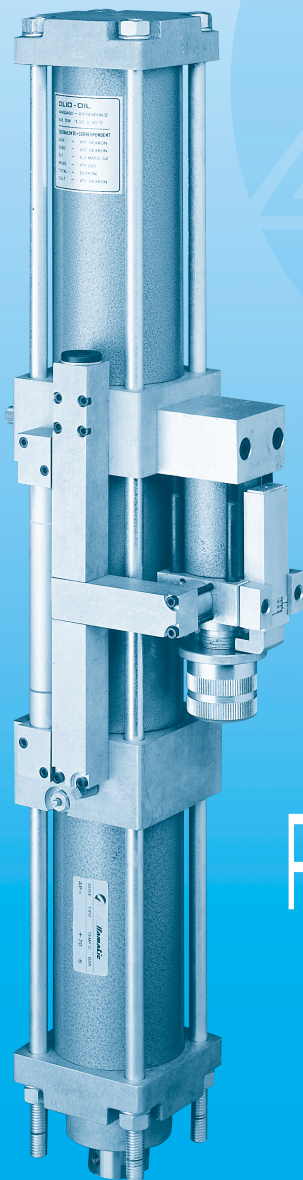




THE POWER OF HYDRAULICS
AT THE SPEED OF AIR



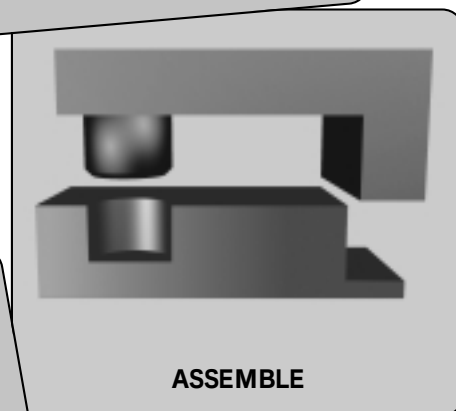
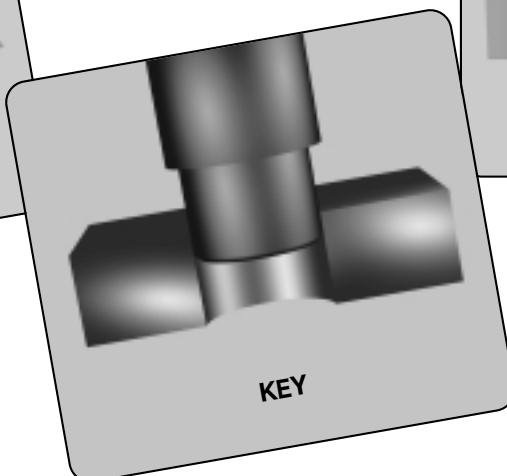
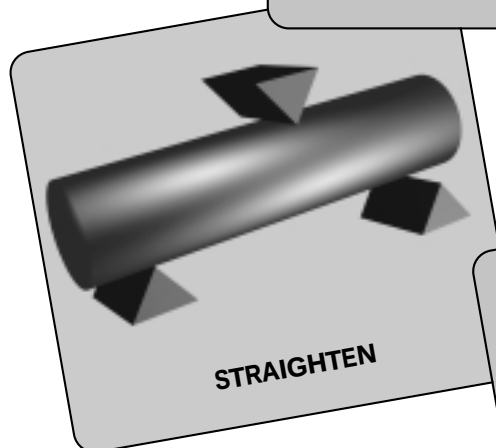
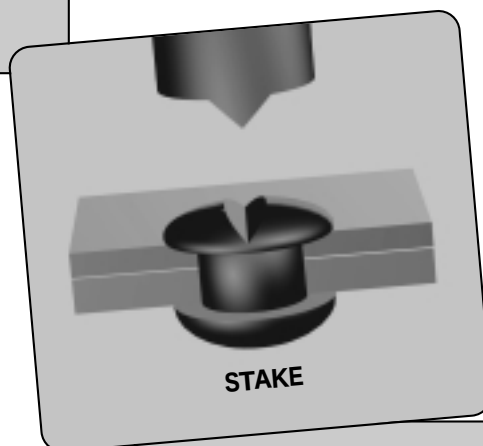
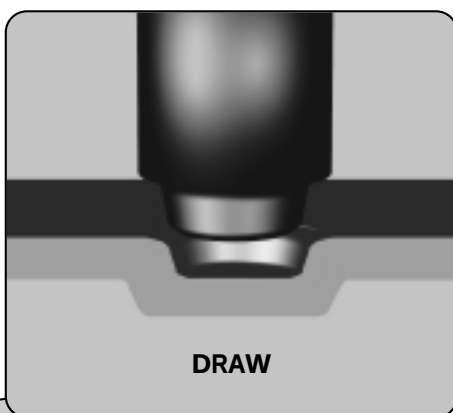
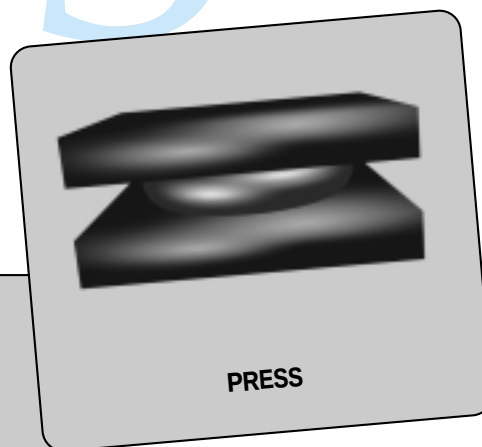
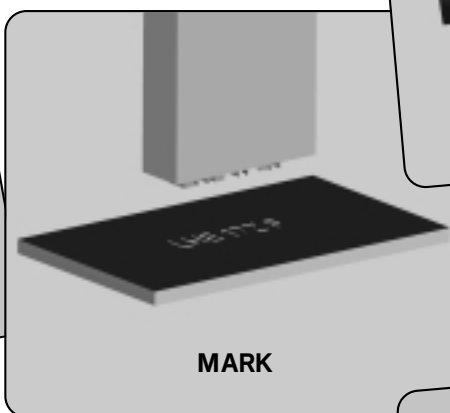
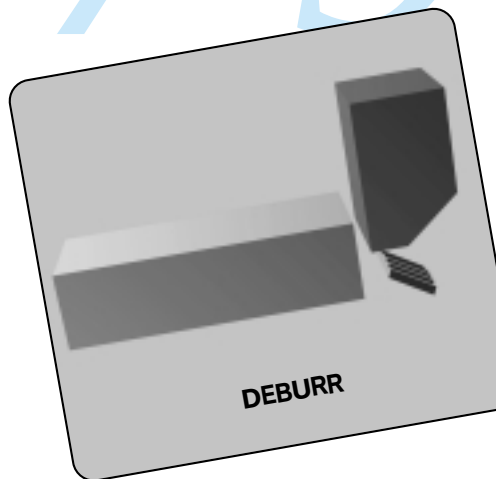
POWER CYLINDERS
HYDROPNEUMATIC
& MANUAL PRESSES

www.alfamatic.com

HYDROpneumatic power cylinders and presses

Standard Models

Versions to...



Sizes with Capacities Ranging from 1,350 to 106,000 lbs.

Visit our website at:
www.alfamatic.com

ALFAMATIC POWER CYLINDERS are an excellent combination of flexibility and simplicity.

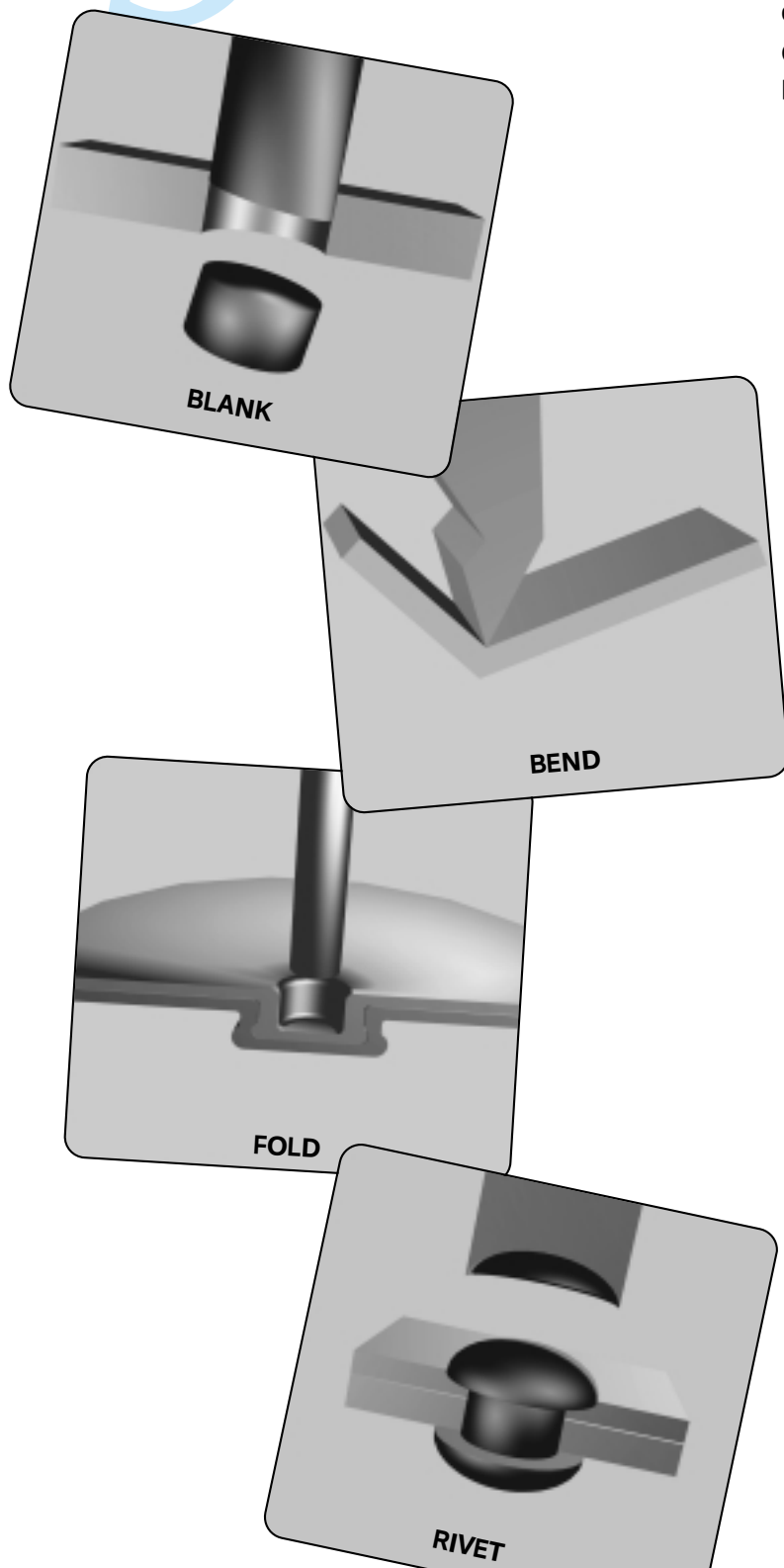
These cylinders are a combination of two principals, namely: the speed of compressed air and the power of hydraulics.

Our practical experience in this design give us a product that offers high cycling and long life.

- **SPEED**
- **QUIET OPERATION**
- **ECONOMIC RUNNING**
- **VERSATILITY IN APPLICATION**
- **MAXIMUM SAFETY**

Table of Contents

Features & Benefits	.2
POWER CYLINDERS	
AP Series	.3
AX Series	.4
UP Series	.5
Standard Features	.6
Stroke Adjustment Options	.7
Options	.8
Electronic Position Sensing	.9
Application Versatility	.10
Circuits	.11
DRAWINGS & DIMENSIONAL FEATURES	
AP SERIES	
AP-0840 - AP-0950	.12-13
AP-1063 - AP-16200	.14-15
Options	.16-17
AX SERIES	.18-19
Options	.20-21
UP SERIES	.22-23
WORK ORIENTATIONS	
AP Series	.24-25
AX Series	.26
UP Series	.27
SENSORS FOR MG UNITS AND ELECTRIC CIRCUIT	.28
PERFORMANCE - CEL, ENI	.29
ORDERING CODE	.30
PRESSES	.31
OP 2M Series	.32-33
OP 2MI Series	.34-35
OP P Series	.36-37
Press Options	.38
Electronic Production Control Systems	.39
ORDERING CODE	.40
TROMBOLINE	.41
Features	.42-43
Performances/Dimensions	.44-45
ORDERING CODE	.46
ALFA-CHECK	
Hydraulic Speed Control Units	.47-49
Operation	.50
PRESSURE MULTIPLIERS	.51-53
ORDERING CODE	.54
METRIC CONVERSION TABLE	.55
APPLICATION INFORMATION/DATA	.56



Why Use Alfamatic Power Cylinders



The Power of Hydraulics at the Speed of Air

INDEPENDENT STROKE CONTROL

The Alfamatic Power Cylinders are designed so that the work and approach strokes can be run independently. This allows for flexible stroke sequencing i.e.....

Sequence	1	Approach + Work + Work
Sequence	2	Approach + Work + Approach + Work
Sequence	3	Work + Approach

APPLICATION VERSATILITY

Thanks to the provision for subdividing the total stroke into two distinct, independent phases which can be actuated alternatively, the power cylinder is well able to carry out various functions within the work cycles (*refer to page 10*).

STROKE ADJUSTMENT

Alfamatic has many styles of stroke adjustment: Working stroke limit valve, Position device and Stroke Adjusters (*refer to page 7*).

OPERATING SPEEDS

With approach speeds up to 800 mm/sec. (31.5 in./sec.) and work speeds up to 111 mm/sec. (4.37 in./sec.), Alfamatic offers high speed alternatives to conventional hydraulic systems.

OPTIONS

A full range of options available for the Alfamatic power cylinders.

STANDARD FEATURES

With a large number of standard features, Alfamatic supplies a unit that is simple to operate and easy to maintain. Cushions are standard on the return stroke. All units are supplied with an oil level indicator. Oil can be replenished without a pump.

LONGER STROKES

The design of the power cylinders allows for longer working strokes (*please contact Alfamatic with your application*).

QUALITY CONTROL

The Alfamatic CSQ system allows you to monitor your system and reduce costs (*please contact Alfamatic for information*).

SPECIALS

The Alfamatic Cylinder design allows for easy production of specials, please consult the factory for details

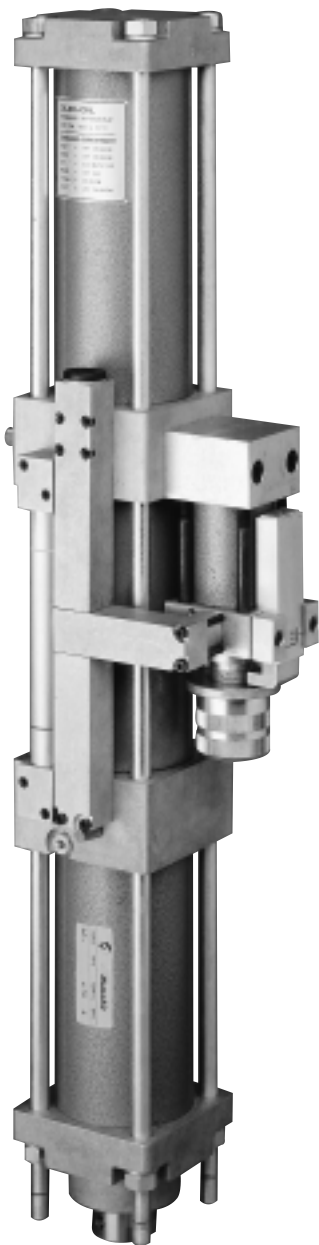


AP In Line Series

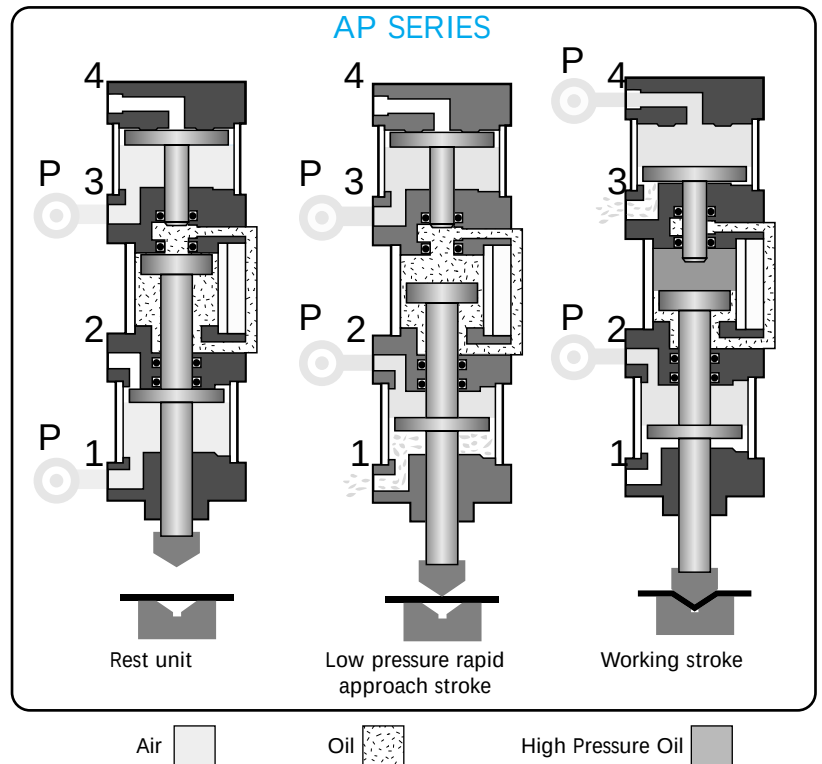
The power cylinders consist essentially of an air cylinder and a built-in hydraulic intensifier. As a result, the full stroke can be subdivided into two distinct phases:

- a low pressure rapid approach stroke
- a working stroke, where force is increased through the intensifier. When the moving ram meets a resistance at any point during its travel, the working stroke can then be engaged.

Their reliability, thanks to their simple design and constant quality control, is proven by more than 30,000 units at work throughout the world.



← Working stroke limit valve optional



Power fluid: filtered compressed and lubricated air. Operating pressure: max. 7(100 pst) bar - Temperature: -20°, +60° C. (-4, 140°F)

FORCE	Part Number	AP 0840	AP 0950	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
Power stroke	lbs @ 100 psi	1,343	1,850	3,675	7,476	13,305	20,705	33,959	53,093	106,185
	kg @ 7 bar	618	852	1,692	3,442	6,125	9,532	15,633	24,442	48,883
Power stroke	lbs/psi	13.4	18.5	36.7	74.8	133.0	207.0	339.6	530.9	1,061.9
	kg/bar	88.3	121.7	241.7	491.7	875.0	1,361.7	2,233.3	3,491.7	6,983.3
Approach stroke	lbs @ 100 psi	157	289	411	699	1,085	1,756	2,803	4,521	4,521
	kg @ 7 bar	72	133	189	322	499	809	1,290	2,081	2,081
Retract stroke	lbs @ 100 psi	109	180	322	530	684	1,021	1,685	3,404	3,404
	kg @ 7 bar	50	83	148	244	315	470	776	1,567	1,567

* note thrusts are proportional to input pressures.

SPEED	Part Number	AP 0840	AP 0950	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
Approach stroke	mm/sec.	800	800	710	600	480	400	310	250	250
	in./sec.	31.52	31.52	27.97	23.64	18.91	15.76	12.21	9.85	9.85
Working stroke	mm/sec.	111	127	91	61	42	35	27	22	22
	in./sec.	4.37	5.00	3.59	2.40	1.65	1.38	1.06	.87	.87

STROKES

Total stroke	mm	30	60	115	165	215	Total stroke	in.	1.18	2.36	4.53	6.50	8.47
	mm	5	5	5	5	5		in.	0.20	0.20	0.20	0.20	0.20
Working stroke	mm	10	10	10	10	10	Working stroke	in.	0.39	0.39	0.39	0.39	0.39
	mm	15	15	15	15	15		in.	0.59	0.59	0.59	0.59	0.59

Special strokes upon request. Special strokes may change overall length. Please consult factory for details.

Refer to circuit drawing on page 11

AX Compact Series

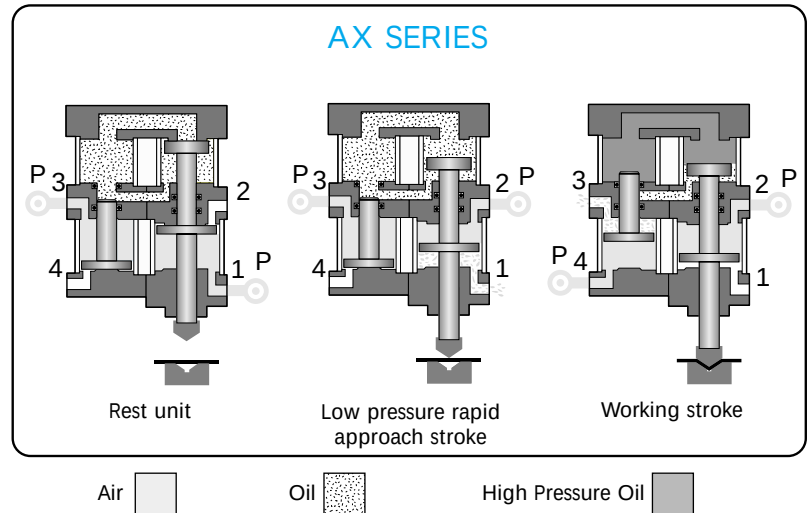
AX Series Power Cylinders have the same technical and functional characteristics as the AP Series.

Thanks to their compact shape, the AX Series can be used when lower overall height is required.

The AX Series configuration allows longer standard approach and working strokes, than the AP Series.



← Working stroke limit valve optional



Power fluid: filtered compressed and lubricated air. Operating pressure: max. 7(100 pst) bar - Temperature: -20°, +60° C. (-4, 140°F)

FORCE

	Part Number	AX 0840	AX 0950	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200	AX 16200
Power stroke*	lbs @ 100 psi	1,343	1,850	3,675	7,476	13,305	20,705	33,959	53,093	106,185
	kg @ 7 bar	618	852	1,692	3,442	6,125	9,532	15,633	24,442	48,883
Power stroke*	lbs/psi	13.4	18.5	36.7	74.8	133.0	207.0	339.6	530.9	1,061.9
	kg/bar	88.3	121.7	241.7	491.7	875.0	1,361.7	2,233.3	3,491.7	6,983.3
Cylinders c/w XR option	lbs @ 100 psi	1,216	1,685	3,168	5,981	11,404	16,523	25,495	33,959	n/a
	kg @ 7 bar	560	776	1,458	2,753	5,250	7,607	11,737	15,633	n/a
Approach stroke*	lbs @ 100 psi	157	289	411	699	1,085	1,756	2,803	4,521	4,521
	kg @ 7 bar	72	133	189	322	499	809	1,290	2,081	2,081
Retract stroke	lbs @ 100 psi	109	180	322	530	684	1,021	1,685	3,404	3,404
	kg @ 7 bar	50	83	148	244	315	470	776	1,567	1,567

* note thrusts are proportional to input pressures.

SPEED

	Part Number	AX 0840	AX 0950	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200	AX 16200
Working stroke	mm/sec	111	127	91	61	42	35	27	22	22
	in./sec	4.37	5.00	3.59	2.40	1.65	1.38	1.06	0.87	0.87
Approach stroke	mm/sec	800	800	710	600	480	400	310	250	250
	in./sec	31.52	31.52	27.97	23.64	18.91	15.76	12.21	9.85	9.85

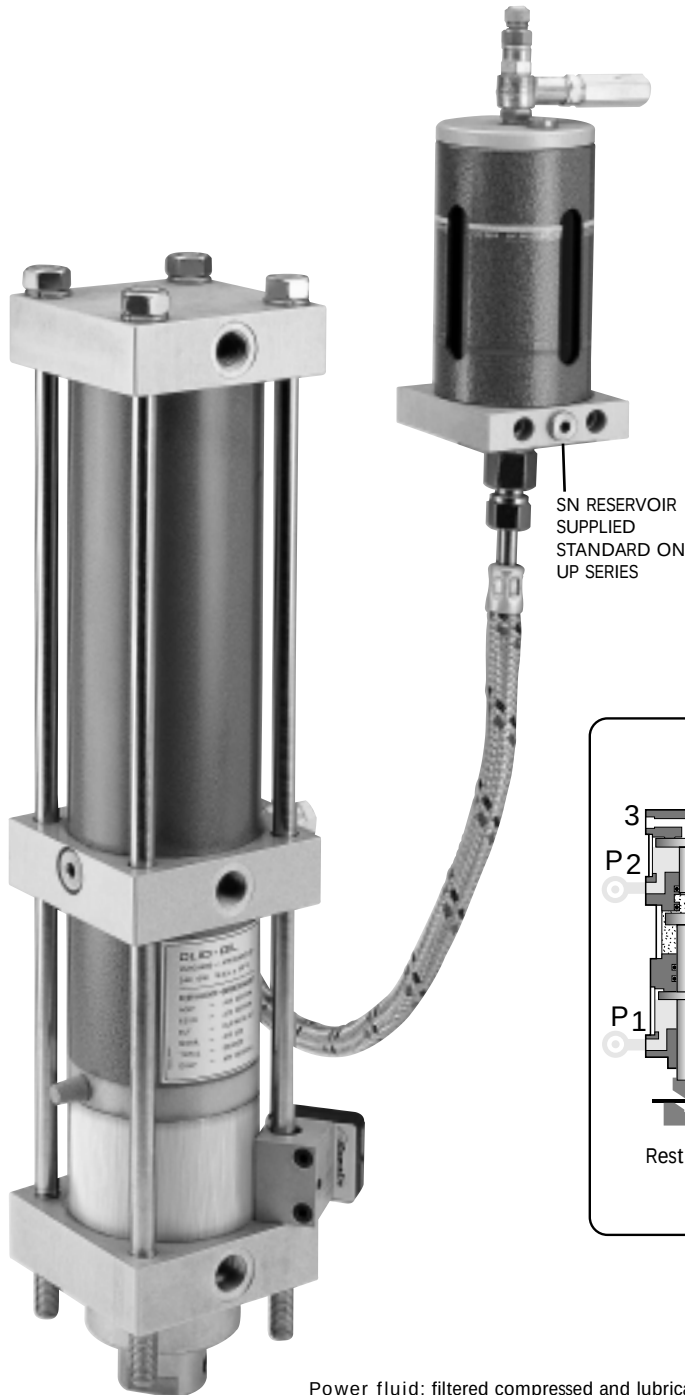
STROKES

STROKES			Total stroke	mm/in.	30/1.18	60/2.36	115/4.53			165/6.50					215/8.46					
			Working stroke	mm	5	5	10	5	10	15	5	10	15	20	25	5	10	15	20	25
				in.	0.20	0.20	0.39	0.20	0.39	0.59	0.20	0.39	0.59	0.79	0.98	0.20	0.39	0.59	0.79	0.98
Multiplier coefficient of working stroke for units AX + XR (stroke adjuster)	1.12	AX 0840																		
	1.10	AX 0950																		
	1.16	AX 1063																		
	1.24	AX 1180																		
	1.25	AX 12100																		
	1.25	AX 13125																		
	1.34	AX 14160																		
	1.57	AX 15200																		
—	AX 16200																			

Special strokes available. Consult factory for dimension considerations.

