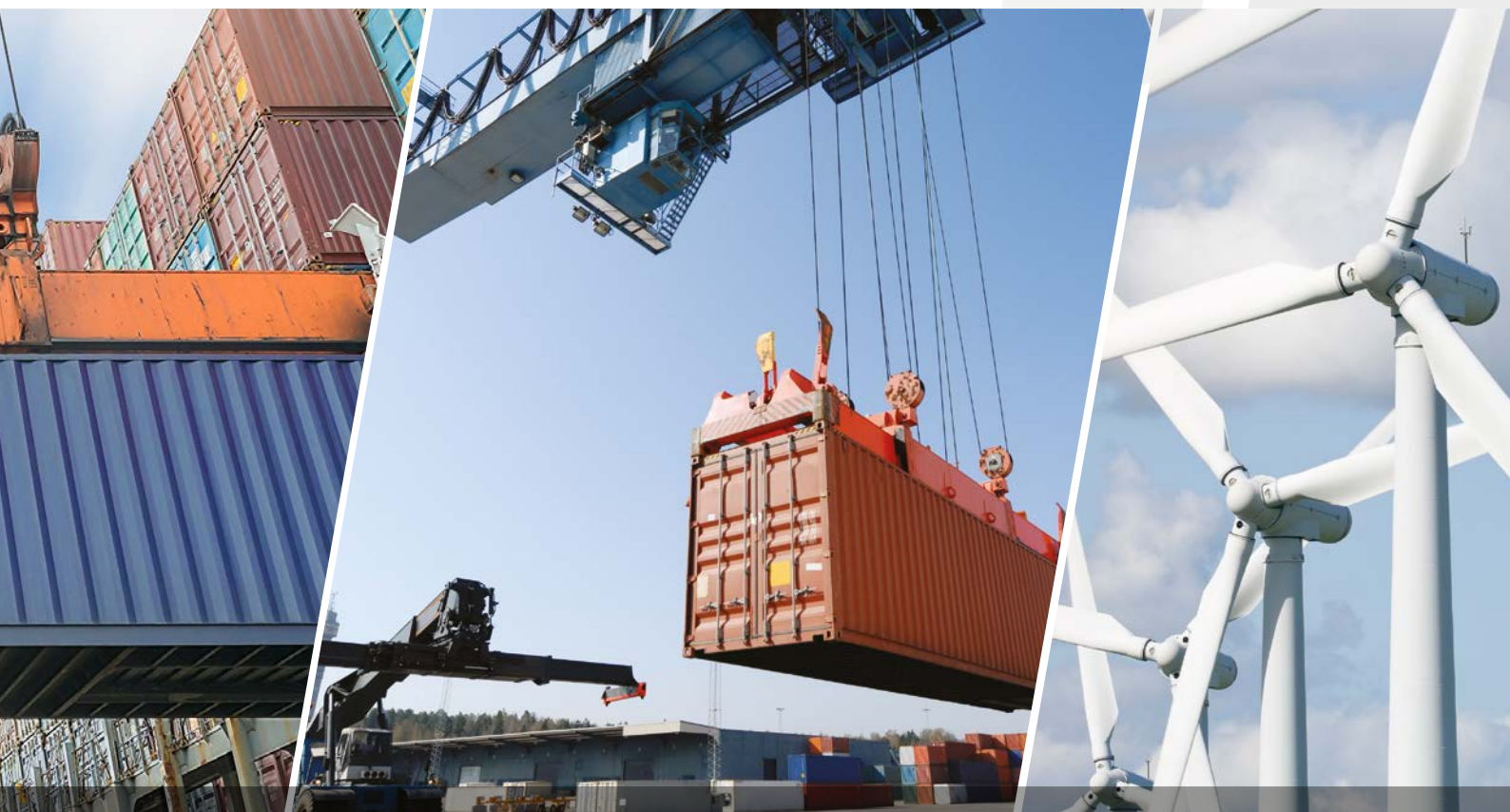
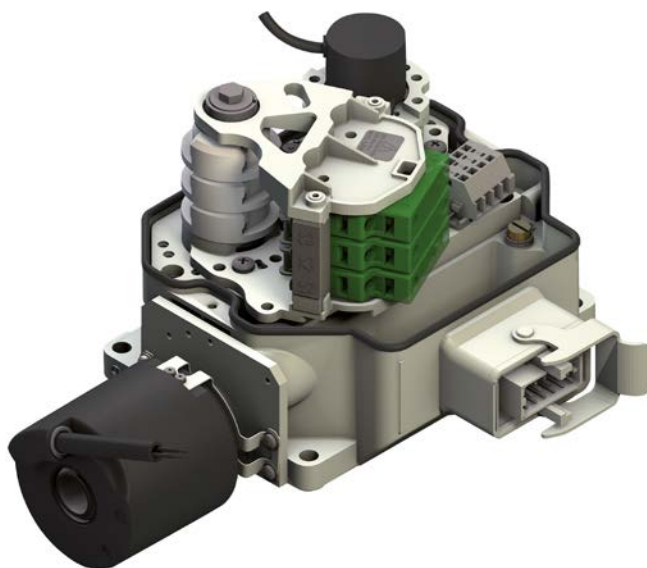




SERIES LIGHT CAM® AND LIGHT CAM® M

GEARED CAM LIMIT SWITCHES



Stromag™

**PRODUCT
CATALOG**



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Across Industries and Applications



Founded in 1932, Stromag™ has grown to become a globally recognized leader in the development and manufacture of innovative power transmission components for industrial drivetrain applications.

Stromag engineers utilize the latest design technologies and materials to provide creative, energy-efficient solutions that meet their customer's most challenging requirements.

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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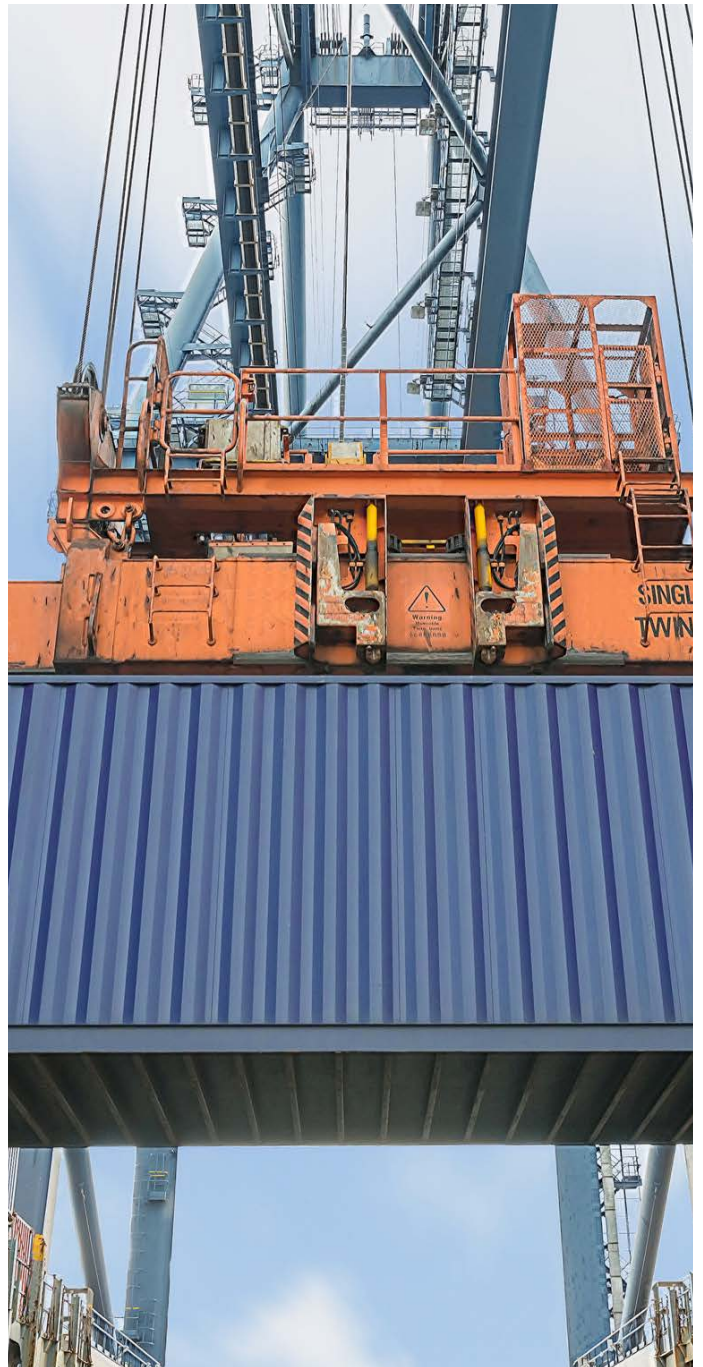
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GEARED CAM LIMIT SWITCHES

AT A GLANCE



LIGHT CAM® AND LIGHT CAM® M

BENEFITS INCLUDE

- Form fit gear
- Self locking design for the cam discs
- High gear ratio of 74 for adjusting the cams
- Drive of incremental and absolute encoders possible
- Operating temperature: -40 °C up to + 80°C

Series LC[®] / LC[®] M – Basic Limit Switch

Revision number: 3.1.2.1-03

Revision date: 28.08.2024

Features

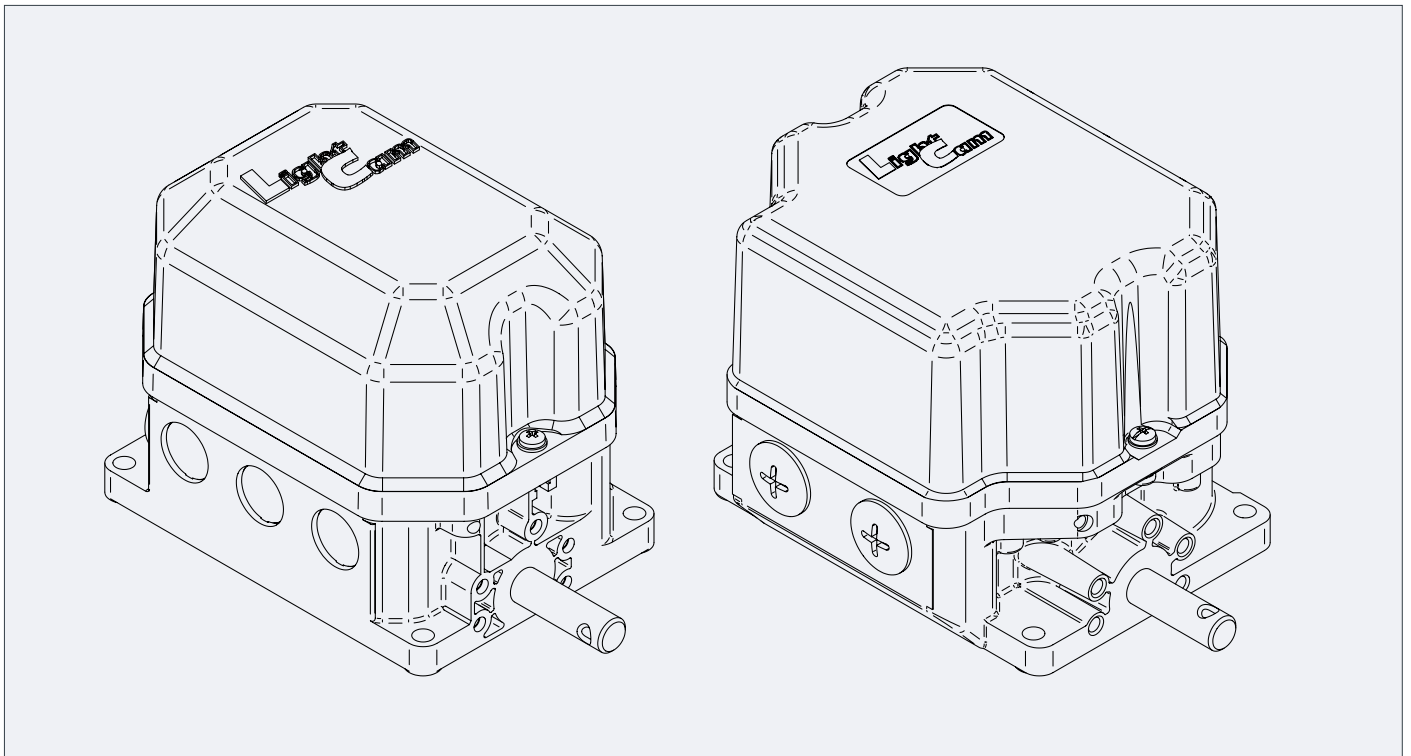
- Combined worm / spur gear for high gear reductions requiring less mounting space
- 4 or 8 switches of type 98, 98P, 98G, 99A, 99T

