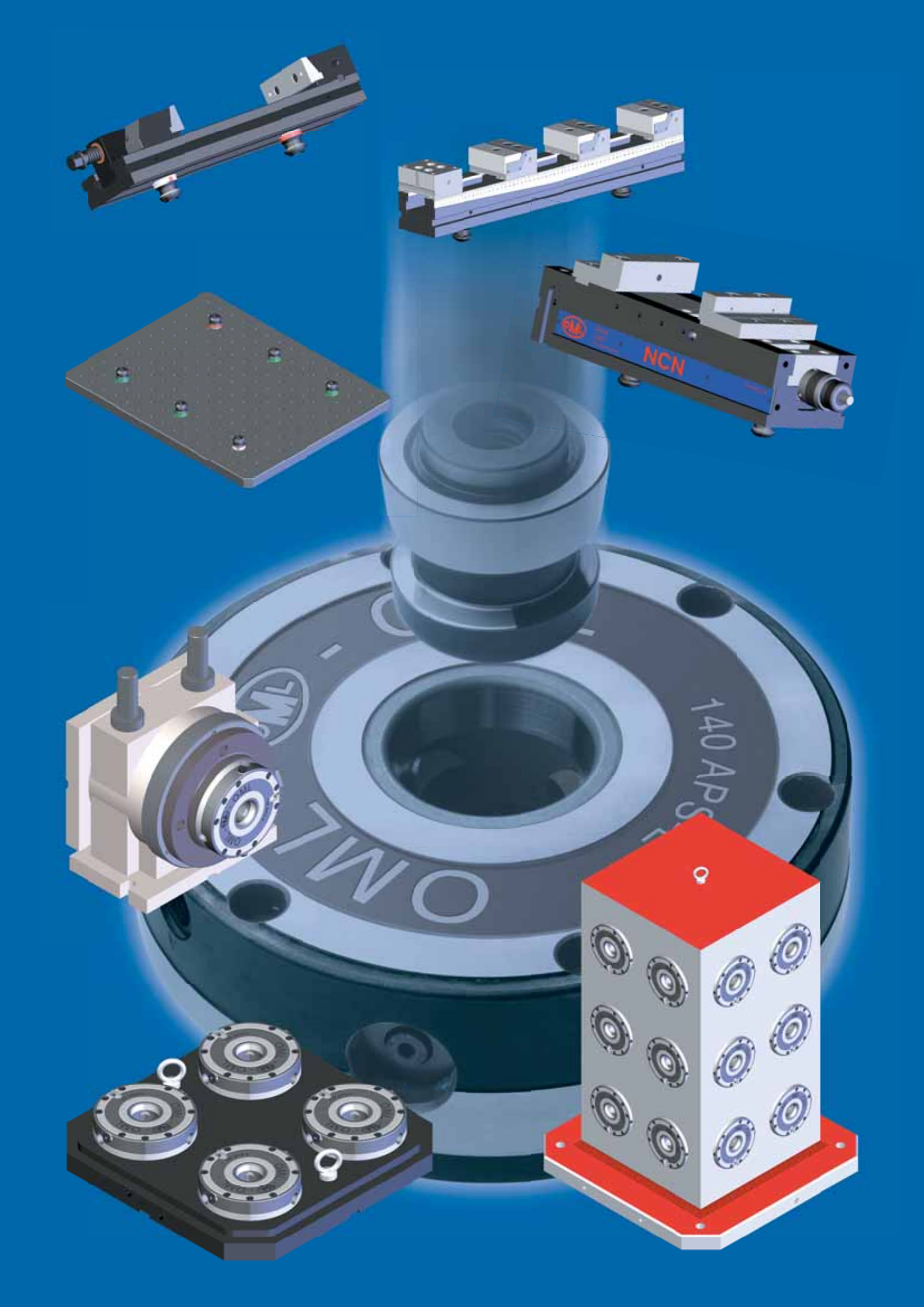
AUTOMATIC POSITIONING SYSTEM


NCN
OML
140 AP

AUTOMATIC POSITIONING SYSTEM

WHAT IS APS?

APS (Automatic Positioning System) is a universal connection between the machine tool, the clamping device and/or the workpiece.
The flexibility of **APS** allows both positioning and clamping in one operation.

WAS IST APS?

APS (Automatisches-Positionier-System) ist ein 0-Punktspannsystem zwischen dem Maschinentisch und Spannmittel und/oder direkt dem zu bearbeitenden Stück.
Die Flexibilität des APS-System erlaubt in einem Arbeitsgang positionieren und spannen.

HOW DOES IT WORK?

APS uses oiled compressed air (6 BAR-85 psi) for unlocking, it uses spring force for clamping. No compressed air is required in the locked condition.
Attach the clamping pins (A;B;C) on the clamping devices or on the workpiece and "it's done"!!!
Positioning and clamping in one operation with repeatability accuracy < 0,005 mm (0.0002").

WIE FUNKTIONIERT DAS APS-SYSTEM?

Das APS-System wird mittels geölte Druckluft (6 BAR) entriegelt, bzw. geflutet.
Das Verriegeln erfolgt über Federkraft und 3 Verriegelungsschieber. (Es ist keine Druckluft im verriegelten Zustand notwendig).
Die Spannbolzen (A;B;C), welche sich am Spannmittel oder direkt im Werkstück befinden, werden direkt mit den APS-0-Punktspannmodulen verbunden. Das Positionieren und Spannen erfolgt in einem einzigen Arbeitsgang mit Wiederholgenauigkeit < 0,005 mm.

WHAT ARE THE ADVANTAGES FOR YOUR COMPANY?

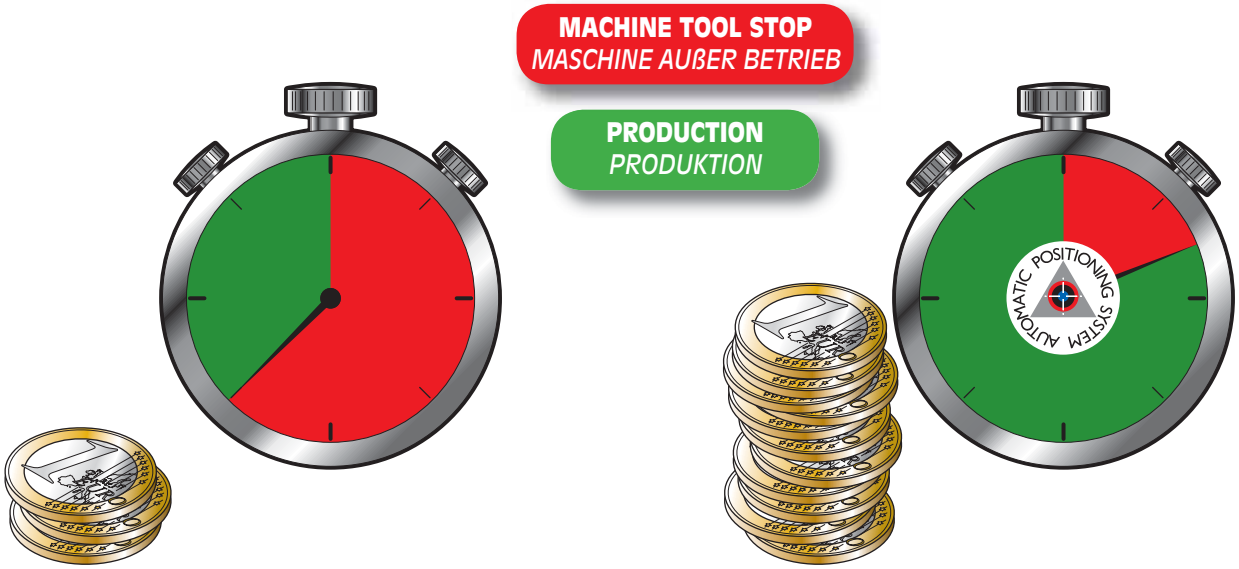
Your set-up times will be reduced by 90 %.
APS offers you greater flexibility in set-up and an increase in productivity resulting in a short pay-back time.

WELCHE NUTZEN HAT IHRE FIRMA?

Ihre Rüstzeiten werden sich bis zu 90% verringern!
Mit APS werden Sie eine grenzenlose Flexibilität erreichen und damit eine enorme Ersparnis von Zeit und Kosten.

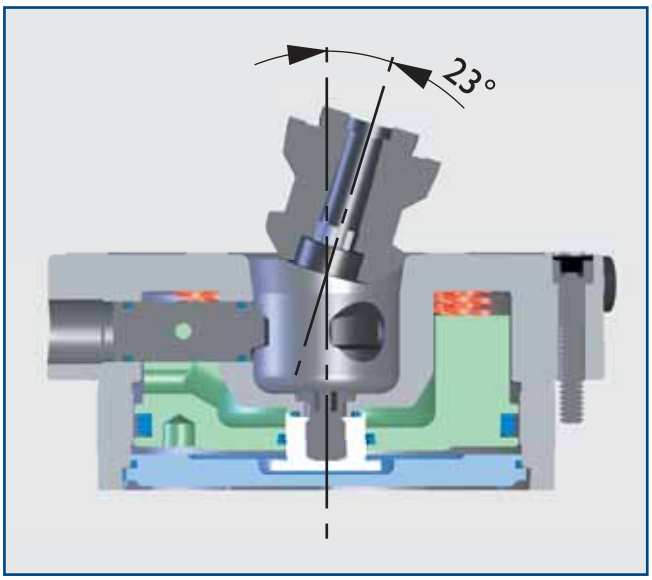
WITHOUT APS
OHNE APS

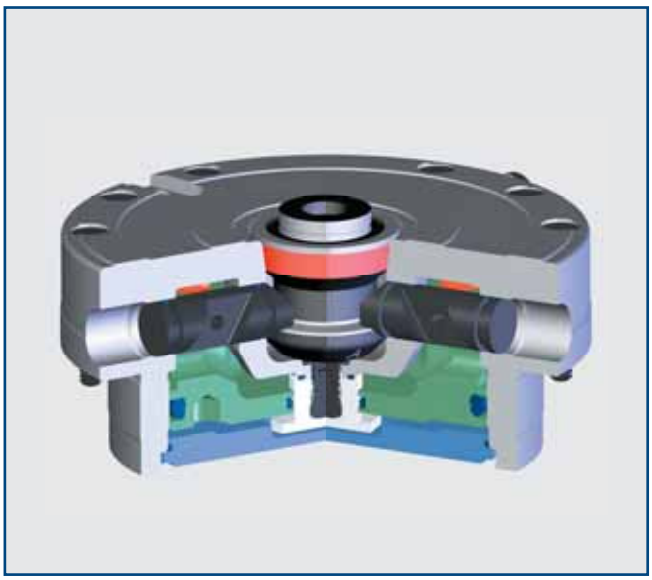
WITH APS
MIT APS

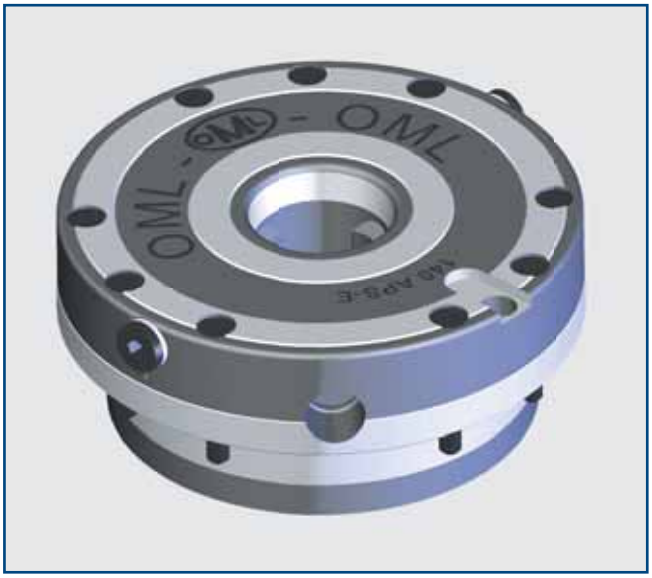


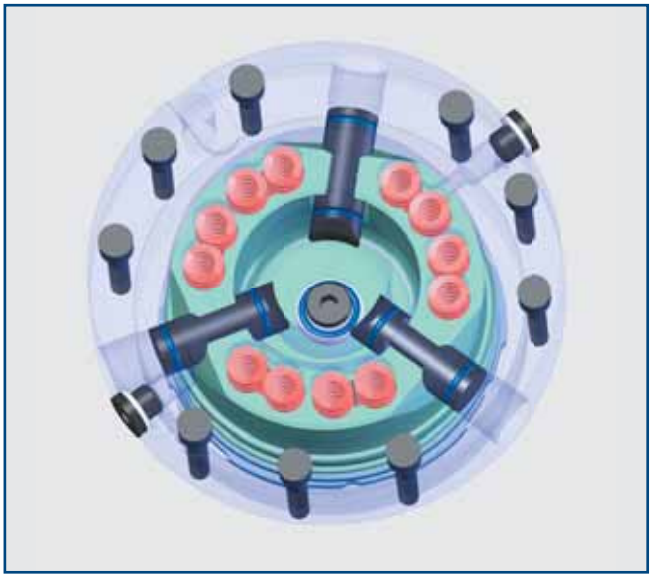
APS 140

Technical features
Technische Merkmale





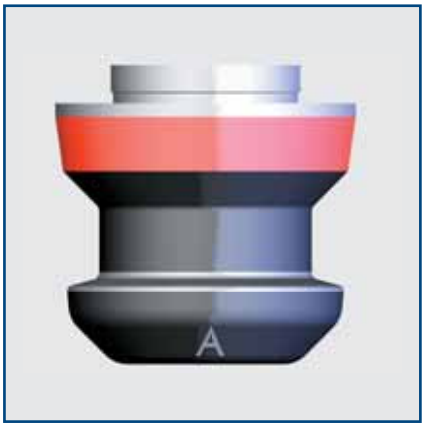




PNEUMATIC SYSTEM	*pneumatisches System*
3-JAW CLAMPING SYSTEM	*0-Punkt-Spannsystem mit 3 Verriegelungschiebern*
MECHANICAL POSITIVE LOCKING OF THE CLAMPING PIN BY DOUBLE IRREVERSIBLE WEDGE	*mechanische Spannung und Verriegelung durch selbsthemmende Doppelkeil-Verriegelungsschieber*
PULL DOWN FORCE OF 30.000 N (6,745 lbs)	*Einzugskraft = 30.000 N*
TURBO EFFECT (THE CLAMPING FORCE OF THE SPRINGS IS FURTHER INCREASED BY THE COMPRESSED AIR)	*„Turboeffekt" = Die von den Federn auf die Verriegelungsschiebern einwirkende Verriegelungs-Kraft wird zusätzlich durch Fluten des Kolbenraumes enorm verstärkt*
TAPERED PIN GIVES SELF-CENTERING CLAMPING	*Zentrierung durch Spannbolzen mit Kegelsitz*
REPEATABILITY ACCURACY < 0.005MM (0.0002")	*Wiederholgenauigkeit < 0.005mm*