Refer to circuit drawing on page 11



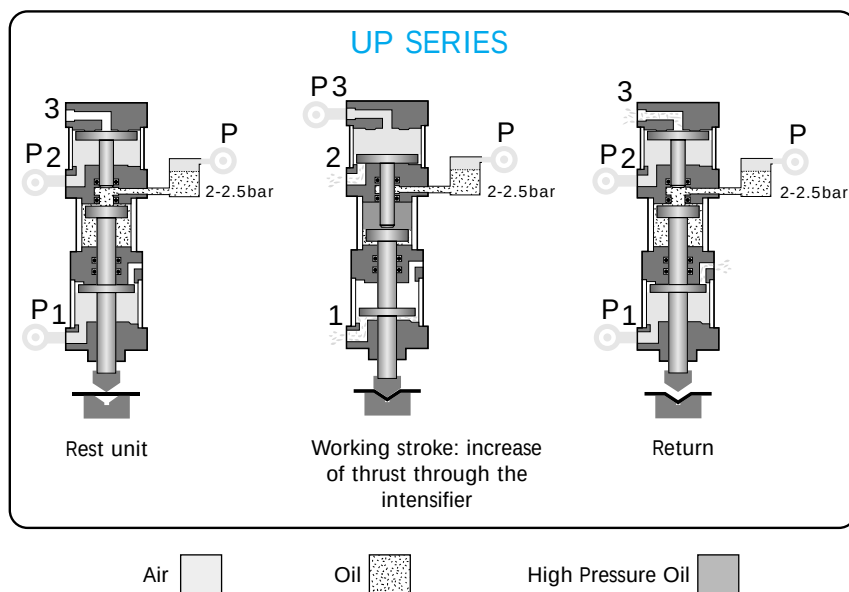


UP Work Series

The UP Series Power Cylinders consist of a hydraulic intensifier which permits immediate use of the work stroke. They are designed for applications where approach stroke is not required.

Essential features:

- Short working strokes
- Speed
- Easy installation
- Economic running
- Replace hydraulic cylinders



Power fluid: filtered compressed and lubricated air. Operating pressure: max. 7(100 pst) bar - Temperature: -20°, +60° C. (-4, 140°F)

FORCE

	Part Number	UP 0163	UP 0280	UP 03100	UP 04125	UP 05160	UP 06200
Power stroke*	lbs @ 100 psi	3,675	7,476	13,305	20,705	33,959	53,093
	kg @7 bar	1,692	3,442	6,125	9,532	15,633	24,442
Power stroke*	lbs/psi	36.7	74.8	133.0	207.0	339.6	530.9
	kg.bar	241.7	491.7	875.0	1,361.7	2,233.3	3,491.7
Retract stroke*	lbs @100 psi	322	530	684	1,021	1,685	3,404
	kg @7 bar	148	244	315	470	776	1,567

* note thrusts is proportional to input pressures.

SPEED

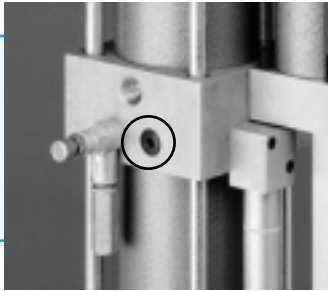
	Part Number	UP 0163	UP 0280	UP 03100	UP 04125	UP 05160	UP 06200
Working stroke	mm/sec	91	61	42	35	28	22
	in/sec	3.59	2.40	1.65	1.38	1.10	0.87

STROKES

Strokes	5, 10 and 15 mm 0.196, 0.393 and 0.590 in.	special strokes are available
---------	--	-------------------------------

Special strokes upon request. Special strokes may change overall length. Please consult factory for details.

Standard Features

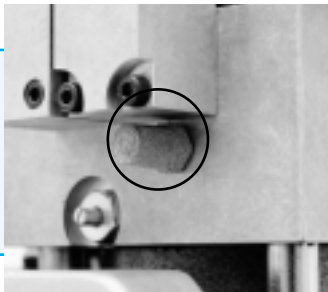


HIGH PRESSURE CHAMBER CONNECTION

Connected to a pressure transducer switch or gauge, it allows monitoring of the pressure/force during the working stroke.

OIL LEVEL INDICATOR

Indicates quantity of oil in the power cylinder.

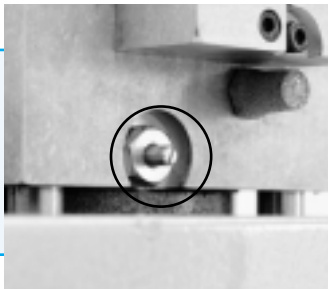
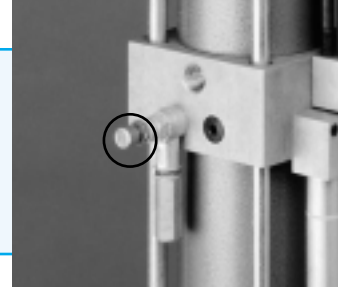


INSPECTION HOLE

Permits evaluation of any oil and air leaks in the event of wear to the seals. Allows the scheduling of preventative maintenance.

BLEED VALVE

Allows air to be bled from the hydraulic circuit. Must be supplied with 2 to 2.5 bar (30 to 35 psig)

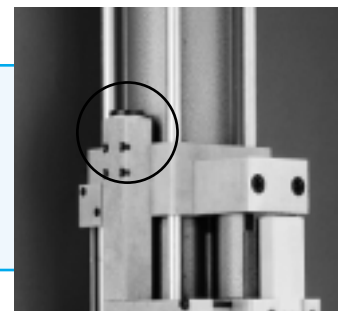


RETURN STROKE CUSHION

Capacity to absorb energy avoids overstressing of the machine structure and reduces noise. The cushion also allows for increased retract speeds.

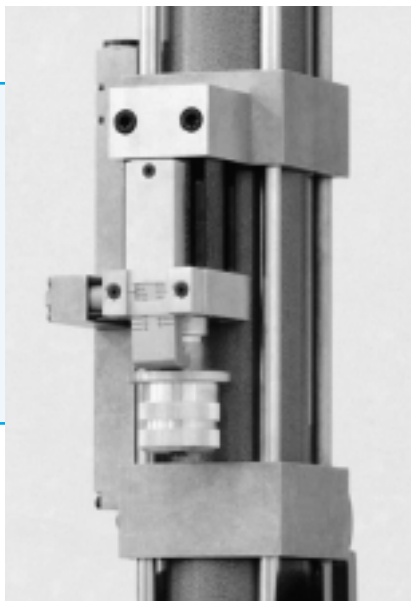
FILL PORT

Permits topping up merely by removing the filler plug, without the need of a pump.



Stroke Adjustment Options

* These units provide flexibility and increased production rates, while conserving energy.



The limit valve adjusts the amount of work stroke. The limit valve controls the work stroke of the unit making positive and external stops unnecessary.

Option W

Working stroke limit valve.

The position device will not fit on those units provided with the limit valve.

Regulation range 0 to 15 mm Repeatability 0.10 mm (0.004 in)

Available on AP Units only

The position device is a volume control device operated pneumatically, that allows the piston rod to be moved forward slowly and be stopped at any point of the approach stroke. Thus creating a new retract position.

- eases positioning of dies
- reduces air consumption
- decreases cycle time

Option J

Position Device

Complete with pilot block. Limits retract of total stroke. See Fig. 6 & 7 page 10. *Consult factory for circuit drawing for J option.



Available on AX Units only

Option XR

Stroke Adjuster

Adjusts the retract and extend position of the total stroke. Reduces air consumption.

Adjustment Range

Extend 0 to 50 mm

Retract 0 to 115 mm

Repeatability 0.02 mm (0.001 in)



Options



Option CEL

Load cell with device to preset working force.



Option SN

Compensating reservoir.



Option R

Non rotating assembly.



Option RS

Die holder pad.



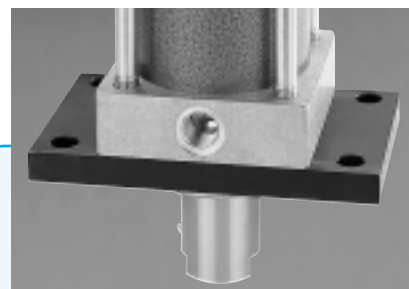
Option IR

Die holder pad with radial location.



Option CS

Rod end.

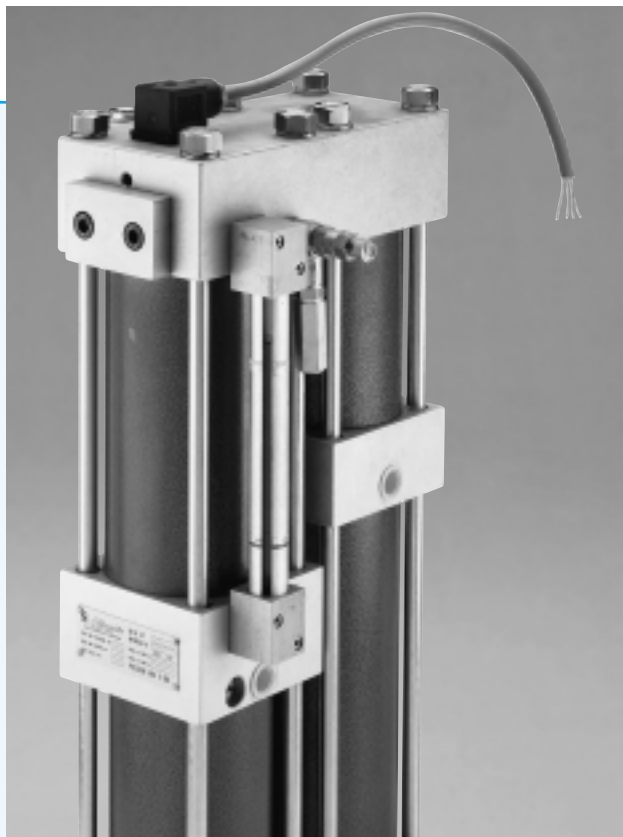


Option FG

Flange for mounting of units.



Electronic Position Sensing



Option EN

Transducer

Electrical Features

Resistance $\pm 10\%$

Limiting voltage

Power dissipation

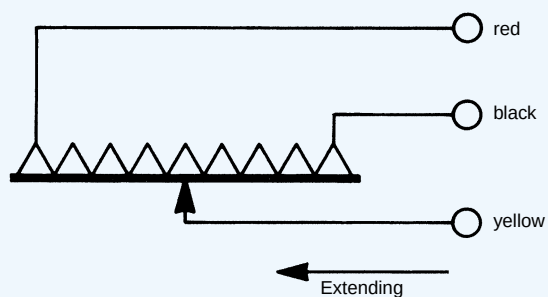
Repeatability

1K OHM/25 mm

max 130V

0,5 W/25 mm stroke

0,025 mm



ONLY AVAILABLE ON AX UNITS



Option MG

Proximity Version

Surveys terminal or intermediate position of pistons, using magnetic sensors, and permits electronic processing of different phases of work cycle.

Refer to page 28 for technical information.

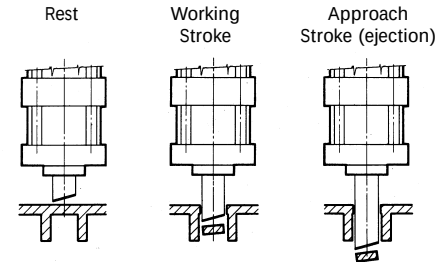


Application Versatility

Thanks to the provision for subdividing the total stroke into two distinct, independent phases which can be actuated alternatively, the power cylinder is well able to carry out various functions within the work cycles, such as:

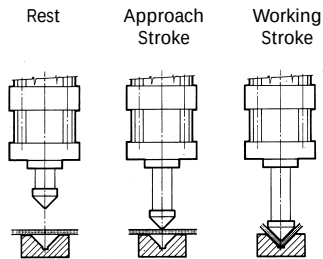
1

- Blanking with Subsequent Ejector Stroke



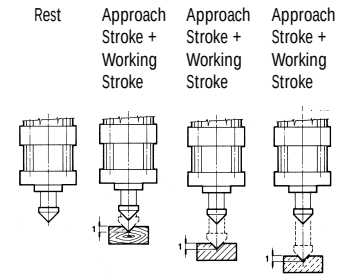
2

- Marking
- Drawing
- Pressing



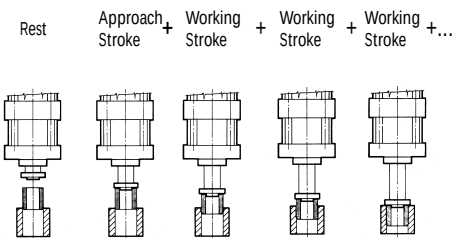
3

- Drawing
 - Pressing
 - Marking
- Adjustable Working Stroke
- Option W-XR



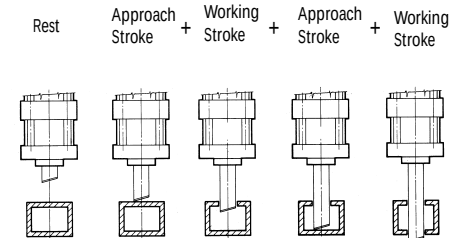
4

- Keying
- Bushing



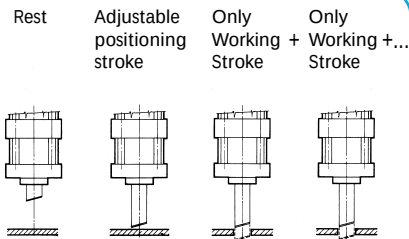
5

- Multiple Blanking
- Option W-XR



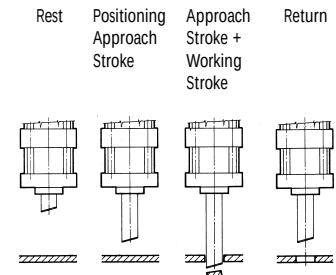
6

- Fast Blanking
 - With Feeding Device
 - With Rotary Table
- Option J

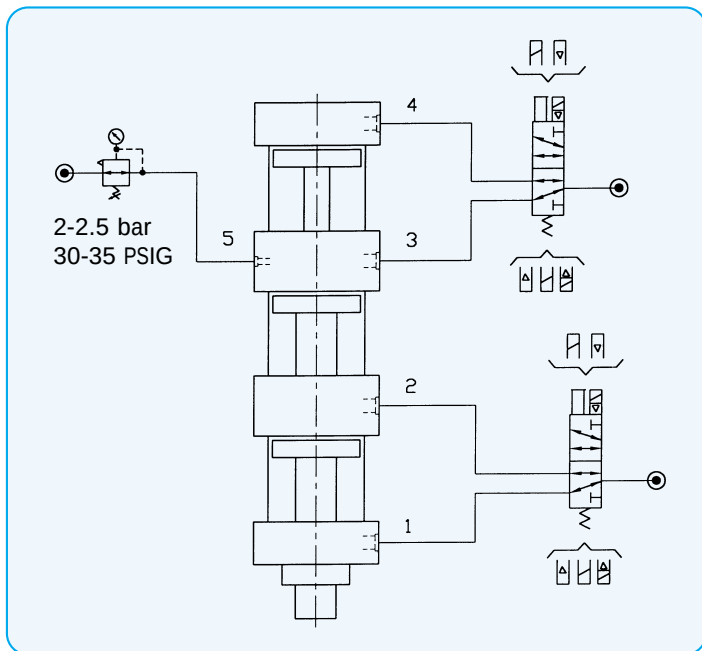


7

- Drawing
 - Pressing
 - Marking
- With Preset Approach Stroke
- Option J-XR



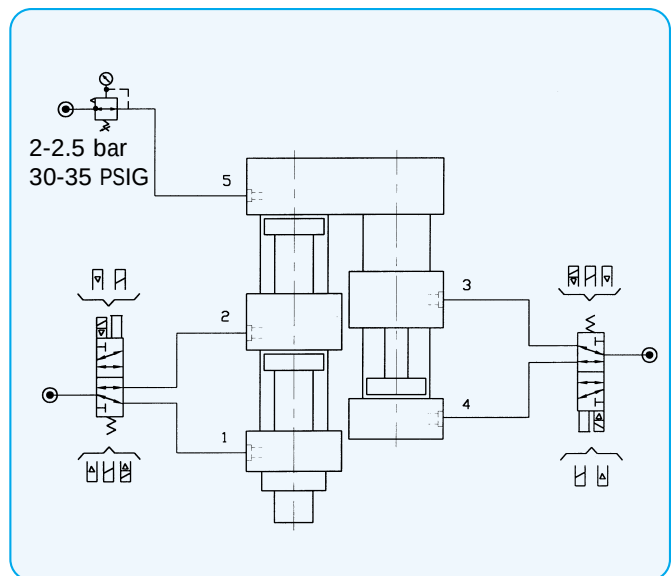
Power Cylinder Standard Circuits



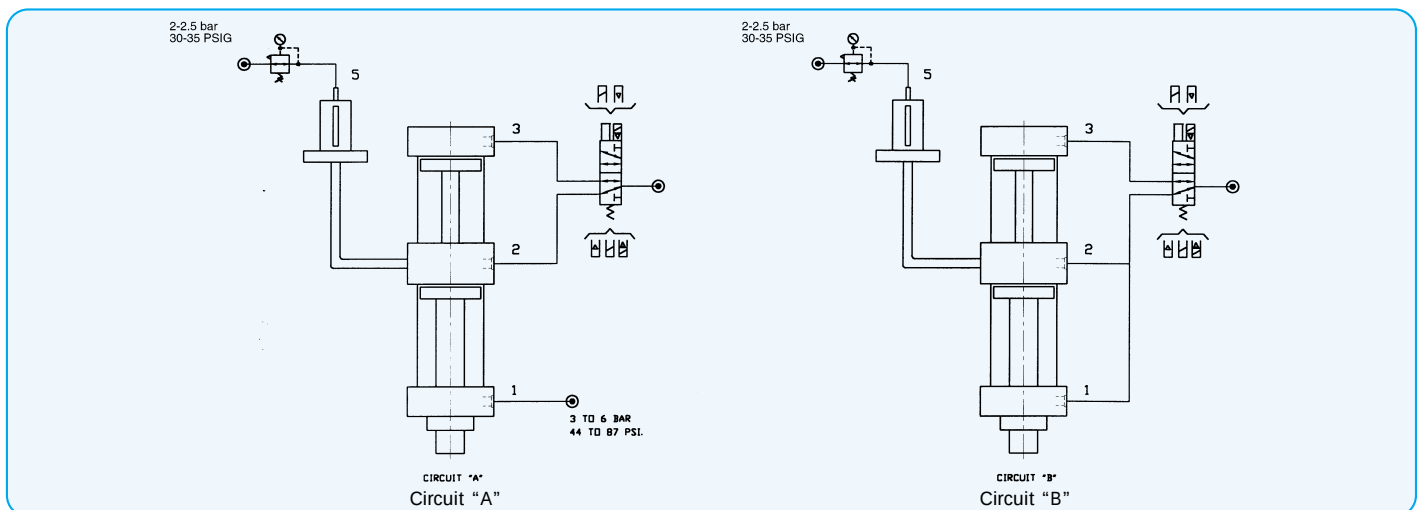
AP Series

The circuits shown on this page represent standard operating sequences in applications requiring non standard sequencing, or having options that change sequencing. Please contact Alfamatic for a circuit drawing. For applications with a decreasing load, i.e. piercing, contact Alfamatic for application assistance.

AX Series



UP Series

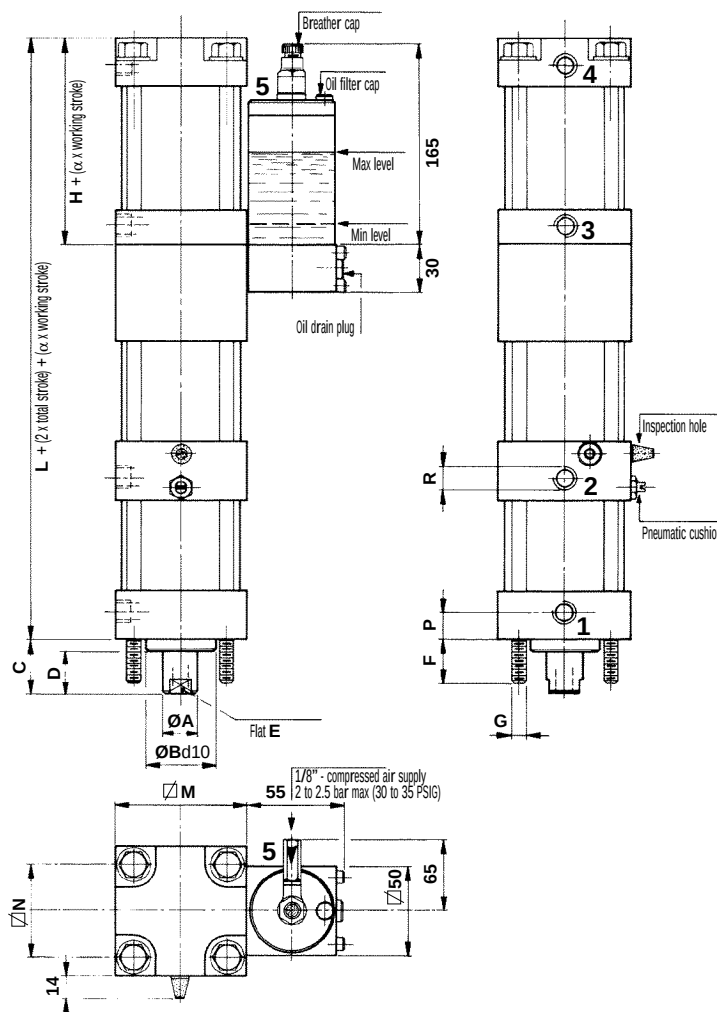


AP - 0840 - AP - 0950

DIMENSIONAL FEATURES



Type NN - base unit



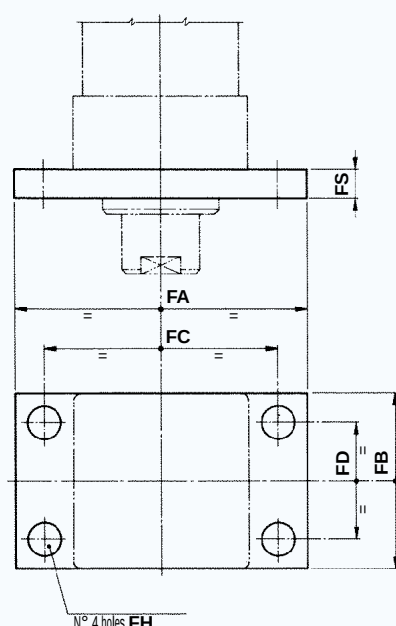
Series Type	AP 0840	AP 0950
a*	7.2	6.3
A	22	22
B	40	40
C	30	30
D	25	25
E	17	17
F	25	25
G	M6	M8
H	78	93
L**	278	305
M	50	70
N	39	50
P	15	15
R	G1/8"	G1/4"

a* Coefficient of working stroke

L** This dimension may change for special strokes. Please consult factory for details.

FLANGE MOUNTING

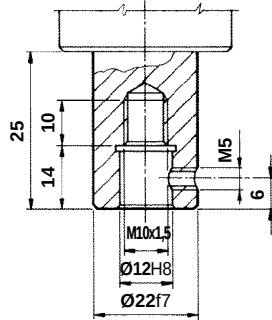
Option FG



Series Type	AP 0840	AP 0950
FA	85	115
FB	50	70
FC	70	95
FD	39	50
FH	6.5	8.5
FS	8	10

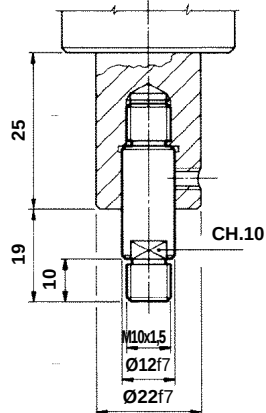


PISTON ROD WITH FEMALE CONNECTION



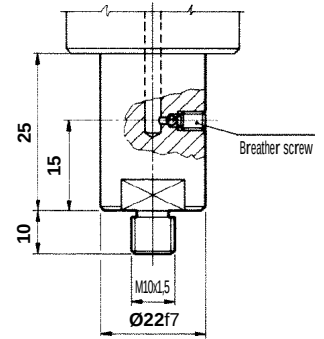
For working area 1

PISTON ROD WITH ROD END



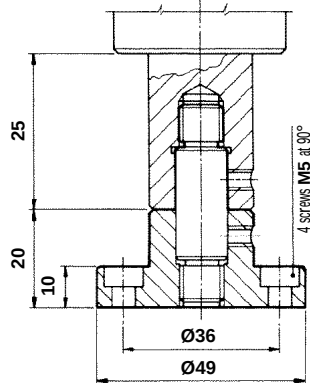
Option CS

PISTON ROD WITH MALE CONNECTION



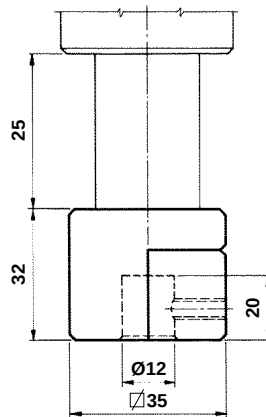
For working areas 2-3-4

DIE HOLDER PAD



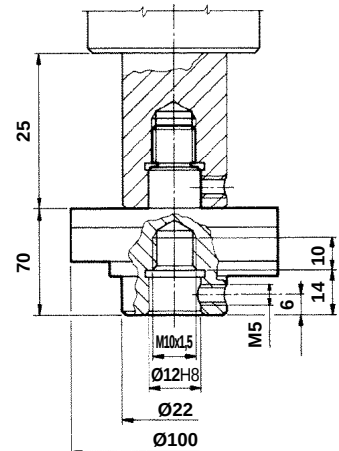
Option RS

RADIAL DIE HOLDER PAD



Option IR

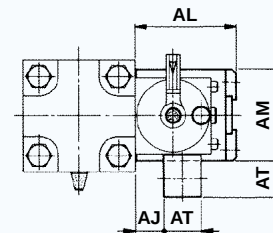
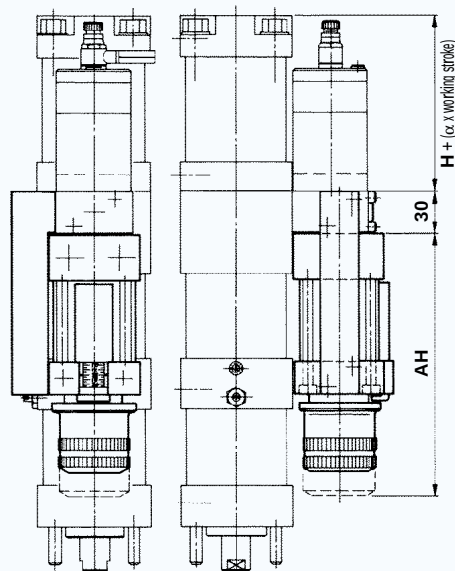
WITH LOAD CELL



Option CEL

WORKING STROKE LIMIT VALVE

Option W



Series Type	AP 0840	AP 0950
H	78	93
AH	176	200
AJ	10	17
AL	58	72
AM	45	60
AT	27	27

Power Cylinder - AP Series

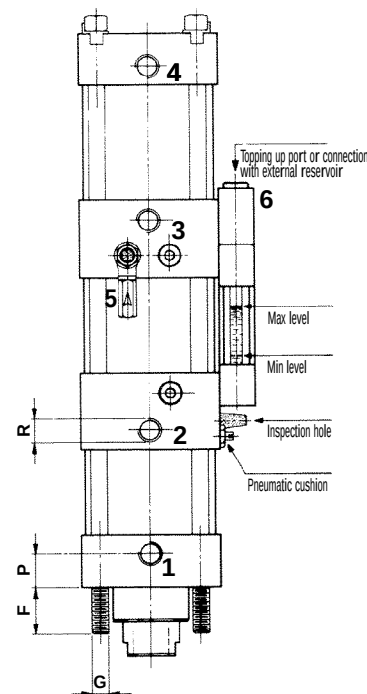
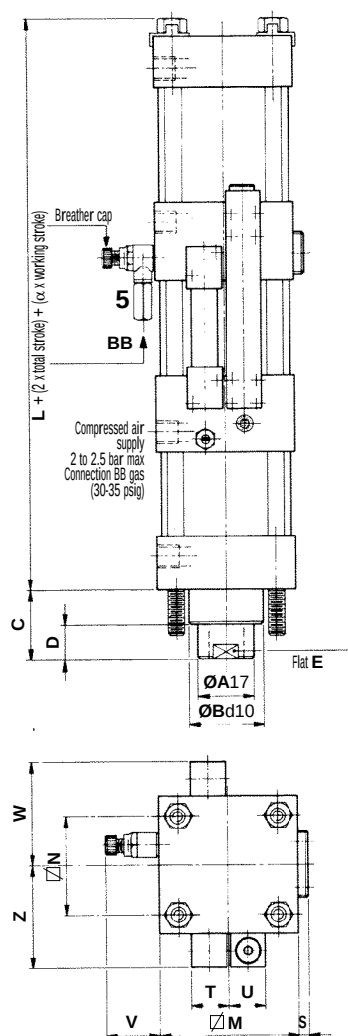
CAD files available at www.alfamatic.com

AP - 1063 - AP - 16200

DIMENSIONAL FEATURES

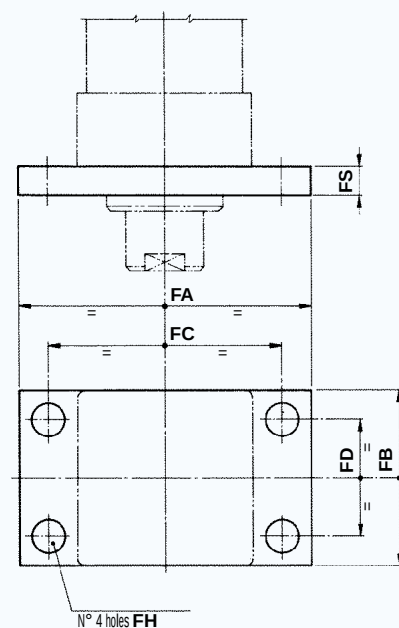


Type NN - base unit



* For AP 16200
 $L + (2 \times \text{total stroke})$
 $+ 2 \times (a \times \text{working stroke})$

FLANGE MOUNTING



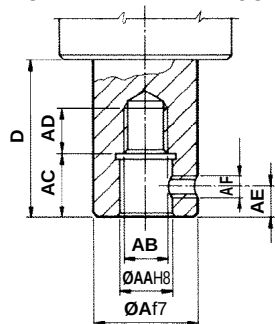
Series Type	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
a*	7.8	9.8	11.2	11.2	11.2	11.2	12
A	30	40	60	80	100	100	100
B	50	70	90	110	130	130	130
C	40	50	60	60	95	95	140
D	25	25	35	35	40	40	85
E	24	32	hole 8X2	hole 8X2	hole 10X2	hole 10X2	hole 10X2
F	30	35	50	58	75	75	103
G	M10	M12	M16	M20	M24	M24	M36X3
L**	335	337	427	464	480	520	690
M	80	100	130	150	185	220	250
N	61	75	100	110	140	175	180
P	18	15	17.5	20	25	35	35
R	G3/8"	G3/8"	G1/2"	G1/2"	G1/2"	G1/2"	G3/4"
S	13	13	15	15	-	-	-
T	27	27	27	27	27	27	27
U	27	27	45	45	45	45	45
V	45	45	53	53	53	53	53
W	-	-	-	-	135	155	170
Z	66	76	105	115	135	155	170
BB	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"	G1/4"	G1/4"

a* Coefficient of working stroke

L** This dimension may change for special strokes. Please consult factory for details.