Application

- Crane
- Wind
- Stage

Additional information

- IP65 synthetic housing or IP66 aluminum housing available
- 1, 2 or 3 switches of type 80, 81, 88, 90, 90G



GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

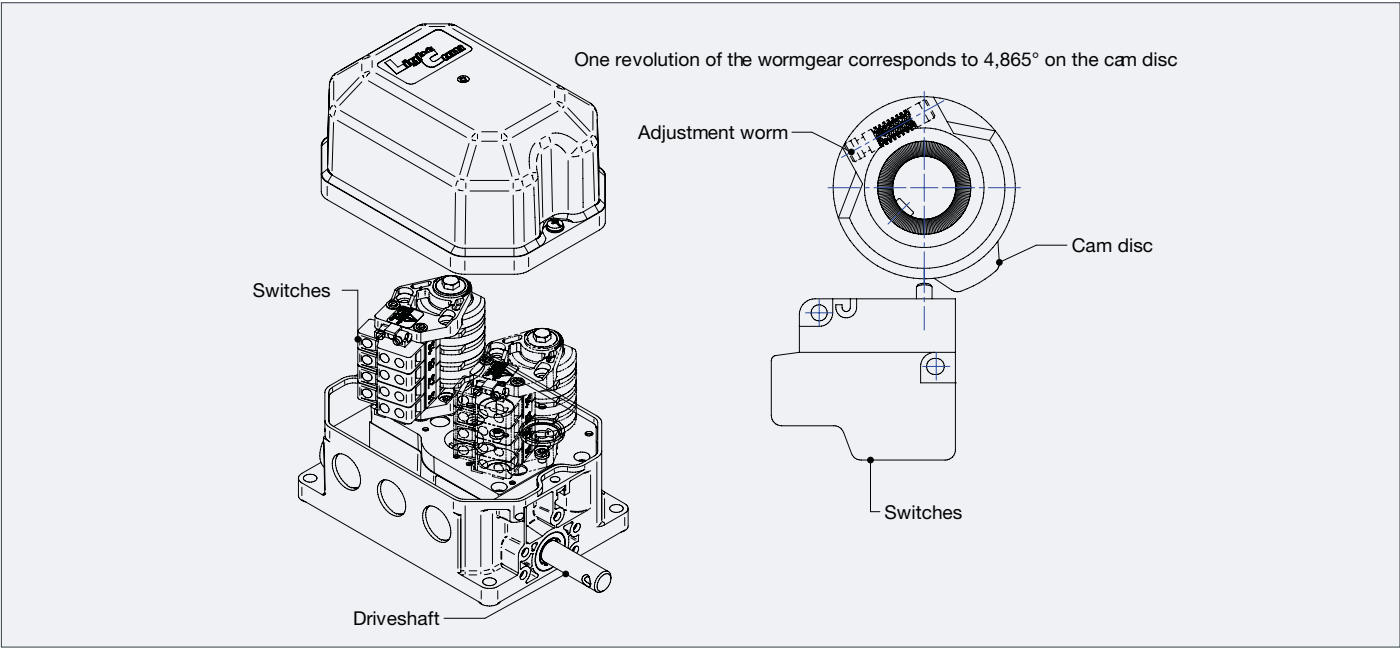
Worm / Bevel Geared Cam Limit Switches

Series LC®/ LC® M – Gear Data

Revision number: 3.1.2.2-04

Revision date: 28.08.2024

- Features**
 - Cam discs with precise adjustment and cam diameter of 42.5 mm
 - Form fit gear design
- Application**
 - Self-locking design for the cam discs
 - High gear ratio of 74 for the cam adjustment
- Additional Information:**
 - Gear table for switches 98, 98P, 98G, 99A, 99T
 - Values for switches 80, 81, 88, 90, 90G upon request



Gear table, for switches 99, 99A, 99G, 99T, 99P with cam discs 40° FV								
Nominal revolutions	Ratio	Usable revolutions on drive shaft	Overrun revolutions on drive shaft	Switch back revolution on drive shaft (average value)	max. drive speed	min. drive speed for changeover opening	max. drive torque for positive opening of 1 switch	max. revolutions between switching point and end of positive opening
[-]	[i]	[U]	[U]	[U]	[U/min]	[U/min]	[Nm]	[U]
0,85	1,00	0,89	0,111	0,003	200	0,05	0,49	0,02
1,85	2,12	1,88	0,235	0,006	200	0,10	0,34	0,05
3,9	4,48	3,99	0,498	0,013	200	0,22	0,27	0,10
6	6,78	6,03	0,753	0,020	200	0,33	0,24	0,15
9	10,25	9,11	1,139	0,031	200	0,50	0,23	0,23
15	16,99	15,11	1,888	0,051	200	0,83	0,22	0,37
25	29,67	26,38	3,297	0,089	200	1,45	0,21	0,65
29	33,53	29,80	3,725	0,101	600	1,64	0,21	0,74
53	60,00	53,33	6,667	0,180	600	2,93	0,21	1,32
76	85,50	76,00	9,500	0,257	600	4,18	0,20	1,88
95	107,37	95,44	11,930	0,322	600	5,24	0,20	2,36
135	153,00	136,00	17,000	0,459	600	7,47	0,20	3,36
180	208,77	185,58	23,197	0,626	600	10,20	0,20	4,58
260	297,50	264,44	33,056	0,893	600	14,50	0,20	6,53
305	343,82	305,62	38,202	1,031	600	16,80	0,20	7,54
360	406,87	361,66	45,208	1,221	600	19,90	0,20	8,93
435	489,94	435,50	54,438	1,470	600	23,90	0,20	10,75
515	579,79	515,37	64,421	1,739	600	28,30	0,20	12,72
620	698,16	620,59	77,574	2,094	600	34,10	0,20	15,32
880	994,88	884,34	110,543	2,985	600	48,60	0,20	21,83

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

Series LC[®]/ LC[®] M – Switches 98, 98P, 98G, 99A, 99T

Revision number: 3.1.2.3-04

Revision date: 28.08.2024

Features

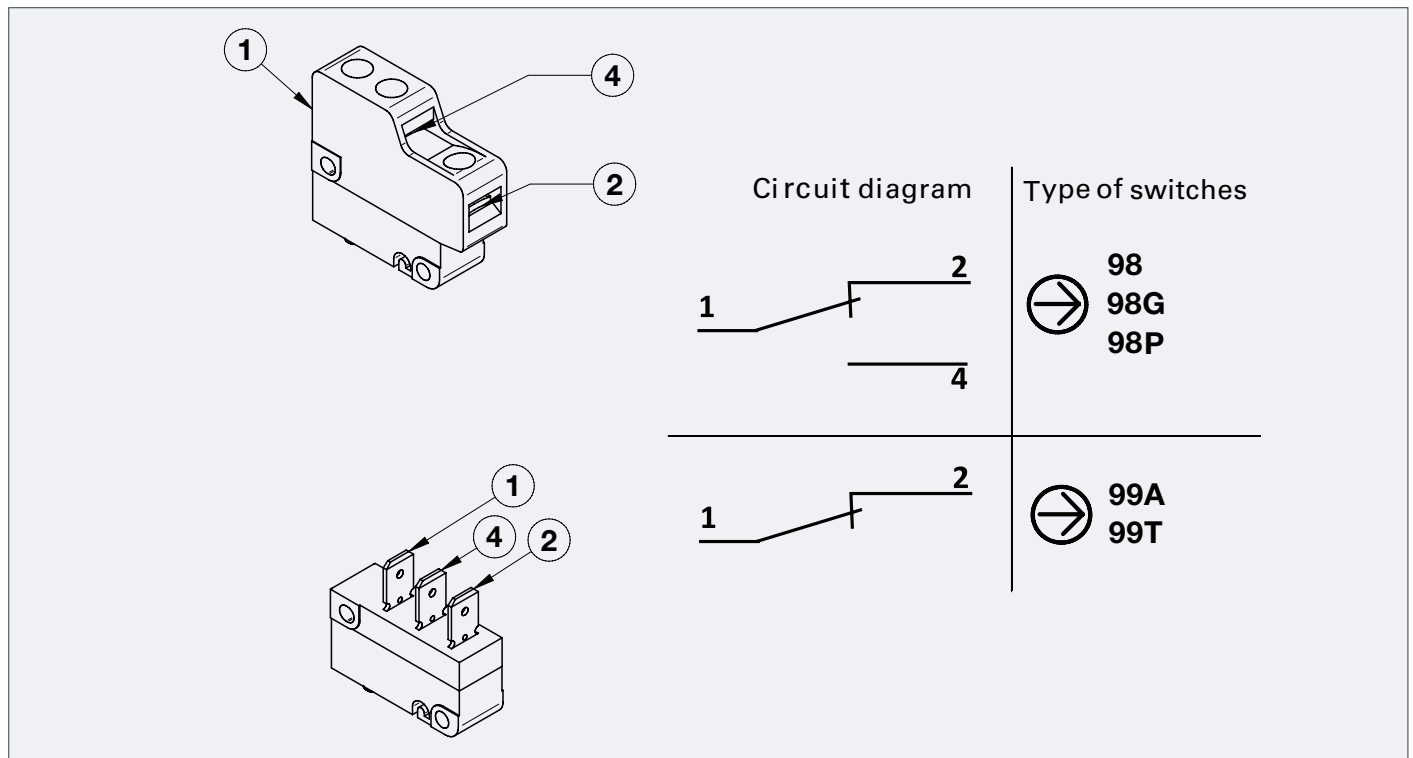
- Switches with positive opening
- For up to 1 million mechanical switching operations
- Gold plated contacts on request
- Push or snap action switches

