

Test Report

No. BZ 117.0

about the determination of characteristics of combined spring brake actuators

1 Technical characteristics of combined spring brake actuators

Manufacturer:	Haldex Brake Products GmbH D-69015 Heidelberg
Trade mark:	Haldex
Nature of components:	Assembly group, consisting of spring brake actuator (chamber type) and pneumatic actuator (brake chamber)
Working pressure:	Max 10 bar
Type (order number):	18/24 (346 186 ...) 20/24 (346 187 ...)
Main dimensions:	See appendix

2 Tests carried out

Six combined spring brake actuators of each type have been tested; working pressure range from 0 ... 10 bar. Measuring procedure of the power output via the stroke according DIN 74060 part 10.

- 2.1 Determination of the characteristics $T_{HA} = f(p)$, $s_p = f(p)$ and of s_{max} , each for the pneumatic actuators.

Symbols and definitions correspond to Appendix 1, para. 2, of Annex VII, 3.4. Directive 71/320/EEC edition of 27.01.1998.

- 2.2 Determination of the characteristics $T_{FZ} = f(s)$ and of p_{LS} , each for the spring brake actuators.

Definition of terms: T_{FZ} = piston force, s = piston stroke, p_{LS} = release pressure at $s = 10$ mm.



Test Report No. : BZ 117.0
Sheet : 2 / 2

RWTÜV

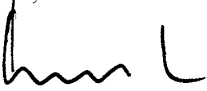
Manufacturer : Haldex
Type : See below

3 Test results

The statistic analysis (besides others linear regression) resulted in the following formulae and values - with p in bar and s in mm:

Combined spring brake actuators (type)	piston stroke S_{max} (mm)	pneumatic actuator		spring brake actuator	
		piston force T_{HA} (N)	piston stroke S_p (mm) $\leq S_{max}$	piston force T_{FZ} (N)	release pressure pLS (bar)
18/24	64	$1080p - 300$	$0.60p + 58$	$7525 - 75s$	4.7
20/24	64	$1190p - 235$	$0.57p + 58$	$7525 - 75s$	4.7.

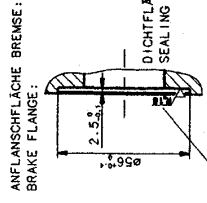
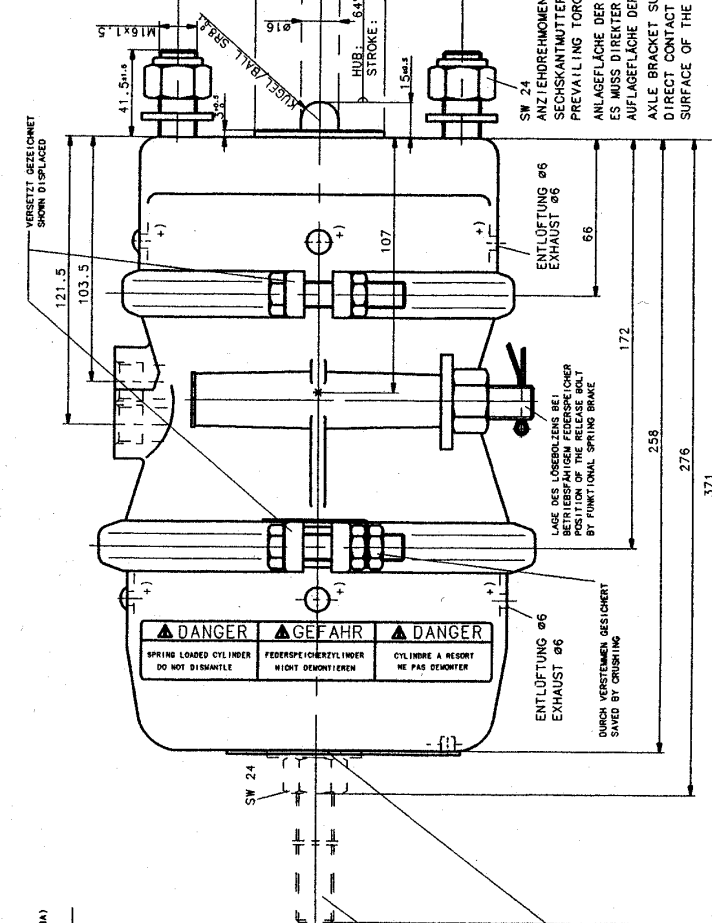
Essen, 29.02.2000


Dipl.-Ing. Kaesler
Officially authorized Inspector
for Motor Vehicles



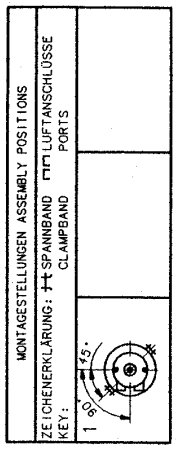
RWTÜV Fahrzeug GmbH - Institute for Vehicle Technology, Adlerstr. 7, D - 45307 Essen
The Testing Laboratory is accredited by the Accreditation Body of the German Federal Motor Transport Authority (KBA) to conduct inspections according to ECE, EG-TypV (EEC), StVZO and FzTV (KBA-P 00009-95).

