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 **RegalRexnord**[™]



SERIES 51 / 51 DZ
GEARED CAM LIMIT SWITCHES





DECADES OF EXPERIENCE

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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GEARED CAM LIMIT SWITCHES

AT A GLANCE



STROMAG SERIES 51

BENEFITS INCLUDE

- Cam adjustment at fixed position inside of the housing
- Large cam disc diameter
- Modular design
- Various housing designs
- Direct drive of incremental and absolute encoders possible

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Basic Limit Switch

Revision number: 3.1.1.1-02

Revision date: 10.06.2020

Features

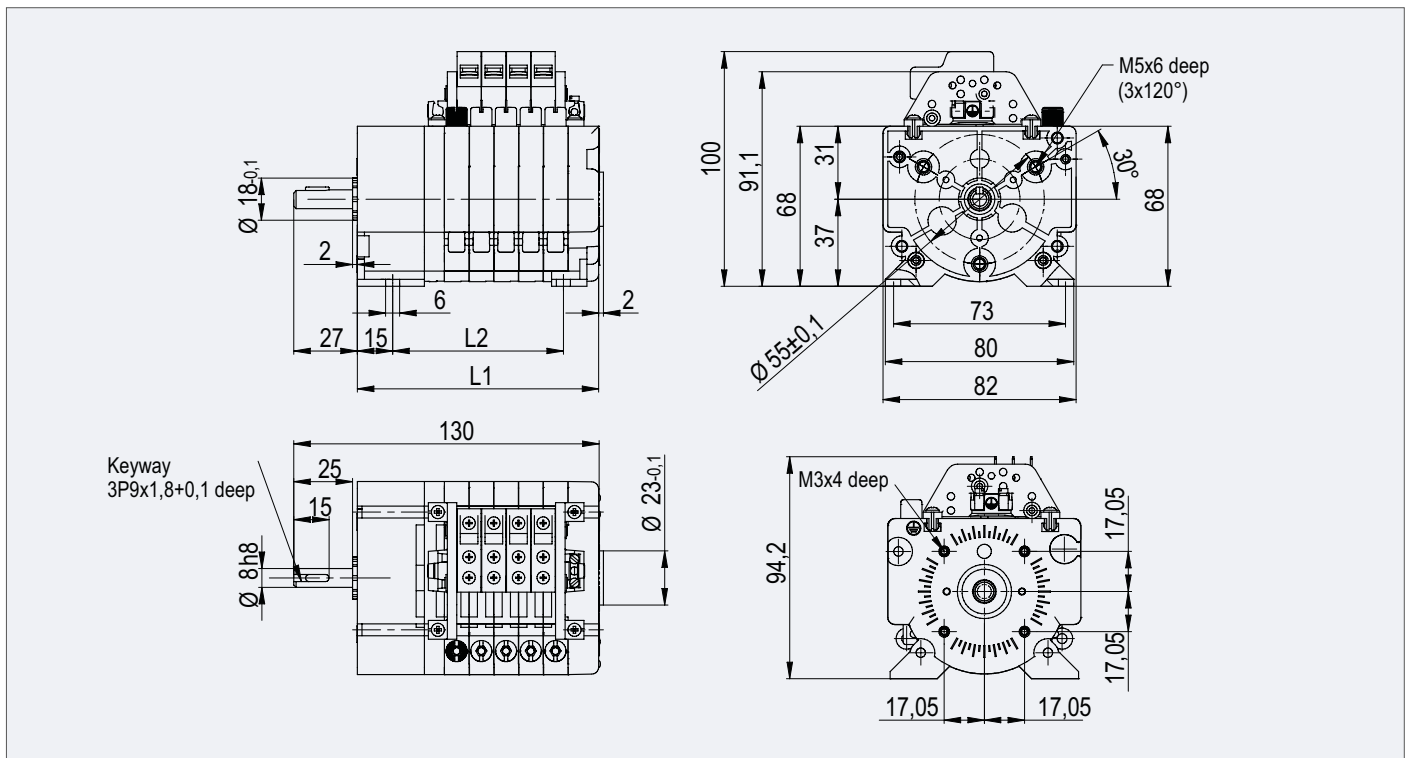
- Patented planetary gear form fit
- Modular design
- Large cam disc diameter 60 mm for high switching point repeatability