Application

- Silver plated contacts for relays
- Gold plated contacts for low electrical loads (<12 V, <50 mA); mechanical endurance limited to 50.000 switching operations

Additional information

- Screw or flat plug connections
- Gold-plated contacts prevent corrosions-related resistances



Type of switch			Contact material		Switching system		Connection			Functionality		Electrical data		
Designation	Change-Over (NC /NO)	Normally closed (NC)	Silver	Gold (PLC-Application)	Snap-action	Push-action	screw terminals: 0,5 - 1,5 mm ² / AWG 16 ... 22	Flatplugs 6,3mm	Standard wire output	Positive opening acc. to EN 60947-5-1 Annex K	Short circuit protection	Utilization category acc. to IEC 60947	Conventional thermal current I _{th}	Rated Insulation Voltage U _i
98	•		•		•		•			•	10A gG	AC-15: 1,5A, 230V DC-13: 0,5A, 60V	6A	250V
98P	•		•		•					•	10A gG			
98G	•			•	•		•			•	2A gR			
99T		•	•			•	•	•		•	10A gG			
99A		•		•		•	•	•		•	2A gG			

• = applicable

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

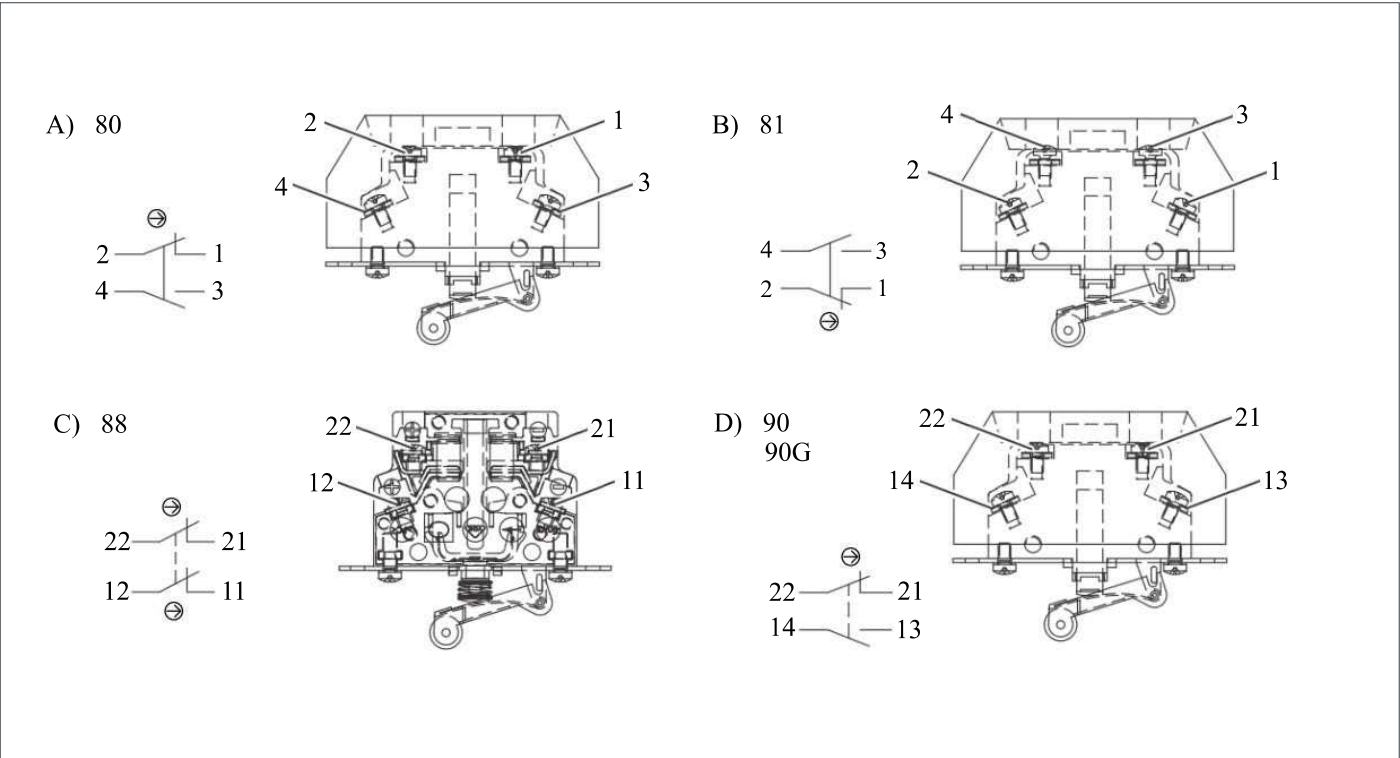
Worm / Bevel Geared Cam Limit Switches

Series LC®/ LC® M – Switches 80, 81, 88, 90, 90G

Revision number: 3.1.2.4-03

Revision date: 28.08.2024

- Features**
 - Switches with positive opening
 - For up to 10 million mechanical switching operations
 - Galvanically isolated contacts possible
 - Push or snap action switches
- Application**
 - Silver plated contacts for relays
 - Gold plated contacts for low electrical loads (<12 V, <50 mA); mechanical endurance limited to 50.000 switching operations
- Additional information**
 - Up to 3 switches can be installed inside
 - Gold plated contacts prevent corrosions-related contact resistances



Type of switch			Contact material		Switching system		Connection	Functionality		Electrical data		
Designation	Change-Over (NC / NO)	Normally closed (NC)	Silver	Gold (PLC-Application)	Snap-action	Push-action	screw terminals; 0,75 - 2,5 mm² / AWG 14 ... 20	Positive opening acc. to EN 60947-5-1 Annex K	Short circuit protection	Utilization category acc. to IEC 60947	Conventional thermal current I _{th}	Rated Insulation Voltage U _i
80	•		•		•		•	•	6A gG	AC-15: 3A, 230V DC-13: 1A, 110V	10A	400V
81	•		•			•	•	•	6A gG	AC-15: 3A, 230V DC-13: 1A, 110V		
90	•		•		•		•	•	6A gR	AC-15: 1A, 230V DC-13: 0,5A, 110V		
90G	•			•	•		•	•	2A gG	AC-12: 0,25A, 230V DC-12: 0,25A, 110V		
88		•		•	•		•	•	10A gG	AC-15: 1,5A, 230V DC-13: 1,5A, 24V		

