Dimensions

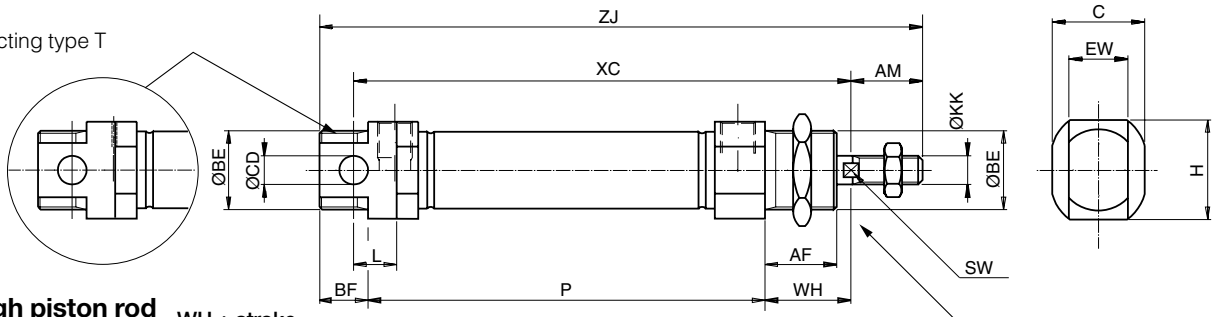
Double and single acting cylinders

CAD drawings on the Internet

Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

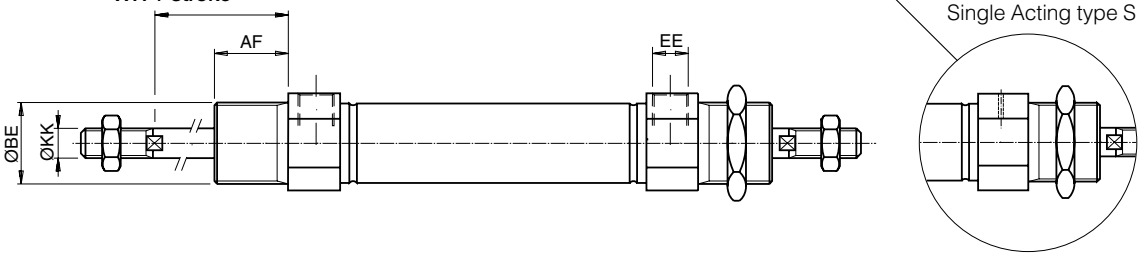
AirCad™ Drawing Library

Single Acting type T



Through piston rod

WH + stroke



Single Acting type S

Cylinder bore mm	AM 0/-2 mm	BE	AF mm	BF mm	C mm	CDH9 mm	EE	EW mm	H mm	KK	L mm	SW mm	WH±1,2 mm
10	12	M12x1,25	12	10	13,0	4	M5	8	13,0	M4	6	–	16
12	16	M16x1,5	18	13	17,8	6	M5	12	17,8	M6	9	5	22
16[1)]	16	M16x1,5	18	13	17,8	6	M5	12	17,8	M6	9	5	22
16[2)]	16	M16x1,5	18	13	23,8	6	M5	12	23,8	M6	9	5	22
20	20	M22x1,5	20	14	23,8	8	G1/8	16	23,8	M8	12	7	24
25	22	M22x1,5	22	14	26,8	8	G1/8	16	26,8	M10x1,25	12	9	28

1) P1A-S016DS/SS/TS
2) P1A-S016MS

Double acting cylinders

Cylinder bore mm	XC mm	ZJ mm	P mm
10	64 + stroke	84 + stroke	46 + stroke
12	75 + stroke	99 + stroke	48 + stroke
16	82 + stroke	104 + stroke	53 + stroke
20	95 + stroke	125 + stroke	67 + stroke
25	104 + stroke	132 + stroke	68 + stroke

Single-acting, spring return, type SS

Stroke/ Cylinder bore mm	10 XC mm	15 XC mm	25 XC mm	40 XC mm	50 XC mm	80 XC mm	10 ZJ mm	15 ZJ mm	25 ZJ mm	40 ZJ mm	50 ZJ mm	80 ZJ mm	10 P mm	15 P mm	25 P mm	40 P mm	50 P mm	80 P mm
10	74	79	89	126	136	174	94	99	109	146	156	194	56	61	71	108	118	156
12	85	90	100	132	142	185	109	114	124	156	166	209	58	63	73	105	115	158
16	92	97	107	122	132	184	114	119	129	144	154	206	63	68	78	93	103	155
20	105	110	120	135	145	191	135	140	150	165	175	221	77	82	92	107	117	163
25	114	119	129	144	154	201	142	147	157	172	182	229	78	83	93	108	118	165