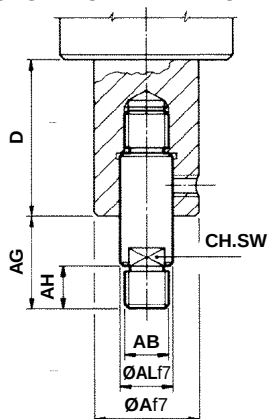


PISTON ROD WITH FEMALE CONNECTION



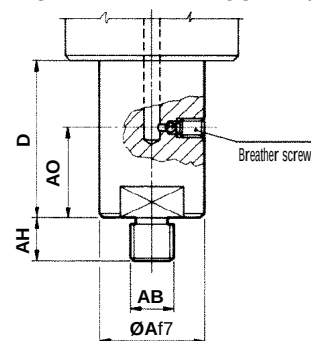
For working area 1

PISTON ROD WITH ROD END



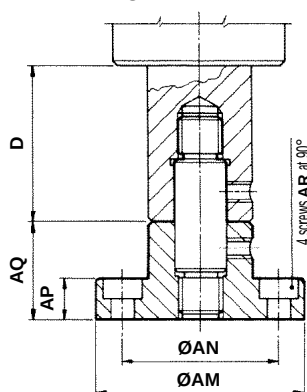
Option CS

PISTON ROD WITH MALE CONNECTION



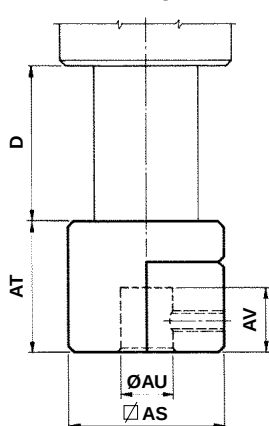
For working areas 2

DIE HOLDER PAD



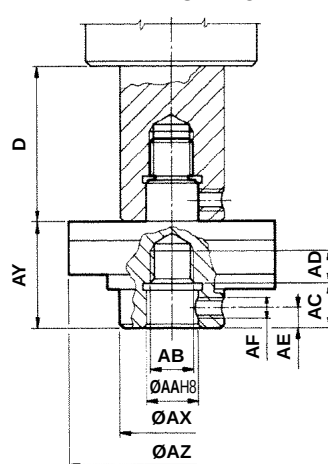
Option RS

RADIAL DIE HOLDER PAD



Option IR

WITH LOAD CELL



Option CEL

Option FG

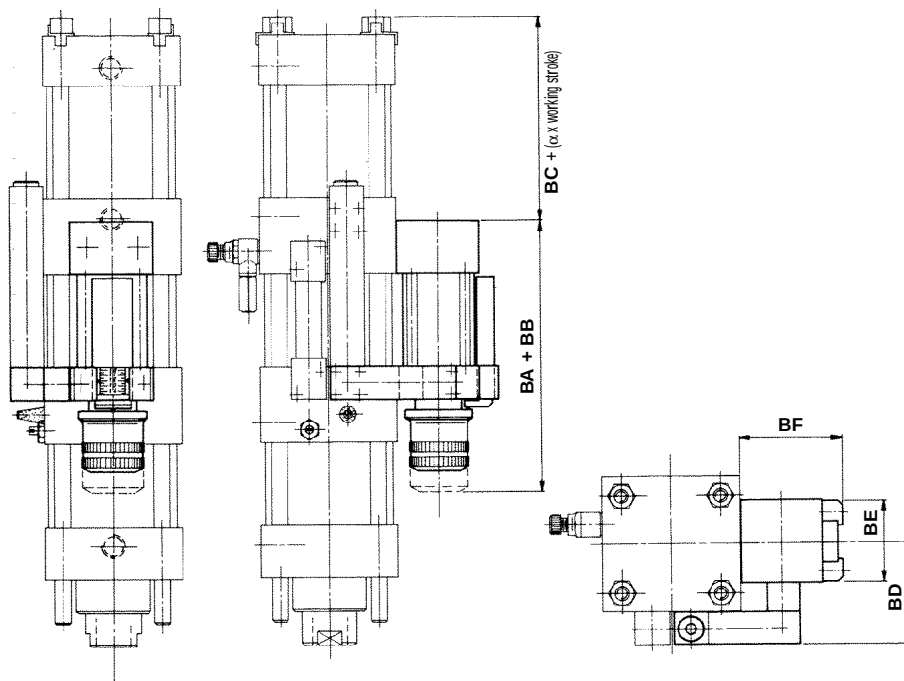
Type AP	FA	FB	FC	FD	FH	FS
1063	135	80	110	61	10.5	12
1180	165	100	135	75	12.5	15
12100	200	130	170	100	17	20
13125	240	150	200	110	21	25
14160	305	200	255	140	25	30
15200	340	250	290	175	25	30
16200	440	250	370	180	38	40

Series Type	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
A	30	40	60	80	100	100	100
D	25	25	35	35	40	40	85
AA	16	20	25	25	30	30	30
AB	M12X1.5	M16X1.5	M20X1.5	M20X1.5	M27X2	M27X2	M27X2
AC	18	22	28	28	35	35	35
AD	12	16	20	20	27	27	27
AE	8	10	12	12	15	15	15
AF	M6	M8	M8	M8	M8	M8	M8
AG	23	33	38	38	52	52	52
AH	12	16	20	20	27	27	27
AL	16	20	25	25	30	30	30
AM	59	78	98	118	158	158	158
AN	46	60	78	98	130	130	130
AO	15	15	25	25	30	30	70
AP	12	15	20	20	25	25	25
AQ	25	35	40	40	55	55	55
AR	M6	M8	M8	M8	M12	M12	M12
AS	50	50	60	80	100	100	100
AT	35	35	50	50	80	80	80
AU	16	20	25	25	30	30	30
AV	18	22	28	28	35	35	35
AY	70	75	85	85	110	110	155
AX	30	40	60	60	80	80	90
AZ	100	127	127	127	165	165	165
SW	12	16	20	20	27	27	27

Options

WORKING STROKE LIMIT VALVE

Option W

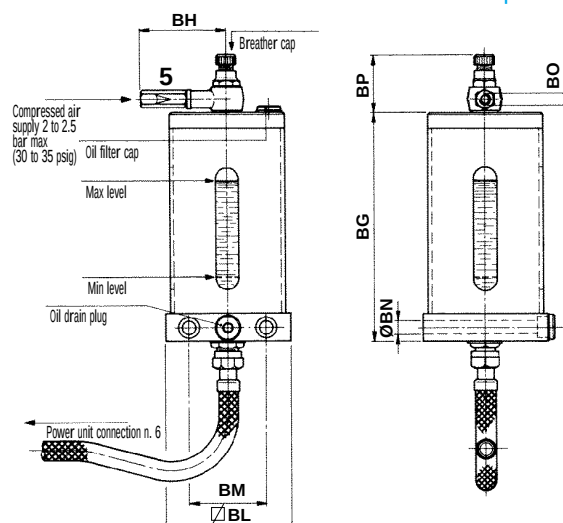
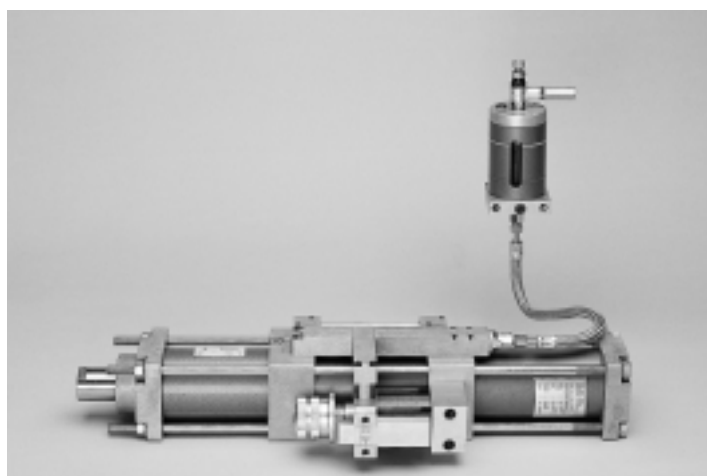


Series Type	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
a*	7.8	9.8	11.2	11.2	11.2	11.2	—
BA	210	210	275	275	332	336	—
BB	—	—	—	—	total stroke		—
BC	109	114	135	148	169	186	—
BD	67	77	110	120	138	155	—
BE	60	60	80	80	120	120	—
BF	75	75	95	95	105	105	—
BG	146	146	148	148	208	208	308
BH	65	65	75	75	75	75	75
BL	80	80	100	100	100	100	100
BM	40	40	60	60	60	60	60
BN	6.5	6.5	8.5	8.5	8.5	8.5	8.5
BO	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"	G1/4"	G1/4"
BP	45	45	53	53	53	53	53

a* Coefficient of working stroke

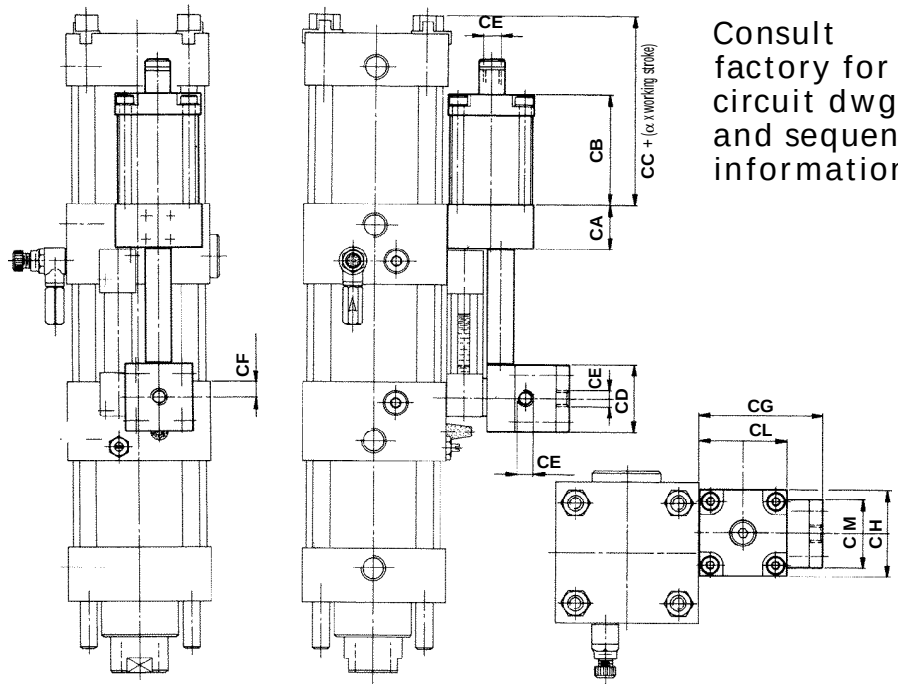
EXTERNAL RESERVOIR

Option SN



POSITION DEVICE

Option J



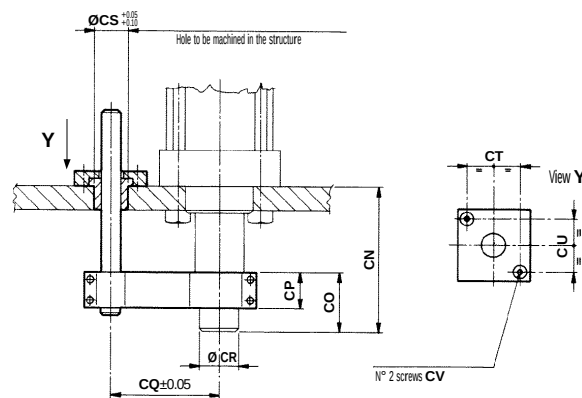
Consult factory for circuit dwg. and sequence information.

Series Type	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
a*	7.8	9.8	11.2	11.2	11.2	11.2	12
CA	28	28	35	35	40	40	40
CB	120	120	135	135	150	150	250
CC	95	100	122	135	153	166	166
CD	50	50	60	60	70	70	70
CE	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"	G1/4"	G1/4"
CF	12	12	17	17	20	20	20
CG	85	85	100	100	125	125	125
CH	60	60	100	100	130	130	130
CL	60	60	100	100	130	130	130
CM	50	50	60	60	70	70	70
CN	91	111	126	141	161	161	185
CO	38	45	55	55	60	60	60
CP	25	30	35	35	35	35	35
CQ	70	90	104	117	155	155	180
CR	30	40	60	60	80	80	90
CS	25	28	36	36	46	46	46
CT	20	26	38	38	45	45	45
CU	30	37	38	38	45	45	45
CV	M4X12	M6X16	M6X16	M6X16	M6X16	M6X16	M6X16

a* Coefficient of working stroke

ANTI-ROTATION GROUP

Option R

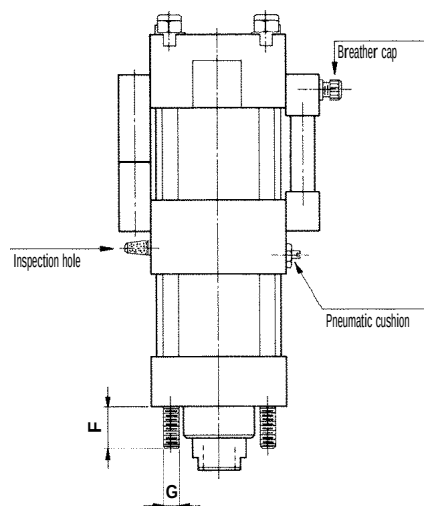
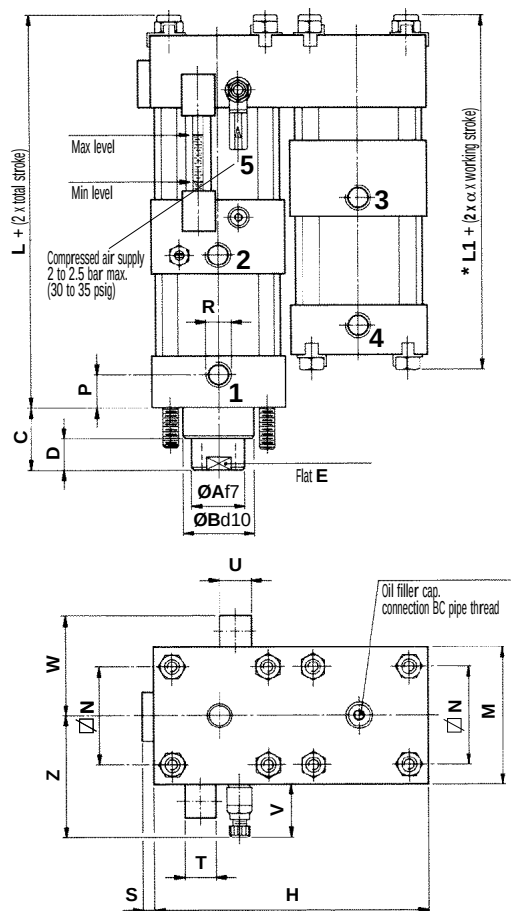


Power Cylinders

CAD files available at www.alfamatic.com

AX SERIES

DIMENSIONAL FEATURES



* For AX 15200
with working stroke = 5 mm -
 $L1 + (a \times 5) + (a \times 10)$

* For AX 16200
 $L1 + (3 \times a \times \text{working stroke})$

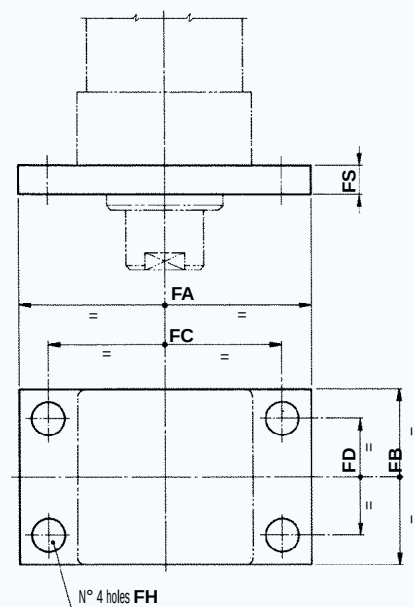
Type NN - base unit

Series Type	AX 0840	AX 0950	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200	AX 16200
a*	7.2	6.3	7.8	9.8	11.2	11.2	11.2	11.2	12
A	22	22	30	40	60	80	100	100	100
B	40	40	50	70	90	110	130	130	130
C	30	30	40	50	60	60	95	95	140
D	25	25	25	25	35	35	40	40	85
E	17	17	24	32	hole 8x2	hole 8x2	hole 10x2	hole 10x2	hole 10x2
F	31	33	40	45	65	73	95	95	103
G	M6	M8	M10	M12	M16	M20	M24	M24	M36x3
H	105	145	165	205	265	305	370	445	505
L**	210	225	260	260	345	375	390	415	450
L1**	185	215	185	185	235	255	280	295	475
M	50	70	80	100	130	150	185	220	250
N	39	50	61	75	100	110	140	175	180
P	15	15	18	15	17.5	20	25	35	35
R	G1/8"	G1/4"	G3/8"	G3/8"	G1/2"	G1/2"	G1/2"	G1/2"	G3/4"
S	-	-	13	13	15	15	-	-	-
T	20	27	27	27	27	27	27	27	27
U	20	27	27	27	45	45	45	45	45
V	45	45	45	45	53	53	53	53	53
W	45	62	67	77	110	120	138	155	170
Z	70	80	85	95	118	128	145	163	178
BB	G1/8"	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"	G1/4"	G1/4"
BC	G1/8"	G1/4"	G3/8"	G3/8"	G1/2"	G1/2"	G1/2"	G1/2"	G1/2"

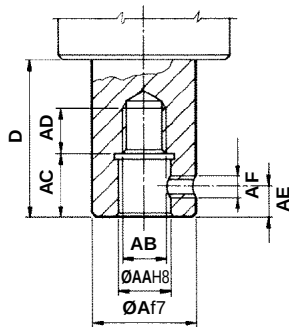
a* Coefficient of working stroke

** This dimension may change for special strokes. Please consult factory for details.

FLANGE MOUNTING

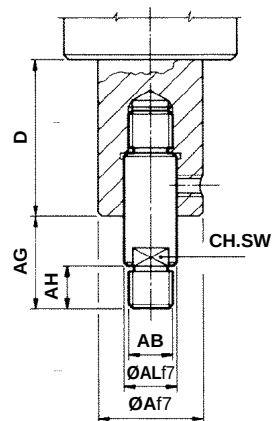


PISTON ROD WITH FEMALE CONNECTION



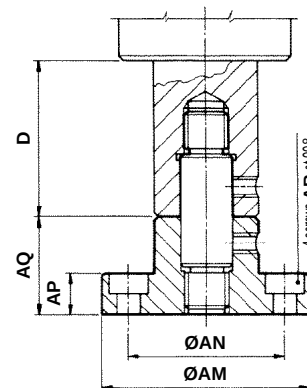
Standard

PISTON ROD WITH ROD END



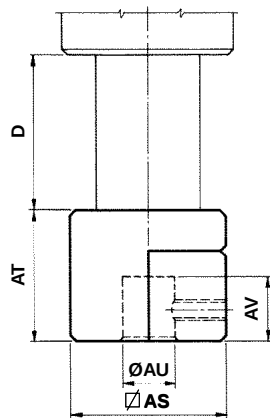
Option CS

DIE HOLDER PAD



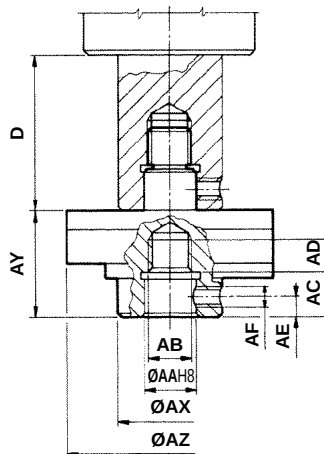
Option RS

RADIAL DIE HOLDER PAD



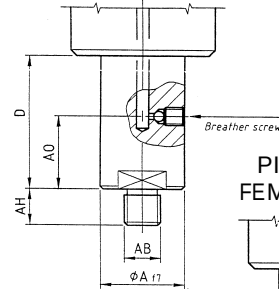
Option IR

WITH LOAD CELL

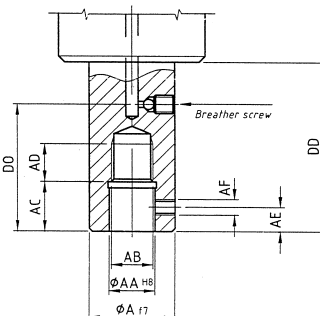


Option CEL

PISTON ROD WITH FEMALE CONNECTION



PISTON ROD WITH FEMALE CONNECTION



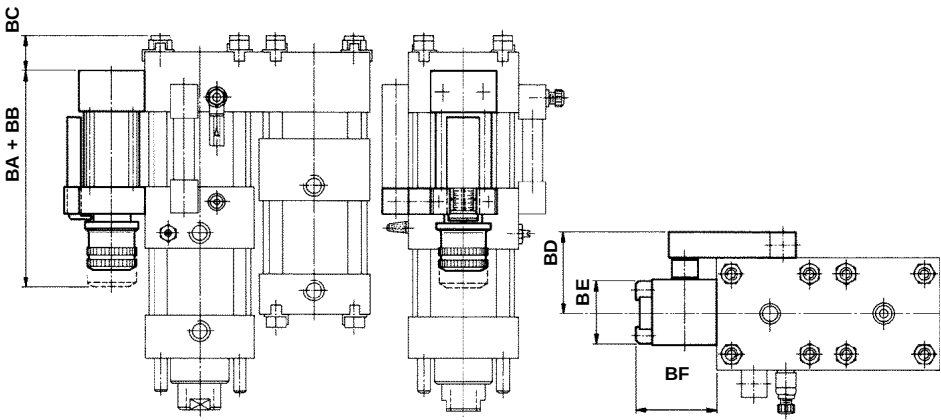
Option FG

AX	FA	FB	FC	FD	FH	FS
0840	85	50	70	39	6.5	8
0950	115	70	95	50	8.5	10
1063	135	80	110	61	10.5	12
1180	165	100	135	75	12.5	15
12100	200	130	170	100	17	20
13125	240	150	200	110	21	25
14160	305	200	255	140	25	30
15200	340	250	290	175	25	30
16200	440	250	370	180	38	40

Series Type	AX 0840	AX 0950	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200	AX 16200
A	22	22	30	40	60	80	100	100	100
D	25	25	25	25	35	35	40	40	85
AA	12	12	16	20	25	25	30	30	30
AB	M10x1.5	M10x1.5	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2	27x2
AC	14	14	18	22	28	28	35	35	35
AD	10	10	12	16	20	20	27	27	27
AE	6	6	8	10	12	12	15	15	15
AF	M5	M5	M6	M8	M8	M8	M8	M8	M8
AG	19	19	23	33	38	38	52	52	52
AH	10	10	12	16	20	20	27	27	27
AL	12	12	16	20	25	25	30	30	30
AM	49	49	59	78	98	118	158	158	158
AN	36	36	46	60	78	98	130	130	130
AP	10	10	12	15	20	20	25	25	25
AQ	20	20	25	35	40	40	55	55	55
AR	M5	M5	M6	M8	M8	M8	M12	M12	M12
AS	35	35	50	50	60	80	100	100	100
AT	32	32	35	35	50	50	80	80	80
AU	12	12	16	20	25	25	30	30	30
AV	20	20	18	22	28	28	35	35	35
AY	70	70	70	75	85	85	110	110	155
AX	22	22	30	40	60	60	80	80	90
AZ	100	100	100	127	127	127	165	165	165
SW	10	10	12	16	20	20	27	27	27
AD	10	10	12	16	20	20	27	27	27
DD	50	50	75	75	85	85	110	110	115
DO	40	40	65	65	75	75	100	100	100