Application

- Crane
- Wind
- Stage

Additional information

- IP20 Protection
- For installation in customer housings
- High number of different gear possibilities



Standard gear	DZ gear	Gear size	2 Switching Contacts A		4 Switching Contacts B		6 Switching Contacts C		8 Switching Contacts D	
			L1 [mm]	L2 [mm]	L1 [mm]	L2 [mm]	L1 [mm]	L2 [mm]	L1 [mm]	L2 [mm]
4,1NM	67DZ	1	62,5	32,5	83,5	53,5	104,5	74,5	125,5	95,5
6,5NM	110DZ									
11NM	180DZ									
17,5BM	280DZ	2	73	43	94	64	115	85	136	106
29BM	470DZ									
48BM	770DZ									
75BM	1200DZ	3	81,5	51,5	102,5	72,5	123,5	93,5	144,5	114,5
125BM	2000DZ									
205BM	3300DZ									
323BM	5200DZ	4	90	60	111	81	132	102	153	123
540BM	8700DZ									
880BM	14200DZ									
1384BM		5	98,5	68,5	119,5	89,5	140,5	110,5	161,5	131,5
2288BM										
3735BM										
5900BM		6	107	77	128	98	149	119	170	140
9800BM										
16000BM										

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

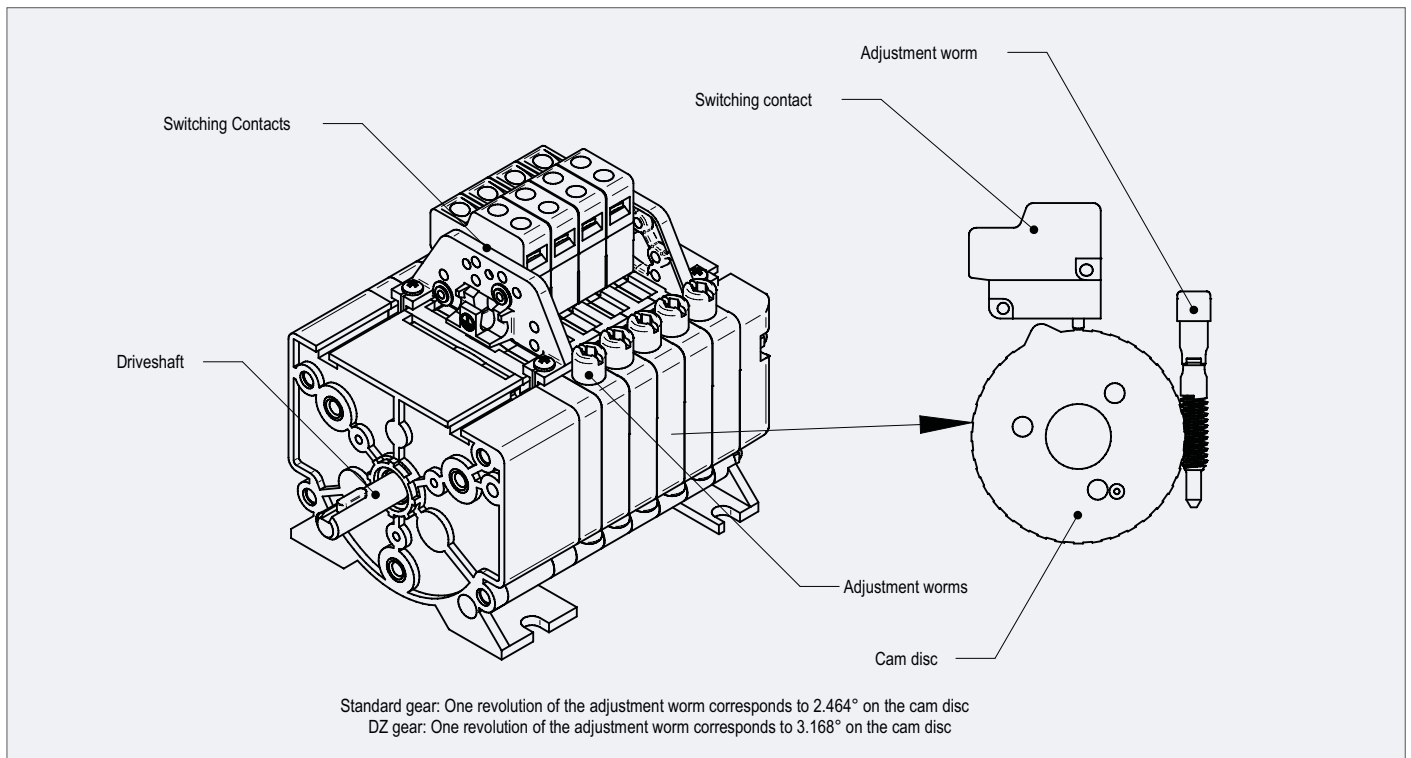
Series 51 – Gear Data

Revision number: 3.1.1.2-03

Revision date: 05.02.2021

Features

- 4.1 up to 16000 nominal revolutions
- Precise and low-wear design
- Usable up to 1800 rpm
- Block adjustment



Gear Data Standard Gear						
Gear size	Nominal revolutions (15° - cam disc)	Nominal revolutions (40° - cam disc)	Gear ratio	Mechanical hysteresis [revolutions at drive shaft]	Max. input speed [rpm]	Min. input speed [rpm] (only when used as a changeover)
