

# Series HGE / HEG / HHEV Geared Cam Limit Switches



# Stromag

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Stromag's extensive product range includes flexible couplings, disc brakes, limit switches, an array of hydraulically, pneumatically, and electrically actuated brakes, and a complete line of electric, hydraulic and pneumatic clutches.

Stromag engineered solutions improve drivetrain performance in a variety of key markets including energy, off-highway, metals, marine, transportation, printing, textiles, and material handling on applications such as wind turbines, conveyor systems, rolling mills, agriculture and construction machinery, municipal vehicles, forklifts, cranes, presses, deck winches, diesel engines, gensets and stage machinery.



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# Stromag Geared Cam Limit Switches

## AT A GLANCE



## STROMAG SERIES HGE / HEG / HHEV

### BENEFITS INCLUDE

- HGE for tight installations (in axial directions)
- Drive of incremental and absolute encoders possible
- Up to 16 contacts
- HEG und HHEV up to 8 contacts

### Series HGE – Worm Gear Limit Switch

Revision number: 3.1.4.1-01

Revision date: 19.11.2019

#### Features

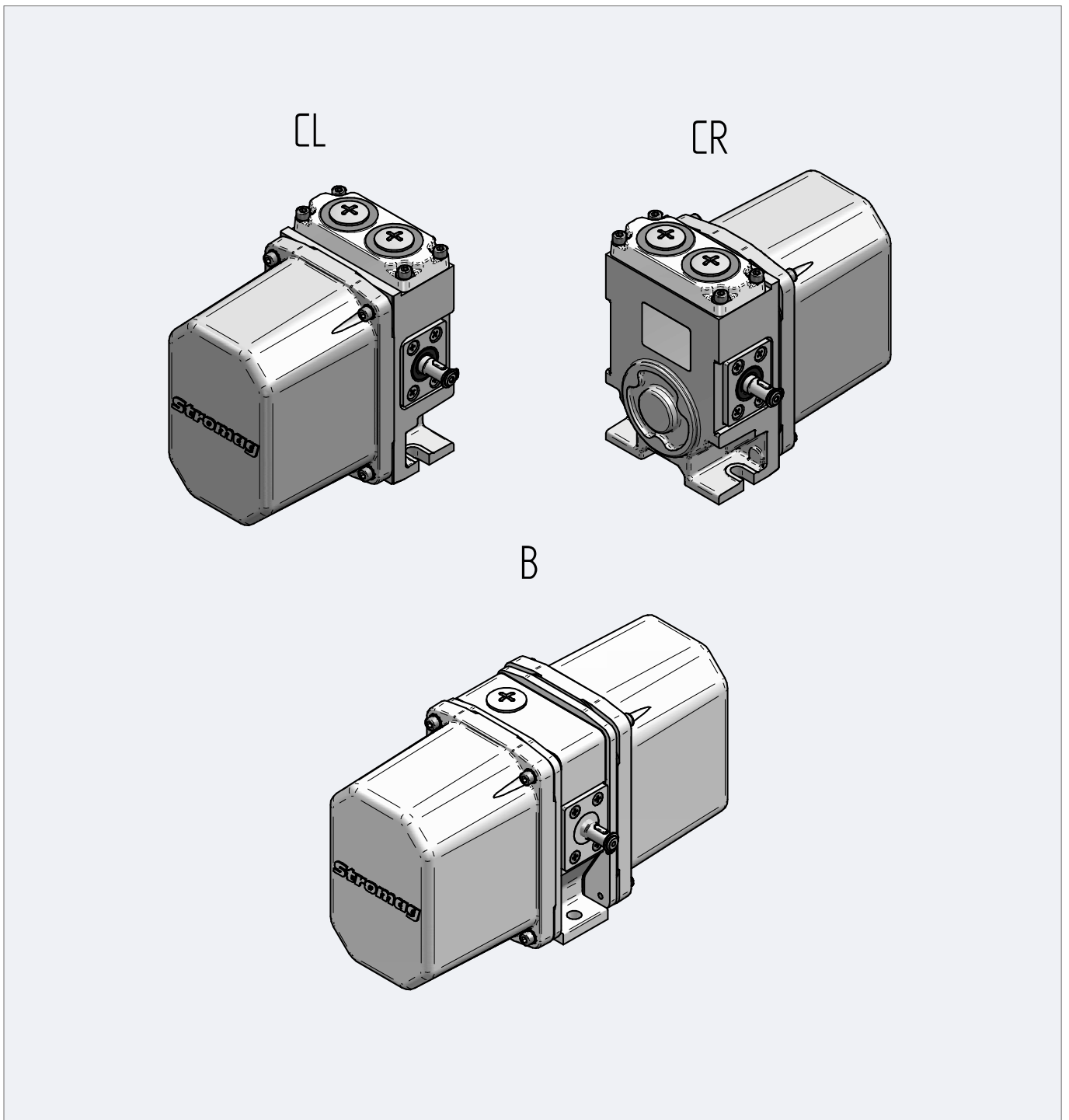
- Sea water resistant aluminum housing protection IP65
- Contact spaces on the left, on the right or on both sides possible

#### Application

- Crane
- Wind
- Steel works

#### Additional information

- For tight installations (especially in axial direction)
- Assembly of incremental or absolute multiturn possible



## Series HGE / HEG / HHEV Limit Switches

# Series HGE – Gear Data

Revision number: 3.1.4.2-01

Revision date: 19.11.2019

### Features

- Designed as worm or worm spur gear
- All gear parts made of metal with life-time lubrication

### Additional information

- 345, 460 and 715 are special gears on request

I) Gearbox - for contacts 80, 81, 88, 90, 90G with cam discs 40° FV70											
Nominal revolutions	Usable revolutions with 40° cam disc	Gear ratio i	Castor revolutions of the drive shaft after each side	Mechanical Hysteresis [revolution at drive shaft]		Max. input speed [min <sup>-1</sup> ]	Min. input speed for alternating operation [min <sup>-1</sup> ]			Min. drive torque for switching an individual contact [Nm]	Max. drive torque for forced opening of an individual contact [Nm]
				Contact			Contact				
				80, 90, 90G	88		80, 81	90, 90G	88		
9,5	10,67	12,000	1,333	0,073	0,097	250	3,638	1,819	0,364	0,20	0,371
18	18,29	20,571	2,286	0,125	0,166	250	6,236	3,118	0,624	0,20	0,300
22	22,40	25,200	2,800	0,154	0,203	250	7,639	3,820	0,764	0,20	0,281
29	29,64	33,344	3,705	0,203	0,269	250	10,108	5,054	1,011	0,20	0,261
35	44,44	50,000	5,556	0,305	0,403	500	15,158	7,579	1,516	0,10	0,141
70	76,19	85,714	9,524	0,523	0,691	500	25,984	12,992	2,598	0,10	0,124
85	93,33	105,000	11,667	0,640	0,846	500	31,831	15,915	3,183	0,10	0,120
100	107,25	120,652	13,406	0,736	0,972	500	36,576	18,288	3,658	0,10	0,117
115	123,50	138,933	15,437	0,847	1,120	750	42,118	21,059	4,212	0,10	0,115
155	155,56	175,000	19,444	1,067	1,410	750	53,052	26,526	5,305	0,10	0,112
180	194,18	218,449	24,272	1,332	1,760	750	66,223	33,112	6,622	0,10	0,109
230	230,30	259,091	28,788	1,580	2,088	1.000	78,544	39,272	7,854	0,05	0,058
260	264,08	297,091	33,010	1,811	2,394	1.000	90,064	45,032	9,006	0,05	0,057
305	313,21	352,364	39,152	2,148	2,839	1.000	106,820	53,410	10,682	0,05	0,056
345	352,36	396,409	44,045	2,417	3,194	1.000	120,172	60,086	12,017	0,05	0,055
460	476,00	535,500	59,500	3,265	4,315	1.000	162,338	81,169	16,234	0,05	0,054
715	740,44	833,000	92,556	5,079	6,712	1.000	252,526	126,263	25,253	0,05	0,052

## Series HGE – Housing Types Cxx

Revision number: 3.1.4.3-01

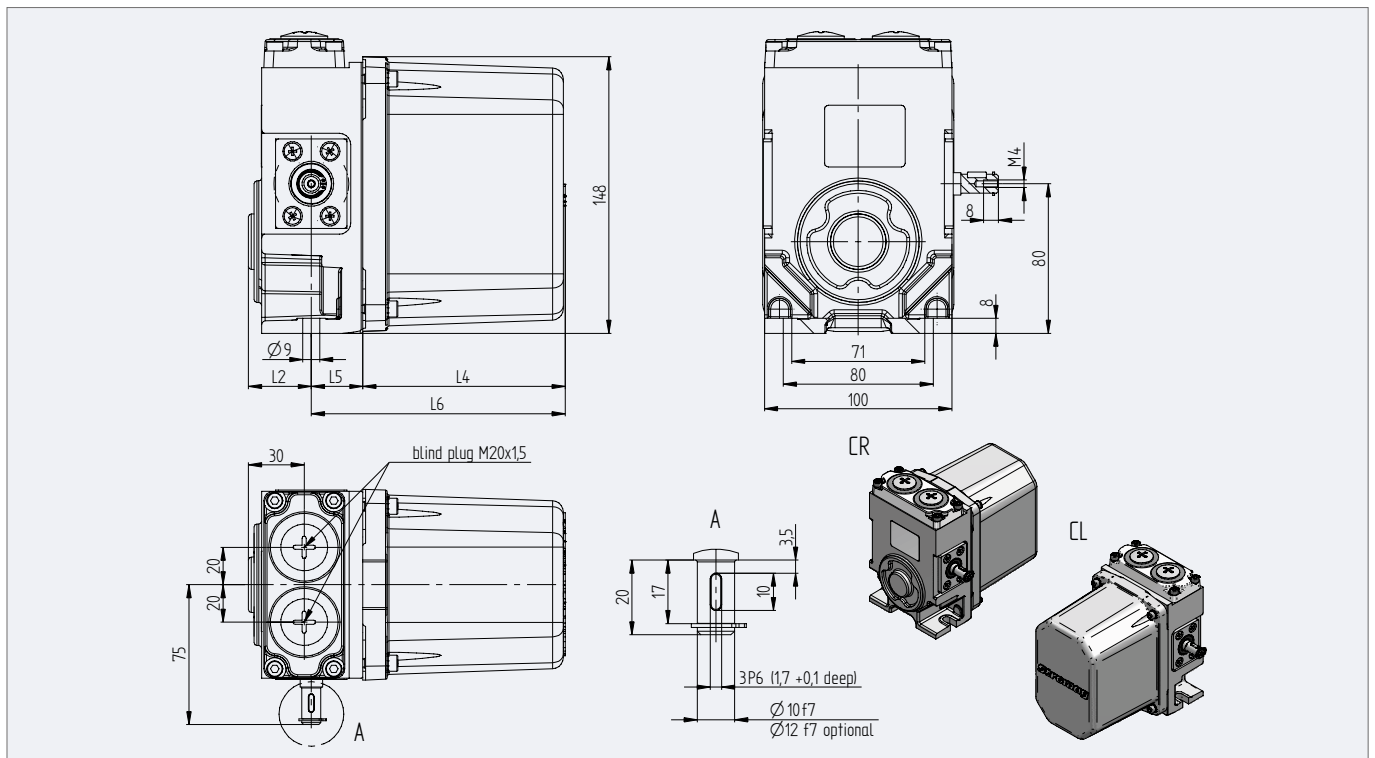
Revision date: 19.11.2019

### Features

- Contact space on the left or on the right possible
- Max. of 8 contacts possible for each side