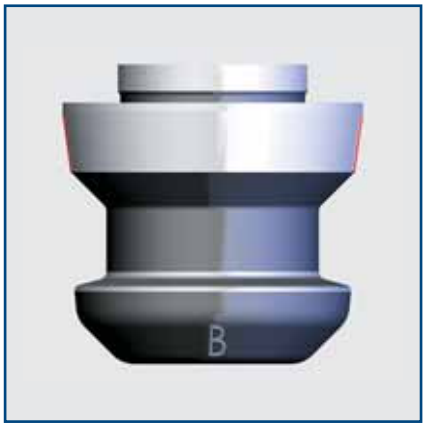
A

CENTERING PIN
ZENTRIERBOLZEN



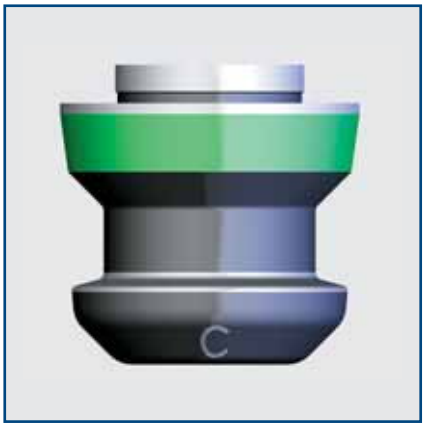
B

REFERENCE PIN
SCHWERTBOLZEN



C

PULL-DOWN PIN ± 0,1 mm
EINZUGSBOLZEN ± 0,1 mm

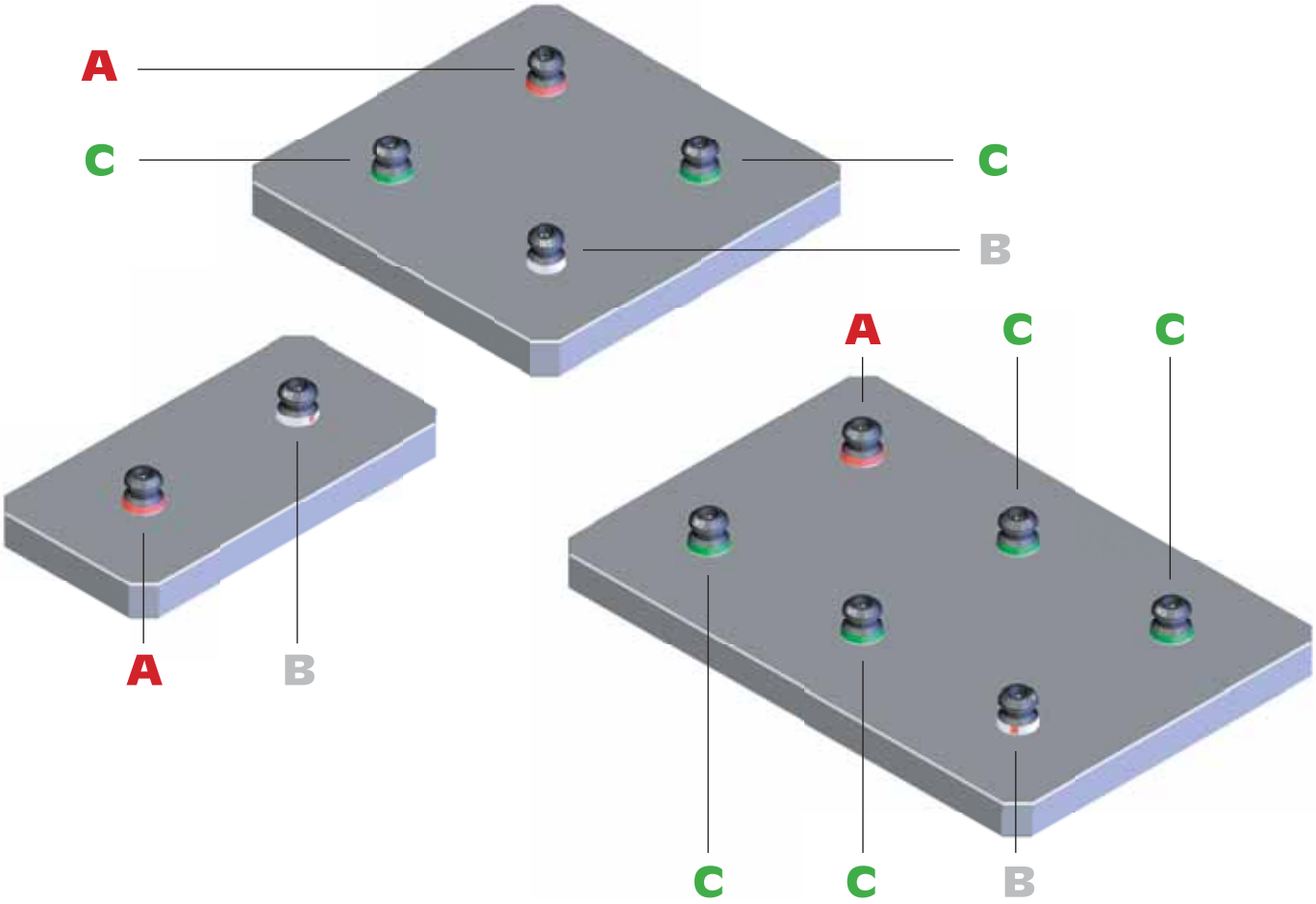


Positioning and clamping of the devices and/or of the workpiece are achieved through the clamping pins.

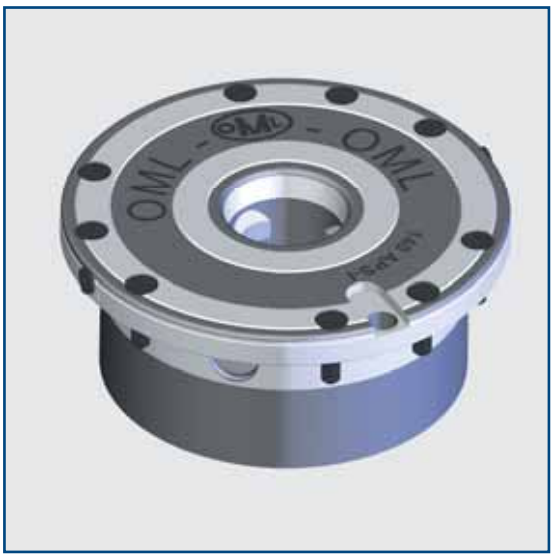
- Zur Fixierung and Positionierung der Spannvorrichtungen und/oder des Werkstücks werden 0-Punkt-Spannbolzen verwendet.

Type A is used for centering, type B is used for reference, type C for clamping.

- Der Zentrier- und Spannbolzen A wird zu Zentrierung eingesetzt, Der Schwertbolzen B dient zu Bestimmung der Rotations-Position, Der Spannbolzen C wird ausschließlich zum Spannen verwendet.



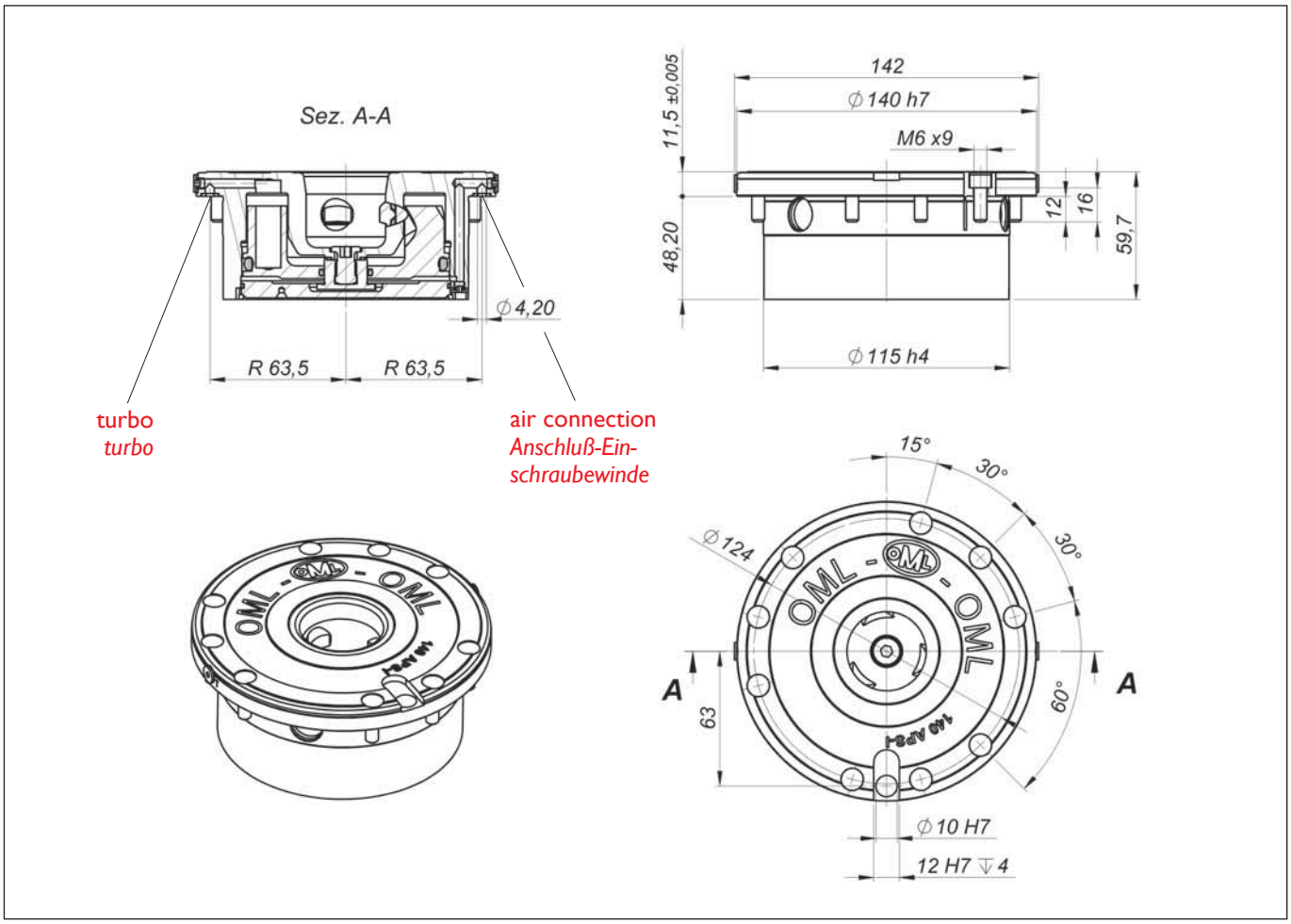
APS 140



Flange mounting module APS 140-I

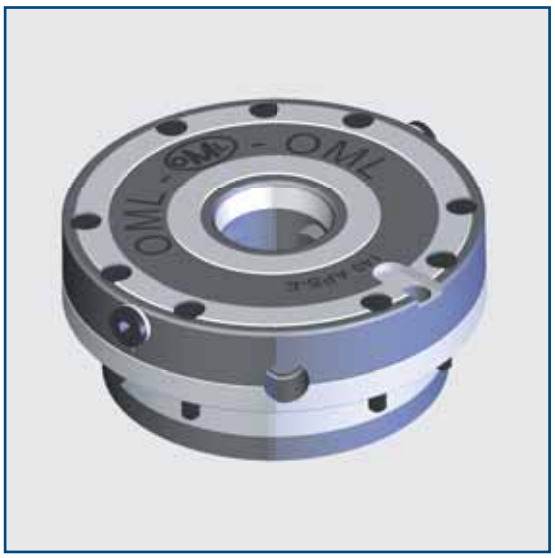
with turbo effect
Mit "Turboeffekt"

Einbauspannmodul APS 140-I



code *Bestell-Nr.*	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederholgenauigkeit* mm	weight *Gewicht* kg
46 16 24 00	30.000	6	> 0,005	4

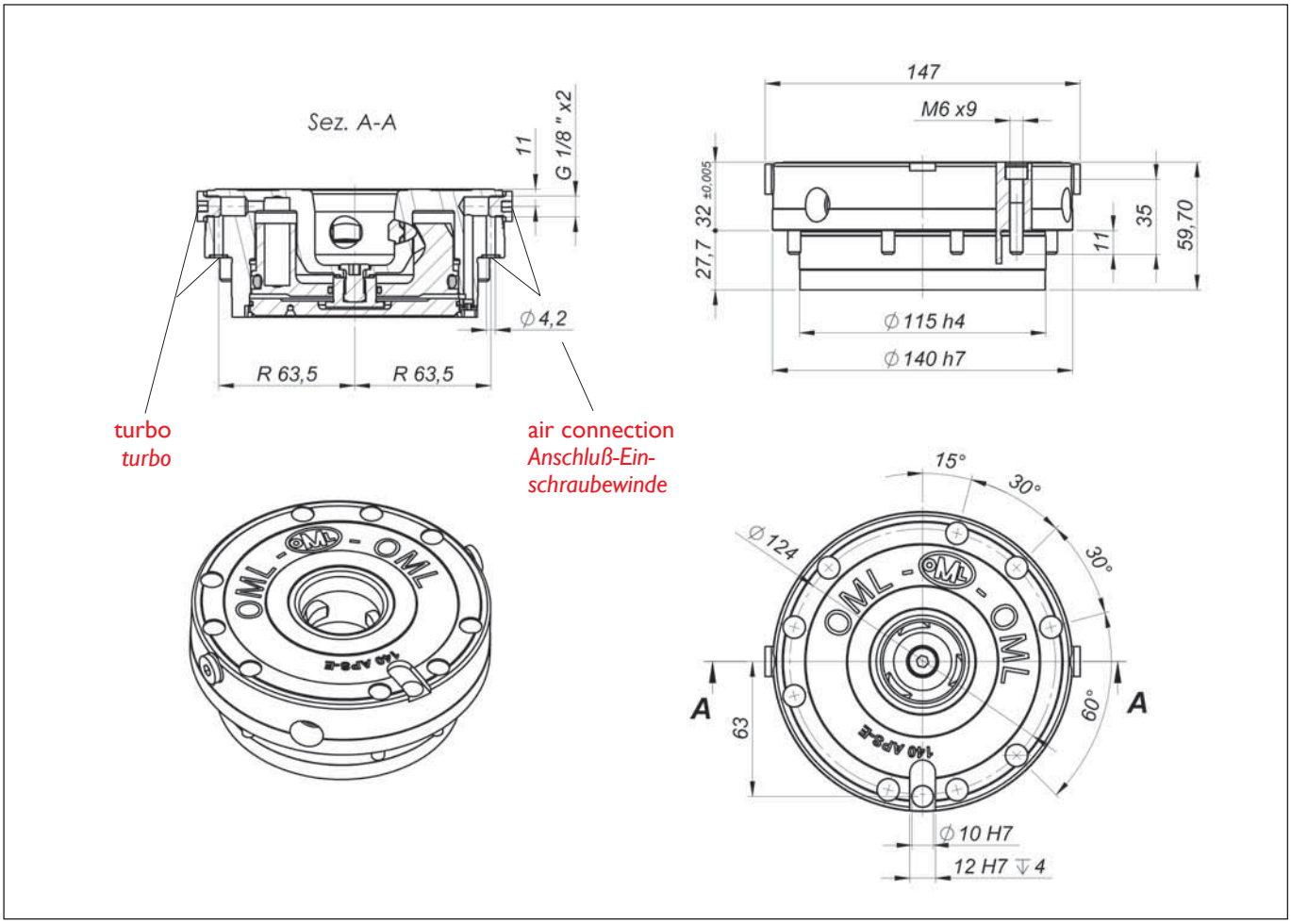
APS 140



Top mounting module APS 140-E

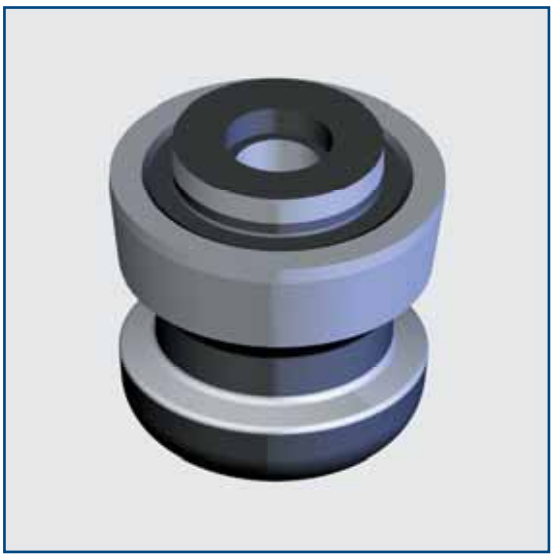
with turbo effect
Mit "Turboeffekt"

Turmspannmodul APS 140-E



code *Bestell-Nr.*	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederholgenauigkeit* mm	weight *Gewicht* kg
46 16 23 00	30.000	6	> 0,005	4,5

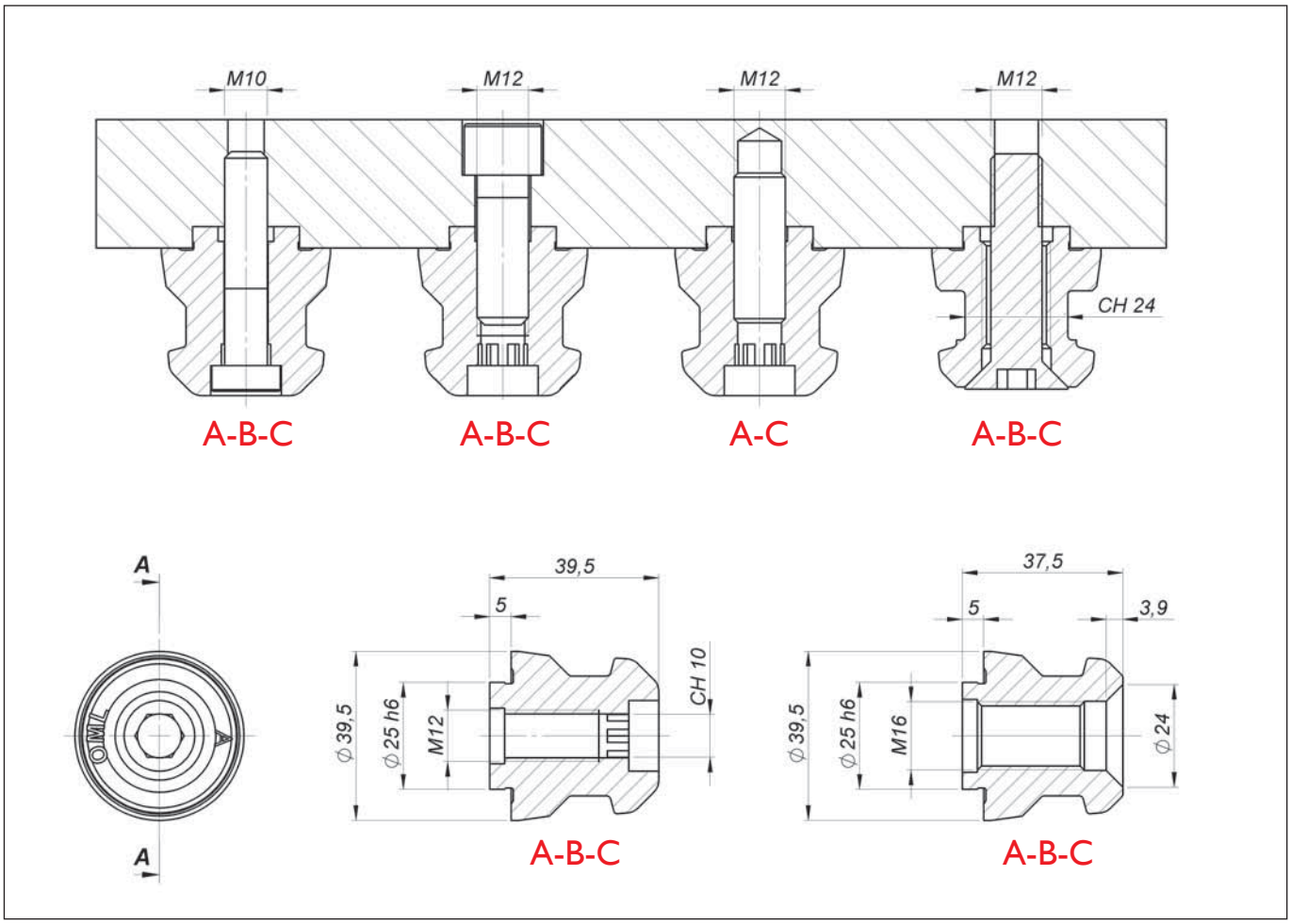
APS 140



Clamping Pins APS (A-B-C)