Single-acting, spring-extended, type TS

Stroke/ Cylinder bore mm	10 XC[3)] mm	15 XC[3)] mm	25 XC[3)] mm	40 XC[3)] mm	50 XC[3)] mm	80 XC[3)] mm	10 ZJ[3)] mm	15 ZJ[3)] mm	25 ZJ[3)] mm	40 ZJ[3)] mm	50 ZJ[3)] mm	80 ZJ[3)] mm	10 P mm	15 P mm	25 P mm	40 P mm	50 P mm	80 P mm
16	107	112	122	137	147	–	129	134	144	159	169	–	78	83	93	108	118	–
20	120	125	135	150	160	195	150	155	165	180	190	225	92	97	107	122	132	167
25	129	134	144	159	169	205	157	162	172	187	197	233	93	98	108	123	133	169

3) With piston rod retracted, as shown in the dimension drawing

Length tolerances ±1 mm
Stroke length tolerances +1,5/0 mm

Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

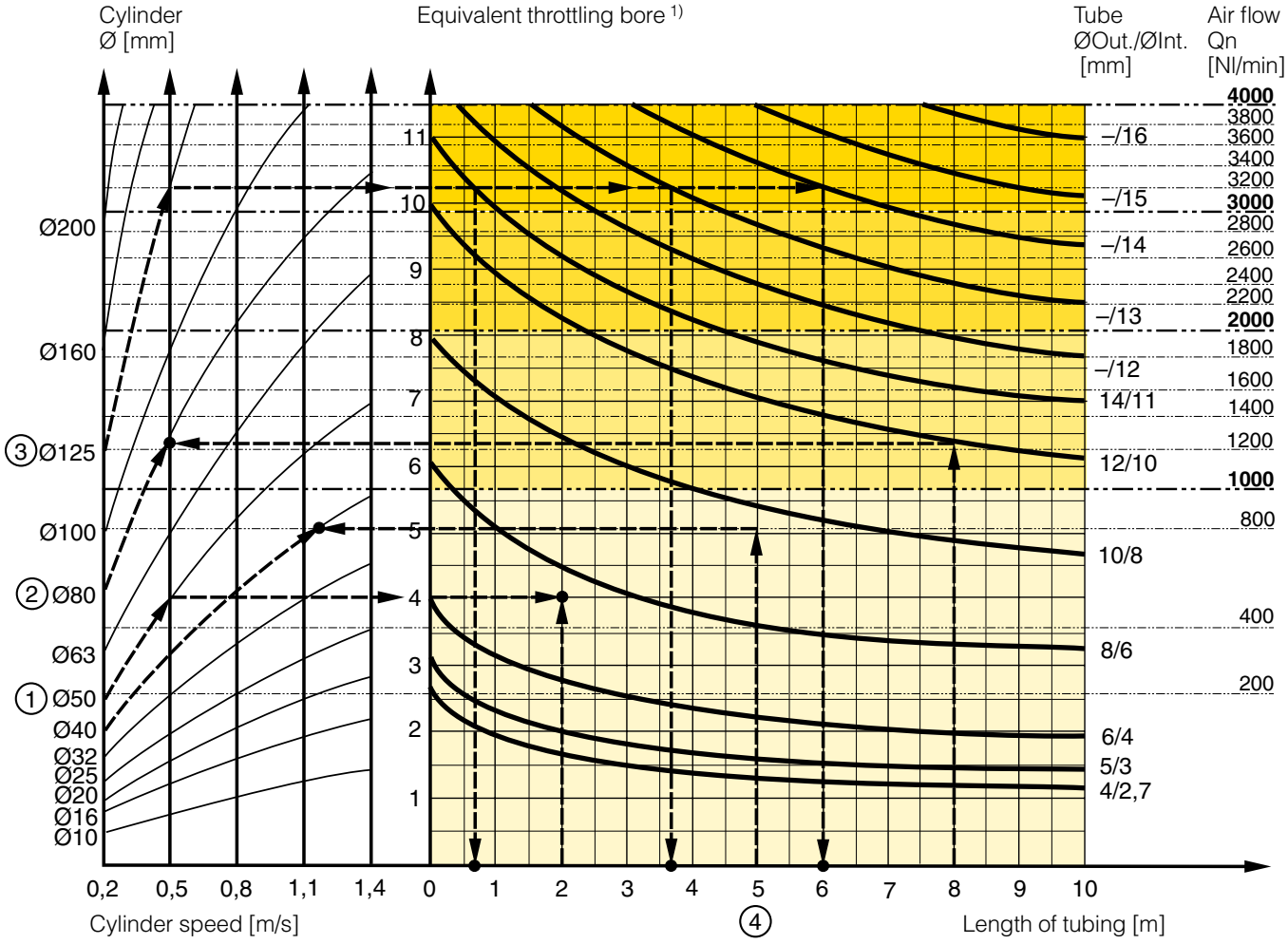
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an “equivalent throttling bore“ of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a P2L-B valve. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a P2L-D valve. What diameter of tube can be used and what is maximum lenght of tube.
We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example ④: Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

