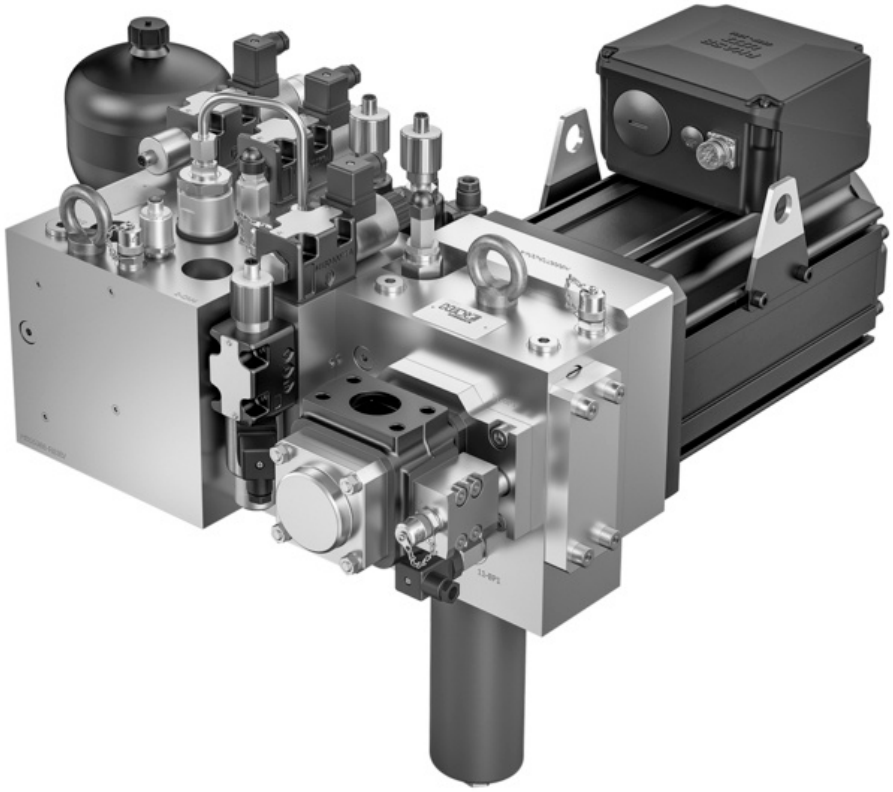
Control system for CNC press brakes of type ePRAX modular

Product documentation

Operating pressure p_{max}:	320 bar
Flow rate Q_{max}:	50 l/min



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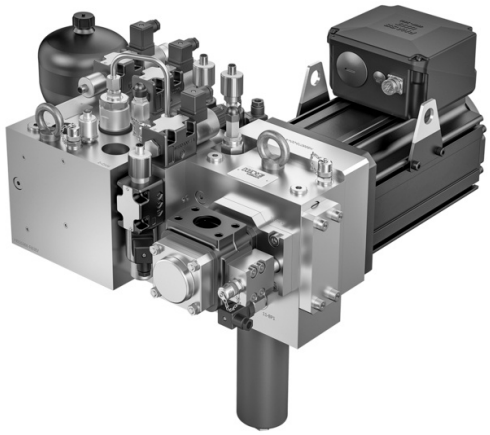
1 Overview of control system for CNC press brakes of type ePRAX modular

Hydraulic press control systems are used in CNC press brakes to control the movement of the two cylinders that drive the ram. These control systems include all hydraulic valves required to precisely actuate and hold up the cylinders. Thanks to the use of advanced technology, these systems ensure that the sheet metal is worked reliably and efficiently.

The ePRAX modular speed-controlled drive is a compact servo drive that controls the cylinder movements of the ram in CNC press brakes. Changes in cylinder rate and position are managed by means of a controlled servomotor separately for each cylinder through combination with dedicated drive controllers. The return stroke is implemented according to the bending task to be performed and the expansion stage of the ePRAX modular with the aid of temporarily stored hydraulic energy. This allows high dynamism and short cycles. The control system has been verified for its intended application in hydraulic press brakes as per DIN EN 12622 certification.

Long oil lines are not required when mounting in the press brake, as the system is mounted directly on the cylinders. The optionally available tank module can be flexibly positioned on the press brake, enabling optimal use of the available installation space. The ePRAX modular control system enables the implementation of press brakes with pressing forces of up to 4,000 kN (400 t), and therefore provides a powerful solution to handle demanding bending applications in sheet metal processing.



ePRAX modular type press control system

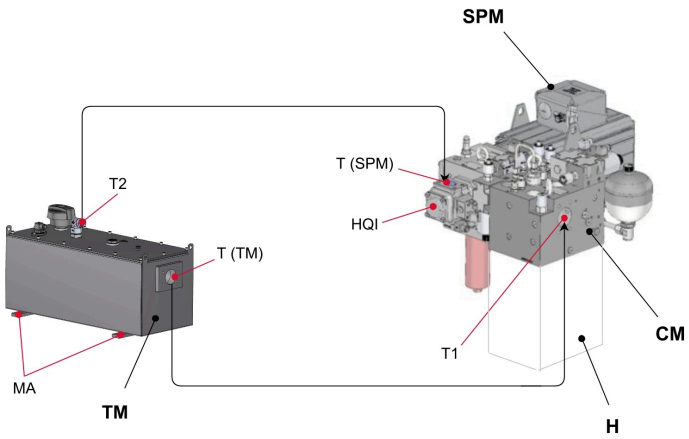
Features and advantages

- The anti-cavitation valves (normally closed version) are integrated into the manifold, which therefore simplifies the cylinder interface
- Energy-efficient
- No limitation on machine length
- Optionally available modules for tool clamping offer additional functionality and customization options

Intended applications

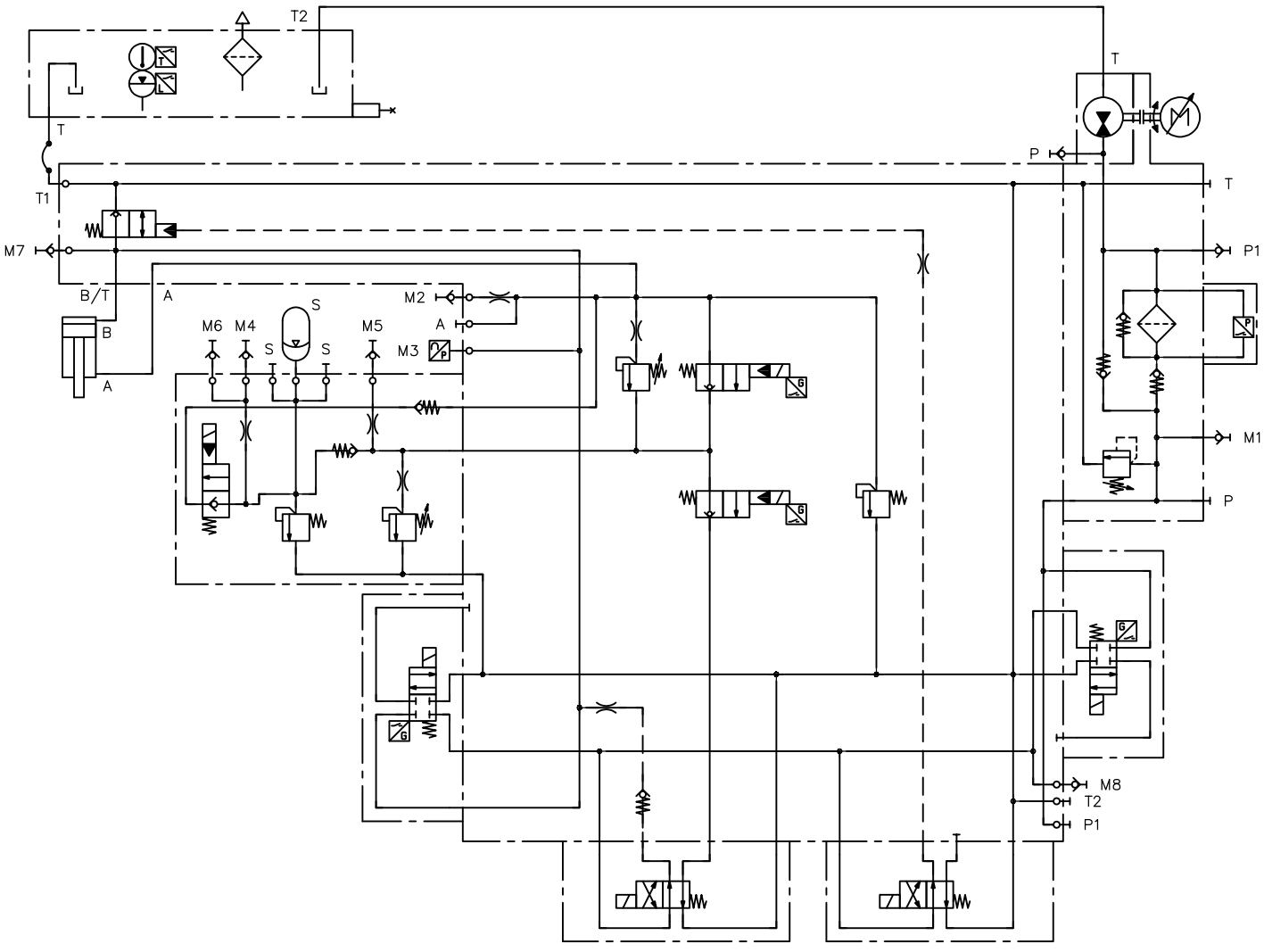
- Press brakes

Structure



- **TM** Tank module
- **SPM** Servo power module
- **CM** Cylinder module
- **H** Hydraulic cylinder
- **HQI** Pump
- **T (TM)** Anti-cavitation valve connection on the tank module
- **T (SPM)** Pump connection
- **T1** Flange surface at the cylinder module
- **T2** Pump connection on the tank module
- **MA** Attachment to the machine frame

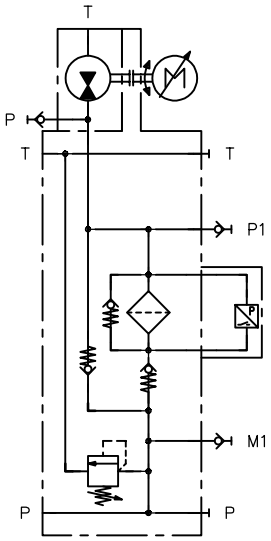
Wiring diagram for overall system



2 Available versions

2.1 Servo power module

Circuit symbol



Ordering example

SPM 2	B	-180/215/40	-Z13	-42/42	-VE1	-...