WORKING STROKE LIMIT VALVE

Option W

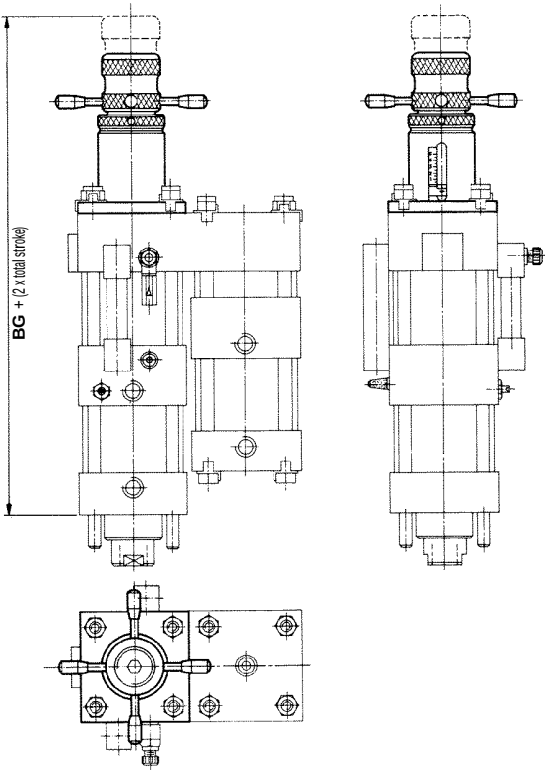


Series Type	AX 0840	AX 0950	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200
a*	7.2	6.3	7.8	9.8	11.2	11.2	11.2	11.2
BA	176	200	210	210	275	275	332	336
BB	—	—	—	—	—	—	total stroke	total stroke
BC	27	24	34	37	48	53	68	68
BD	45	62	67	77	110	120	138	155
BE	45	60	60	60	80	80	120	120
BF	58	72	75	75	95	95	105	105
BG	440	450	495	500	595	620	645	680

a* Coefficient of working stroke

STROKE ADJUSTER

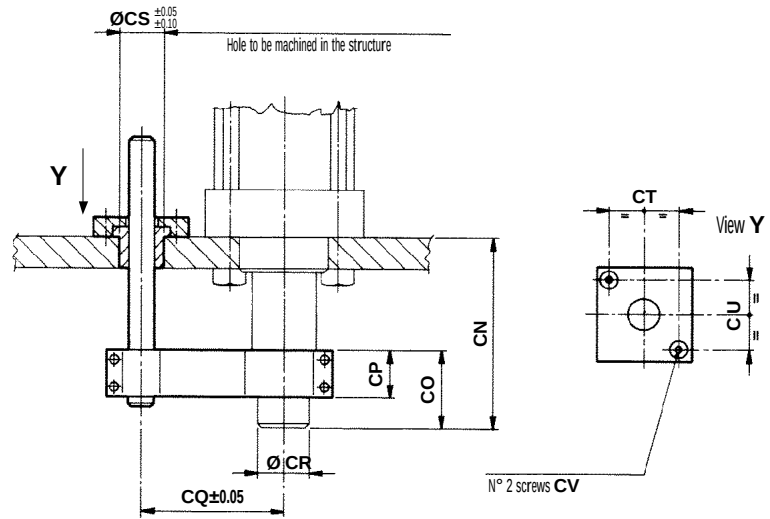
Option XR



Options

ANTI-ROTATION GROUP

Option R

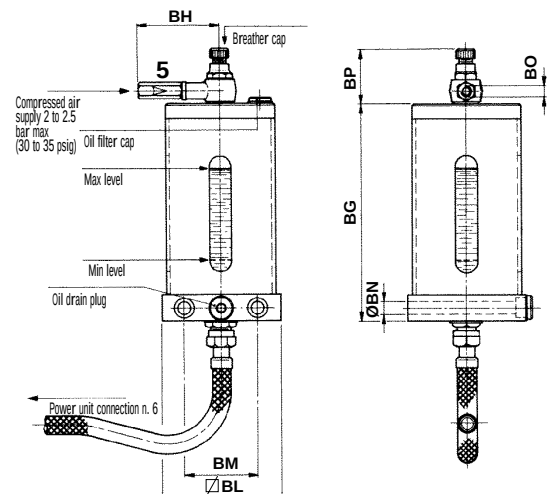
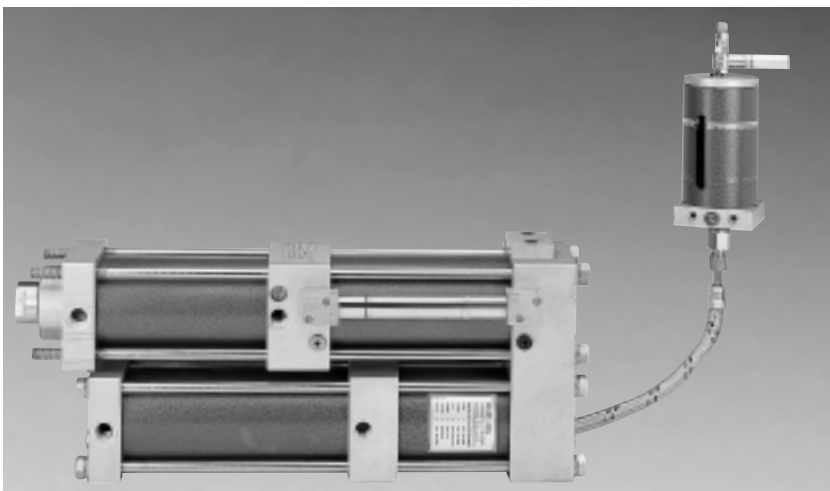


Series Type	AX 1063	AX 1180	AX 12100	AX 13125	AX 14160	AX 15200	AX 16200
a*	7.8	9.8	11.2	11.2	11.2	11.2	12
CN	91	111	126	141	161	161	185
CO	38	46	55	55	60	60	60
CP	25	30	35	35	35	35	35
CQ	70	90	104	117	155	155	180
CR	30	40	60	60	80	80	90
CS	25	28	36	36	46	46	46
CT	20	26	38	38	45	45	45
CU	30	37	38	38	45	45	45
CV	M4X12	M6X16	M6X16	M6X16	M6X16	M6X16	M6X16
BG	146	146	148	148	208	208	308
BH	65	65	75	75	75	75	75
BL	80	80	100	100	100	100	100
BM	40	40	60	60	60	60	60
BN	6.5	6.5	8.5	8.5	8.5	8.5	8.5
BO	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"	G1/4"	G1/4"
BP	45	45	53	53	53	53	53

a* Coefficient of working stroke

EXTERNAL OIL RESERVOIR

Option SN



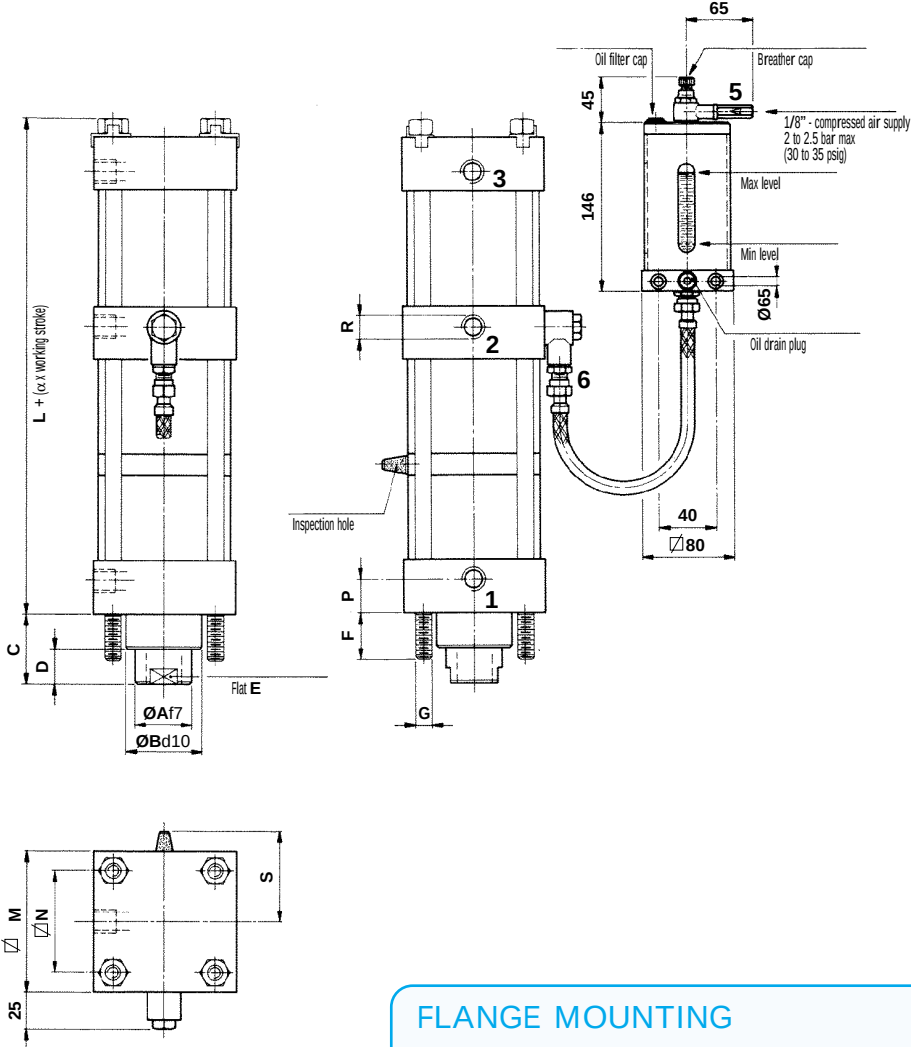
Power Cylinders

UP SERIES

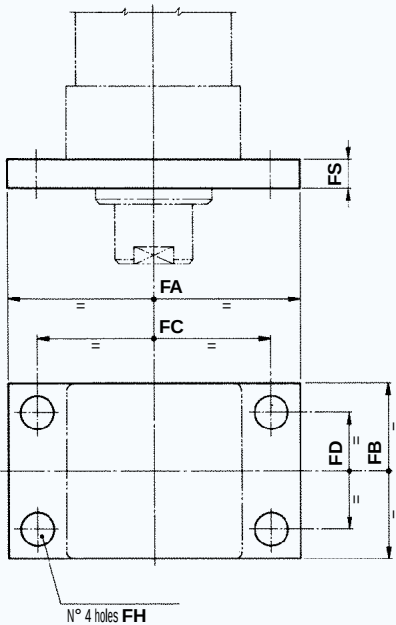
DIMENSIONAL FEATURES



Type NN - base unit



FLANGE MOUNTING



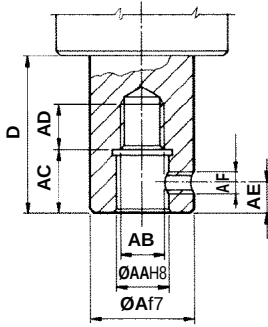
Series Type	UP 0163	UP 0280	UP 03100	UP 04125	UP 05160	UP 06200
a*	7.8	9.8	11.2	11.2	11.2	11.2
A	30	40	60	80	100	100
B	50	70	90	110	130	130
C	40	50	60	60	95	95
D	25	25	35	35	40	40
E	24	32	hole 8X2	hole 8X2	hole 10X2	hole 10X2
F	30	35	45	50	60	60
G	M10	M12	M16	M20	M24	M24
L**	300	300	355	390	420	445
M	80	100	130	150	185	220
N	61	75	100	110	140	175
P	18	15	17.5	20	25	35
R	G3/8"	G3/8"	G1/2"	G1/2"	G1/2"	G1/2"
S	55	60	80	85	105	125

a* Coefficient of working stroke

L** This dimension may change for special strokes. Please consult factory for details.

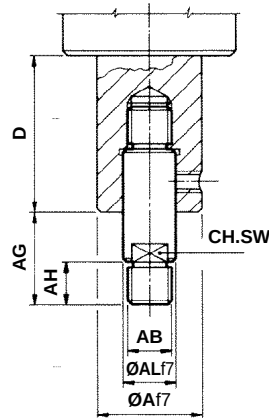


PISTON ROD WITH FEMALE CONNECTION



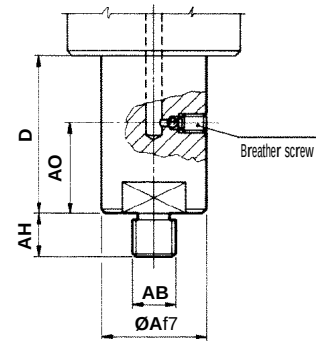
Standard

PISTON ROD WITH ROD END



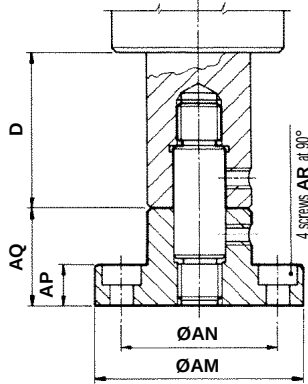
Option CS

PISTON ROD WITH MALE CONNECTION



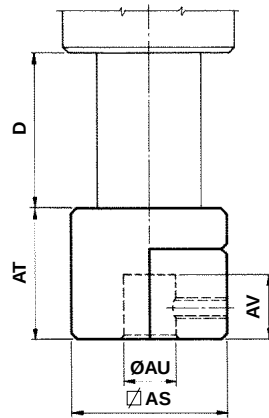
For working areas 2-3

DIE HOLDER PAD



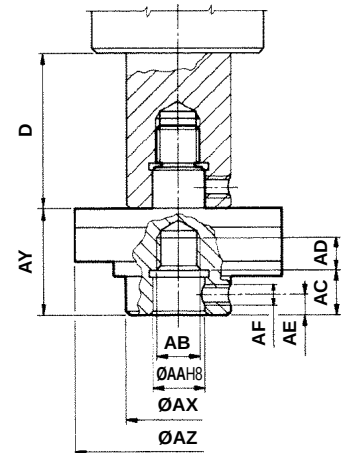
Option RS

RADIAL DIE HOLDER PAD



Option IR

WITH LOAD CELL



Option CEL

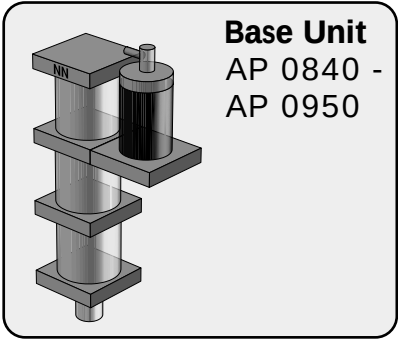
Option FG

Type UP	FA	FB	FC	FD	FH	FS
0163	135	80	110	61	10.5	12
0280	165	100	135	75	12.5	15
03100	200	130	170	100	17	20
04125	240	150	200	110	21	25
05160	305	200	255	140	25	30
06200	340	250	290	175	25	30

Series Type	UP 0163	UP 0280	UP 03100	UP 04125	UP 05160	UP 06200
A	30	40	60	80	100	100
D	25	25	35	35	40	40
AA	16	20	25	25	30	30
AB	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2
AC	18	22	28	28	35	35
AD	12	16	20	20	27	27
AE	8	10	12	12	15	15
AF	M6	M8	M8	M8	M8	M8
AG	23	33	38	38	52	52
AH	12	16	20	20	27	27
AL	16	20	25	25	30	30
AM	59	78	98	118	158	158
AN	46	60	78	98	130	130
AO	15	15	25	25	30	30
AP	12	15	20	20	25	25
AQ	25	35	40	40	55	55
AR	M6	M8	M8	M8	M12	M12
AS	50	50	60	80	100	100
AT	35	35	50	50	80	80
AU	16	20	25	25	30	30
AV	18	22	28	28	35	35
AY	70	75	85	85	110	110
AX	30	40	60	60	80	80
AZ	100	127	127	127	165	165
SW	12	16	20	20	27	27

Work Orientations & Available Option Combinations

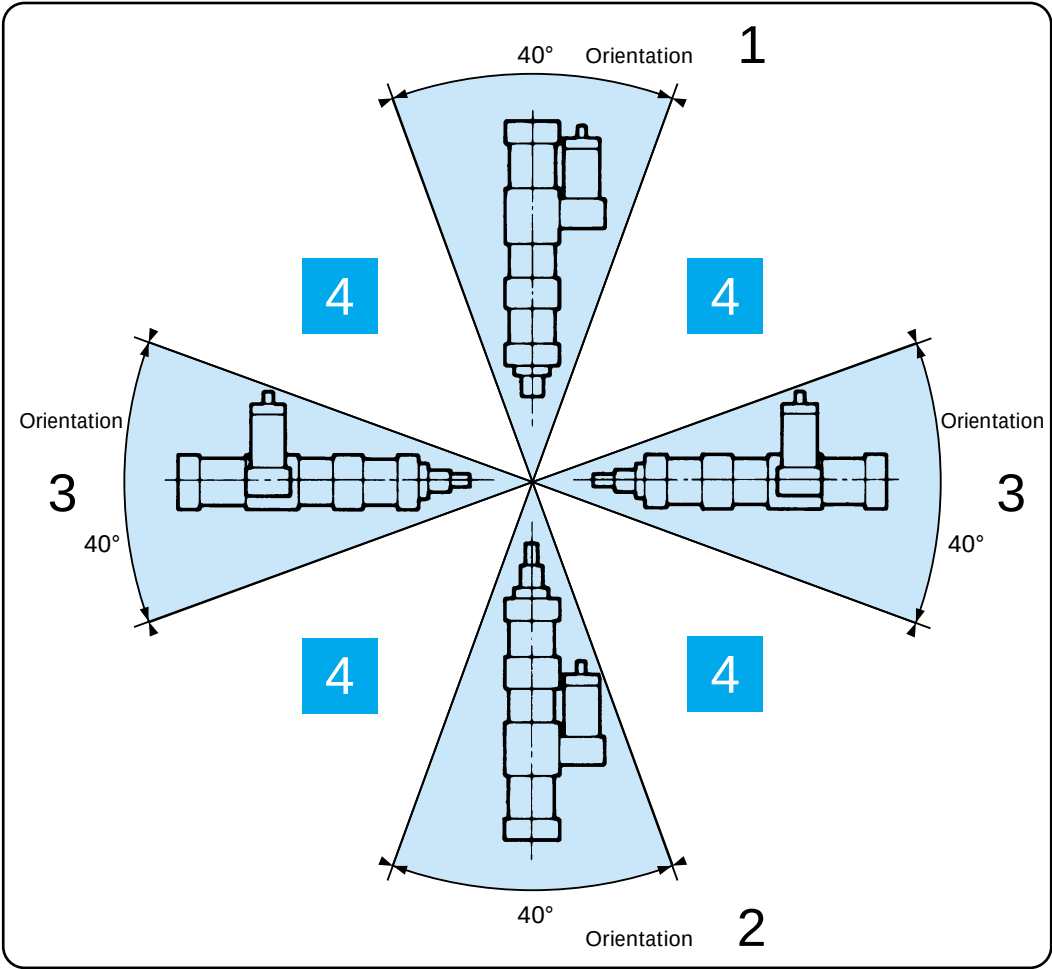
AP SERIES



NOTE:
Contact factory for
custom rod end
requirements

4

For this area of work, reservoir will
be supplied with wall type fixing.



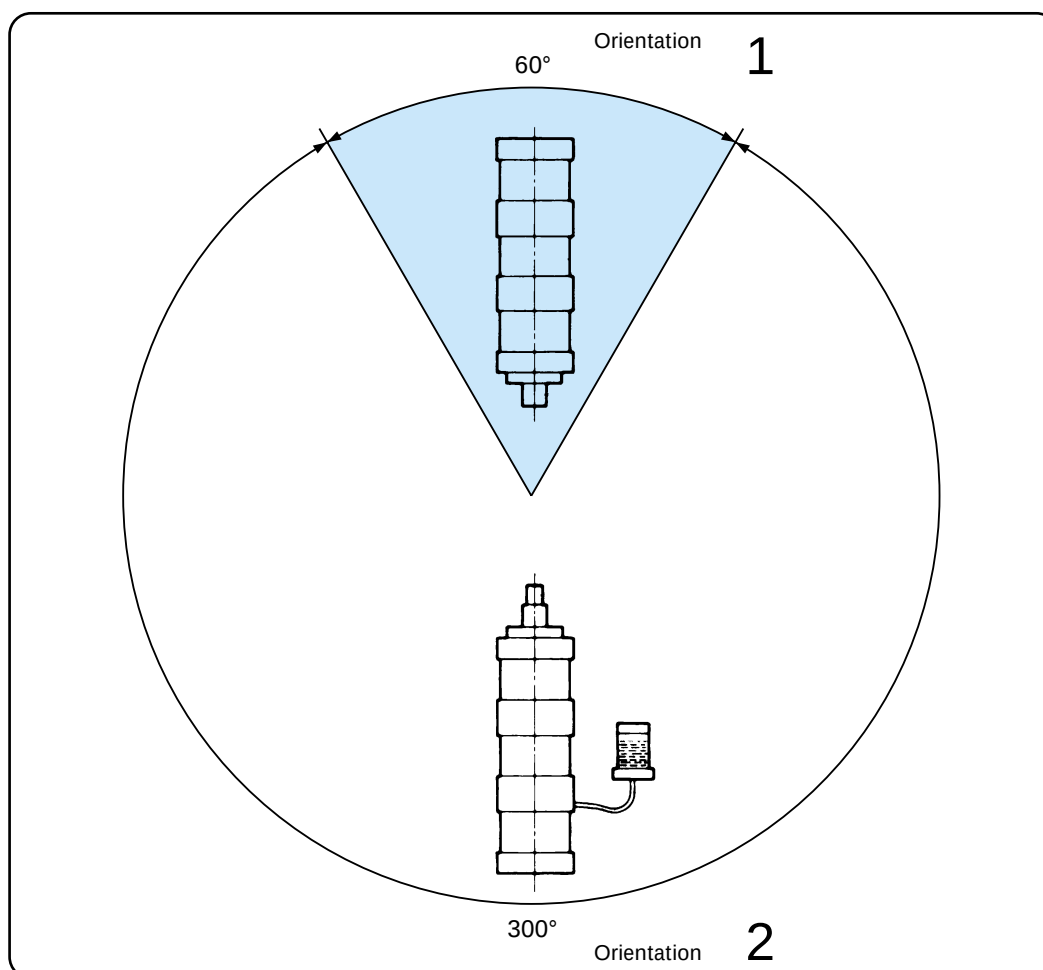
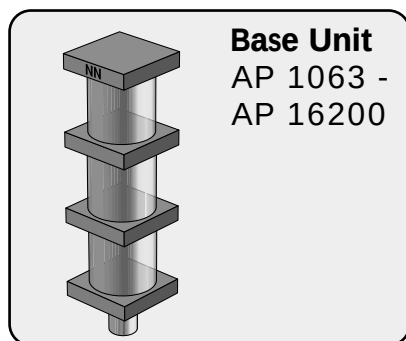
		Orientation			
Option		1	2	3	4
Female Rod End	HF	R	NA	NA	NA
Male Rod End	HM	NA	R	R	R
Limit Valve	W	A	A	A	A
Switch Option	MG	A	A	A	A
Rod End	CS	A	NA	NA	NA
Die Holder Pad	RS	A	A	A	A
Radial Die Holder Pad	IR	A	A	A	A
Load Cell	CEL	A	A	A	A

Availability A=available NA=not applicable R=required



Work Orientations & Available Option Combinations

AP SERIES



NOTE:

Contact factory for custom rod end requirements.

Limit valve 'W' not available with Position Device 'J'.

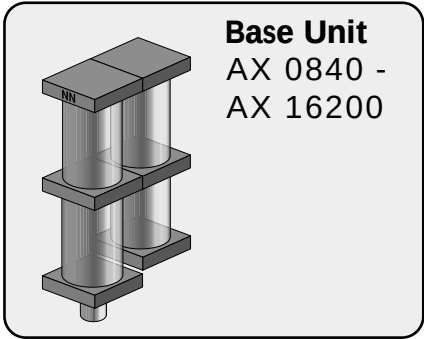
Reservoir 'SN' not available with Position Device 'J'.

Option		Orientation	
		1	2
Female Rod End	HF	R	NA
Male Rod end	HM	NA	R
Limit Valve	W	A	A
Switch Option	MG	A	A
Position Device	J	A	NA
External Reservoir	SN	A	R
Rod End	CS	A	NA
Die Holder Pad	RS	A	A
Non-Rotating Device	R	A	A
Radial Die Holder Pad	IR	A	A
Load Cell	CELL	A	A

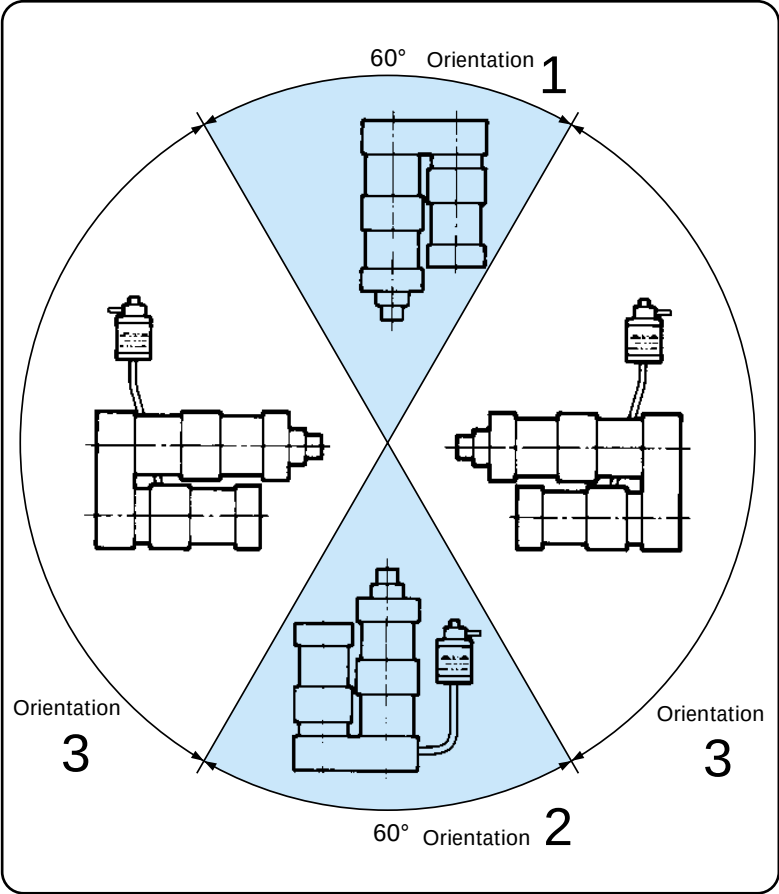
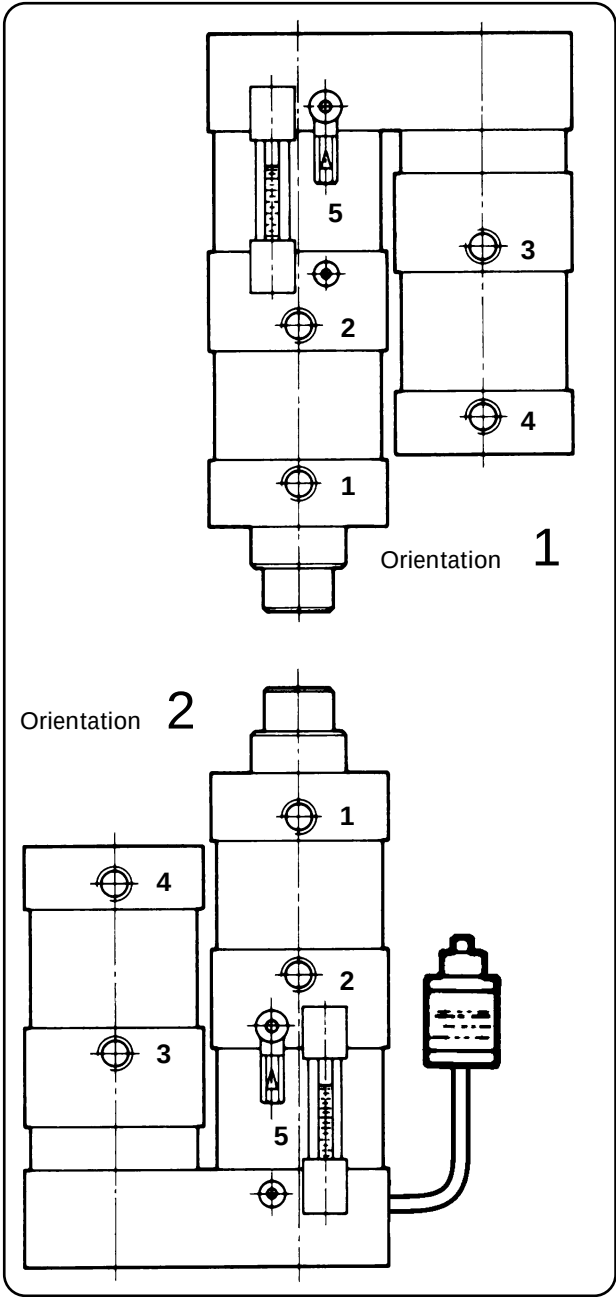
Availability A=available NA=not applicable R=required

Work Orientations & Available Option Combinations

AX SERIES



Configuration for:



Contact factory for custom rod end requirements.

