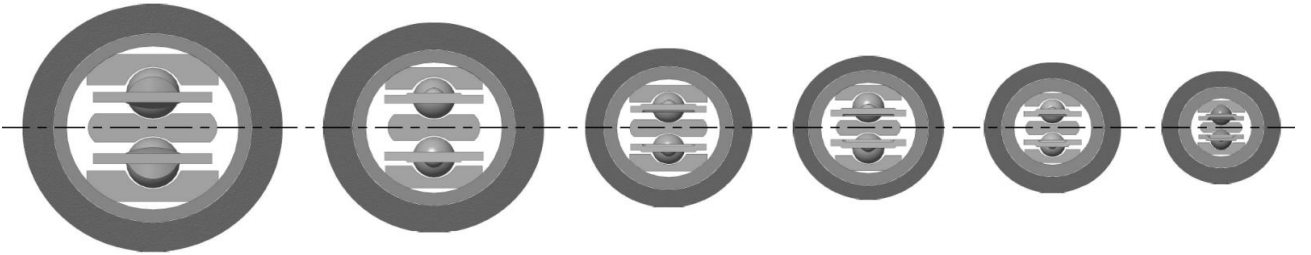


# DURAFLEX®



# FLEXBALLO®



Industrial Products  
Catalogue 2024

# Overview

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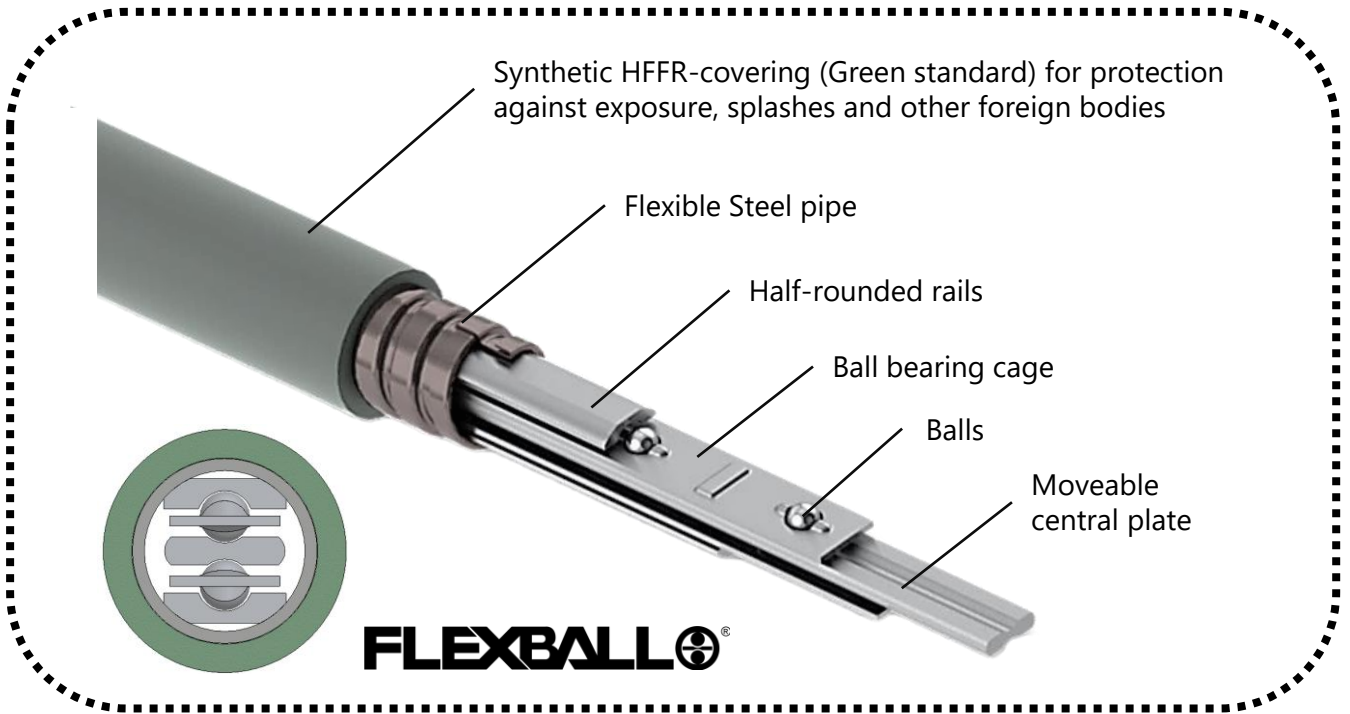
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## 4. OTHER POSSIBLE APPLICATIONS AND SPECIAL CONSTRUCTIONS

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1955  Made in Germany

### **DURA FLEXBALL®:**

- The mechanical, ball bearing, flexible remote control transfers linear lifting movements of up to 200 mm. Only the ball-bearing principle used enables loads of 6000 N pressure and 15000 N traction so easily and smoothly.
- Is laid spatially on three levels in a system of bends with low bending radii and is 97% effective, particularly under heavy payloads. Stainless steel inner components guarantee an optimal life-span with high fatigue resistance under reverse bending processes
- Replaces in many cases complex solid rods, hydraulic, pneumatic, or electric transfer devices, and the energy supply machinery required to power them
- Is manufactured in ready to install lengths

### **The advantages at a glance:**

- Flexible with easy three-dimensional installation
- Works on compression and tension
- High efficiency > 97%
- No necessary maintenance or lubrication
- Comfortable installation
- Always precise, independently of temperature variances
- Works reliably and without play, even at lengths of more than 20 meters and spatial laying
- FLEXBALL products conform to the REACH and RoHS regulations
- FIRE PROTECTION CONDITIONS HFFR conduit, complied according EN45545-2 R22; HL1/HL2/HL3



## FLEXBALL DESIGN AND PERFORMANCE:

- FLEXBALL functional metal parts are all made from Stainless Steel
- Agraff tube (Flexible Steel Pipe) with special HFFR coating ( Color variants: GREEN / GREY / BLACK )
- Agraff tube with silicon coating for high temperature 200°C application is available (DZ60 Type)
- Special design models possible.

Type	55 <sup>1)</sup>	60 <sup>1)</sup>	80	95	125	160
Degree of efficiency						
a) for small loads	90%					
b) for large loads	97%					
R min. installation radius <sup>2)</sup>	80	100	120	140	200	250
Elastic deformation <sup>3)</sup> per m at 100 N load	0,30	0,18	0,16	0,10	0,057	0,035
	Temperature range with HFFR coating -55°C to +135°C Temperature range without coating -55°C to +300°C					

- 1) Type 55 is only available in lengths of up to 10m, type 60 is available in lengths of up to 20m.
- 2) For rapid stroke sequences and endurance run to be installed in largest possible installation radius, two times of R min. and even more for better performance result
- 3) The elastic deformation in addition of push and pull load

### The following information is required when ordering

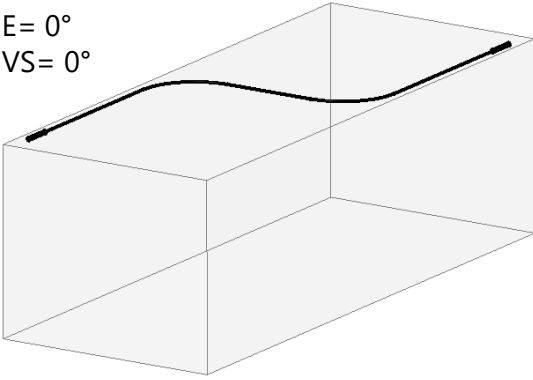
- DURA FLEXBALL model > DZ, S3, .... etc. – see data sheets
- DURA FLEXBALL type – the choice of type is determined by the forces transferred by the respective stroke
- Casing length <G> or the total length <L> – see reference edge measurements on data sheets
- Required control stroke – max. bolt/pin movement IN / OUT position
- Possible pre-stress <VS> required for a total angle of over 180° – see information sheets
- Type and number of accessories – fork end (clevis), ball joint, .... etc. – see data sheets
- Possible attachment of transmission / reception elements – see information sheets
- Stroke sequence – double stroke per unit of time while this/or for endurance run
- The assembly of DURA FLEXBALL Control requires count all angle with final pre-stress compensation for angles greater than 180° (i.e. negative angle)
  - E [ ° ] = sum up angle at installation actuation (HG=H+HZ)
  - VS [ ° ] = pre-stress, if „E“ > 180°; (min. VS = E – 180°)

\* Shortest DURA FLEXBALL length should be <G> = 2A + 200 + elbow length + stroke

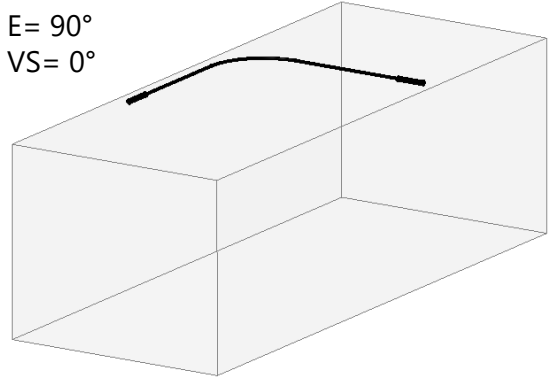
\*\* The traction values given are only valid for nom. stroke HG=100 / pre-stress <VS> on the „installation angle“!  
 For long-term stress in the max. stress field, the next largest type should be chosen.



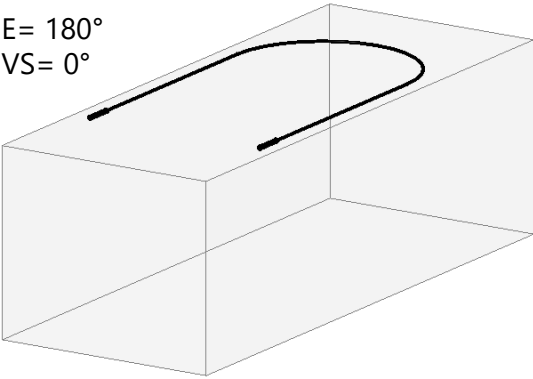
$E = 0^\circ$   
 $VS = 0^\circ$



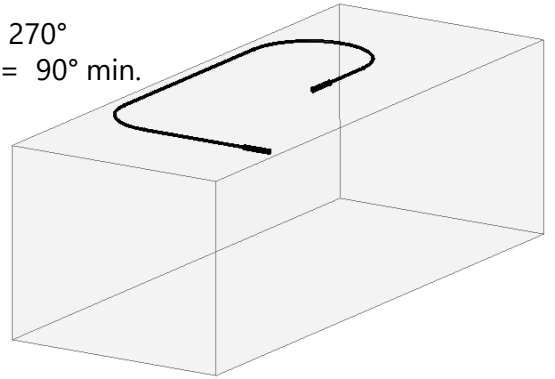
$E = 90^\circ$   
 $VS = 0^\circ$



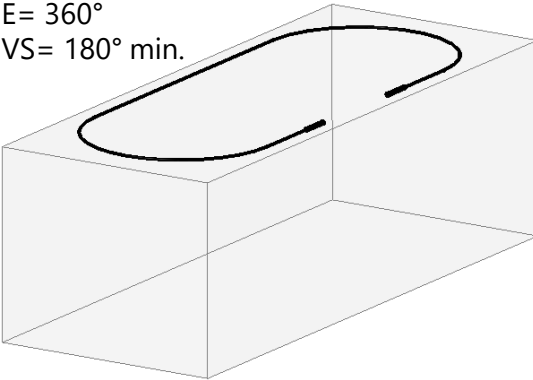
$E = 180^\circ$   
 $VS = 0^\circ$



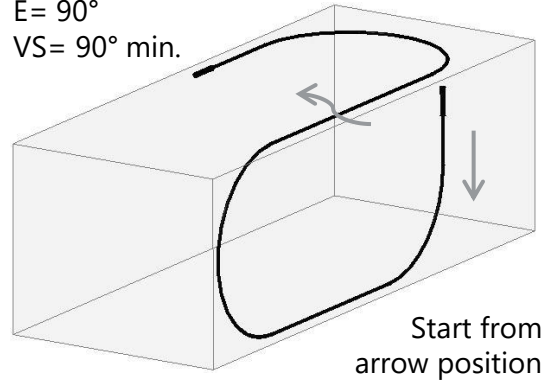
$E = 270^\circ$   
 $VS = 90^\circ \text{ min.}$