Spannbolzen APS (A-B-C)

- **CAN BE USED WITH UNILOCK SYSTEM**
  SIND MIT DEM UNILOCK-SYSTEM KOMPATIBEL
- **(see page 5 for operating instructions)**
  (Gebrauch und Anwendung siehe Seite 5)



		A	B	C	weight kg *Gewicht kg*
code *Bestell-Nr.*	M 12	46 16 23 05	46 16 23 06	46 16 23 07	0,3
	M 16	46 16 24 05	46 16 24 06	46 16 24 07	0,3

APS 140

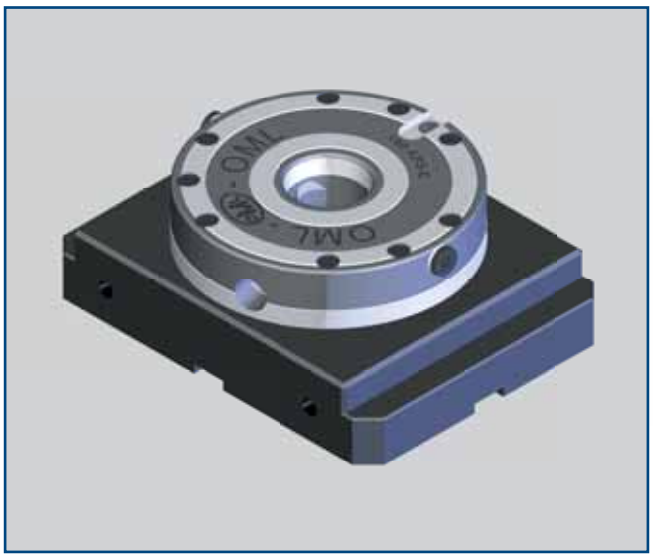
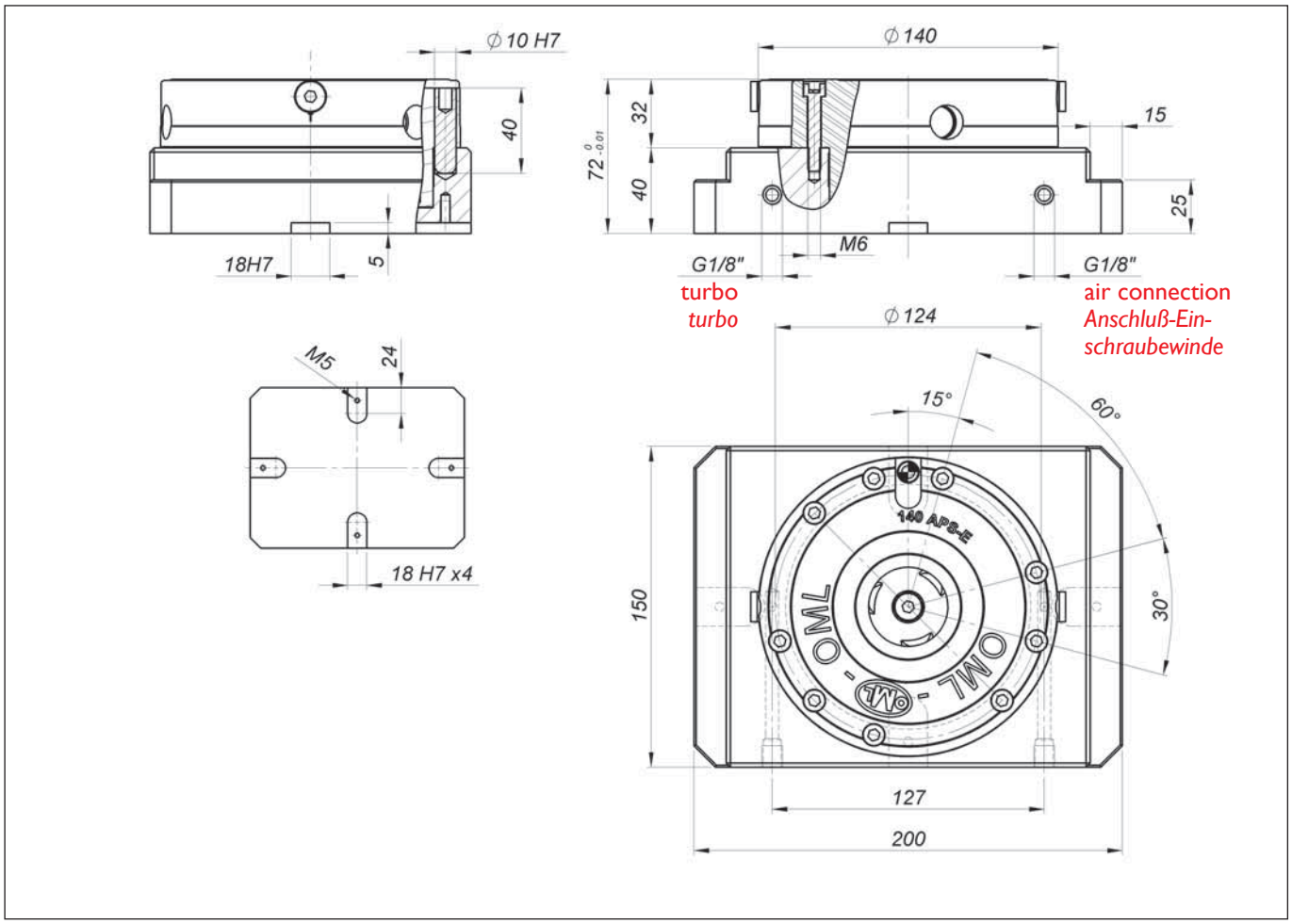


Plate with 1 module APS 140-E

with turbo effect
Mit "Turboeffekt"

Spanneinheit "Single" APS 140-E



code *Bestell-Nr.*	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederholgenauigkeit* mm	weight *Gewicht* kg
46 16 70 10	30.000	6	> 0,005	11

APS 140

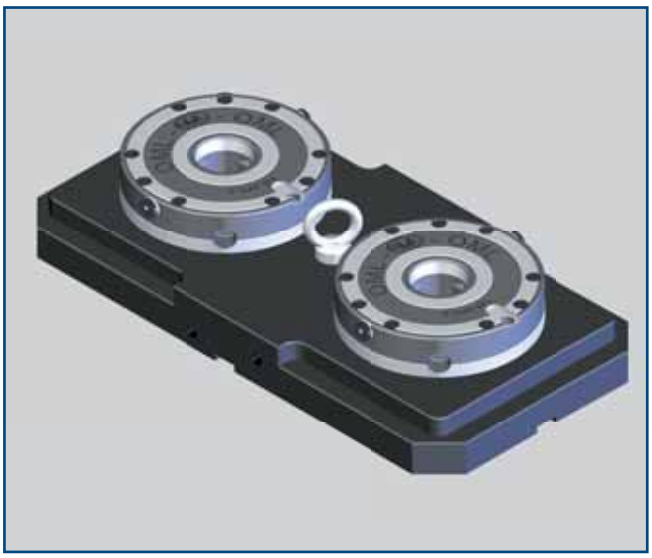
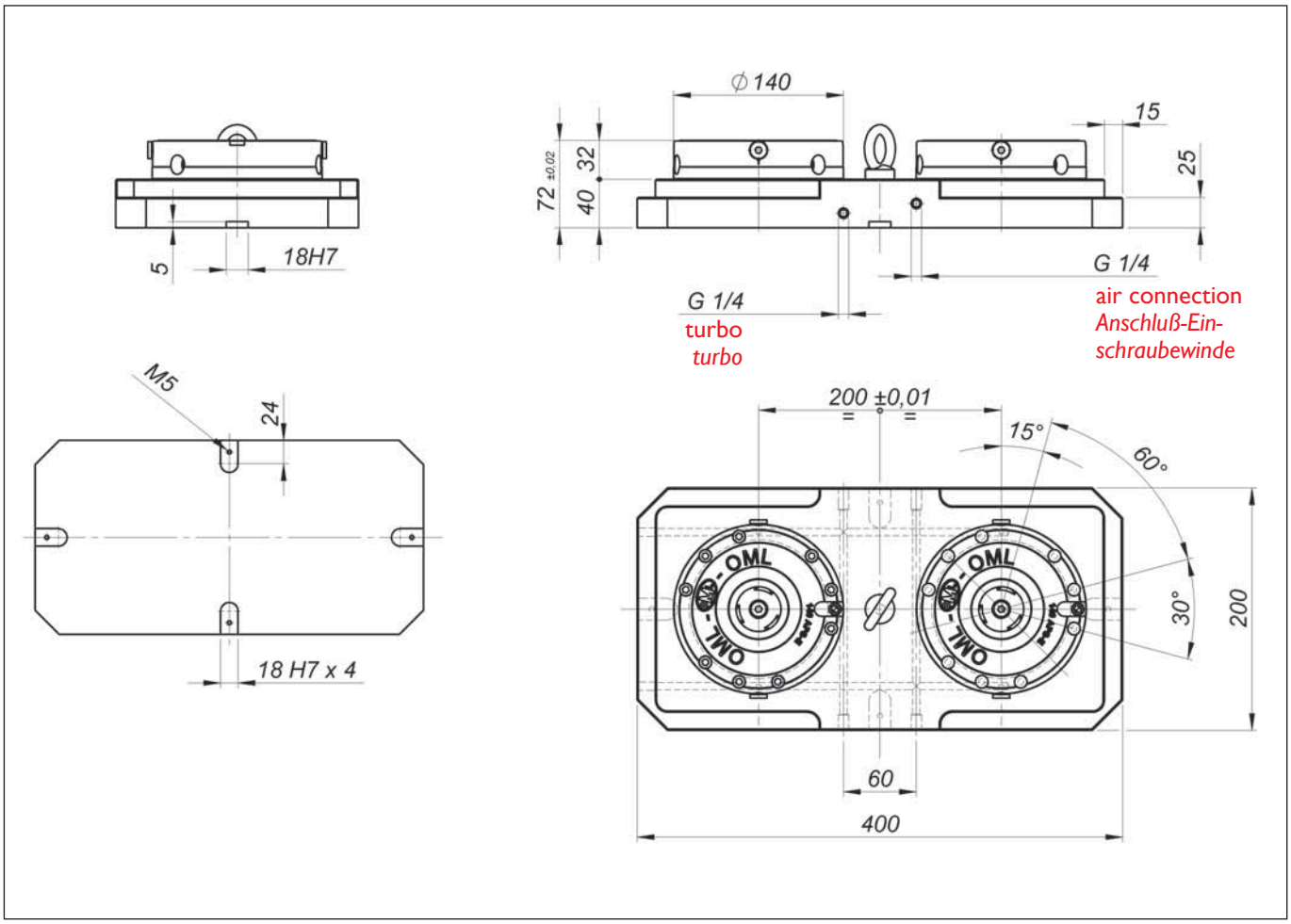


Plate with 2 modules APS 140-E

with turbo effect
Mit "Turboeffekt"

Spanneinheit "DUO" APS 140-E



code *Bestell-Nr.*	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederholgenauigkeit* mm	weight *Gewicht* kg
46 16 70 20	30.000	6	> 0,005	28

APS 140

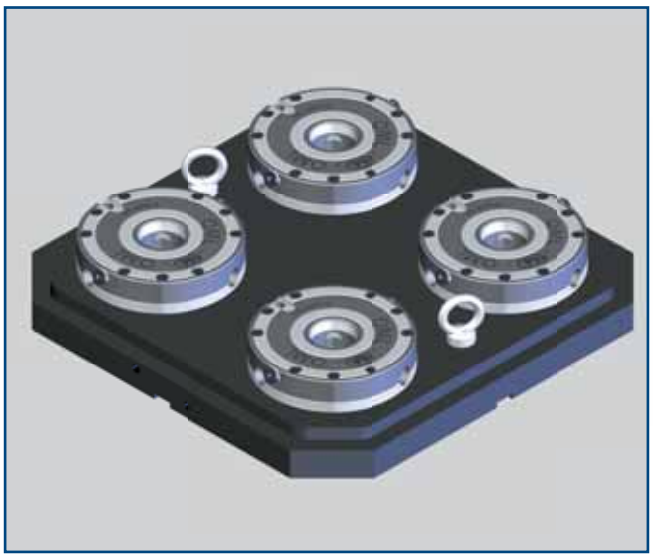
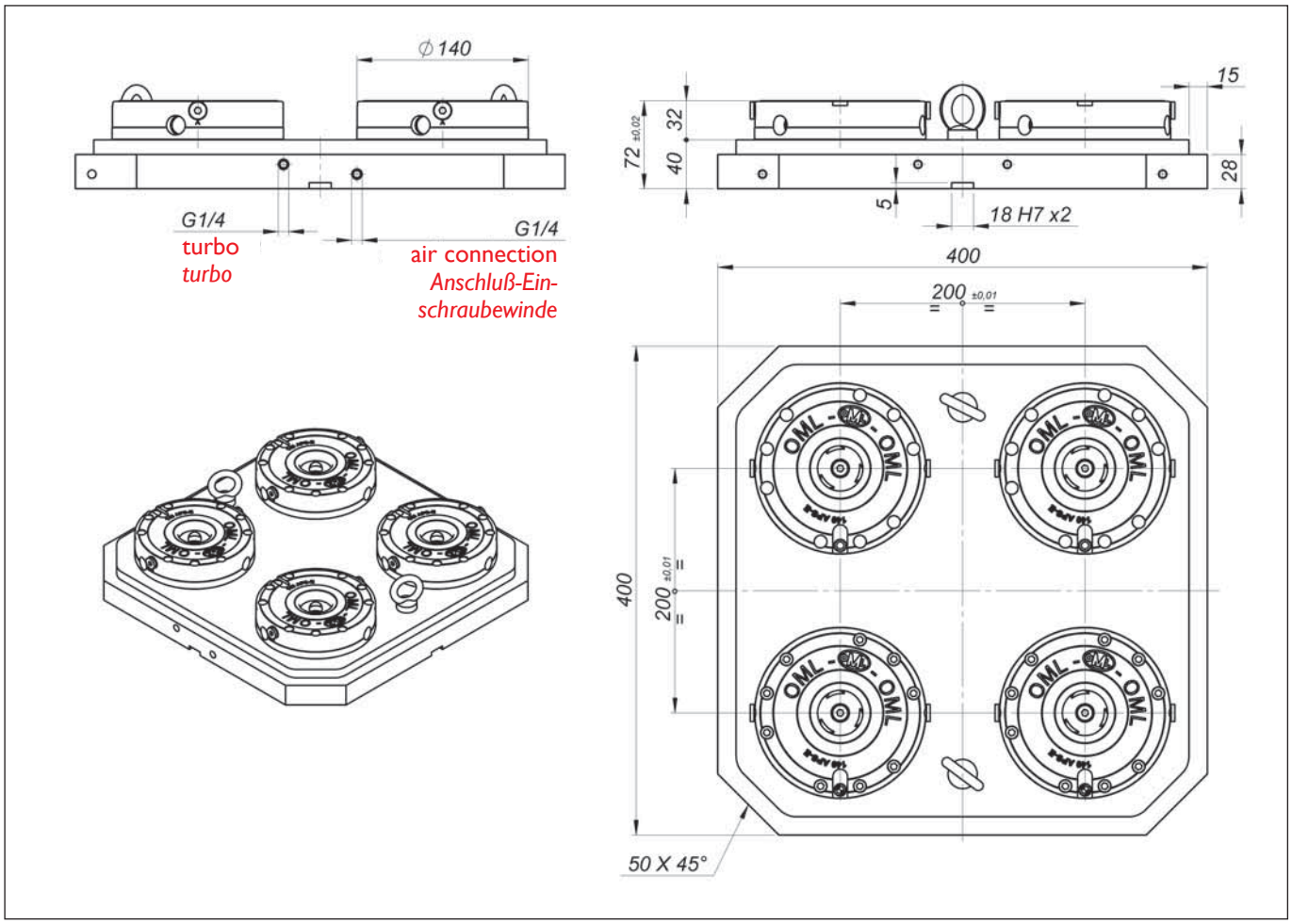


Plate with 4 modules APS 140-E for vertical machining centers

with turbo effect
Mit "Turboeffekt"

Spanneinheit "quattro" APS 140-E für Vertikal-Bearbeitungszentren



code *Bestell-Nr.*	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederholgenauigkeit* mm	weight *Gewicht* kg
46 16 70 30	30.000	6	> 0,005	56

