






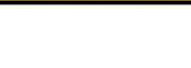




Deceleration technology for Grantry , Cranes , Girders , Trolleys



Ordering Information			Optional Accessories		
	SIZE	STROKE			Bellows
					Urethane Striker Cap
AKHG	100	200	FR	B	
 FR : Rear Flange Mount  FF- Front Flange Mount  SS : Front and Rear Flange Mount  RC : Rod Clevis EC : End Clevis  TM : Front Flange and foot , Rear Flange  FM : Front and Rear Foot Mount					

- . Working Tempratures : 10 degrees to 50 degress Celcius
- . Stainless Steel Options available on request
- . Special Sensors can be mounted for additional Saftey

Formulae for selection model of Shock Absorber

1. Symbols

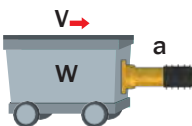
Symbol	Unit	Description
E_K	kJ	Kinetic Energy
E_W	kJ	Work Energy
E_T	kJ	Total Energy
E_TC	kJ/h	Total Energy Absorbed Per Hour
F_S	kN	Maximum Buffer Force
V	m/s	Impact Velocity
V_E	m/s	Effective Velocity
S	m	Buffer Stroke
S_D	m/s^2	Deceleration
C	Cycle/h	Cycle Per Hour
H	m	Drop Height
p	bar	Operation Pressure
P	kW	Motor Power
g	$m/s^2(9.8m/s^2)$	Accelleration
n	-	Min. Efficiency

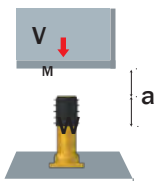
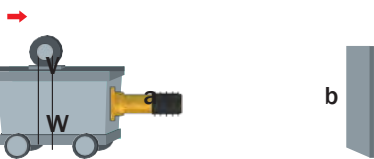
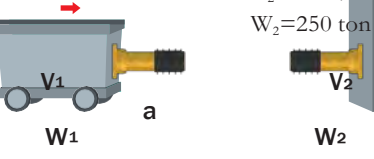

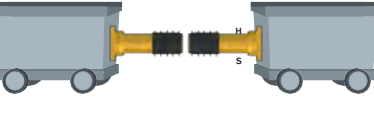
■ 1kgf = 9.81N , 1Nm = 1J , 1MPa = 10bar = 10.2kg/cm² , 1g = 9.8m/s²

2. Formula

$$E_K = \frac{W \cdot V^2}{2} \quad E_TC = E_T \quad C \quad E_W = F \times S, E_T = E_K + E_W \quad F_M = \frac{E_K}{S \cdot 0.8} \quad S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} \quad S \geq \frac{V^2}{2 \cdot S_D \cdot 0.8}$$

3. Calculation examples

Moving Weight	Example	Buffer Model	
a)  $V=0.6m/s$ $W=80ton$	$E_K = \frac{W \cdot V^2}{2} = \frac{80 \times 0.6^2}{2} = 14.4kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{14.4}{0.15 \times 0.8} = 120kN$ $V_E = 0$ $S_D = \frac{V^2}{2 \cdot S \cdot 0.8} = \frac{0.6^2}{2 \times 0.15 \times 0.8} = 1.5m/s^2$ $S = \frac{V^2}{2 \cdot S_D \cdot 0.8} = \frac{0.6^2}{2 \times 1.5 \times 0.8} = 0.15m = 150mm$	pre-selected	AKHG85-150 Stroke : 150
		final selection	AKHG85-150