### Additional information

- Dimensional drawing for 345,460 and 715 on request



Switch size	Gear size	No. switching contacts	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	weight [kg]
C1R/C1L	max. 305	max. 5	-	33,5	-	108	27	135	2,80
C2R/C2L	max. 305	max. 8	-	34	-	138	27	165	3,25

## Series HGE / HEG / HHEV Limit Switches

# Series HGE – Housing Types Bxx

Revision number: 3.1.4.4-01

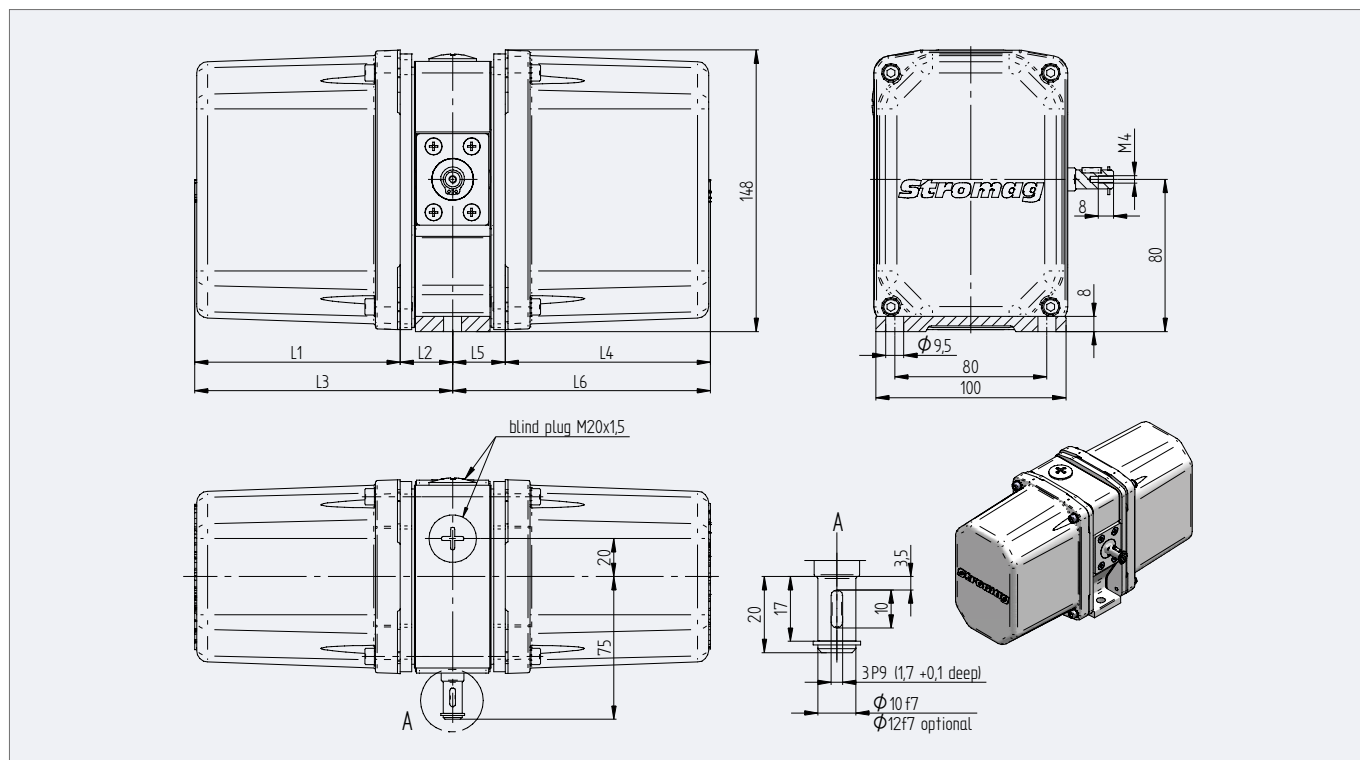
Revision date: 19.11.2019

### Features

- Up to 16 contacts possible, max. 8 contacts on each side

### Additional information

- Dimensional drawing for 345, 460 and 715 on request



Switch size	Gear size	No. switching contacts	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	weight [kg]
B11	max. 305	max. 10	108	27	135	108	27	135	3,70
	>305		108	27	135	108	37	145	
B22	max. 305	max. 16	138	27	165	138	27	165	4,40
	>305		138	27	165	138	37	175	

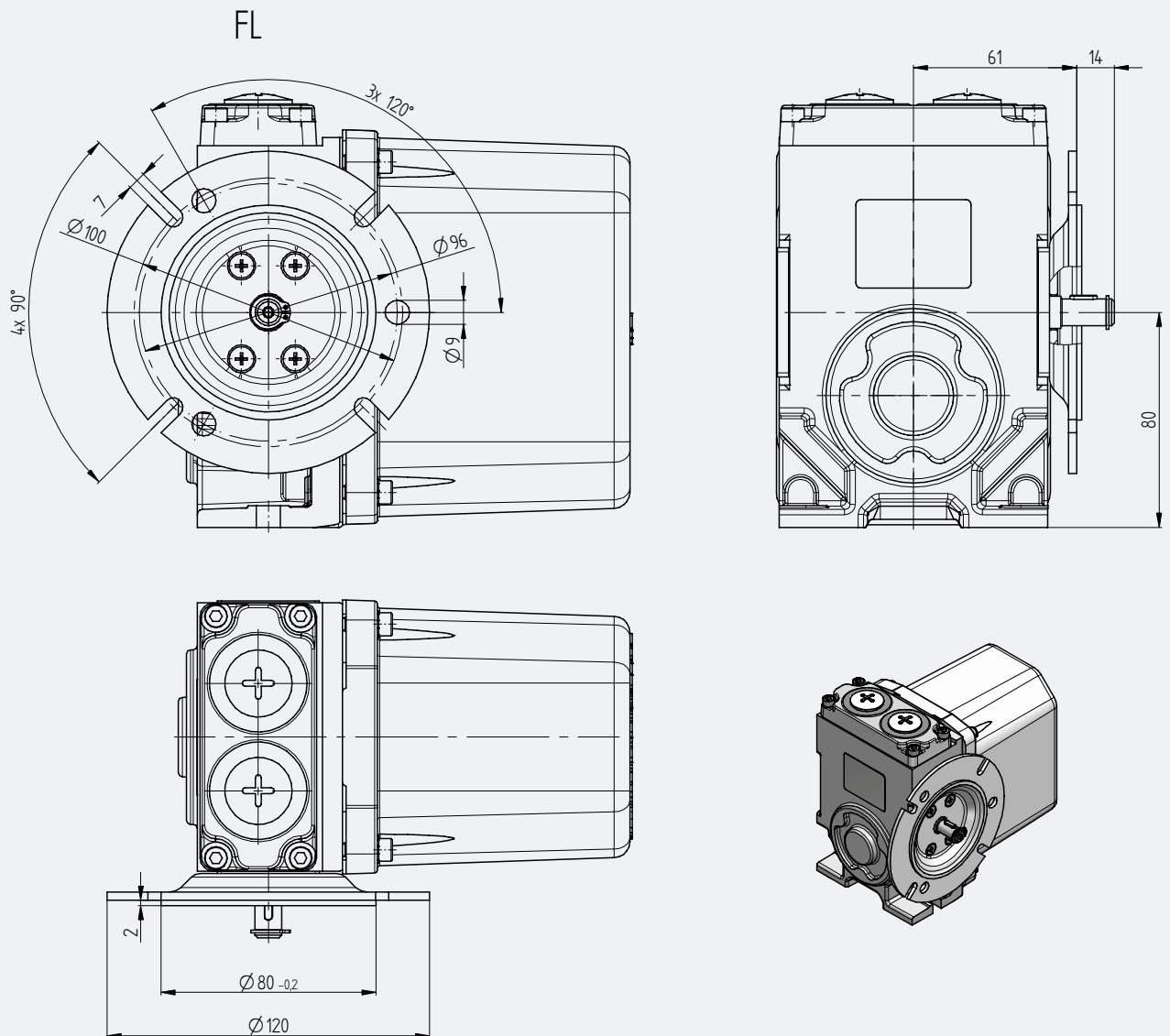


### Series HGE – Option: Mounting Flanges FL, FL160

Revision number: 3.1.4.5-01

Revision date: 19.11.2019

Additional weight: 0,10 kg



Series HGE / HEG / HHEV Limit Switches

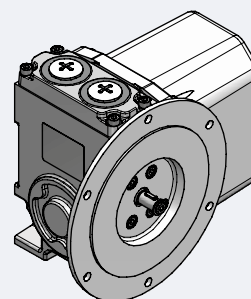
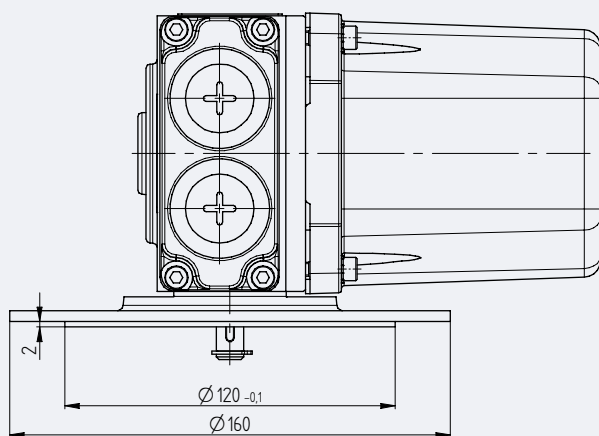
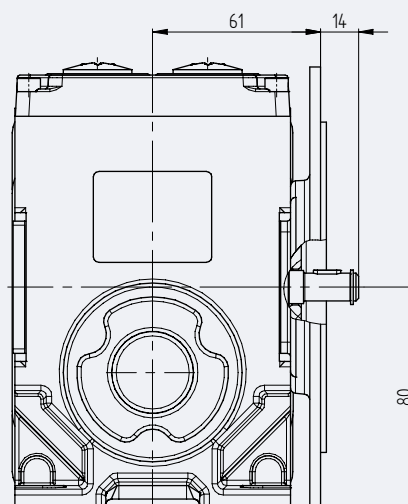
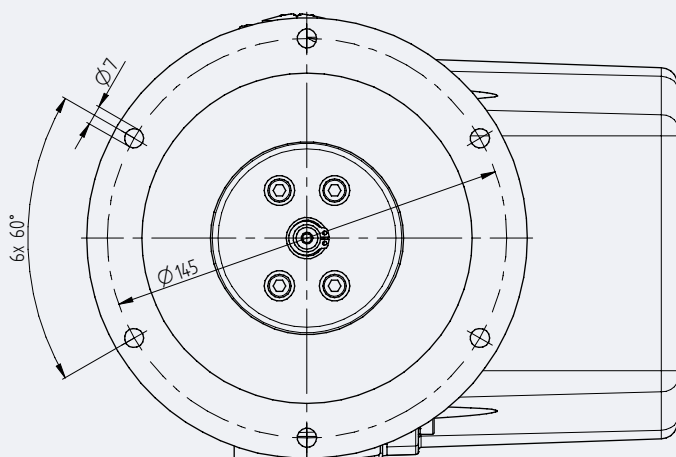
## Series HGE – Option: Mounting Flanges FL, FL160