APS 140

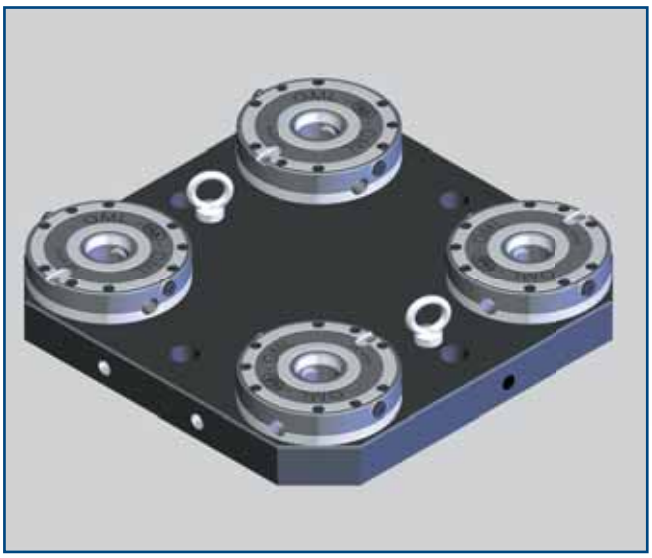
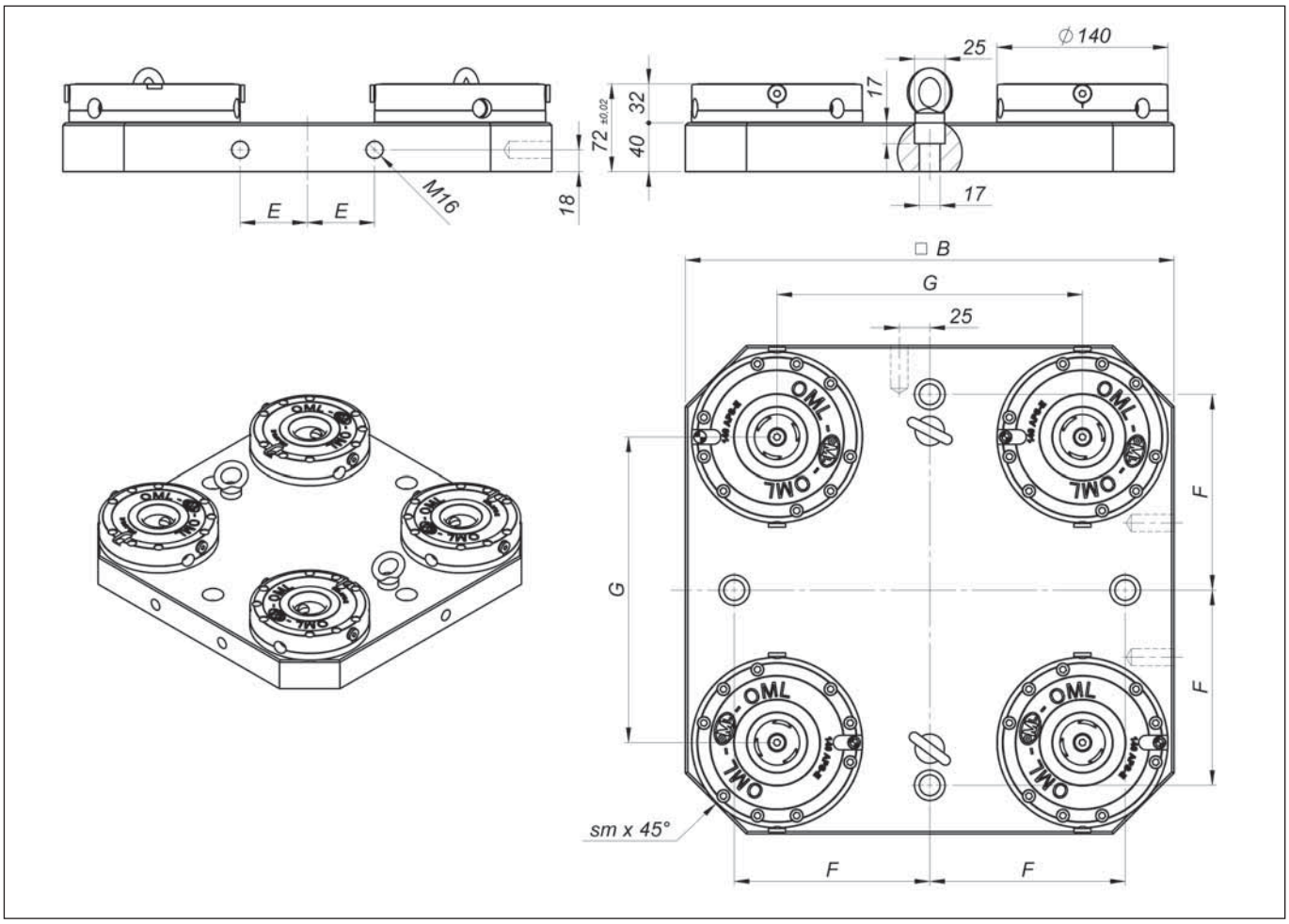


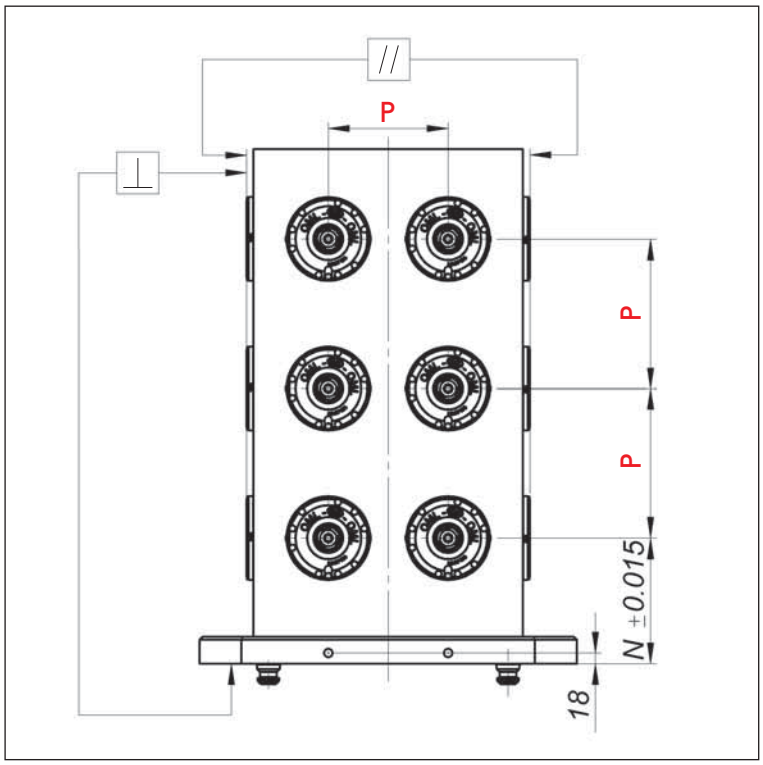
Plate with 4 modules APS 140-E
for horizontal machining centers

with turbo effect
Mit "Turboeffekt"

Spanneinheit "quattro" APS 140-E
für Horizontal-Bearbeitungszentren

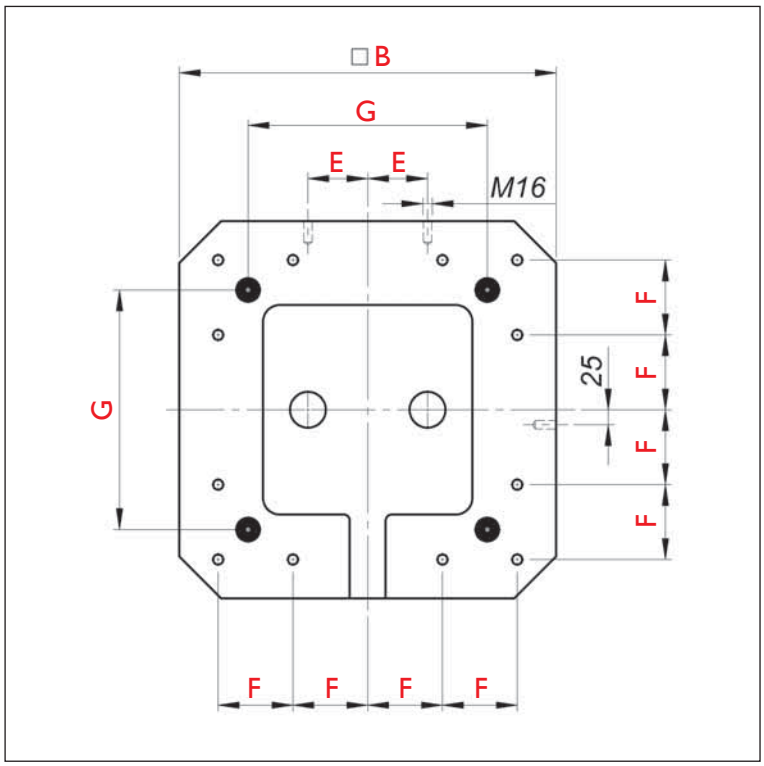


code *Bestell-Nr.*	B mm	E mm	F mm	G mm	pull down force *Einzugskraft* N	unlocking pressure *Entriegelungsdruck* bar	repeatability *Wiederhol-genauigkeit* mm	weight *Gewicht* kg
46 16 70 40	400	55	160	250	30.000	6	> 0,005	57
46 16 70 50	500	75	200	300	30.000	6	> 0,005	85
46 16 70 60	630	100	250	400	30.000	6	> 0,005	130



Manufacturing tolerances
Fertigungstoleranzen

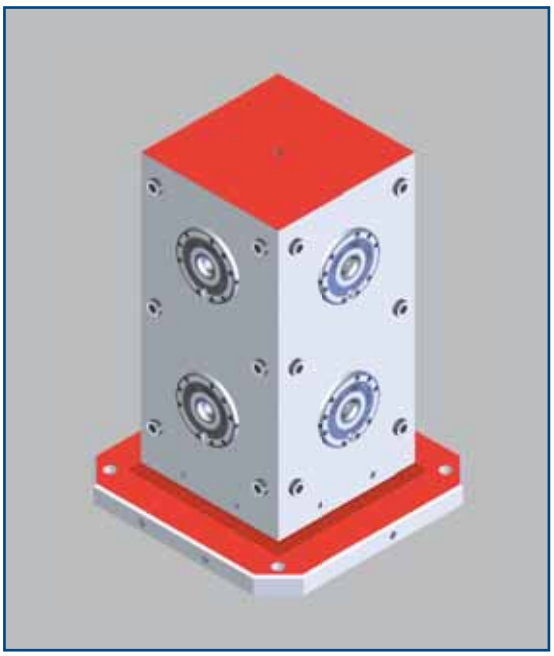
⊥	0,02 0,035	500 1000
//	0,03 0,05	500 1000
P	± 0,01 ± 0,02	200 300



Standard interface for machine tools pallet
Schnittstelle / Anbindung zum Maschinentisch

B mm	E mm	F mm	G mm
400	55	80	250
500	75	100	300
630	100	125	400

APS 140



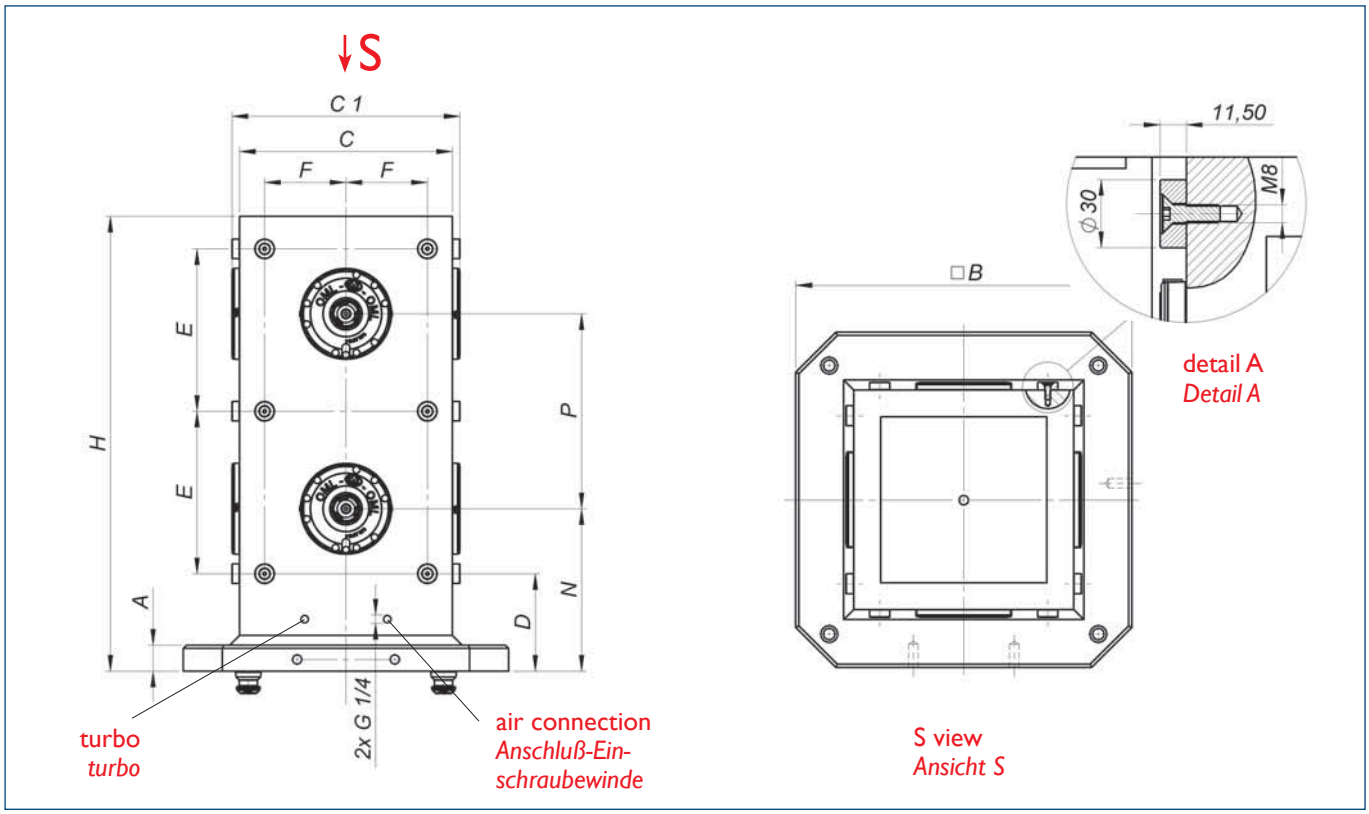
Tombstone with 8 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

Spannturm mit 8 Turmspannmodulen APS 140-I

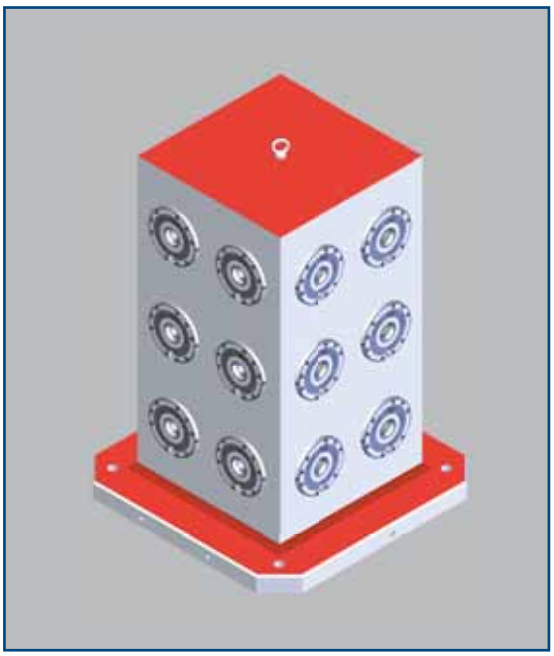
Clamping / unclamping the modules on the same face is simultaneous

Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	C mm	H mm	P mm	N mm	C1 mm	D mm	E mm	FG mm	weight *Gewicht* kg
STEEL *STAHL*	**46 16 71 10**	40	400	250	600	250	225	273	125	225	100	195
	46 76 71 20	40	500	350	700	300	300	373	150	250	125	328
ALUMINIUM *ALUMINIUM*	**46 16 71 40**	40	400	250	600	250	225	273	125	225	100	90
	46 16 71 50	40	500	350	700	300	300	373	150	250	125	137
CAST IRON *GRAUGUSS*	**46 16 71 70**	40	400	250	600	250	225	273	125	225	100	190
	46 16 71 90	40	500	350	700	300	300	373	150	250	125	315