2.1.6 "Options"

2.1.5 "Filter set/contamination indicator"

2.1.4 "Coupling"

2.1.3 "Pump"

2.1.2 "Motor flange"

Model B = 8179 101

2.1.1 "Basic type and size"

2.1.1 Basic type and size

Type	Description
SPM 2	Servo power module, size 2

2.1.2 Motor flange

Coding	Centring diameter (mm)	Bolt circle (mm)	Width (mm)
130/165/20	130	165	20
130/165/40	130	165	40
180/215/40	180	215	40
180/215/40	180	215	40
180/215/59	180	215	59

2.1.3 Pump

Internal gear pump

Coding	Displacement volume V_g (cm³/rev)
Z4	4.2
Z5	5.4
Z6	6.4
Z8	7.8
Z11	10.8
Z13	13.3
Z16	15.6
Z19	18.9
Z22	21.8
Z25	24.8

2.1.4 Coupling

Coding	Coupling size	Motor shaft ∅ (mm)
28/24	ROTEX 28	24
38/32	ROTEX 38	32
42/28	ROTEX 42	28
42/38	ROTEX 42	38
42/42	ROTEX 42	42

2.1.5 Filter set/contamination indicator

Coding	Description
VE1	▪ Filter set with pressure filter housing M76x2 ▪ Filter element LM210 with 3 bar bypass valve ▪ Contamination indicator with 2.4 bar response differential pressure

2.1.6 Options

Ordering example

- M1/G 8 MA	Measuring coupling
- VDBE08E	Pressure-limiting valve
- PG SPM 2	Plate group
- MU U31007A.25.3.R4.0.Y0.K.00	Motor unit
- DC AxN 22.44.4C000F0000	Drive controller
- BR RXLG 1200W 12R	Brake resistor
- LF DL-25EBK5/40	Line filter

Measuring coupling

Coding	Port
without coding	without measuring coupling for connection P: sealed with tapped plug
M1/G 8 MA	M1
P1/KC5421	P1

Pressure-limiting valve

Coding	Pressure range up to
VDBE08EE	350 bar
VDBE08EE-320	350 bar, set at 320 bar

Plate group

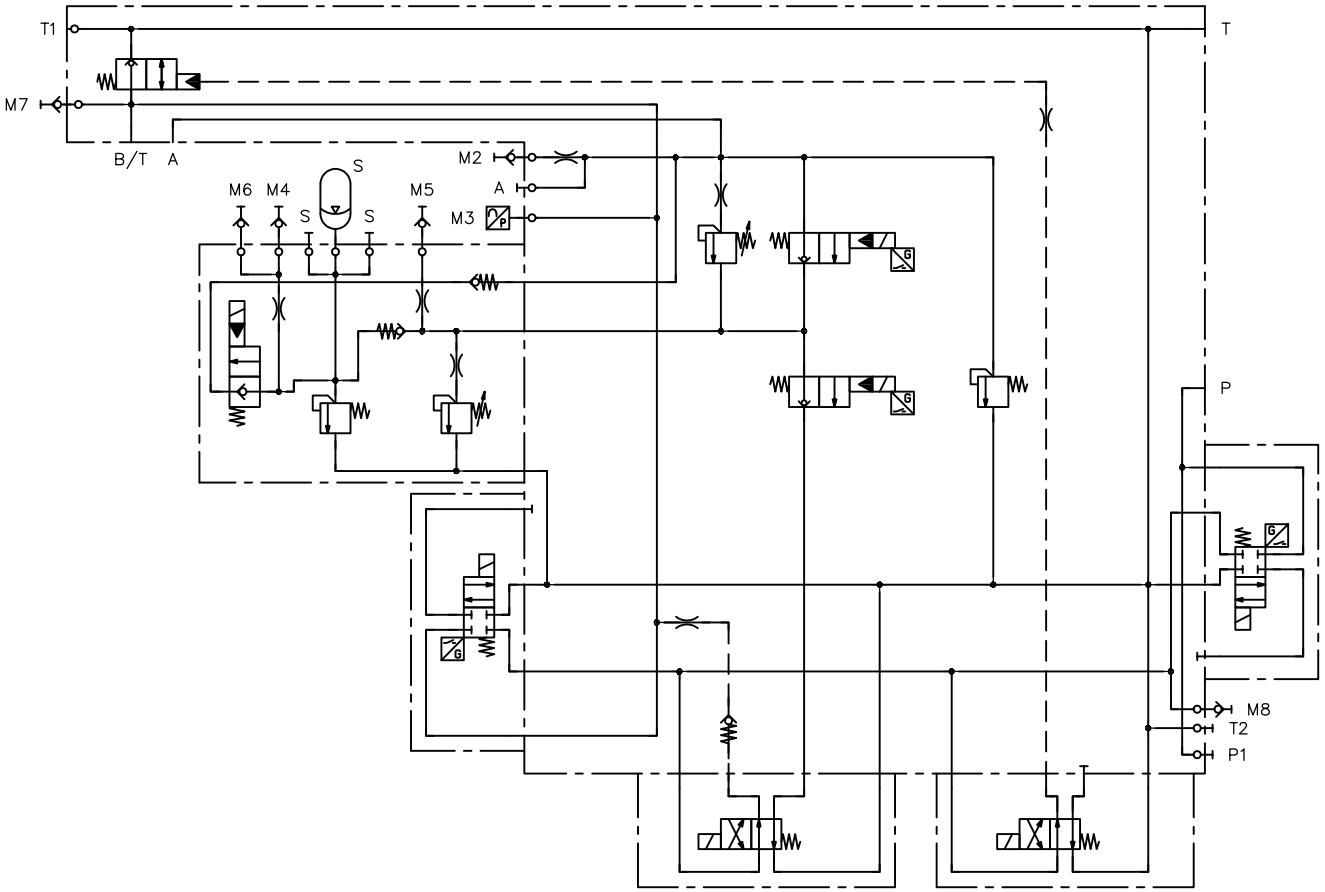
Coding	Description
PG SPM 2	Standard plate group for SPM (can be used on both sides)
PG SPM 2 - 15 MM L	Plate group with intermediate plate 15 mm for installation on the left SPM side
PG SPM 2 - 15 MM R	Plate group with intermediate plate 15 mm for installation on the right SPM side
PG SPM 2 - 32 MM/54 MM L	Plate group with intermediate plate 32 mm + offset 54 mm for installation on the left SPM side
PG SPM 2 - 32 MM/54 MM R	Plate group with intermediate plate 32 mm + offset 54 mm for installation on the right SPM side

Motor unit

Coding	Description	Combination options with		
		Drive controller	Brake resistor	Line filter
MU U30720A.30.3.R4.0.YZ.E.00	▪ Nominal torque 11 Nm ▪ Maximum torque 65 Nm ▪ Rated speed 3000 min^{-1} ▪ without fan	DC AxN 09.20.4C000F0000	BR RXLG 800W 25R	LF DL-10EBK5/40
		DC AxN 15.30.4C000F0000	BR RXLG 800W 18R	LF DL-16EBK5/40
MU U30730A.28.3.R4.0.YZ.E.00	▪ Nominal torque 19.1 Nm ▪ Maximum torque 100 Nm ▪ Rated speed 2800 min^{-1} ▪ without fan	DC AxN 09.20.4C000F0000	BR RXLG 800W 25R	LF DL-10EBK5/40
		DC AxN 15.30.4C000F0000	BR RXLG 800W 18R	LF DL-16EBK5/40
		DC AxN 22.44.4C000F0000	BR RXLG 1200W 12R	LF DL-25EBK5/40
MU U30740A.25.3.R4.0.YZ.E.00	▪ Nominal torque 35.2 Nm ▪ Maximum torque 130 Nm ▪ Rated speed 2500 min^{-1} ▪ without fan	DC AxN 15.30.4C000F0000	BR RXLG 800W 18R	LF DL-16EBK5/40
		DC AxN 22.44.4C000F0000	BR RXLG 1200W 12R	LF DL-25EBK5/40
		DC AxN 35.70.4C000F0000	BR RXLG 2000W 7R	LF DL-35EBK5/40
MU U30740F.30.3.R4.0.YZ.E.00	▪ Nominal torque 43.5 Nm ▪ Maximum torque 130 Nm ▪ Rated speed 3000 min^{-1} ▪ with fan	DC AxN 22.44.4C000F0000	BR RXLG 1200W 12R	LF DL-25EBK5/40
		DC AxN 35.70.4C000F0000	BR RXLG 2000W 7R	LF DL-35EBK5/40
MU U31007A.25.3.R4.0.Y0.K.00	▪ Nominal torque 42 Nm ▪ Maximum torque 210 Nm ▪ Rated speed 2500 min^{-1} ▪ without fan	DC AxN 22.44.4C000F0000	BR RXLG 1200W 12R	LF DL-25EBK5/40
		DC AxN 35.70.4C000F0000	BR RXLG 2000W 7R	LF DL-35EBK5/40
		DC AxN 50.100.4C000F0000	BR RXLG 800W 5R	LF DL-50EBK5/40

2.2 Cylinder module

Circuit symbol



Ordering example

S	CM	55368	R	050	-2	H	-A

2.2.7 "Slow Up module"

2.2.6 "Interface to tank module"

2.2.5 "Interface to the servo power module"

2.2.3 "Basic block and nominal size"

2.2.4 "Version"

2.2.3 "Basic block and nominal size"

2.2.2 "System"

2.2.1 "Position monitoring of the valves"

2.2.1 Position monitoring of the valves

Coding	Description
without coding	no monitoring
S	Monitoring of: ▪ two 2/2-way seated valves ▪ two 4/2-way seated valves

2.2.2 System

Coding	Description
CM	press brake control

2.2.3 Basic block and nominal size

Coding	Nominal size Anti-cavitation valve	Flow rate Q_{max} (l/min)	Flow rate of anti-cavitation valve Q_{max} (l/min)
53368	**050**	30	420
55074	**063**	50	680

2.2.4 Version

Coding	Description
L	left
R	right

2.2.5 Interface to the servo power module

Coding	Description
2	SPM size 2

2.2.6 Interface to tank module

Coding	Description
H	2 1/2"

2.2.7 Slow Up module

Coding	Description
X	without Slow Up module
A	1.4-210-X
B	2.0-210-X

Ordering example

1.4 -210 -X

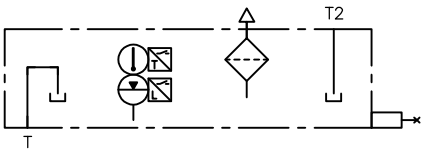
Pre-charge pressure (p0) X unfilled
... (bar)

Accumulator pressure (p2) 210 210 bar
250 250 bar

Nominal volume of accumulator 1.4 1.4 l
2.0 2.0 l

2.3 Tank module

Circuit symbol



Ordering example

TM 070 H 0001 A 0002

Variety counter design 0002 = 8179 101

Level and temperature switch X without level and temperature switch
A with level and temperature switch

Variety counter dimensions 0001

Interface cylinder module 2 1/2"

Tank size 70 l

Tank module

2.4 Accessories

Cables

Components	Order number
Motor line - 5 m	
PW-A-D04-5-GTV	KB3375A
PW-C-D06-5-GTV	KB3422A
Motor line - 10 m	
PW-A-D04-10-GTV	KB3308A
PW-C-D06-10-GTV	KB3423A
Resolver line - 5 m	
CR-X-A28-5-GTV	KB3376A
Resolver line - 10 m	
CR-X-A28-10-GTV	KB3309A

Tool clamping

Component	Order number
Tool clamping without pressure control	HB55369-002A
Tool clamping with pressure control 80 bar	HB55370-002B

3 Parameters

3.1 General data

Installation position	horizontal (Cylinder Module (CM), Tank Module (TM)) or arbitrary (Servo Power module (SPM))		
Volume	Tank module (TM): ~ 70 l		
Surface protection	Servo Power Module (SPM):	Housing:	Autokatalytic nickel coating ISO 4527-Fe/NiP (10) 5
		Plate:	Autokatalytic nickel coating ISO 4527-Fe/NiP (10) 5
		Motor flange:	without
	Cylinder Module (CM):	Autokatalytic nickel coating ISO 4527-Fe/NiP (10) 5	
	Tank Module (TM):	Surface after welding: DIN 509 42-Fe/MnPh Outside surface coated with BISCON HB NTL , black matt Coating thickness 50 - 100 µm	
Material	Servo Power Module (SPM):	Housing:	0.7040 (EN-GJS-400-15)
		Plate:	1.0718 (11SMnPb30)
		Motor flange:	3.1645 (EN AW-2007); Alternative material: 3.1355 (EN AW- 2024)
	Cylinder Module (CM):	0.7040 (EN-GJS-400-15)	
	Tank Module (TM):	Material 1.0037 (S235JR) / alternative material Q235-A	
Hydraulic fluid	Hydraulic fluid, according to DIN 51524 Parts 2 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 10 - 600 mm²/s, recommended for continuous operation: 20–100 mm²/s		
Cleanliness level	**ISO 4406** 18/15/12		
Temperatures	Ambient conditions: 0 to +40 °C, hydraulic fluid: -10 to +70°C, ensure the correct viscosity range.		