Revision number: 3.1.4.5-01

Revision date: 19.11.2019

Additional weight: 0,27 kg

FL160



## Series HGE – Option: Encoder Preparation

Revision number: 3.1.4.6-01

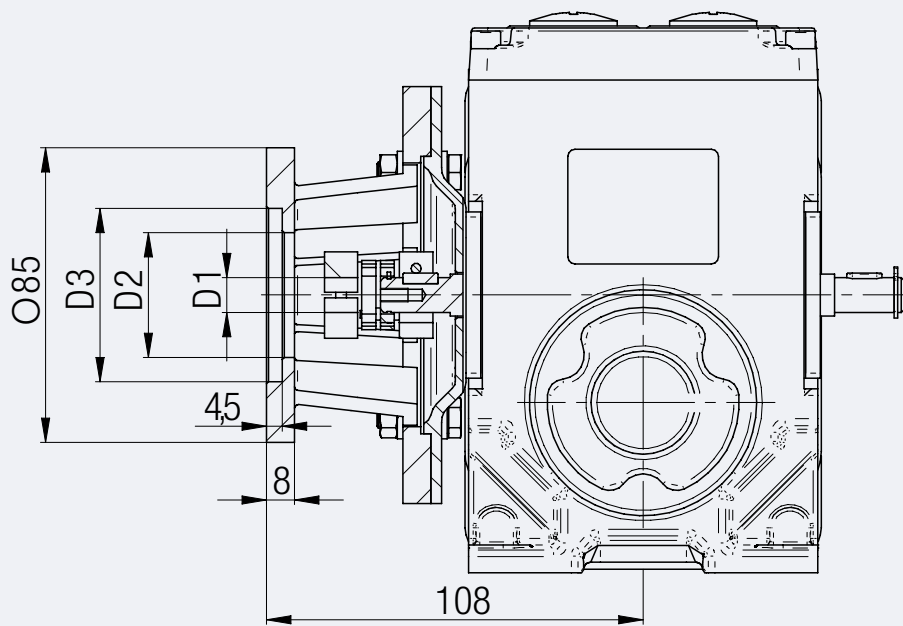
Revision date: 19.11.2019

### Features

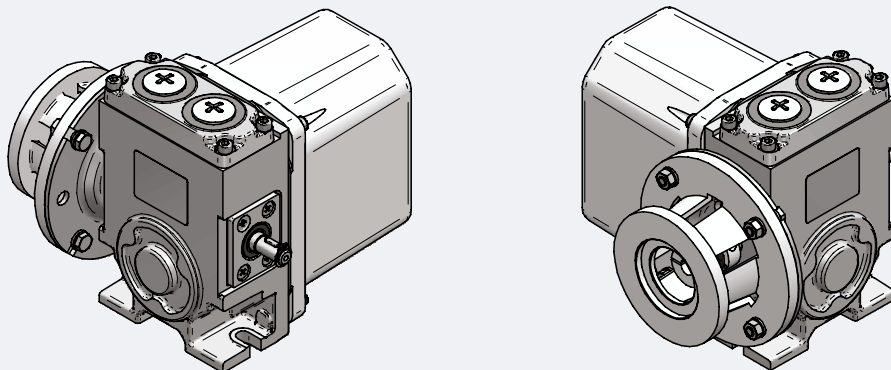
- Preparation for the installation of multi-turn encoders possible, driven by lead through drive shaft

### Additional information

- Adaptor for encoders with centering of 36 or 50 mm, other centerings on request
- Connection to the encoder with special encoder coupling



Example: CR



D1 [mm]	D2 [mm]	D3 [mm]
Ø6	Ø36H7 or other	Ø50H7 or other
Ø8		
Ø10		
Ø12		

## Series HGE / HEG / HHEV Limit Switches

# Series HGE – Option: Internal Encoder

Revision number: 3.1.4.6-01

Revision date: 19.11.2019

### Features

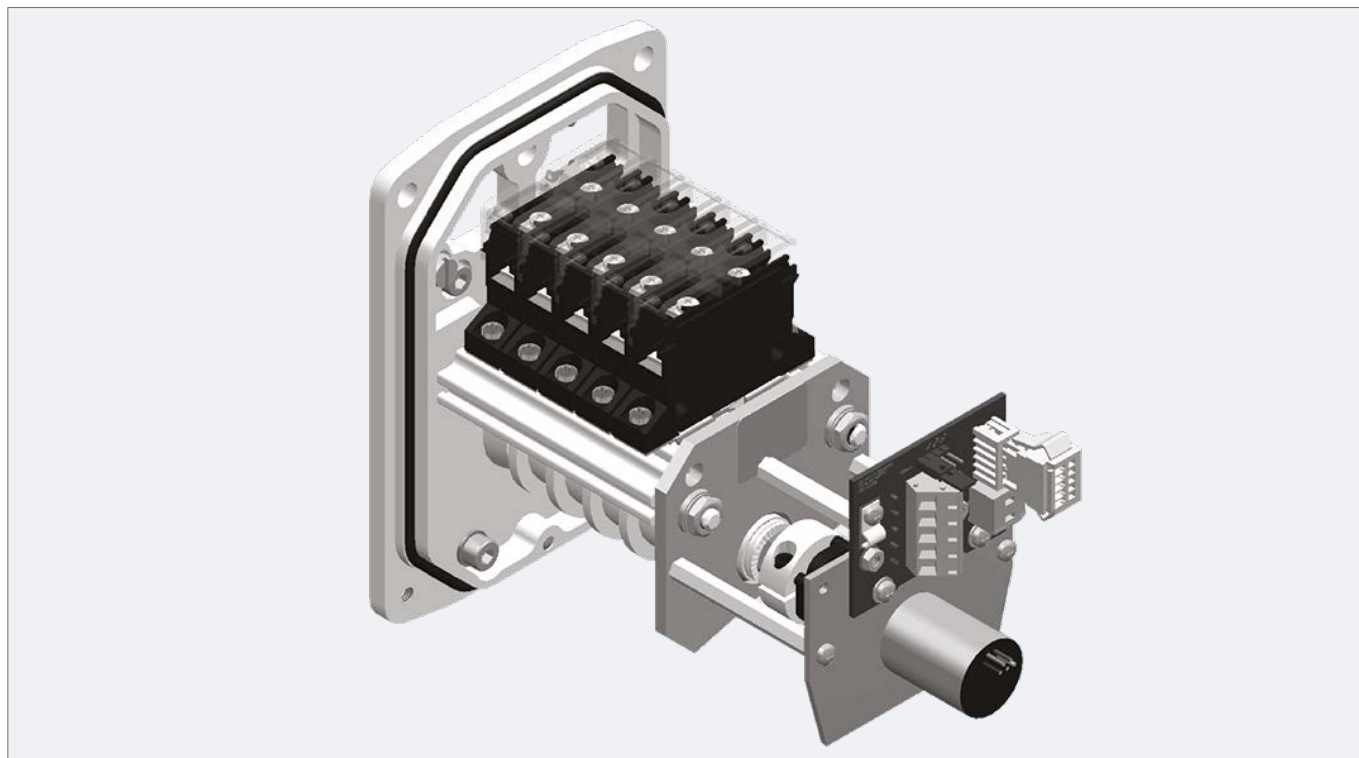
- Contactless measuring method
- Absolute value acquisition
- Long lifetime
- Turning synchronously with the cam discs

### Application

- For simple measuring of absolute signals (voltage or current)

### Additional information

- Programmable type CW or CCW
- 0 point setting



Type	Current	Voltage
Supply Voltage UBB	18 to 35 VDC (RL = 500 W) 12 to 35 VDC (RL = 200 W)	18 to 35 VDC
Signal output	Iout: 4 to 20 mA (0°...360°)	Uout: 0.1 to 10 V (0°...360°)
Linearity	±0,1% to effective range	±0,1% to effective range
Hysteresis	max. 0,1°	max. 0,1°
Output charge	Load resistor 0...0,5 kW	Load resistor >= 10 kW
Rotary angle mech.	360° rotation possible	360° rotation possible
Temperature range	-40°C to +85°C	-40°C to +85°C
Weight	approx. 100 g	approx. 100 g

