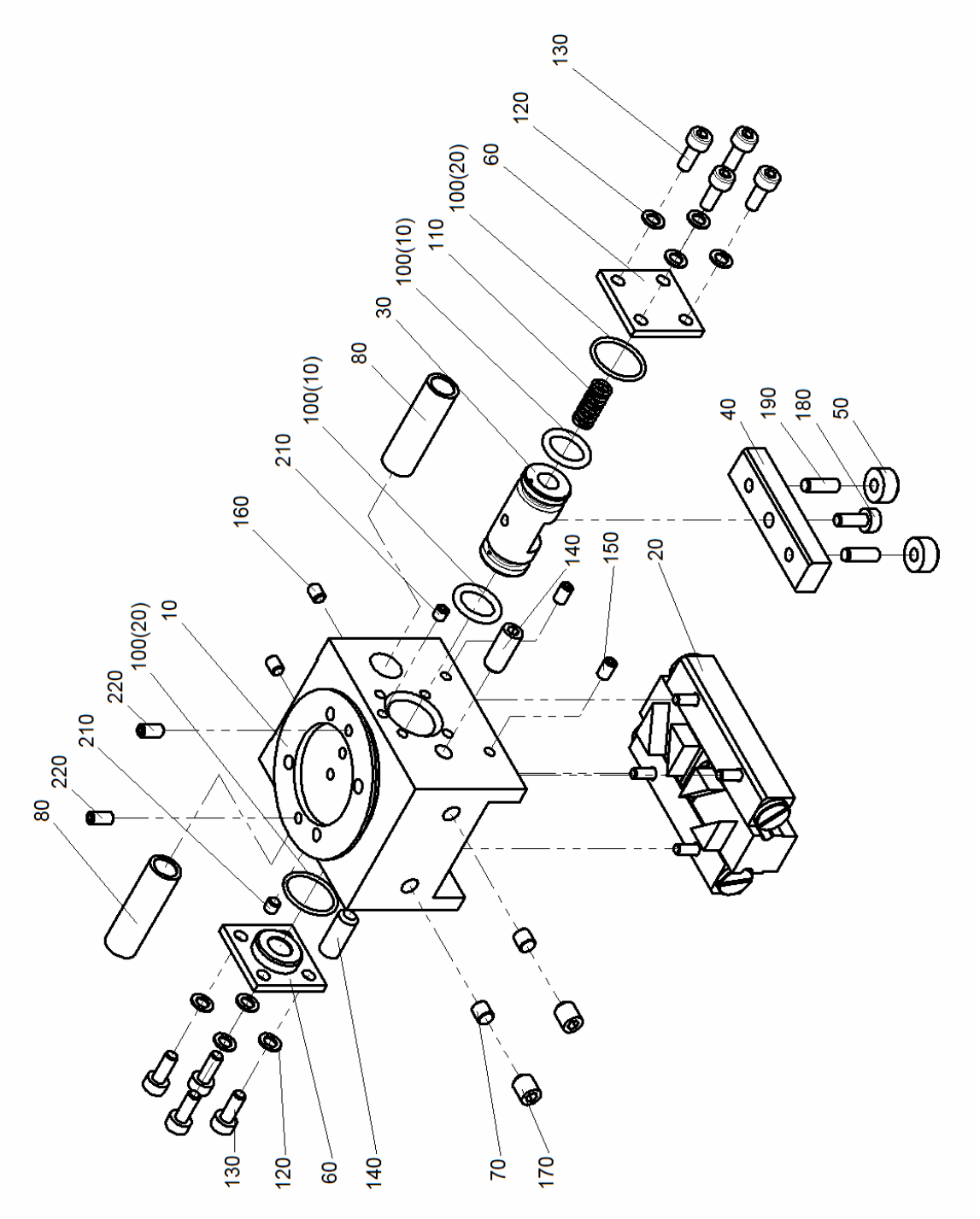


5.2. Parts lists GPP- gripper

No.	Sym.	Part	Ref.No.			Material
			Size 1	Size 2	Size 3	
	◘	GPP- gripper	41357	41359	41363	Various
10	◊	Casting GPP	48735	48731	48708	Aluminium
20	●	Set of jaws	56895	56905	56906	Steel
30	◊	Piston	38006	37927	38049	Bronze
40	◊	Slide-valve	43802	40913	40914	Steel
50	◊	Roller	43803	–	–	Steel
50	●	Needle bearing	–	503597	503597	Steel
60	◊	Cover GPP	38012	37933	38054	Aluminium
70	◊	Jib	47641	47641	47641	POM
80	●	Clamping sleeve	42009	42009	42009	POM
100	●	Seal kit for	507249	507250	507251	NBR
100/10	◊	O-Ring	504819	501466	505031	NBR
100/20	◊	O-Ring	503109	503140	503803	NBR
110	●	Comp. spring	503011	503142	503334	Steel
120	◊	Ribbed washer 3.2	502363	502363	502363	Steel
130	◊	Chhd screw M3x8	501603	501603	501603	Steel
140	◊	Set-screw M5	501913	501914	501915	Steel
150	◊	Set-screw M3	501887	501889	501888	Steel
160	◊	Set-screw M3	501884	501889	501890	Steel
170	◊	Set-screw M5	501908	501910	506005	Steel
180	◊	Chhd screw M3	501603	501621	501622	Steel
190	◊	Cyl. pin ø3x10h6	502020	–	–	Steel
190	◊	Bearing pin	–	40915	40915	Steel
200	◊	Prot. stopper	503536	503536	503536	Polyurethan