APS 140



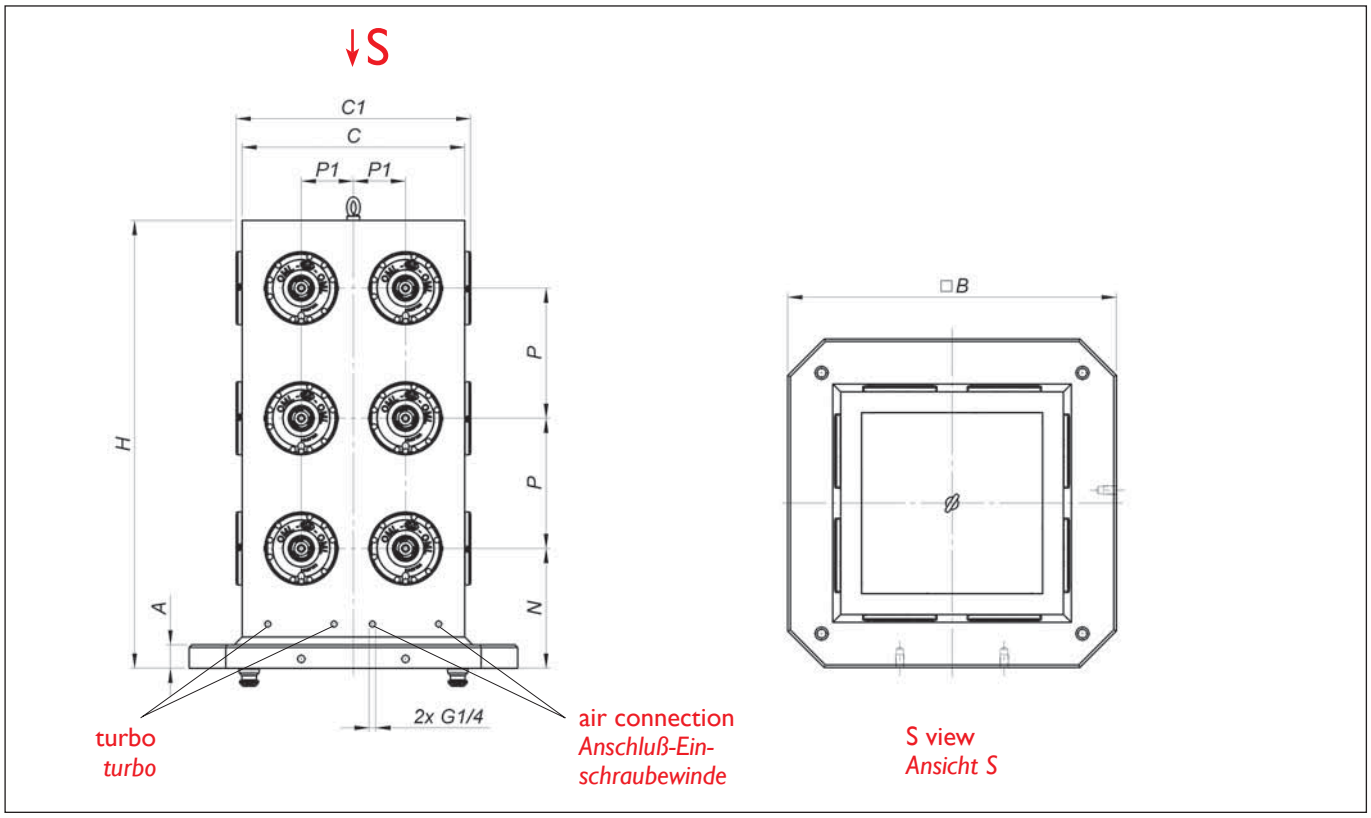
Tombstone with 24 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

Spannturm mit 24 Turmspannmodulen APS 140-I

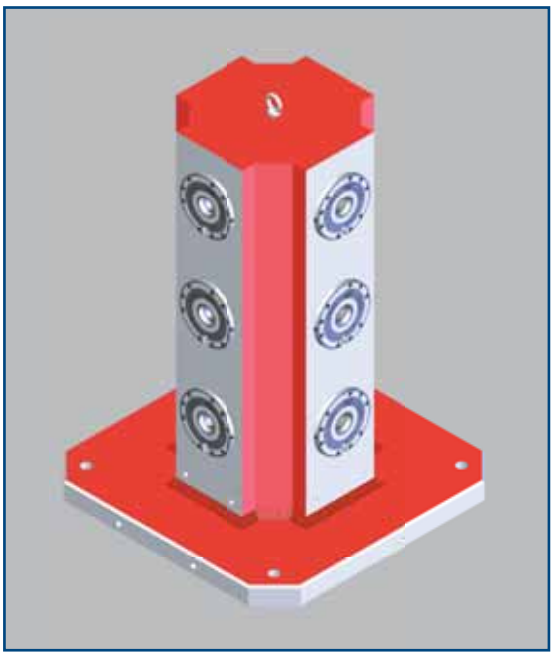
Clamping / unclamping the modules on the same face is simultaneous

Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	P1 mm	C mm	H mm	P mm	I mm	weight *Gewicht* kg
STEEL *STAHL*	**46 16 71 30**	45	630	100	450	860	250	230	565
ALUMINIUM *ALUMINIUM*	**46 16 71 60**	45	630	100	450	860	250	230	280
CAST IRON *GRAUGUSS*	**46 16 71 90**	45	630	100	450	860	250	230	550

APS 140



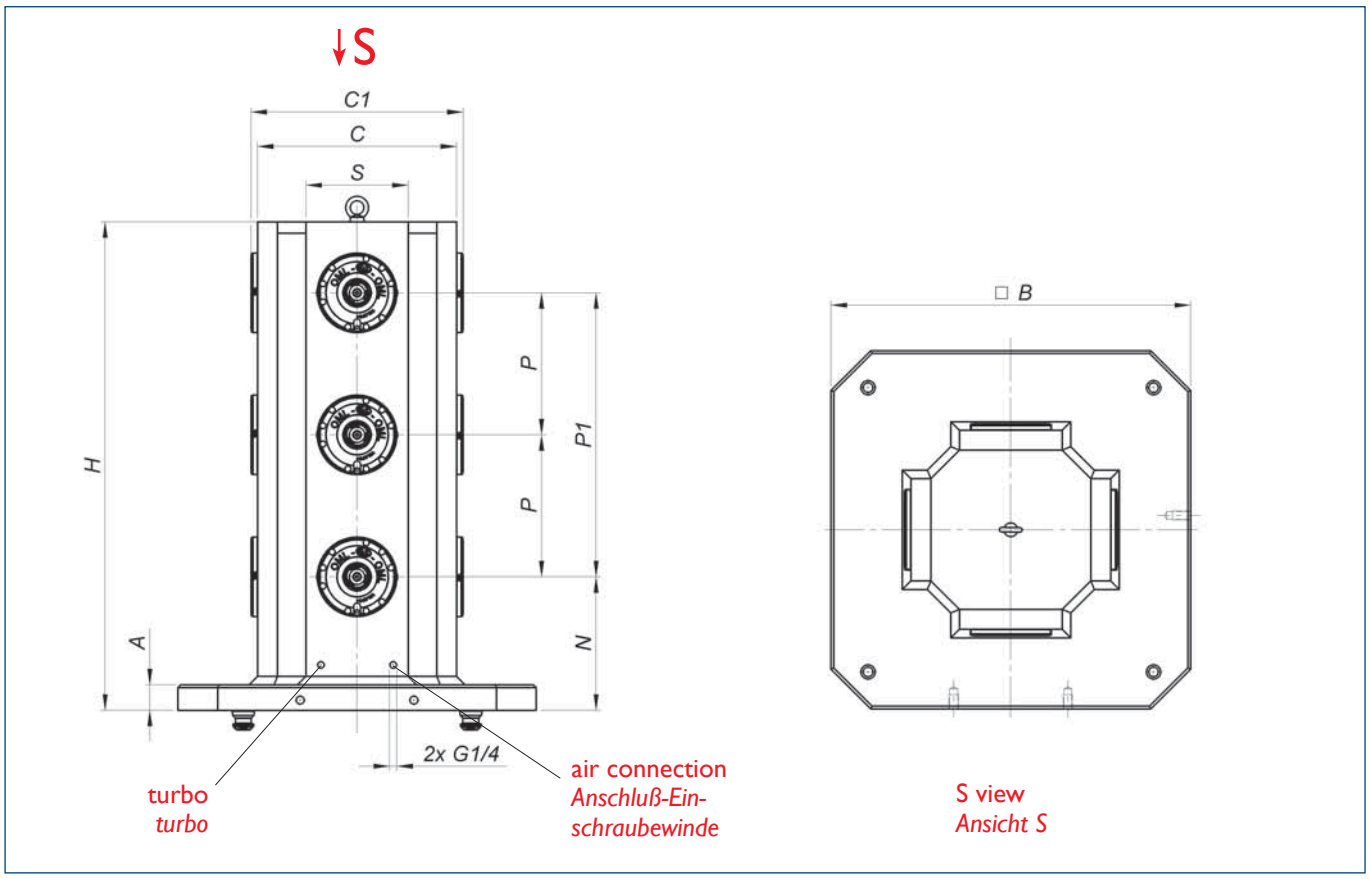
Cross tombstone with 12 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

Kreuz-Spannturm mit 12 Turmspannmodulen APS 140-I

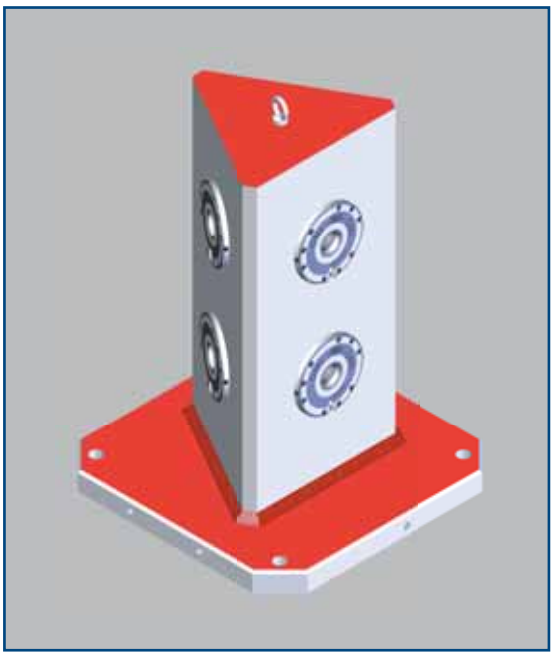
- **Clamping / unclamping the modules on the same face is simultaneous**

  Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	C mm	H mm	P mm	P1 mm	C1 mm	N mm	S mm	weight *Gewicht* kg
STEEL *STAHL*	**46 16 72 10**	40	500	280	600		250	303	225	150	188
	46 16 72 20	40	500	300	690	250	500	323	235	150	222
	46 16 72 30	45	630	350	860	250	500	373	235	180	365

APS 140



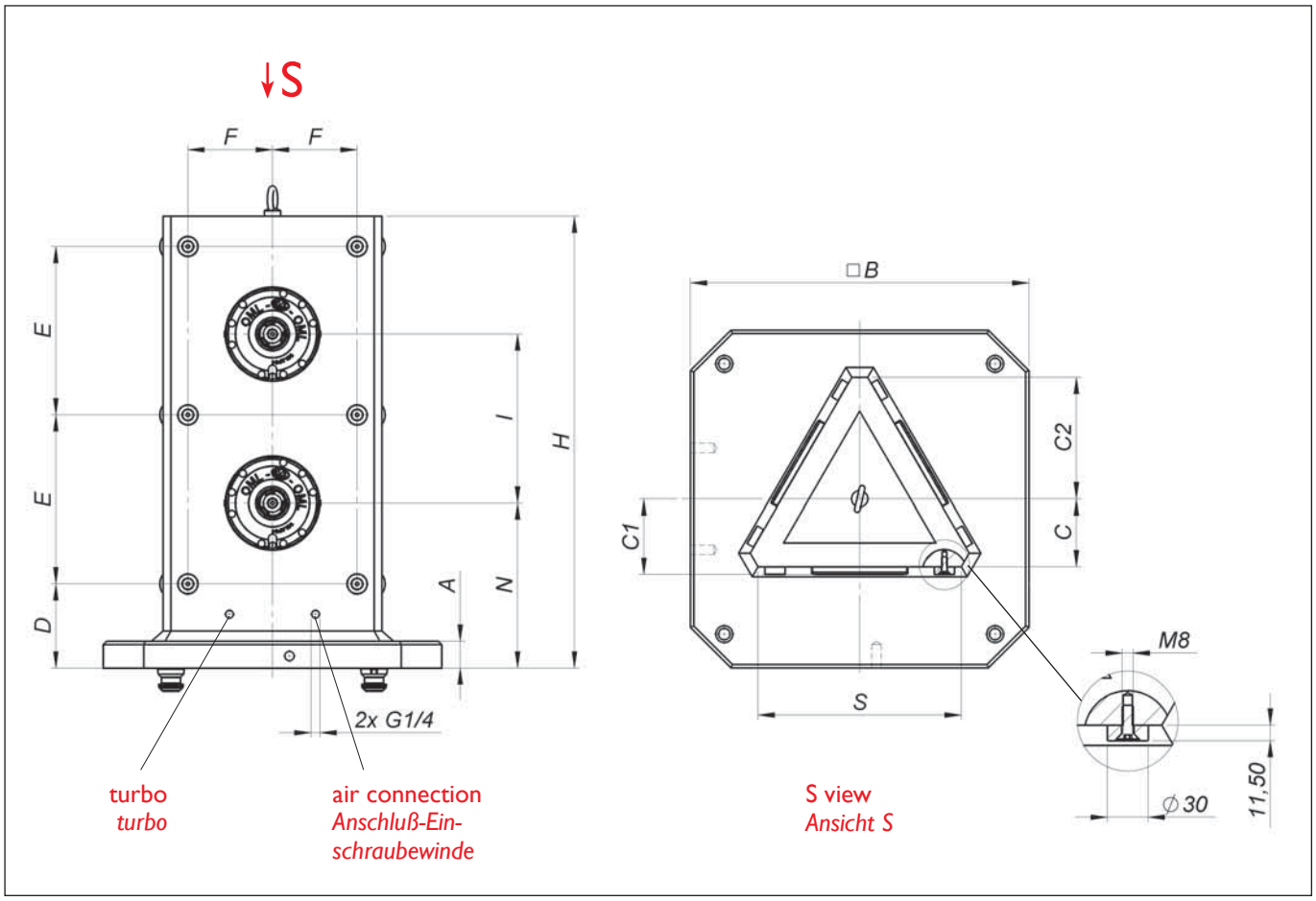
Triangular tombstone with 6 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

3-Kant-Spannturm mit 6 Turmspannmodulen APS 140-I

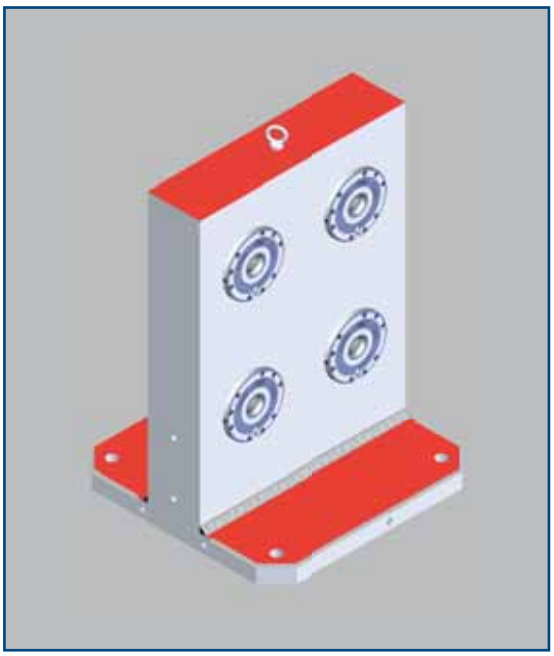
- **Clamping / unclamping the modules on the same face is simultaneous**

  Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	H mm	P mm	N mm	C mm	E mm	F mm	D mm	C1 mm	C2 mm	S mm	weight *Gewicht* kg
STEEL *STAHL*	**46 16 72 40**	40	400	600	250	225	100	225	125	125	111,5	180	300	200
	46 16 72 50	40	500	660	250	245	100	250	125	125	111,5	180	300	227

APS 140



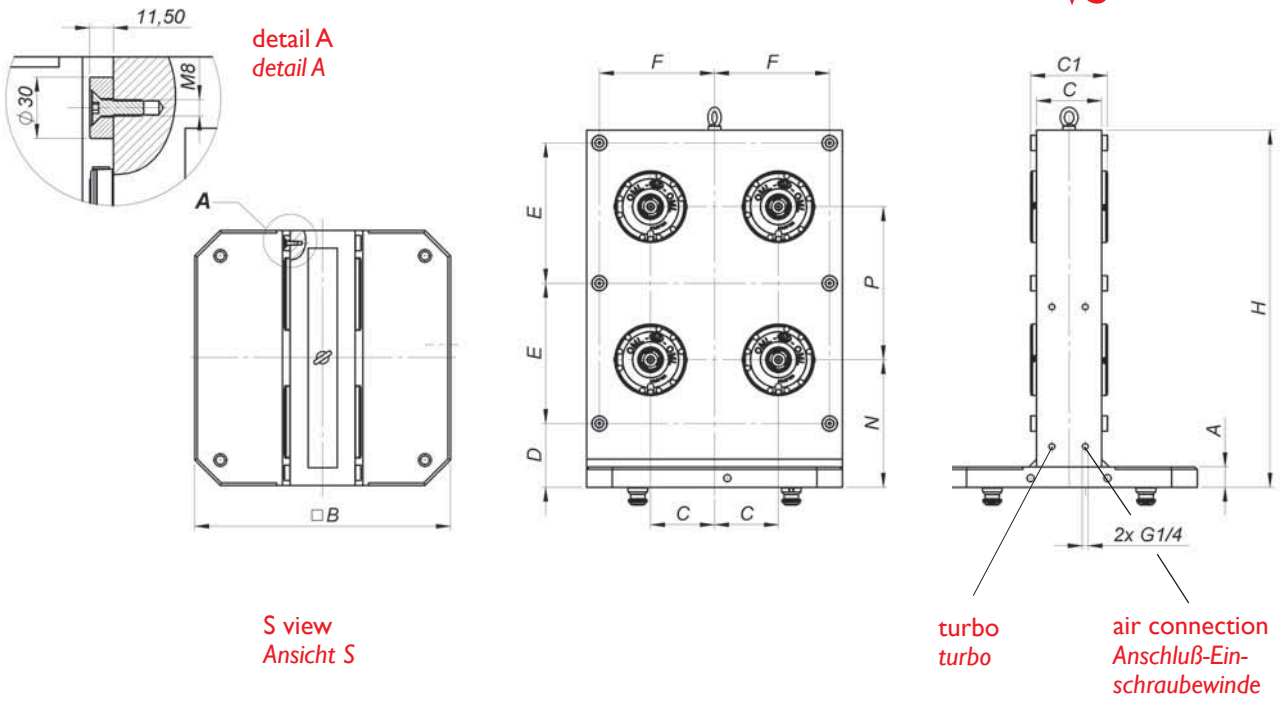
Crankweb with 8 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