## Series HEG – Spur Gear Limit Switch

Revision number: 3.1.4.7-01

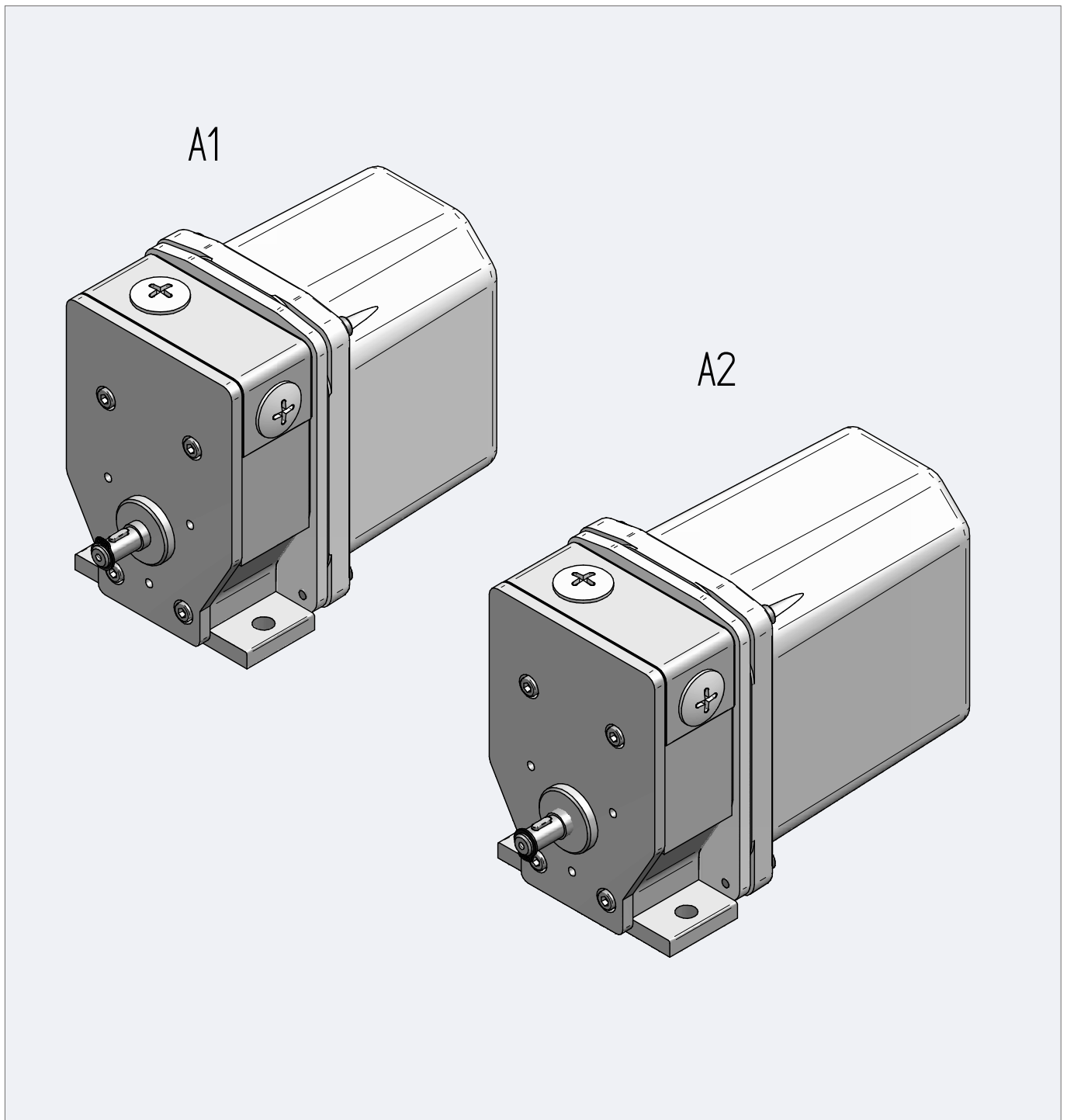
Revision date: 19.11.2019

**Features**

- Spur gear made of metal
- gear ratios <1 available
- Up to 8 contacts possible

**Application**

- Crane
- Steel works



## Series HGE / HEG / HHEV Limit Switches

# Series HEG – Gear Data

Revision number: 3.1.4.8-01

Revision date: 19.11.2019

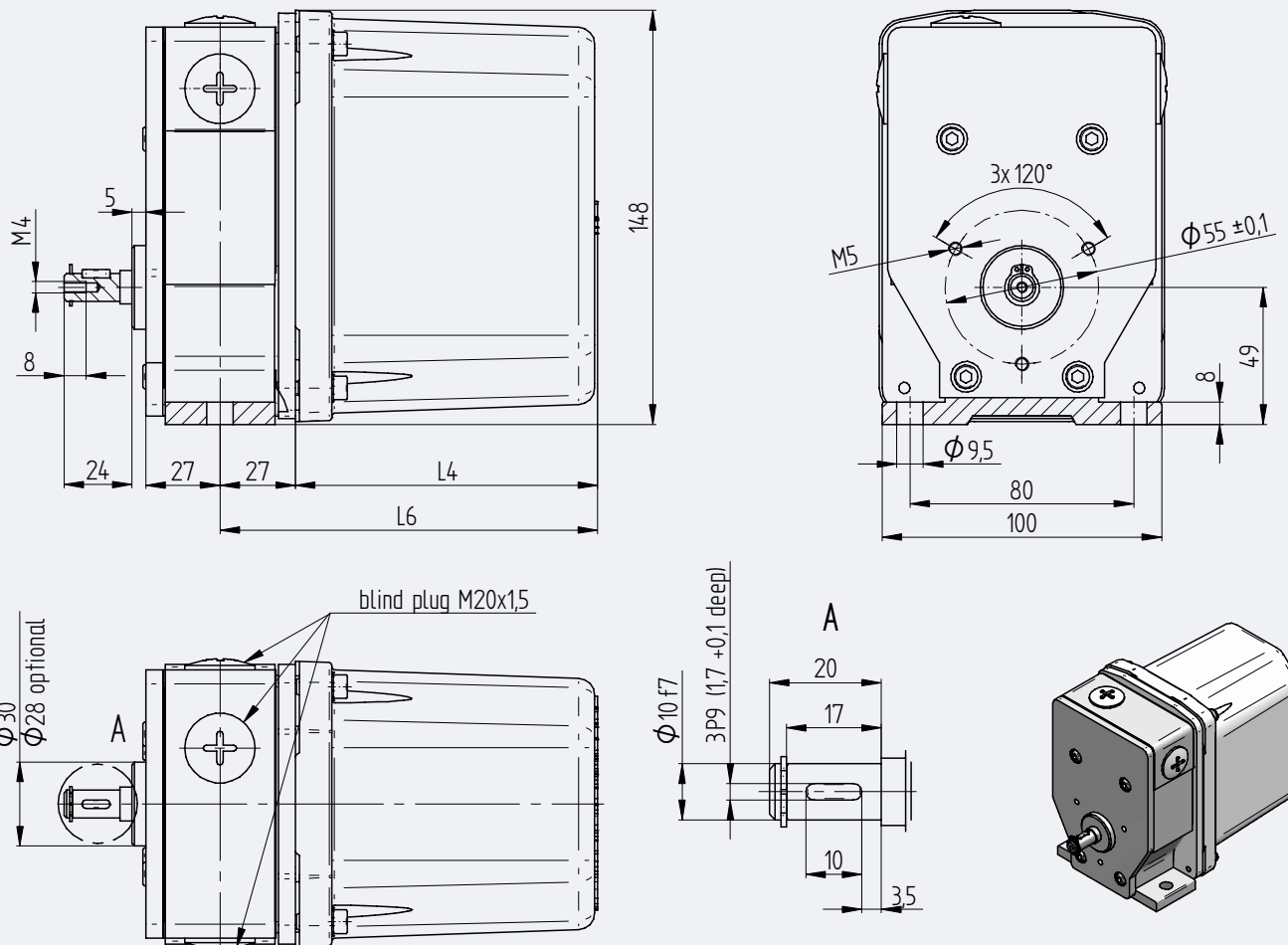
I) Gearbox - for contacts 80, 81, 88, 90, 90G with cam discs 40° FV70											
Nominal revolutions	Usable revolutions with 40° cam disc	Gear ratio i	Castor revolutions of the drive shaft after each side	Mechanical Hysteresis [revolution at drive shaft]		Max. input speed [rpm]	Min. input speed for alternating operation [rpm]			Min. drive torque for switching an individual contact [Nm]	Max. drive torque for forced opening of an individual contact [Nm]
				Contact			Contact				
				80, 90, 90G	88		80, 81	90, 90G	88		
0,15	0,18	0,200	0,022	0,001	0,002	50	0,061	0,030	0,006	0,625	10,238
0,2	0,22	0,250	0,028	0,002	0,002	50	0,076	0,038	0,008	0,500	8,190
0,28	0,30	0,333	0,037	0,002	0,003	50	0,101	0,051	0,010	0,375	6,143
0,38	0,40	0,444	0,049	0,003	0,004	50	0,135	0,067	0,013	0,281	4,607
0,5	0,53	0,600	0,067	0,004	0,005	150	0,182	0,091	0,018	0,208	3,413
1	0,89	1,000	0,111	0,006	0,008	150	0,303	0,152	0,030	0,125	2,048
1,1	1,19	1,333	0,148	0,008	0,011	150	0,404	0,202	0,040	0,094	1,536
1,5	1,60	1,800	0,200	0,011	0,015	150	0,546	0,273	0,055	0,069	1,138
2	2,67	3,000	0,333	0,018	0,024	250	0,909	0,455	0,091	0,042	0,683
2,5	3,56	4,000	0,444	0,024	0,032	250	1,213	0,606	0,121	0,031	0,512
3,5	4,44	5,000	0,556	0,030	0,040	250	1,516	0,758	0,152	0,025	0,410
6	8,00	9,000	1,000	0,055	0,073	250	2,728	1,364	0,273	0,014	0,228

II) Gearbox – for contacts 51 with cam discs 40° FV70, 52, 53 with cam discs 40° FV50 (All gear parts made of metal)											
Nominal revolutions	Usable revolutions with 40° cam disc	Gear ratio i	Castor revolutions of the drive shaft after each side	Mechanical Hysteresis [revolution at drive shaft]		Max. input speed [rpm]	Min. input speed for alternating operation [rpm]		Min. drive torque for switching an individual contact [Nm]	Max. drive torque for forced opening of an individual contact [Nm]	
				Contact			51, 52	53			
				51, 52	53						
0,15	0,17	0,200	0,028	0,002	0,002	50	0,001	0,085	0,446	3,375	
0,2	0,22	0,250	0,034	0,002	0,002	50	0,002	0,106	0,357	2,700	
0,28	0,29	0,333	0,046	0,003	0,003	50	0,002	0,141	0,268	2,025	
0,38	0,38	0,444	0,061	0,004	0,004	50	0,003	0,189	0,201	1,519	
0,5	0,52	0,600	0,083	0,005	0,005	150	0,004	0,255	0,149	1,125	
1	0,87	1,000	0,138	0,008	0,008	150	0,007	0,424	0,089	0,675	
1,1	1,15	1,333	0,183	0,011	0,011	150	0,009	0,566	0,067	0,506	
1,5	1,55	1,800	0,248	0,014	0,014	150	0,013	0,764	0,050	0,375	
2	2,59	3,000	0,413	0,024	0,024	250	0,021	1,273	0,030	0,225	
2,5	3,45	4,000	0,550	0,032	0,032	250	0,028	1,698	0,022	0,169	
3,5	4,31	5,000	0,688	0,040	0,040	250	0,035	2,122	0,018	0,135	
6	7,76	9,000	1,238	0,072	0,072	250	0,064	3,820	0,010	0,075	

# Series HEG – Housing Types A1, A2

Revision number: 3.1.4.9-01

Revision date: 19.11.2019



Switch size	No. switching contacts	L4 [mm]	L6 [mm]	weight [kg]
A1	max. 5	108	135	2,80
A2	max. 8	138	165	3,25