* THEOR. DREHPUNKT DER DRUCKSTANGE IN UNBELÜFTETEM ZUSTAND
THEOR. SWIVEL POINT OF THE PUSH ROD
SCHWENKBEREICH DER DRUCKSTANGE ALSEITIG
MISALIGNMENT OF THE PUSH ROD IN ANY DIRECTION 4°
KRAFTABGABE DER RÜCKSTELLFEDER BEI 0-HUB 150^{±0,3} N
OUTPUT FORCE OF RETAINING SPRING AT 0 STROKE
LIEFERZUSTAND: FEDERSPEICHER MECH. GELOST
(KOLBENSTANGE EINGEFÄHRT)
STATE OF DELIVERY: SPRING BRAKE MECH. RELEASED (CAGED)



ANZIENHERMOMENT/TIGHTENING TORQUE 180^{±7} Nm
SECHSKANTMUTTER SELBSTSICHERND MIT KLEMMTEIL
PREVAILING TORQUE SELF-LOCKING TYPE HEXAGON NUT
ANLAGEFLÄCHE DER BEFESTIGUNGSKONSOLLE MUSS PLAN SEIN (ZUL. ABWEICHUNG MAX. 0.2 mm)
ES MUSS DIREKTER KONTAKT ZWISCHEN BEF.-KONSOLLE UND ZYLINDER SICHERGESTELLT WERDEN
AUF LAGEFLÄCHE DER BEF.-KONSOLLE NICHT ENTLAUFEN (NUR GRUNDRISS).
AXLE BRACKET SURFACE TO BE PLANE WITHIN MAX.0.2 mm.
DIRECT CONTACT BETWEEN AXLE BRACKET AND ACTUATOR MUST BE ENSURED.
SURFACE OF THE AXLE BRACKET PRIMED ONLY, NO FINAL PAINTING.

BESTELL-NR. / MONTAGESTELLUNG PART NO. / ASSEMBLY POSITION	
348 186 001	1



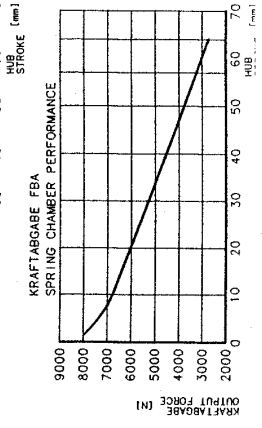
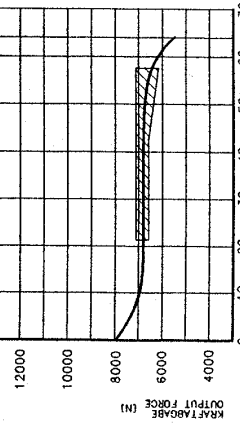
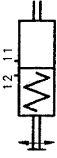
ANSCHLÜSSE 11 UND 12 MIT SCHUTZSTOPFEN VERSCHLOSSEN
PORTS 11 AND 12 TO BE PLUGGED BY PROTECTIVE PLUGS

ACHTUNG ZYLINDER KEINESFALLS MIT
VERSCHLOSSENEN ENTLÜFTUNGSBOHRUNGEN
(MEMBRAN- UND FEDERSPEICHERTEIL)
BETÄTIGEN!
DO NOT USE THE CHAMBER WITH CLOSED
EXHAUSTS! (SERVICE BRAKE AND
SPRING BRAKE)