● These are wearing parts and available ex stock.
◊ Not available ex stock individually (upon request)
◘ Price-listed items available ex stock

5.3. Exploded view GPPI

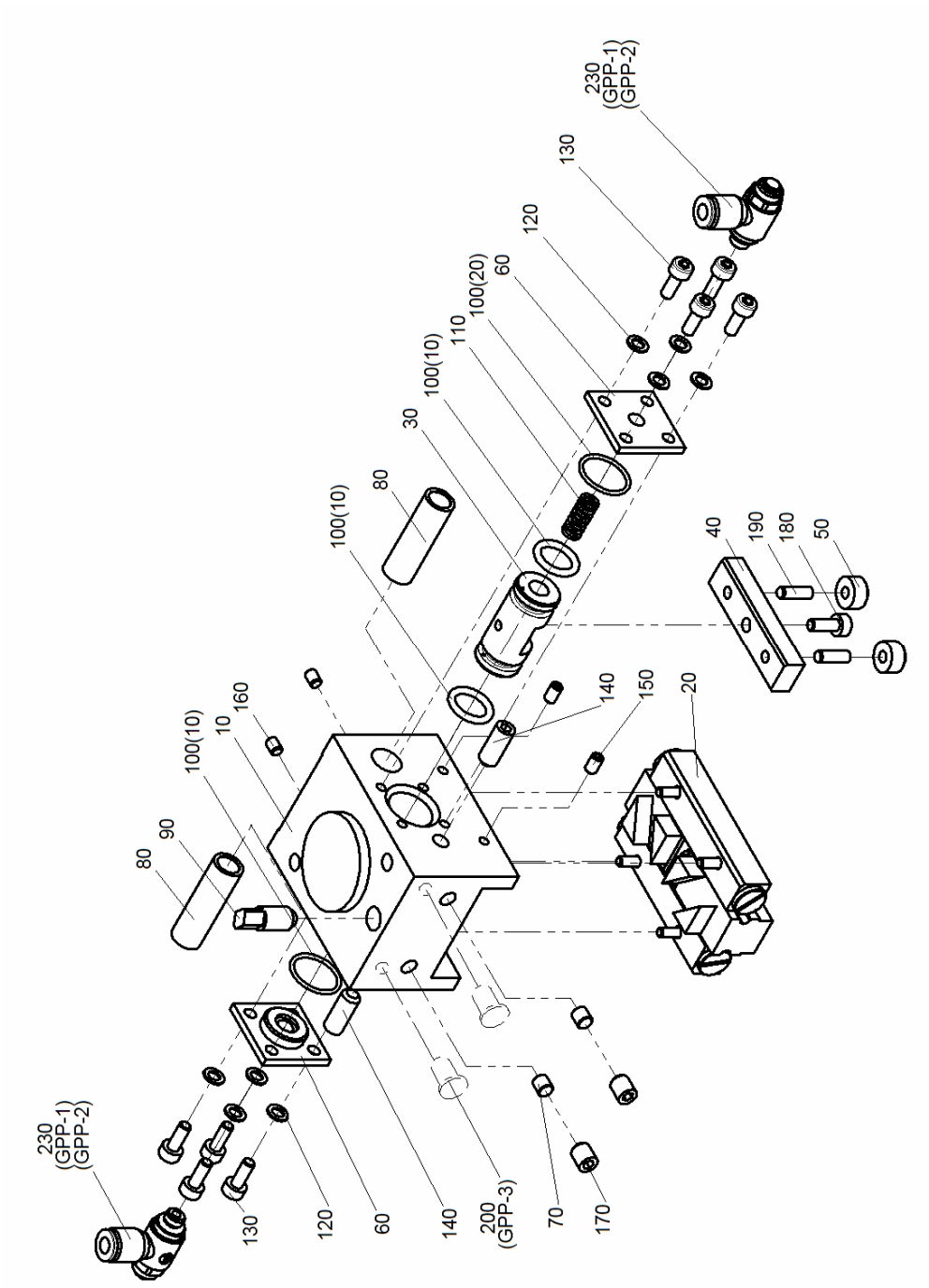


5.4. Parts lists GPPI

No.	Sym.	Part	Ref.No.			Material
			Size 1	Size 2	Size 3	
	◘	GPPI- gripper	41358	41361	41365	Various
10	◊	Casting GPPI	41185	41186	41187	Aluminium
20	●	Set of jaws	56895	56905	56906	Steel
30	◊	Piston	38006	37927	38049	Bronze
40	◊	Slide-valve	43802	40913	40914	Steel
50	◊	Roller	43803	–	–	Steel
50	●	Needle bearing	–	503597	503597	Steel
60	◊	Deckel GPPI	38012	37933	38054	Aluminium
70	◊	Jib	47641	47641	47641	POM
80	●	Clamping sleeve	42009	42009	42009	POM
100	●	Seal kit for	507249	507250	507251	NBR
100/10	◊	O-ring	504819	501466	505031	NBR
100/20	◊	O-ring	503109	503140	503803	NBR
110	●	Comp. spring	503011	503142	503334	Steel
120	◊	Ribbed washer 3.2	502363	502363	502363	Steel
130	◊	Chhd screw M3x8	501603	501603	501603	Steel
140	◊	Set-screw M5	501913	501914	501915	Steel
150	◊	Set-screw M3	501887	501889	501888	Steel
160	◊	Set-screw M3	501884	501889	501890	Steel
170	◊	Set-screw M5	501908	501910	506005	Steel
180	◊	Chhd screw M3	501603	501621	501622	Steel
190	◊	Cyl. pin ø3x10h6	502020	–	–	Steel
190	◊	Bearing pin	–	40915	40915	Steel
210	◊	Set-screw M3x3	501885	501885	501885	Steel
220	◊	Set-screw M3	501886	501885	501885	Steel

● These are wearing parts and available ex stock.
◊ Not available ex stock individually (upon request)
◘ Price-listed items available ex stock

5.5. Exploded view GPP-ISO



5.6. Parts lists GPPI

No.	Sym.	Part	Ref.No.			Material
			Size 1	Size 2	Size 3	
	◘	GPP-ISO- gripper	39814	39817	45094	Various
10	◊	Casting GPP-ISO	39815	39818	45093	Aluminium
20	●	Set of jaws	56895	56905	56906	Steel
30	◊	Piston	38006	37927	38049	Bronze
40	◊	Slide-valve	43802	40913	40914	Steel
50	◊	Roller	43803	–	–	Steel
50	●	Needle bearing	–	503597	503597	Steel