Series HGE / HEG / HHEV Limit Switches

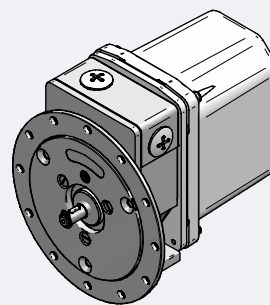
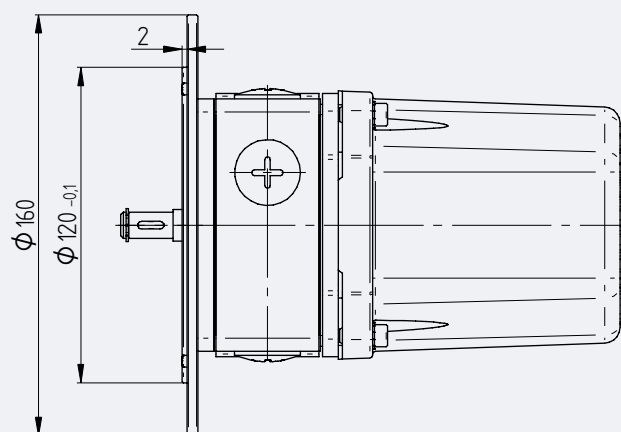
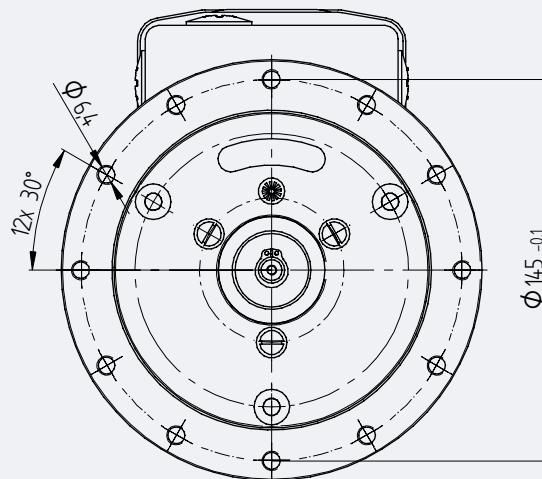
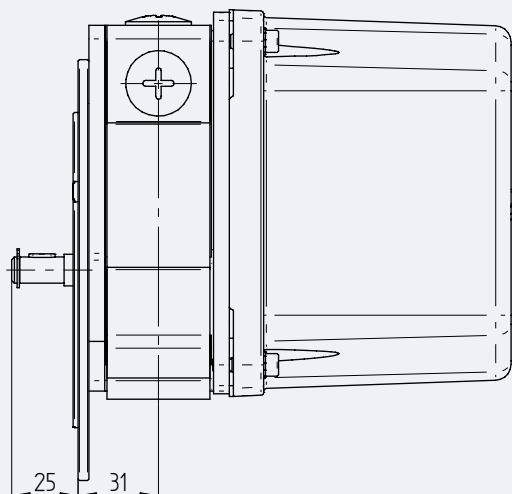
## Series HEG – Option: Mounting Flanges FL