Moving Weight		Example	Buffer Model	
b)	 <p>V=1.2m/s W=200 ton P=20kW</p>	$E_K = \frac{W \cdot V^2}{2} = \frac{200 \times 1.2^2}{2} = 144kJ$ $F = \frac{2.5 \cdot P}{V} = \frac{2.5 \times 20}{1.2} = 41.7kN$ $E_W = F \cdot S = 41.7 \times 0.3 = 12.5kJ$ $E_T = E_K + E_W = 144 + 12.5 = 156.5kJ$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{156.5}{0.3 \times 0.8} = 652kN$	pre-selected	AKHG140-300 Stroke : 300
			final selection	AKHG140-300
c)	 <p>V=1.8m/s W=150 ton</p>	$E_K = \frac{0.5 \cdot W \cdot V^2}{2} = \frac{0.5 \cdot 150 \cdot 1.8^2}{2} = 121.5kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{121.5}{0.4 \times 0.8} = 379.69kN$ $V_E = \frac{V}{2} = \frac{1.8}{2} = 0.9m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{0.9^2}{2 \times 0.4 \times 0.8} = 1.27m/s^2$	pre-selected	AKHG130-400 Stroke : 400
			final selection	AKHG130-400
d)	 <p>V₁=1.0m/s W₁=180 ton V₂=0.6m/s W₂=250 ton</p>	$E_K = \frac{W_1 \cdot W_2 \cdot (V_1 + V_2)^2}{2(W_1 + W_2)} = \frac{180 \times 250 \cdot (1.0 + 0.6)^2}{2(180 + 250)} = 133.95kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{133.95}{0.5 \times 0.8} = 334.88kN$ $V_E = V_1 + V_2 = 1.0 + 0.6 = 1.6m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{1.6^2}{2 \times 0.5 \times 0.8} = 3.2m/s^2$	pre-selected	AKHG120-500 Stroke : 500
			final selection	AKHG120-500
e)	 <p>V₁=1m/s W₁=220 ton V₂=0.7m/s W₂=260 ton</p>	$E_K = \frac{W_1 \cdot W_2 \cdot (V_1 + V_2)^2}{4(W_1 + W_2)} = \frac{220 \times 260 \cdot (1 + 0.7)^2}{4(220 + 260)} = 86kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{86}{0.25 \times 0.8} = 430.49kN$ $V_E = \frac{V_1 + V_2}{2} = \frac{1 + 0.7}{2} = 0.85m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{0.85^2}{2 \times 0.25 \times 0.8} = 1.806m/s^2$	pre-selected	AKHG120-250 Stroke : 250
			final selection	AKHG120-250
f)	 <p>W=2.5 ton H=0.4m</p>	$E_K = g \cdot W \cdot H = 9.81 \times 2.5 \times 0.4 = 9.81kJ$ $E_W = W \cdot g \cdot S = 2.5 \times 9.81 \times 0.15 = 3.67kJ$ $E_T = E_K + E_W = 9.81 + 3.67 = 13.48kJ$ $V = \sqrt{2 \cdot g \cdot H} = \sqrt{2 \times 9.81 \times 0.4} = 2.8m/s$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{13.48}{0.15 \times 0.8} = 112.33kN$	pre-selected	AKHG85-150 Stroke : 150
			final selection	AKHG85-150

for a faster assistance in selecting the product visit

<http://www.cranebuffer.com>

NOTE : Select buffers to get a deceleration less than 5M/s² and
Velocity be considered a 50 % of the rated Crane Speed