3.2 Pressure and flow rate

Operating pressure p_{max} (inlet pressure)	320 bar
Flow rate Q_{max}	▪ Nominal size 050: 30 l/min ▪ Nominal size 063: 50 l/min see Chapter 2.2.3, "Basic block and nominal size"
Flow rate Q_{max} Anti-cavitation valve	▪ Nominal size 050: 420 l/min ▪ Nominal size 063: 680 l/min see Chapter 2.2.3, "Basic block and nominal size"

3.3 Weight

Cylinder Module (CM)	▪ Nominal size 050: approx. 90 kg (including Slow U_p Module) ▪ Nominal size 063: approx. 120 kg (including Slow U_p Module)
Servo Power Module (SPM)	approx. 100 kg
Tank Module (TM)	approx. 35 kg

3.4 Electrical data

Rated voltage	3 x 400 V AC 50/60 Hz		
Nominal current		**Rated current**	**Peak current**
	DC AxN 09.20.4C000F0000:	9 A	20 A
	DC AxN 15.30.4C000F0000:	15 A	30 A
	DC AxN 22.44.4C000F0000:	22 A	44 A
	DC AxN 35.70.4C000F0000:	35 A	70 A
	DC AxN 50.100.4C000F0000:	50 A	100 A
Nominal power	U30720A.30.3.R4.0.YZ.E.00:	3.5 kW	
	U30730A.28.3.R4.0.YZ.E.00:	6 kW	
	U30740A.25.3.R4.0.YZ.E.00:	9.2 kW	
	U30740F.30.3.R4.0.YZ.E.00:	13.7 kW	
	U31007A.25.3.R4.0.Y0.K.00:	10.5 kW	
Frequency	50/60 Hz		
Frequency fluctuation	± 10%		
Asymmetry	± 3%		
Operating mode / Duty cycle	S1		
Protection class	IP 20 to DIN 40050		

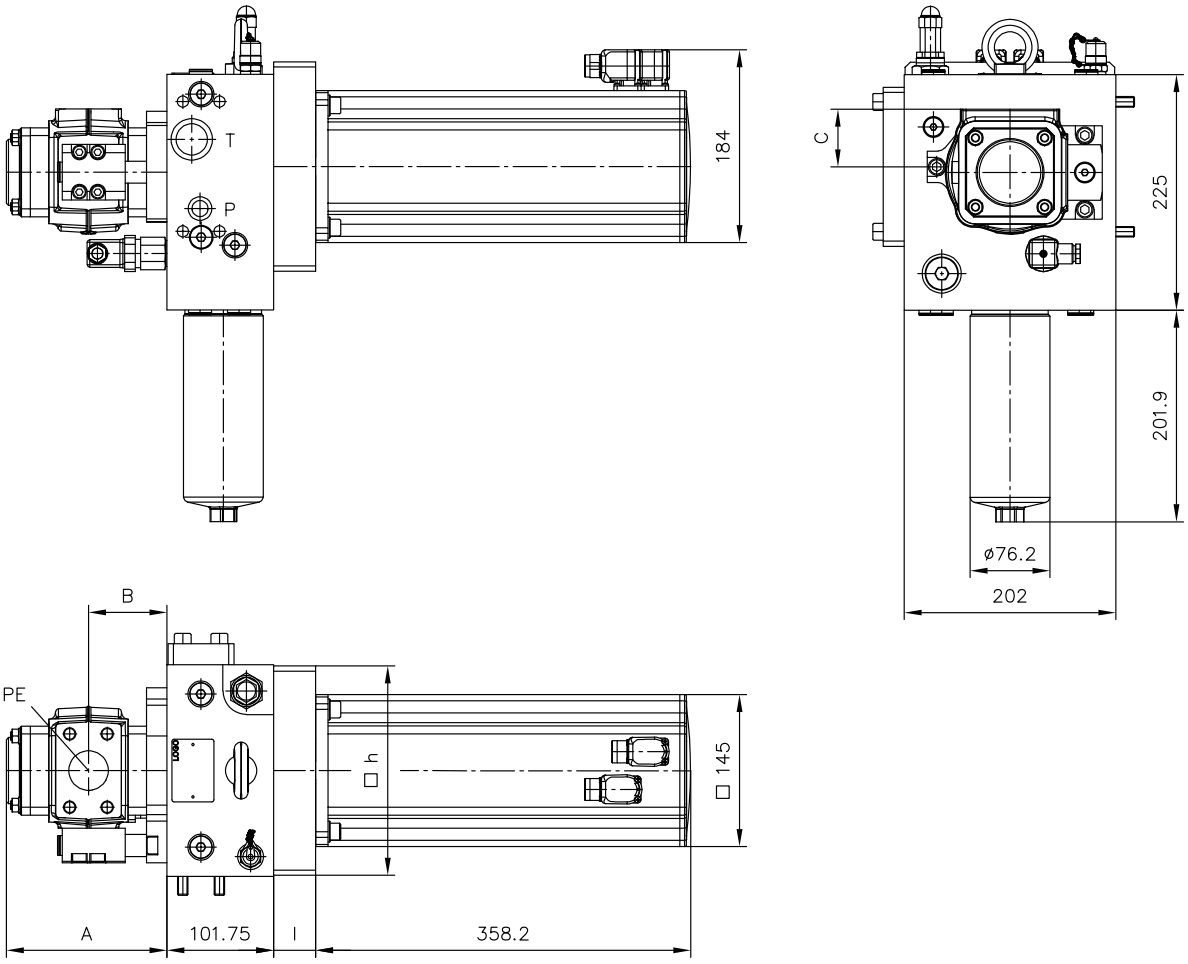
The performance data may vary (depends on the motor and converter being used).

4 Dimensions

All dimensions in mm, subject to change.

4.1 Servo power module

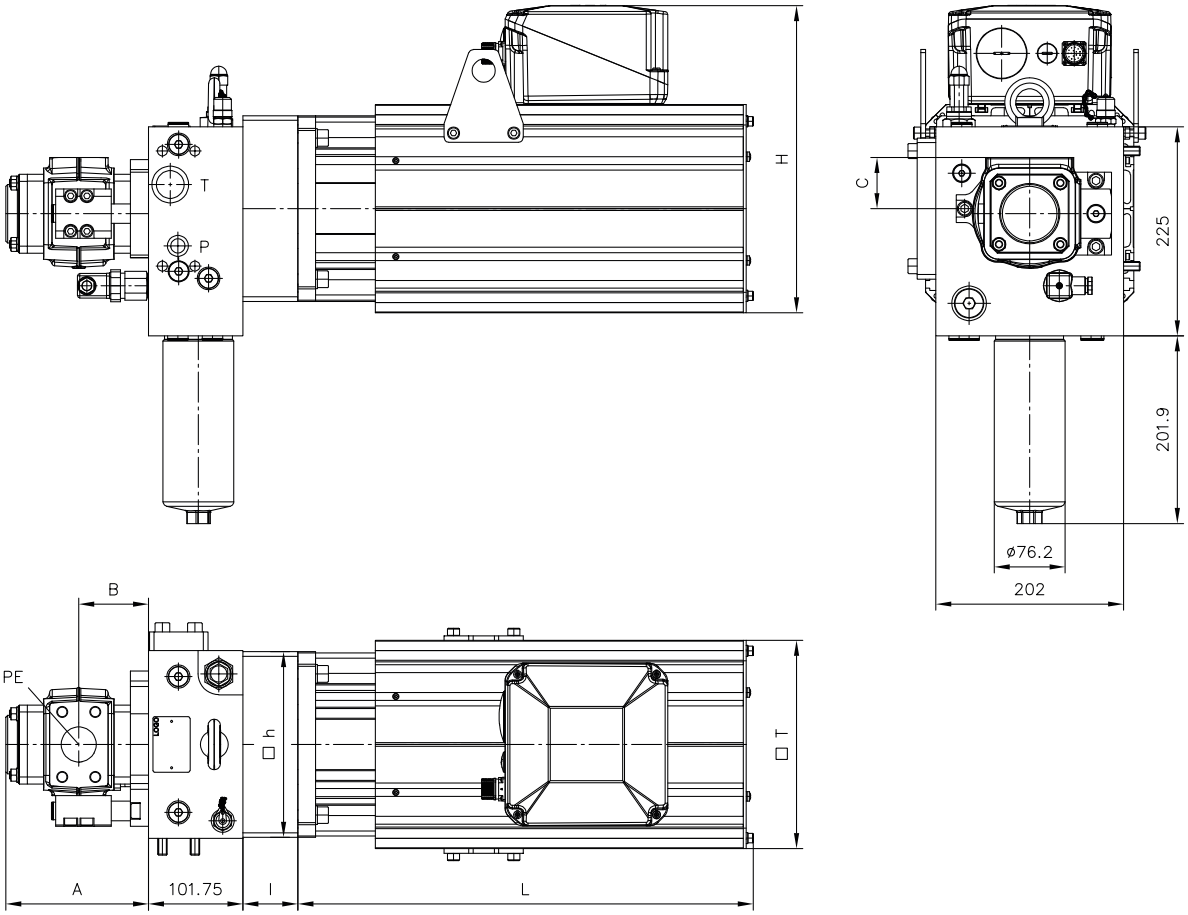
SPM 2 B-130/165/20-Z13-28-VE1



Pump	A	B	C
Z4	113.5	55	50
Z5	113.5	55	50
Z6	115.5	56	50
Z8	118.5	57.5	50
Z11	124.5	60.5	50
Z13	129.5	63	50
Z16	134.5	65.5	50
Z19	141.5	69	55
Z22	147.5	72	55
Z25	153.5	75	55

Coding for motor flange	h	l
130/165/20	160	20
130/165/40	200	40

SPM 2 B-180/215/59-Z19-42/42-VE1

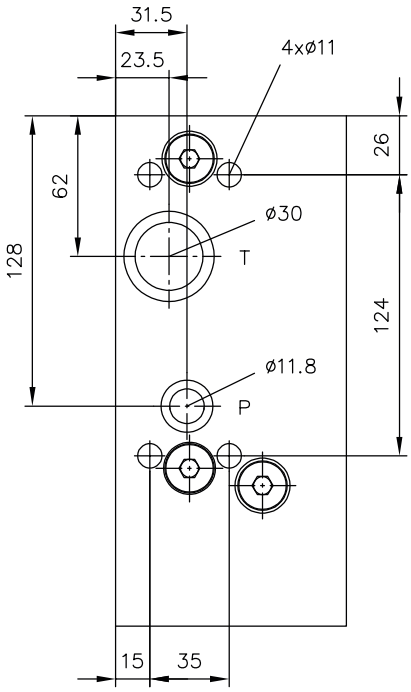


Pump	A	B	C
Z4	113.5	55	50
Z5	113.5	55	50
Z6	115.5	56	50
Z8	118.5	57.5	50
Z11	124.5	60.5	50
Z13	129.5	63	50
Z16	134.5	65.5	50
Z19	141.5	69	55
Z22	147.5	72	55
Z25	153.5	75	55