Series LC[®] – Light Cam[®] B3

Revision number: 3.1.2.5-01

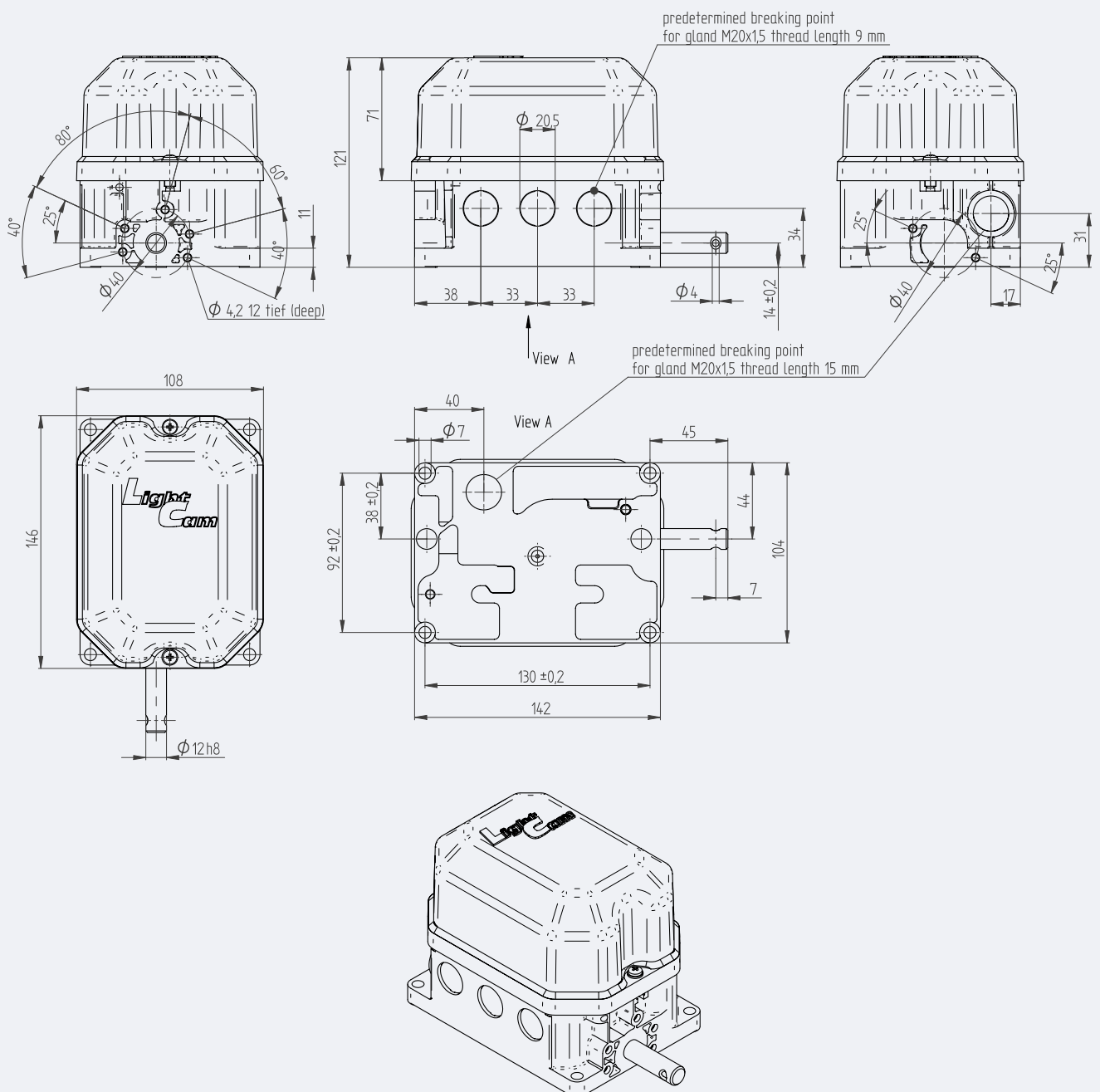
Revision date: 19.11.2019

Features

- Synthetic housing IP65 for outdoor application

Application

- Crane
- Wind
- Stage



GEARED CAM LIMIT SWITCHES

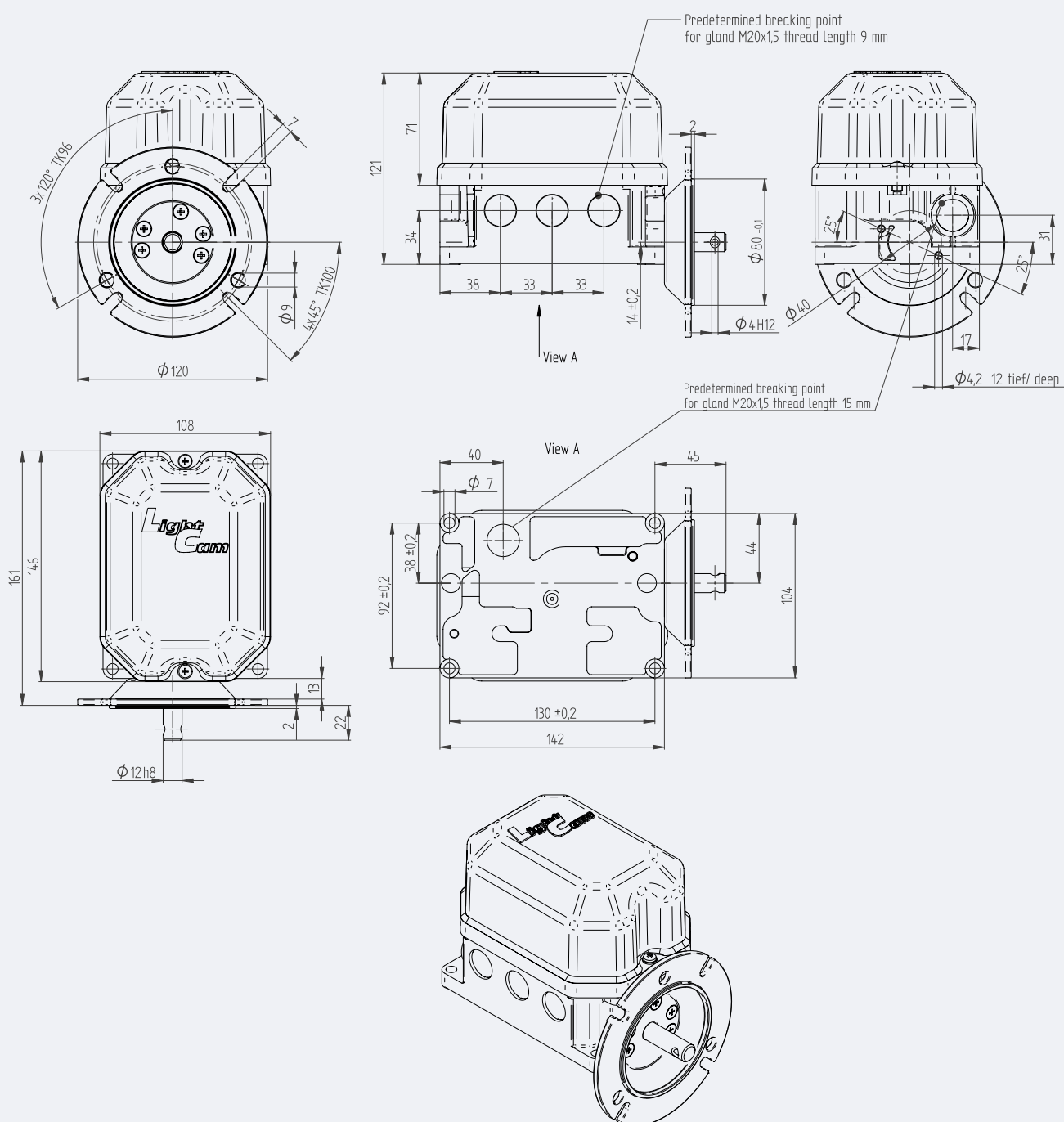
Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

Series LC[®] – Light Cam[®] B5

Revision number: 3.1.2.6-01

Revision date: 19.11.2019



GEARED CAM LIMIT SWITCHES

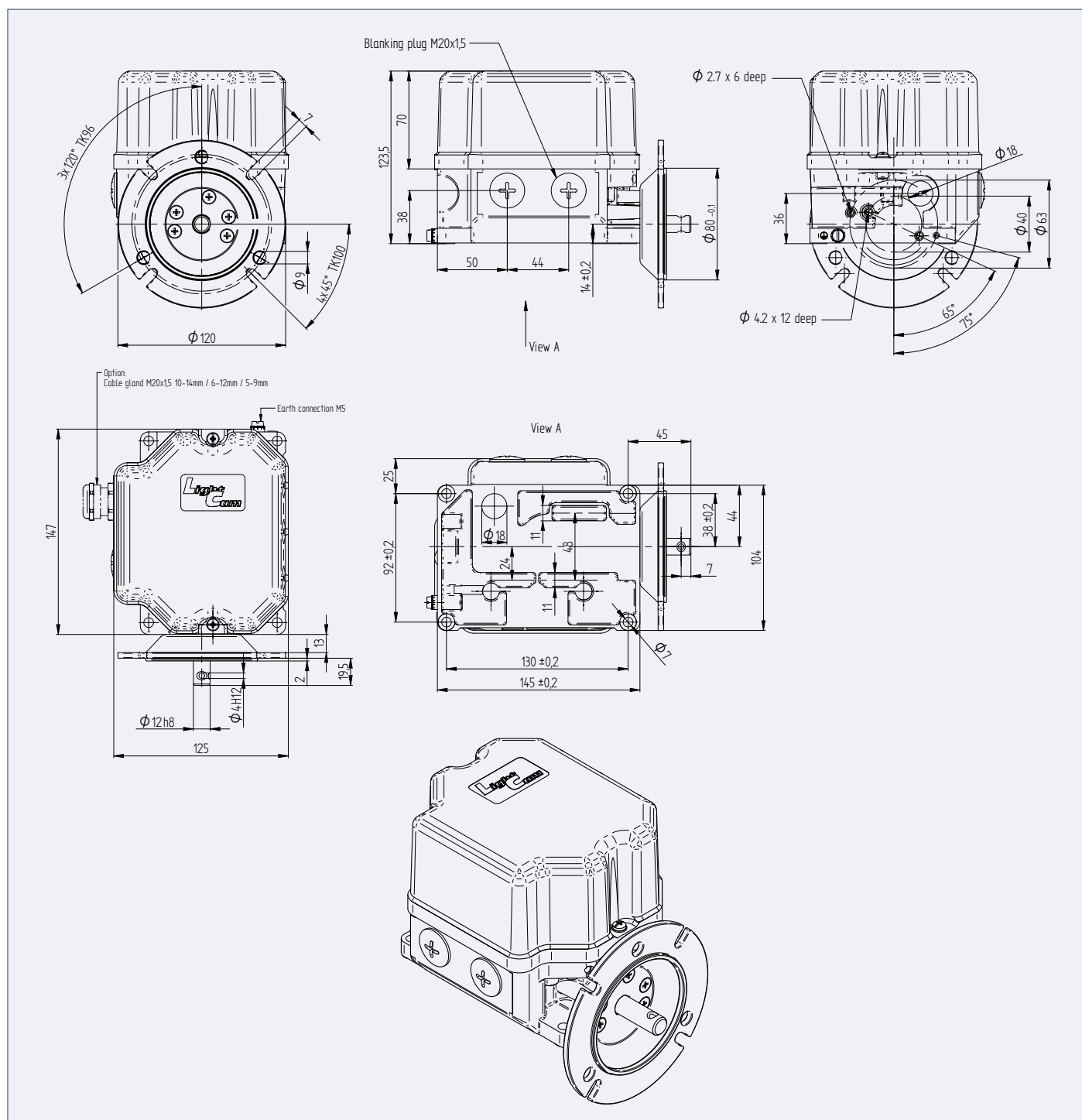
Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

Series LC® – Light Cam® Metal B5

Revision number: 3.1.2.8-02

Revision date: 28.10.2022



LC® / LC® M – Customizable Cam Discs

Revision number: 3.1.2.9-02

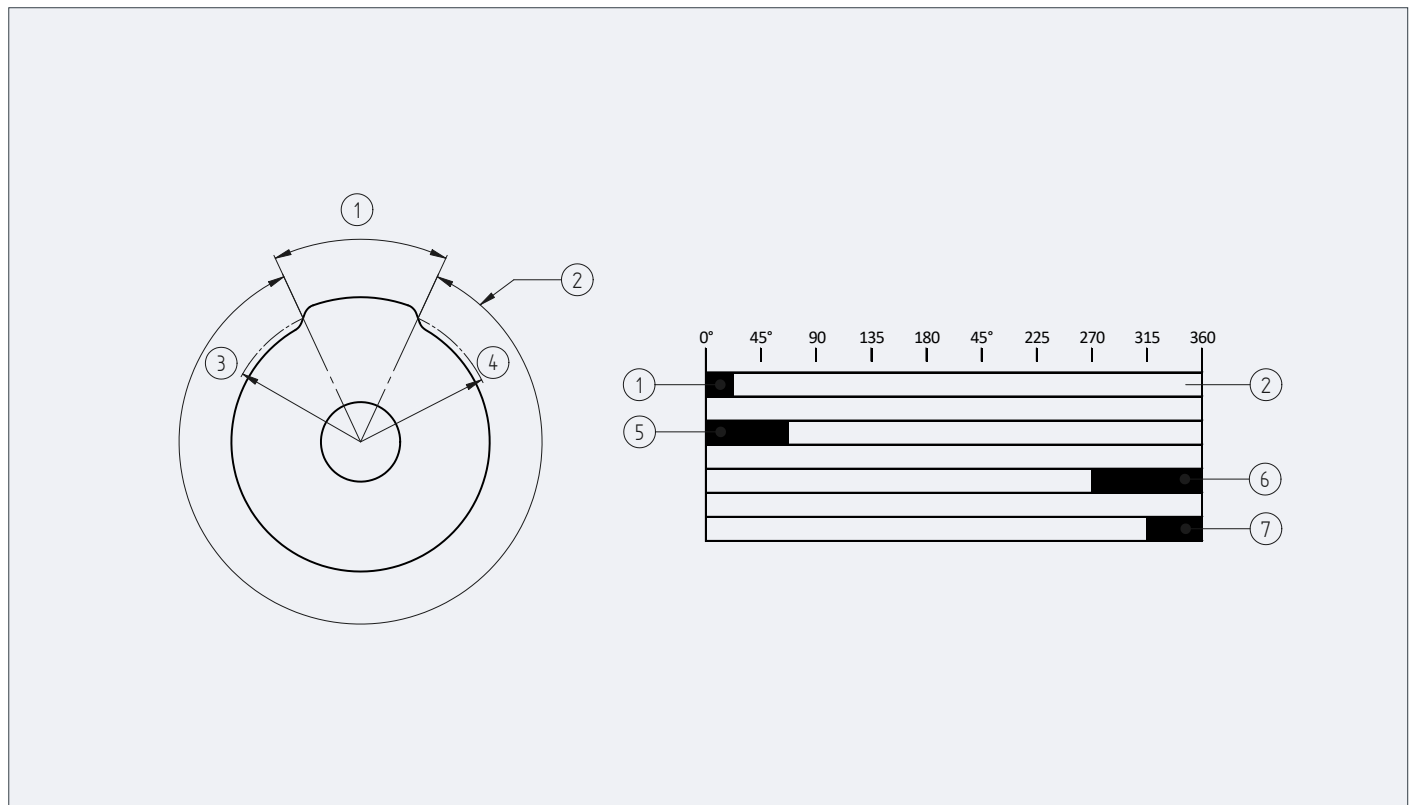
Revision date: 29.08.2024

Features

- 40 degree cam discs standard
- Other cam angles on request

Application

- For different switching programs cam discs with customized angles can be manufactured



A	Cam angle diagram
1	Effective cam angle α (=castor angle)
2	Usable cam angle β
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 after the effective cam angle. For cam discs of series Light Cam® / Light Cam®M, this corresponds to the switching point angle on the switching point radius of the cam disc. Standard cam angle for series Light Cam® / Light Cam®M is 40°.