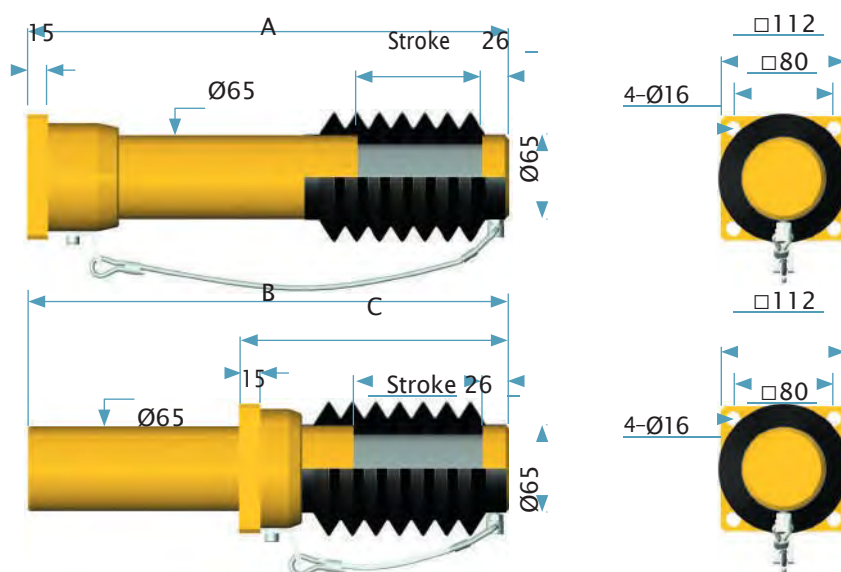
AKHG 65 Series

Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _s	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG65-25	25	2	100	100	1.0	3.2	3.5	3.5	6
-50	50	4	200	100		4.7	3.5	3.5	7
-75	75	6	300	100		5.3	3	3	8
-100	100	8	400	100		6.6	3	3	9
-125	125	10	500	100		6.6	2.5	2.5	10
-150	150	12	600	100		6.6	2	2	11
-200	200	16	800	100		9.0	2	2	12

Rear Mount

Front Mount



Dimensions (unit :mm)

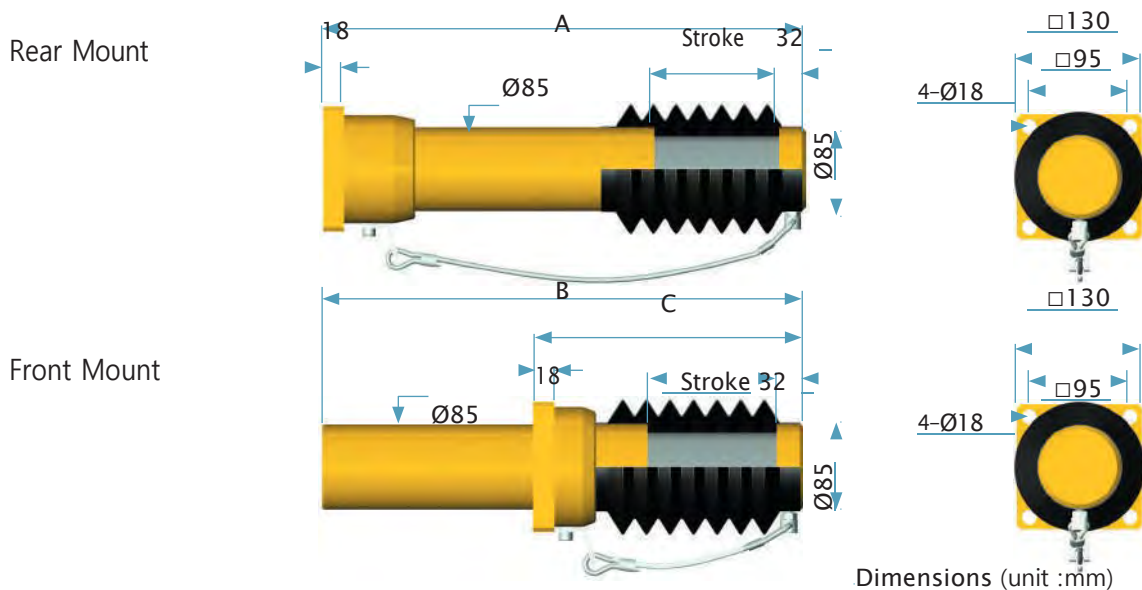
Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG65-25	25	262	250	126	14
-50	50	312	300	151	
-75	75	372	360	176	
-100	100	432	420	231	
-125	125	497	485	256	
-150	150	552	540	281	
-200	200	682	670	371	



AKHG 85 Series

Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _s	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG85-50	50	8	600	200		10	4	3.5	12
-100	100	16	1,200	200		13	3	3	15
-150	150	24	1,800	200	1.5	17	2	2	18
-200	200	32	2,400	200		19	1.8	1.5	20
-250	250	40	2,850	200		20	1.5	1.2	22



Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG85-50	50	323	310	183	16
-100	100	463	450	242	
-150	150	603	590	305	
-200	200	743	730	367	
-250	250	883	870	430	