$E = 360^\circ$   
 $VS = 180^\circ \text{ min.}$

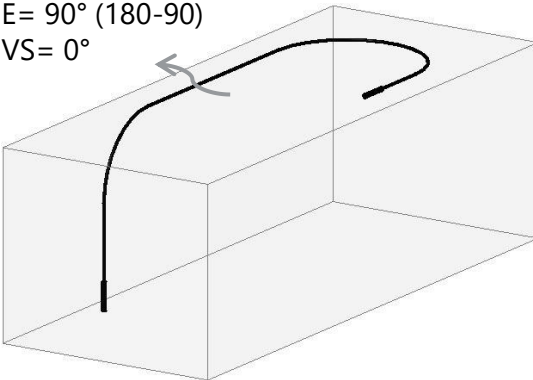


$E = 90^\circ$   
 $VS = 90^\circ \text{ min.}$

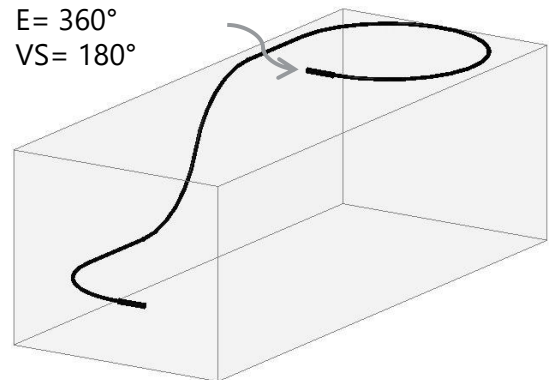


Start from  
arrow position

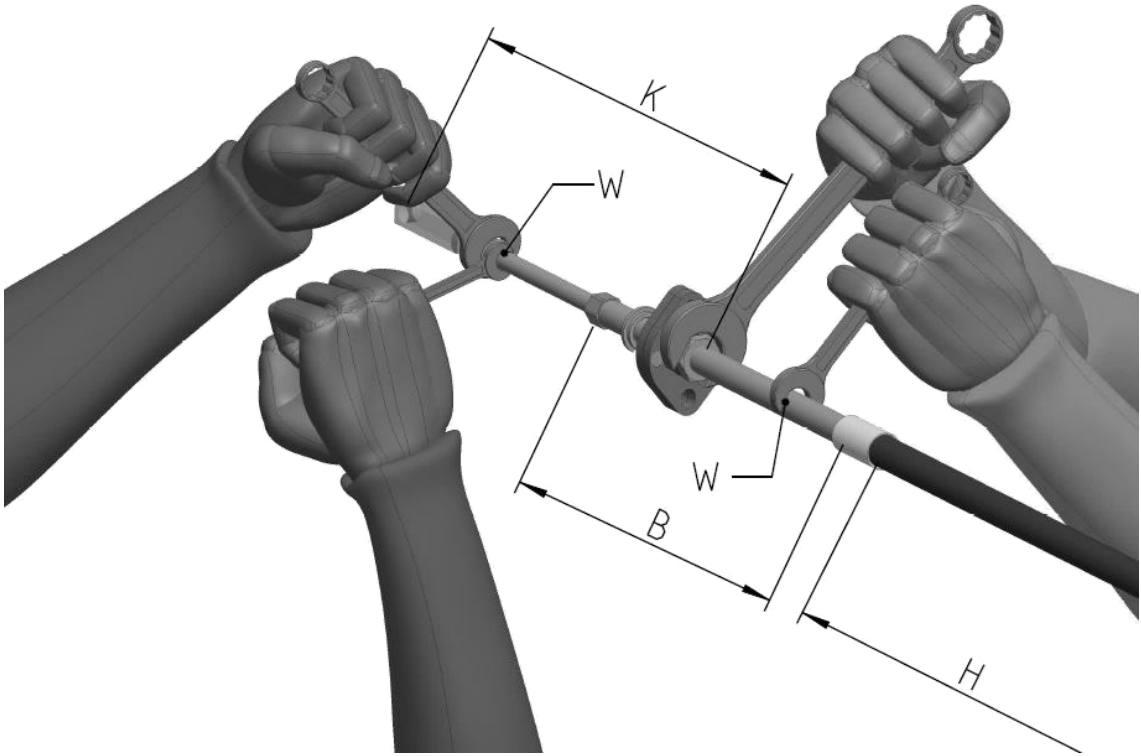
$E = 90^\circ (180-90)$   
 $VS = 0^\circ$



$E = 360^\circ$   
 $VS = 180^\circ$



## INSTALLATION INFORMATION < FLEXBALL >



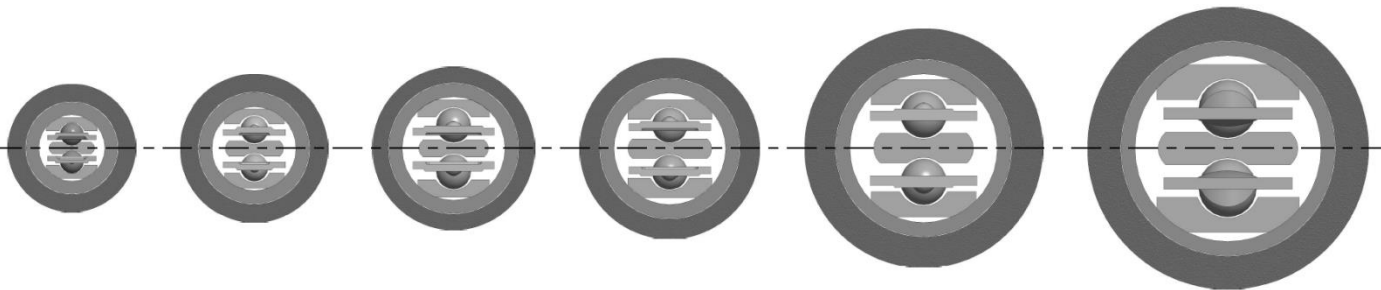
### Assembly instruction:

The position of the ball joint at the abutment should be mediated with the lever amplitude.

Angle amplitude of the guiding bushing  $= a/2$ , but not more than  $a = \pm 8^\circ$

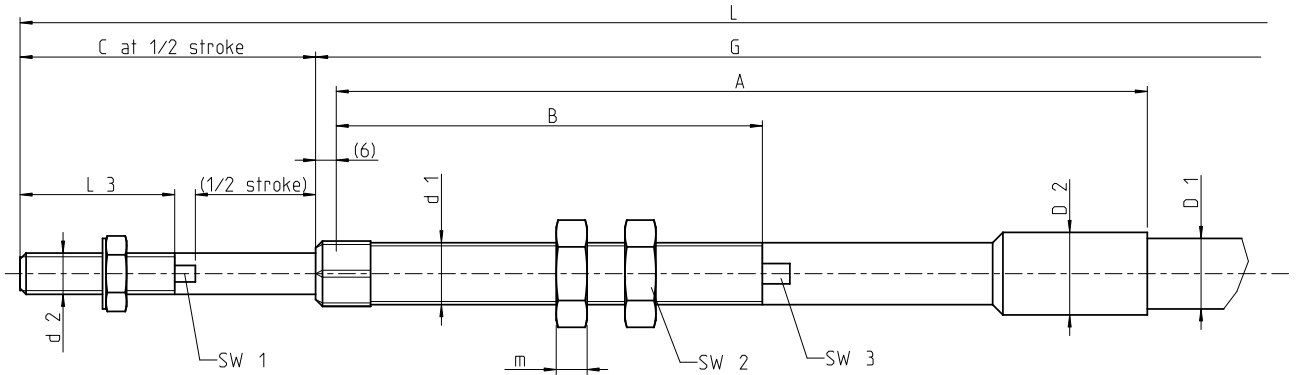
Secure toggle joint of the guiding bushing as far to the back of the thread end as possible, to achieve the minimum possible out swing. The parts are made from yellow brass.

See Installation Instructions page appendix.



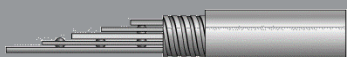
Cross-sectional view FLEXBALL type 55-160

## FLEXBALL PUSH-PULL Model < DZ >

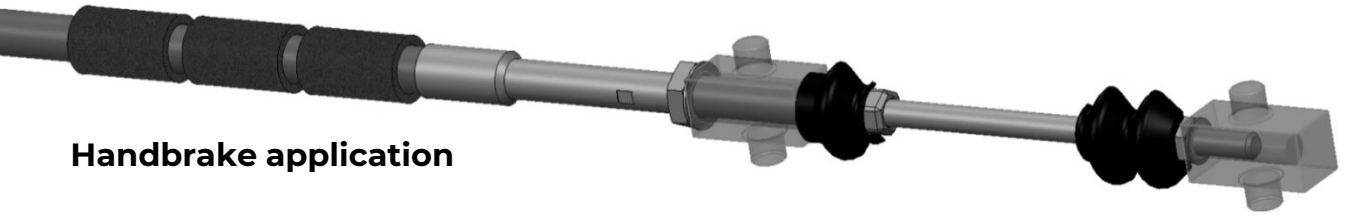


Order example: FLEXBALL DZ 95 / G=2000 / H=100 [ G= \* ]

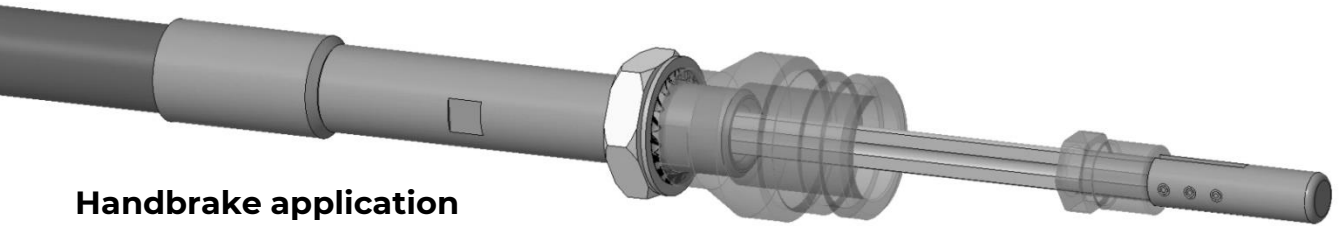
Type	Stroke	A	B	C	D <sub>1</sub>	D <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	m	AF <sub>1</sub> SW	AF <sub>2</sub> SW	AF <sub>3</sub> SW	Operating load [N] max.		
														stroke	pressure	traction**
55	-50	130	55	24+	1/2 stroke ø 11	ø 14	M10x1	M5	20	4	4	14	8	-100	300	800
	-70	150	75	35+												
	-100	180	105	1/2 stroke												
60	-50	142	55	35+	1/2 stroke ø 12,7	ø 16	M12x1	M6	30	5	6	17	11	-100	1200	2500
	-70	162	75													
	-100	192	105													
	-150	242	155													
	-200	292	205													
80	-50	146	55	35+	1/2 stroke ø 14	ø 18	M14x1	M8	30	8	7	19	13	-100	1400	2800
	-70	166	75													
	-100	196	105													
	-150	246	155													
	-200	296	205													
95	-50	158	70	38+	1/2 stroke ø 15,5	ø 19	M16x1,5	M10	30	8	9	24	14	-100	2500	5000
	-70	178	90													
	-100	208	120													
	-150	258	170													
	-200	308	220													
125	-50	186	74	41+	1/2 stroke ø 20,5	ø 24	M18x1,5	M12x1,5	35	9	11	27	17	-100	5000	10000
	-70	206	94													
	-100	236	124													
	-150	286	174													
	-200	336	224													
160	-50	228	100	41+	1/2 stroke ø 24	ø 28	M22x1,5	M14x1,5	35	10	13	32	20	-100	6000	15000
	-70	248	120													
	-100	278	150													
	-150	328	200													
	-200	378	250													



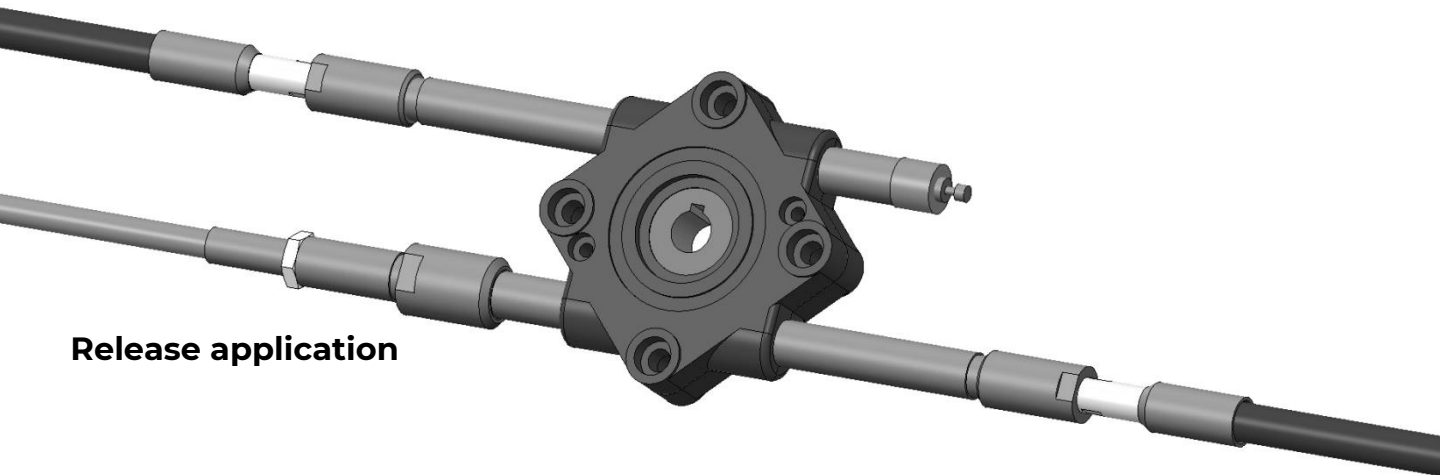




**Handbrake application**

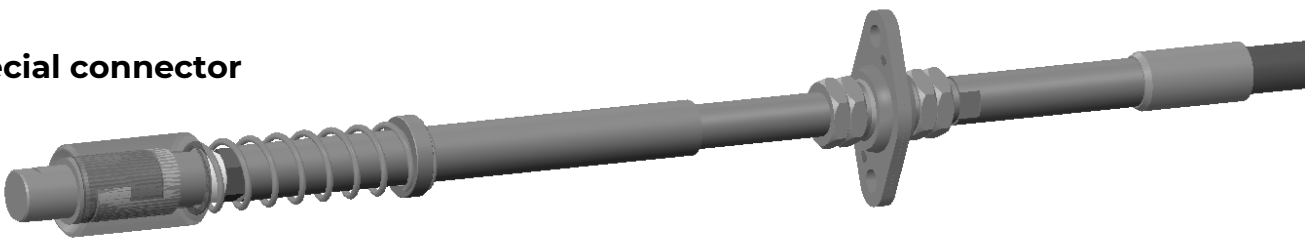


**Handbrake application**



**Release application**

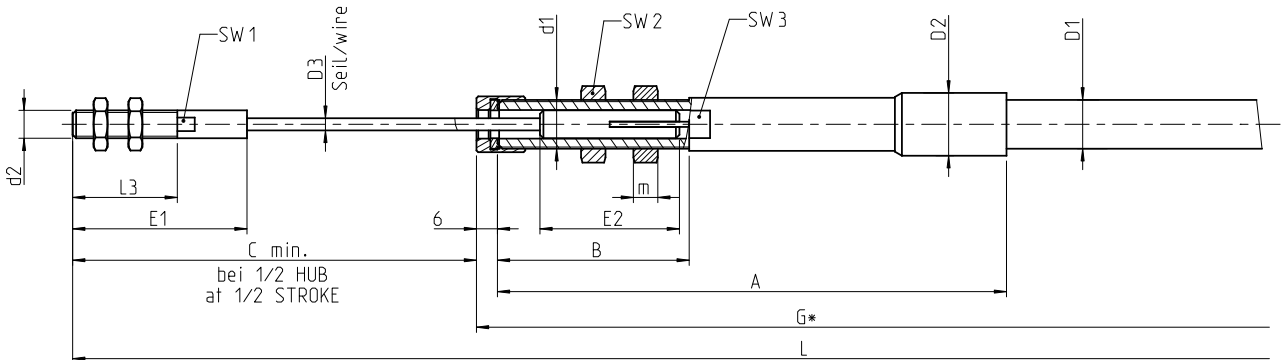
**Special connector**



DURA-Industrial develops unique control systems solutions for leading railway manufacturers worldwide. Our advanced FLEXBALL® products are engineered to deliver the efficient performance and durability that railway applications demand. DURA is ready to provide full test installation services world wide. Please contact us to learn more about our specific DURA-DURAFLEX® and DURA-FLEXBALL® designs for railway applications and do not hesitate to ask for our special kind of technical support.