NOTE:

'SN' reservoir must be used in Area 3.

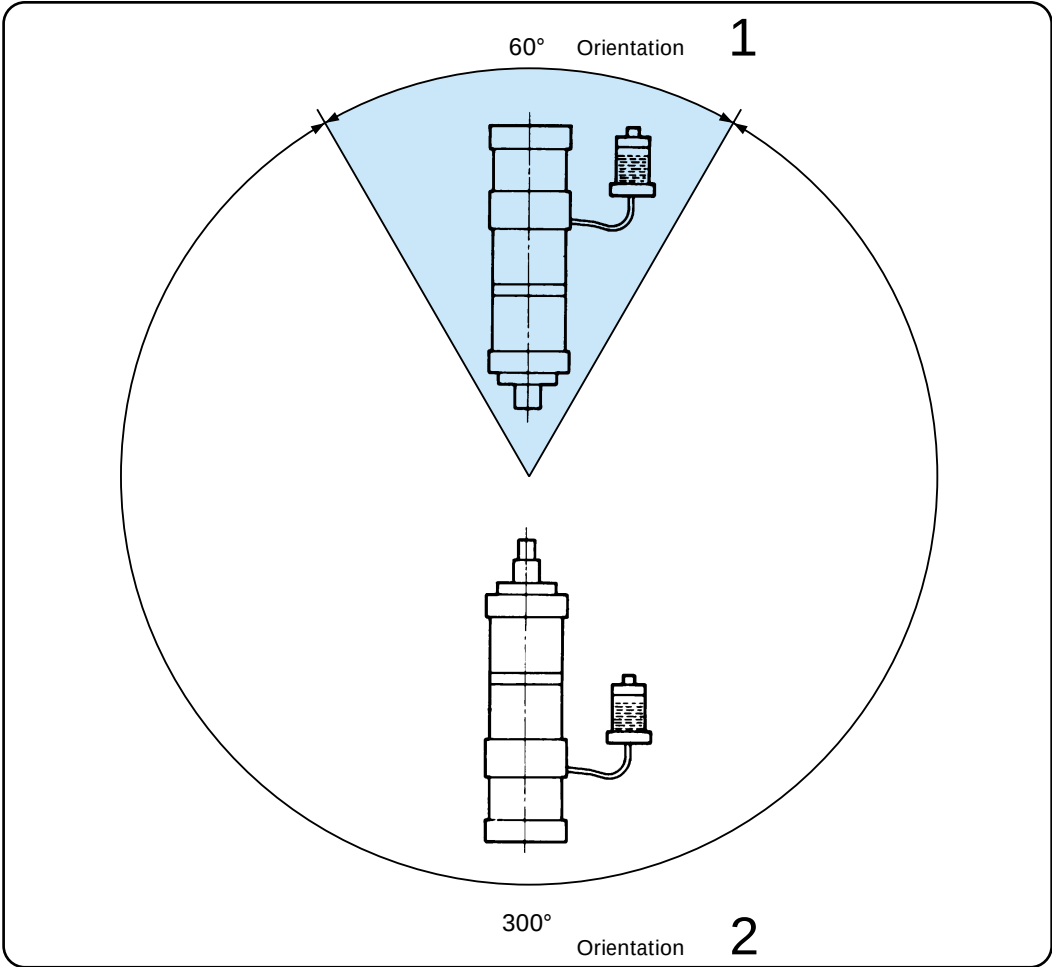
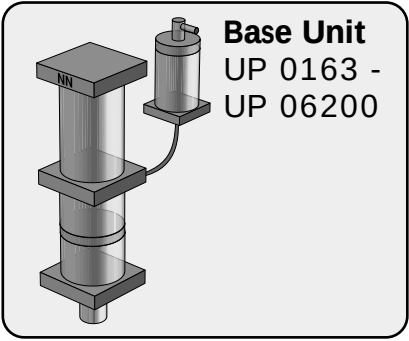
Option		Orientation		
		1	2	3
Female Rod End	HF	R	NA	R
Male Rod end	HM	NA	R	NA
Limit Valve	W	A	A	A
Switch Option	MG	A	A	A
Stroke Adjustment	XR	A	A	A
Linear Potentiometer	EN	A	NA	A
External Reservoir	SN	A	R	R
Rod End	CS	A	NA	A
Die Holder Pad	RS	A	A	A
Non-Rotating Device	R	A	A	A
Radial Die Holder Pad	IR	A	A	A
Load Cell	CELL	A	A	A

Availability A=available NA=not applicable R=required
* Not available on AX09840 & AX0950



Work Orientations & Available Option Combinations

UP SERIES



Contact factory for custom rod end requirements.

Option		Orientation	
		1	2
Female Rod End	HF	R	NA
Male Rod end	HM	NA	R
Switch Option	MG	A	A
External Reservoir	SN	R	R
Rod End	CS	A	NA
Die Holder Pad	RS	A	A
Radial Die Holder Pad	IR	A	A
Load Cell	CELL	A	A

Availability A=available NA=not applicable R=required

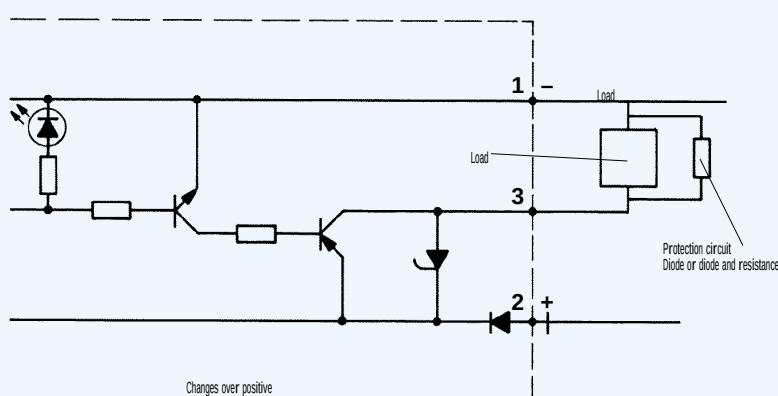


Sensors for MG Units (Proximity Version)

FEATURES

Temperature range	– 10°C +70°C
Repeatability precision	± 0.1 mm a 24°C
Working voltage	15 a 30 V DC
Max. current	800 mA
Working current without charge	
not connected	<14 mA
connected	< 25 mA
Max. connection frequency	15 Hz
Electric connection	connector with 3 poles (DIN 43650-A)
Protection	IP-65

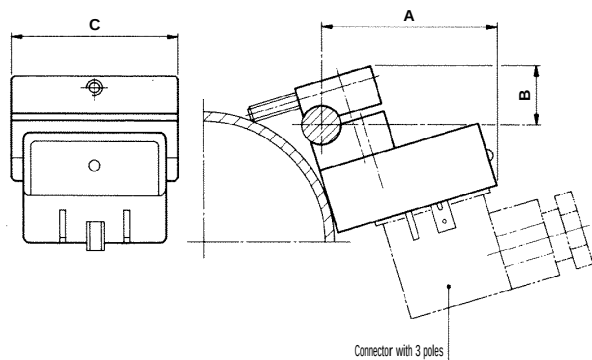
Electric Circuit with LED Code



Sensor with connector
0830

Sourcing Switch

DIMENSIONS

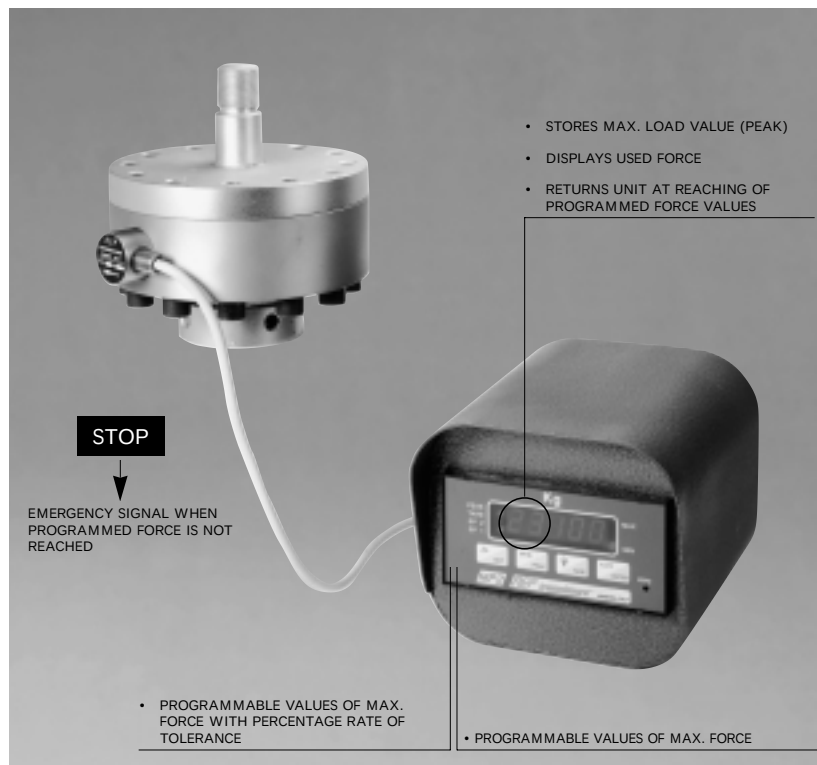


AP-AX	Type	UP	A	B	C
0840	–	–	45	13	37
0950	–	–	45	13	37
1063	0163	–	45	15	43
1180	0280	–	45	20	44
12100	03100	–	40	25	37
13125	04125	–	50	25	37
14160	05160	–	50	35	40
15200	06200	–	50	35	40
16200	–	–	50	45	50



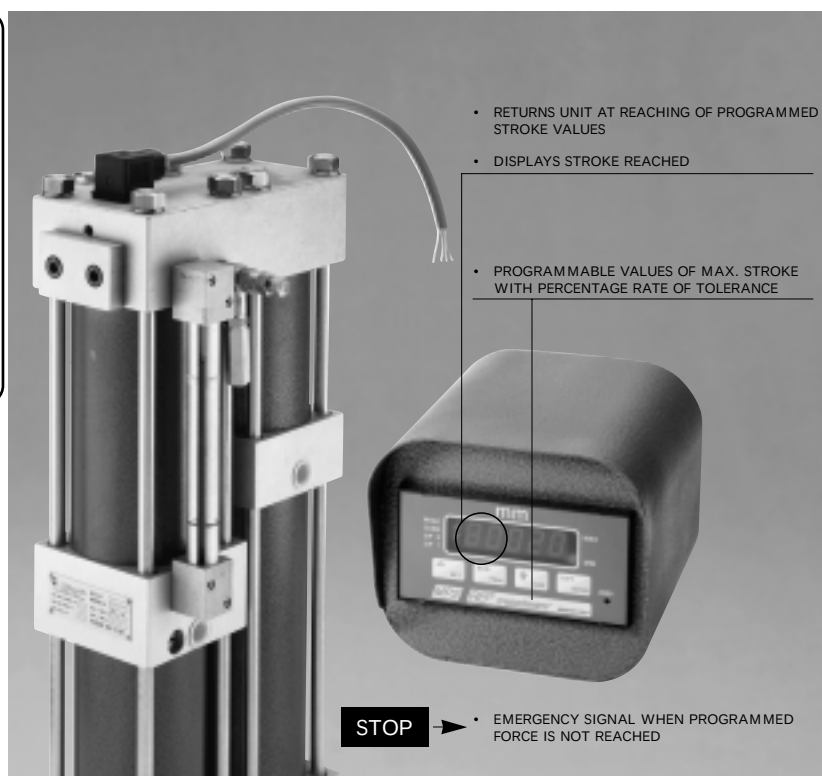
TECHNICAL FEATURES

- Digital indicator with 5 figures
- Variable scale
- Automatic tare and peak function
- Gauging in kg
- 2 analogue set points for min. and max.
- 2 set points fixable on keyboard
- Accuracy FS: 0.01 % (at lower speed)
- Inputs in: MV - V - MA - O - 20/4 - 20

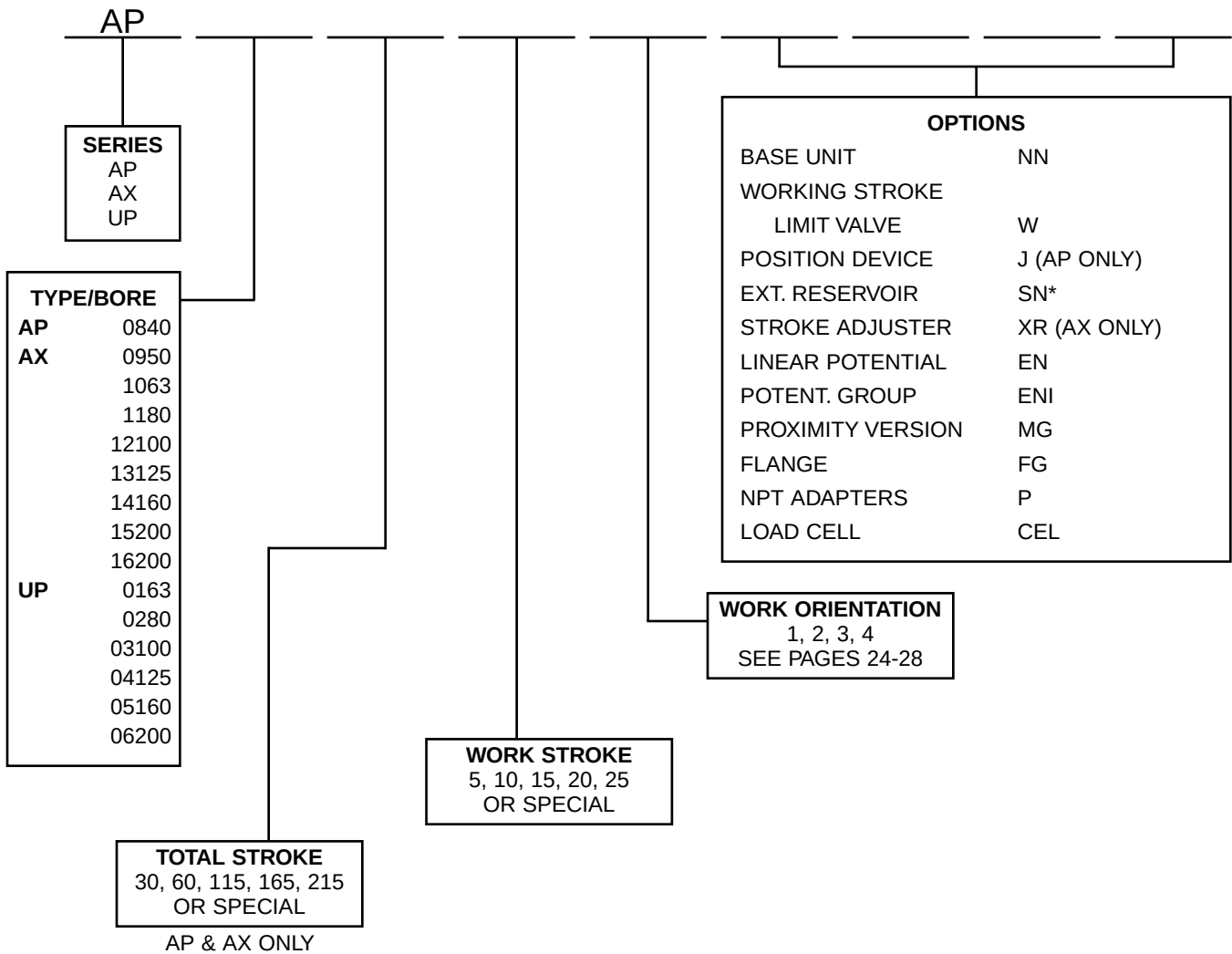


TECHNICAL FEATURES

- Digital indicator with 6 figures
- Variable scale
- 2 programmable thresholds
- Reset timer
- Input multiplying factor: 0.00001 to 9,99999
- Auxiliary entries feeding: 12V DC-100 MA - from terminal board
- Outputs: 2 relays with exchange contacts - carrying capacity 5A - 250V AC



Ordering Code



*SUPPLIED STANDARD ON UP SERIES

ACCESSORIES		TYPE/BORE	SERIES
ROD END	CS	08, 09, 10	AP
DIE HOLDER PAD	RS	11, 12, 13	AX
NON ROTATING	R	14, 15, 16	UP



PRESSES



OP 2M Series



OP 2MI Series



OP P Series



**Tromboline
MOP Series**

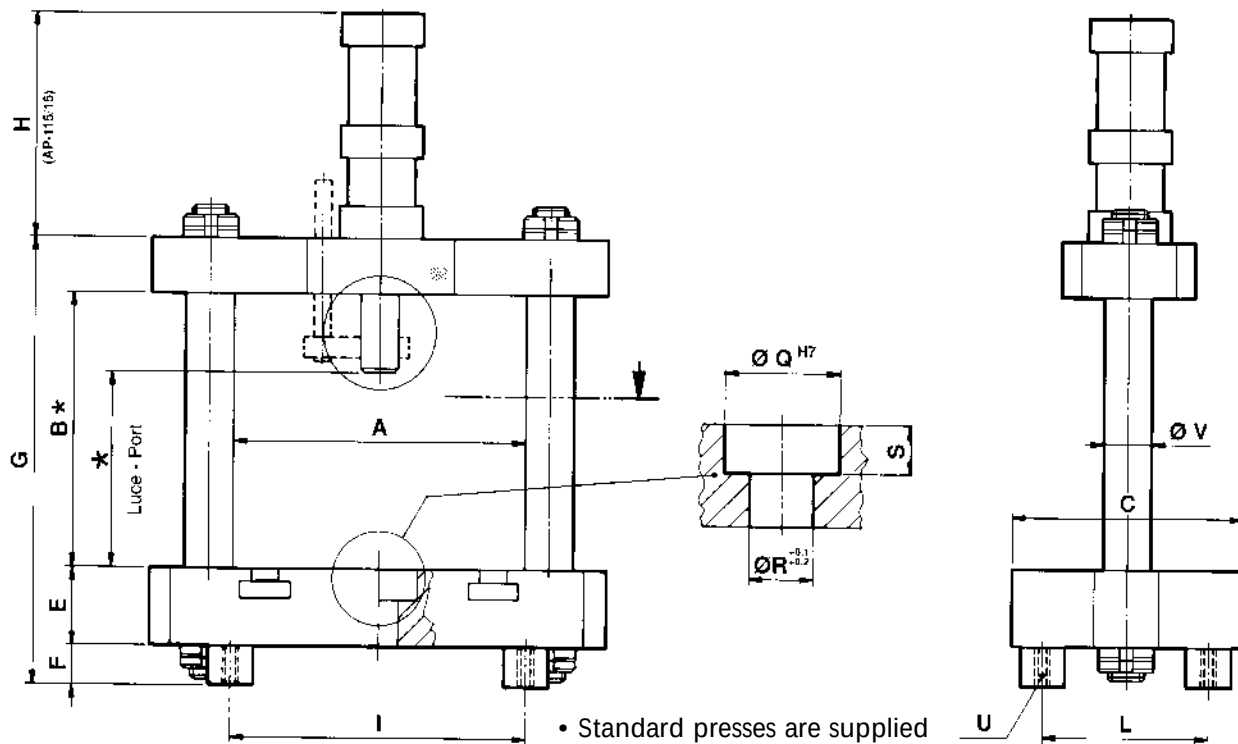
See Page 41

PRESS FORCE CHART

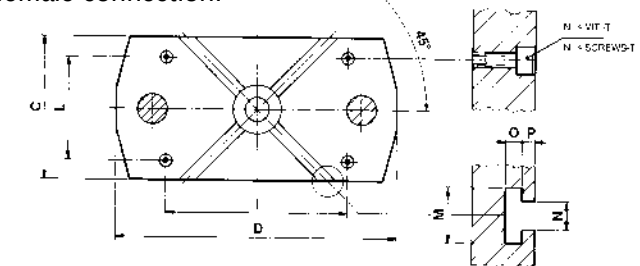
	Part Number	OP 1	OP 3	OP 5	OP 8	OP 13	OP 21	OP 42
Power stroke	lbs @ 100 psi	3,675	7,476	13,305	20,705	33,959	53,093	106,185
	kg @ 7 bar	1,692	3,442	6,125	9,532	15,633	24,442	48,883
Power stroke	lbs/psi	36.7	74.8	133.0	207.0	339.6	530.9	1,061.9
	kg/bar	241.7	491.7	875.0	1,361.7	2,233.3	3,491.7	6,983.3
Approach stroke	lbs @ 100 psi	411	699	1,085	1,756	2,803	4,521	4,521
	kg @ 7 bar	189	322	499	809	1,290	2,081	2,081
Retract stroke	lbs @ 100 psi	322	530	684	1,021	1,685	3,404	3,404
	kg @ 7 bar	148	244	315	470	776	1,567	1,567

This chart can be used for all Press series OP, OP P, OP 2MI





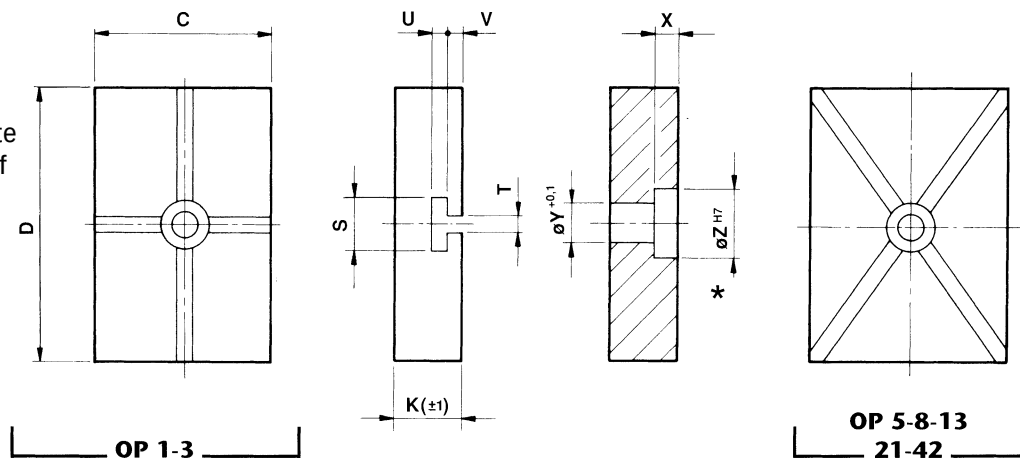
Series	OP 1	OP 3	OP 5	OP 8	OP 13	OP 21	OP 42
A	285	380	420	440	470	470	530
B	120	150	160	180	200	200	230
C	200	250	280	300	350	350	400
D	300	350	400	450	500	500	600
E	200	260	270	315	385	385	525
F	410	480	520	590	650	700	790
G	500	670	720	770	860	860	1,060
H	620	855	910	1,000	1,150	1,150	1,505
I	560	520	630	650	680	710	850
L	1,180	1,375	1,540	1,650	1,830	1,860	2,355
S	18	21	21	21	28	28	28
T	10	12	12	12	16	16	16
U	8	9	9	9	12	12	12
V	7	8	8	8	10	10	10
Z	60	70	70	90	110	110	110
Y	45	50	50	60	70	70	70
K	31	36	46	56	75	75	75
X	16	18	18	18	25	25	25



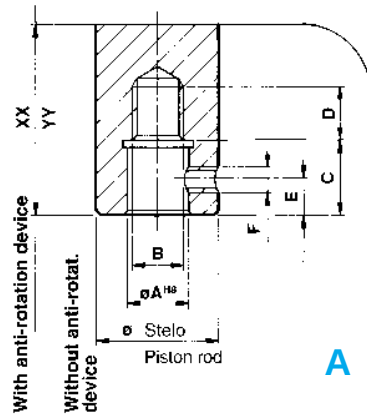
Series	Weight kg	Shipping dimensions cm	Feed Hose Ø
OP-1	125	130x55x60	12
OP-3	230	170x65x85	17
OP-5	320	170x65x85	17
OP-8	450	180x70x90	17
OP-13	720	200x85x100	17
OP-21	830	200x85x100	17
OP-42	1,050	240x100x120	24

Bolster Plate

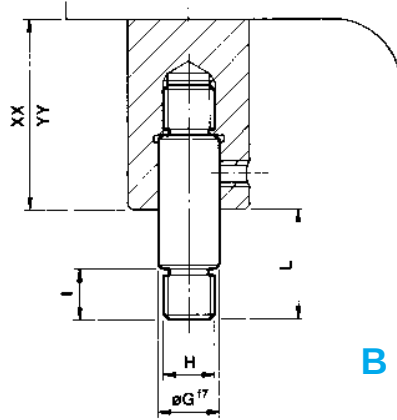
* Central hole of bolster plate is not concentric with axis of piston rod