Revision number: 3.1.4.10-01

Revision date: 19.11.2019

Additional weight: 0,25kg

FL





## Series HHEV – Lever Limit Switch

Revision number: 3.1.4.11-01

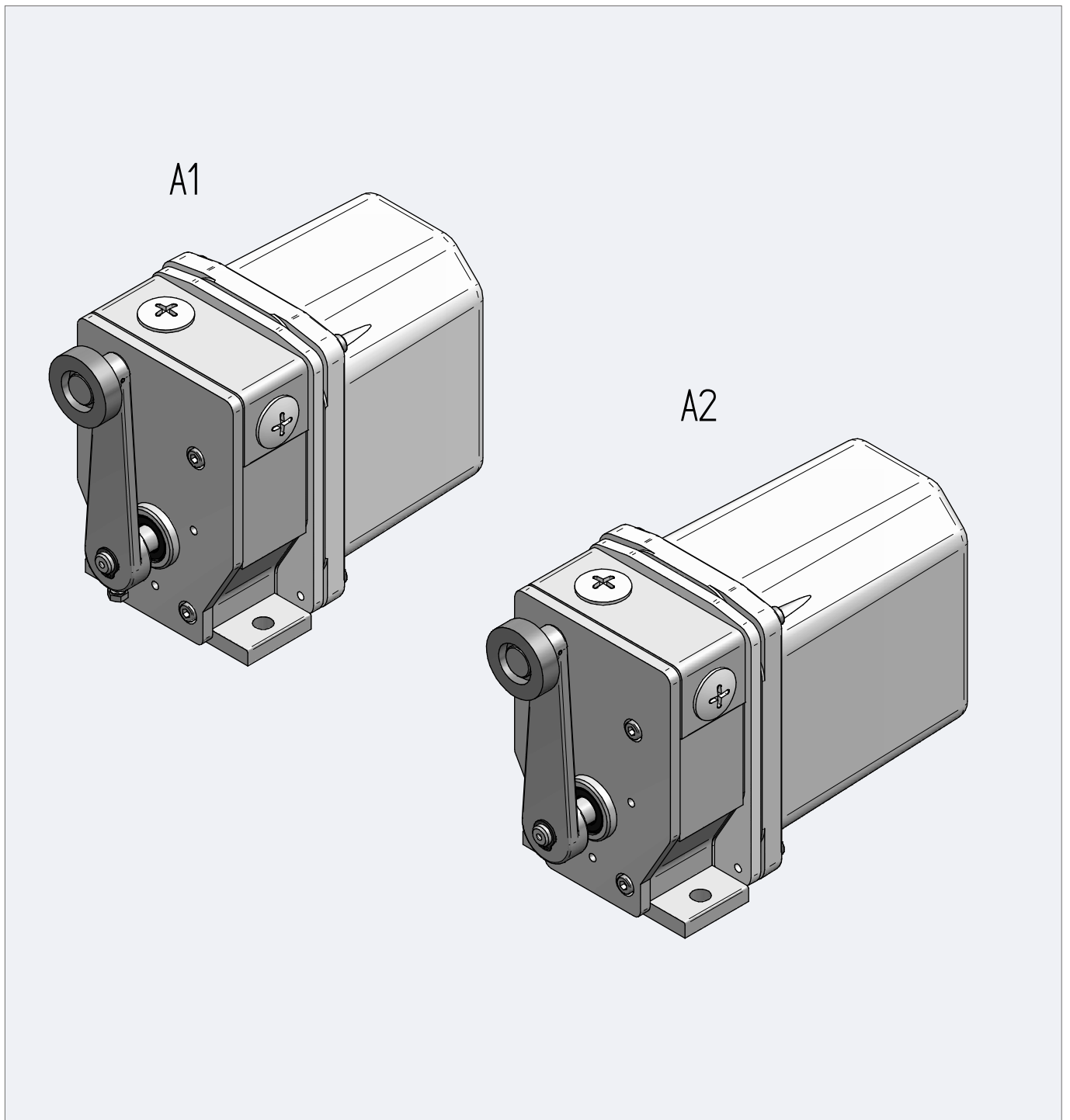
Revision date: 19.11.2019

### Features

- Aluminum housing IP65
- Up to 8 contacts possible

### Additional information

- Actuation to both sides possible



## Series HGE / HEG / HHEV Limit Switches

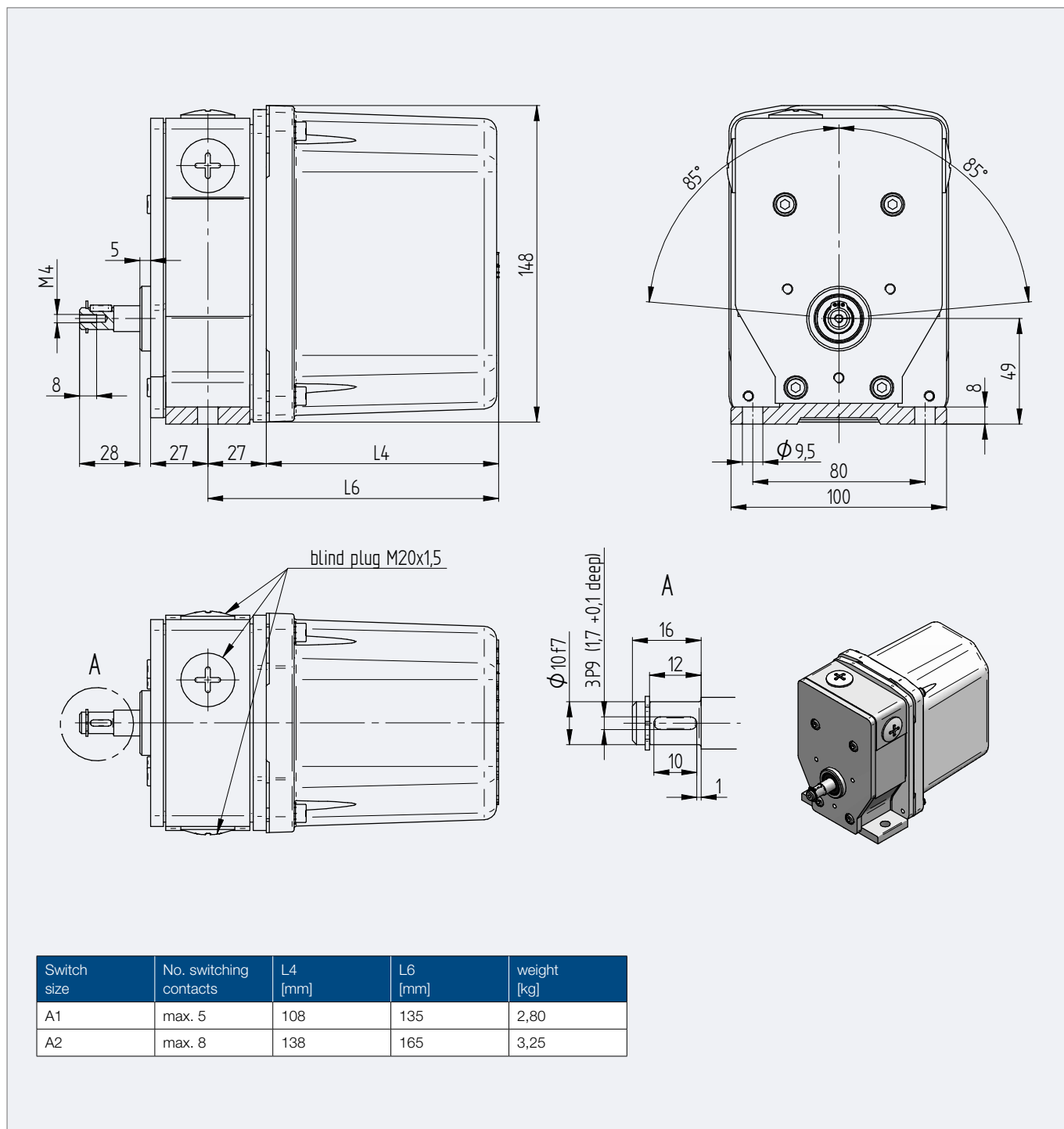
# Series HHEV – Housing Types A1, A2

Revision number: 3.1.4.12-01

Revision date: 19.11.2019

### Features

- Mechanical limits at +/- 85°
- Cam discs individually adjustable



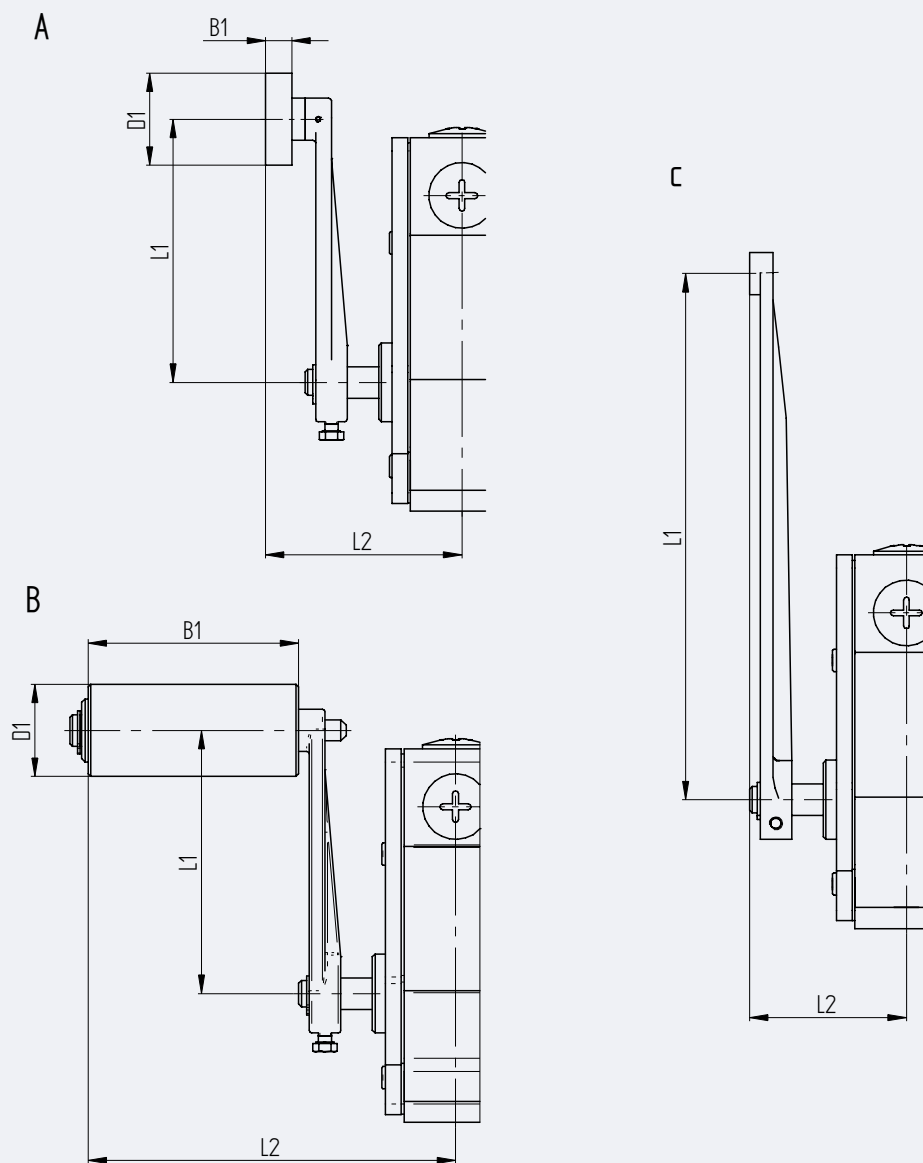
## Series HHEV – Available Levers

Revision number: 3.1.4.13-01

Revision date: 19.11.2019

### Additional information

- Type „C“ lever (L1=200mm) only for special applications, without spring return function



Shape	Material	bearing	D1 [mm]	B1 [mm]	L1 [mm]	L2 [mm]
A	brass	sleeve bearing	35	10	100	75
B	synthetic	ball bearing	35	80	100	140
C	x	x	x	x	200	60

## Series HGE / HEG / HHEV Limit Switches

# Series HGE, HEG, HHEV – Available Switches

Revision number: 3.1.4.14-03

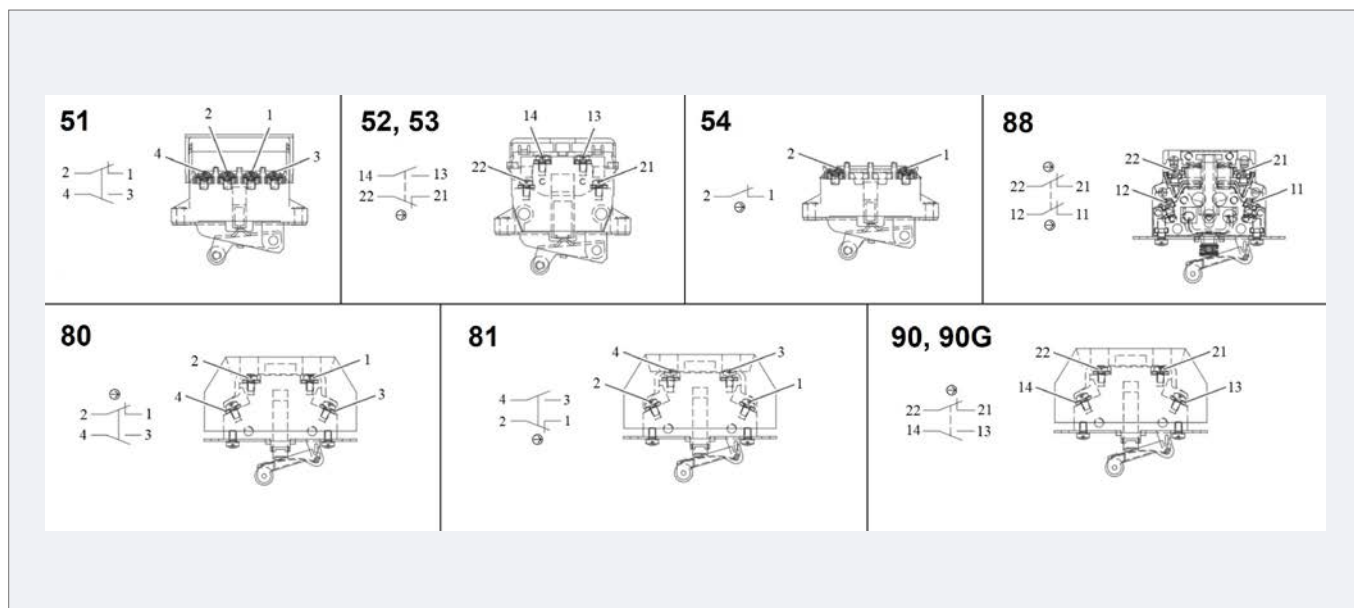
Revision date: 31.03.2022

### Features

- Snap – and push action contacts available in silver and gold
- Galvanic isolated elements available
- Positive opening contacts available

### Application

- For relays or PLC



Switching contact		Contact material	Switching system		Connection	Electrical data					Additional data				
Designation	Circuit as a changeover	Circuit as an NC contact	Silver	Gold (PLC-Application)	Snap action switch	Push action switch	Screw terminals: 0,75 - 2,5 mm <sup>2</sup> / AWG 14 ... 20	Utilization category acc. to IEC 60947	Conventional thermal current I <sub>th</sub>	Rated Insulation Voltage U <sub>i</sub>	Short circuit protection	Degree of Pollution	Mechanical Lifetime	Positive opening acc. to EN 60947-5-1 Annex K	Operating Temperature
51	•			•	•		•	AC-15: 230V, 2,5A DC-13: 24V, 4A	6A	250V	10A gL/gG	PD 2	30x106		-30°C ... +85°C *
52	•			•	•		•	AC-15: 230V, 2,5A DC-13: 24V, 6A	10A	250V	6A gL/gG	PD 3	1x106	•	-30°C ... +85°C
53	•			•	•		•	AC-15: 230V, 2,5A DC-13: 24V, 6A	10A	250V	6A gL/gG	PD 3	1x106	•	-30°C ... +85°C
54		•	•		•		•	AC-15: 230V, 2,5A DC-13: 24V, 1A	6A	250V	10A gL/gG	PD 2	30x106	•	-30°C ... +85°C *
80	•		•		•		•	AC-15: 230V, 3A DC-13: 110V, 1A	10A	400V	6A gG	PD 3	10x106	•	-40°C ... +85°C
81	•		•		•		•	AC-15: 230V, 3A DC-13: 110V, 1A	10A	400V	6A gG	PD 3	10x106	•	-40°C ... +85°C
90	•		•		•		•	AC-15: 230V, 1A DC-13: 110V, 0,5A	10A	400V	6A gR	PD 3	10x106	•	-40°C ... +85°C
90G	•		•		•		•	AC-12: 230V, 0,25A, DC-12: 110V, 0,25A	10A	400V	2A gG	PD 3	10x106	•	-40°C ... +85°C
88		•	•	•			•	AC-15: 230V, 1,5A DC-13: 24V, 1,5A	10A	400V	10A gG	PD 3	1,5x106	•	-40°C ... +85°C