1	4,1	3,8	4,286	0,01 – 0,02	1000	0,67
	6,5	6,2	7,085	0,01 – 0,02	1200	1,1
	11	10,2	11,567	0,02 – 0,04	1500	1,8
2	17,5	16,3	18,367	0,03 – 0,06	1800	2,9
	29	26,9	30,362	0,05 – 0,1	1800	4,7
	48	44	49,573	0,08 – 0,16	1800	7,7
3	75	69	78,717	0,13 – 0,3	1800	12,2
	125	115	130,124	0,21 – 0,42	1800	20,2
	205	188	212,456	0,35 – 0,68	1800	33
4	323	299	337,359	0,6 – 1,17	1800	52
	540	495	557,676	0,92 – 1,8	1800	87
	880	809	910,526	1,5 – 2,9	1800	141
5	1384	1285	1445,826	2,4 – 4,7	1800	224
	2288	2124	2390,039	3,9 – 7,7	1800	371
	3735	3468	3902,255	6,5 – 12,7	1800	606
6	5900	5507	6196,398	10,3 – 20,1	1800	-
	9800	9104	10243,025	17,0 – 33,3	1800	-
	16000	14865	16723,951	27,8 – 54,2	1800	-

Gear Data DZ Gear						
Gear size	Nominal revolutions (15° - cam disc)	Nominal revolutions (40° - cam disc)	Gear ratio	Mechanical hysteresis [revolutions at drive shaft]	Max. input speed [rpm]	Min. input speed [rpm] (only when used as a changeover)
1	67	62	70,000	0,11 – 0,22	1800	10,9
	110	102	115,714	0,19 – 0,4	1800	18
	180	167	188,929	0,31 – 0,6	1800	29,4
2	280	266	300,000	0,5 – 1,0	1800	46,7
	470	440	495,918	0,84 – 1,7	1800	77,1
	770	719	809,694	1,35 – 2,6	1800	125
3	1200	1142	1285,714	2,1 – 4,1	1800	199
	2000	1889	2125,364	3,5 – 10,3	1800	330
	3300	3084	3470,117	5,5 – 11,3	1800	539
4	5200	4897	5510,204	9,1 – 17,8	1800	856
	8700	8096	9108,705	15,1 – 29,5	1800	1415
	14200	13219	14871,928	24,7 – 48,2	1800	-