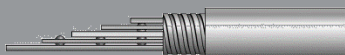


## FLEXBALL < S3 >

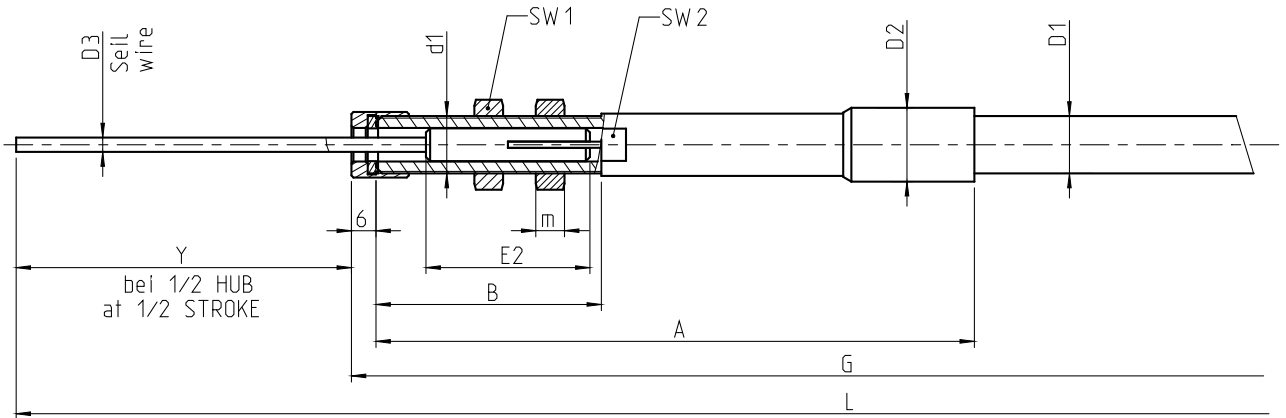


Order example: FLEXBALL S3 80 / G=1200 / H=50 C measurement (if > than Cmin.)

Type	Stroke	d <sub>1</sub>	d <sub>2</sub>	A	B	C <sub>min</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	E <sub>1</sub>	E <sub>2</sub>	L <sub>3</sub>	m	AF <sub>1</sub> sw	AF <sub>2</sub> sw	AF <sub>3</sub> sw	Operating load [N] max.**
<b>60</b>	-50	M12x1	M6	142	55	115	Ø12,7	Ø16	Ø3,5	50	44	30	5	6	17	11	2500
	-70			162	75	125											2500
	-100			192	105	140											2500
	-150			242	155	165											1250
	-200			292	205	190											600
<b>80</b>	-50	M14x1	M8	146	55	115	Ø14	Ø18	Ø3,5	50	44	30	8	7	19	13	2800
	-70			166	75	125											2800
	-100			196	105	140											2800
	-150			246	155	165											1400
	-200			296	205	190											700
<b>95</b>	-50	M16x1,5	M10	158	70	120	Ø15,5	Ø19	Ø5	55	47	30	8	9	24	14	5000
	-70			178	90	130											5000
	-100			208	120	145											5000
	-150			258	170	170											2500
	-200			308	220	195											1250



## FLEXBALL < T3 >

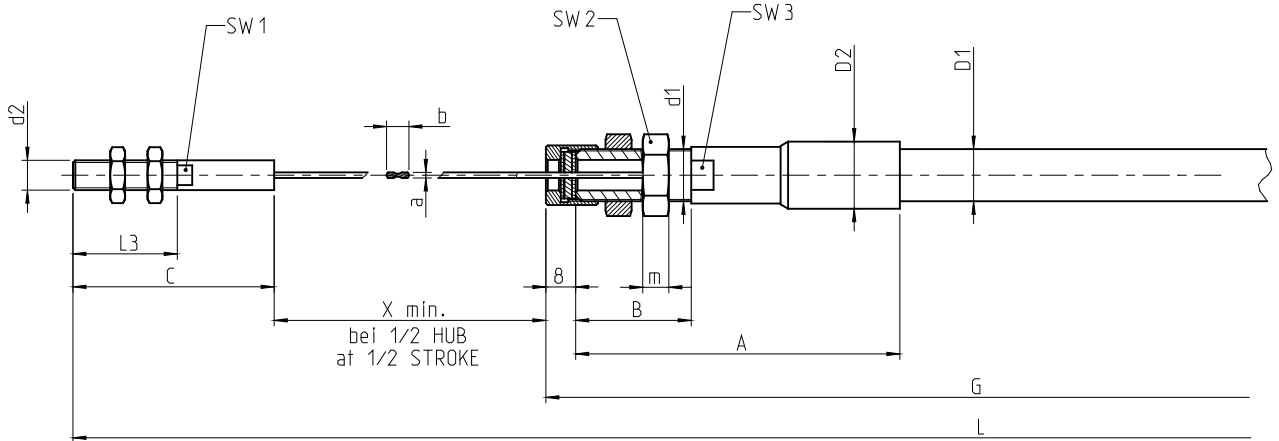


Order example: FLEXBALL T3 80 / G=1200 / H=50 with free length cable end

Type	Stroke	A	B	d <sub>1</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	E <sub>2</sub>	m	AF <sub>1</sub> SW	AF <sub>2</sub> SW	Operating load [N] max.**
<b>60</b>	-50	142	55	M12x1	Ø12,7	Ø16	Ø3,5	44	5	6	17	2500
	-70	162	75									2500
	-100	192	105									2500
	-150	242	155									1250
	-200	292	205									600
<b>80</b>	-50	146	55	M14x1	Ø14	Ø18	Ø3,5	44	8	7	19	2800
	-70	166	75									2800
	-100	196	105									2800
	-150	246	155									1400
	-200	296	205									700
<b>95</b>	-50	158	70	M16x1,5	Ø15,5	Ø19	Ø5	47	8	9	24	5000
	-70	178	90									5000
	-100	208	120									5000
	-150	258	170									2500
	-200	308	220									1250

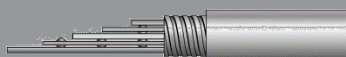


## FLEXBALL < Z3 >

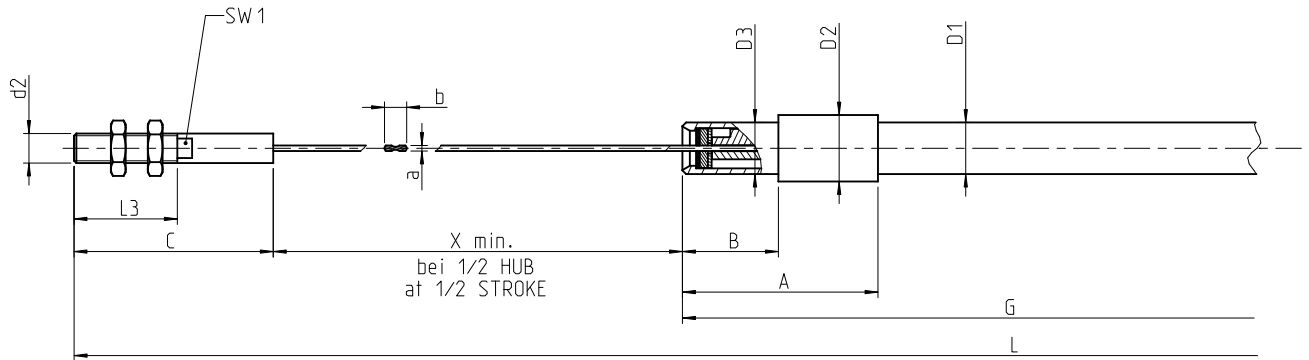


Order example: FLEXBALL Z3 125 / G=3000 / H=150 / X please specify

Type	d <sub>1</sub>	d <sub>2</sub>	A	B	C	D <sub>1</sub>	D <sub>2</sub>	L <sub>3</sub>	m	a x b	AF <sub>1</sub> sw	AF <sub>2</sub> sw	AF <sub>3</sub> sw	Operating load [N] max.**
<b>60</b>	M12x1	M6 M8	87	35	54	Ø12,7	Ø16	30	5	1,35x5	6	17	11	2500
<b>80</b>	M14x1	M8 M10	87	35	54	Ø14	Ø18	30	8	1,5x6	7	19	13	2800
<b>95</b>	M16x1,5	M10 M12x1,5	128	50	70	Ø15,5	Ø19	35	8	1,7x7	9	24	18	5000
<b>125</b>	M18x1,5	M12x1,5	150	56	70	Ø20,5	Ø24	35	9	2,5x8,2	11	27	22	10000

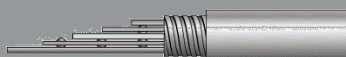


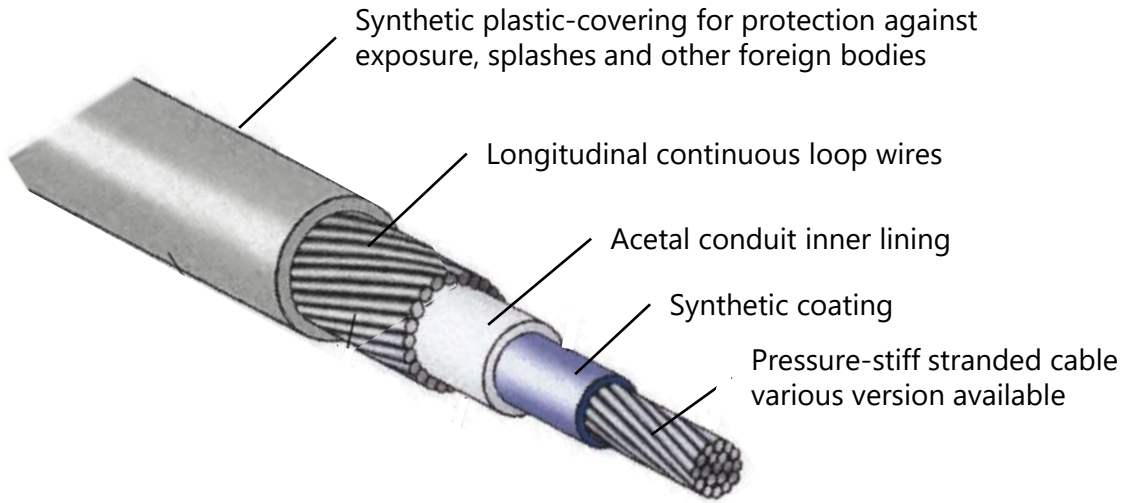
## FLEXBALL < Z4 >



Order example: FLEXBALL Z4 80 / G=5000 / H=100 / X + d2 please specify

Type	d <sub>2</sub>	A	B	C	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	L <sub>3</sub>	a x b	AF <sub>1</sub> sw	Operating load [N] max.**
<b>60</b>	M6 M8	50	23	54	Ø12,7	Ø16	Ø11	30	1,35x5	6	2500
<b>80</b>	M8 M0	50	23	54	Ø14	Ø18	Ø14	30	1,5x6	7	2800
<b>95</b>	M10 M12x1,5	68	25	70	Ø15,5	Ø19	Ø14,5	35	1,7x7	9	5000
<b>125</b>	M12x1,5	90	35	70	Ø20,5	Ø24	Ø17,5	35	2,5x8,2	11	10000





**DURAFLEX®**

1973  Made in Germany

## DURAFLEX®:

- The mechanical, flexible remote control cable transfer of push and pull loads in reliable implementation forces.
- The cable core consists of a special pressure-stiff stranded cable with a modified synthetic coating
- The conduit as a stress bearer consists of an POM Plastic conduit inner lining which is reinforced with compression- and extension-resistant longitudinal continuous loop wires and is extrusion coated with Polyamide Plastic
- The ideal material mixture of the cable core exterior the lining of the conduit and also the lining of the end galvanized steel end fittings guarantee optimal gliding properties and a high degree of durability maintenance free function by best cold resistance supported with available special lubrication and different cable core flat wire armored designs.

## The advantages at a glance:

- High force capacity at push and pull functions
- Stroke up to 200 mm without force limitation
- Three-dimensional installation with smallest installation radius.
- High degree of efficiency
- Temperature range  $-40^{\circ}$  to  $+100^{\circ}\text{C}$
- Also available with fire protection conduit, complied according EN45545-2 R22; HL1/HL2/HL3
- Easy handling and assembly

## DURAFLEX®

Available as standard in the two types of shown end fitting version.

I. Guiding bushing / II. Swivel bulkhead end

The end fittings can be combined with each other means DURAFLEX® cables can be manufactured with a guiding bushing on one side and a swivel bulkhead end on the other side. The information on the following table (2.2 and 2.3) of measurements refers to "Nominal stroke in central position".

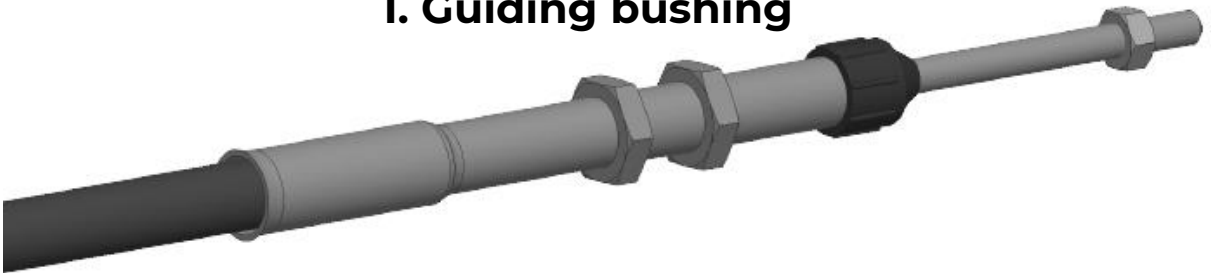
The cable length values refers to fixed points of the – G – and – L – measurements.