Doppelwinkel mit 8 Turmspannmodulen APS 140-I

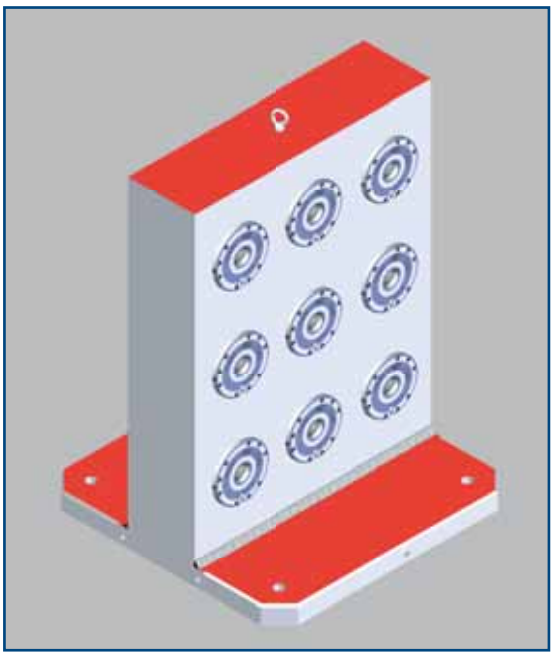
Clamping / unclamping the modules on the same face is simultaneous

Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	C mm	H mm	P mm	N mm	C1 mm	D mm	E mm	F mm	weight *Gewicht* kg
STEEL *STAHL*	46 16 73 10	40	400	150	600	250	225	173	125	215	175	200
	46 16 73 20	40	500	150	700	300	250	173	150	275	225	290
ALUMINIUM *ALUMINIUM*	46 16 73 40	40	400	150	600	250	225	173	125	215	175	90
	46 16 73 50	40	500	150	700	300	250	173	150	275	225	120
CAST IRON *GRAUGUSS*	46 16 73 70	40	400	150	600	250	225	173	125	215	175	185
	46 16 73 80	40	500	150	700	300	250	173	150	275	225	270

APS 140



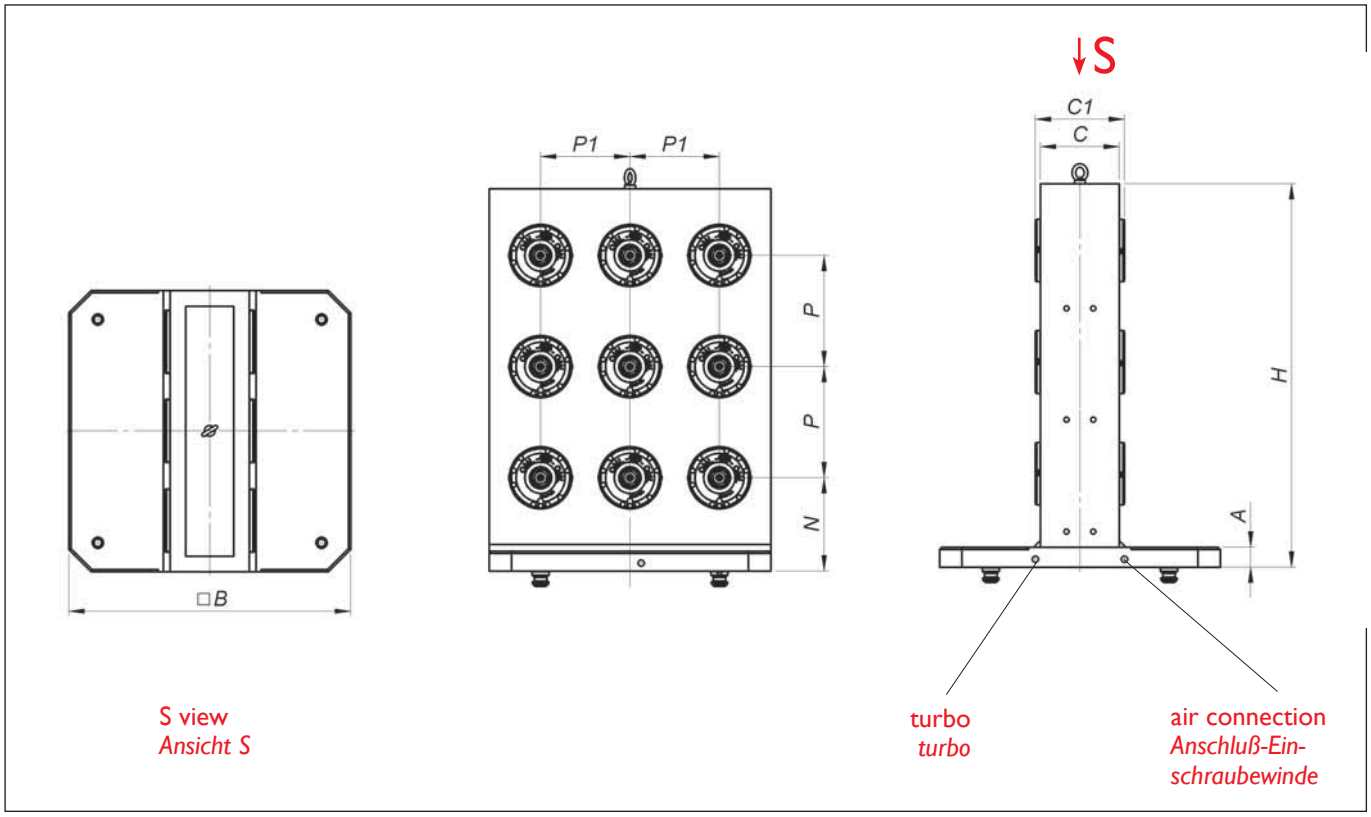
Crankweb with 18 modules APS 140-I

with turbo effect
Mit "Turboeffekt"

Doppelwinkel mit 18 Turmspannmodulen APS 140-I

Clamping / unclamping the modules on the same face is simultaneous

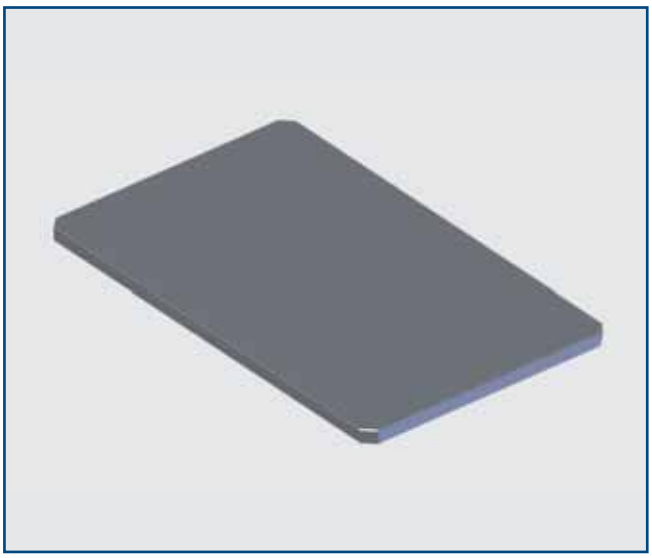
Je Turm-Aufspannseite erfolgt das Verriegeln und Entriegeln gleichzeitig



	code *Bestell-Nr.*	A mm	B mm	P1 mm	C mm	C1 mm	H mm	P mm	N mm	weight *Gewicht* kg
STEEL *STAHL*	**46 16 73 30**	45	630	200	200	223	860	250	230	495
ALUMINIUM *ALUMINIUM*	**46 16 73 60**	45	630	200	200	223	860	250	230	230
CAST IRON *GRAUGUSS*	**46 16 73 90**	45	630	200	200	223	860	250	230	480

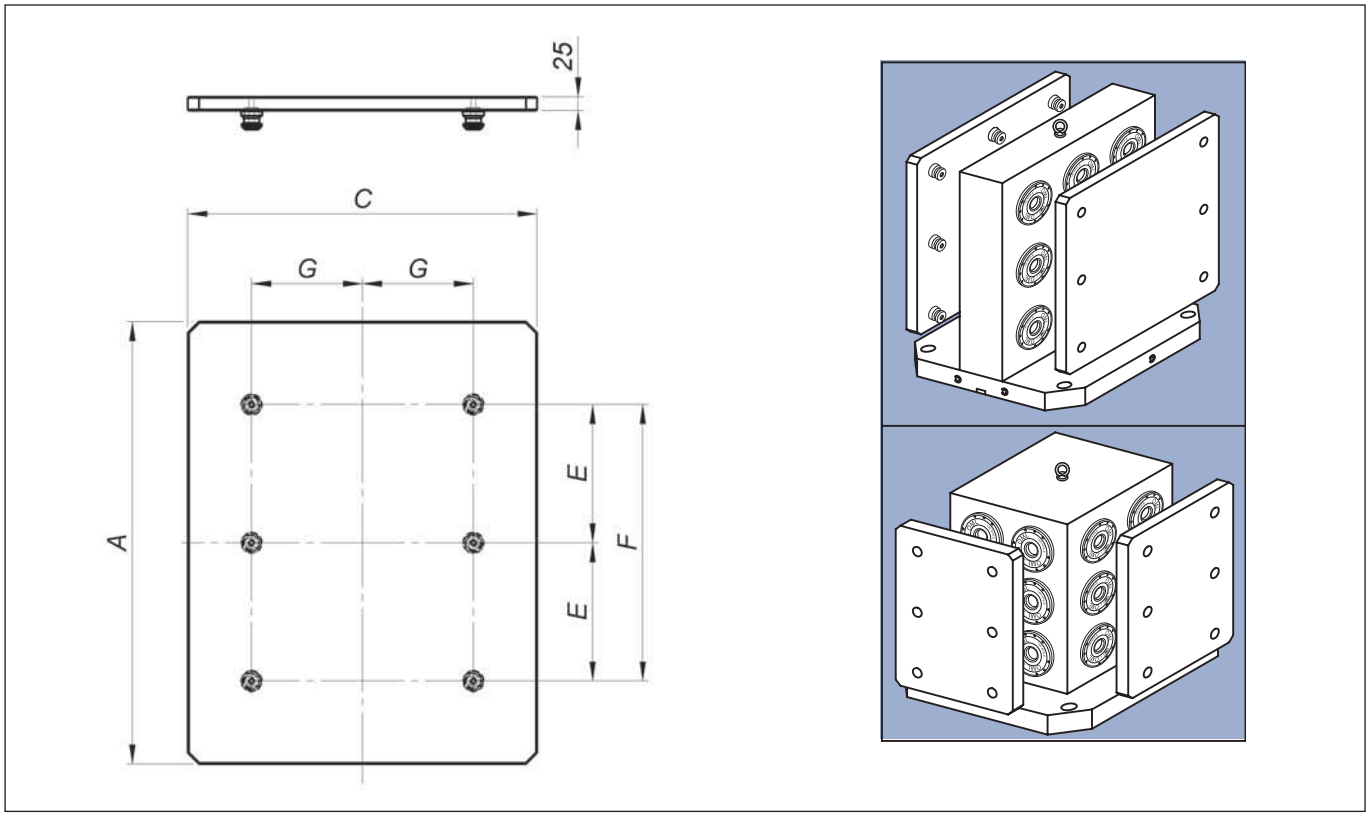
APS 140

Steel smooth plates
Stahlplatten beidseitig geschliffen, ohne Raster



Smooth plate for APS 140

Stahlplatte beidseitig geschliffen, ohne Raster für APS 140



	code *Bestell-Nr.*	A mm	C mm	E mm	F mm	G mm	weight *Gewicht* kg
For Tombstones *Für Spannturmen*	**46 16 74 10**	500	250	-	250	-	25
	46 16 74 20	600	350	-	300	-	42
	46 16 74 30	760	450	250	500	100	67
For Crankwebs *Für Doppelwinkeln*	**46 16 74 40**	500	400	-	250	100	48
	46 16 74 50	600	500	-	300	125	60
	46 16 74 60	800	630	250	500	200	98

APS 140

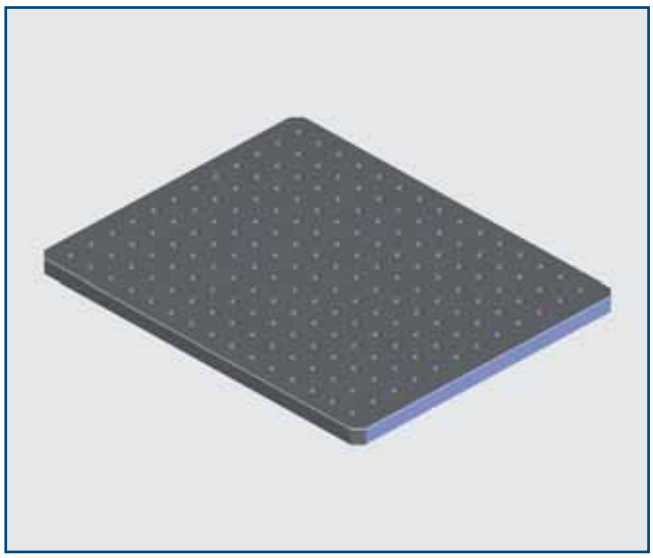
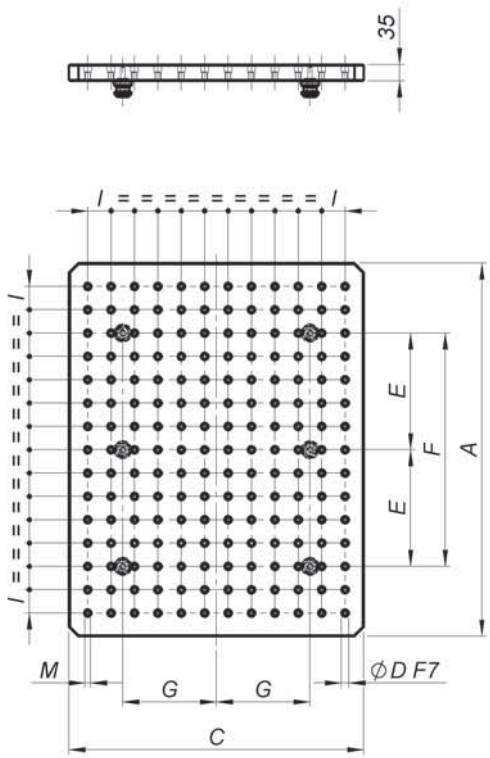
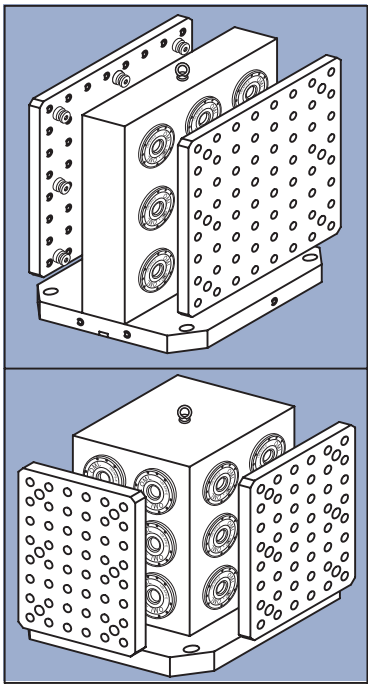


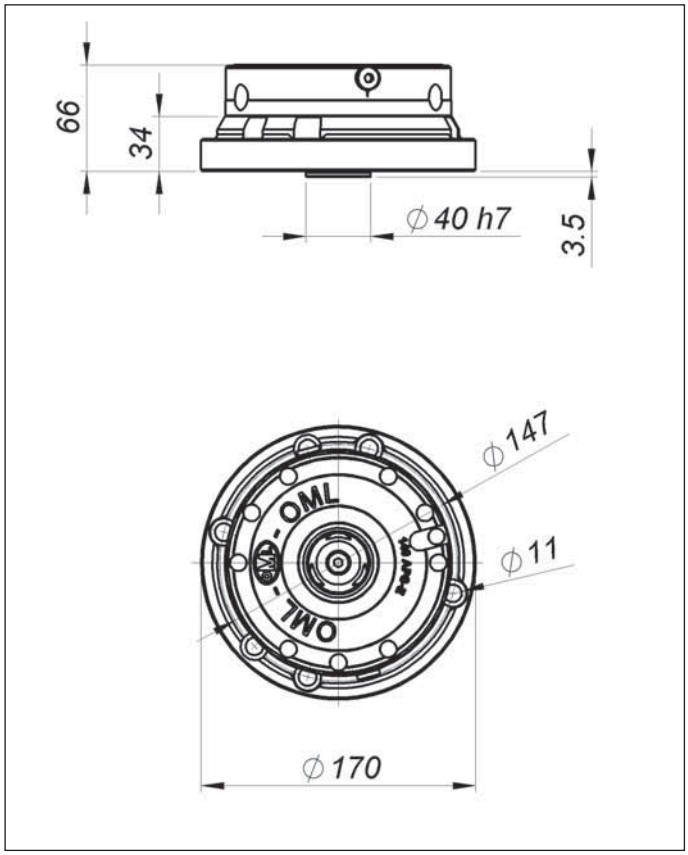
Plate with grid for APS 140

Rasterplatte für APS 140





	code *Bestell-Nr.*	A mm	C mm	E mm	F mm	G mm	I mm	M mm	Ø D mm	weight *Gewicht* kg
For Tombstones *Für Spannturmen*	**46 16 75 10**	500	250	-	250	-	50	12	16	32
	46 16 75 20	600	350	-	300		50	12	16	55
	46 16 75 30	760	450	250	500	100	50	12	16	96
For Crankwebs *Für Doppelwinkeln*	**46 16 75 40**	500	400	-	250	100	50	12	16	64
	46 16 75 50	600	500	-	300	125	50	12	16	79
	46 16 75 60	800	630	250	500	200	50	12	16	132