Stromag Geared Cam Limit Switches

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Switching Contacts

Revision number: 3.1.1.3-05

Revision date: 25.06.2024

Features

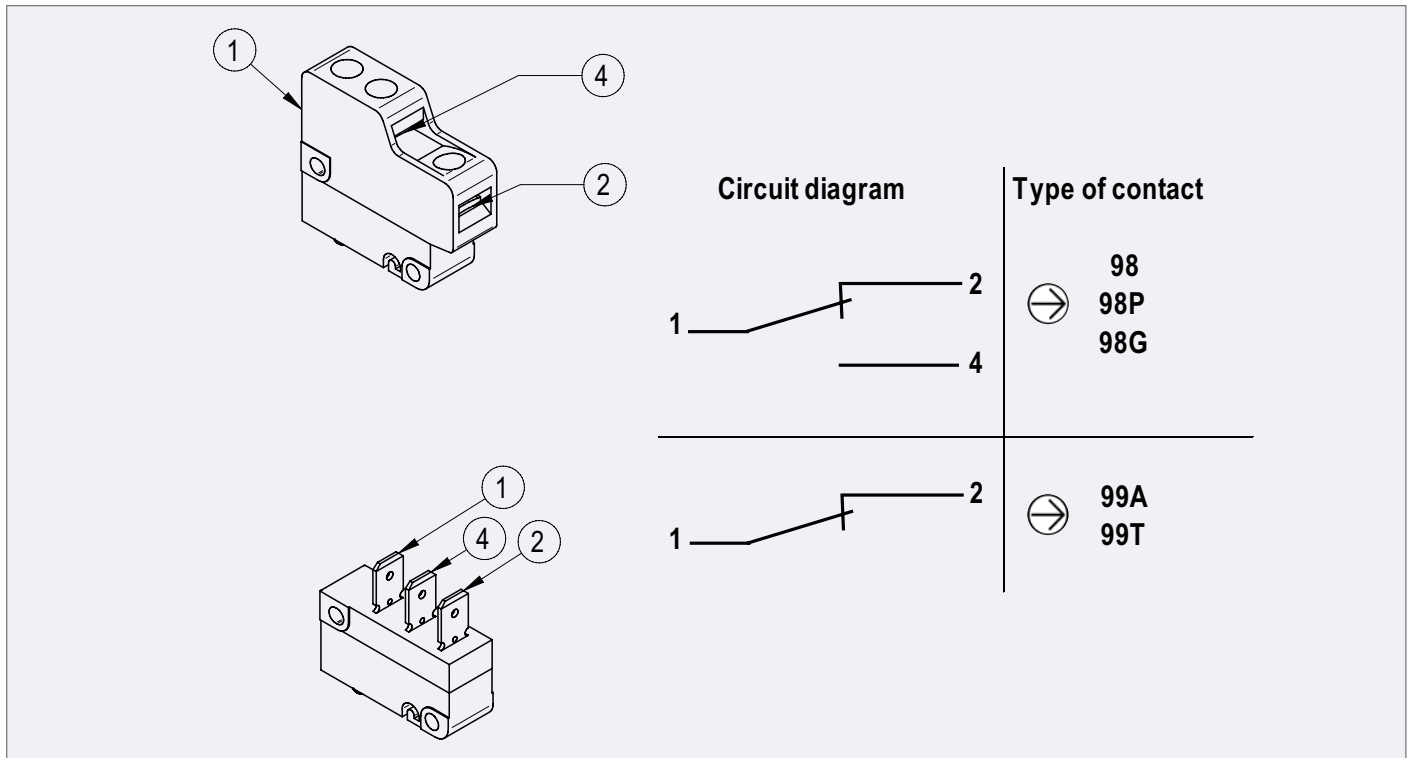
- Contacts with positive opening
- For up to 1 million mechanical switching operations
- Screw or flat plug connection
- Push or snap action contacts

Application

- Silver contacts for relays
- Gold plated contacts for low electrical loads (<12V; < 50 mA); Mechanical endurance limited to 50 000 switching operations

Additional information

- Approvals in accordance with CCC, cUL, CSA and DGUV V17 possible.
- Gold plated contacts prevent corrosions-related contact resistances.



Switching Contact			Contact Material		Switching System		Connection				Function		Electrical Data		
Designation	Circuit as a changeover	Circuit as an NC contact	Silver	Gold (PLC application)	Snap action switch	Push action switch	Screw terminals; 0.5 - 1.5 mm ² / AWG 16 ... 22	Flat plugs 6.3 mm	Soldering pins	Stranded 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	•		•		•						•	10 A gG	AC-15: 1.5 A, 230 V DC-13: 0.5 A, 60 V	6 A	250 V
98P	•		•							•	10 A gG				
98G	•			•	•					•	2 A gR				
99T		•	•			•				•	10 A gG				
99A		•		•		•				•	2 A gR				

• = applicable

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Protective Housing Compact (CxZ) IP65