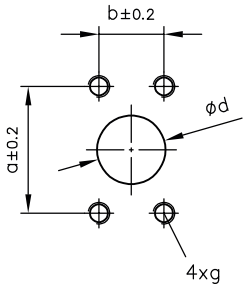
Coding for motor flange	h	l
200/215/40	200	40
200/215/59	200	59

Coding for motor unit	L	H	T
MU U31007A.25.3.R4.0.Y0.K.00	328	306.8	200
MU U31007F.25.3.R4.0.Y0.K.00	418.1	330.8	224
MU U31010F.30.3.R4.0.Y0.K.00	490.1	330.8	224

Pump carrier



Port PE

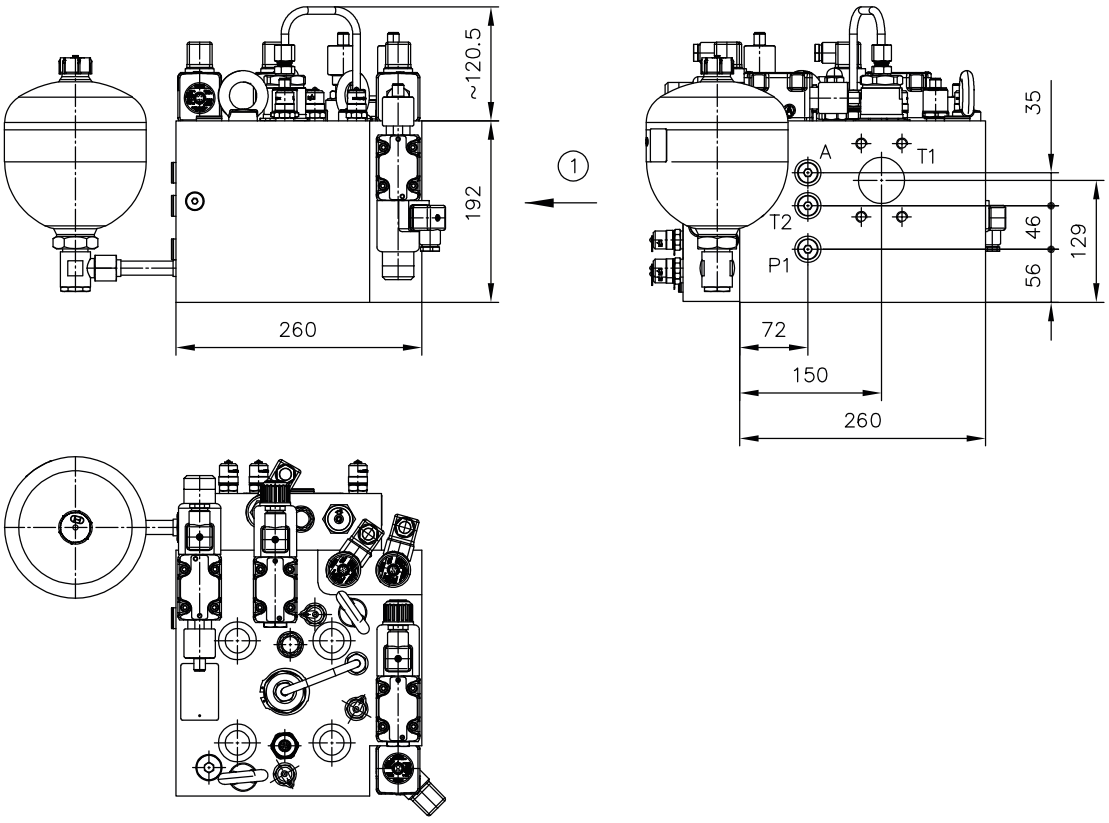


Pump	a	b	∅d	g	SAE
Z4	38.1	17.5	14	M8x15	1/2"
Z5	38.1	17.5	14	M8x15	1/2"
Z6	47.5	22	19	M10x16	3/4"
Z8	47.5	22	19	M10x16	3/4"
Z11	52.4	26.2	25	M10x17	1"
Z13	52.4	26.2	25	M10x17	1"
Z16	52.4	26.2	25	M10x17	1"
Z19	69.9	35.7	38.1	M12x23	1 1/2"
Z22	69.9	35.7	38.1	M12x23	1 1/2"
Z25	69.9	35.7	38.1	M12x23	1 1/2"

4.2 Cylinder module

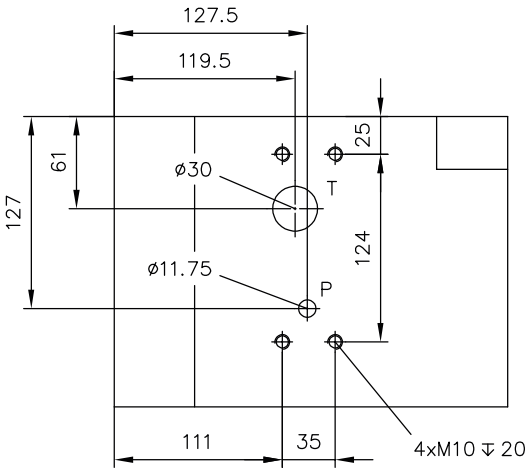
Cylinder module CM050 right

CM..050

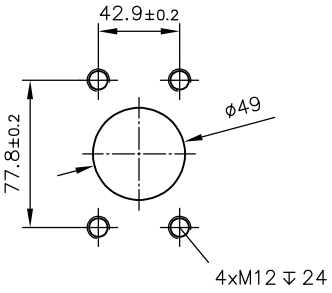


1 View X

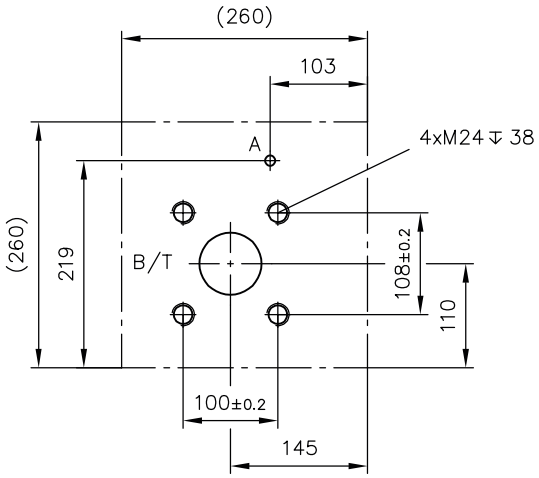
Port T and P (right)
(view X)

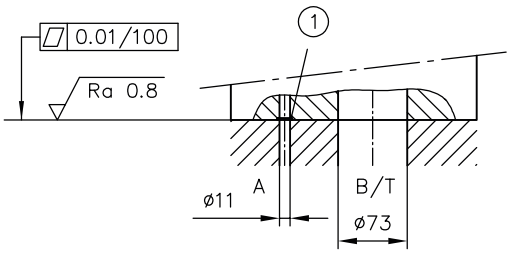


Port T1



Hole pattern of the base plate (right)

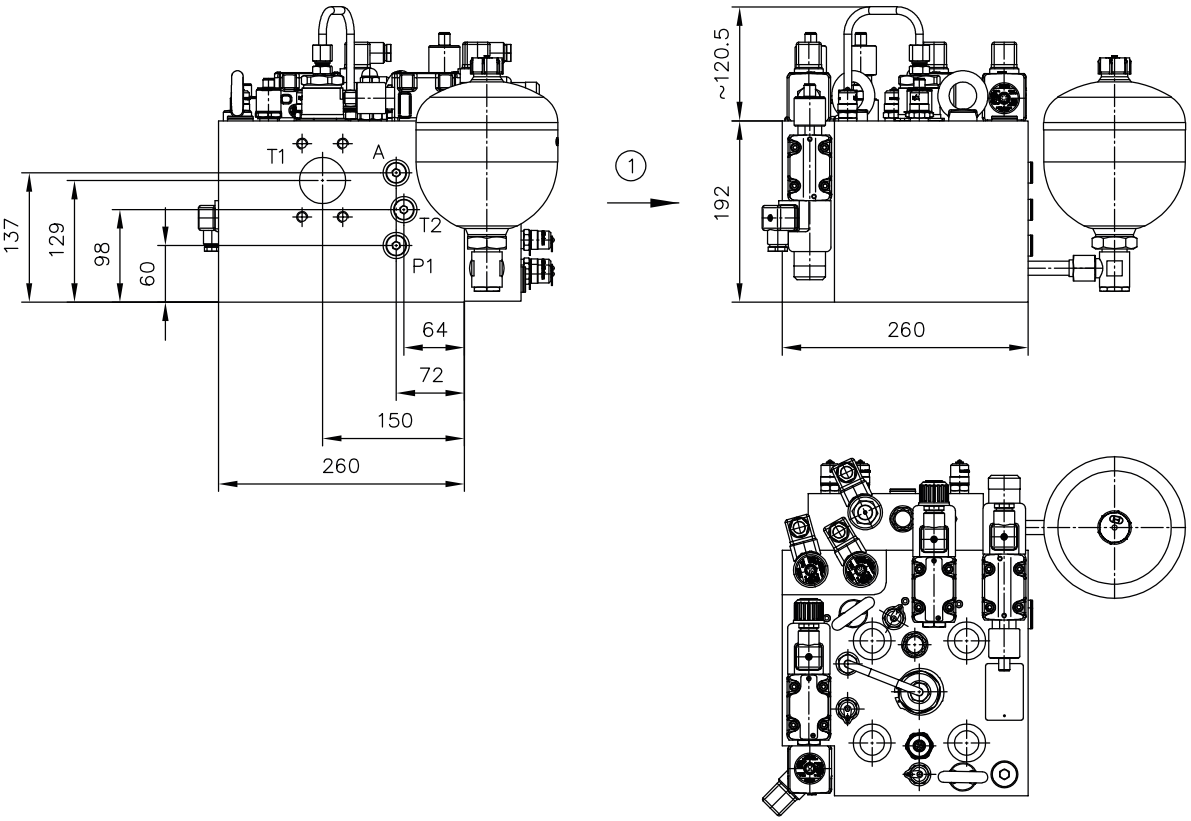




1 O-ring

Cylinder module CM050 left

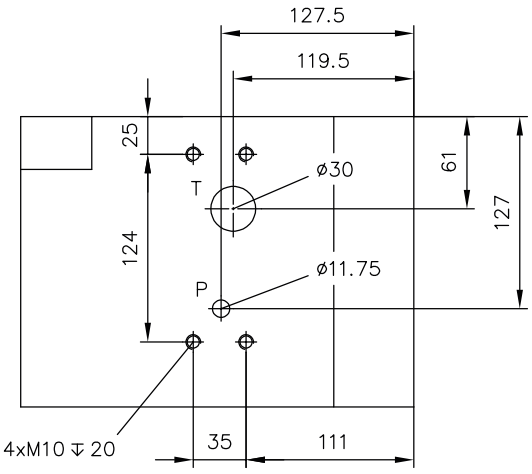
CM..050



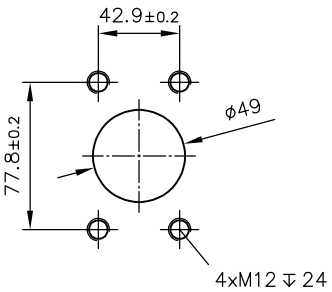
1 View X

Port T and P (left)