– G – > Conduit with end fitting length end to end of plastic sealing cap

– L – > Core with threaded bolt end to end

For cable / control lever combinations the reference edges refers to lever data sheets

### I. Guiding bushing

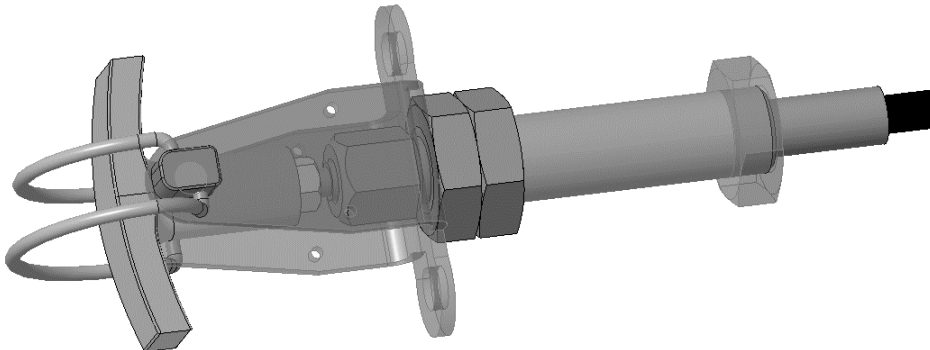


### II. Swivel bulkhead end

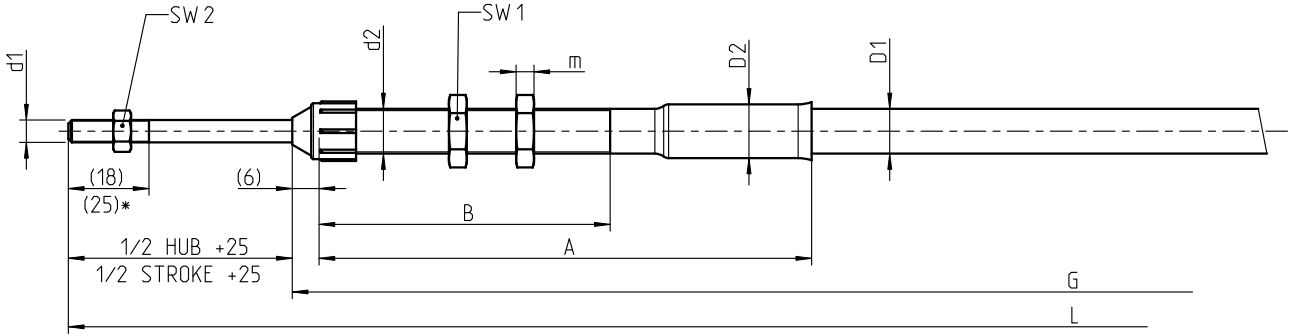


### DURAFLEX Special customized versions are also possible

- Core rope stainless steel flat wire sheathing or stainless steel wire construction
- PTFE liner with flat wire sheathing and longitudinal continuous loop wires
- **Fire protection conduit** covered with HFFR plastic for **EN45545-2** specification



## I. Guiding bushing

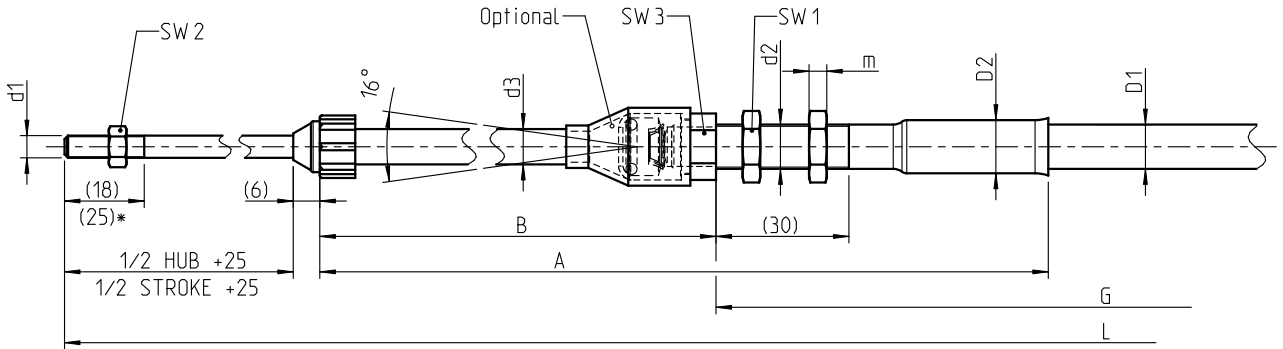


Type 4, 5, 6: C = 1/2 Stroke + 25    Type 8: C = 1/2 Stroke + 30    \* Length of thread 25 for type 8 only

Type	Stroke	A ≈	B	D <sub>1</sub>	D <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>1</sub>	m	SW <sub>1</sub>	SW <sub>2</sub>	Operating load [N]			Minimum installation radius
												stroke	pressure	traction**	
4	-25	115	65	ø 8	ø 10	M5	M10x1	14	4	14	8	-25	500	500	80
	-50	140	90									-50	500		
	-75	165	115									-75	300		
	-100	190	140									-100	150		
5	-25	115	65	ø 10	ø 12,1	M5	M10x1	14	4	14	8	-25	600	800	80
	-50	140	90									-50	600		
	-75	160	115									-75	400		
	-100	190	140									-100	200		
	-125	215	165									-125	150		
	-150	240	190									-150	150		
	-175	265	215									-175	100		
-200	290	240	-200	100											
6	-25	115	65	Ø11,5	ø 13,6	M6	M12x1	15	5	17	10	-25	700	1000	100
	-50	140	90									-50	700		
	-75	160	115									-75	500		
	-100	190	140									-100	300		
	-125	215	165									-125	200		
	-150	240	190									-150	200		
	-175	265	215									-175	150		
-200	290	240	-200	150											
8	-25	115	65	ø 14	ø 16	M8	M14x1	15	7	19	13	-25	800	1500	150
	-50	140	90									-50	800		
	-75	165	115									-75	600		
	-100	190	140									-100	400		
	-125	215	165									-125	300		
	-150	240	190									-150	300		
	-175	265	215									-175	250		
-200	290	240	-200	250											



## II. Swivel bulkhead end



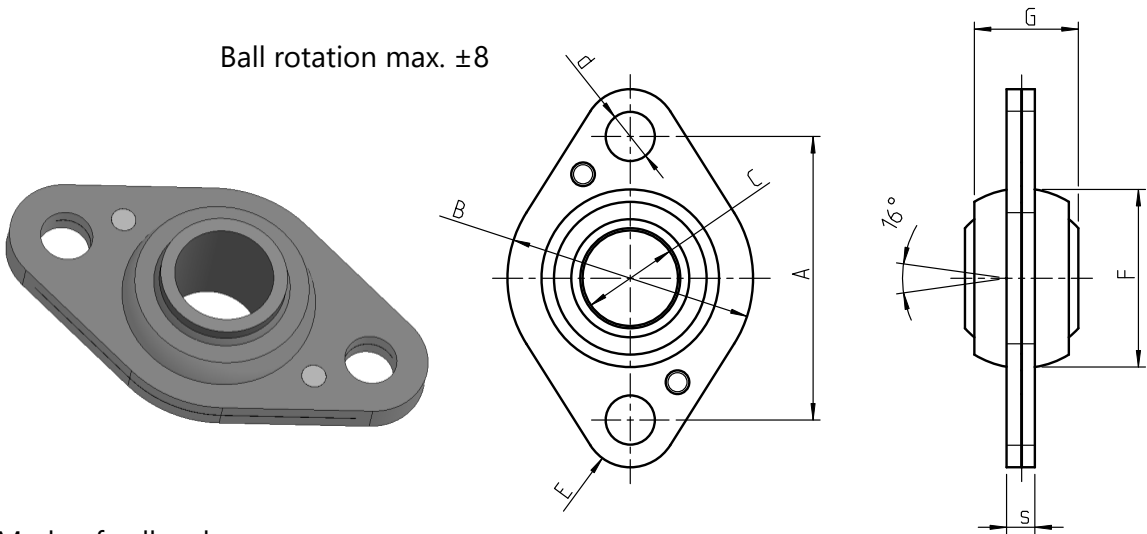
Type 4, 5, 6: C = 1/2 Stroke +25    Type 8: C = 1/2 Stroke +30    \* Length of thread 25 for type 8 only

Type	Stroke	A ≈	B	D <sub>1</sub>	D <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>1</sub>	m	SW <sub>1</sub>	SW <sub>2</sub>	SW <sub>3</sub>	Operating load [N] max.			Minimum installation radius
													stroke	pressure	traction**	
4	-25	175	100	ø 8	ø 10	M5	M10x1	14	4	14	8	15	-25	500	500	80
	-50	200	125										-50	500		
	-75	225	150										-75	300		
	-100	250	175										-100	150		
5	-25	175	100	ø 10	ø 12,1	M5	M10x1	14	4	14	8	15	-25	600	800	80
	-50	200	125										-50	600		
	-75	225	150										-75	400		
	-100	250	175										-100	200		
	-125	275	200										-125	150		
	-150	300	225										-150	150		
	-175	325	250										-175	100		
-200	350	275	-200	100												
6	-25	175	100	ø 11,5	ø 13,6	M6	M12x1	15	5	17	10	15	-25	700	1000	100
	-50	200	125										-50	700		
	-75	225	150										-75	500		
	-100	250	175										-100	300		
	-125	275	200										-125	200		
	-150	300	225										-150	200		
	-175	325	250										-175	150		
-200	350	275	-200	150												
8	-25	175	100	ø 14	ø 16	M8	M14x1	15	7	19	13	17	-25	800	1500	150
	-50	200	125										-50	800		
	-75	225	150										-75	600		
	-100	250	175										-100	400		
	-125	275	200										-125	300		
	-150	300	225										-150	300		
	-175	325	250										-175	250		
-200	350	275	-200	250												

## Ball Joint

< DURAFLEX – FLEXBALL APPLICATION >

Ball rotation max.  $\pm 8$



Made of yellow brass.

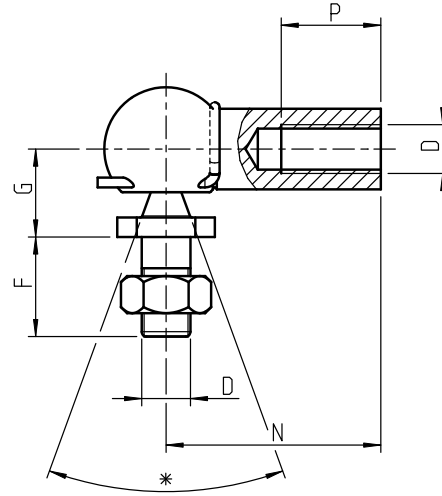
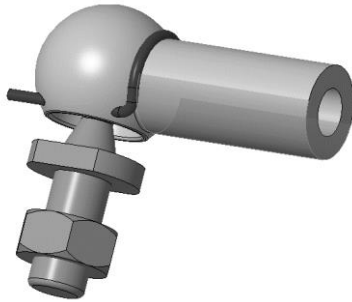
Ball joints are available for all DURAFLEX and FLEXBALL types. See Chart overview

For Type	A	B	C	d	E	F	G	S	AF	Order number
<b>4 &amp; 5</b>	30	26	10,1	6.4	5	19.5	12	3	14	1128 001 A24
<b>6</b>	40	30	12,1	6.4	7	25	16	4	17	1128 001 B24
<b>8</b>	40	31	14,1	6.4	7	25	16	46	22	1128 001 C24

For Type	A	B	C	d	E	F	G	S	AF	Order number
<b>55</b>	30	26	10,1	6.4	5	19,5	12	3	14	1128 001 A24
<b>60</b>	40	30	12,1	6.4	7	25	16	4	17	1128 001 B24
<b>80</b>	40	31	14,1	6.4	7	26	16	4	22	1128 001 C24
<b>95</b>	52	42	16,1	8.5	10	34	22	5	24	1128 001 D24
<b>125</b>	56	45	18,1	8.5	10	36	25	5	27	1128 001 E24
<b>125*</b>	60	59	18,1	10.2	10	36	27	16	27	1128 030 E24
<b>160</b>	60	59	22,1	10.2	10	40	27	16	32	1128 001 F24

## Angle Joint

< DURAFLEX – FLEXBALL APPLICATION >



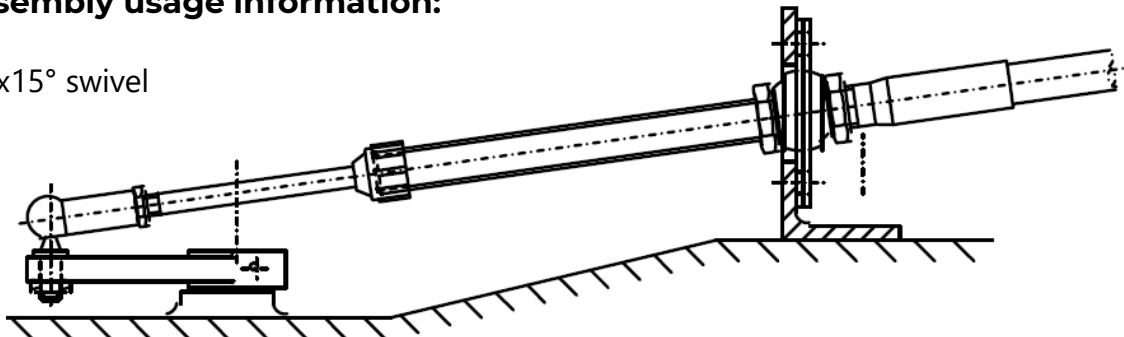
Ball joints are available for all DURAFLEX and FLEXBALL types. See Chart overview

For Type	D	F	G	L	N	P	Order number
<b>4 &amp; 5</b>	M5	10.2	9	7	22	10,2	1750 001 A10
<b>6</b>	M6	12.5	11	8	25	11,5	1750 001 B10
<b>8</b>	M8	16.5	16	14	35	15,5	1750 001 E10

For Type	D	F	G	L	N	P	Order number
<b>55</b>	M5	10.2	9	7	22	10,2	1750 001 A10
<b>60</b>	M6	12.5	11	8	25	11,5	1750 001 B10
<b>80</b>	M8	16.5	13	12	30	14	1750 003 B10
<b>95</b>	M10	20	16	14	35	15,5	1750 001 D10
<b>125</b>	M12x1,5*	20	16	14	35	15,5	1750 001 E10