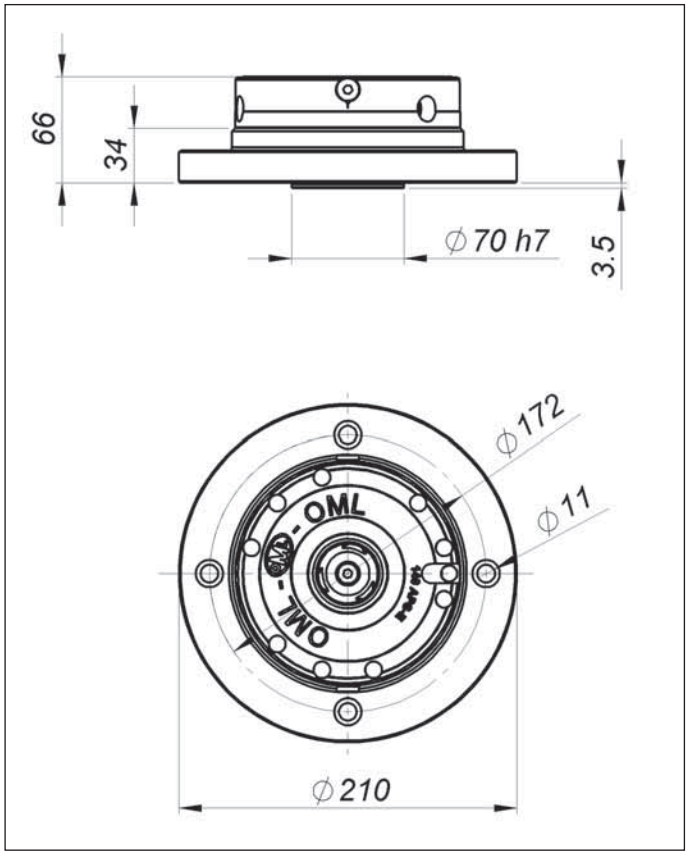


Flange with 1 module APS 140-E for indexing tables "TOUCHDEX" FDM-150 and FD-200-04 and FD-200-360

Adapterflansch mit einem integrierten APS 140-E Einbauspannmodul für Rundtische "TOUCHDEX" FDM-150 und FD-200-04 und FD-200-360

code *Bestell-Nr.*	weight *Gewicht* kg
46 16 76 20	15

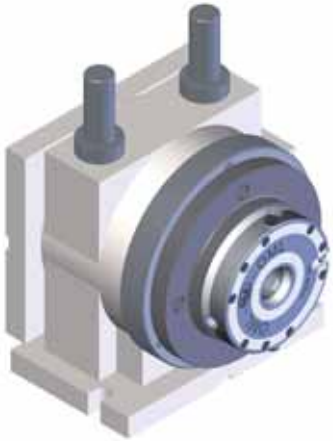
Example with FD-200
Beispiel mit FD-200



Flange with 1 module APS 140-E for indexing tables "TOUCHDEX" FDM-230 and FDR-230 FDM-230-360 and FDR-230-360

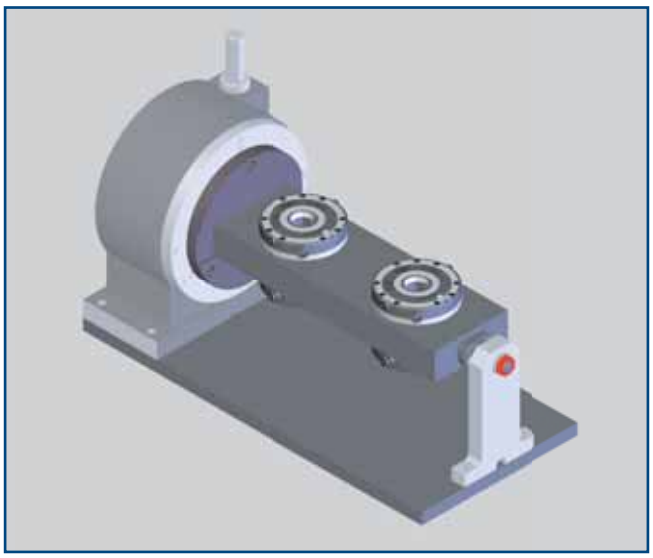
Adapterflansch mit einem integrierten APS 140-E Einbauspannmodul für Rundtische "TOUCHDEX" FDM-230 und FDR-230 FDM-230-360 und FDR-230-360

code *Bestell-Nr.*	weight *Gewicht* kg
46 16 76 30	17



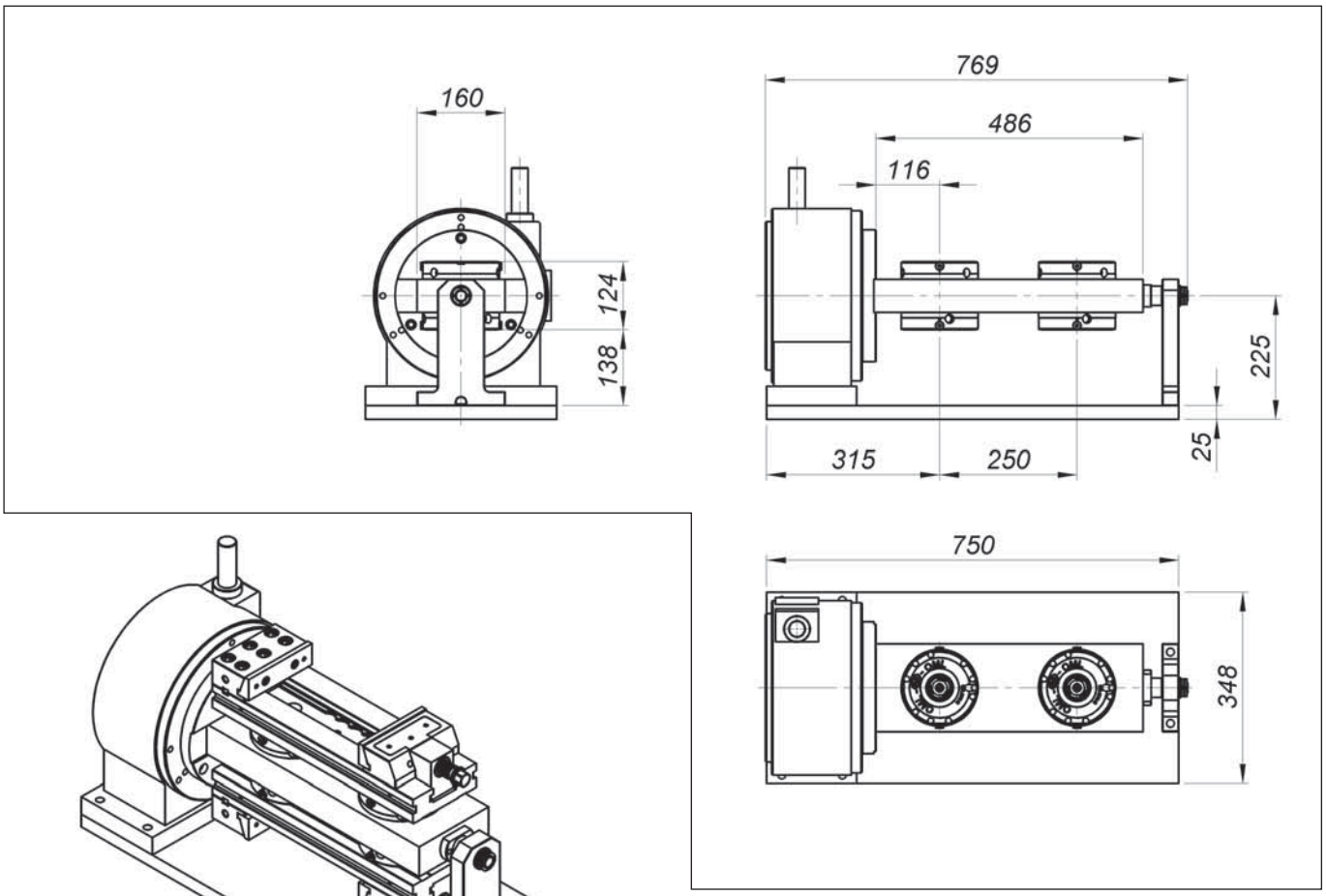
Example with FD-230
Beispiel mit FD-230

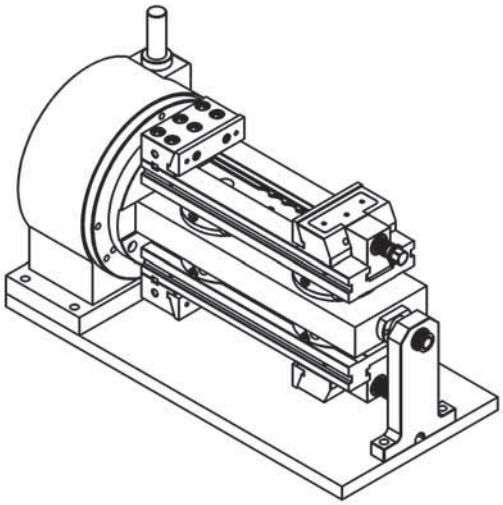
APS 140



COMBIDEX with 4 modules APS 140-E

COMBIDEX mit 4 integrierten APS 140-E Einbauspannmodulen





Example with TC-t

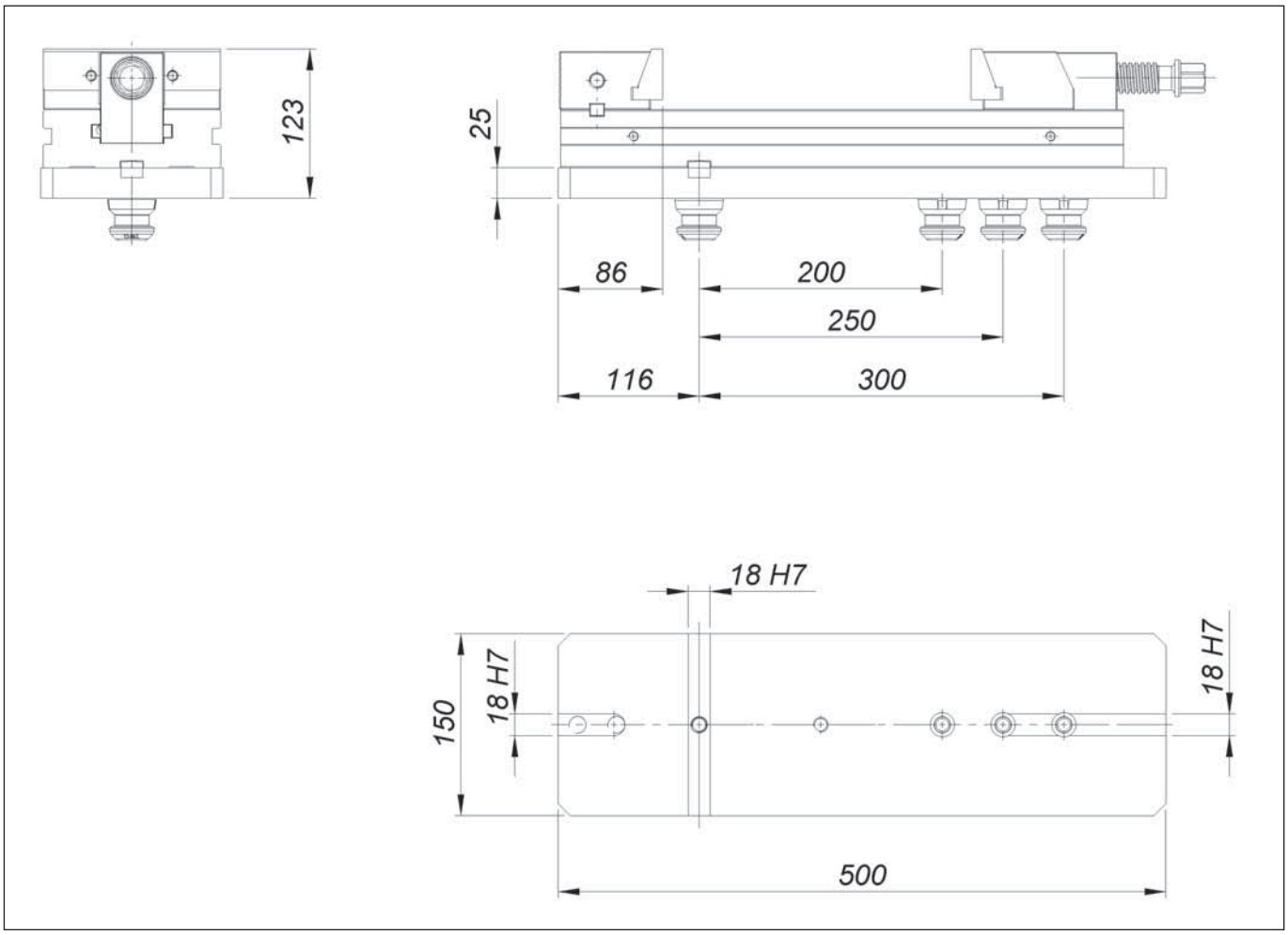
Beispiel mit TC-t

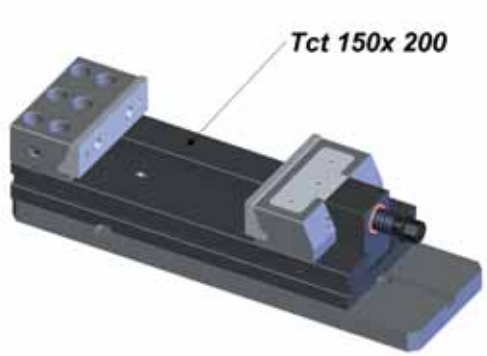
code *Bestell-Nr.*	for type *Für Modell*	indexing angles *Winkelmaße (Inkrement)*		pushbar Stroke *Hub der Schaltsäule*	weight *Gewicht*
		min°	max°	mm	kg
46 16 76 10	FDV-301	5°	45°	75	126

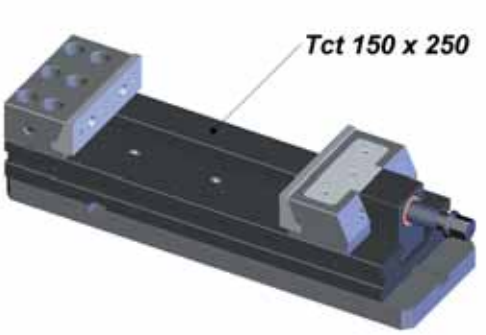
Interface plate for APS 140 with TCt 150

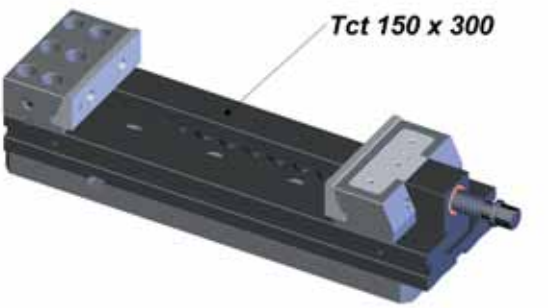
Adapterplatte für APS 140 mit TCt 150

code *Bestell-Nr.*	weight *Gewicht* kg
46 16 77 10	14



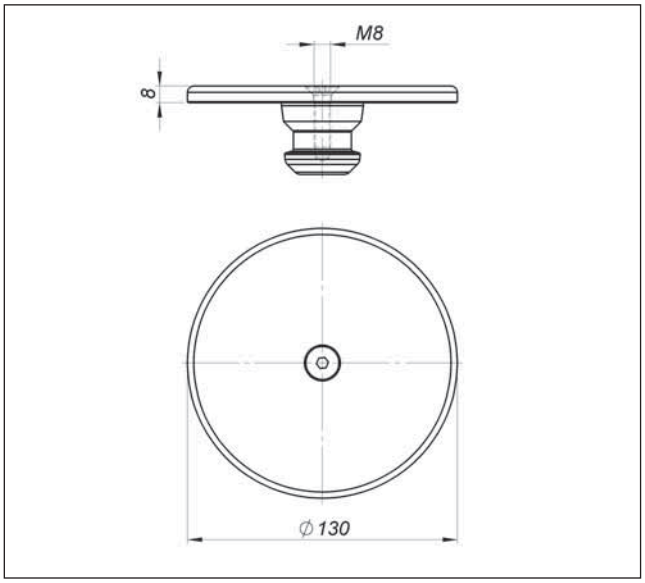






Working examples

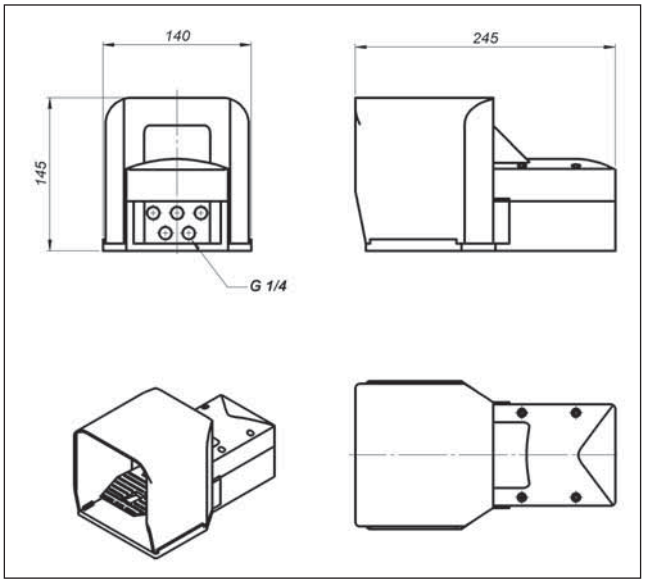
Anwendungsbeispiele



Protection cover

Abdeckplatte als Späneschutz

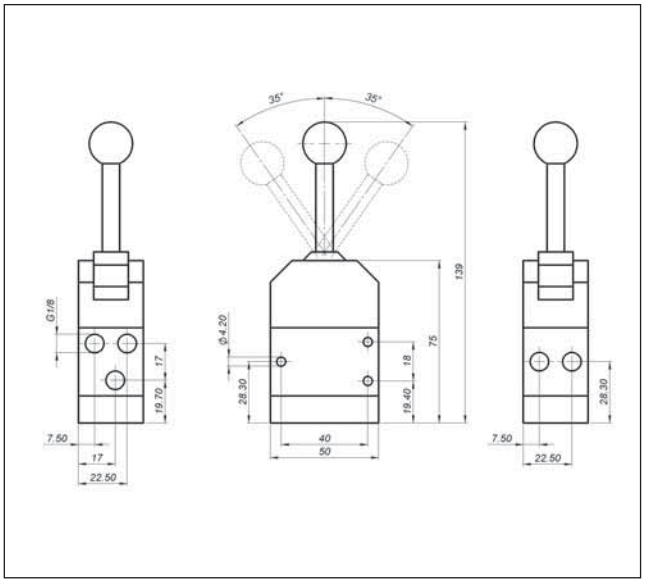
code *Bestell-Nr.*	weight *Gewicht* kg
46 16 23 25	0,12