Any cam angles (15° – 345°) can be supplied as a special design upon request.

For cam discs with an effective angle α other than 40°, the usable revolutions and the overrun revolutions are obtained by multiplying the values stated in the table „gear data“ by the following factors:

$$\text{Factor usable revolutions} = \frac{360^\circ - \alpha^\circ}{360^\circ - 40^\circ}$$

$$\text{Factor overrun revolutions} = \frac{\alpha^\circ}{40^\circ}$$

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

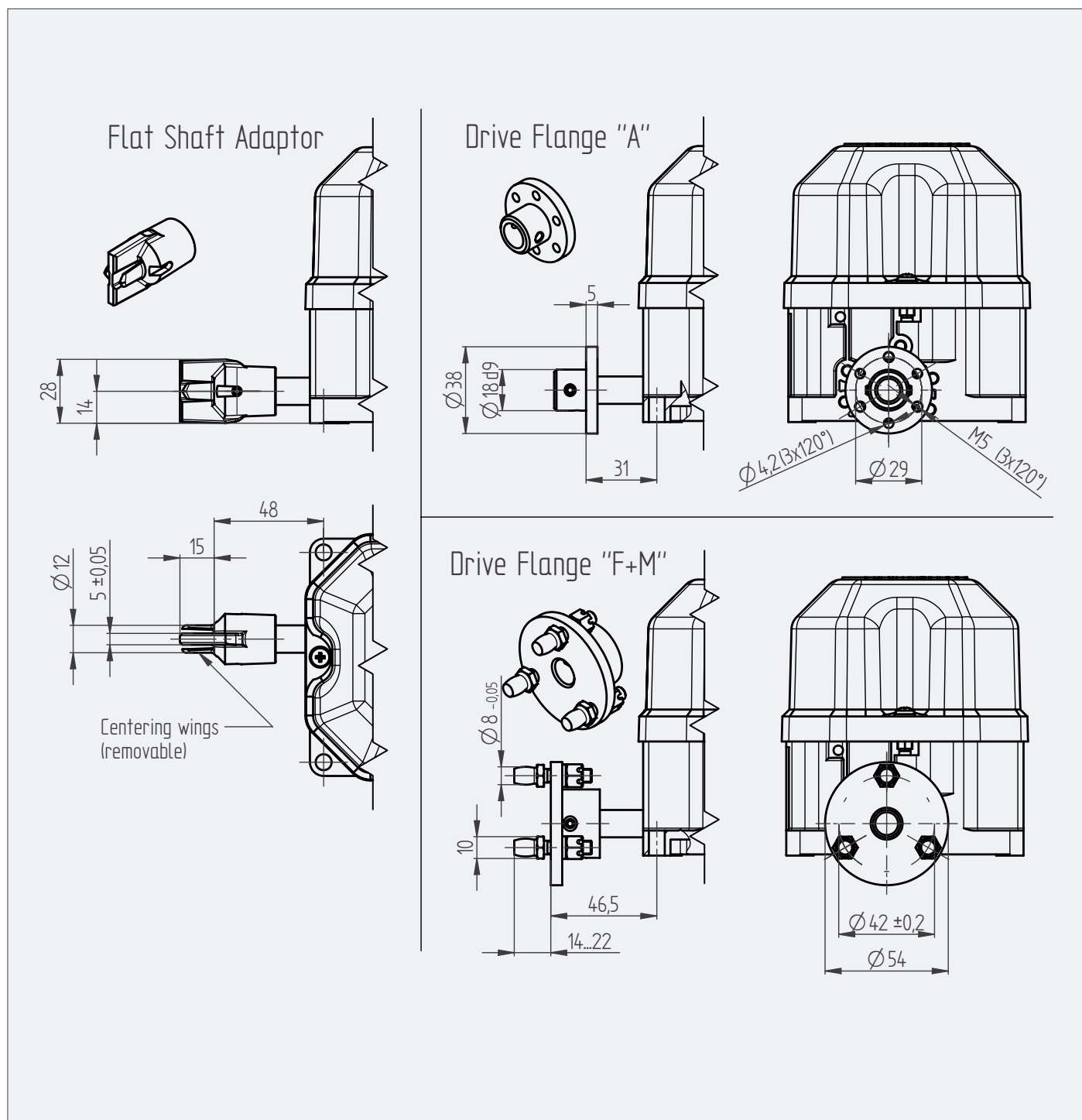
LC® / LC® M – Optional Drive Flanges

Revision number: 3.1.2.10-01

Revision date: 19.11.2019

Features

- Easy adaptation for crane hoist with flange F+M and flat shaft adaptor
- Flange A for pinion wheels and belt drives



LC[®] / LC[®] M – Option: Anti-Condensation-Heating

Revision number: 3.1.2.11-02

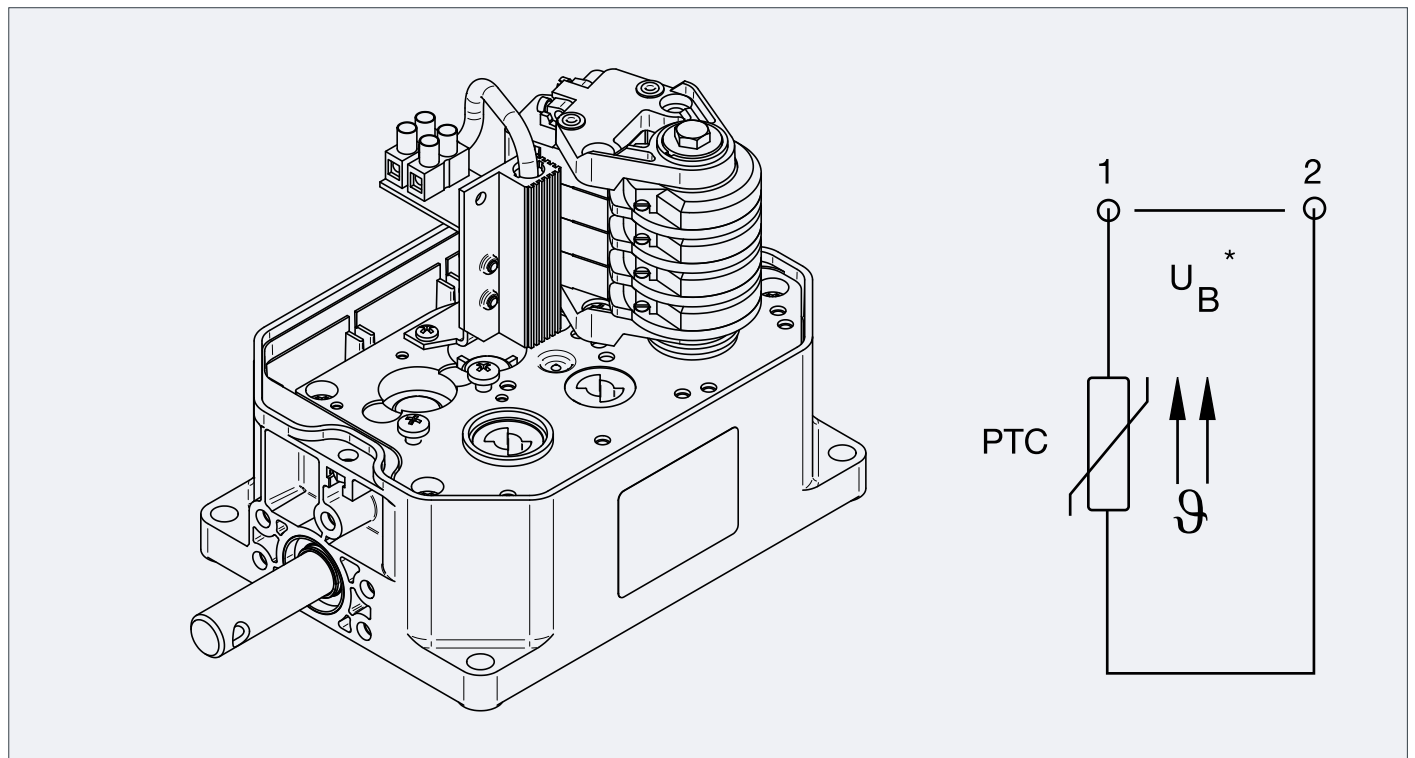
Revision date: 06.09.2022

Features

- PTC regulated heater
- 12 -36 or 110 – 250 V AC/DC

Application

- For application with high humidity or changing temperatures to avoid condensation water



Design: UB	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 Ω ± 35 %	R25 = 1500 Ω ± 35 %
PTC Reference temperature	50 °C	50 °C
Protection class (VDE 0100, 0160)	not required	II
Connecting cable	2 x 0,25 mm ² , Silicon cable	2 x 0,25 mm ² , Silicon cable
Radiator	Anodised aluminum	Anodised aluminum
Weight	approx. 40 g	approx. 40 g

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

LC® / LC® M – Option: Potentiometer

Revision number: 3.1.2.12-01

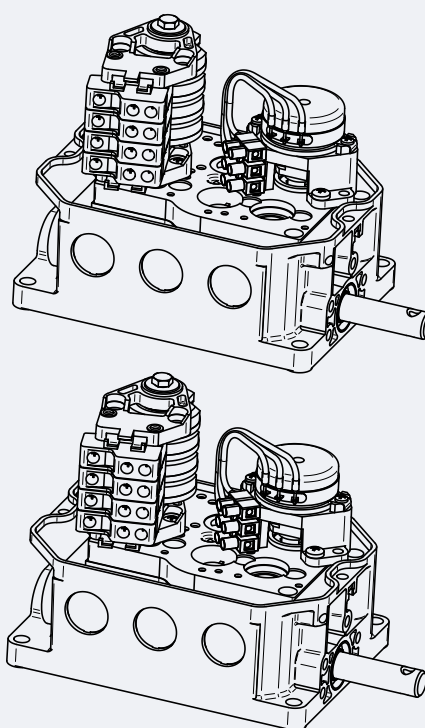
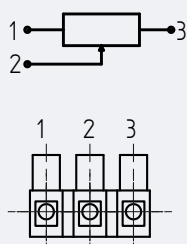
Revision date: 19.11.2019