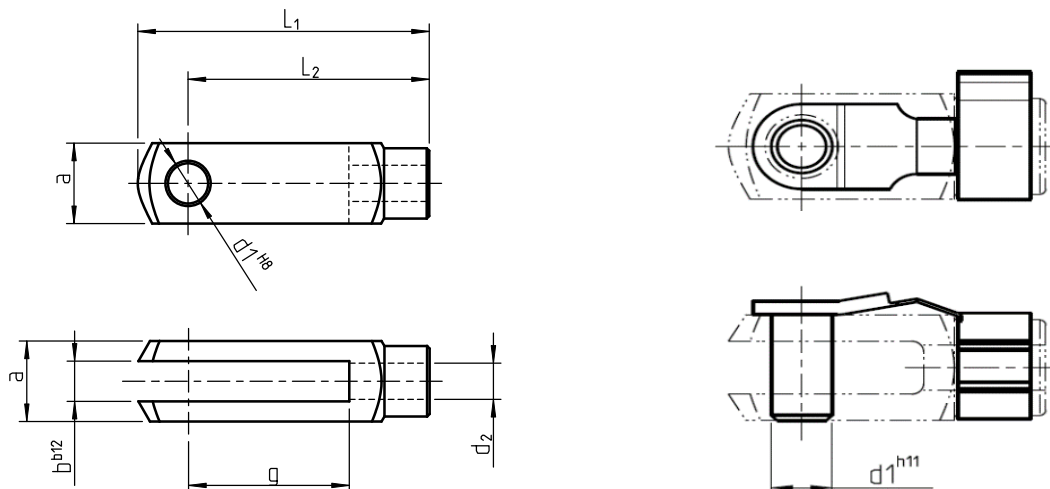
### Assembly usage information:

\* 2x15° swivel



## Yoke End – ES-Pins

< DURAFLEX – FLEXBALL APPLICATION >

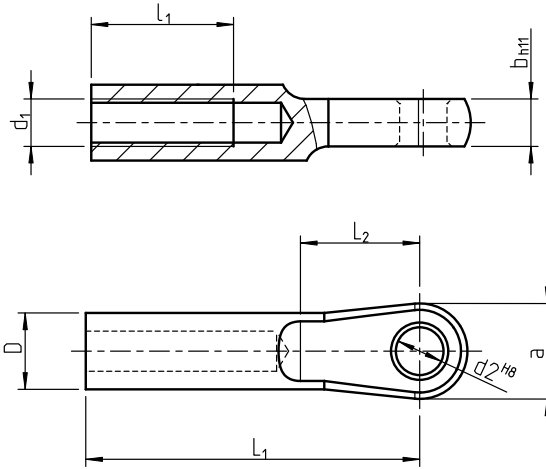
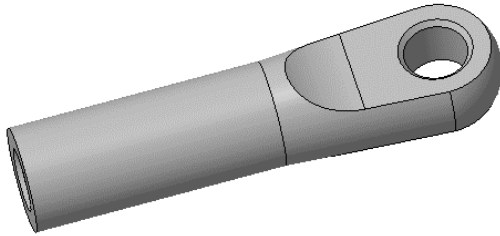


For Type	a	b	d <sub>1</sub>	d <sub>2</sub>	g	L <sub>1</sub>	L <sub>2</sub>	Fork (DIN 71752)			ES pins	
								Best.-Bez.	Order no. Without ES pins	Order no. with ES pins	Order desc.	Order no.
<b>4 &amp; 5</b>	10	5	5	M5	10 20	26 36	20 30	G 5x10	1741 001 A10	1741 101 A10	ESN01 5x10	1742 001 A10
								G 5x20	1741 002 A10	1741 102 A10	ESN01 5x20	1742 002 A10
<b>6</b>	12	6	6	M6	12 24	31 43	24 36	G 6x12	1741 001 B10	1741 101 A10	ESN01 6x12	1742 001 B10
								G 6x24	1741 002 B10	1741 102 B10	ESN01 6x24	1742 002 B10
<b>8</b>	16	8	8	M8	16 32	42 58	32 48	G 8x16	1741 005 B10	1741 105 B10	ESN01 8x16	1742 003 B10
								G 8x32	1741 007 B10	1741 107 B10	ESN01 8x32	1742 004 B10

For Type	a	b	d <sub>1</sub>	d <sub>2</sub>	g	L <sub>1</sub>	L <sub>2</sub>	Fork (DIN 71752)			ES pins	
								Best.-Bez.	Order no. Without ES pins	Order no. with ES pins	Order desc.	Order no.
<b>55</b>	10	5	5	M5	10 20	26 36	20 30	G 5x10	1741 001 A10	1741 101 A10	ESN01 5x10	1742 001 A10
								G 5x20	1741 002 A10	1741 102 A10	ESN01 5x20	1742 002 A10
<b>60</b>	12	6	6	M6	12 24	31 43	24 36	G 6x12	1741 001 B10	1741 101 A10	ESN01 6x12	1742 001 B10
								G 6x24	1741 002 B10	1741 102 B10	ESN01 6x24	1742 002 B10
<b>80</b>	16	8	8	M8	16 32	42 58	32 48	G 8x16	1741 005 B10	1741 105 B10	ESN01 8x16	1742 003 B10
								G 8x32	1741 007 B10	1741 107 B10	ESN01 8x32	1742 004 B10
<b>95</b>	20	10	10	M10	20 40	52 72	40 60	G 10x20	1741 001 D10	1741 101 D10	ESN01 10x20	1742 001 D10
								G 10x40	1741 002 D10	1741 102 D10	ESN01 10x40	1742 002 D10
<b>125</b>	24	12	12	M12x1,5	24 48	62 86	48 72	G 12x24	1741 001 E10	1741 101 E10	ESN01 12x24	1742 001 E10
								G 12x48	1741 002 E10	1741 102 E10	ESN01 12x48	1742 002 E10
<b>160</b>	27	14	14	M14x1,5	28 56	72 101	56 85	G14x28	1741 001 F10	1741 101 F10	ESN01 14x28	1742 001 F10
								G14x56	1741 001 F10	1741 102 F10	ESN01 14x56	1742 002 F10

## Ring Eye

< DURAFLEX – FLEXBALL APPLICATION >

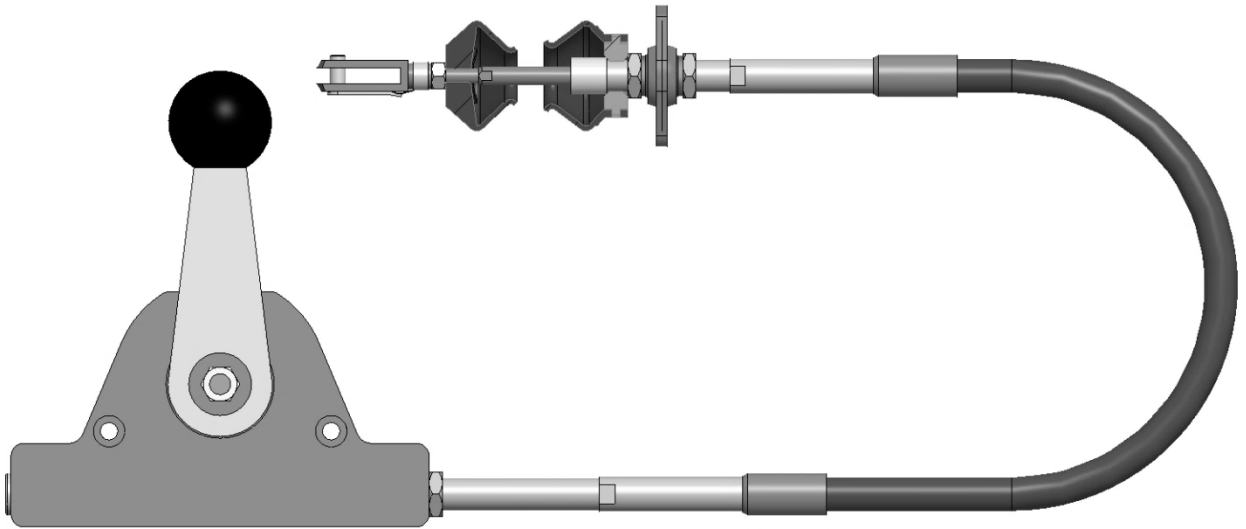


For Type	a	b	d1	d2	D	l1	L1	L2	Order number
<b>4 &amp; 5</b>	10	10	M5	5	8	15	35	10	1023 001 A14
<b>6</b>	12	12	M6	6	10	20	40	8	1023 001 B14
<b>8</b>	16	16	M8	8	12	20	46	14	1023 027 B14

For Type	a	b	d1	d2	D	l1	L1	L2	Order number
<b>55</b>	10	5	M5	5	8	15	35	10	1023 001 A14
<b>60</b>	12	6	M6	6	10	20	40	8	1023 001 B14
<b>80</b>	16	8	M8	8	12	20	46	14	1023 027 B14
<b>95</b>	20	10	M10	10	16	30	55	14	1023 001 D14
<b>125</b>	24	12	M12x1.5	12	18	30	60	22	1023 001 E14
<b>160</b>	28	14	M14x1.5	14	20	30	70	22	1023 001 F14

## Control Lever

< DURAFLEX – FLEXBALL APPLICATION >

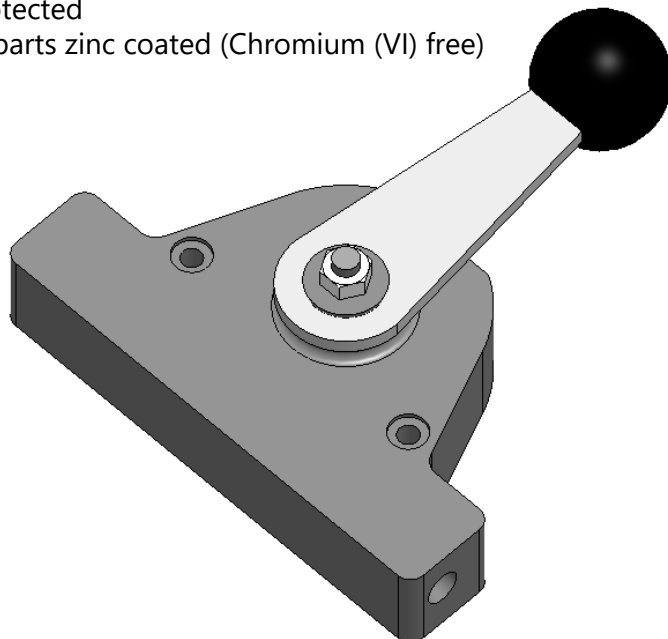


### Type description:

- Smooth running control lever, with and without lock
- Assembly as single or double control lever
- Connection possible to the right – left – both sides
- The slewing range of the lever can be located in any 360° position
- Ball stop available, customized at different position stops

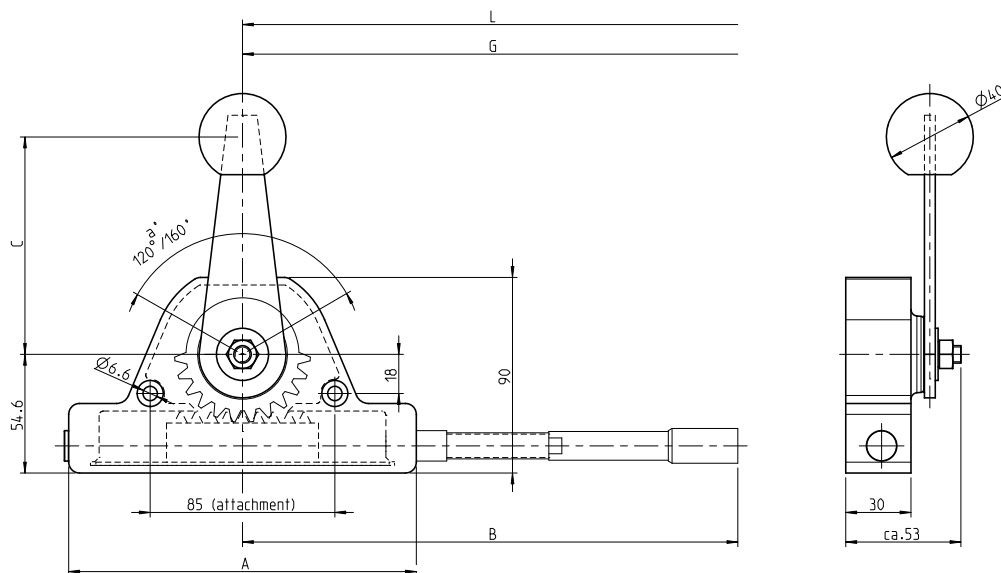
### Technical data:

- Variable adjustment of friction lock
- Free wheel lock self-locking up to 300 N
- Load for push and pull transmission function max. 800 N
- Vibration-safe and dust-protected
- Die-cast housing and steel parts zinc coated (Chromium (VI) free)



## Control Lever

< DURAFLEX – FLEXBALL APPLICATION >



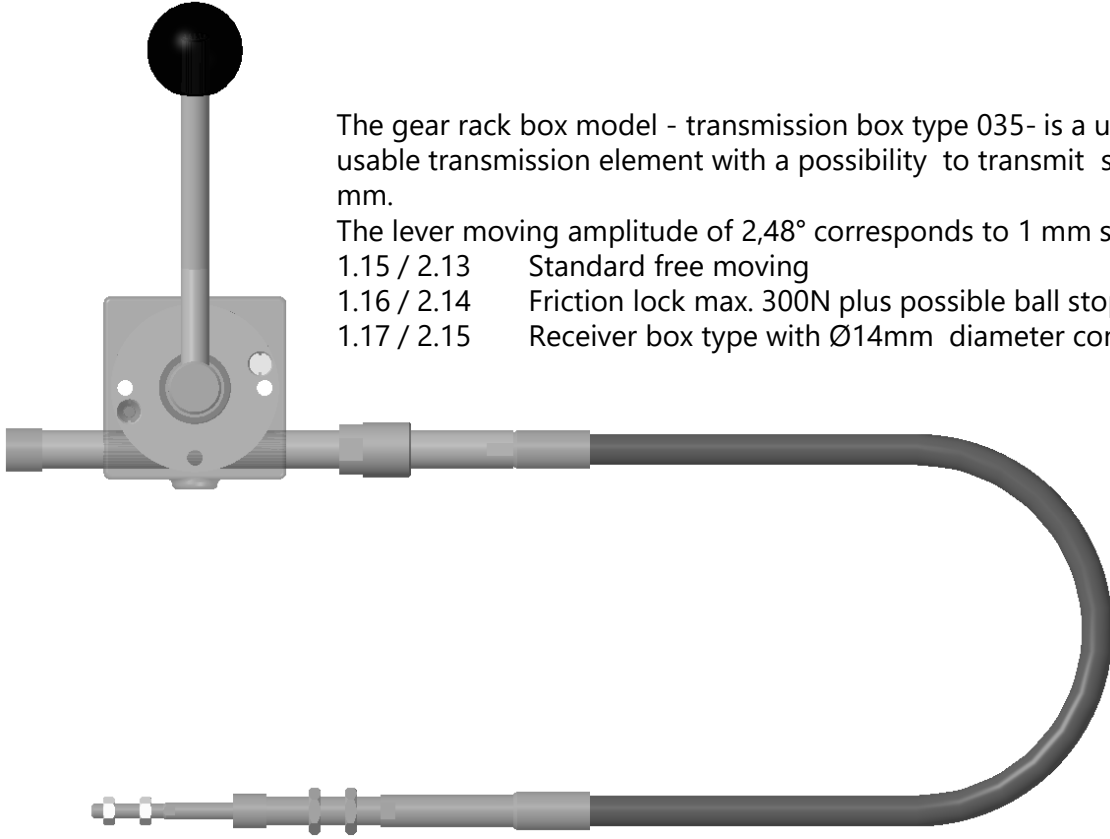
For type	Stroke up to	Order number			A	B	C	i	α
		Finger-tip control	Friction lock	Free wheel lock					
4 & 5	60	3860 001 K02	3860 021 K02	3861 001 K02	160	250	100	1:3,5	120°
	80	3880 001 K02	3880 021 K02	3881 001 K02	195	275	175	1:6	160°
6	60	3860 004 K02	3860 024 K02	3861 004 K02	160	250	100	1:3,5	120°
	80	3880 004 K02	3880 024 K02	3881 004 K02	195	275	175	1:6	160°
8	60	3860 005 K02	3860 025 K02	3861 005 K02	160	250	100	1:3,5	120°
	80	3880 005 K02	3880 025 K02	3881 005 K02	195	275	175	1:6	160°