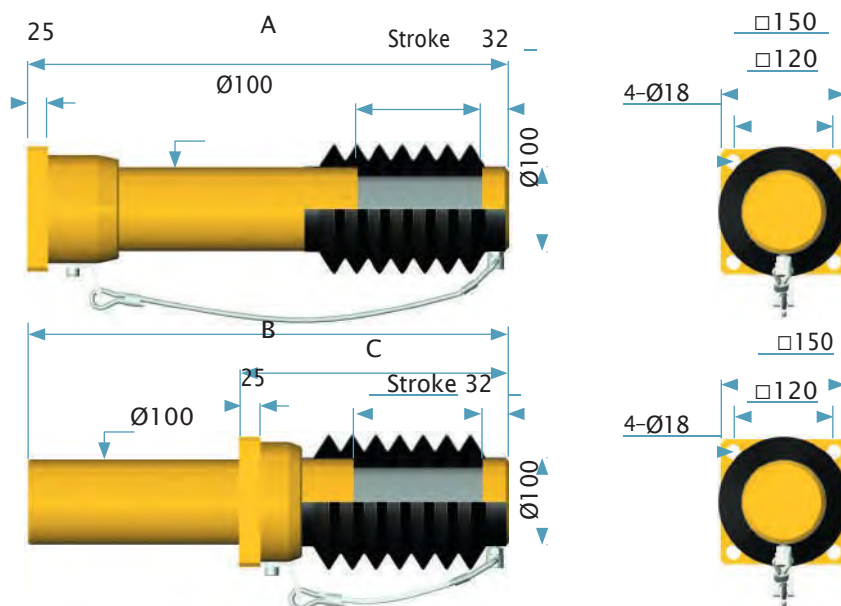
AKHG 100 Series

Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG100-50	50	11	750	280	2.4	16	5	4	17
-80	80	18	1,200	280		16	4.5	4	20
-100	100	23	1,600	280		16	5	4	25
-120	120	27	1,800	280		20	4.5	3.5	27
-150	150	34	2,300	280		20	4.5	3.5	28
-200	200	46	3,100	280		20	4	3	34
-250	250	58	3,600	280		25	3.5	2.5	39
-300	300	69	4,200	280		25	3	2	43
-400	400	90	5,400	280		25	2.5	2	49
-500	500	110	6,600	275		25	2.5	2	55
-600	600	125	7,200	260		25	2	1.5	62
-800	800	140	7,900	210		25	2	1.5	73

Rear Mount

Front Mount



Dimensions (unit :mm)

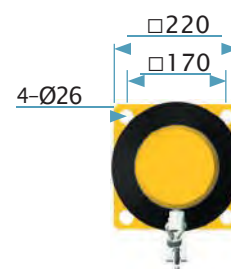
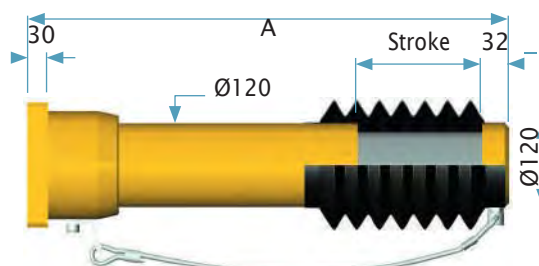
Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG100-50	50	332	312	175	16
-80	80	423	403	215	
-100	100	450	430	252	
-120	120	529	509	270	
-150	150	580	560	315	
-200	200	720	700	377	
-250	250	865	845	440	
-300	300	1,010	990	502	
-400	400	1,349	1,329	645	
-500	500	-	1,616	890	
-600	600	-	1,888	1,010	
-800	800	-	2,426	1,345	