Features

- Cost effective solution for analog measurement

Application

- For simple measurements with lower requirements for preciseness



Connector

Solid conductor	0.5 ... 2.5 mm ² / 20 ... 12 AWG
Fine-stranded conductor	0.5 ... 2.5 mm ² / 20 ... 12 AWG
Strip length	ca. 4 mm / ca. 0.15 Inch

Pin Assignment

Pin	Color
1	red
2	blue
3	black

Technical data

Technology	wirewound					conductive synthetic		
Effective electrical angle of rotation*	355° ±5°					350° ±2°		
Rotational noise (ENR)	100 Ohm							
Max. / recommended wiper current	35 mA / 2 µA					max. 1 µA		
Power rating @ 70°C	0,5 W							
Insulation Voltage	1000 VAC, 1 min							
Insulation Resistance	1000 Mohm @ 1000 VDC					> 10 Mohm @ 500 V		
Lifetime	1 Mio. rotations (90° el. eff. angle half sine)*					100.000.000 movements*		
Operating temperature range	-20 ... +80 °C					-30 ... +80 °C		
Vibration (IEC 68-2-6, Test Fc)	15g 10..2000Hz x 12h					20g / 5..2000Hz / 0,75 mm		
Shock (IEC 68-2-27, Test Ea)	49g @ 11 ms x 18					50g / 11 ms		
Total resistance [kOhm]	1	2	5	10	20	1	2	5
Resistance tolerance	±3%	±3%	±3%	±3%	±3%	±20%	±20%	±20%
Independent linearity (best straight line)	±0,35%	±0,25%	±0,25%	±0,25%	±0,25%	±0,075%	±0,075%	±0,075%
Number of wire turns	570	740	1000	1270	1670	-	-	-
Theoretical resolution	0,18%	0,14%	0,10%	0,08%	0,60%	0,008°	0,008°	0,008°

* Referring to potentiometer shaft

LC[®] / LC[®] M – Option: Analog Encoder 4 – 20 mA

Revision number: 3.1.2.13-02

Revision date: 12.10.2021

Features

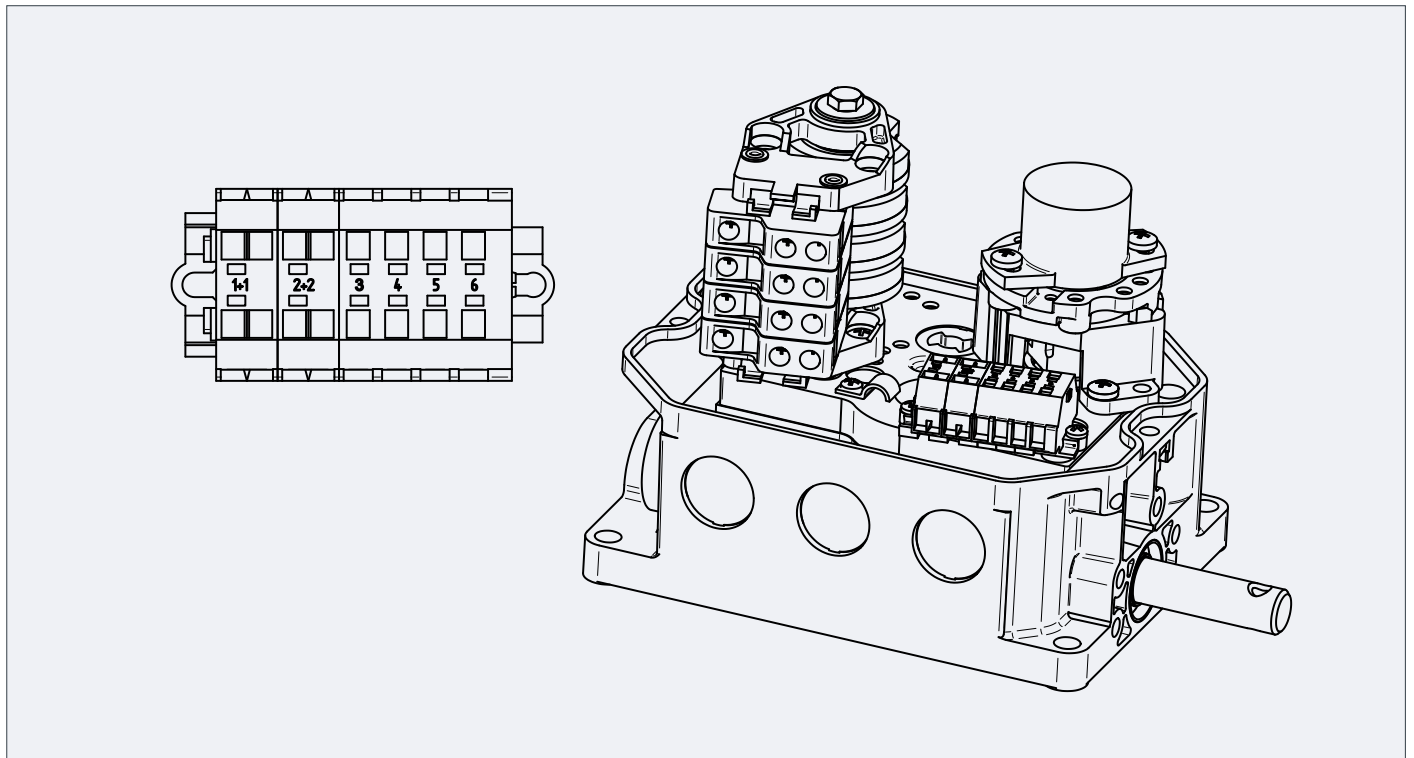
- Contactless measuring method
- Absolute value acquisition
- Long lifetime
- Turning synchronously with the cam discs

Application

- For simple measuring of absolute signals

Additional information

- Programmable type on request



Technical Data	
	non-programmable type
Drive	Coupling (1:1 with cam discs)
Measuring range (Referring to encoder shaft)	360°
Output Signal	4 ... 20 mA
Turning direction (Referring to drive shaft limit switch)	cw rising values
Resolution	12 Bit
Indep. Linearity	± 0.3 % of measuring range
Supply Voltage	16 ... 35 V DC
Current consumption without load (typ.)	19 mA
Ohmic load at output	0 ... 500 Ohm
Max. capacitive load at output	100 nF
Lifetime	50 mio. movements
Operating Temperature	-40°C ... +85 °C

Signal	Pin	Color
Supply Voltage	1+1	brown
Ground	2+2	green
-	3	-
Output signal	4	white
Screen	5	
-	6	-

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

LC® / LC® M – Option: Incremental Encoder

Revision number: 3.1.2.14-01

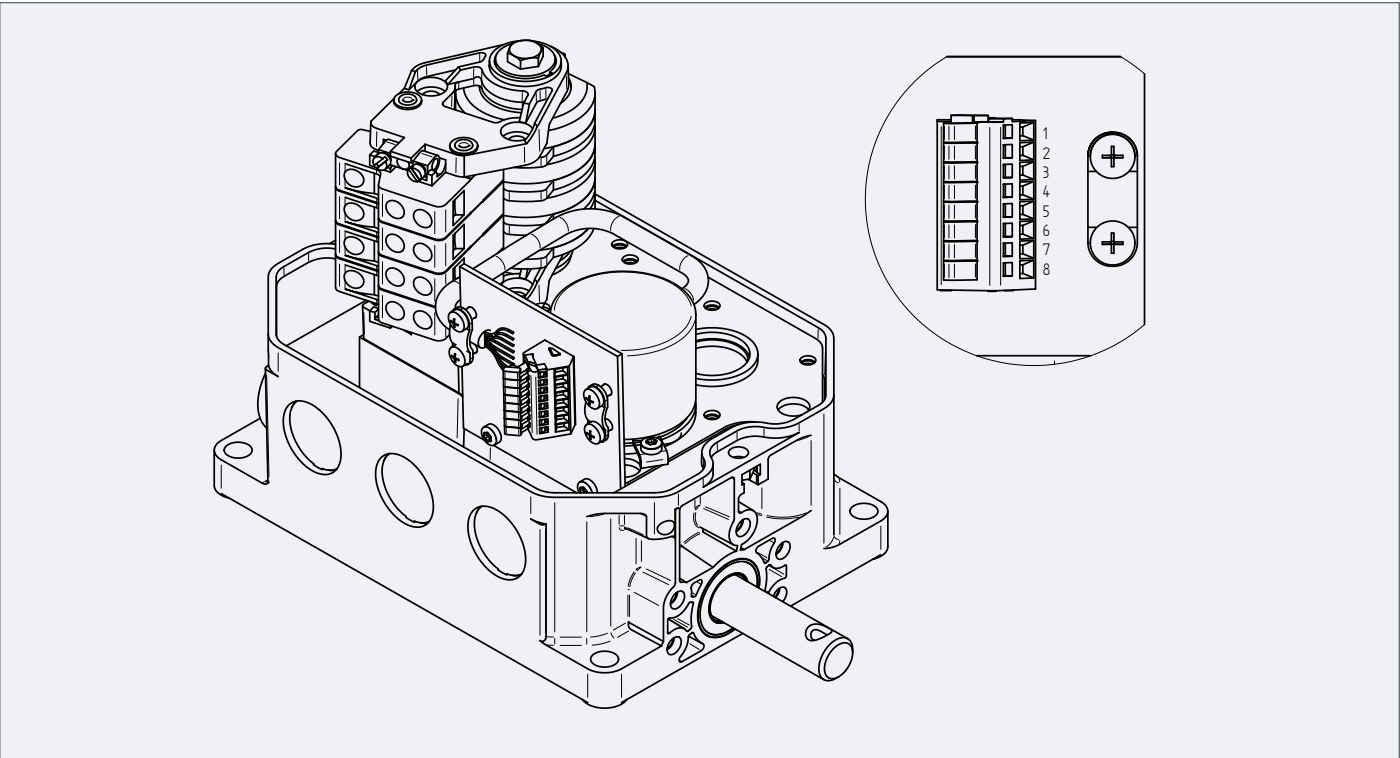
Revision date: 19.11.2019

- Features

 - Optical measuring
 - Up to 3600 increments in small housing possible
 - Already wired to squirrel cage tension
- Application

 - For giving information about speed and position
- Additional information

 - Driven 1:1 by bevel gear



Technical Data			Assignment	Pin	Color	Connector	
Power Supply UB	5 V ± 5% or 8...30 V	8 ... 30 V DC	Ground	1	white	Solid conductor	0.08 ... 1.5 mm² / 28 ... 16 AWG
Pulses / 360°	5 ... 3600		Supply-Voltage V _{cc}	2	brown	Multi-stranded conductor	0.08 ... 1.5 mm² / 28 ... 16 AWG
Power consumption	Typ. 40 mA	< 40 mA	A - Signal	3	green	Fine-stranded conductor	0.08 ... 1.5 mm² / 28 ... 16 AWG
(without load)	Max. 90 mA		B - Signal	4	yellow	Strip length	9 ... 9 mm / 0.31 ... 0.35 Inch
Permissible load	± 20 mA	± 50 mA	0 - Signal	5	gray		
Signal level "high"	> 2,5 V	> V _{cc} - 3 V	A-Inv. - Signal	6	pink		
Signal level "low"	< 0,5 V	< 2,5 V	B-Inv. - Signal	7	blue		
Max. Frequency	300 kHz	200 kHz	0-Inv. - Signal	8	red		
Operating Temperature	-40°C ... +85 °C (5...1024 pulses)						
	-30°C ... +85 °C (>1024 pulses)						