60	◊	Deckel GPPI	40195	40196	38054	Aluminium
70	◊	Jib	47641	47641	47641	POM
80	●	Clamping sleeve	42009	42009	42009	POM
90	◊	Seal kit for	39816	39816	39816	Steel
100	●	Seal kit for	507249	507250	507251	NBR
100/10	◊	O-ring	504819	501466	505031	NBR
100/20	◊	O-ring	503109	503140	503803	NBR
110	●	Comp. spring	503011	503142	503334	Steel
120	◊	Ribbed washer 3.2	502363	502363	502363	Steel
130	◊	Chhd screw M3x8	501603	501603	501603	Steel
140	◊	Set-screw M5	501913	501914	501915	Steel
150	◊	Set-screw M3	501887	501889	501888	Steel
160	◊	Set-screw M3	501884	501889	501890	Steel
170	◊	Set-screw M5	501908	501910	506005	Steel
180	◊	Chhd screw M3	501603	501621	501622	Steel
190	◊	Cyl. pin ø3x10h6	502020	–	–	Steel
190	◊	Bearing pin	–	40915	40915	Steel
200	◊	Prot. stopper	-	-	503536	Polyurethan
230	◊	Non-return throttle valve M5x4	505023	505023	-	brass

● These are wearing parts and available ex stock.
◊ Not available ex stock individually (upon request)
◘ Price-listed items available ex stock

6. Environmental Compatability and Disposal

- Materials used
- Aluminium
- Steel
- Bronze
- Acrylnitrile butadiene rubber (NBR to ISO 1629)
- Polyoxymethylene (polyacetal) (POM)
- Paraffinic mineral oil, synthetic hydrocarbnon oil

Surface treatment
- Anodizing of aluminium
- Surface hardening of alloy steels
- Blackening of steel

- Shaping processes
- Machining of Al, Steel, POM, Bronze
- Moulding of NBR seals

Emissions during operation
- None
- When the equipment is used with oiled air, it is advisable to return the exhaustair to atmosphere through an oil filter or separator.

Disposal
Grippers which cannot be used any more should be recycled, not as complete units, but dismantled to components and disposed of according to the type of material. The kind of material used for each part is shown in the spare parts list. Material which cannot be recycled should be appropriately disposed of.