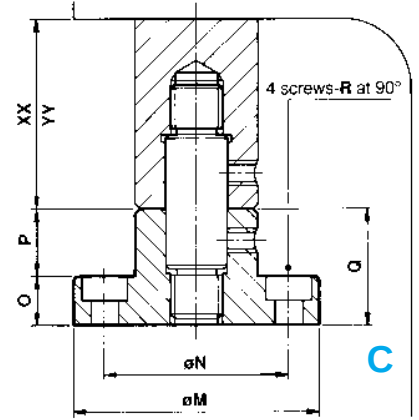
PISTON ROD WITH FEMALE CONNECTION

**A**

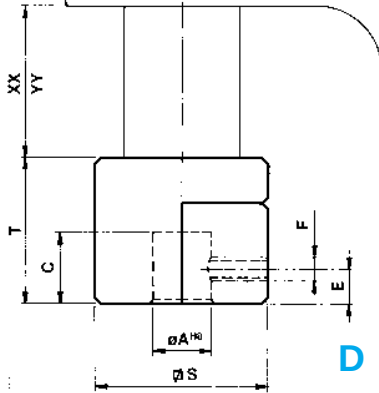
PISTON ROD WITH MALE CONNECTION

**B**

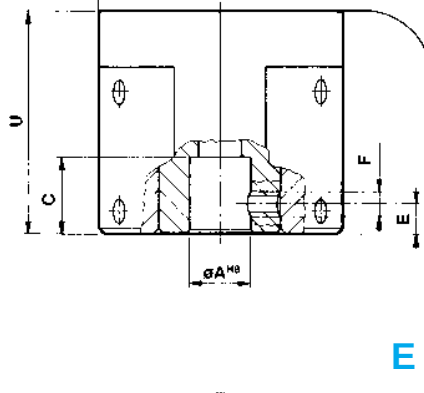
PISTON ROD WITH DIE HOLDER PAD

**C**

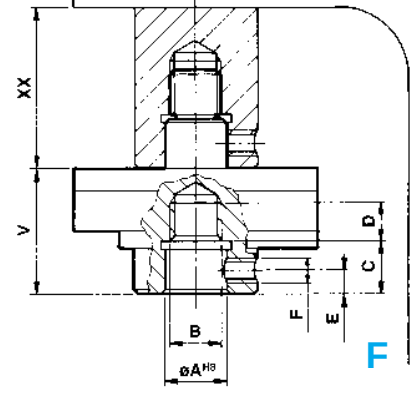
RADIAL DIE HOLDER PAD

**D**

WITH RAM GROUP

**E**

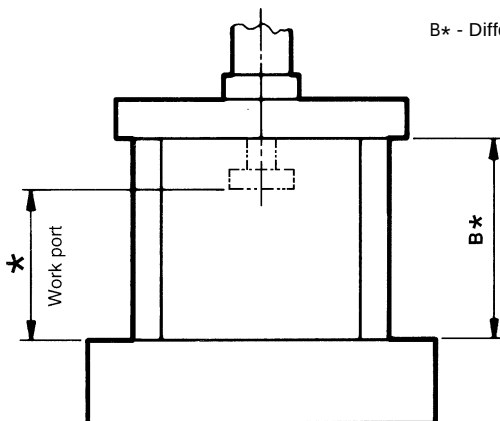
WITH LOAD CELL

**F**

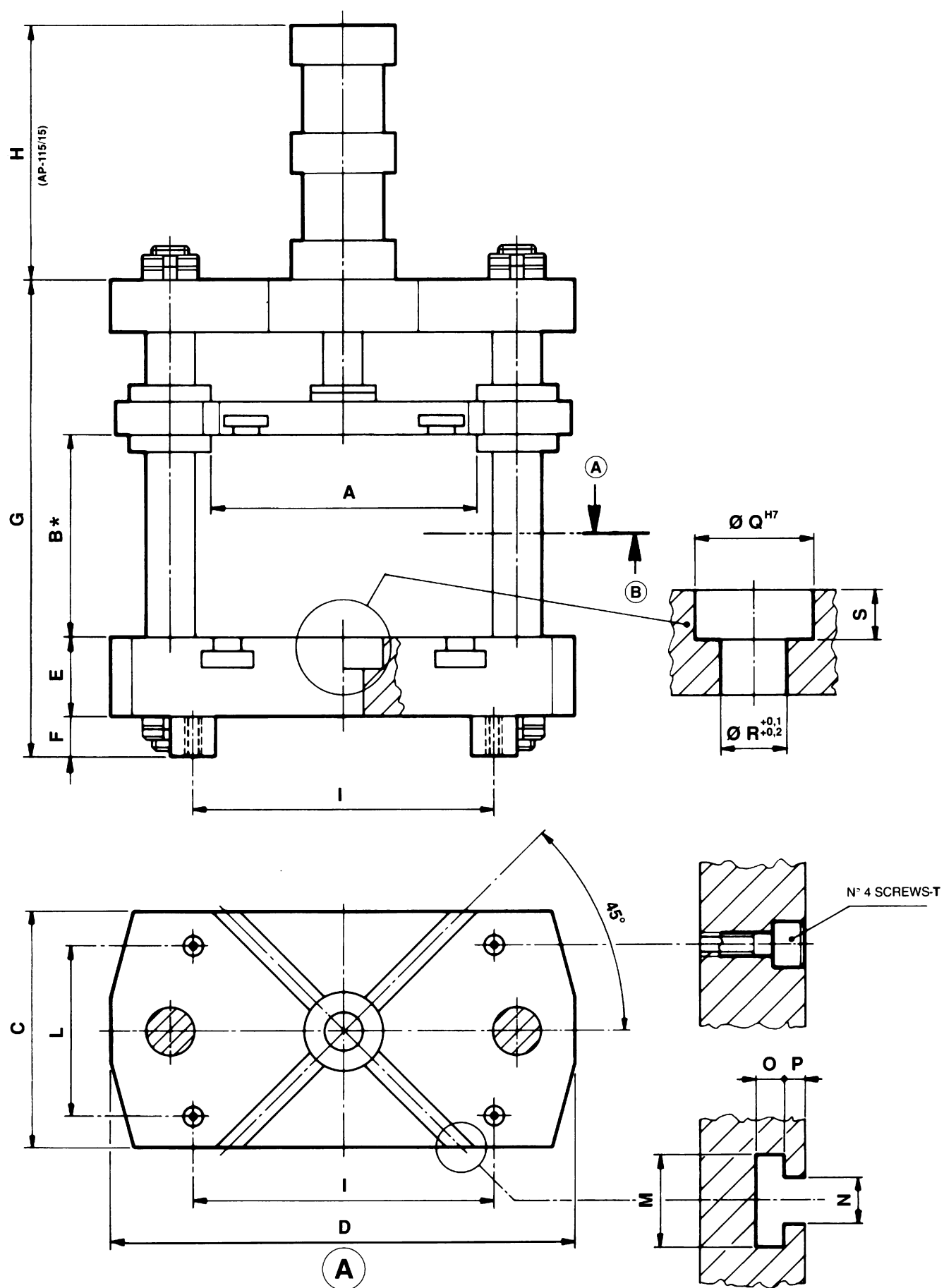
Series	OP 1	OP 3	OP 5	OP 8	OP 13	OP 21	OP 42
A	16	20	25	25	30	30	30
B	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2	M27x2
C	18	22	28	28	35	35	35
D	12	16	20	20	27	27	30
E	8	10	12	12	15	15	15
F	M6	M8	M8	M8	M8	M8	M8
G	16	20	25	25	30	30	30
H	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2	M27x2
I	12	16	20	20	27	27	27
L	23	33	38	38	52	52	52

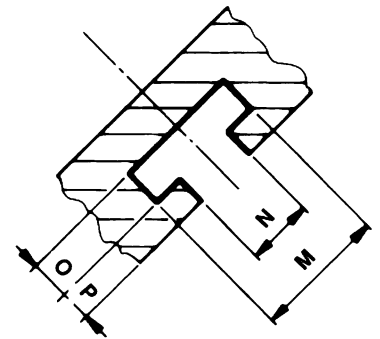
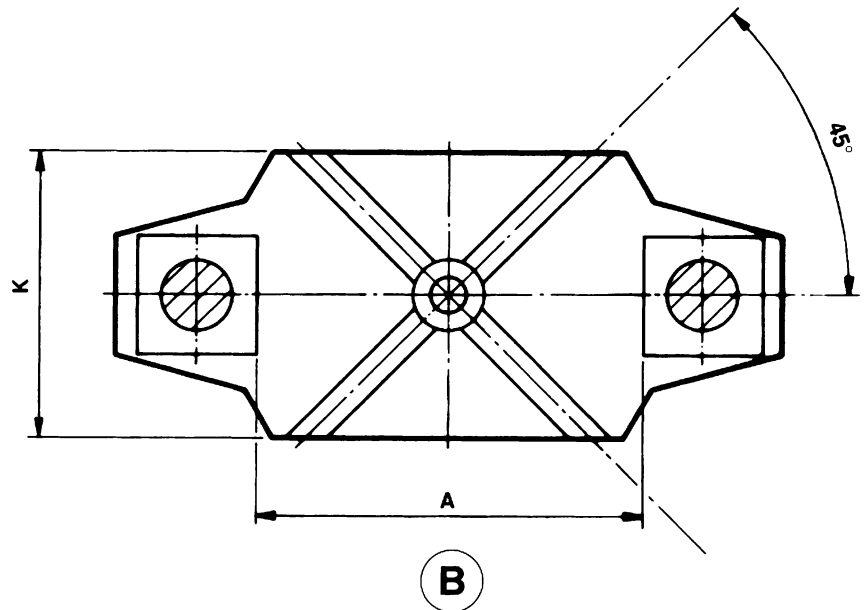
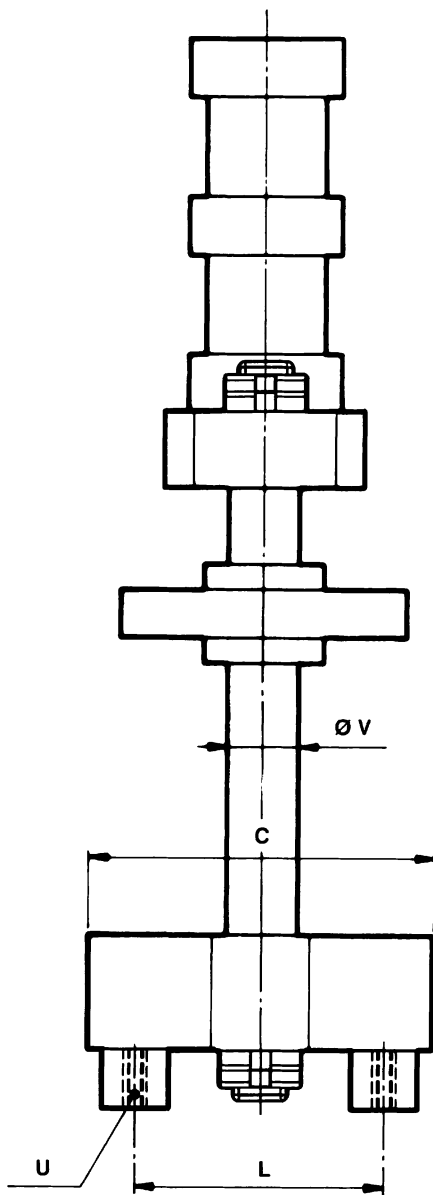
Series	OP 1	OP 3	OP 5	OP 8	OP 13	OP 21	OP 42
M	59	78	98	118	158	158	158
N	46	60	78	98	130	130	130
O	12	15	20	20	25	25	25
P	13	20	20	20	30	30	30
Q	25	35	40	40	55	55	55
R	M6	M8	M8	M8	M12	M12	M12
S	50	50	60	80	100	100	100
T	35	35	50	50	80	80	80
U	145	170	170	170	200	200	200
V	70	75	85	85	110	110	155

B* - Different dimensions upon request

***Work Port**

Series	OP 1	OP 3	OP 5	OP 8	OP 13	OP 21	OP 42
A-XX	275	265	305	295	335	335	385
B-XX	252	232	267	257	283	283	333
C-XX	250	230	265	255	280	280	330
D-XX	240	230	255	245	255	255	305
F-XX	205	190	220	210	225	225	230
A-YY	310	300	345	340	380	380	430
B-YY	287	267	307	302	328	328	378
C-YY	285	265	305	300	325	325	375
D-YY	275	265	295	290	300	300	350
E	205	180	230	230	250	250	315

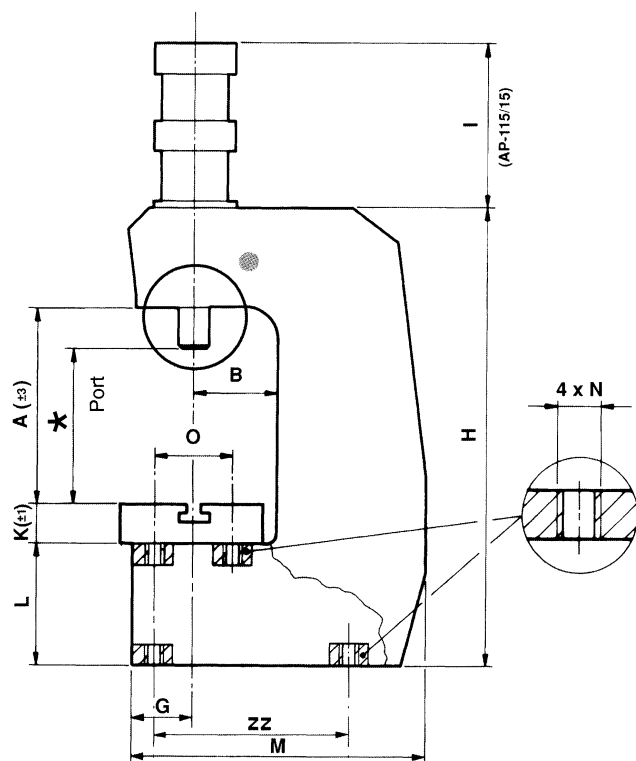




Series	OP 2MI 1	OP 2MI 3	OP 2MI 5	OP 2MI 8	OP 2MI 13	OP 2MI 21	OP 2MI 42
A	340	340	360	360	410	410	480
B*	250	250	300	300	400	400	450
C	250	250	300	300	350	350	400
D	470	470	570	570	660	660	780
E	35	55	75	75	95	95	118
F	35	35	50	50	60	60	80
G	460	515	640	650	820	820	936
H	670	700	830	850	885	920	1250
I	390	390	460	460	480	480	580
K	200	200	250	250	280	280	320
L	220	220	260	260	300	300	330
M	18	21	21	21	28	28	28
N	10	12	12	12	16	16	16
O	8	9	9	9	12	12	12
P	7	8	8	8	10	10	10
Q	60	70	70	90	110	110	110
R	45	50	50	60	70	70	70
S	16	18	18	18	25	25	25
T	M8X40	M8X60	M10X80	M10X80	M12X100	M12X100	M12X130
U	M8	M8	M10	M10	M12	M12	M12
V	40	40	60	60	80	80	100

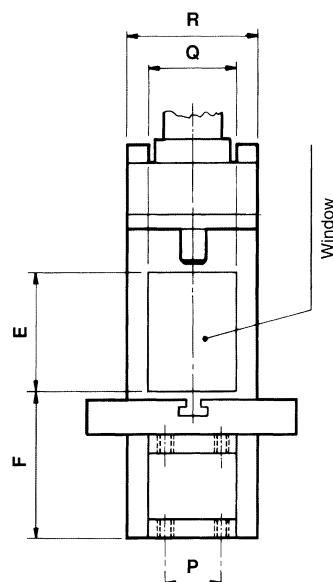
B* - Different dimensions upon request

Series	Weight kg	Shipping dimensions cm	Feed Hose Ø
OP 2MI-1	95	130x55x35	12
OP 2MI-3	125	130x55x35	17
OP 2MI-5	180	170x60x40	17
OP 2MI-8	255	170x60x40	17
OP 2MI-13	355	180x70x45	17
OP 2MI-21	465	200x70x45	17
OP 2MI-42	520	210x80x50	24



- Standard presses are supplied with female connection.

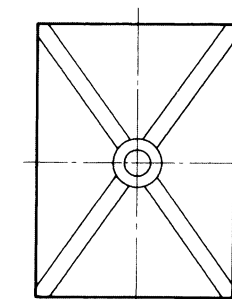
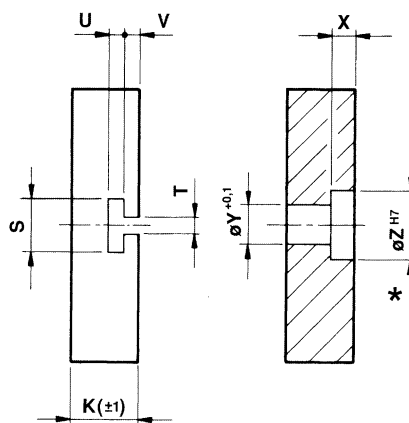
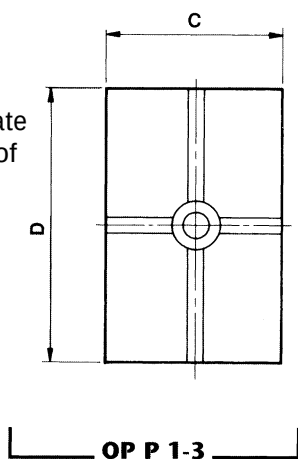
Series	Weight kg	Shipping dimensions cm	Feed Hose Ø
OP P-1	120	130x55x60	12
OP P-3	223	170x65x85	17
OP P-5	312	170x65x85	17
OP P-8	440	180x70x90	17
OP P-13	708	200x85x100	17
OP P-21	816	200x85x100	17
OP P-42	1,030	240x100x120	24



Series	OP P 1	OP P 3	OP P 5	OP P 8	OP P 13	OP P 21	OP P 42
A	285	380	420	440	470	470	530
B	120	150	160	180	200	200	230
C	200	250	280	300	350	350	400
D	300	350	400	450	500	500	600
E	190	260	260	290	320	320	350
F	225	280	305	355	430	430	550
G	90	115	132	125	140	140	155
H	620	855	910	1,000	1,150	1,150	1,505
I	560	520	630	650	680	710	850
L	170	225	225	260	310	310	450
M	400	540	590	620	710	710	910
N	M8	M10	M10	M10	M10	M10	M10
O	100	160	160	160	190	190	200
P	80	100	120	130	160	160	160
Q	110	130	160	190	230	260	210
R	140	180	220	260	310	360	410
S	18	21	21	21	28	28	28
T	10	12	12	12	16	16	16
U	8	9	9	9	12	12	12
V	7	8	8	8	10	10	10
Z	60	70	70	90	110	110	110
Y	45	50	50	60	70	70	70
K	31	36	46	56	75	75	75
X	16	18	18	18	25	25	25

Bolster Plate

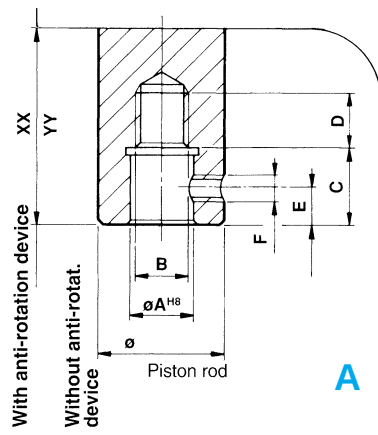
* Central hole of bolster plate is not concentric with axis of piston rod



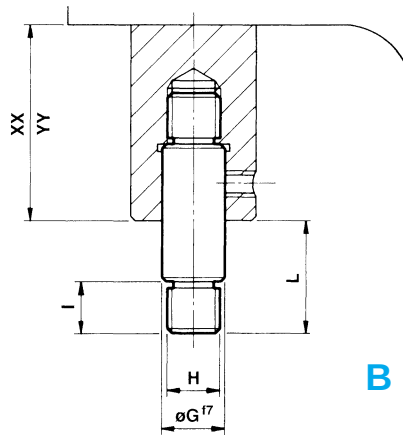
OP P 5-8-13
21-42



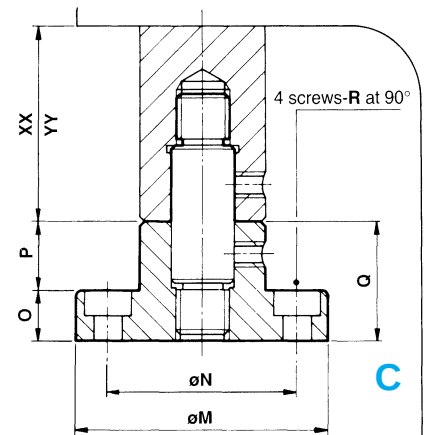
PISTON ROD WITH FEMALE CONNECTION

**A**

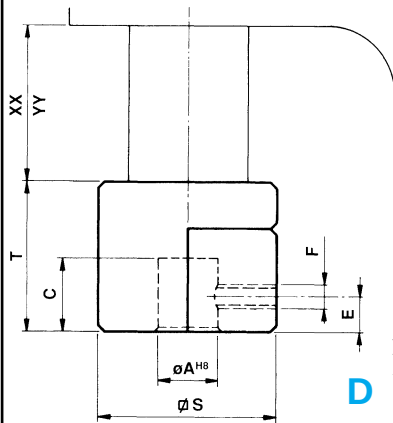
PISTON ROD WITH MALE CONNECTION

**B**

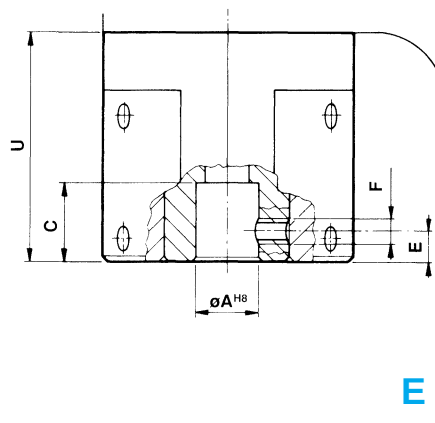
PISTON ROD WITH DIE HOLDER PAD

**C**

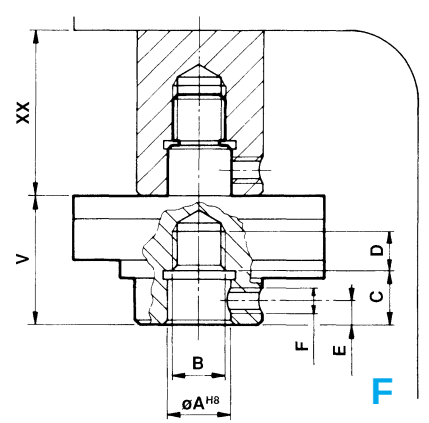
RADIAL DIE HOLDER PAD

**D**

WITH RAM GROUP

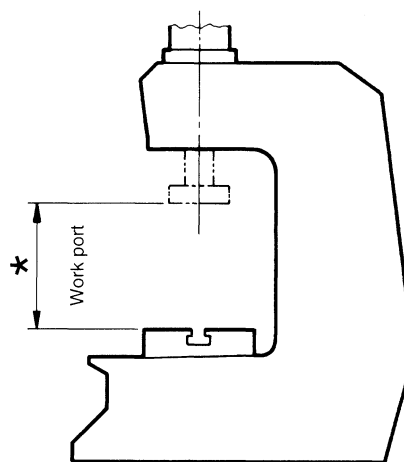
**E**

WITH LOAD CELL

**F**

Series	OP P 1	OP P 3	OP P 5	OP P 8	OP P 13	OP P 21	OP P 42
A	16	20	25	25	30	30	30
B	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2	M27x2
C	18	22	28	28	35	35	35
D	12	16	20	20	27	27	30
E	8	10	12	12	15	15	15
F	M6	M8	M8	M8	M8	M8	M8
G	16	20	25	25	30	30	30
H	M12x1.5	M16x1.5	M20x1.5	M20x1.5	M27x2	M27x2	M27x2
I	12	16	20	20	27	27	27
L	23	33	38	38	52	52	52

Series	OP P 1	OP P 3	OP P 5	OP P 8	OP P 13	OP P 21	OP P 42
M	59	78	98	118	158	158	158
N	46	60	78	98	130	130	130
O	12	15	20	20	25	25	25
P	13	20	20	20	30	30	30
Q	25	35	40	40	55	55	55
R	M6	M8	M8	M8	M12	M12	M12
S	50	50	60	80	100	100	100
T	35	35	50	50	80	80	80
U	145	170	170	170	200	200	200
V	70	75	85	85	110	110	155



*Work Port

With anti-rotation device

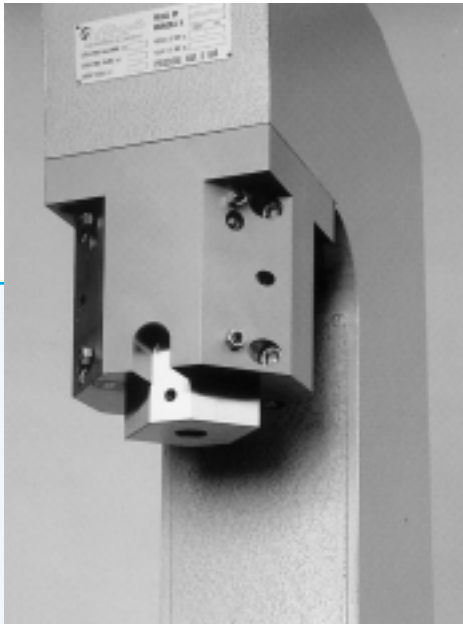
Series	OP P 1	OP P 3	OP P 5	OP P 8	OP P 13	OP P 21	OP P 42
A-XX	210	295	325	335	355	355	400
B-XX	187	262	287	297	303	303	348
C-XX	185	260	285	295	300	300	345
D-XX	175	260	275	285	275	275	320
F-XX	140	220	240	250	245	245	245

Without anti-rotation device

Series	OP P 1	OP P 3	OP P 5	OP P 8	OP P 13	OP P 21	OP P 42
A-YY	245	330	365	380	400	400	445
B-YY	222	297	327	342	348	348	393
C-YY	220	295	325	340	345	345	390
D-YY	210	295	315	330	320	320	365
E	140	210	250	270	270	270	330

Press Options

OP Series Presses use AP & AX series intensifiers. Please consult pages 6-9 for standard features and options, as well as these Press Specific Options.



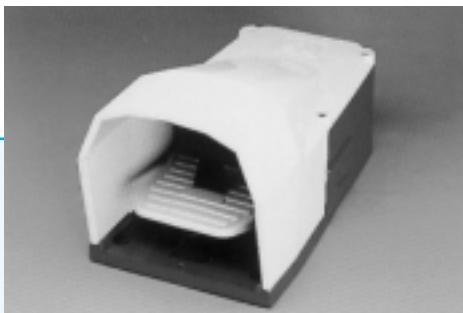
Option MB Ram Group

- Body in foliated cast iron
- Ram in hardened steel
- Slide band in P.T.F.E.
- Total stroke 60 mm



Option ENC

Linear potentiometer with device to preset working stroke.



Option 542 PP

Foot pedal, three position, step by step for presses without pneumatic equipment.

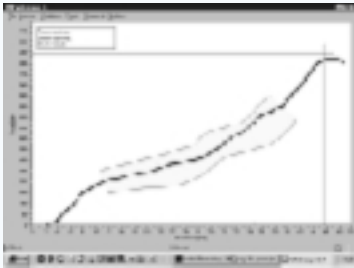


Option TY

Stroke counter with manual zero set.

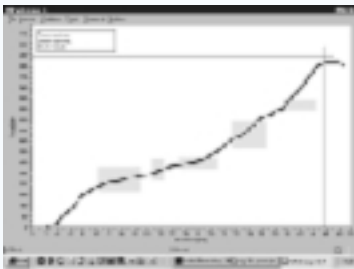


ELECTRONIC PRODUCTION CONTROL SYSTEMS



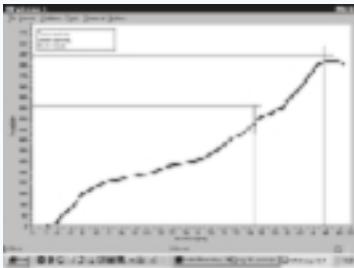
TRO.

The peak of evolution in electronic control. It controls the pressing process by analyzing the stroke versus the force that generates during the manufacturing of each piece. This output curve can be compared to a user specified tolerance, that can be applied to any part or all of the process.



CSQ.

As in the TRO the CSQ controls the pressing process by analyzing the stroke versus the force that generates during the manufacturing of each piece. This control is provided by the use of tolerance windows that monitor the process at user defined points.



CHECK-POINT.

The most economical control system. It controls the quality of the piece by user defined limits to stroke and force.