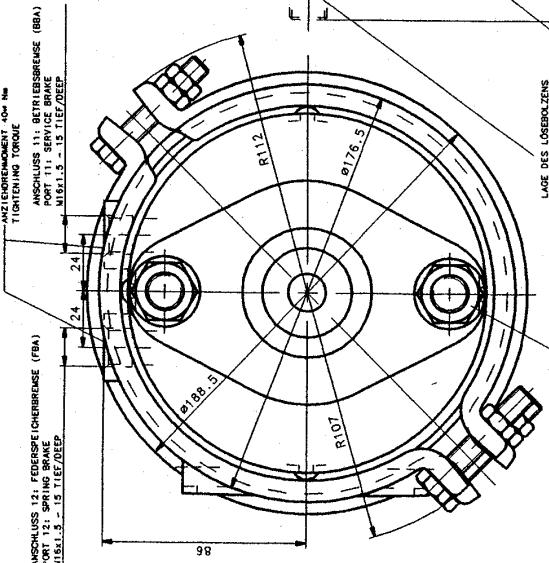
+) ALLE ENTLÜFTUNGSBOHRUNGEN VERSCHLOSSEN
NACH UNTEN ZEIGENDE BOHRUNGEN NACH EINBAU DES ZYLINDERS ÖFFNEN
HOLES DIRECTED DOWNWARDS HAVE TO BE OPENED AFTER INSTALLATION

MEDIUM	LUFT	
MEDIUM	AIR	
BETRIEBSDRUCK BBA	OPERATING PRESSURE SERVICE CHAMBER	±8.5 bar
BETRIEBSDRUCK FBA	OPERATING PRESSURE SPRING CHAMBER	±8.5 bar
THEM. ANWENDUNGSBEREICH	THERMAL RANGE OF APPLICATION	-40 °C...+80 °C
HUBVOLUMEN FEDERSPEICHERZYLINDER	AIR VOLUME SERVICE CHAMBER	±1.3 l
HUBVOLUMEN BETRIEBSDRUCKZYLINDER	AIR VOLUME SERVICE CHAMBER	±1.1 l
HUB	STROKE	64 ^{±0,3} mm
LÖSEDRUCK (FBA)	RELEASE PRESSURE	±4.7 bar (BEI 10 mm HUB) (AT 10 mm STROKE)
GEWICHT	ASSEMBLY WEIGHT	≈ 8 kg

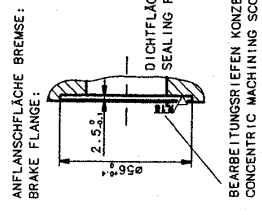
SYMBOL NACH DIN 74253
SYMBOL PER DIN 74253



KOMBIZYLINDER		TYP 18/24	
CLAS	CLASS	SCALE	SCALE
A	A	1:1	1:1
B	B		
C	C		
D	D		
E	E		
F	F		
G	G		
H	H		
I	I		
J	J		
K	K		
L	L		
M	M		
N	N		
O	O		
P	P		
Q	Q		
R	R		
S	S		
T	T		
U	U		
V	V		
W	W		
X	X		
Y	Y		
Z	Z		
0	0		
1	1		
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
REVISIONSNUMMERNUMBER OF REVISIONS		REVISIONSNUMMERNUMBER OF REVISIONS	
10.03.		10.03.	
Haldex		Haldex	
Brake Products GmbH		Brake Products GmbH	
TECHNISCHE ZEICHNUNG / DRAWING		TECHNISCHE ZEICHNUNG / DRAWING	
348 186 000 2		348 186 000 2	
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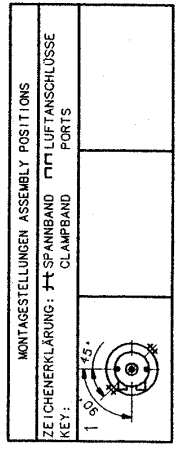
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 THEOR. SWIVEL POINT OF THE PUSH ROD
 SCHWENKBEREICH DER DRUCKSTANGE ALSEITIG 4°
 MISALIGNMENT OF THE PUSH ROD IN ANY DIRECTION 4°
 KRAFTABGABE DER RÜCKSTELLEFEDER BEI 0-HUB 1500 N
 OUTPUT FORCE OF RETAINING SPRING AT 0 STROKE 1500 N
 LIEFERZUSTAND: FEDERSPEICHER MECH. GELOST
 (KOLBENSTANGE EINGEFÄHRT)
 STATE OF DELIVERY: SPRING BRAKE MECH. RELEASED (CAGED)



ANFLANSCHFLÄCHE BREMSE:
 BRAKE FLANGE:
 DICHTFLÄCHE GEFETTE:
 SEALING FACE GREASE:
 BEARBEITUNGSRIEFEN KONZENTRISCH
 CONCENTRIC MACHINING SCORES

ANZIENDEHMOMENT/TIGHTENING TORQUE 180° Nm
 SECHSKANTMUTTER SELBSTSICHERND MIT KLEMMTEIL
 PREVAILING TORQUE SELF-LOCKING TYPE HEXAGON NUT
 ANLAGEFLÄCHE DER BEFESTIGUNGSKONSOLE MUSS PLAN SEIN (ZUL. ABWEICHUNG MAX. 0.2 mm)
 ES MUSS DIREKTER KONTAKT ZWISCHEN BEF.-KONSOLE UND ZYLINDER STÖßERGESTELLT WERDEN
 AUFLAGEFLÄCHE DER BEF.-KONSOLE NICHT ENDLACKIERT (NUR GRUNDIERT).
 AXLE BRACKET SURFACE TO BE PLANE WITHIN MAX.0.2 mm.
 DIRECT CONTACT BETWEEN AXLE BRACKET AND ACTUATOR MUST BE ENSURED.
 SURFACE OF THE AXLE BRACKET PRIMED ONLY, NO FINAL PAINTING.