LC[®] / LC[®] M – Option: SSI Multiturn Encoder

Revision number: 3.1.2.15-01

Revision date: 19.11.2019

Features

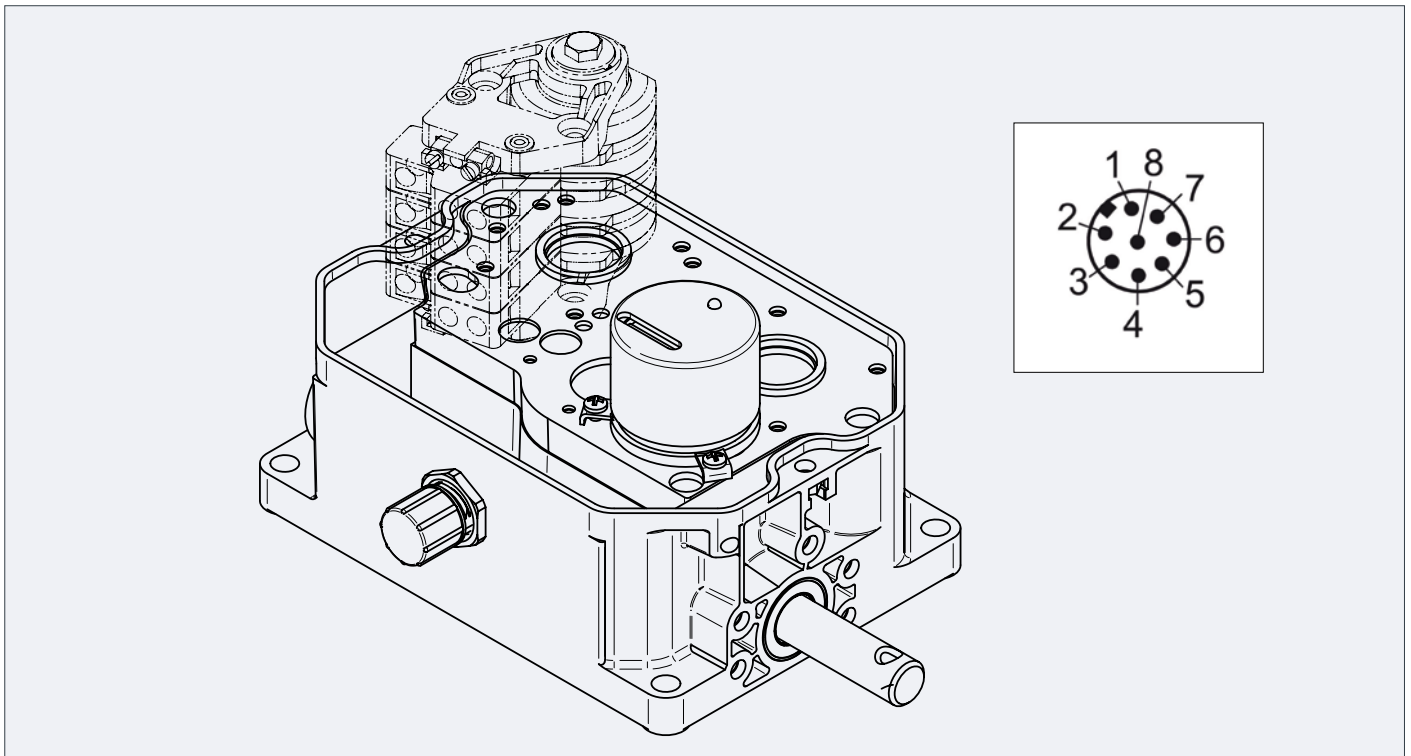
- Absolute value with high preciseness
- Without gear (Energy harvesting technology)
- Connection via M12 plug at the outside of the housing

Application

- For very high accuracy demands

Additional information

- Driven 1:1 by the bevel gear



Technical Data		Configuration		Pin Assignment		
Resolution Singleturn	8 ... 14 Bit	Turning direction	CW : DIR = GND	Signal	Pin	Color
Resolution Multiturn	1 ... 39 Bit	(View on shaft)	CCW : DIR = +UB	Ground	1	white
Interface	SSI	Set to Zero	Preset = +UB (2s)	Supply Voltage	2	brown
Code	Gray / Binary	Deactivate	Preset = GND	SSI CLK +	3	green
Clock frequency	100 kHz ... 500 kHz	LED -Behaviour		SSI CLK -	4	yellow
Data output	RS485 comp.	At Boot-Up	red (< 2,3s)	SSI DATA +	5	gray
Power Supply	10 ... 32 V DC	Error	red (> 2,3s)	SSI DATA -	6	pink
Power Consumption	Max. 0,5 W	Normal function	green	Preset	7	blue
Turn on time	max. 1,5 s			DIR	8	red
Operating Temperature	-40°C ... +85 °C			Screen	9	violet

GEARED CAM LIMIT SWITCHES

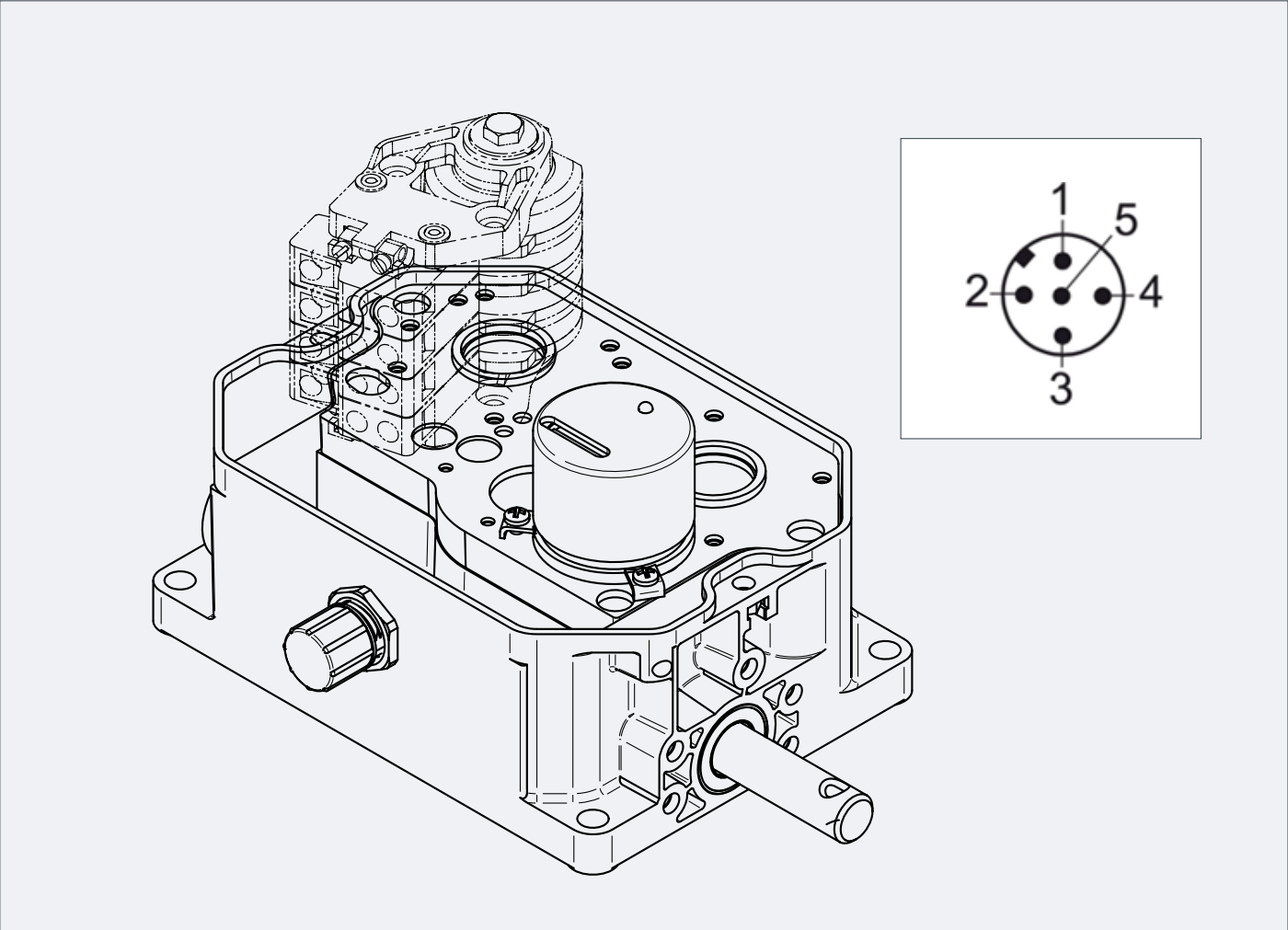
Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

LC® / LC® M – Option: CANopen Multiturn Encoder

Revision number: 3.1.2.16-01

Revision date: 27.05.2025



Technical Data	
Resolution singleturn	8 ... 14 Bit
Resolution multiturn	1 ... 39 Bit
Code	Binary
Interface	CAN
Protocol	CANopen
Node ID	1 ... 127 (default: 127)
Programmable CAN transmission modes	Synchronous / Asynchronous
Power Supply	10 ... 32 V DC
Power Consumption	Max. 0,5 W
Turn on time	max. 1,5 s
Operating Temperature	-40°C ... +85 °C

Pin Assignment		
Signal	Pin	Color
Ground	1	white
Supply Voltage	2	brown
CAN High	3	green
CAN Low	4	yellow
CAN GND	5	gray

Standard settings as well as any customization in the software can be changed via LSS (CiA 305) and the SDO protocol (PDOs, Scaling, Heartbeat, Node-ID, Baud rate, etc.)