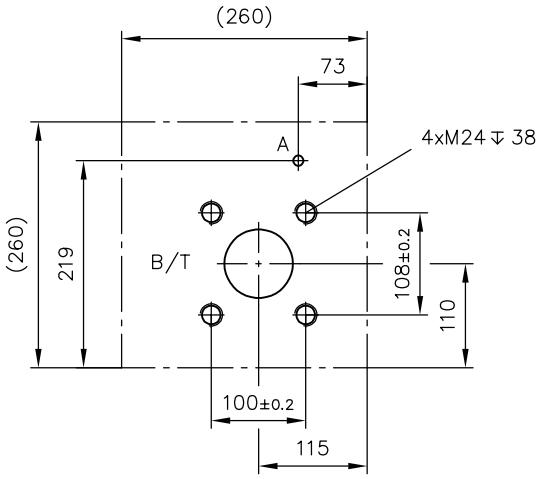
(view X)

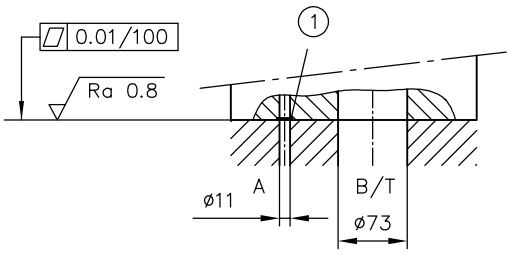


Port T1



Hole pattern of the base plate (left)

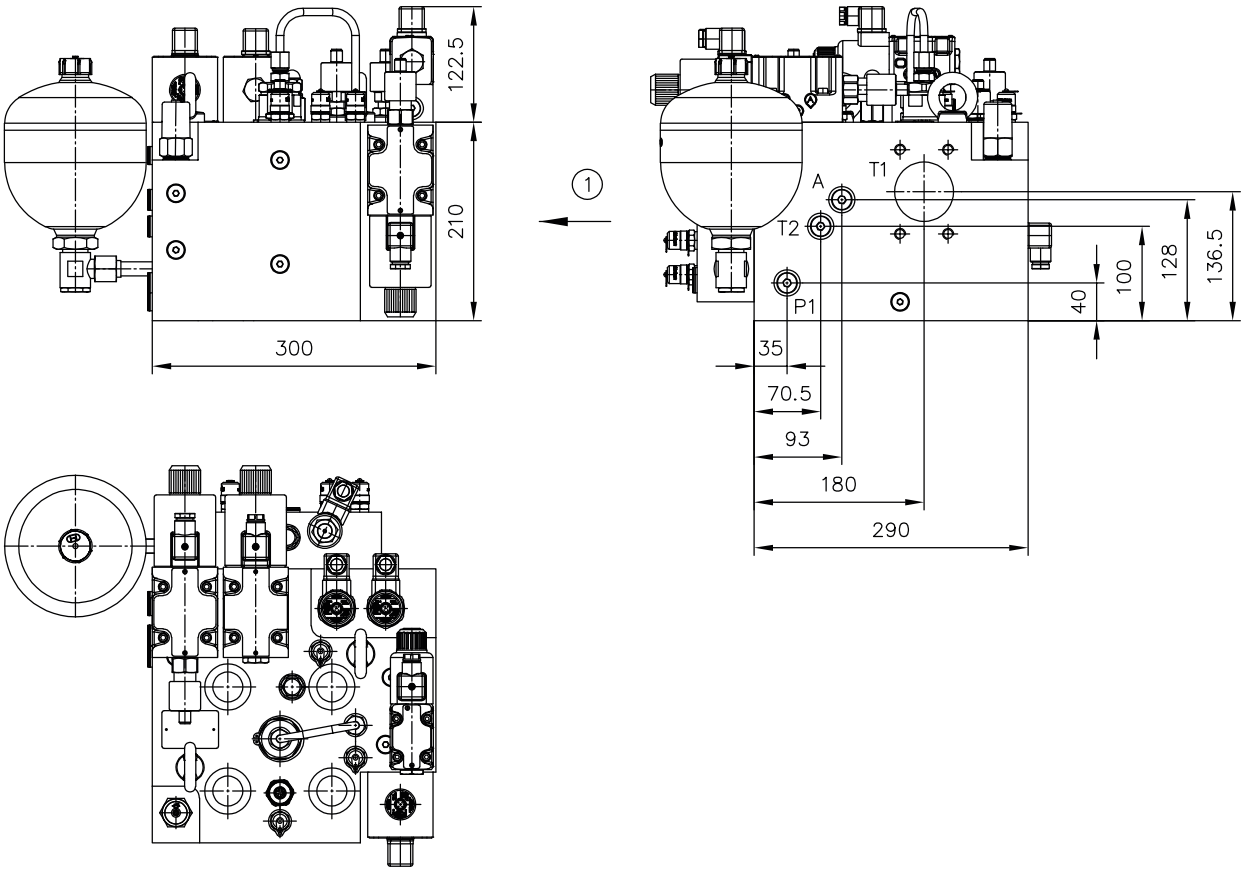




1 O-ring

Cylinder module CM063 right

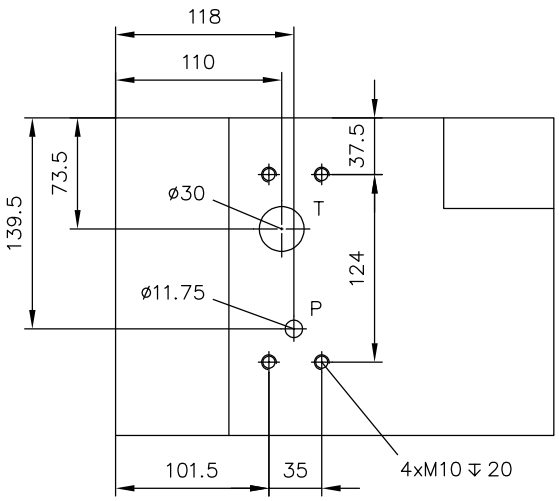
CM..063



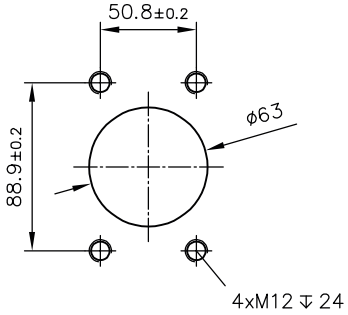
1 View X

Port T and P (right)

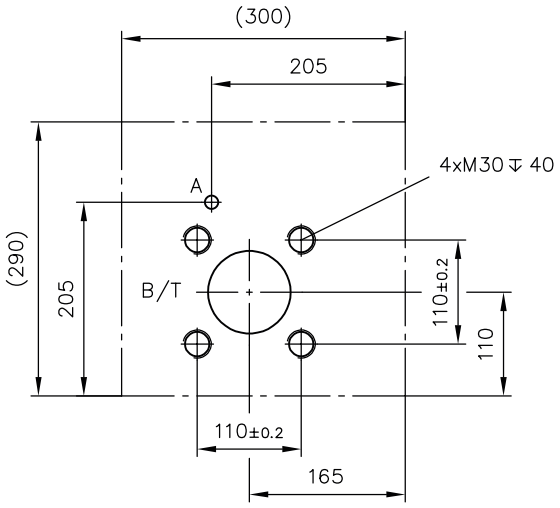
(view X)

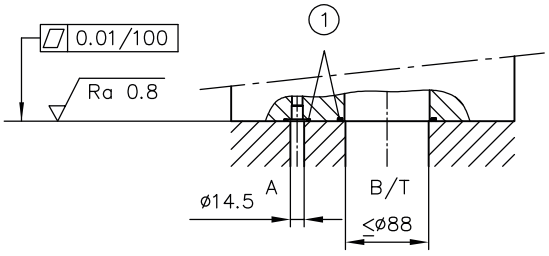


Port T1



Hole pattern of the base plate (right)

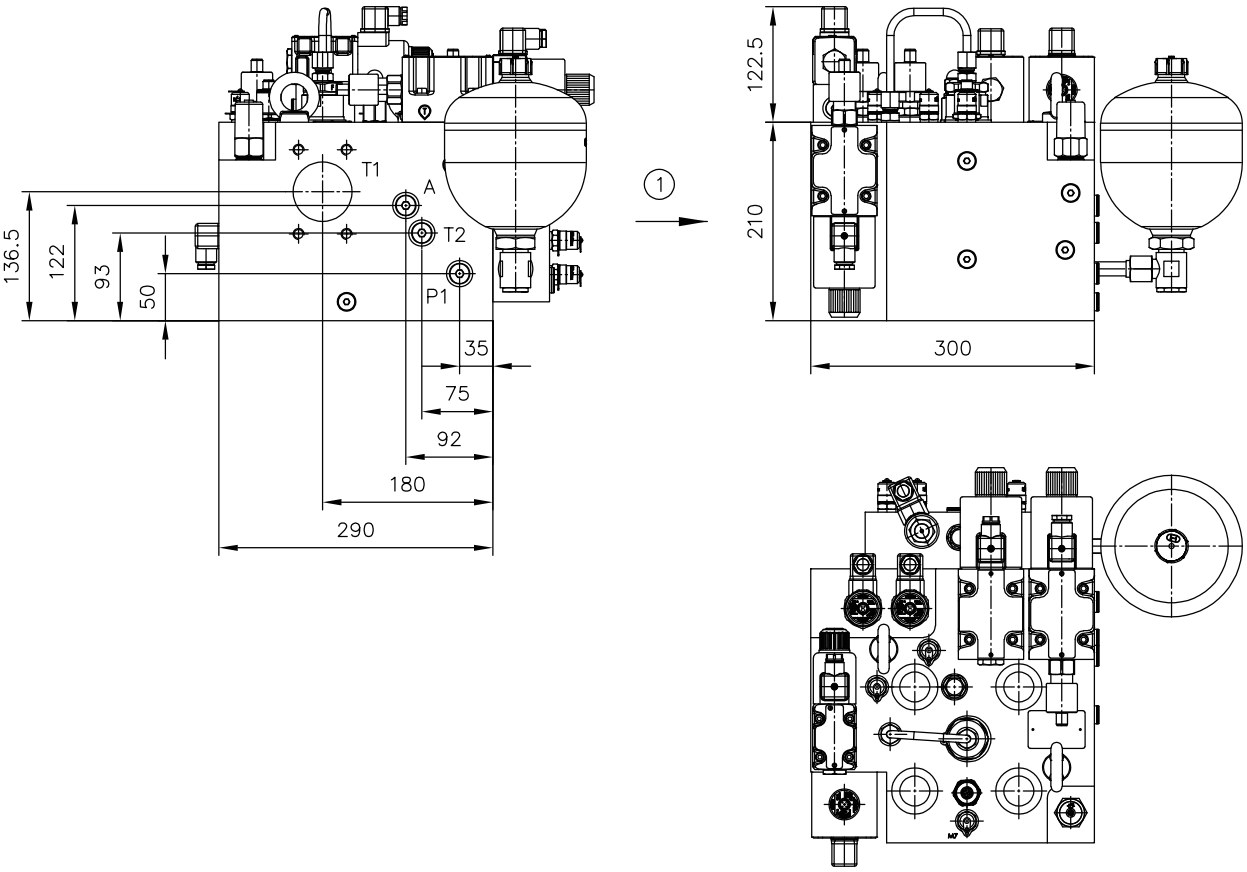




1 O-ring

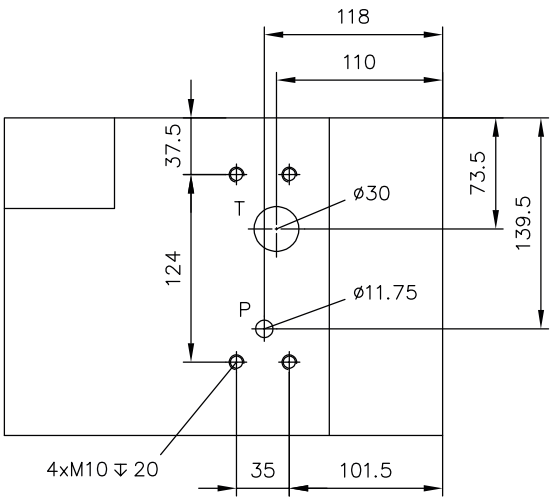
Cylinder module CM063 left

CM..063

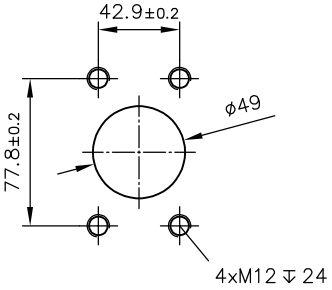


1 View X

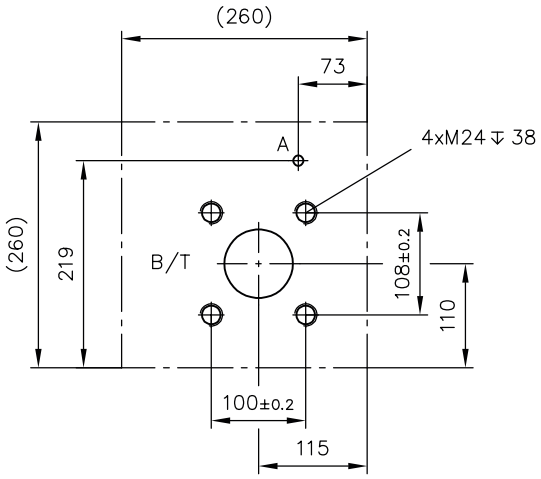
Port T and P (left)
(view X)