For type	Stroke up to	Order number			A	B	C	i	α
		Finger-tip control	Friction lock	Free wheel lock					
55	60	3860 001 K02	3860 021 K02	3861 001 K02	160	250	100	1:3,5	120°
	80	3880 001 K02	3880 021 K02	3881 001 K02	195	275	175	1:6	160°
60	60	3860 004 K02	3860 024 K02	3861 004 K02	160	250	100	1:3,5	120°
	80	3880 004 K02	3880 024 K02	3881 004 K02	195	275	175	1:6	160°
80	60	3860 005 K02	3860 025 K02	3861 005 K02	160	250	100	1:3,5	120°
	80	3880 005 K02	3880 025 K02	3881 005 K02	195	275	175	1:6	160°



## Gear Rack Box type 035

< DURAFLEX – FLEXBALL APPLICATION >



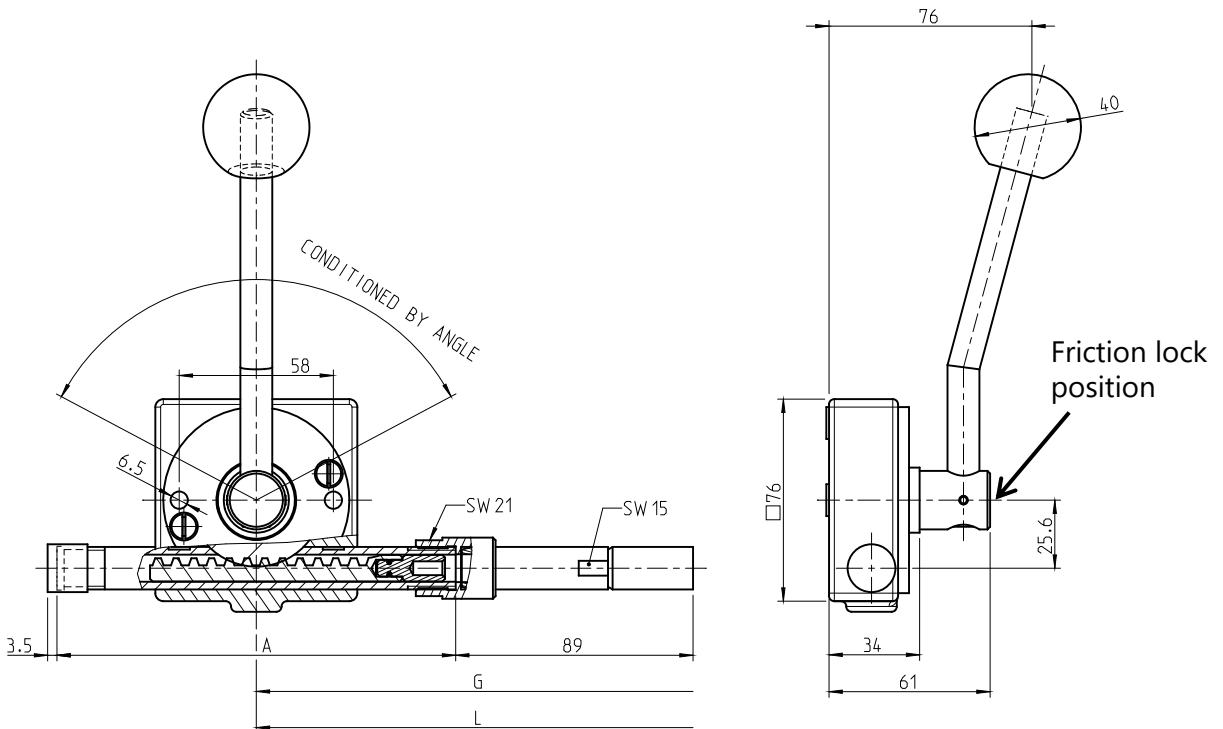
The gear rack box model - transmission box type 035- is a universally usable transmission element with a possibility to transmit stroke of 150 mm.

The lever moving amplitude of 2,48° corresponds to 1 mm stroke

1.15 / 2.13 Standard free moving

1.16 / 2.14 Friction lock max. 300N plus possible ball stop application

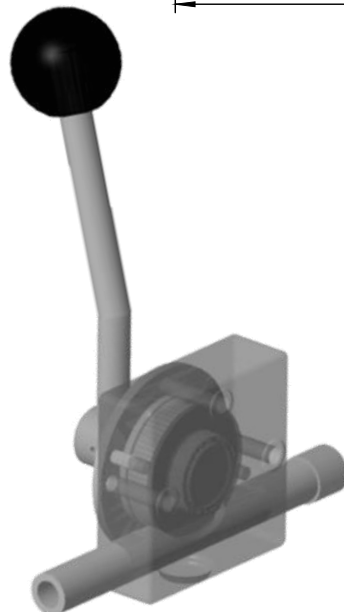
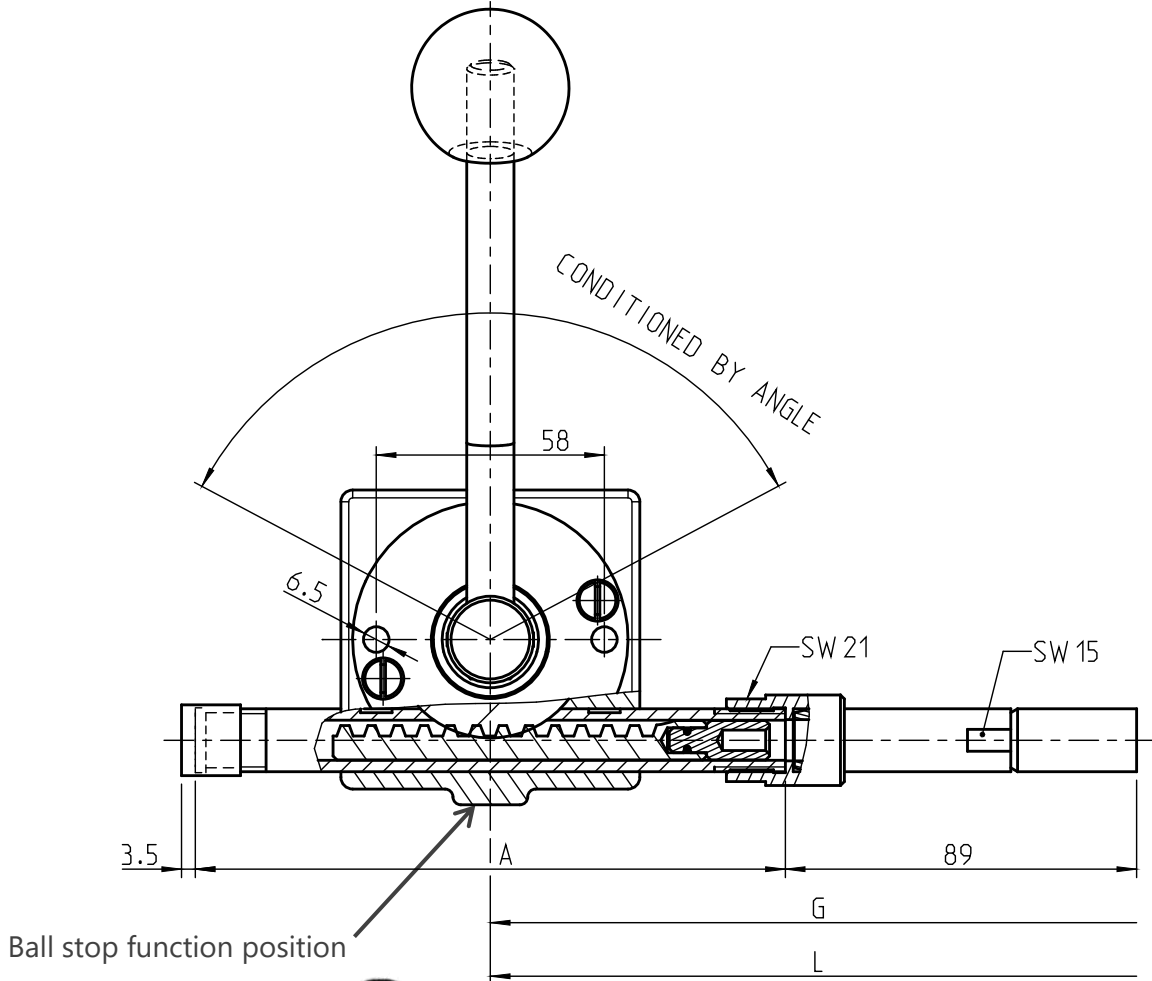
1.17 / 2.15 Receiver box type with Ø14mm diameter connection



## Gear Rack Box type 035

< DURAFLEX – FLEXBALL APPLICATION >

**Transmission Box with / without friction lock and possible ball stop function**



## Gear Rack Box type 035

< DURAFLEX – FLEXBALL APPLICATION >

Transmission Box – Standard free moving

Order number for models with standard free moving				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 001 R02	3935 001 S02	3935 001 T02
75	200	3935 002 R02	3935 002 S02	3935 002 T02
100	250	3935 003 R02	3935 003 S02	3935 003 T02
125	300	3935 004 R02	3935 004 S02	3935 004 T02
150	350	3935 005 R02	3935 005 S02	3935 005 T02

Order number for models with friction lock				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 011 R02	3935 011 S02	3935 011 T02
75	200	3935 012 R02	3935 012 S02	3935 012 T02
100	250	3935 013 R02	3935 013 S02	3935 013 T02
125	300	3935 014 R02	3935 014 S02	3935 014 T02
150	350	3935 015 R02	3935 015 S02	3935 015 T02

Order number for models with standard free moving			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 001 B02	3935 001 C02
75	200	3935 002 B02	3935 002 C02
100	250	3935 003 B02	3935 003 C02
125	300	3935 004 B02	3935 004 C02
150	350	3935 005 B02	3935 005 C02

Order number for models with standard free moving			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 011 B02	3935 011 C02
75	200	3935 012 B02	3935 012 C02
100	250	3935 013 B02	3935 013 C02
125	300	3935 014 B02	3935 014 C02
150	350	3935 015 B02	3935 015 C02

## Gear Rack Box type 035

< DURAFLEX – FLEXBALL APPLICATION >

Transmission Box – Friction lock max. 300N  
 plus possible ball stop application

Order number for models with friction lock				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 191 R02	3935 191 S02	3935 191 T02
75	200	3935 192 R02	3935 192 S02	3935 192 T02
100	250	3935 193 R02	3935 193 S02	3935 193 T02
125	300	3935 194 R02	3935 194 S02	3935 194 T02
150	350	3935 195 R02	3935 195 S02	3935 195 T02

Order number for models with friction lock and ball stop (indicate ball stop position when ordering)				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 196 R02	3935 196 C02	3935 196 T02
75	200	3935 197 R02	3935 197 C02	3935 197 T02
100	250	3935 198 R02	3935 198 C02	3935 198 T02
125	300	3935 199 R02	3935 199 C02	3935 199 T02
150	350	3935 200 R02	3935 200 C02	3935 200 T02

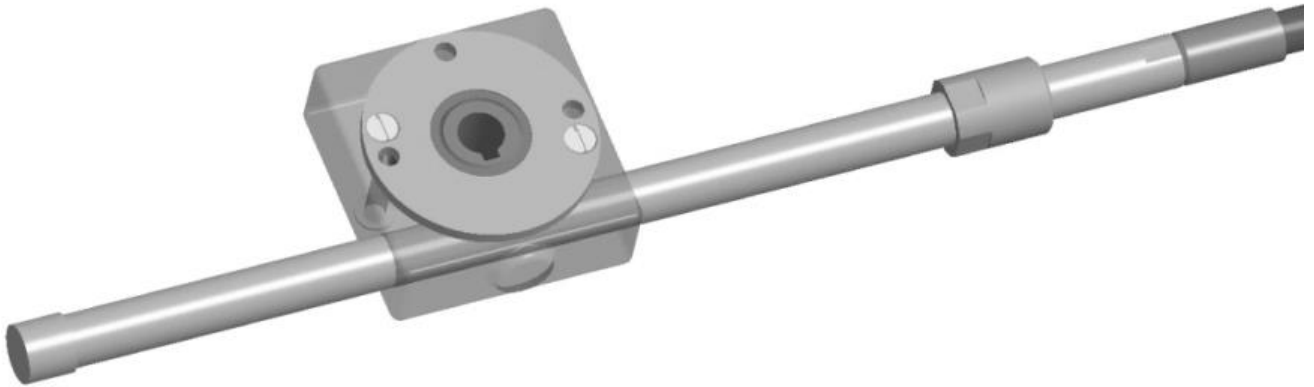
Order number for models with friction lock			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 191 B02	3935 191 C02
75	200	3935 192 B02	3935 192 C02
100	250	3935 193 B02	3935 193 C02
125	300	3935 194 B02	3935 194 C02
150	350	3935 195 B02	3935 195 C02