BESTELL-NR. / MONTAGESTELLUNG	PART NO. / ASSEMBLY POSITION
346 187 001	1



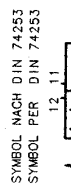
MONTAGESTELLUNGEN ASSEMBLY POSITIONS
 ZEICHENERKLÄRUNG: SPANNBAND CLAMPBAND
 PORTS

ANSCHLÜSSE 11 UND 12 MIT SCHUTZSTOPFEN VERSCHLOSSEN
 PORTS 11 AND 12 TO BE PLUGGED BY PROTECTIVE PLUGS

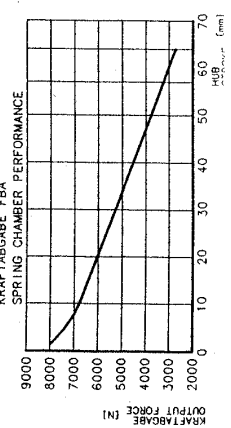
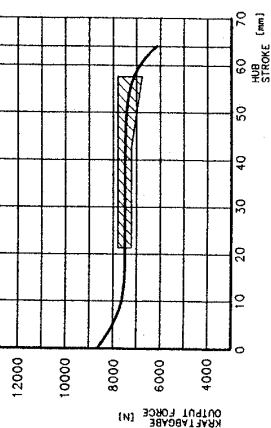
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+) ALLE ENTLÜFTUNGSBOHRUNGEN VERSCHLOSSEN
 NACH UNTEN ZEIGENDE BOHRUNGEN NACH EINBAU DES ZYLINDERS ÖFFNEN
 ALL BREATHER HOLES CLOSED
 HOLES DIRECTED DOWNWARDS HAVE TO BE OPENED AFTER INSTALLATION

MEDIUM	LUFT
MEDIUM	AIR
BETRIEBSDRUCK BBA	8.5 bar
OPERATING PRESSURE SERVICE CHAMBER	
BETRIEBSDRUCK FBA	8.5 bar
OPERATING PRESSURE SPRING CHAMBER	
Therm. Anwendungsbereich	-40°C...+80°C
THERMAL RANGE OF APPLICATION	
HUBVOLUMEN FEDERSPEICHERZYLINDER	41.3 l
AIR VOLUME FEDERSPEICHERZYLINDER	
(BEI 8 bar UND MAX. HUB)	
(AT 8 bar AND FULL STROKE)	
HUBVOLUMEN BETRIEBSSPEICHERZYLINDER	41.1 l
AIR VOLUME SERVICE CHAMBER	
HUB	64 mm
STROKE	
LOSDRUCK (FBA)	4.7 bar (BEI 10 mm HUB)
RELEASE PRESSURE	
(AT 10 mm STROKE)	
GEWICHT	24.8 kg
ASSEMBLY WEIGHT	



SYMBOL NACH DIN 74253
 SYMBOL PER DIN 74253



KRAFTABGABE		OUTPUT FORCE	
Hub	Stroke	Hub	Stroke
0	0	0	0
10	10	10	10
20	20	20	20
30	30	30	30
40	40	40	40
50	50	50	50
60	60	60	60
70	70	70	70

ANWENDUNGSGEBIET
 APPLICATION RANGE
 10...30°C
 50...60°C
 70...80°C
 90...100°C
 110...120°C
 130...140°C
 150...160°C
 170...180°C
 190...200°C
 210...220°C
 230...240°C
 250...260°C
 270...280°C
 290...300°C
 310...320°C
 330...340°C
 350...360°C
 370...380°C
 390...400°C
 410...420°C
 430...440°C
 450...460°C
 470...480°C
 490...500°C

BRANDSCHUTZ
 FIRE PROTECTION
 10...30°C
 50...60°C
 70...80°C
 90...100°C
 110...120°C
 130...140°C
 150...160°C
 170...180°C
 190...200°C
 210...220°C
 230...240°C
 250...260°C
 270...280°C
 290...300°C
 310...320°C
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WÄRMEDÄMMUNG
 INSULATION
 10...30°C
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