• = applicable

\* Up to +120°C in combination with high temperature type

## Series HGE, HEG, HHEV – Cam Disc Types

Revision number: 3.1.4.15-01

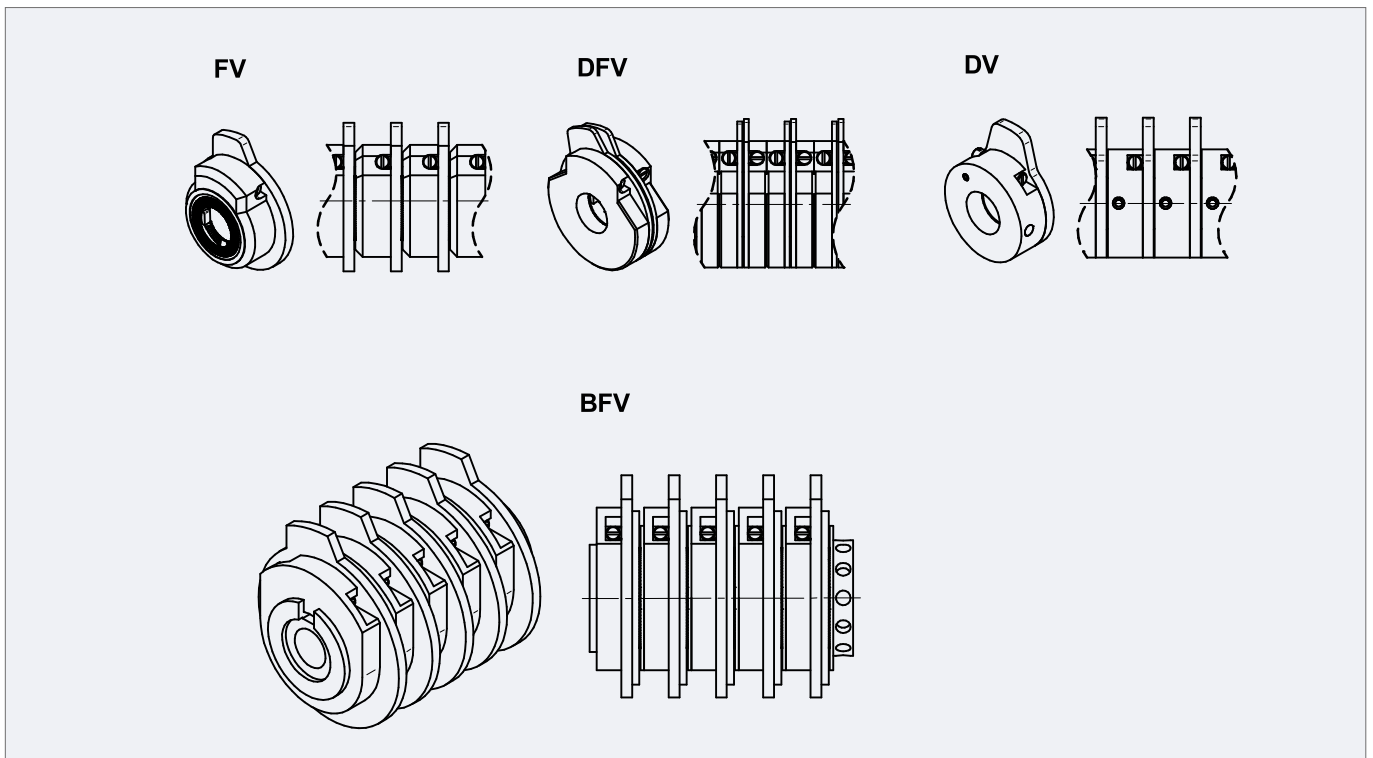
Revision date: 19.11.2019

**Features**

- Easy adjustable cam discs via self-locking worm, gear ratio of 74
- Large cam disc diameter for high switching point accuracy

**Additional information**

- FV for normal application
- DFV for flexible adjustment of the cam angle



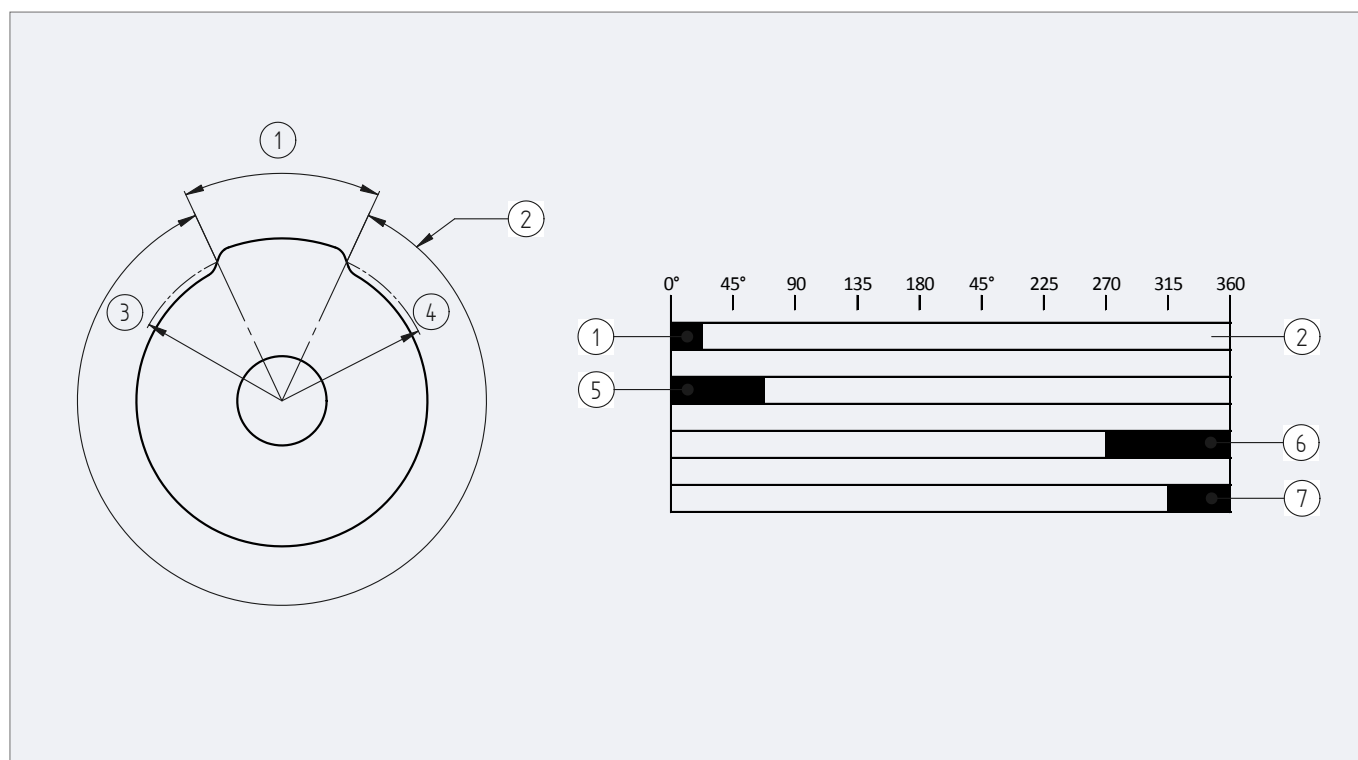
Cam Disc Types	Material	Diameter Cam Disk	Standard Cam Angle	Special Cam Angel	Gradation Cam Angle	precisely adjustable	block adjustment
FV50	synthetic	50mm	40°	other cam angles on request	1°	x	
DFV50	synthetic	50mm	40°		1°	x	
DV50	brass	50mm	40°		1°	x	
FV70	synthetic	70mm	40°		1°	x	
BFV70	synthetic	70mm	40°		1°	x	x

## Series HGE / HEG / HHEV Limit Switches

# Series HGE, HEG, HHEV – Customizable Cam Discs

Revision number: 3.1.4.16-01

Revision date: 19.11.2019



### A Cam angle diagram

- 1 Effective cam angle  $\alpha$  (=castor angle)
- 2 Effective cam angle  $\beta$
- 3 Switching point radius
- 4 Reset point radius

### B Application examples

- 1 Effective cam angle 15°
- 5 Effective cam angle 60°
- 6 Effective cam angle 90°
- 7 Effective cam angle 45°

The cam discs are named due to the effective cam angle. The effective cam angle corresponds to the switching point angle on the switching point radius of the cam disc. Standard cam angle for series HEG, HEG, HHEV is 40°.

Any other cam angles (from 15° up to 345°) can be supplied as a special design upon request.

The usable revolutions enabled by a cam disc on the drive shaft, result in the following:

$$U = \frac{\beta * i}{360^\circ} = \frac{(360^\circ - \alpha) * i}{360^\circ} = 1 - \frac{\alpha * i}{360^\circ}$$

- U = Usable revolutions
- $\alpha$  = Effective cam angle
- $\beta$  = Usable cam angle ( $\beta = 360^\circ - \alpha$ )
- i = gear ratio

## Series HGE, HEG, HHEV – Option: Anti-Condensation-Heating

Revision number: 3.1.4.17-02

Revision date: 06.09.2022

### Features

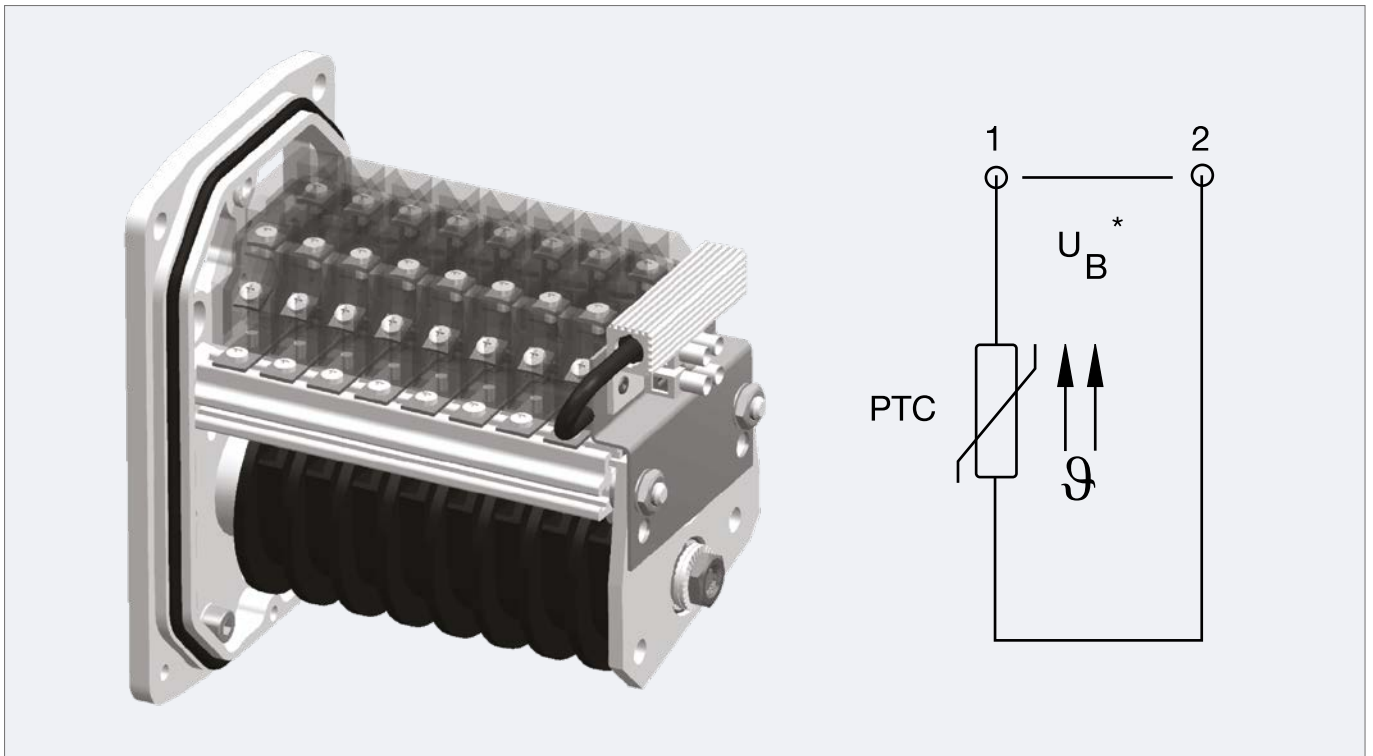
- Self-regulating PTC heating element

### Application

- For anti-condensation to avoid water condensation within the geared cam limit switch