Revision number: 3.1.1.4-01

Revision date: 19.11.2019

Features

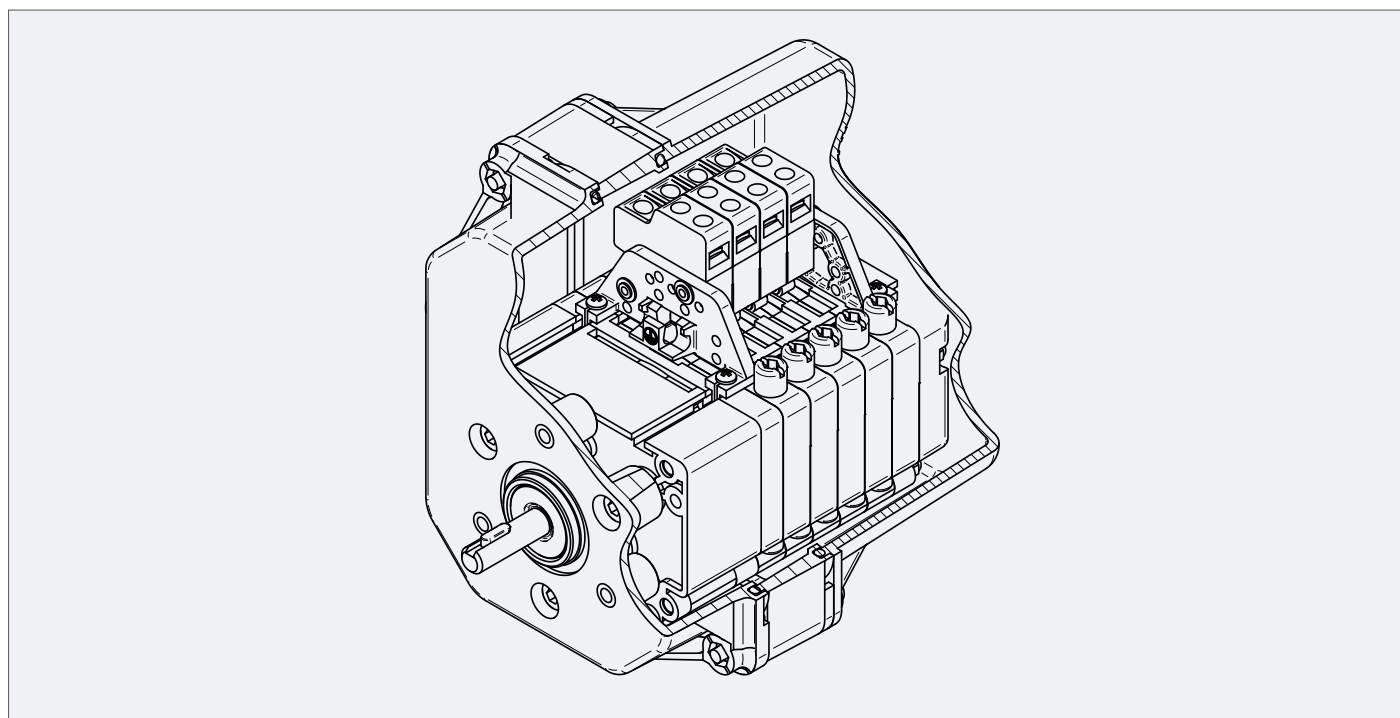
- Small modular housing for outdoor application
- Reinforced polycarbonate
- IP65 Protection

Application

- For crane and stage application

Additional information

- Possibility of integration of potentiometers, analog sensors, incremental encoders and small absolute encoders



Standard gear	DZ gear	Gear size	2 Switching Contacts A		4 Switching Contacts B		6 Switching Contacts C		8 Switching Contacts D	
			L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers
4,1NM	67DZ	1	106	0	106	0	131	1	156	2
6,5NM	110DZ									
11NM	180DZ									
17,5BM	280DZ	2	106	0	131	1	156	2	181	3
29BM	470DZ									
48BM	770DZ									
75BM	1200DZ	3	106	0	131	1	156	2	181	3
125BM	2000DZ									
205BM	3300DZ									
323BM	5200DZ	4	131	1	152	2	156	2	181	3
540BM	8700DZ									
880BM	14200DZ									
1384BM		5	131	1	152	2	181	3	206	4
2288BM										
3735BM										
5900BM		6	131	1	152	2	181	3	206	4
9800BM										
16000BM										