AKHG 120 Series

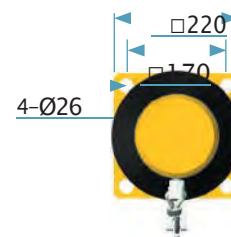
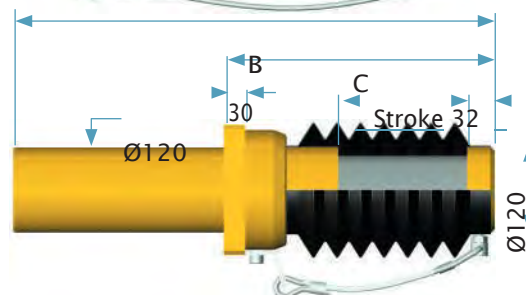
Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG120-100	100	45	2,900	570		38	4	4.5	41
-150	150	70	4,400	570		38	4	3.5	48
-200	200	92	5,800	570		38	3.5	3.5	58
-250	250	114	7,200	570		40	3	3	65
-300	300	130	8,500	450		40	3	2.5	72
-400	400	160	10,000	450		40	2.5	2	78
-500	500	180	11,500	450		40	2	1.5	86
-600	600	200	12,800	450		40	2	1.5	95
-800	800	240	13,600	375		40	2	1.3	112
-1000	1,000	280	14,500	350		40	2	1.3	118

Rear Mount



Front Mount



Dimensions (unit :mm)

Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG120-100	100	470	450	277	24
-150	150	610	590	340	
-200	200	760	740	402	
-250	250	900	880	465	
-300	300	1,050	1,030	527	
-400	400	1,340	1,320	680	
-500	500	1,620	1,600	815	
-600	600	1,920	1,900	950	
-800	800	-	2,400	1,290	
-1000	1,000	-	2,960	1,360	

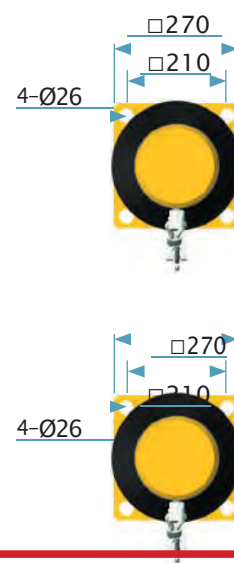
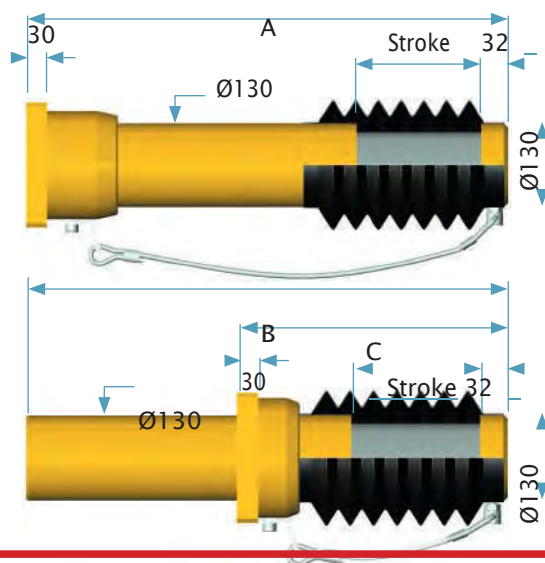


AKHG 130 Series

Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _{rC}	Max Buffer Force (kN) F _s	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
KHG130-250	250	120	8,200	550	4.5	40	4.5	4	85
-300	300	140	9,600	550		40	4.5	4	92
-400	400	180	12,000	550		50	4	3.5	106
-500	500	220	15,000	550		50	3.5	3.5	118
-600	600	260	17,800	550		50	2	1.5	127
-800	800	300	19,000	460		50	2	1.5	148

Rear Mount



Front Mount

Dimensions (unit :mm)

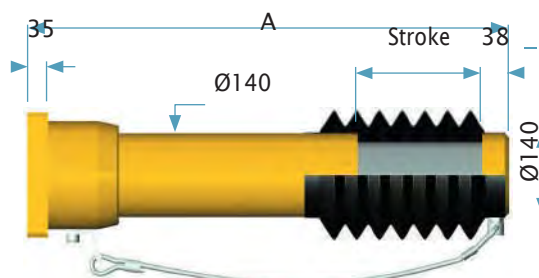
Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG130-250	250	897	877	545	24
-300	300	1,029	1,009	605	
-400	400	1,293	1,273	735	
-500	500	1,602	1,582	820	
-600	600	-	1,917	1,060	
-800	800	-	2,445	1,350	