Order key

P1A – S 016 M S – 0025

Cylinder bore mm
010
012
016
020
025

	Cylinder type / function	
M		Double-acting, adjustable cushioning. Ø16-25 mm. Not for sealingmaterial type F and L
D		Double-acting, non-adjustable cushioning, Ø10 - Ø25
F		Double-acting, adjustable cushioning, thru-rod, Ø16-25 mm. Not for sealing material type F
K		Double-acting, non-adjustable cushioning, thru-rod, Ø10 - Ø25
S		Single-acting, non-adjustable cushioning, spring return for retract stroke, Ø10-25 mm
T		Single-acting, non-adjustable cushioning, spring return for advance stroke, Ø16-25 mm

Stroke length, mm

E.g. 0025 = 25 mm
For standard stroke length and max length see table below.

	Sealing material	
S		Standard, -20 °C to +80 °C. Magnetic piston
F		High temperature, Ø12, 16, 20 and 25 mm -10 °C to +150 °C. Non-magnetic piston
V		External seals of fluorinated rubber. -20 °C to +80 °C. Magnetic piston

Stroke length

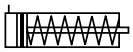
Cylinder designation	Cylinder bore	● Standard stroke length in mm / Non standard stroke length																
		10	15	20	25*	30	40	50*	80*	100*	125*	160*	200*	250*	320*	400*	500*	
Double acting with fixed end-cushioning:																		
P1A-S010D	10	●	●	●	●	●	●	●	●	●	●							
P1A-S012D	12	●	●	●	●	●	●	●	●	●	●	●	●					
P1A-S016D	16	●	●	●	●	●	●	●	●	●	●	●	●					
P1A-S020D	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●			**
P1A-S025D	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●			**
Double acting with adjustable end-cushioning:																		
P1A-S016M	16			●	●	●	●	●	●	●	●	●	●	●	●	●	●	
P1A-S020M	20			●	●	●	●	●	●	●	●	●	●	●	●	●	●	**
P1A-S025M	25			●	●	●	●	●	●	●	●	●	●	●	●	●	●	**
Single acting, spring return:																		
P1A-S010SS	10	●	●		●		●	●	●									
P1A-S012SS	12	●	●		●		●	●	●									
P1A-S016SS	16	●	●		●		●	●	●									
P1A-S020SS	20	●	●		●		●	●	●									
P1A-S025SS	25	●	●		●		●	●	●									
Single acting, spring-extended:																		
P1A-S016TS	16	●	●		●		●	●										
P1A-S020TS	20	●	●		●		●	●	●									
P1A-S025TS	25	●	●		●		●	●	●									

* Standard stroke lengths in mm according to ISO 4393
** Max stroke 1000 mm

Data

Working pressure	max. 10 bar
Working temperature	max. +80 °C
	min. –20 °C

Single-acting spring return



Fixed end cushioning

Cyl.bore mm	Stroke mm	Order code
10 Conn. M5	10	**P1A-S010SS-0010**
	15	**P1A-S010SS-0015**
	25	**P1A-S010SS-0025**
	40	**P1A-S010SS-0040**
	50	**P1A-S010SS-0050**
	80	**P1A-S010SS-0080**
12 Conn. M5	10	**P1A-S012SS-0010**
	15	**P1A-S012SS-0015**
	25	**P1A-S012SS-0025**
	40	**P1A-S012SS-0040**
	50	**P1A-S012SS-0050**
	80	**P1A-S012SS-0080**
16 Conn. M5	10	**P1A-S016SS-0010**
	15	**P1A-S016SS-0015**
	25	**P1A-S016SS-0025**
	40	**P1A-S016SS-0040**
	50	**P1A-S016SS-0050**
	80	**P1A-S016SS-0080**
20 Conn. G1/8	10	**P1A-S020SS-0010**
	15	**P1A-S020SS-0015**
	25	**P1A-S020SS-0025**
	40	**P1A-S020SS-0040**
	50	**P1A-S020SS-0050**
	80	**P1A-S020SS-0080**
25 Conn. G1/8	10	**P1A-S025SS-0010**
	15	**P1A-S025SS-0015**
	25	**P1A-S025SS-0025**
	40	**P1A-S025SS-0040**
	50	**P1A-S025SS-0050**
	80	**P1A-S025SS-0080**

Cylinders are supplied complete with neck mounting and piston rod nuts.