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

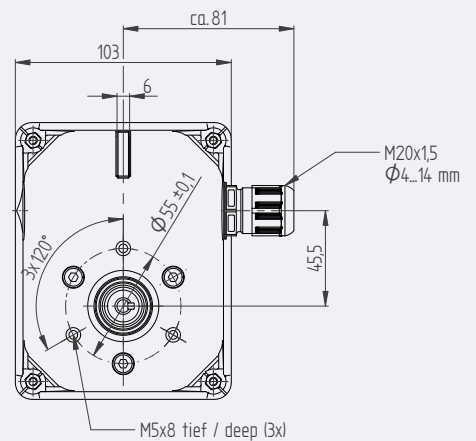
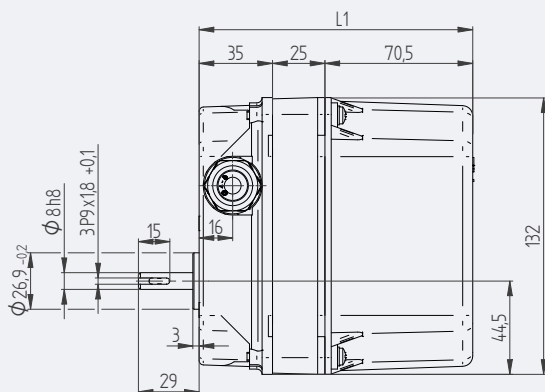
Planetary Gear Limit Switches

Series 51 – Protective Housing Compact (CxZ) IP65

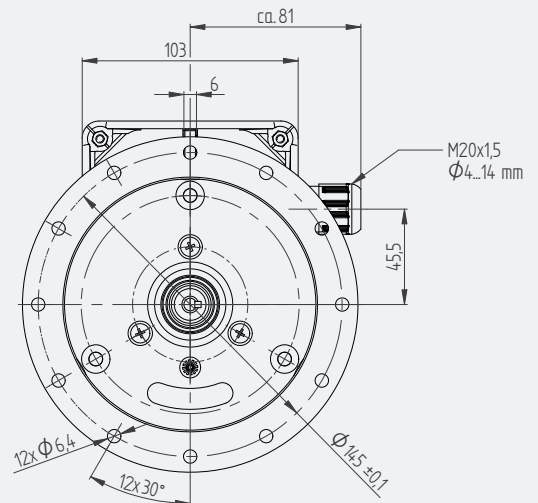
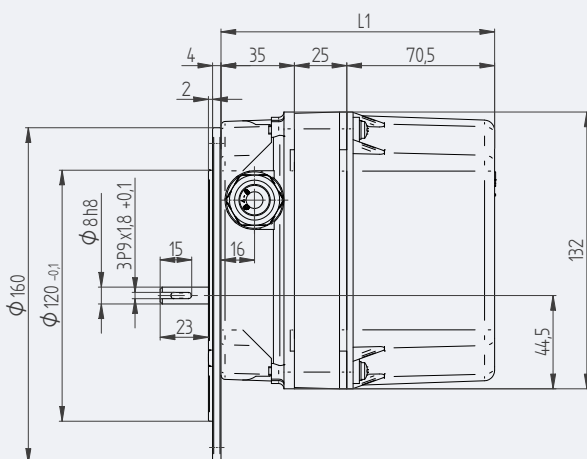
Revision number: 3.1.1.4-01

Revision date: 19.11.2019

Type B14



Type B5



GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Protective Housing (MxZ) IP66