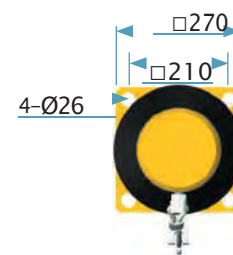
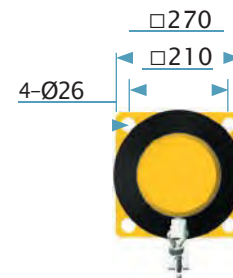
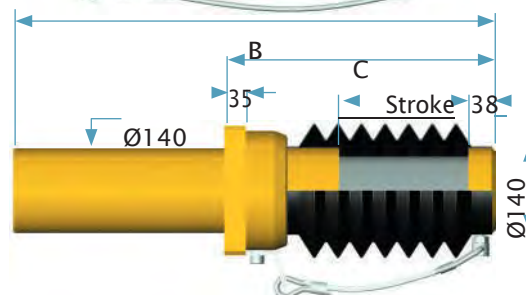
AKHG 140 Series Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG 140-100	100	62	3,800	760	5.5	38	4.5	4	60
-150	150	91	5,800	760		65	4.5	4	72
-200	200	124	9,800	730		70	4	3.5	85
-300	300	175	12,000	730		70	3.5	2.5	110
-400	400	234	15,000	730		78	2.5	1.5	135
-500	500	270	17,000	680		78	2	1.3	150
-600	600	300	20,000	630		78	2	1.3	160
-800	800	325	25,000	510		78	2	1.3	185
-1000	1,000	360	27,500	450		78	1.6	1.2	200

Rear Mount



Front Mount



Dimensions (unit : mm)

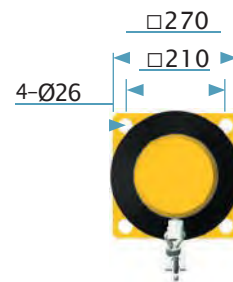
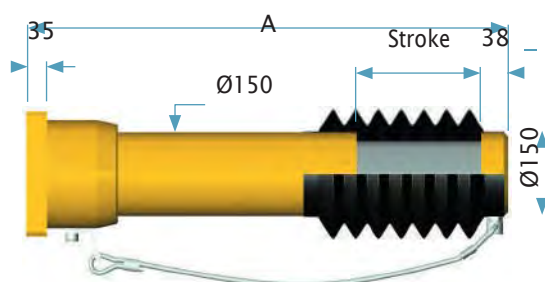
Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG140-100	100	480	460	297	24
-150	150	620	600	360	
-200	200	770	750	422	
-300	300	1,060	1,040	547	
-400	400	1,350	1,330	712	
-500	500	1,630	1,610	847	
-600	600	1,930	1,910	982	
-800	800	2,350	2,330	1,252	
-1000	1,000	-	2,880	1,595	

Custom Built Possibilities
Sealing design to Suit
Weather
Bellows , Sensors on
Request

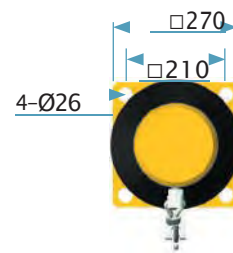
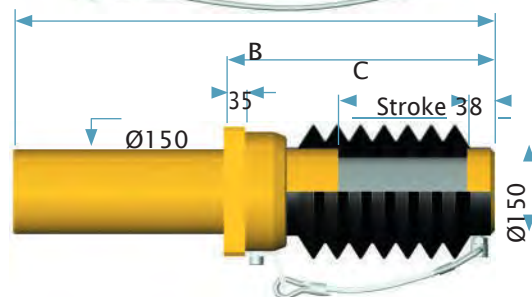
AKHG 150 Series Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _s	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG150-100	100	70	4,000	880	6.2	45	4	4.5	77
-200	200	136	7,200	850		75	4	3.5	90
-300	300	183	13,000	770		75	3.5	3.5	135
-400	400	243	13,500	760		75	3	3	146
-500	500	285	17,400	710		85	3	2.5	166
-600	600	323	21,000	670		85	2.5	2	176
-800	800	367	25,600	580		85	2	1.5	220
-1000	1,000	410	28,000	510		85	2	1.5	253