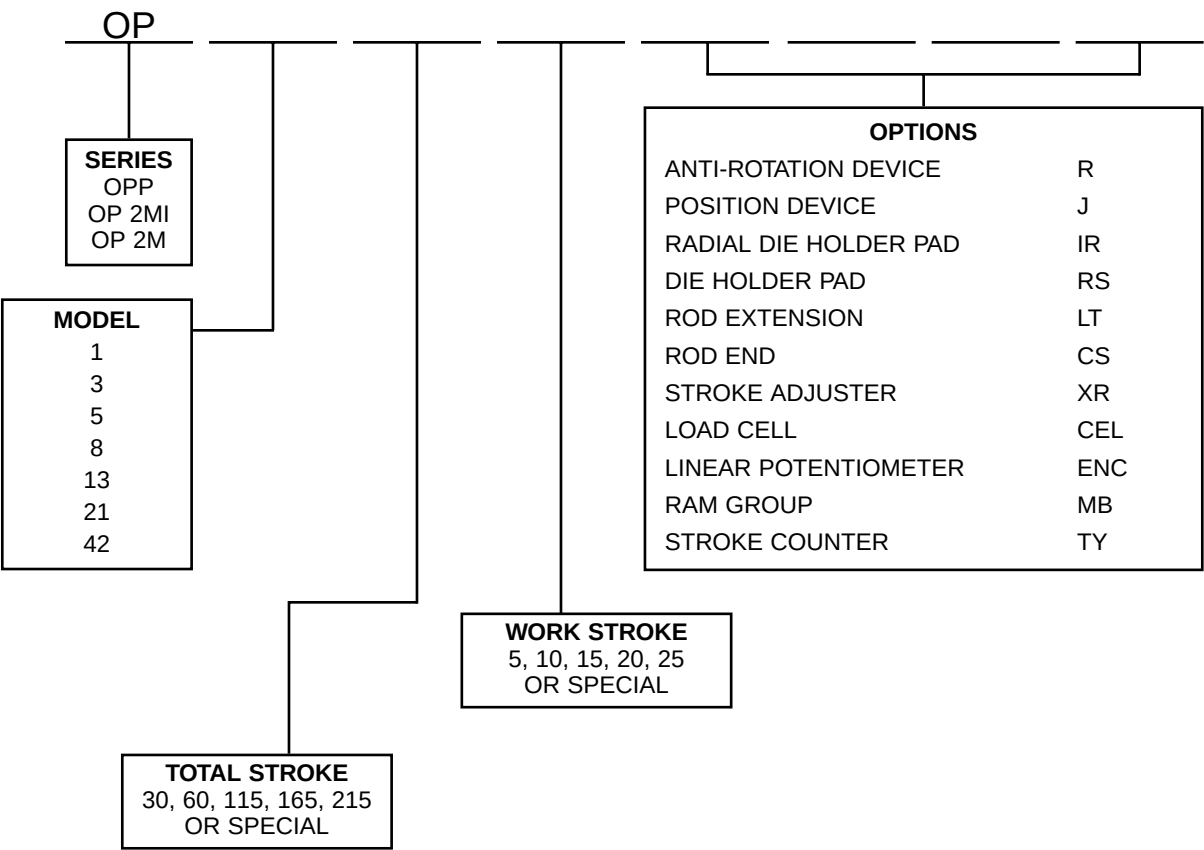
CEL.

Using a load cell to provide an analog output of the force applied, this output is then displayed on an LED screen. It allows the machine operator a real time display of the force applied by the cylinder and the ability to provide set points to terminate the cycle.



Ordering Code

PRESSES



ACCESSORIES (ORDER SEPARATELY)

FOOT PEDAL 341-542 PP

Presses can be supplied with the following added:

- Index Table
- Column Posts
- Pick & Place Unit
- Additional Intensifiers
- Electronic Feedback
- Special Pneumatic Controls



TROMBOLINE

The MOP Series Press uses air to oil intensification combined with a manual approach to make a unit that is rapid and lessens operator strain

15 Standard versions

4 Models with adjustable forces:

MOP 07	700 kg -	1,543 lb.
MOP 15	1,450 kg -	3,197 lb.
MOP 30	3,000 kg -	6,614 lb.
MOP 50	5,000 kg -	11,024 lb.

60 mm of stroke length

4 Hydropneumatic working strokes

5 mm	0.19 in.	15 mm	0.59 in.
10 mm	0.39 in.	20 mm	0.78 in.

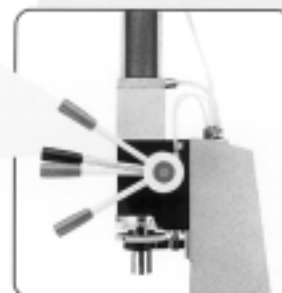


The Exclusive Features

The TROMBOLINE consists of a hydropneumatic intensifier and a manually operated mechanical unit. The working cycle is split up into three phases.

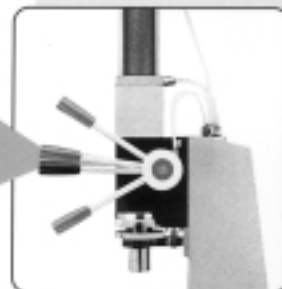
Approach stroke

- The lever operates the down stroke of the piston rod through a rock-and-pinion device. It allows the approach of the tool to the workpiece.



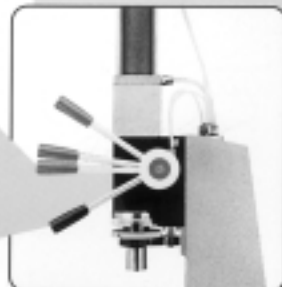
Slip clutch stroke of intensifier

- The continuing movement of the lever, engages the intensifier. It operates with a friction clutch system



Working stroke with hydropneumatic force

- With continued down stroke of the lever, the intensifier carries out the working stroke. Releasing the lever causes the unit to return to the starting position.



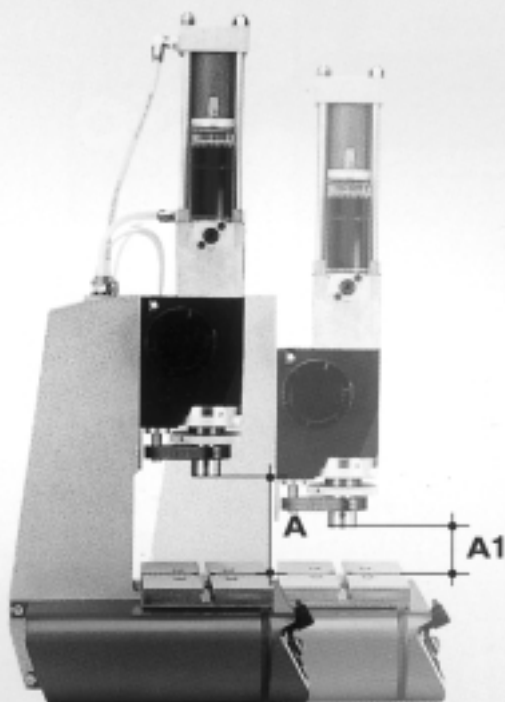
1 Readout of applied pressure

2 Pressure regulator (working stroke)

The force of the hydropneumatic intensifier is proportional to pressure setting.
 Ex. MOP 15 - force 1500 kg at 6 bar
 Set pressure:
 $4 \text{ bar} = 1500 : 6 \times 4 = 1000 \text{ kg}$
 Mop is - Force 3300 lbs @ 87 psi
 Set pressure = $3300 : 87 \times 60 = 2275 \text{ lbs}$

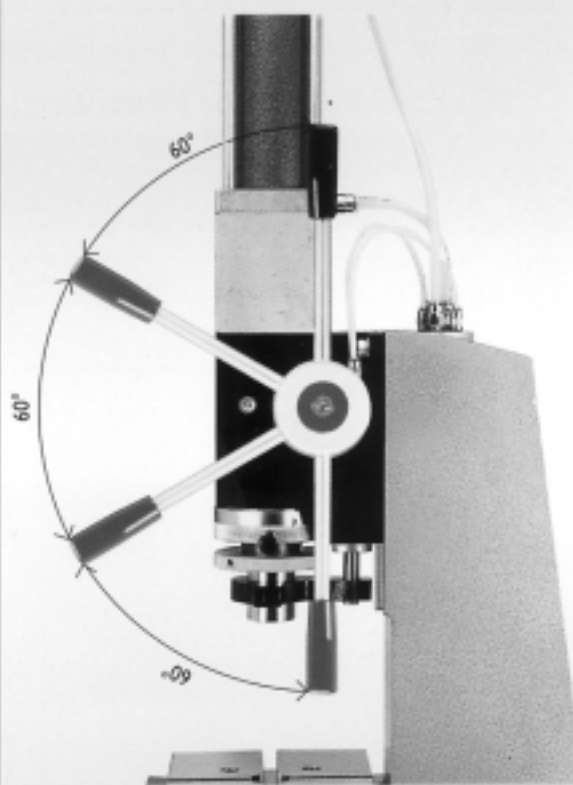
3 Switch with safety key

It cuts out hydropneumatic circuit



Change of work height

The frame is provided with holes that allow to lower the power set, therefore to reduce the height.



Operating lever

It can be positioned in 4 different points within 180° for a optimum ease of operation. To change position of the lever, unscrew and re-fit it in desired position.

Features



Approach stroke limiting bracket (T.D.C.)

The bracket is used to position the tool. It shortens the return stroke of the piston rod.

The positioning is done by moving the piston rod to the desired position by means of the lever, then loosening the screw of the bracket, sliding it to the upper ledge and re-tightening the screw.

Options

Mechanical regulation of B.D.C. code X

code X



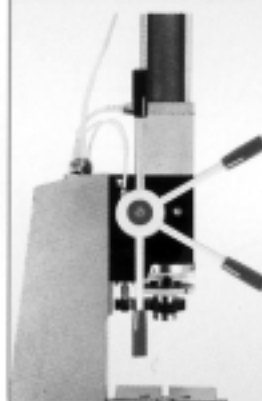
Locking ring

Regulation ring

The end stroke (B.D.C.) can be regulated for 10 mm using the ring that operates on a movable positive stop, placed inside the cylinder. This device is absolutely necessary when a high precision in end stroke position is required

Operation lever on the left side

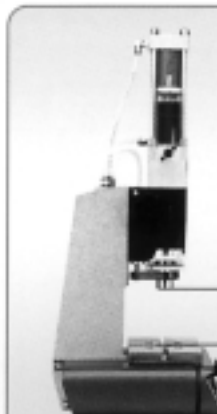
code L



Single power sets with manual or motor-driven operation



Special work heights by request



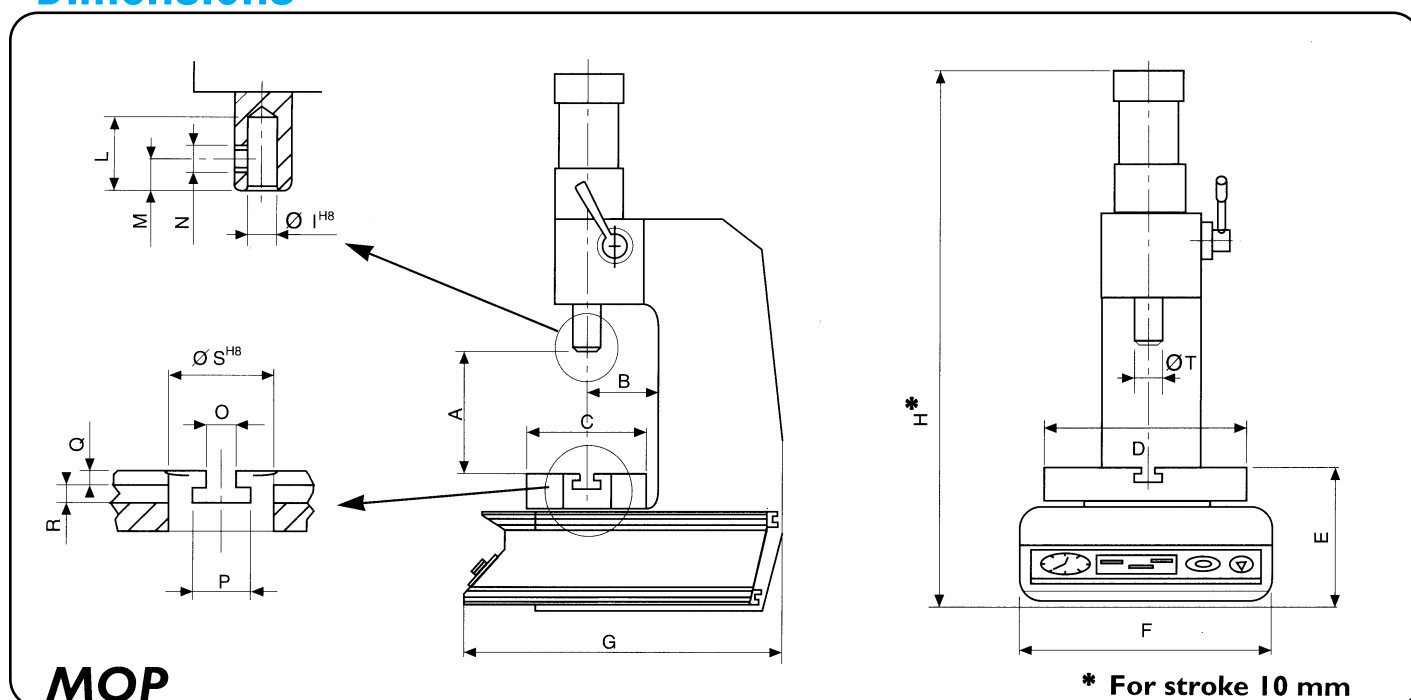
SPECIAL



Performances

VALID FOR ALL VERSIONS		VERSIONS				
		MOP	-	MOPS	-	MOPH
Power Fluid		filtered air max 7 bar (100 psi)				
Model		07	15	30	50	
Working stroke force	kg @ 7 bar <i>lb @ 80 psi</i>	700 <i>1,420</i>	1,450 <i>2,940</i>	3,000 <i>6,080</i>	5000 <i>10,140</i>	
Total Stroke	mm <i>in.</i>	60 <i>2.36</i>	60 <i>2.36</i>	60 <i>2.36</i>	60 <i>2.36</i>	
Working stroke (hydropneumatic thrust)	mm <i>in.</i>	5 <i>.19</i>	10 <i>.39</i>	15 <i>.59</i>	20 <i>.78</i>	
Thrust of return stroke	kg <i>lb.</i>	1.4 <i>3.08</i>	1.8 <i>2.96</i>	2.2 <i>4.85</i>	2.4 <i>5.29</i>	
Mechanical regulation of bottom dead centre	mm <i>in.</i>	10 <i>.39</i>	10 <i>.39</i>	10 <i>.39</i>	10 <i>.39</i>	
Consumption at 6 bar for 1 mm of working stroke	nL	0.188	0.337	0.566	1.098	
Max weight of tools applied	kg <i>lb.</i>	0.8 <i>1.76</i>	1.3 <i>2.86</i>	1.8 <i>3.96</i>	1.8 <i>3.96</i>	
Working speed at 6 bar	mm/sec <i>in./sec</i>	90 <i>3.54</i>	65 <i>2.56</i>	40 <i>2.57</i>	30 <i>1.18</i>	

Dimensions

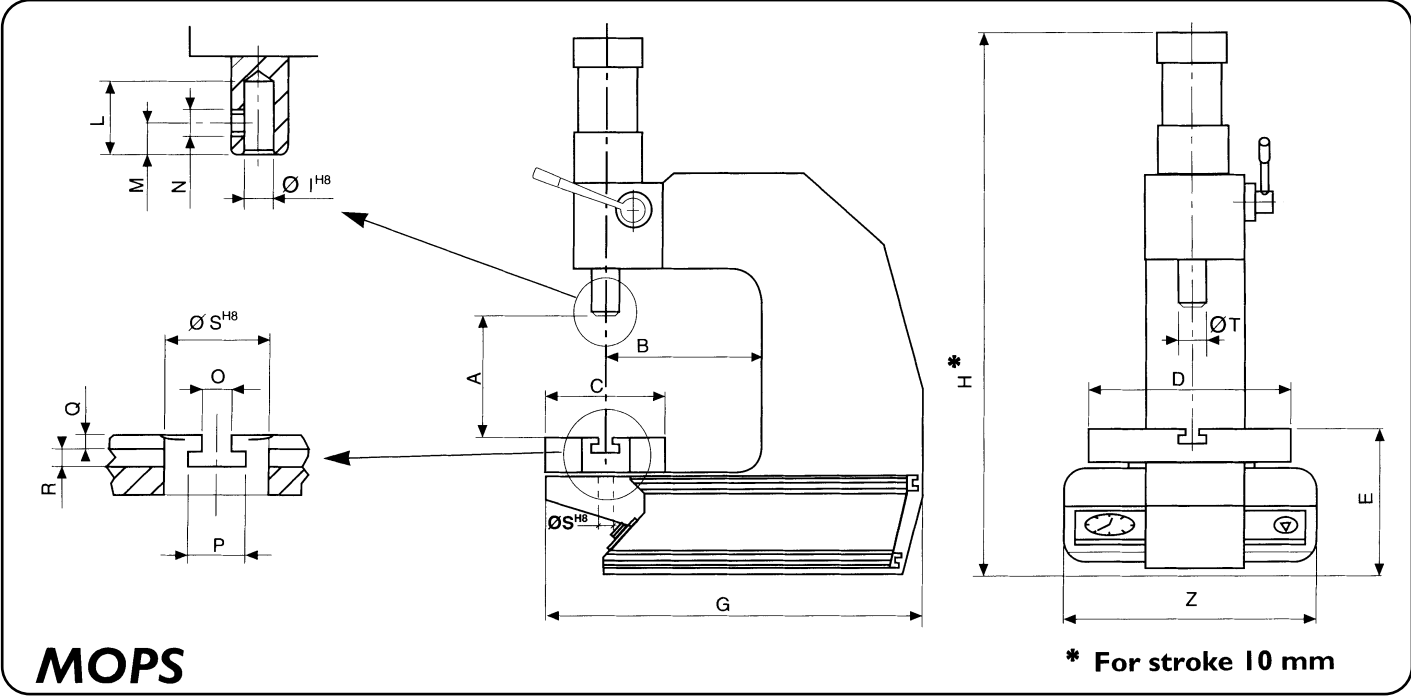


with power set in low position

	A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	Weight kg
MOP 07	100	50	85	150	180	107	290	315	650	14	45	15	M8	10	18	7	8	30	35	45
MOPB 07	180	50	85	150	180	107	290	315	650	14	45	15	M8	10	18	7	8	30	35	45
MOP 15	117	67	85	150	200	127	300	335	726	14	45	15	M8	10	18	7	8	30	35	62
MOPB 15	217	67	85	150	200	127	300	335	726	14	45	15	M8	10	18	7	8	30	35	62
MOP 30	150	100	100	160	220	155	340	390	835	20	50	15	M8	12	21	8	9	30	50	105
MOPB 30	250	100	100	160	220	155	340	390	835	20	50	15	M8	12	21	8	9	30	50	105
MOP 50	200	110	190	300	205	400	475	980	20	50	15	M8	12	21	8	9	30	50	130	148

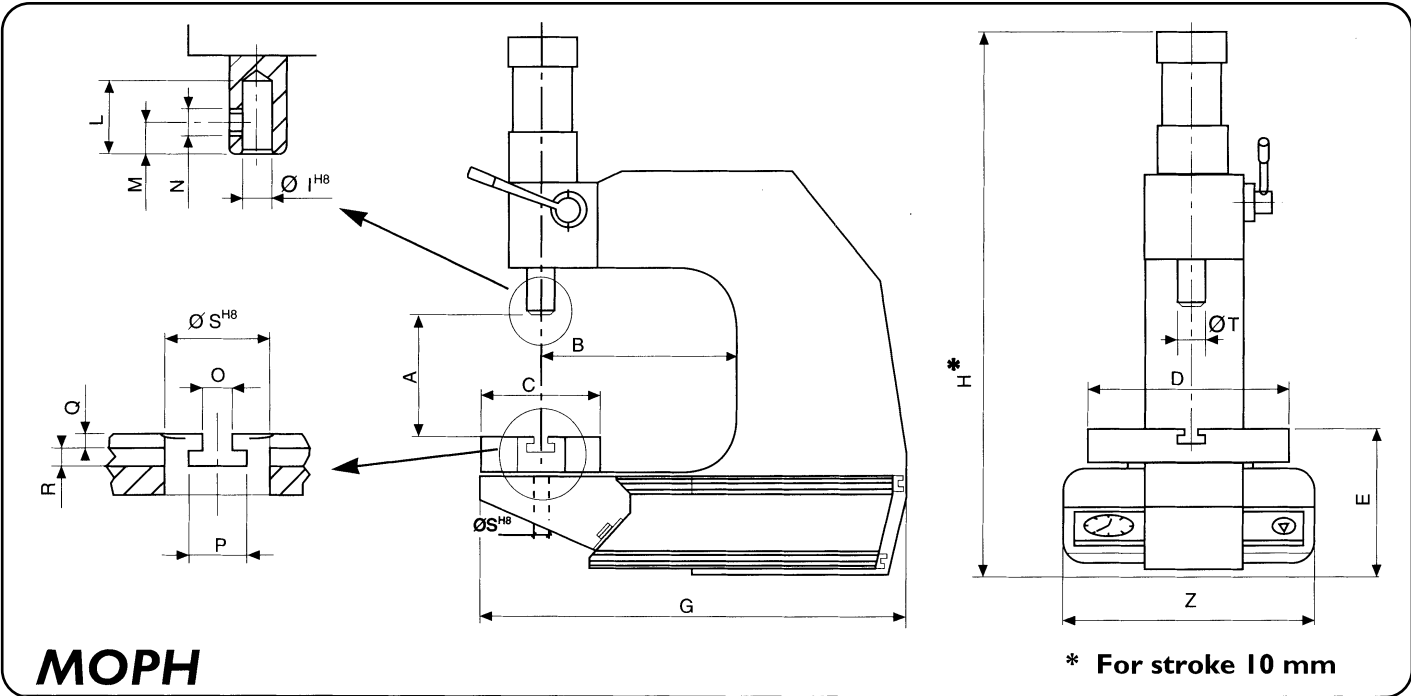


Dimensions



	A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	Z	Weight kg
MOPS 07	100	50	170	150	180	140	290	410	690	14	45	15	M8	10	18	7	8	30	35	60	59
MOPS 15	140	70	170	150	200	180	300	480	790	14	45	15	M8	10	18	7	8	30	35	80	81
MOPS 30	190	140	200	160	220	210	340	550	900	20	50	15	M8	12	21	8	9	30	50	100	128
MOPS 50	190	140	200	160	220	210	340	550	900	20	50	15	M8	12	21	8	9	30	50	100	128

Dimensions

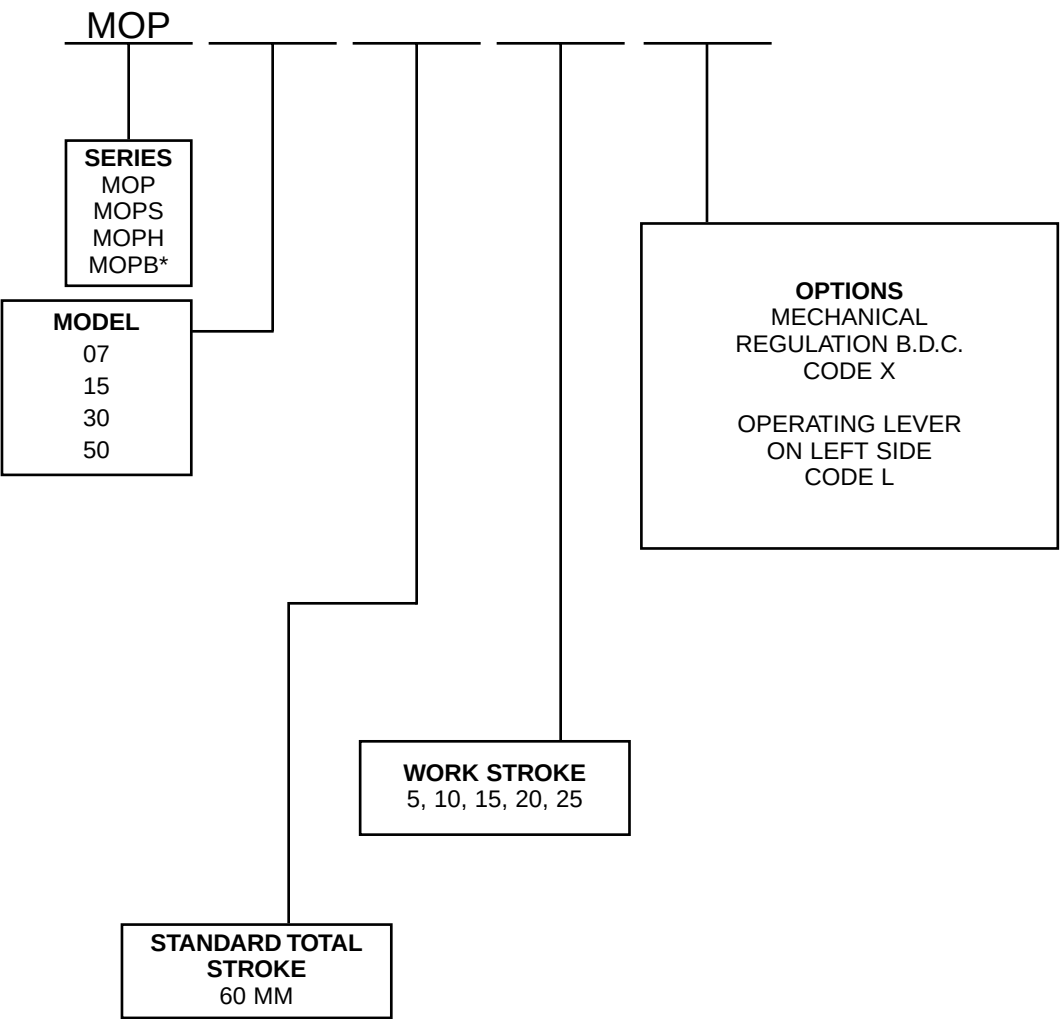


	A	A1	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	Z	Weight kg
MOPH 07	100	50	250	150	180	190	290	560	740	14	45	15	M8	10	18	7	8	30	35	60	75
MOPH 15	140	70	300	150	200	240	300	670	840	14	45	15	M8	10	18	7	8	30	35	80	109
MOPH 30	190	140	350	160	220	280	340	770	960	20	50	15	M8	12	21	8	9	30	50	100	154
MOPH 50	190	140	350	160	220	280	340	770	960	20	50	15	M8	12	21	8	9	30	50	100	154



Ordering Code

TROMBOLINE

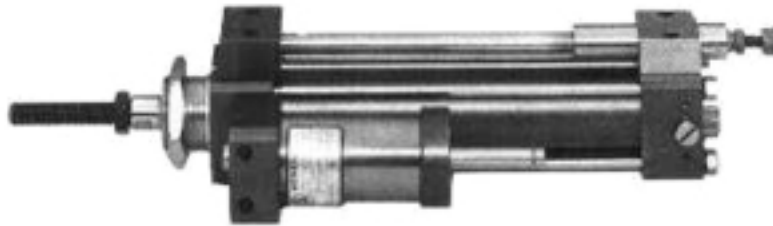


*Not available for Model 50



Hydraulic Speed Control (Check) Units

GENERAL: the check is a closed circuit hydraulic device which; when coupled to one or more air cylinders, provides constant and adjustable cylinder working speed. More-over, acceleration or instant stopping is available through the SKIP or STOP valves. This unit can be utilized with pneumatic energy to form hydraulic drives with thrusts up to 800 kg. Normal application of these units is where the air cylinders are used for controlling movement of the machine tool head (such as boring machines, milling machines, drilling machines, etc.).