Single-acting spring-extended

Fixed end cushioning

Cyl.bore mm	Stroke mm	Order code
16 Conn. M5	10	**P1A-S016TS-0010**
	15	**P1A-S016TS-0015**
	25	**P1A-S016TS-0025**
	40	**P1A-S016TS-0040**
	50	**P1A-S016TS-0050**
20 Conn. G1/8	10	**P1A-S020TS-0010**
	15	**P1A-S020TS-0015**
	25	**P1A-S020TS-0025**
	40	**P1A-S020TS-0040**
	50	**P1A-S020TS-0050**
	80	**P1A-S020TS-0080**
25 Conn. G1/8	10	**P1A-S025TS-0010**
	15	**P1A-S025TS-0015**
	25	**P1A-S025TS-0025**
	40	**P1A-S025TS-0040**
	50	**P1A-S025TS-0050**
	80	**P1A-S025TS-0080**

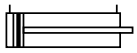
Cylinders are supplied complete with neck mounting and piston rod nuts.

Data

Working pressure	max. 10 bar
Working temperature	max. +80 °C
	min. –20 °C

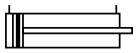
Double-acting

Fixed end cushioning



Cyl.bore mm	Stroke mm	Order code
10 Conn. M5	10	**P1A-S010DS-0010**
	15	**P1A-S010DS-0015**
	20	**P1A-S010DS-0020**
	25	**P1A-S010DS-0025**
	30	**P1A-S010DS-0030**
	40	**P1A-S010DS-0040**
	50	**P1A-S010DS-0050**
	80	**P1A-S010DS-0080**
	100	**P1A-S010DS-0100**
Max stroke 500 mm	125	**P1A-S010DS-0125**
12 Conn. M5	10	**P1A-S012DS-0010**
	15	**P1A-S012DS-0015**
	20	**P1A-S012DS-0020**
	25	**P1A-S012DS-0025**
	30	**P1A-S012DS-0030**
	40	**P1A-S012DS-0040**
	50	**P1A-S012DS-0050**
	80	**P1A-S012DS-0080**
	100	**P1A-S012DS-0100**
	125	**P1A-S012DS-0125**
	160	**P1A-S012DS-0160**
Max stroke 500 mm	200	**P1A-S012DS-0200**
16 Conn. M5	10	**P1A-S016DS-0010**
	15	**P1A-S016DS-0015**
	20	**P1A-S016DS-0020**
	25	**P1A-S016DS-0025**
	30	**P1A-S016DS-0030**
	40	**P1A-S016DS-0040**
	50	**P1A-S016DS-0050**
	80	**P1A-S016DS-0080**
	100	**P1A-S016DS-0100**
	125	**P1A-S016DS-0125**
	160	**P1A-S016DS-0160**
Max stroke 500 mm	200	**P1A-S016DS-0200**

Fixed end cushioning



Cyl.bore mm	Stroke mm	Order code
20 Conn. G1/8	10	**P1A-S020DS-0010**
	15	**P1A-S020DS-0015**
	20	**P1A-S020DS-0020**
	25	**P1A-S020DS-0025**
	30	**P1A-S020DS-0030**
	40	**P1A-S020DS-0040**
	50	**P1A-S020DS-0050**
	80	**P1A-S020DS-0080**
	100	**P1A-S020DS-0100**
	125	**P1A-S020DS-0125**
	160	**P1A-S020DS-0160**
	200	**P1A-S020DS-0200**
	250	**P1A-S020DS-0250**
Max stroke 1000 mm	320	**P1A-S020DS-0320**
25 Conn. G1/8	10	**P1A-S025DS-0010**
	15	**P1A-S025DS-0015**
	20	**P1A-S025DS-0020**
	25	**P1A-S025DS-0025**
	30	**P1A-S025DS-0030**
	40	**P1A-S025DS-0040**
	50	**P1A-S025DS-0050**
	80	**P1A-S025DS-0080**
	100	**P1A-S025DS-0100**
	125	**P1A-S025DS-0125**
	160	**P1A-S025DS-0160**
	200	**P1A-S025DS-0200**
	250	**P1A-S025DS-0250**
Max stroke 1000 mm	320	**P1A-S025DS-0320**

Cylinders are supplied complete with neck mounting and piston rod nuts.
Cylinders with Through piston rods are supplied with two piston rod nuts and one neck mounting nut.