Revision number: 3.1.1.5-01

Revision date: 19.11.2019

Features

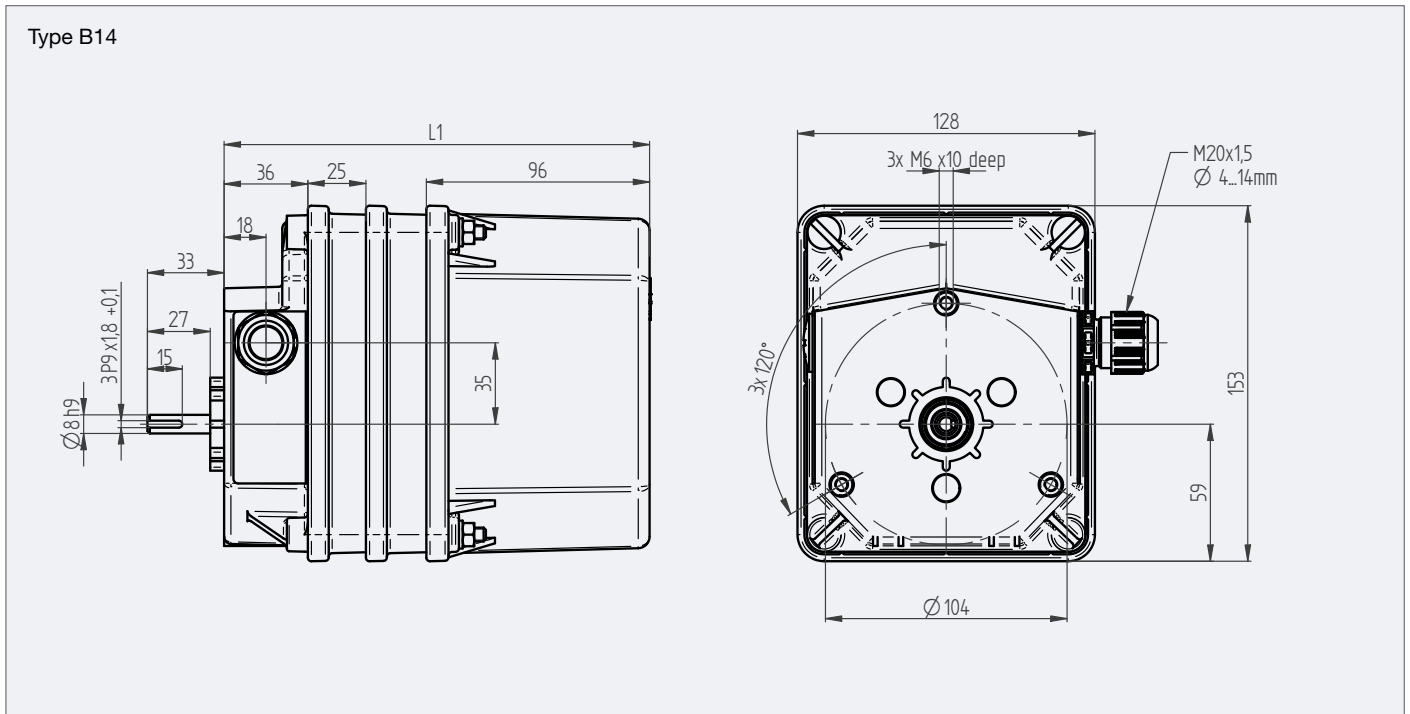
- Modular housing for outdoor application
- Reinforced polycarbonate
- IP66 Protection

Application

- Crane
- Wind
- Stage

Additional information

- Possibility of integration of potentiometers, analog sensors, incremental encoders and absolute encoders
- Ball bearing for input shaft
- Additional cable glands on request



Standard gear	DZ gear	Gear size	2 Switching Contacts A		4 Switching Contacts B		6 Switching Contacts C		8 Switching Contacts D	
			L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers
4,1NM	67DZ	1	132	0	132	0	132	0	157	1
6,5NM	110DZ									
11NM	180DZ									
17,5BM	280DZ	2	132	0	132	0	157	1	182	2
29BM	470DZ									
48BM	770DZ									
75BM	1200DZ	3	132	0	132	0	157	1	182	2
125BM	2000DZ									
205BM	3300DZ									
323BM	5200DZ	4	132	0	157	1	182	2	182	2
540BM	8700DZ									
880BM	14200DZ									
1384BM		5	132	0	157	1	182	2	207	3
2288BM										
3735BM										
5900BM		6	157	1	157	1	182	2	207	3
9800BM										
16000BM										