Order number for models with friction lock and ball stop (indicate ball stop position when ordering)			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 196 B02	3935 196 C02
75	200	3935 197 B02	3935 197 C02
100	250	3935 198 B02	3935 198 C02
125	300	3935 199 B02	3935 199 C02
150	350	3935 200 B02	3935 200 C02

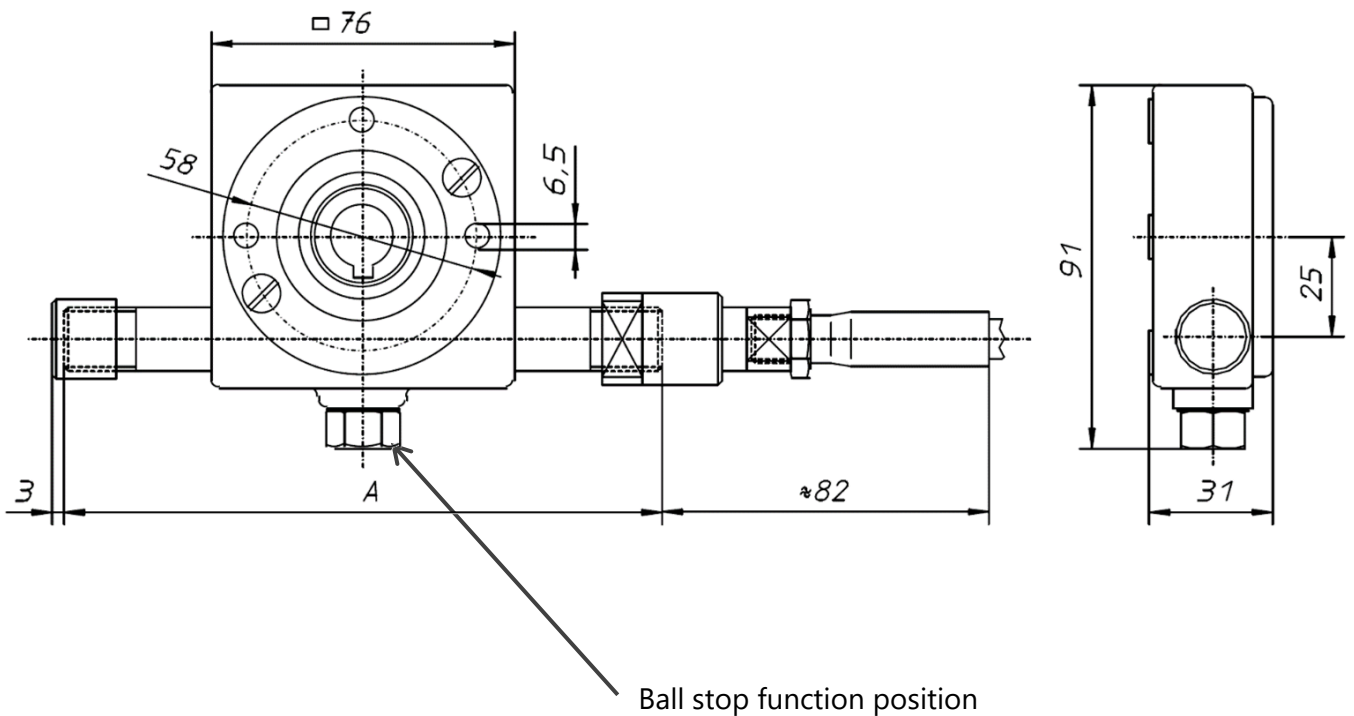
## **Gear Rack Box type 035** < DURAFLEX – FLEXBALL APPLICATION >

**Transmission Box with / without friction lock and possible ball stop function**

**Receiver Box with / without possible ball stop function**



Receiver box type with  $\varnothing 14$ mm diameter connection



## Gear Rack Box type 035

< DURAFLEX – FLEXBALL APPLICATION >

Receiver box type with Ø14mm diameter connection

Order number for models with standard free moving				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 051 R02	3935 051 S02	3935 051 T02
75	200	3935 052 R02	3935 052 S02	3935 052 T02
100	250	3935 053 R02	3935 053 S02	3935 053 T02
125	300	3935 054 R02	3935 054 S02	3935 054 T02
150	350	3935 055 R02	3935 055 S02	3935 055 T02

Order number for models with friction lock (indicate ball stop position when ordering)				
Stroke	A	Connection for type 4/5	Connection for type 6	Connection for type 8
50	150	3935 041 R02	3935 041 S02	3935 041 T02
75	200	3935 042 R02	3935 042 S02	3935 042 T02
100	250	3935 043 R02	3935 043 S02	3935 043 T02
125	300	3935 044 R02	3935 044 S02	3935 044 T02
150	350	3935 045 R02	3935 045 S02	3935 045 T02

Order number for standard models			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 051 B02	3935 051 C02
75	200	3935 052 B02	3935 052 C02
100	250	3935 053 B02	3935 053 C02
125	300	3935 054 B02	3935 054 C02
150	350	3935 055 B02	3935 055 C02

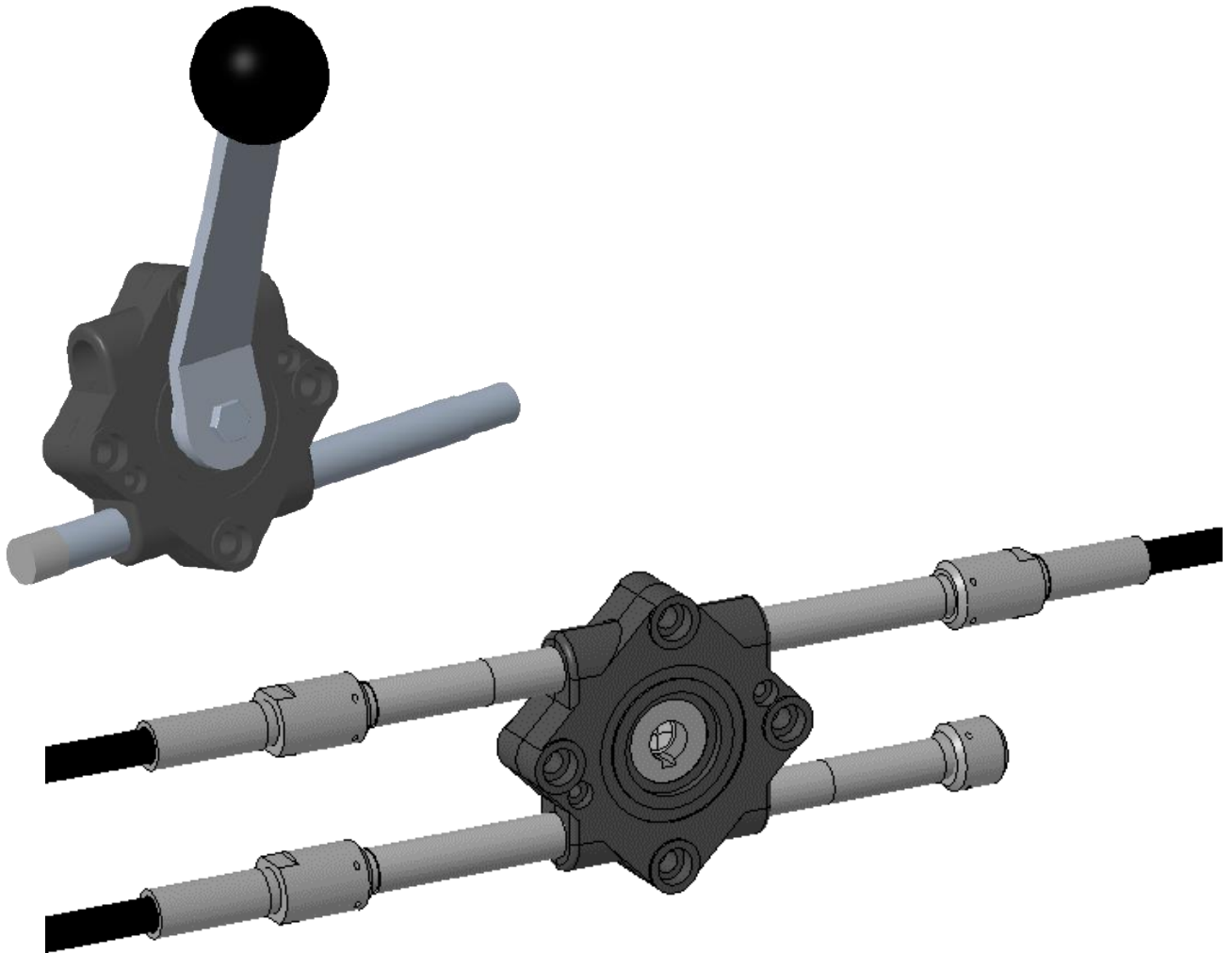
Order number for models with ball stop (indicate ball stop position when ordering)			
Stroke	A	Connection for Flexball type 60	Connection for Flexball type 80
50	150	3935 041 B02	3935 041 C02
75	200	3935 042 B02	3935 042 C02
100	250	3935 043 B02	3935 043 C02
125	300	3935 044 B02	3935 044 C02
150	350	3935 045 B02	3935 045 C02

## Universal Gear Rack Box < DURAFLEX – FLEXBALL APPLICATION >

The universal gear rack box (basic box no. 6) is available for DURA FLEXBALL® models up to and including model 80. It can be used as a transmitter (with operating handle), as a receiver or as a splitter. It features one or two gear racks and enables the connection of up to four controls. Two or more boxes can be arranged next to one another on the same shaft.

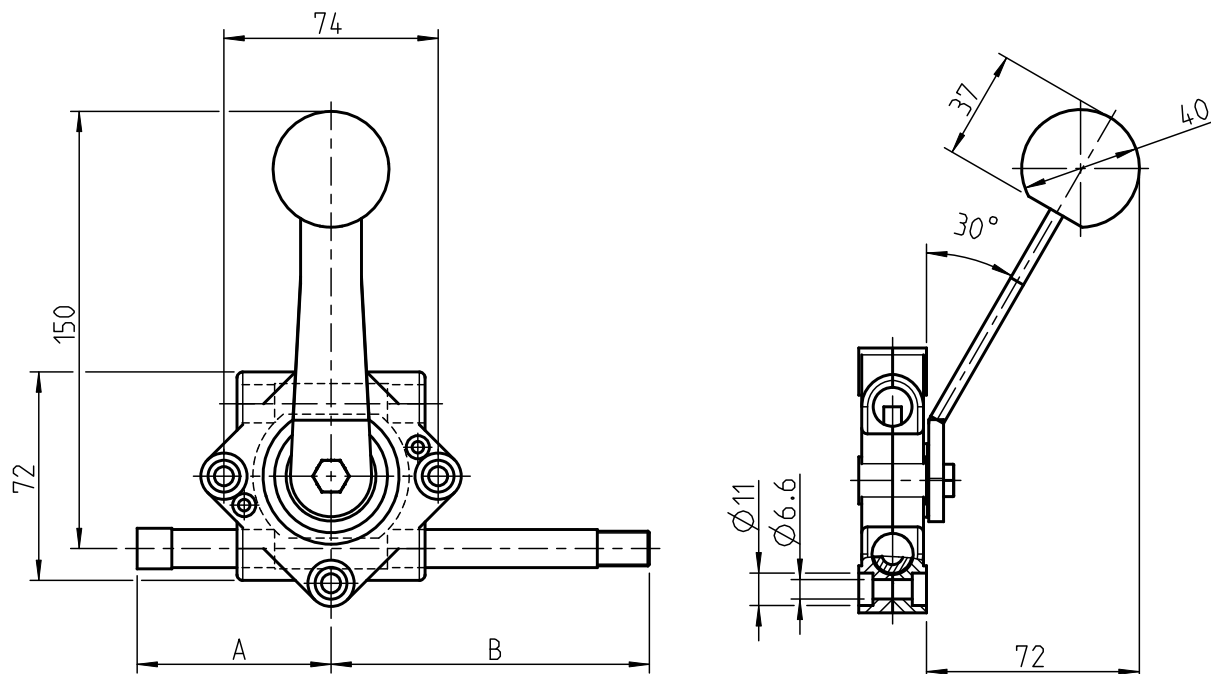
Note: The gear rack box is also available for DURAFLEX®.  
In case of interest please get in contact.

Basic box no.	TK-Ø	Z	m	max. payload	1 mm stroke =
6	48	48	1	150 N	2,39°





## Universal Gear Rack Box < DURAFLEX – FLEXBALL APPLICATION >



**Note:**

Always order controls corresponding to the respective gear rack box, since a special connection is required.

Drilled hole conductor length		
Stroke	A	B
-50	67	110
-70	87	130
-100	117	160
-150	177	220

Permissible pushing force [N]			
Type	Stroke 70	Stroke 100	Stroke 150
<b>55</b>	150	100	-
<b>60</b>	150	150	150
<b>80</b>	150	150	150

Drilled pinion hole optional		
d <sub>1</sub>	l	b
Ø12 <sup>H7</sup>	13,8	4 <sup>P9</sup>
Ø14 <sup>H7</sup>	16,3	5 <sup>P9</sup>
Ø16 <sup>H7</sup>	18,3	5 <sup>P9</sup>

## Universal Gear Rack Box

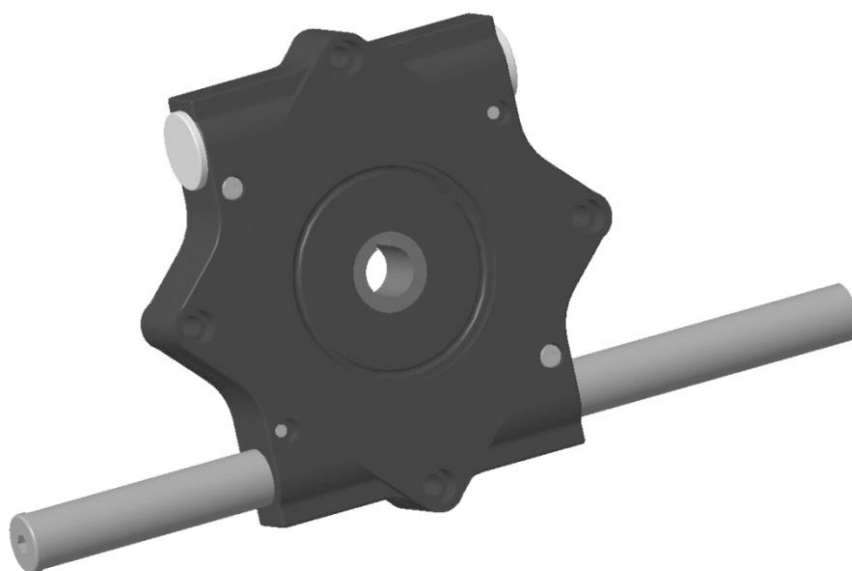
### < DURAFLEX – FLEXBALL APPLICATION >

Universal gear rack boxes are available for DURA FLEXBALL® models 60 to 125. They can be used as transmitters (with operating handle shown on information page 32), as receivers or as splitters. They feature one or two gear racks and enable the connection of up to four controls. To achieve different strokes, universal gear rack boxes of different sizes can be combined with each other (changing the transmission ratio). The number of control connections is increased at the same time.