### Additional information

- Additional safety for usage in low temperatures



Design	H1	H2
Supply Voltage UBB	12 – 30 V AC/DC	110 – 250 V AC/DC
Heat Output	ca. 2.5 Watts	ca. 4 Watts
PTC Cooling resistor (at 25 °C) R25	20 $\Omega \pm 35 \%$	1500 $\Omega \pm 35 \%$
PTC Reference temperature	50 °C	50 °C
Protection class (VDE 0100, 0160)	II	II
Connecting cable	2 x 0,25 mm <sup>2</sup> , Silicon cable	2 x 0,25 mm <sup>2</sup> , Silicon cable
Radiator	Anodised aluminum	Anodised aluminum
Weight	approx. 40 g	approx. 40 g

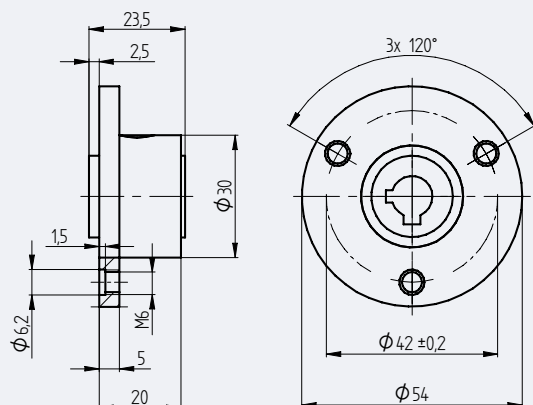
## Series HGE / HEG / HHEV Limit Switches

# Series HGE, HEG – Option Drive Flange F, F+M

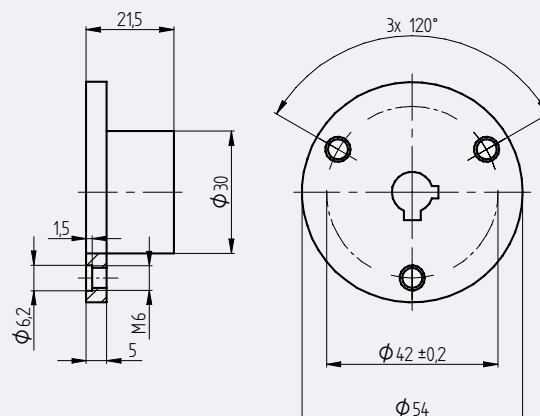
Revision number: 3.1.4.18-01

Revision date: 19.11.2019

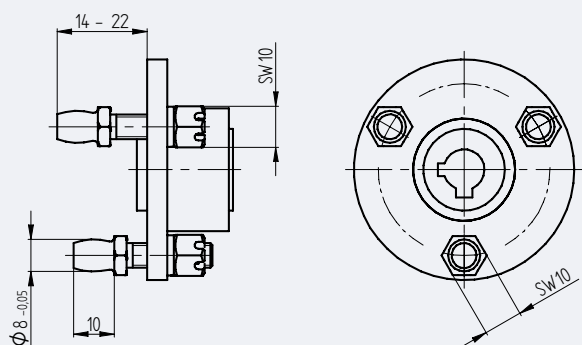
F, flexible



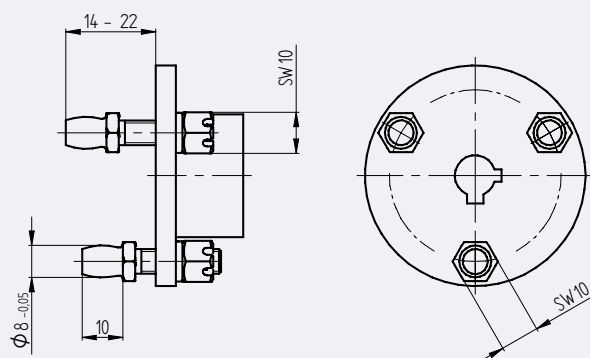
F, non-flexible



F+M, flexible



F+M, non-flexible




Flange	Type	Operating speed	Torsion angle (with a torque of 5 Nm)	Comment
F	flexible	$n_{\max} = 1000$ rpm	$5 \pm 0.5^\circ$	not for HHEV
F	non-flexible	$n_{\max} = 1000$ rpm	$0^\circ$	not for HHEV
F+M	flexible	$n_{\max} = 1000$ rpm	$5 \pm 0.5^\circ$	not for HHEV
F+M	non-flexible	$n_{\max} = 1000$ rpm	$0^\circ$	not for HHEV



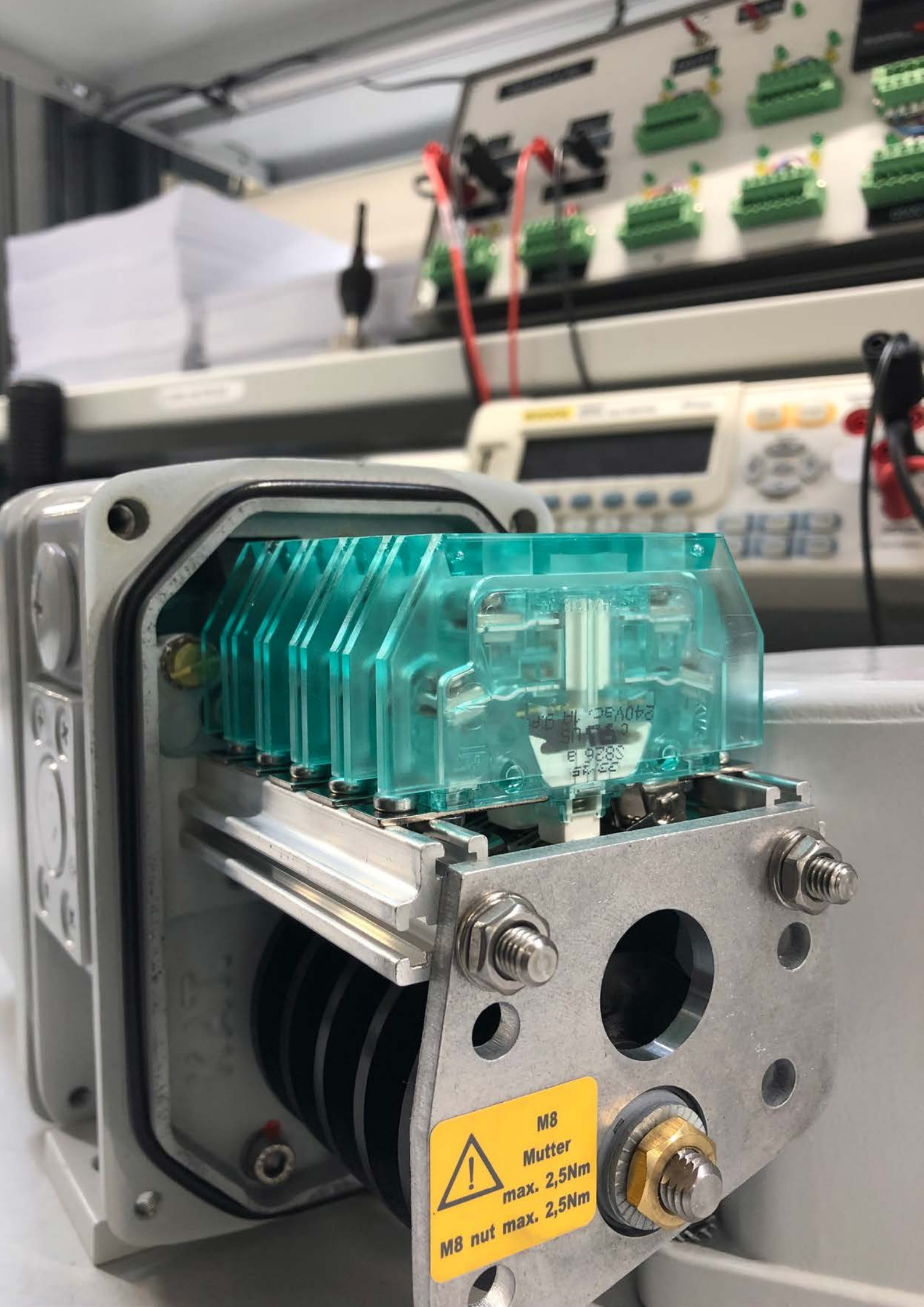
## Series HGE, HEG, HHEV – Key of Types

Revision number: 3.1.4.19-01

Revision date: 19.11.2019

<b>Stromag GmbH</b> Hansastr.120, 59425 Unna Tel.+49(0)2303102-0 Made in Germany		
<b>Getriebeendschalter</b> Typ: 155_HGE_590_BFV70_A1R_G Auftr.Nr.: Ref-Nr.:		
<b>Baujahr</b>		

HGE, HEG or HHEV			
155	nominal revolutions	HGE	9.5, 18, 22, 29, 35, 70, 85, 100, 115, 155, 180, 230, 260, 305, 345, 460, 715
		HEG	0.15, 0.2, 0.28, 0.38, 0.39, 0.4, 0.5, 0.6, 0.65, 1, 1.05, 1.1, 1.4, 1.5, 1.9, 2, 2.5, 3.5, 6
		HHEV	0
HGE	Switch type	HGE	Worm Gear Limit Switch HGE
		HEG	Spur Gear Limit Switch HEG
		HHEV	Lever Limit Switch Series HHEV
5	Number of contacts fitted	HGE	1 to 8 contacts
		HEG	1 to 8 contacts
		HHEV	1 to 16 contacts
90	Type of switching contact	51	Contact (changeover) with screw connections, contact material: Gold
		52	Contact (changeover) with screw connections, contact material: Gold ☉
		53	Contact (push action) with screw connections, contact material: Gold ☉
		54	Contact (push action) with screw connections, contact material: Silver ☉
		80	Contact (changeover) with screw connections, contact material: Silver ☉
		81	Contact (push action) with screw connections, contact material: Silver ☉
		90	Contact (changeover) with screw connections, contact material: Silver ☉
		90G	Contact (changeover) with screw connections, contact material: Gold ☉
		88	Contact (double action) with screw connections, contact material: Gold ☉
BFV70	Type of built-in cam discs	FV50	Synthetic Material, precisely adjustable, diameter 50mm
		DFV50	Synthetic Material, double cams, precisely adjustable, diameter 50mm
		DV50	Brass, precisely adjustable, diameter 50mm
		FV70	Synthetic Material, precisely adjustable, diameter 70mm
A1R	Size contact space	BFV70	Synthetic Material, block adjustment, precisely adjustable, diameter 70mm
		A1	1 to 5 contacts
		A2	1 to 8 contacts
		A1R	1 to 5 contacts, right
		A2R	1 to 8 contacts, right
		A1L	1 to 5 contacts, left
		A2L	1 to 8 contacts, left
		B11	1 to 5 contacts, both sides
		B22	1 to 8 contacts, both sides
		B12	1 to 5 contacts, left / 1 to 8 contacts, right
B21	1 to 8 contacts, left / 1 to 5 contacts, right		
G	Additional components	G	with encoder / sensor
		P	with potentiometer



 M8  
Mutter  
max. 2,5Nm  
M8 nut max. 2,5Nm

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