Rear Mount



Front Mount



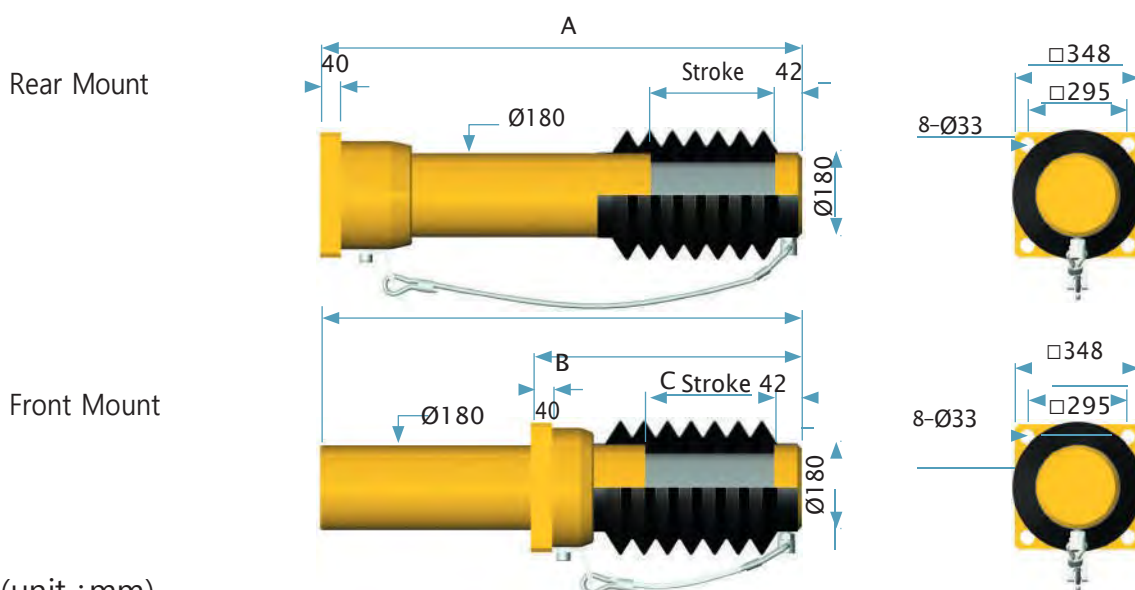
Dimensions (unit :mm)

Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG150-100	100	510	490	327	24
-200	200	800	780	452	
-300	300	1,090	1,070	577	
-400	400	1,280	1,260	740	
-500	500	1,660	1,640	800	
-600	600	1,960	1,940	905	
-800	800	2,360	2,340	1,270	
-1000	1,000	2,910	2,890	1,625	



AKHG 180 Series Engineering Data

Model	Stroke (mm) S	Max. Energy / Cycle (kJ) E _T	Max. Energy / Hour (kJ/h) E _T C	Max Buffer Force (kN) F _s	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
					Ext	Comp	R Type	F Type	
AKHG 180-100	100	80	4,500	980	8	75	4.5	4	110
-200	200	160	10,000	980		80	4.5	4	126
-250	250	200	12,800	980		80	4.5	4	140
-400	400	280	14,500	880		90	4.5	4	168
-500	500	350	18,000	880		100	4	3.5	198
-600	600	430	23,000	890		100	3.5	3	235
-800	800	570	27,000	890		100	3	2.5	295
-1000	1,000	720	29,000	890		110	2.5	2	360



Dimensions (unit :mm)

Model	Stroke (mm) S	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
AKHG180-100	100	491	471	350	30
-200	200	760	740	450	
-250	250	850	830	550	
-400	400	1,486	1,466	804	
-500	500	1,766	1,746	939	
-600	600	2,066	2,046	1,074	
-800	800	2,666	2,646	1,344	
-1000	1,000	3,226	3,206	1,614	