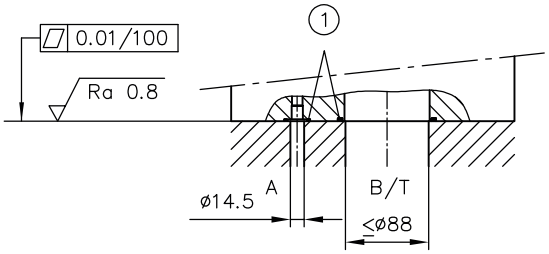


Port T1



Hole pattern of the base plate (left)

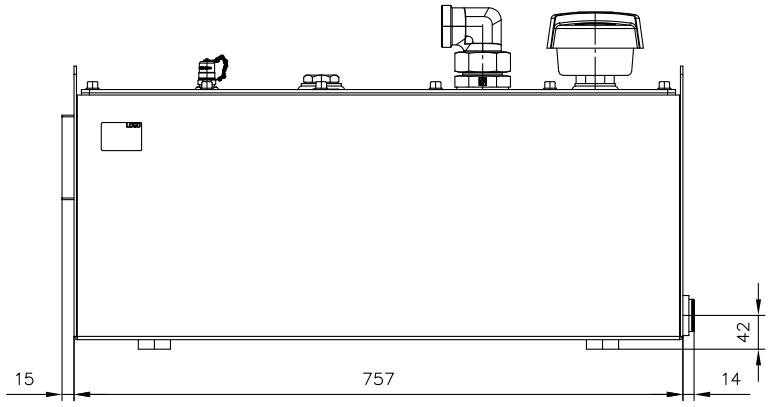


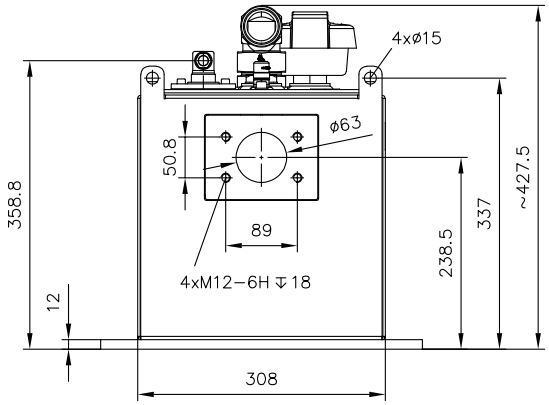


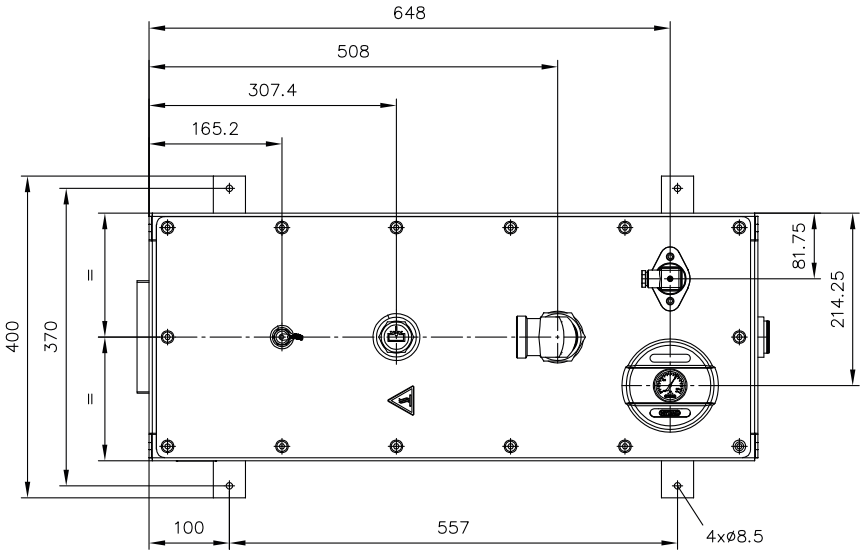
1 O-ring

4.3 Tank module

TM070H0001A0002X(B2)

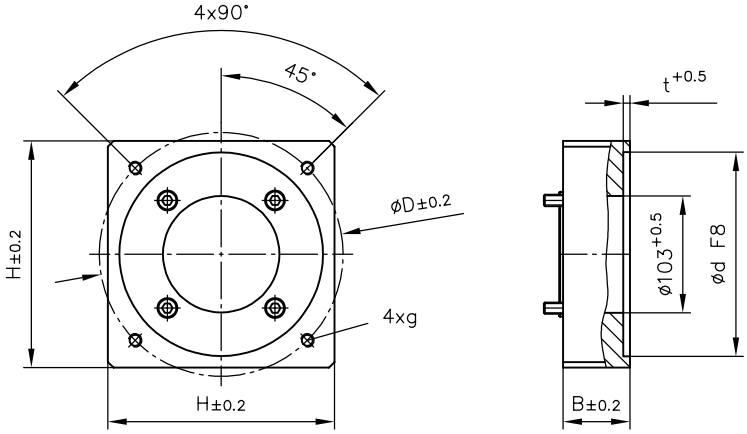






4.4 Motor flange

130/165/..
180/215/..

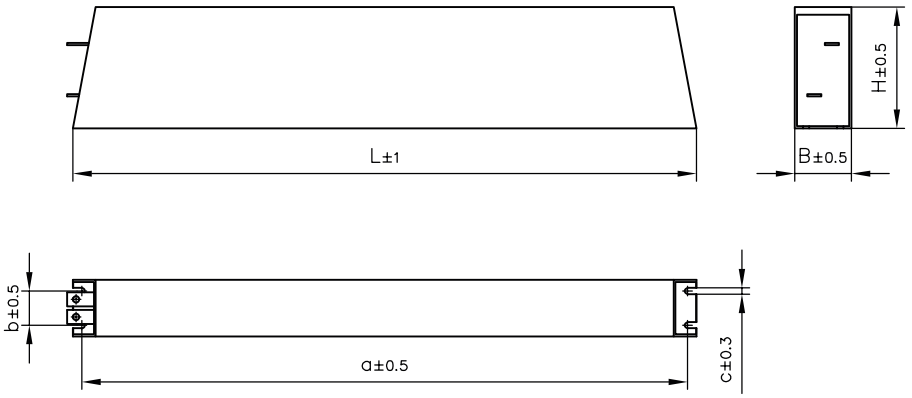


Coding	B	H	∅D	∅d	t	g
130/165/20	20	160	165	130	4	M10x13
130/165/40	40	200	165	130	6	M10x20
180/215/40	40	200	215	180	6	M12x24
180/215/59	59	200	215	180	6	M12x24

4.5 Additional options

4.5.1 Brake resistor

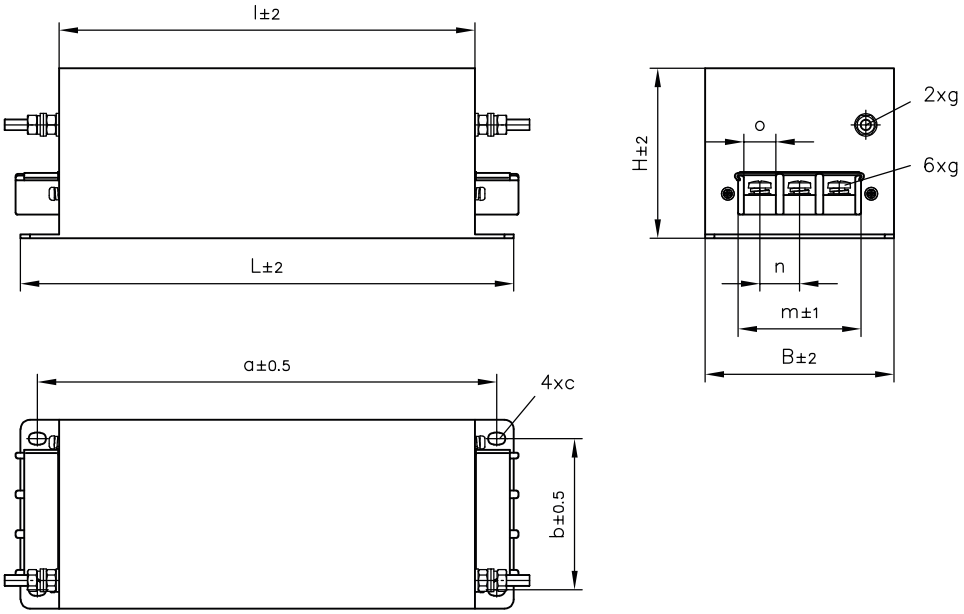
BR RXLG 800W
BR RXLG 1200W 12R
BR RXLG 1500W 3.5R
BR RXLG 2000W 7R



Coding	L	B	H	a	b	c
BR RXLG 800W 5R	400	50	107	382	30	6.1
BR RXLG 1200W 12R	450	50	107	434	30	6.1
BR RXLG 1500W 3.5R	485	50	107	470	30	6.1
BR RXLG 2000W 7R	550	50	107	532	30	6.1

4.5.2 Line filter

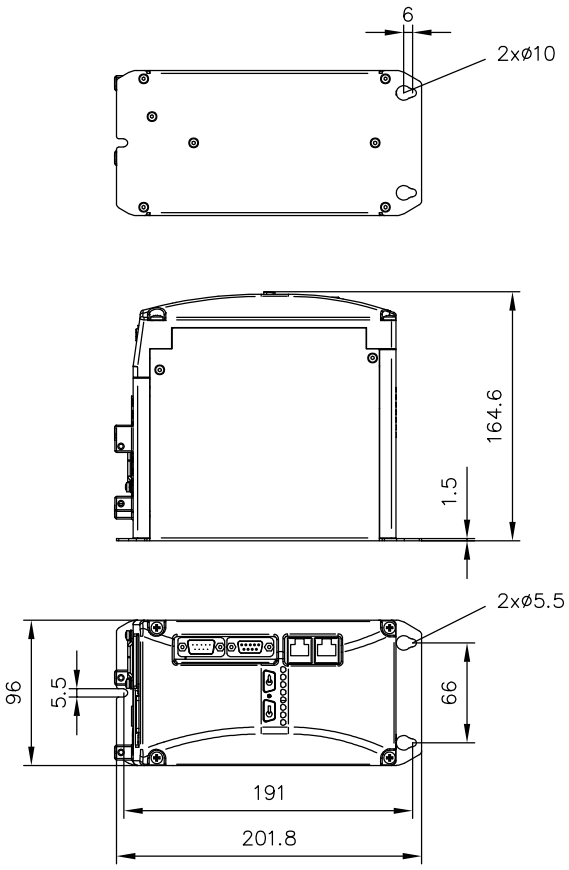
LF DL-10EBK5/40
LF DL-16EBK5/40
LF DL-25EBK5/40
LF DL-35EBK5/40
LF DL-50EBK5/40