Note: The Universal Gear Rack box is also available for DURAFLEX®.  
 In case of interest please get in contact.

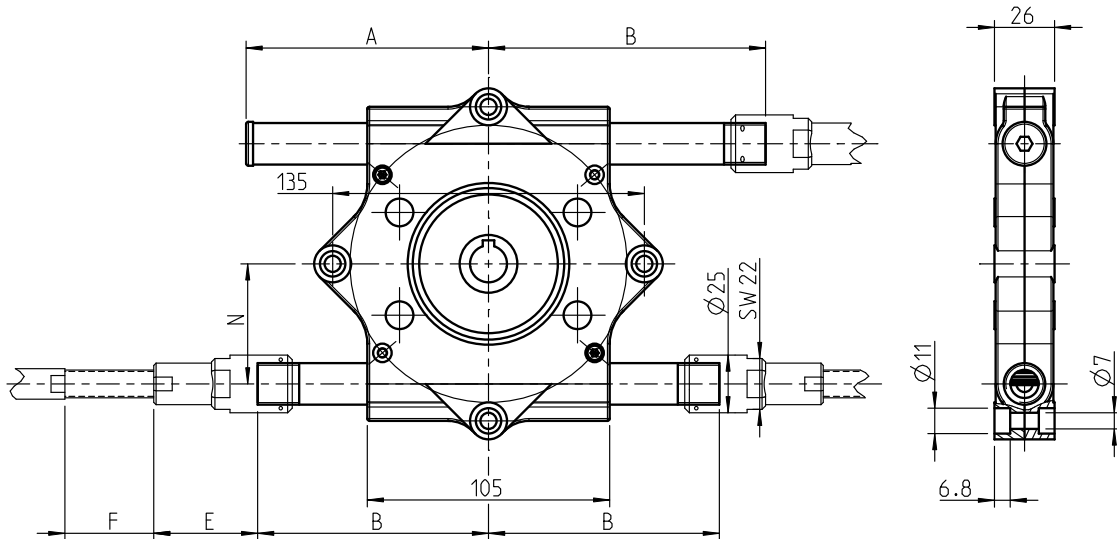
Casing GDAIMg9 hard coated all round; connection parts made from galvanized steel. High strength brass also available upon request.

Basic box no.	Drilled pinion hole						N	max. operation load [N]	1 mm stroke =
	TK-Ø	H	J	K	m	Z			
<b>7</b>	102	16	18,2	5	1,5	68	52	600	1,123°
<b>8</b>	72	16	18,2	5	1,5	48	37	600	1,591°
<b>9</b>	84	16 40	18,2 43,2	5 12	1,5	56	43	2000	1,360°



## Universal Gear Rack Box

< DURAFLEX – FLEXBALL APPLICATION >



**Note:**

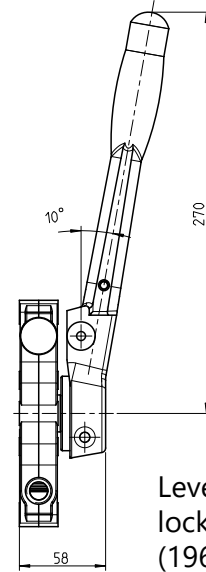
Always order controls corresponding to the respective gear rack box, since a special connection is required.

Type	E	F
<b>60</b>	45	32
<b>80</b>	45	32
<b>95</b>	55	38
<b>125</b>	66	45

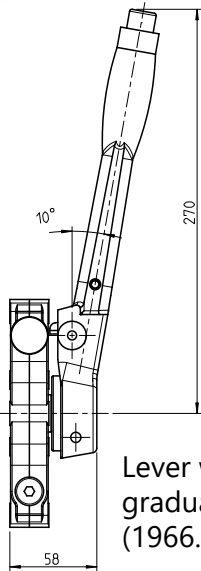
Stroke	A	B
-50	86	100
-70	106	120
-100	136	150
-150	186	200
-200	236	250

Permissible pushing force [N]								
Basic box no. 7 and 8					Basic box no. 9			
Type	Stroke 70	Stroke 100	Stroke 150	Stroke 200	Stroke 70	Stroke 100	Stroke 150	Stroke 200
<b>60</b>	500	400	250	-	500	400	250	-
<b>80</b>	500	400	250	-	500	400	250	-
<b>95</b>	600	600	500	400	1300	1000	500	400
<b>125</b>	600	600	500	600	2000	1500	1300	1000

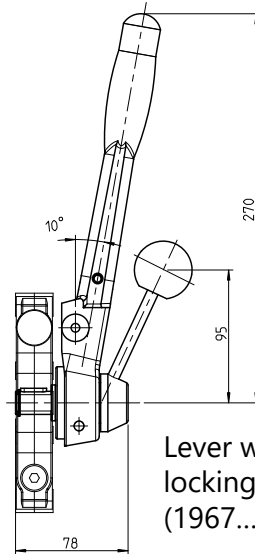
## Control Lever for Universal Gear Rack Boxes < DURAFLEX – FLEXBALL APPLICATION >



Lever without locking  
 (1965...)



Lever with graduated lock  
 (1966...)



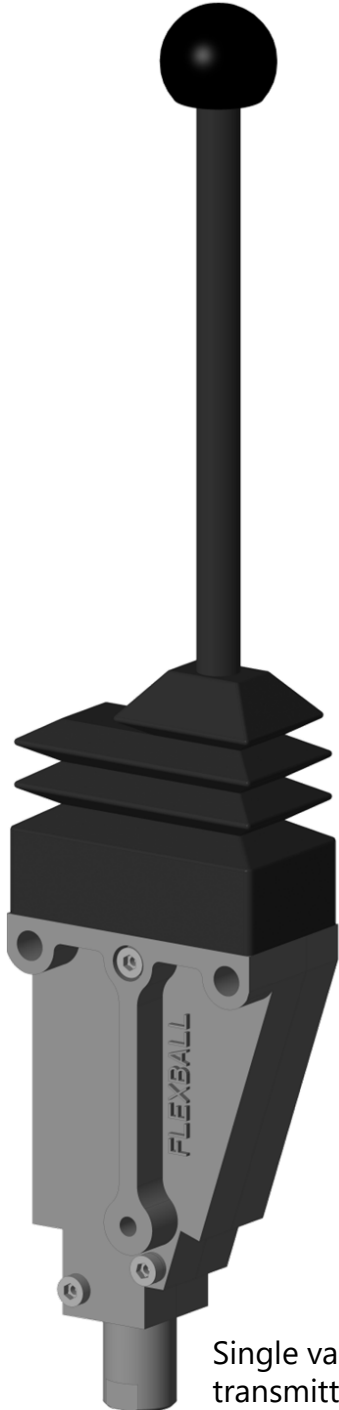
Lever with locking device  
 (1967...)

Order number		For Z box basic no.	Locking	Lever length	Payload [N]
Without indicator	With indicator				
1965 001 0	1965 002 0	7, 8, 9	none	270	500
1966 001 0	1966 002 0	7, 8, 9	locking 5°	270	500
1967 001 0	1967 002 0	7, 8	Locking handle	270	500

## Other possible Applications and Special Constructions

### < DURAFLEX – FLEXBALL APPLICATION >

As a globally established manufacturer, the automotive supplier DURA Automotive offers a wide range of special developments with the DURA Industrial Division. The Industrial Division has already produced a large number of customer-oriented requests. This ranges from specially made levers, handles and assembly accessories to highly complex electronic actuators for the automotive and industrial sectors. Our own engineering department will be happy to work on an individual solution for your product. You will benefit from our many years of know-how in the automotive and industrial sectors. Below you will find some further applications, which we also have to offer in our product range. If you are interested in one of these applications or a special development, feel free to contact us.



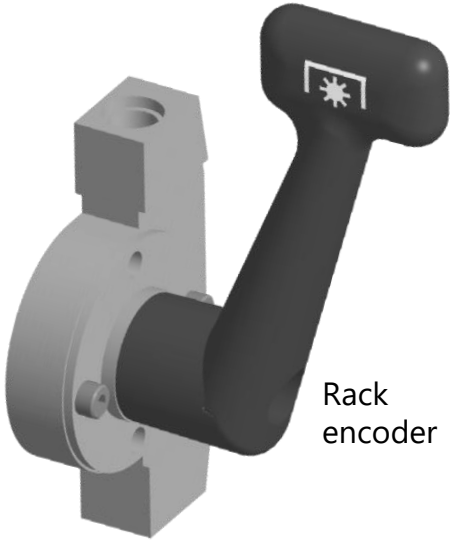
Single valve transmitter



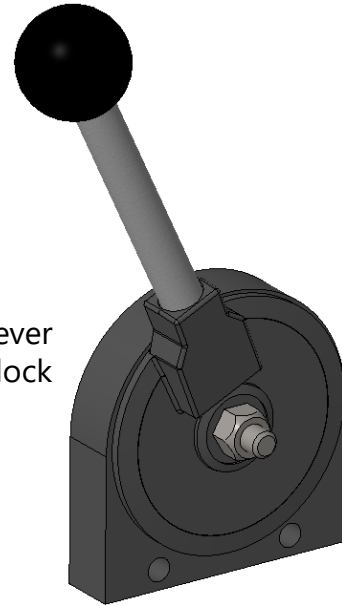
Joystick Applications

## Other possible Applications and Special Constructions

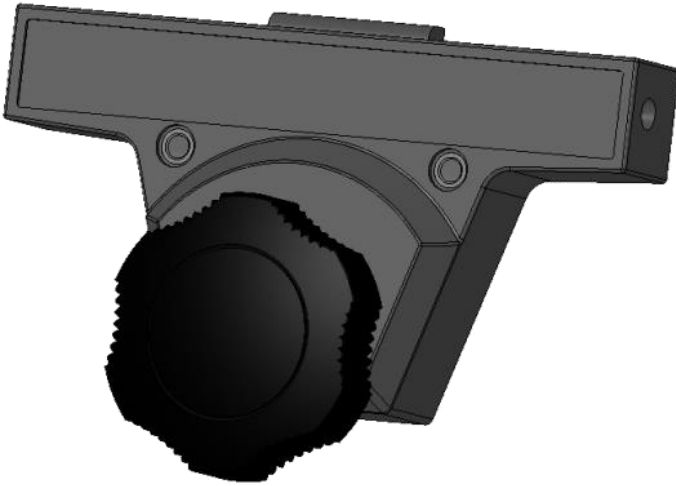
< DURAFLEX – FLEXBALL APPLICATION >



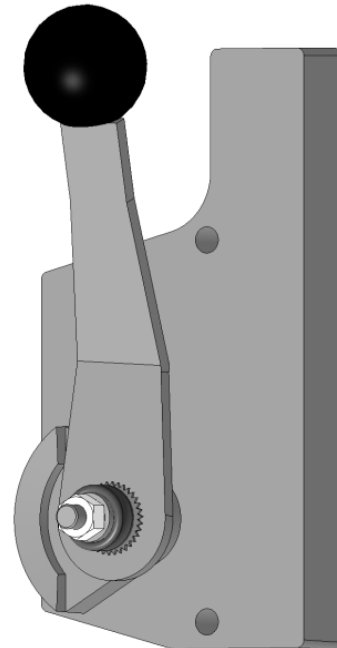
Rack encoder



Regulating lever with friction lock



Step-by-Step Control Lever



Control Lever with lock

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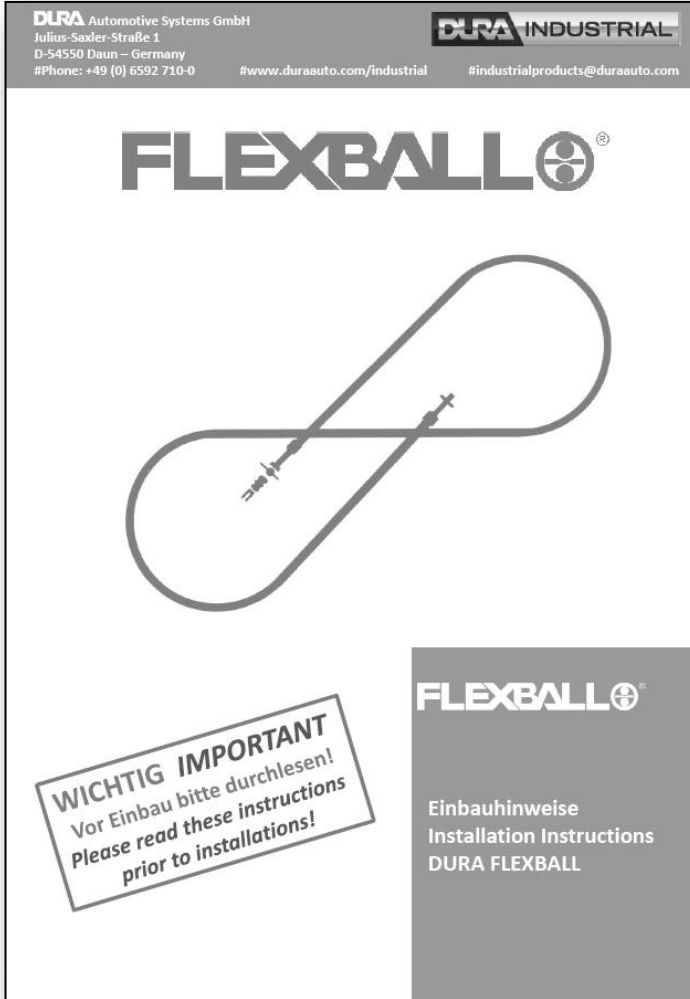
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