5/2 1/4" way foot valve with guarded pedal

Geschütztes Pedal mit 5/2 1/4" Ventilen

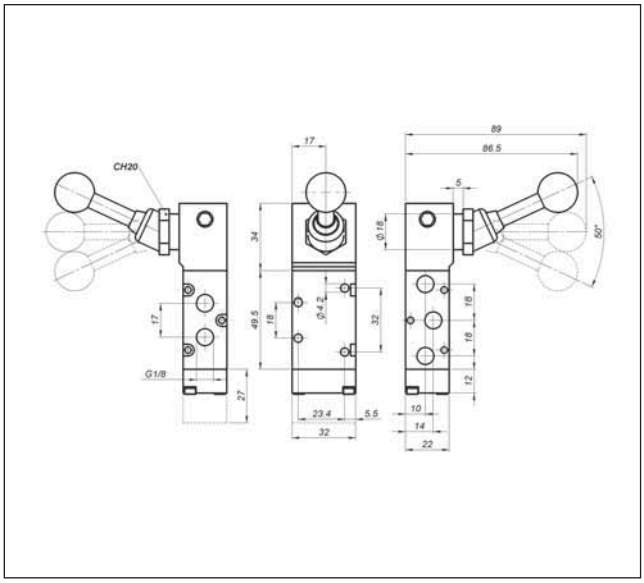
code *Bestell-Nr.*	weight *Gewicht* g	symbol *Zeichen*
71 64 22 14	1035	



Hand-operated valve front lever 5/3 1/8"

Handbetätigtes Ventil Fronthebel 5/3 1/8"

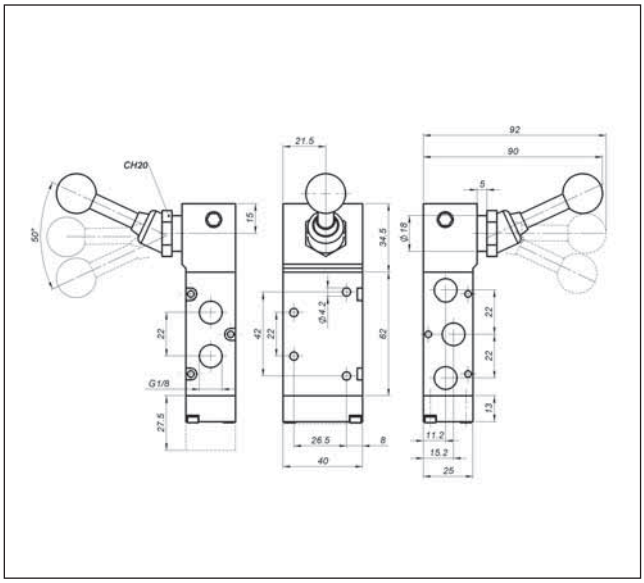
code *Bestell-Nr.*	weight *Gewicht* g	symbol *Zeichen*
71 64 21 04	316	



Hand-operated valve angular lever 90° 5/3 1/8"

Handbetätigtes Ventil 90°-Hebel 5/3 1/8"

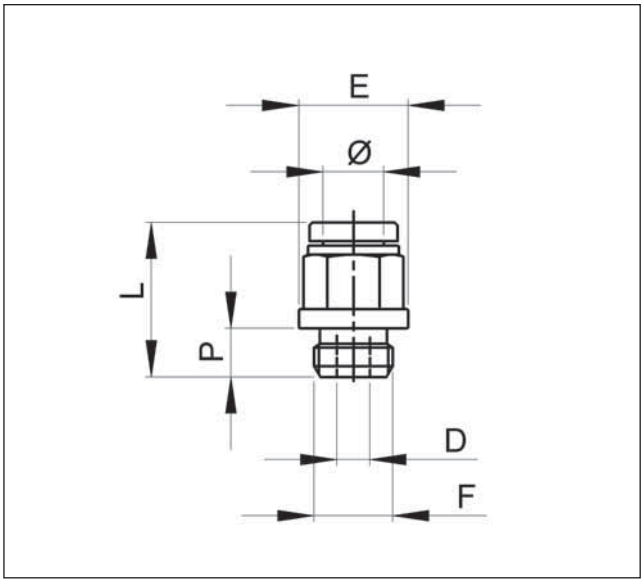
code *Bestell-Nr.*	weight *Gewicht* kg	symbol *Zeichen*
71 64 21 05	194	



Hand-operated valve angular lever 90° 5/3 1/4"

Handbetätigtes Ventil 90°-Hebel 5/3 1/4"

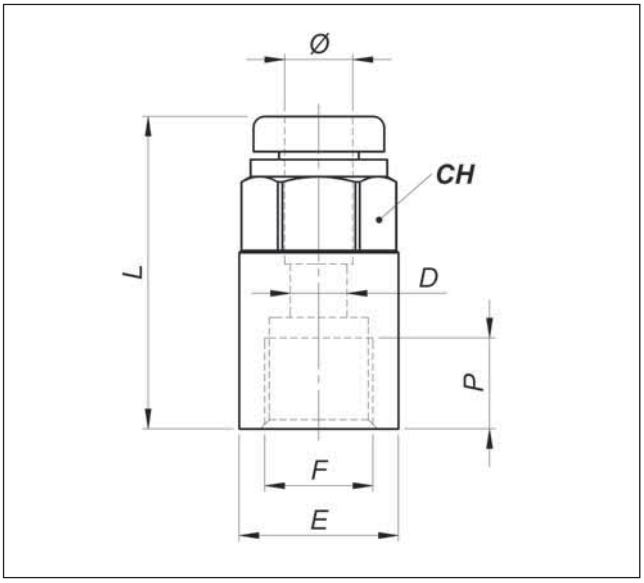
code *Bestell-Nr.*	weight *Gewicht* kg	symbol *Zeichen*
71 64 21 14	288	



Straight, cylindrical, male fittinf

Gerade Verschraubungen-zylindrisch

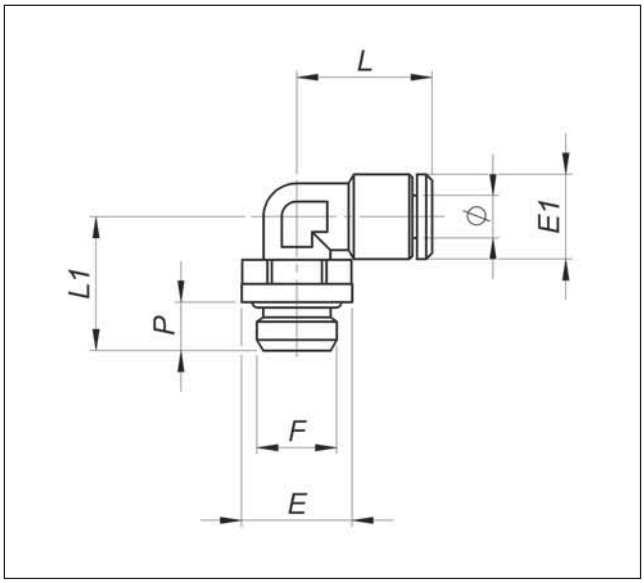
code *Bestell-Nr.*	Ø	G	Ch	Ch1	P	L	D	E
71 61 20 01	6	1/8	13	4	6.0	24.0	4.2	15.0
71 61 20 02	6	1/4	13	4	8.0	24.0	4.2	18.0
71 61 20 03	8	1/8	15	5	6.0	27.5	5.2	16.5
71 61 20 04	8	1/4	15	6	8.0	25.5	6.2	18.0



Straight, female fitting

Gerade Verschraubung

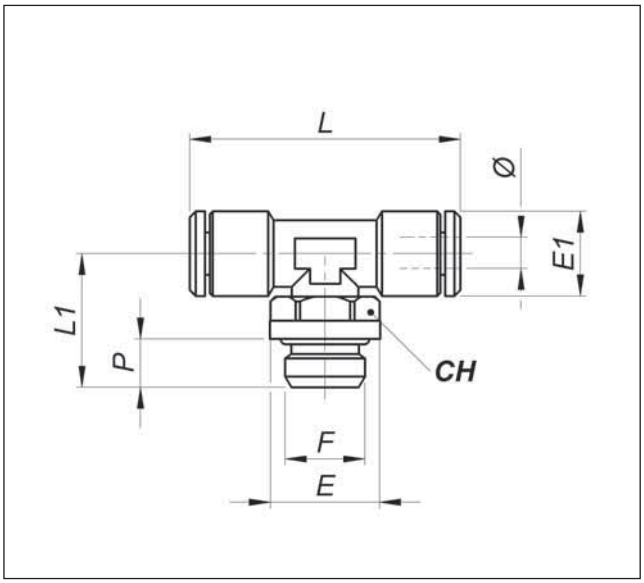
code *Bestell-Nr.*	Ø	F	Ch	P	L	D	E
71 61 20 05	6	1/8	13	4	6.0	24.0	4.2
71 61 20 06	6	1/4	13	4	8.0	24.0	4.2
71 61 20 07	8	1/8	15	5	6.0	27.5	5.2
71 61 20 08	8	1/4	15	6	8.0	25.5	6.2



Rotary elbow male cylindrical

Winkelverschraubungen zylindrisch

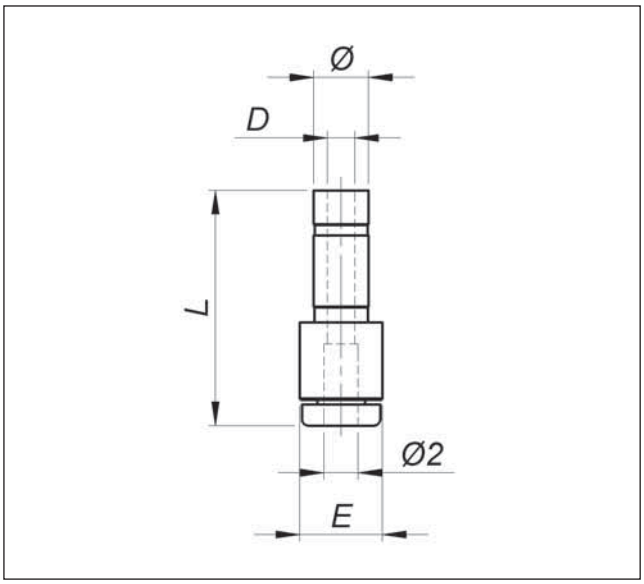
code *Bestell-Nr.*	Ø	F	Ch	E	E1	L	L1	P
71 61 20 09	6	1/8	13	15	12.5	24.5	21	6
71 61 20 10	6	1/4	16	18	12.5	26	24.5	8
71 61 20 11	8	1/8	13	15	14.5	27.5	22.5	6
71 61 20 12	8	1/4	16	18	14.5	27.5	24.5	8



Central tee male cylindrical rotary

T-Einschraubverschraubung, zylindrisch

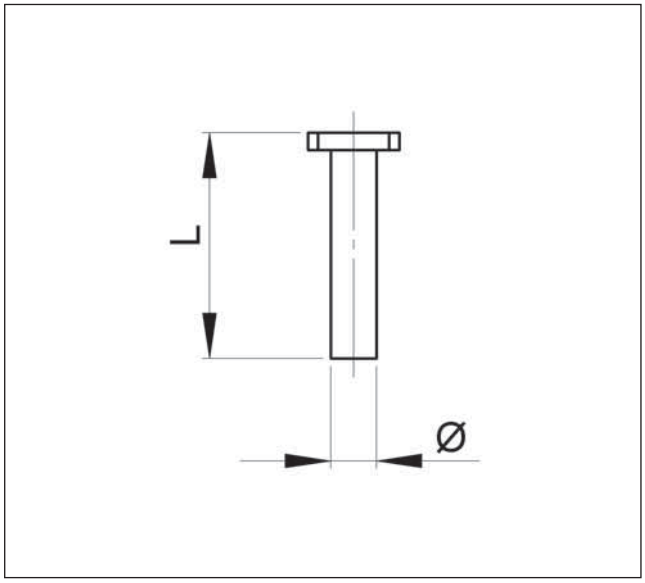
code *Bestell-Nr.*	Ø	F	Ch	E	E1	L	L1	P
71 61 20 13	6	1/8	13	15	12.5	49	21	6
71 61 20 14	6	1/4	16	18	12.5	52	24.5	8
71 61 20 15	8	1/8	13	15	14.5	55	22.5	6
71 61 20 16	8	1/4	16	18	14.5	55	24.5	8



Reducer

Reduzierstecktülle

code *Bestell-Nr.*	Ø1	Ø2	L	D	E
71 61 20 17	6	1/8	13	4	6.0



Plug

Verschlußstopfen

code *Bestell-Nr.*	Ø	L
71 61 20 18	6	29.8
71 61 20 19	8	33.6

Code Bestell-Nr.	page Seite
46 16 23 00	7
46 16 23 05	8
46 16 23 06	8
46 16 23 07	8
46 16 23 25	25
46 16 24 00	6
46 16 24 05	8
46 16 24 06	8
46 16 24 07	8
46 16 70 10	9
46 16 70 20	10
46 16 70 30	11
46 16 70 40	12
46 16 70 50	12
46 16 70 60	12
46 16 71 10	14
46 16 71 20	14
46 16 71 30	15
46 16 71 40	14
46 16 71 50	14
46 16 71 60	15
46 16 71 70	14
46 16 71 80	14
46 16 71 90	15
46 16 72 10	16
46 16 72 20	16
46 16 72 30	16
46 16 72 40	17
46 16 72 50	17
46 16 73 10	18
46 16 73 20	18
46 16 73 30	19
46 16 73 40	18
46 16 73 50	18
46 16 73 60	19
46 16 73 70	18
46 16 73 80	18
46 16 73 90	19
46 16 74 10	20
46 16 74 20	20

Code Bestell-Nr.	page Seite
46 16 74 30	20
46 16 74 40	20
46 16 74 50	20
46 16 71 60	20
46 16 75 10	21
46 16 75 20	21
46 16 75 30	21
46 16 75 40	21
46 16 75 50	21
46 16 75 60	21
46 16 76 10	23
46 16 76 20	22
46 16 76 30	22
46 16 77 10	24
71 61 20 01	27
71 61 20 02	27
71 61 20 03	27
71 61 20 04	27
71 61 20 05	27
71 61 20 06	27
71 61 20 07	27
71 61 20 08	27
71 61 20 09	27
71 61 20 10	27
71 61 20 11	27
71 61 20 12	27
71 61 20 13	28
71 61 20 14	28
71 61 20 15	28
71 61 20 16	28
71 61 20 17	28
71 61 20 18	28
71 61 20 19	28
71 64 21 04	25
71 64 21 05	26
71 64 21 14	26
71 64 22 14	25

OFFICINA MECCANICA LOMBARDA S.p.a.

Via Cristoforo Colombo, 5 - 27020 Travacò Siccomario (PV) - ITALY
Tel. +39. 0382. 55 96 13 - Fax +39 0382. 55 99 42
www.omlspa.it - E-mail: omlspa@omlspa.it

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Tel. +39. 0382. 55 96 13 - Fax +39 0382. 55 99 42
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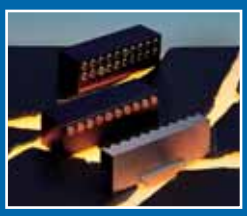
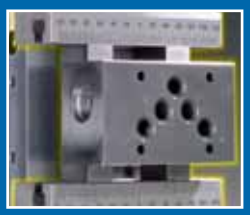
Via Cristoforo Colombo, 5
27020 Travacò Siccomario (PV) - ITALY
Tel. +39. 0382. 55 96 13
Fax +39 0382. 55 99 42
www.omlspa.it
E-mail: omlspa@omlspa.it

AZIENDA CON SISTEMA DI GESTIONE PER LA QUALITA' CERTIFICATO DA DNV
UNI EN ISO 9001:2000