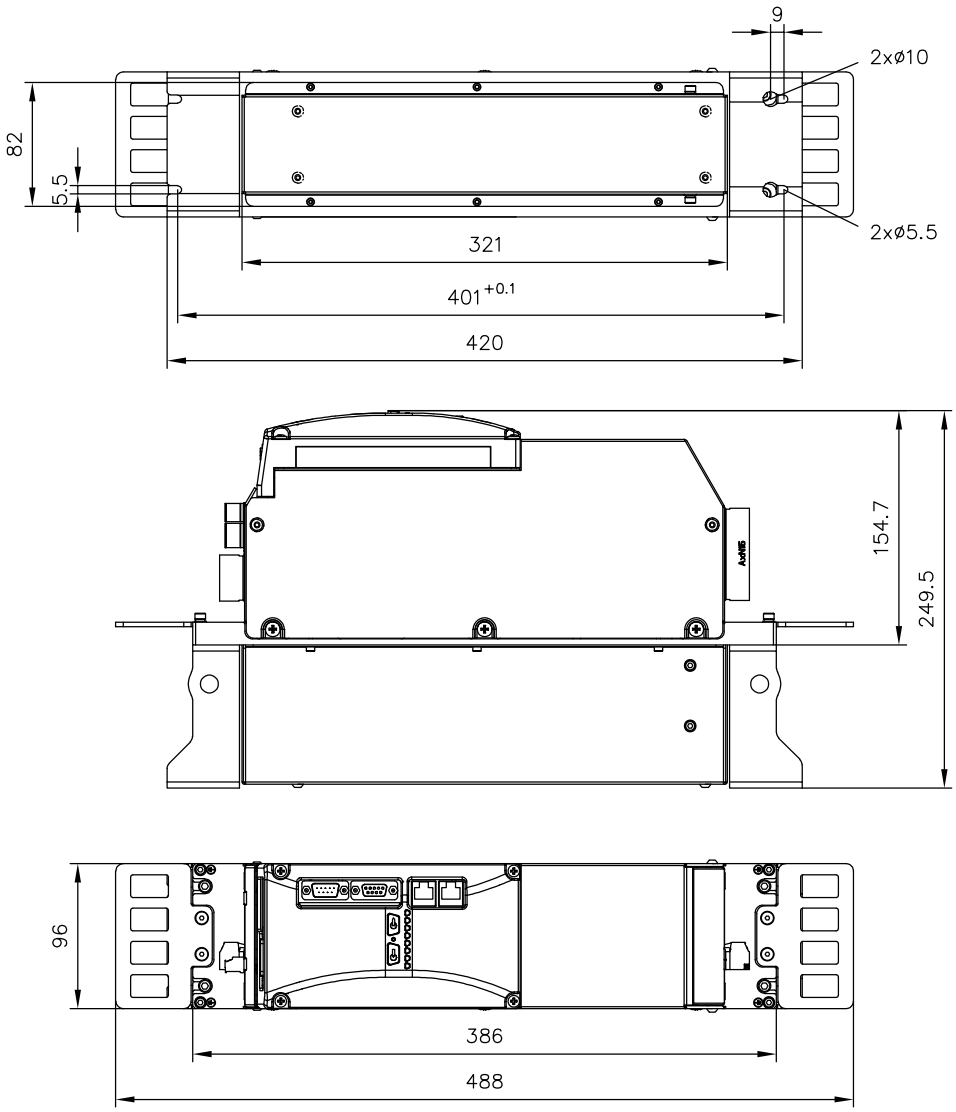
Coding	L	B	H	l	a	b	c	m	n	o	g
LF DL-10EBK5/40	204	86	58	160	184	70	6.4x9.4	50	16	12.4	M4
LF DL-16EBK5/40	204	86	58	160	184	70	6.4x9.4	50	16	12.4	M4
LF DL-25EBK5/40	261	100	90	220	243	80	6.4x9.4	65	21	17	M6
LF DL-35EBK5/40	261	100	90	220	243	80	6.4x9.4	66	21	18	M6
LF DL-50EBK5/40	261	100	90	220	243	80	6.4x9.4	66	21	18	M6

4.5.3 Converter

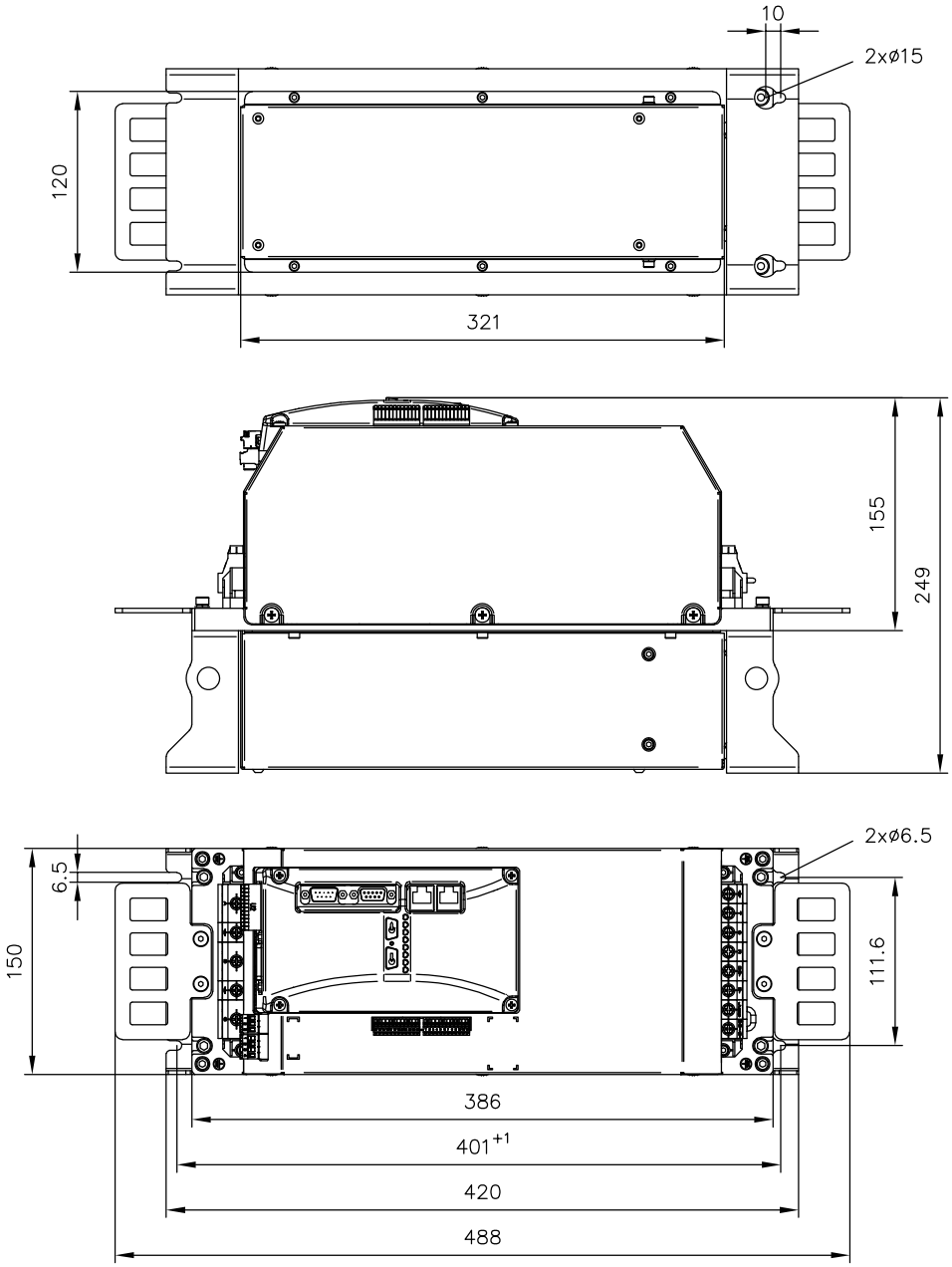
DC AxN 09.20.4C000F0000



DC AxN 15.30.4C000F0000

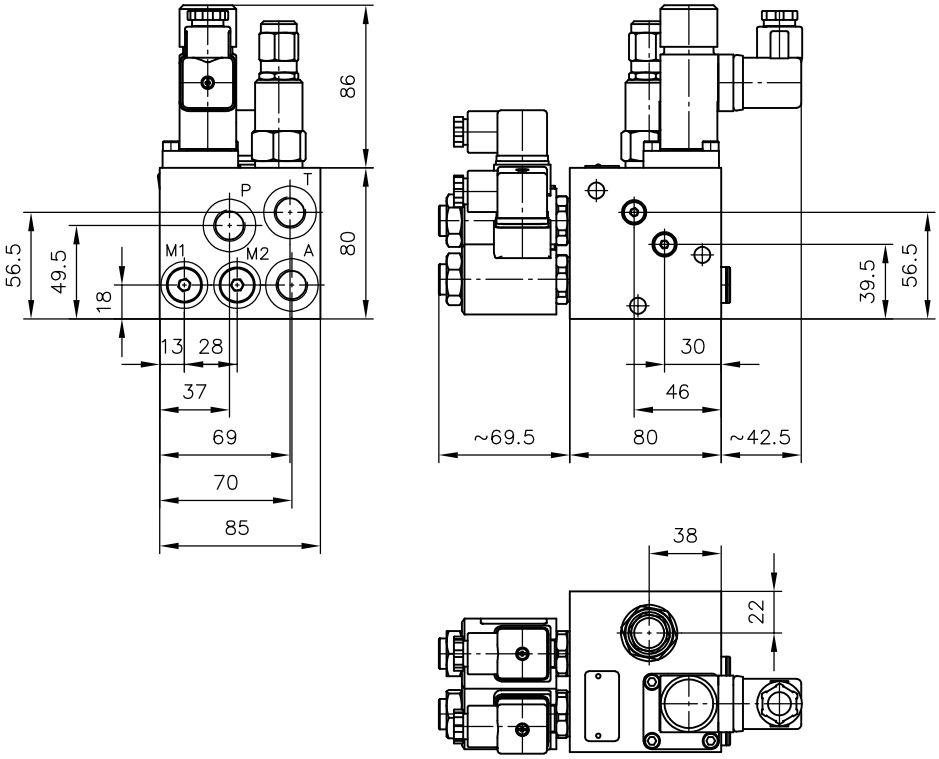


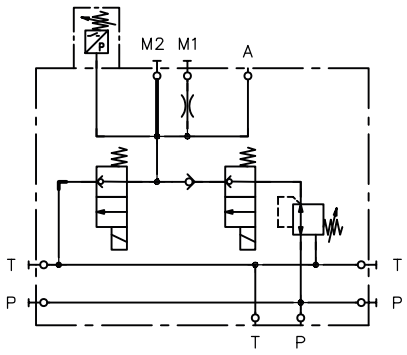
DC AxN 22.44.4C000F0000
DC AxN 35.70.4C000F0000
DC AxN 50.100.4C000F0000