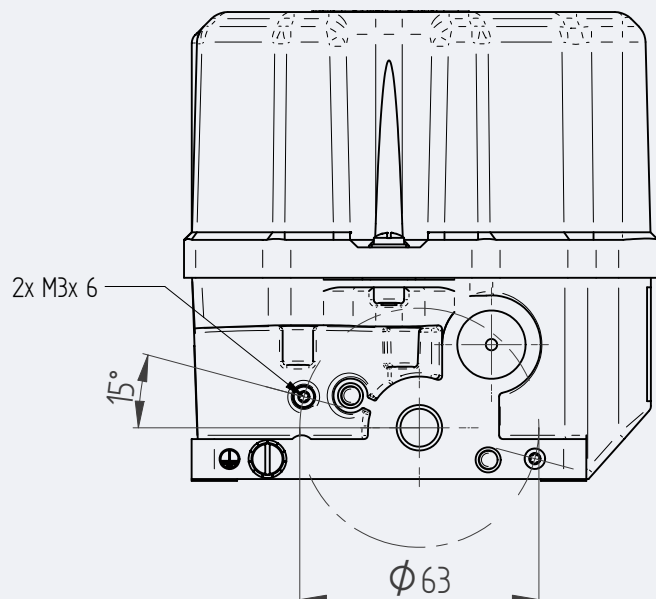
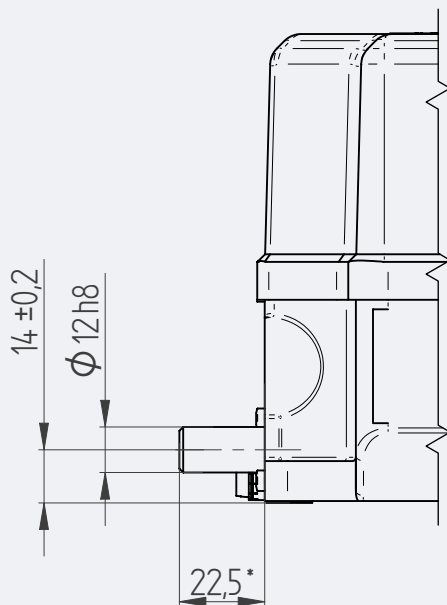
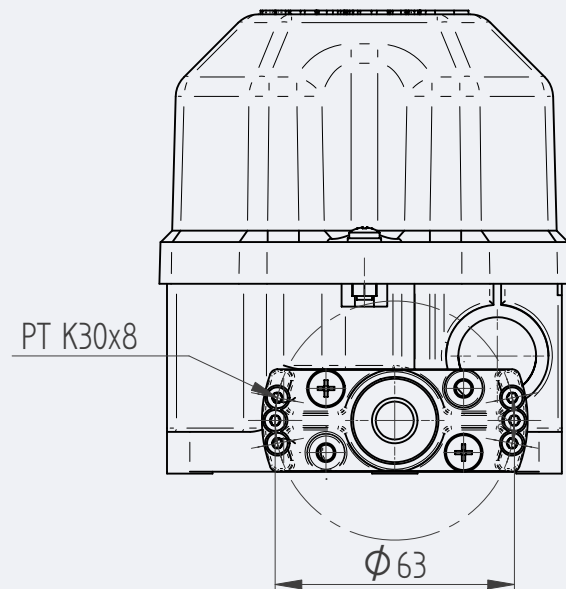
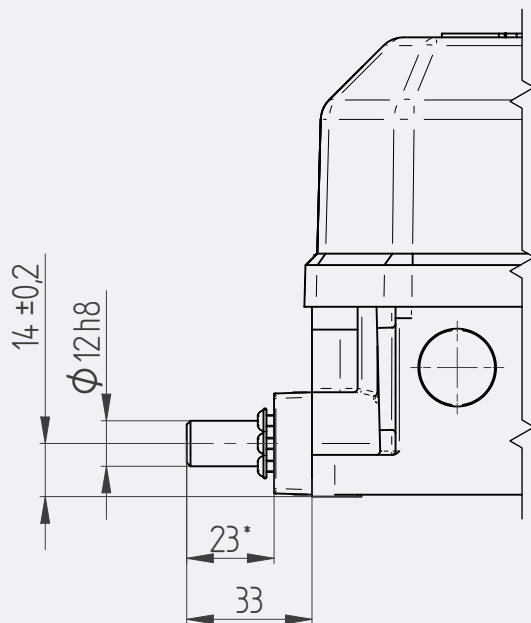
LC[®] / LC[®] M: 2nd shaft end (encoder drive)

Revision number: 3.1.2.17-02

Revision date: 28.10.2022

Additional information

- For driving multiturn hollow shaft encoders from the second shaft end
- Driven 1:1 by the input shaft



GEARED CAM LIMIT SWITCHES

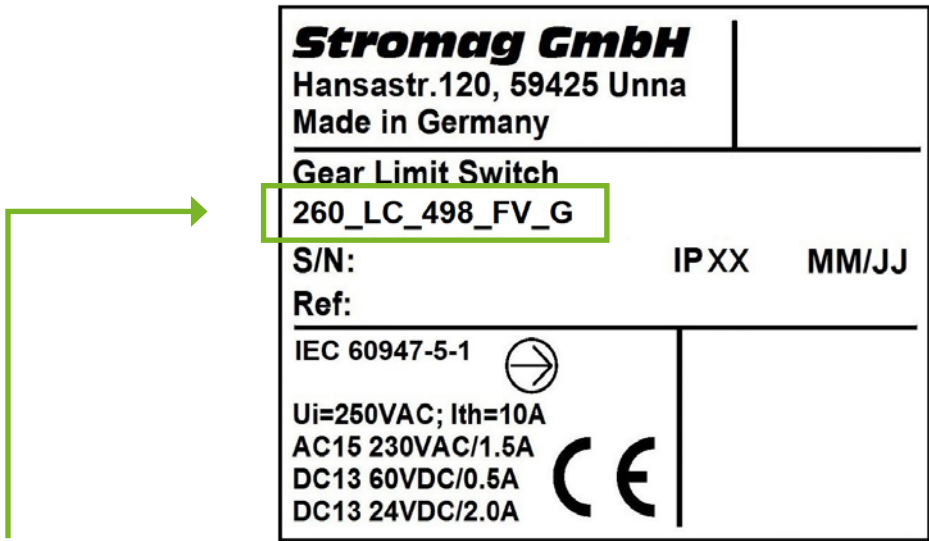
Limit Switch Control Current

Worm / Bevel Geared Cam Limit Switches

LC® / LC® M: Key of Types

Revision number: 3.1.2.18-04

Revision date: 29.08.2024



Light Cam® / Light Cam® Metal		Switch type: GCLS Series Light Cam® / Light Cam® Metal	
260	Nominal Revolutions	0.85, 1.85, 3.9, 6, 9, 15, 25, 29, 53, 76, 95, 135, 180, 260, 360, 435, 515, 620, 880	
LC	Housing type	Light Cam®	Synthetic housing
		Light Cam®M	Aluminum housing
4	Number of switches fitted	1 - 8	
98	Type of switch fitted	98	Switch (changeover) with screw connections, contact material: Silver (standard)
		98G	Switch (changeover) with screw connections, contact material: Gold
		99P	Switch (changeover) with flat plug connections, contact material: Silver
		99T	Switch (push action) with screw connections, contact material: Silver
		99A	Switch (push action) with screw connections, contact material: Gold
		90	Switch (NC+NO) with screw connections, contact material: Silver
		90G	Switch (NC+NO) with screw connections, contact material: Gold
		88	Switch (2x NC) with screw connections, contact material: Gold
		80	Switch (NC+NO) with screw connections, contact material: Silver
		81	Switch (NC+NO, push action) with screw connections, contact material: Silver
FV	Type of cam discs	FV	Precise adjustable
G	Additional components	G	With encoder / sensor
		P	With potentiometer

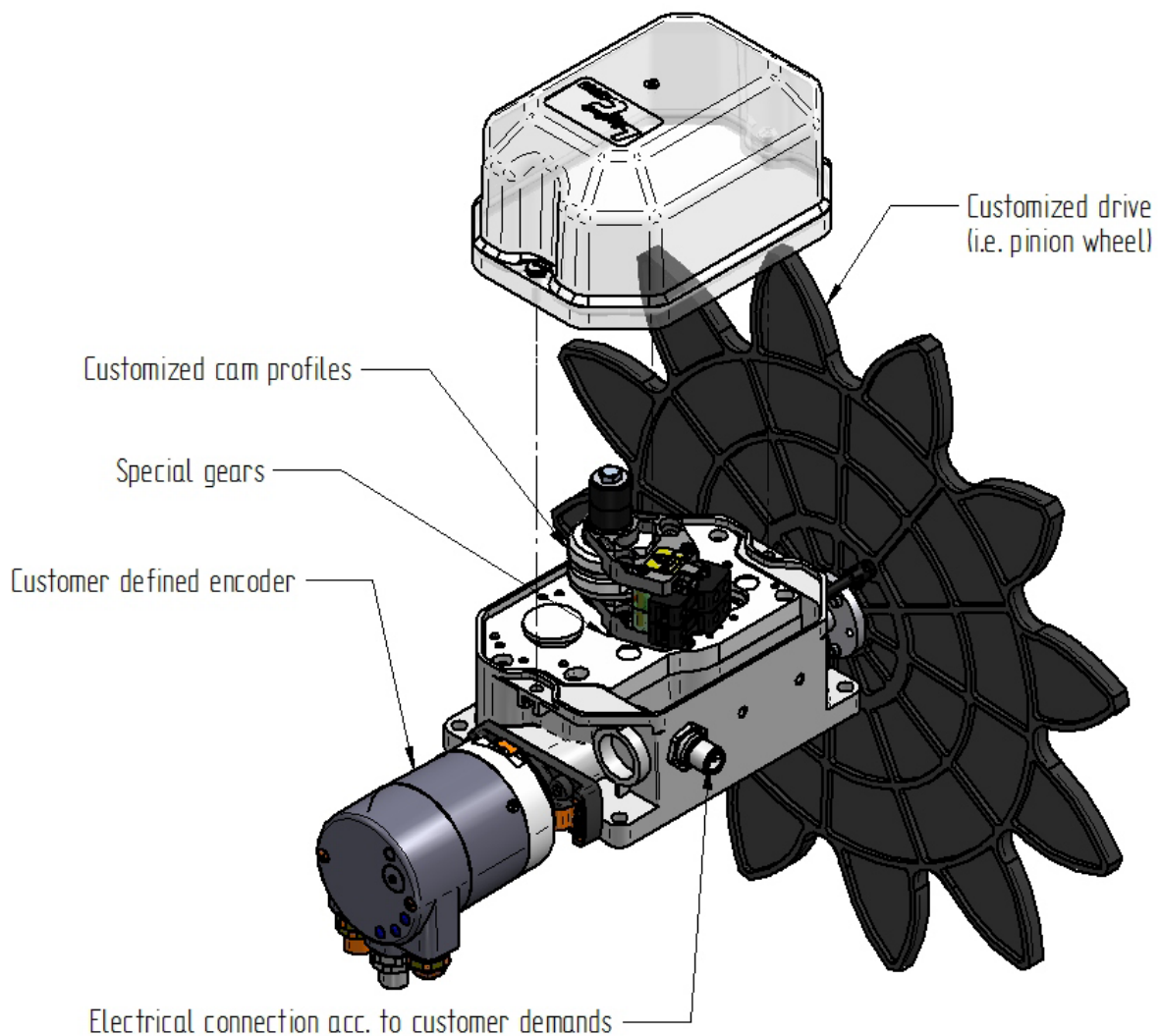
LC[®] / LC[®] M: Highly customizable solutions

Revision number: 3.1.2.19-01

Revision date: 19.11.2019

Additional information

- Pinion wheels available on request
- Highly customized options for almost all parts available on request





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