SPECIFICATIONS

Controllable thrust	max. 800 kg / 1750 lbs
Feed Rate	min. 40mm / min-max 12 mt/min / 1-1/2"/min
Max. Operating temperature	max. 80°C / 175°C
Ambient temperature range	min - 10°C +70°C / min. 15°F max. 160°F
Mounting	nose mounting
Standard strokes	mm. 50-100-150-200-250-300-350-400-450-500

DESIGN FEATURES

End Caps	Painted light alloy 11S
Body	Painted steel
Rod	High strength, hard chrome-plated steel
Seal	Oil resistant rubber
Oil	Constant viscosity hydraulic grade



Hydraulic Speed Control Units

Accessories for Parallel Coupling of Check-Air Cylinder

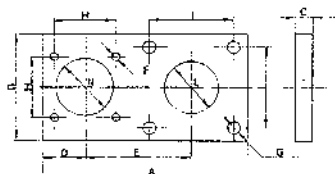


Axial Coupling Check-Air Cylinder

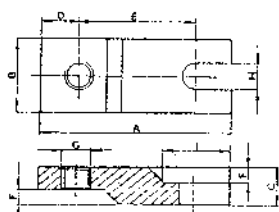


Parallel Coupling Check-Air Cylinder

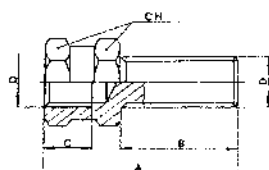
Accessories for Parallel Coupling of Check-Air Cylinder



Mounting Plate



Mounting Flange



Nipple

Ø CIL.	Model	A	B	C	D	E	F	G	H	I	L	N
40	CZPT 40	113.5	50	10	25	62.5	6.5	6.5	37	40	32	35
50	CZPT 50	120	65	10	25	62.5	6.5	8.5	37	49	32	35
63	CZPT 63	130	75	12	25	67.5	6.5	8.5	37	59	45	35
80	CZPT 80	150	95	12	25	77.5	6.5	10.5	37	75	45	35
100	CZPT 100	170	115	15	25	87.5	6.5	10.5	37	90	55	35

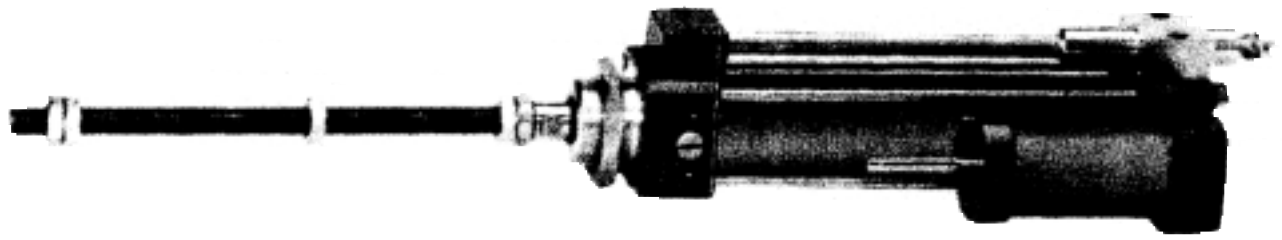
Ø CIL.	Model	A	B	C	D	E	F	G	H	I
40 ÷ 50	CZBR 50	90	40	20	15	61	8	M16 x 1.5	14	30
63 ÷ 80	CZBR 63	115	40	15	20	66	—	M20 x 1.5	14	—
40 ÷ 50	CZBR 50	90	40	20	15	61	8	M16 x 1.5	14	30
100	CZBR 100	130	50	30	25	86	12	M27 x 2	14	35

Ø CIL.	Model	A	B	C	D	E	F	G	H	I
40 ÷ 50	CZ NP 50	60			36		15	M16 x 1.5	24	
63 ÷ 80	CZ NP 63	76			46		19	M20 x 1.5	30	
100	CZ NP 100	103			63		30	M27 x 2	41	

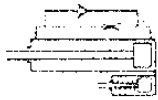
*Please consult factory for NFPA Mounting hardware



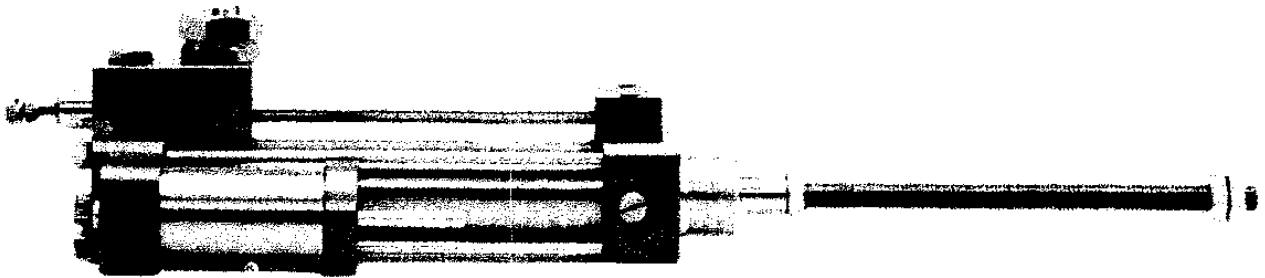
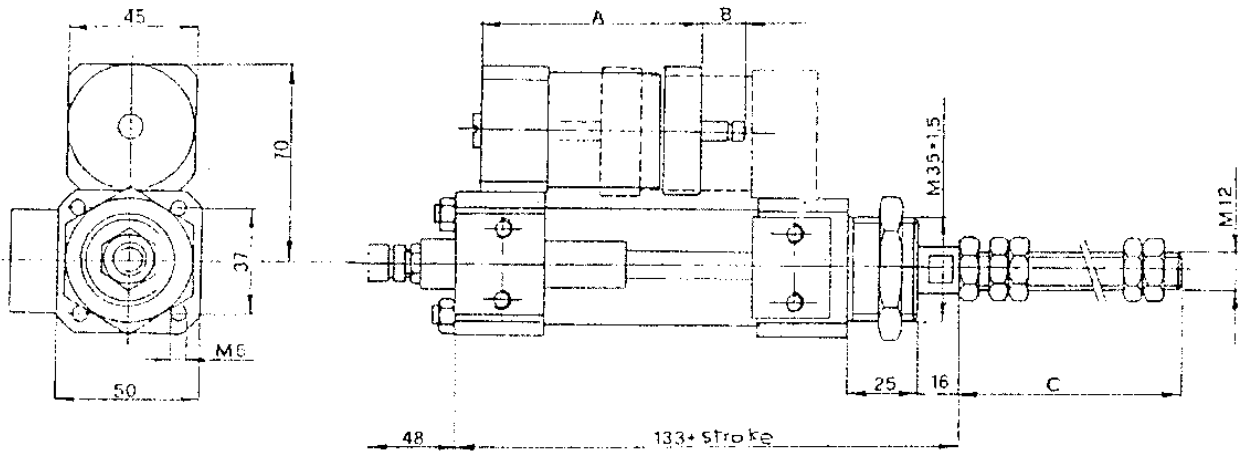
HYDRAULIC SPEED CONTROL UNITS



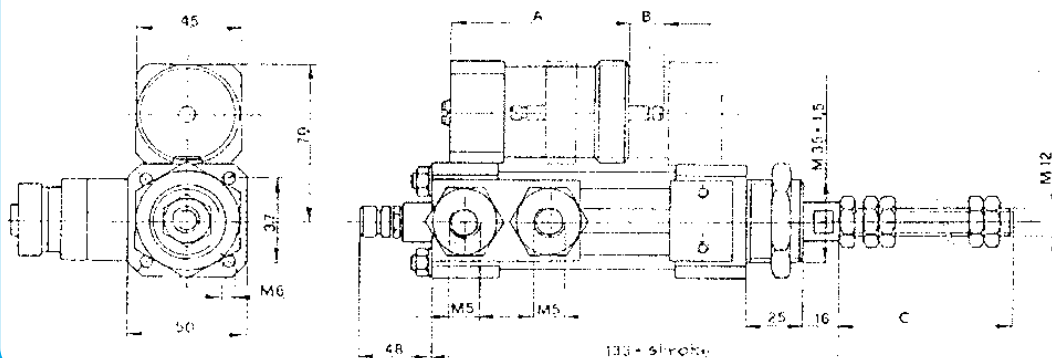
Unit CZ 35 / .U CONTROLLED OUT STROKE



Unit CZ 35 / .P CONTROLLED IN STROKE



UNIT CZ 35 / .. U AND CZ 35 / ... R WITH SKIP AND STOP VALVES



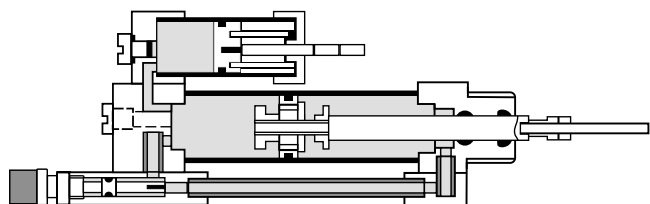
stroke	A	B Max	C
40 - 50	90	40	195
76 - 154	106	56	195
155 - 225	163	83	325
226 - 300	179	99	325
301 - 450	251	141	425



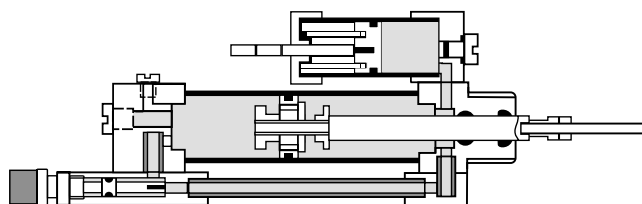
OPERATION

The standard speed control unit consists of a cylinder filled with oil, a rod-piston assembly and a side compensation reservoir. When the rod is connected to an external moving member, it is displaced thereby closing a check valve. The oil is then forced to flow through a tube until reaching an externally adjustable metering needle. The oil then flows into the chamber to the rear side of the piston.

In this phase, the stroke is checked in a regular manner. During the rapid return phase, the check valve is opened with unrestricted oil flow.



Speed Control on out stroke



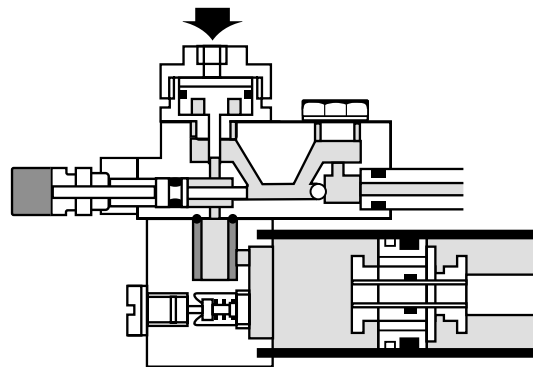
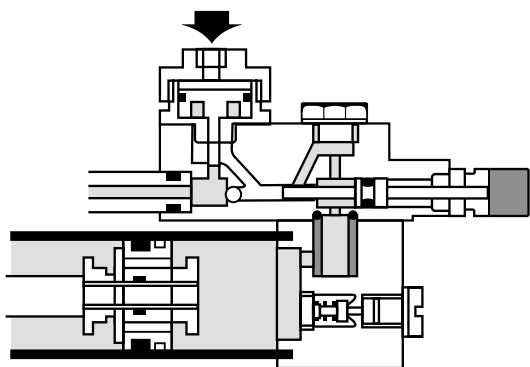
Speed control on return (in) stroke

SKIP VALVE

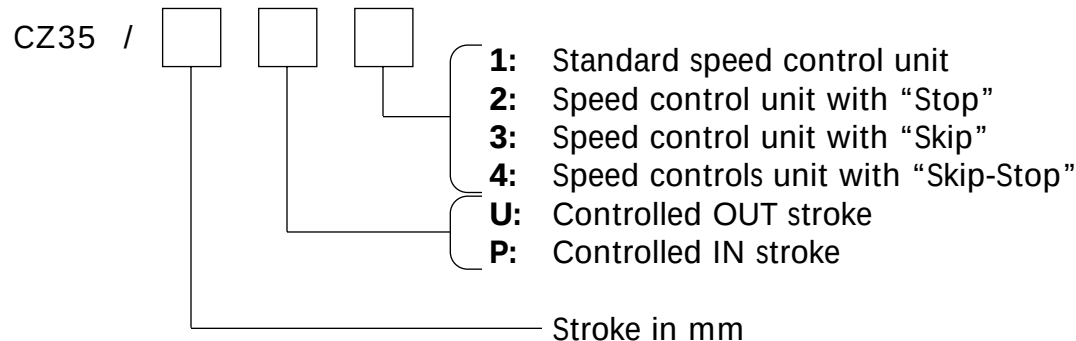
The skip valve is normally opened and located at the side of the needle valve. In this phase the fluid bypasses the needle valve thereby permitting rapid movement of the piston rod assembly. When relative signal is given, the skip valve is closed and the fluid flows through the needle valve. This valve is used when acceleration of movement is required instead of controlled rate of feed.

STOP VALVE

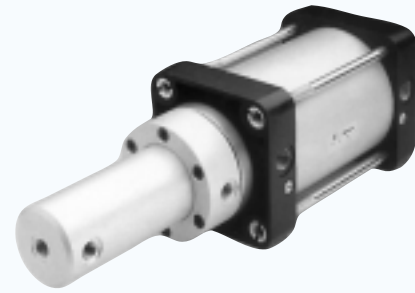
On receiving relative signal, this valve blocks piston movement thereby stopping the stroke. It is used when instant precision stops are required from the speed control unit.



How to Determine Order Code



MF PRESSURE MULTIPLIERS

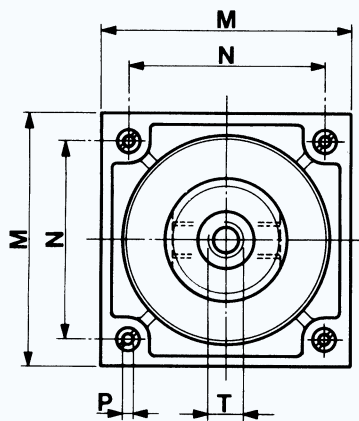


BOOSTER TYPE
MF102, 103, 122, 123

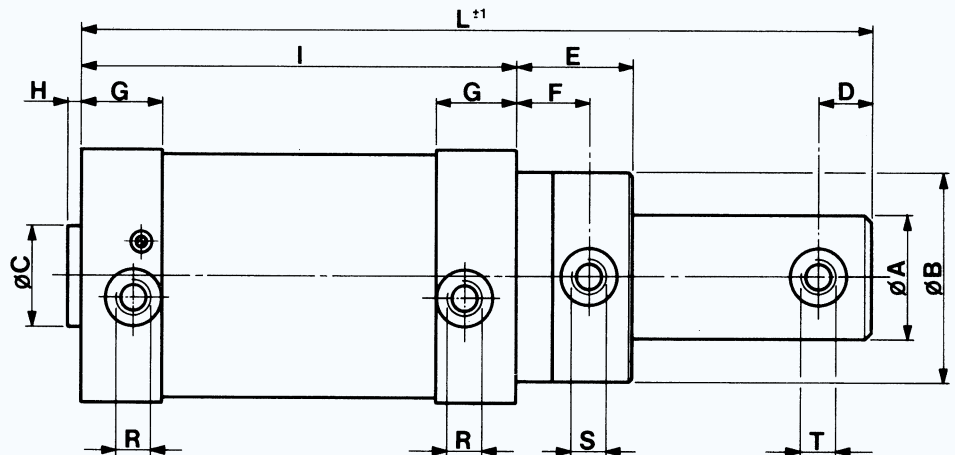
BOOSTER TYPE
MF162, 163, 164, 202, 203, 204

	Bore (mm)	Piston Rod dia (mm)	Stroke (mm)	Intensifier Ratio	Output Pressure		Output Volume		Output Volume /		Passive Stroke (mm)	Efficiency	Weight
					bar	psi	cc	cu.in	cc	cu.in			
MF102-150	100	22	150	20.66/1	124	1,798	50	3.05	3.8	0.23	20	0.85	7.5
MF103-150	100	30	150	11.11/1	66	957	92	5.61	7.06	0.43	20	0.85	7.5
MF122-150	125	22	150	32.28/1	194	2,813	50	3.05	3.8	0.23	20	0.85	9.0
MF123-150	125	30	150	17.36/1	104	1,508	92	5.61	7.06	0.43	20	0.85	9.0
MF162-150	160	22	150	52.89/1	317	4,597	50	3.05	3.8	0.23	21	0.90	11.5
MF163-150	160	30	150	28.44/1	170	2,465	92	5.61	7.06	0.43	21	0.90	11.5
MF164-150	160	40	150	16.00/1	96	1,392	163	9.95	12.56	0.77	21	0.90	11.5
MF202-150	200	22	150	82.64/1	495	7,178	50	3.05	3.8	0.23	21	0.90	14.0
MF203-150	200	30	150	44.44/1	266	3,857	92	5.61	7.06	0.43	21	0.90	14.0
MF204-150	200	40	150	25.00/1	150	2,175	163	9.95	12.56	0.77	21	0.90	14.0

*Passive stroke is the stroke required to take the fluid from low pressure to high pressure



High pressure fluid



Air

Air

Low pressure fluid

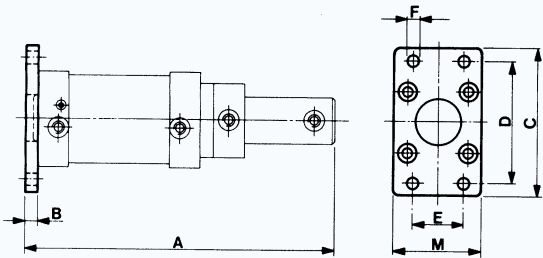
High pressure fluid

Code	Bore Size mm	Stroke mm	A mm	B mm	C e9	D mm	E mm	F mm	G mm	H mm	I(1) mm	L(1) mm	M mm	N mm	P mm	R gas	S gas	T gas	a	β
MF102-150	100	150	70	115	55	30	65	40	45	6	295	545	115	90	M10	1/2"	1/2"	1/2"	145	245
MF103-150	100	150	70	115	55	30	65	40	45	6	295	545	140	110	M12	1/2"	1/2"	1/2"	145	245
MF122-150	125	150	70	115	55	30	65	40	45	6	295	545	140	110	M12	1/2"	1/2"	1/2"	145	245
MF123-150	125	150	70	115	55	30	65	40	45	6	295	545	140	110	M12	1/2"	1/2"	1/2"	145	245
MF162-150	160	150	90	140	65	35	77	46	47.5	8	330	595	180	140	M16	3/4"	1/2"	1/2"	180	295
MF163-150	160	150	90	140	65	35	77	46	47.5	8	330	595	180	140	M16	3/4"	1/2"	1/2"	180	295
MF164-150	160	150	90	140	65	35	77	46	47.5	8	330	595	180	140	M16	3/4"	1/2"	1/2"	180	295
MF202-150	200	150	90	140	65	35	77	46	47.5	8	330	595	220	175	M16	3/4"	1/2"	1/2"	180	295
MF203-150	200	150	90	140	65	35	77	46	47.5	8	330	595	220	175	M16	3/4"	1/2"	1/2"	180	295
MF204-150	200	150	90	140	65	35	77	46	47.5	8	330	595	220	175	M16	3/4"	1/2"	1/2"	180	295

Non standard strokes I = a + stroke L = B + stroke



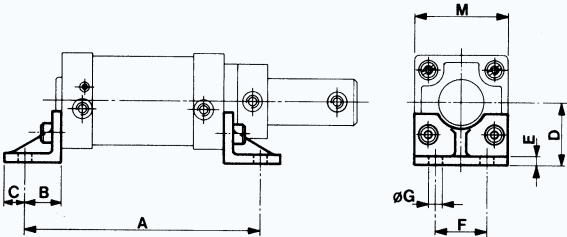
FLANGE MOUNT (FL)



Code	Diameter mm	A*	B	C	D	E	F	M
CN FL 100	100	557	12	170	150	90	14	115
CN FL 125	125	561	16	205	180	110	18	140
CN FL 160	160	615	20	260	228	140	22	180
CN FL 200	200	615	20	300	268	175	22	220

*For 150mm stroke

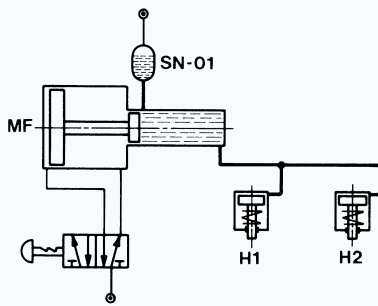
FOOT MOUNT (PB)



Code	Diameter mm	A*	B	C	D	E	F	G	M
CN PB 100	100	381	43	17	73	7	90	14	115
CN PB 125	125	399	52	18	91	8	100	18	140
CN PB 160	160	454	62	18	115	10	130	22	180
CN PB 200	200	454	62	18	135	10	170	22	220

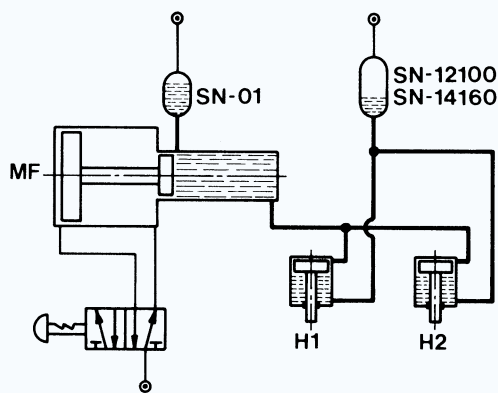
*For 150 mm stroke

CIRCUIT 1 (SINGLE ACTING CYLINDERS)



Control for Single Acting Hydraulic Cylinders
(return mechanical spring)

CIRCUIT 2 (Double Acting Cylinders)

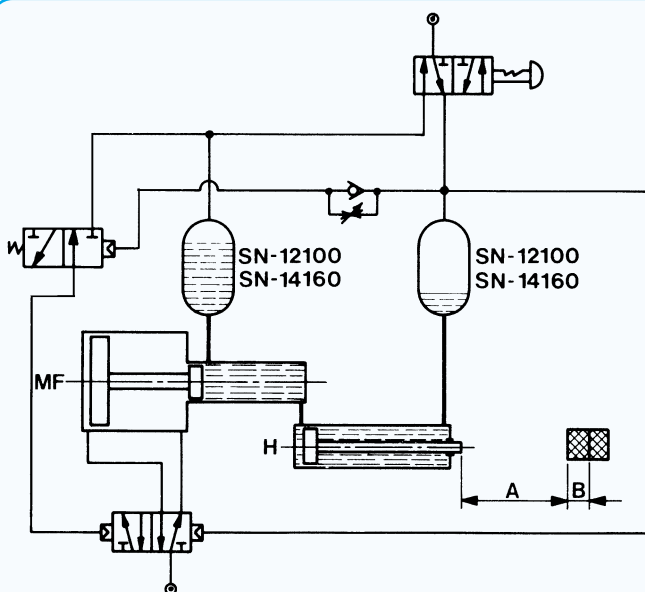


Control for Double Acting Hydraulic Cylinders

(return with hydropneumatic spring)

Return thrust of hydraulic cylinders can be regulated by changing the air pressure in the reservoir.

CIRCUIT 3 (Rapid Advance “A” - High Force Work “B”)



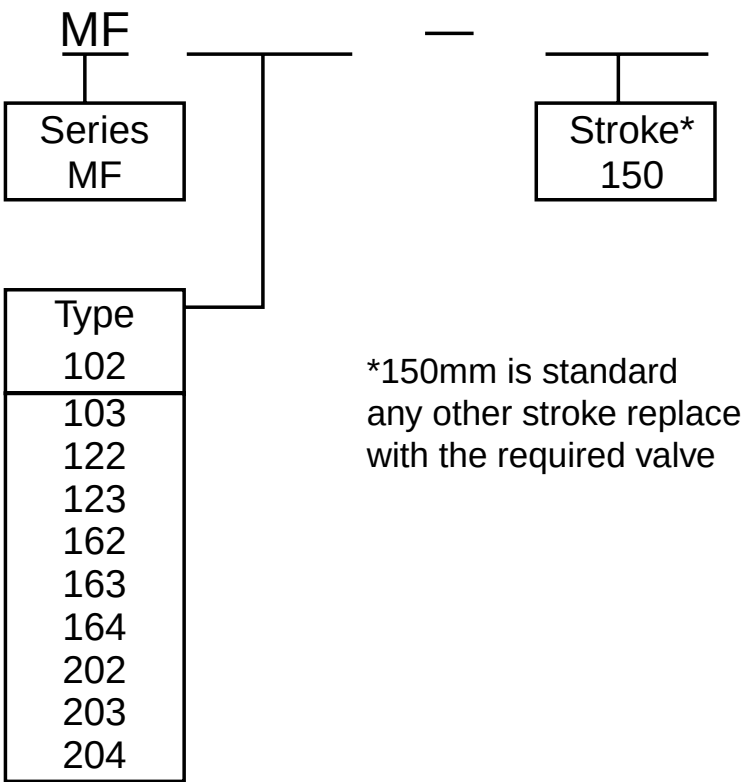
Control for Double Acting Hydraulic Cylinders

- Low pressure approach stroke A
- High pressure working stroke B

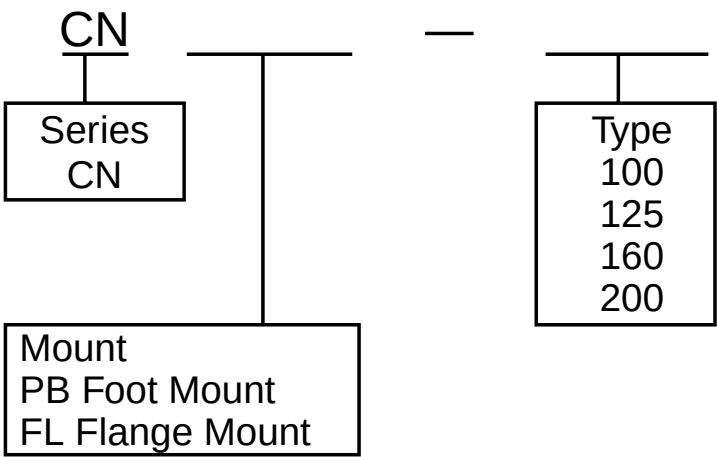
Working Cycle

- Approach stroke A: fluid goes directly to cylinder H from reservoir S1
- Working stroke B: starting of MF multiplier
- Return cylinder H: fluid goes back to multiplier MF and to reservoir S!

Ordering Code



Accessories



Metric Conversion Table

Length

Metric

1 millimetre (mm)
1 centimetre (cm) 10 mm
1 metre (m) 100 cm

English

1 inch (in.)
1 foot (ft.) 12 in.
1 yard (yd.) 3 ft.

English

0.0394 in.
0.3937 in.
1.0936 yd.

Metric

2.54 cm
0.3048 m
0.9144 m

Volume/Capacity

Metric

1 cm³
1,000 cm³
1 m³
1 litre (l)

English

1 cu. in.
1 cu. ft. 1,728 cu. in.
1 fluid ounce (fl. oz.)
1 pint (pt.) 20 fl. oz.
1 gallon (gal.) 8 pt.

USA measure

1 fluid ounce
1 pint (16 fl. oz.)
1 gallon US

English

0.0610 cu. in.
0.0353 cu. ft.
1.3080 cu. yd.
1.76 pt.

Metric

16.387 cm³
0.0283 m³
28.413 ml
0.5683 l
4.5461 l

Metric

29.574 m
0.4731 l
3.7854 l

Mass

Metric

1 milligram (mg)
1 gram (g) 1,000 mg
1 kilogram (kg) 1,000 g
1 tonne (t) 1,000 kg

English

1 ounce (oz.) 437.5 grain
1 pound (lb.) 16 oz.
1 stone 14 lb.
1 ton

English

0.0154 grain
0.0353 oz.
2.2046 lb.
1.1023 ton

Metric

28.35 g
0.4536 kg
6.3503 kg
0.907 t

Pressure

Metric

1 bar

English

14.5 psi

Application Information/Data

Customer Information

Contact: _____ Title: _____

Company: _____

Address: _____

City: _____ Zip/Postal Code: _____

State/Prov.: _____ E-Mail Address: _____

Phone: _____ Fax: _____

Product Information

Application Type: (Marking, Blanking, etc.) _____

Total Stroke: _____ mm Work Stroke: _____ mm

Tooling Weight: _____ kg Force Required: _____ kg

Available Air Pressure: _____ bar Style: ☐ MOP ☐ MOPB

Cycle Rate: _____ ☐ MOPS ☐ MOPH

Options: _____ ☐ OPP ☐ OP2M

Orientation: _____ ☐ OP2MI

Comments

Date: _____





***The Power of Hydraulics
at the Speed of Air***



ALFAMATIC INCORPORATED
363 Sovereign Road
London, Ontario
N6M 1A3
1-888-524-2532 (ALFA)
Fax: (519) 452-7109
www.alfomatic.com

Distributor

ALFAPC0699-C