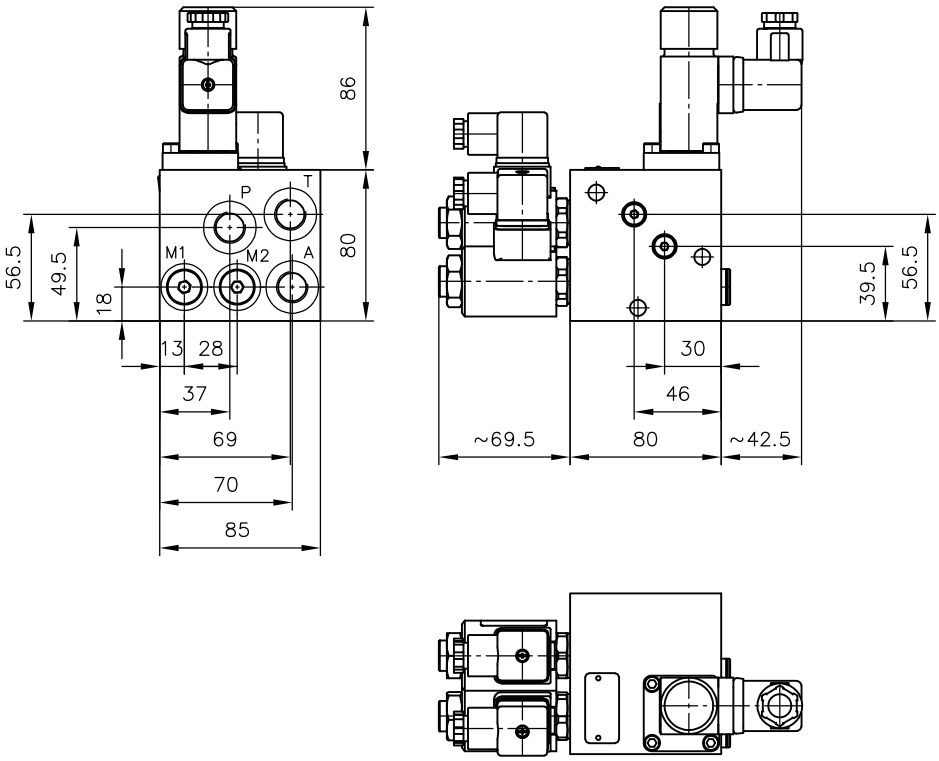
4.6 Accessories

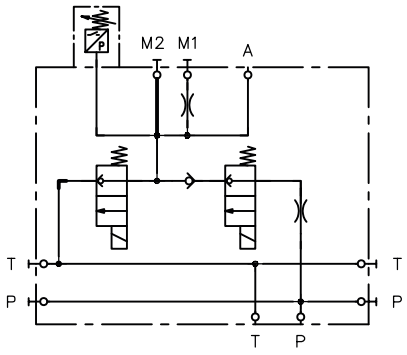
Tool clamping with pressure control





Tool clamping without pressure control





5 Installation, operation and maintenance information

NOTICE

Available for this product: assembly instructions with notes on

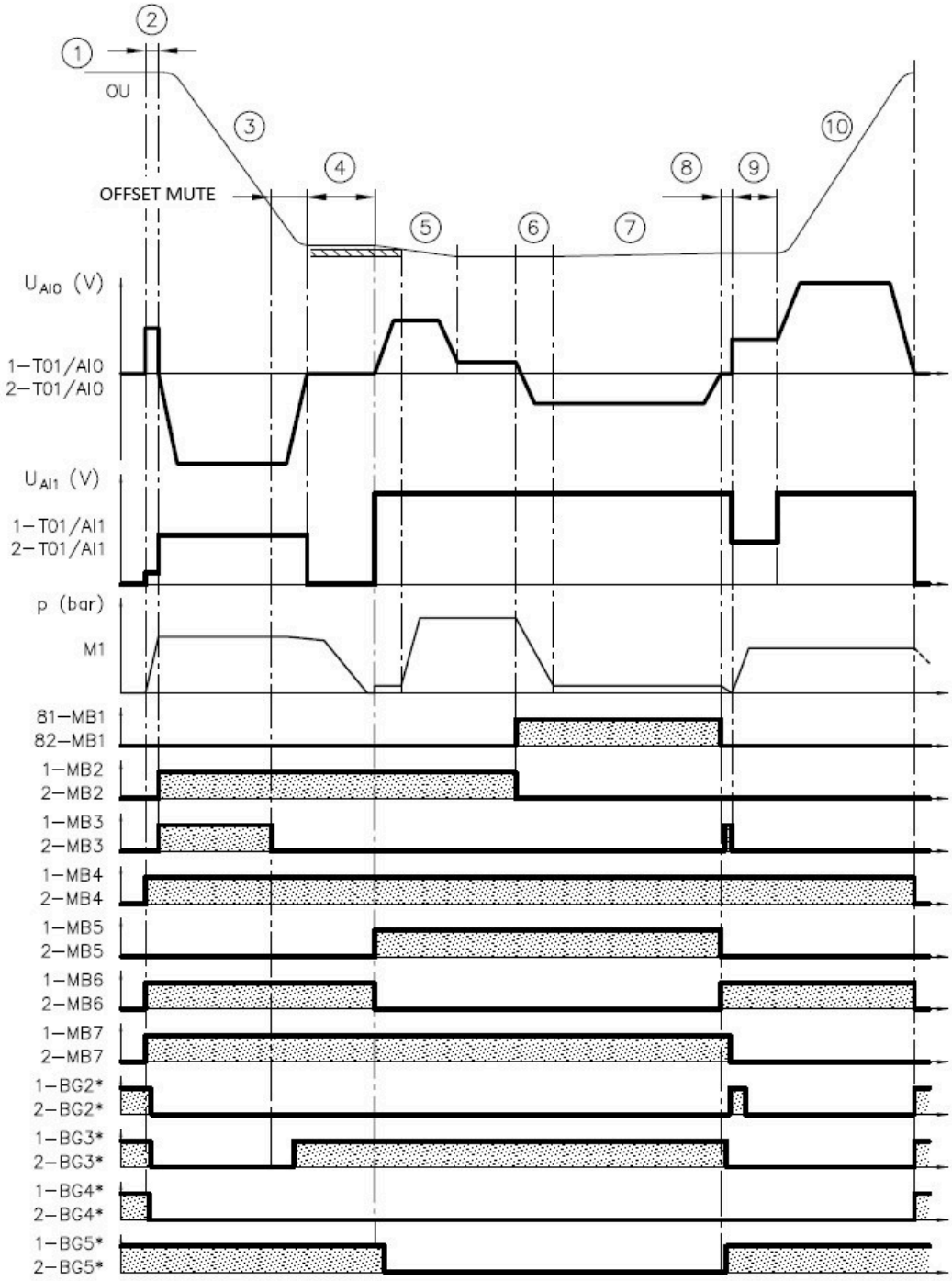
- Intended use,
- Operating and maintenance,
- Assembly information

Assembly instructions Control for CNC press brakes type ePrAX modular: B 6340

6 Other information

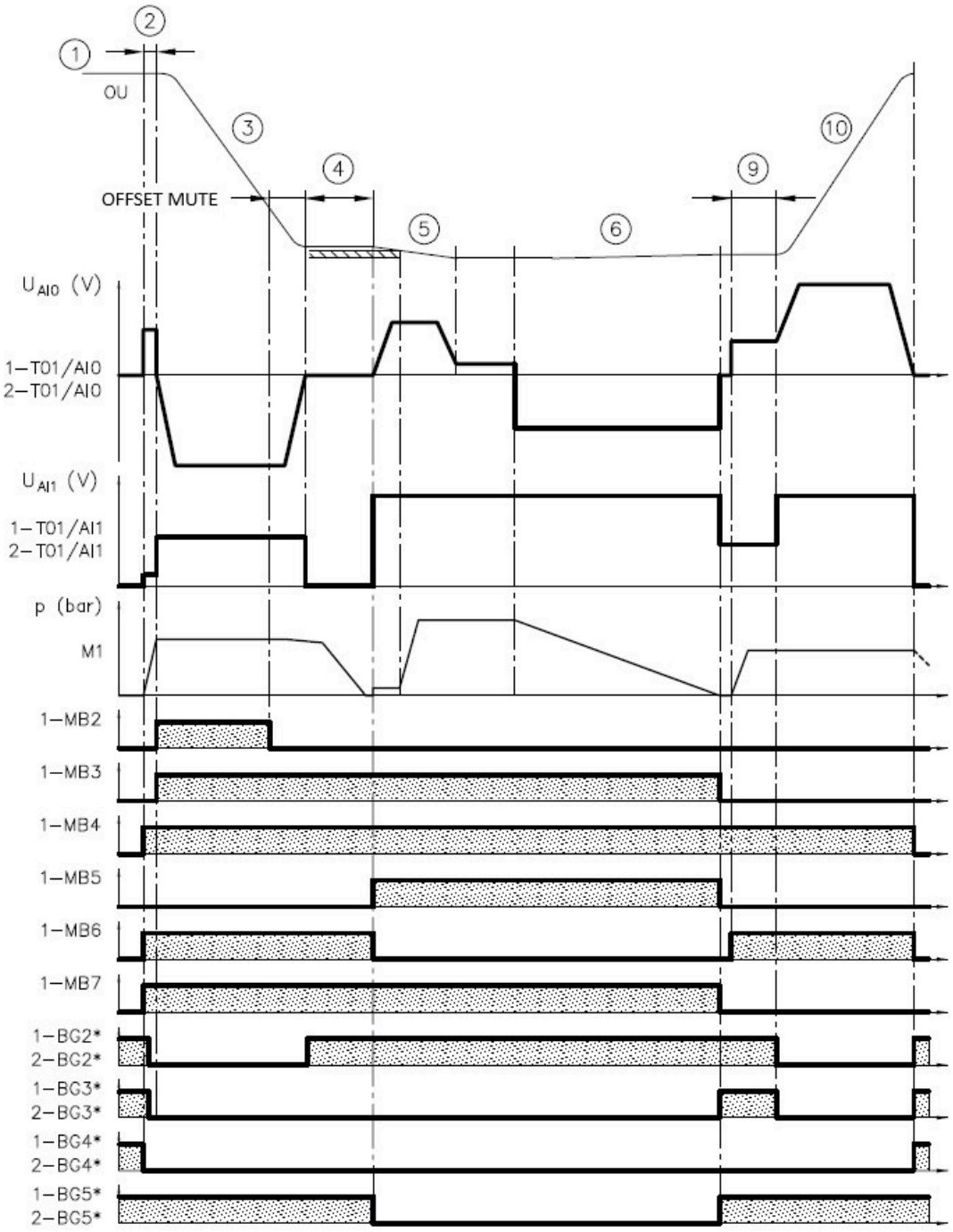
6.1 Functional diagram

Bending cycle with Slow Up option



1 IDLE
2 PRECLOSING
3 FAST DOWN
4 MUTE
5 WORKING SPEED
6 DECOMPRESSION
7 SLOW UP
8 WAIT
9 PREOPENING
10 FAST SPEED UP

Bending cycle without Slow Up option



1 IDLE
2 PRECLOSING
3 FAST DOWN
4 MUTE
5 WORKING SPEED
6 DECOMPRESSION
9 PREOPENING
10 FAST SPEED UP

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Phone +49 89 379100-1000 | info@hawe.de | www.hawe.com

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