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

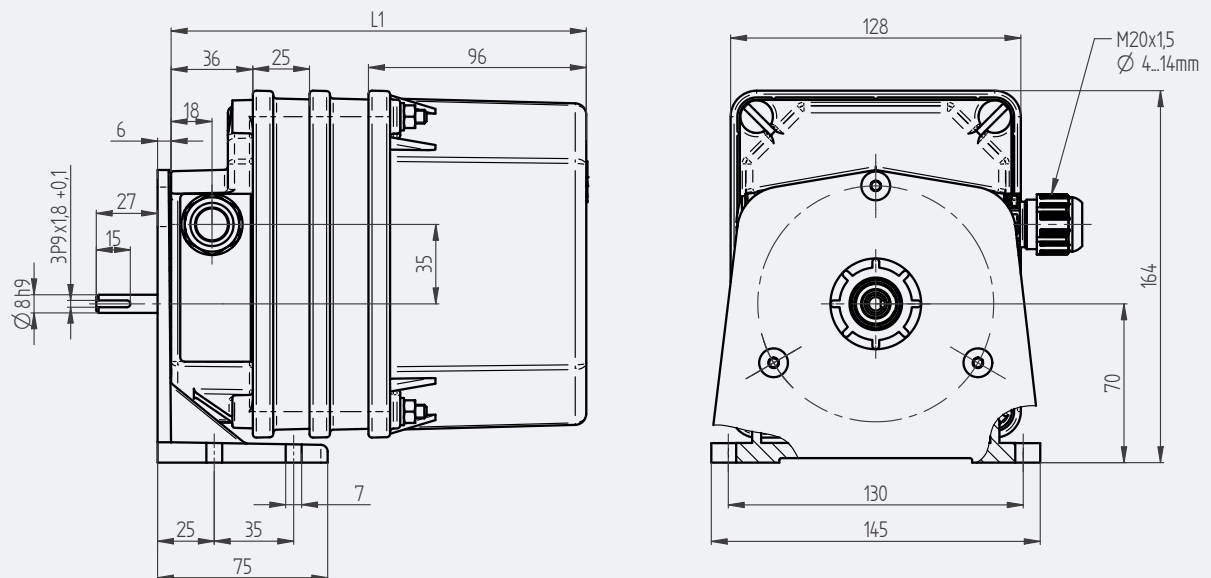
Planetary Gear Limit Switches

Series 51 – Protective Housing (MxZ) IP66

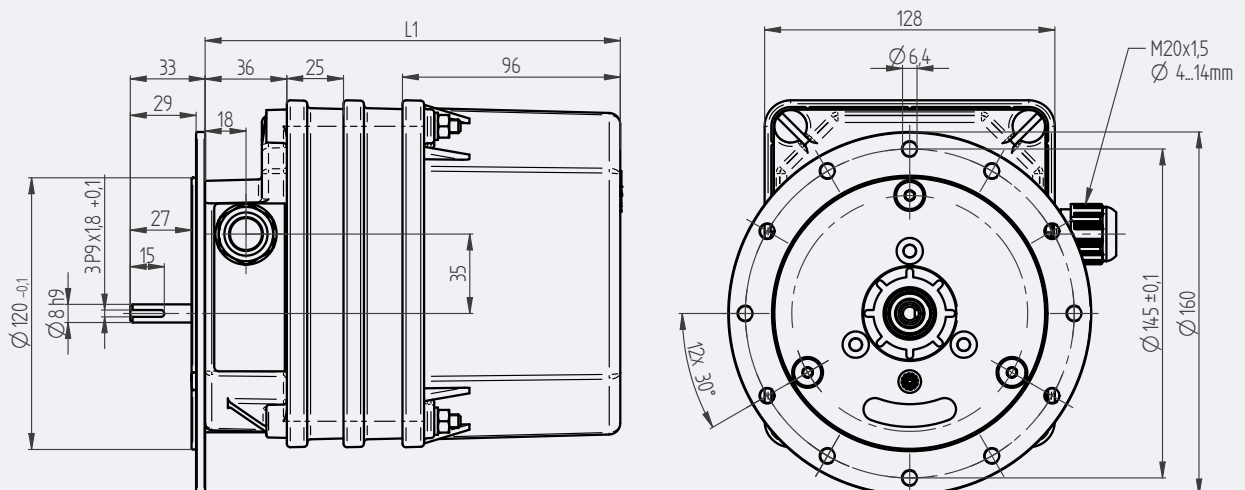
Revision number: 3.1.1.5-01

Revision date: 19.11.2019

Type B3



Type B5



GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Protective housing “MH” (Aluminum IP65)

Revision number: 3.1.1.6-01

Revision date: 19.11.2019

Features

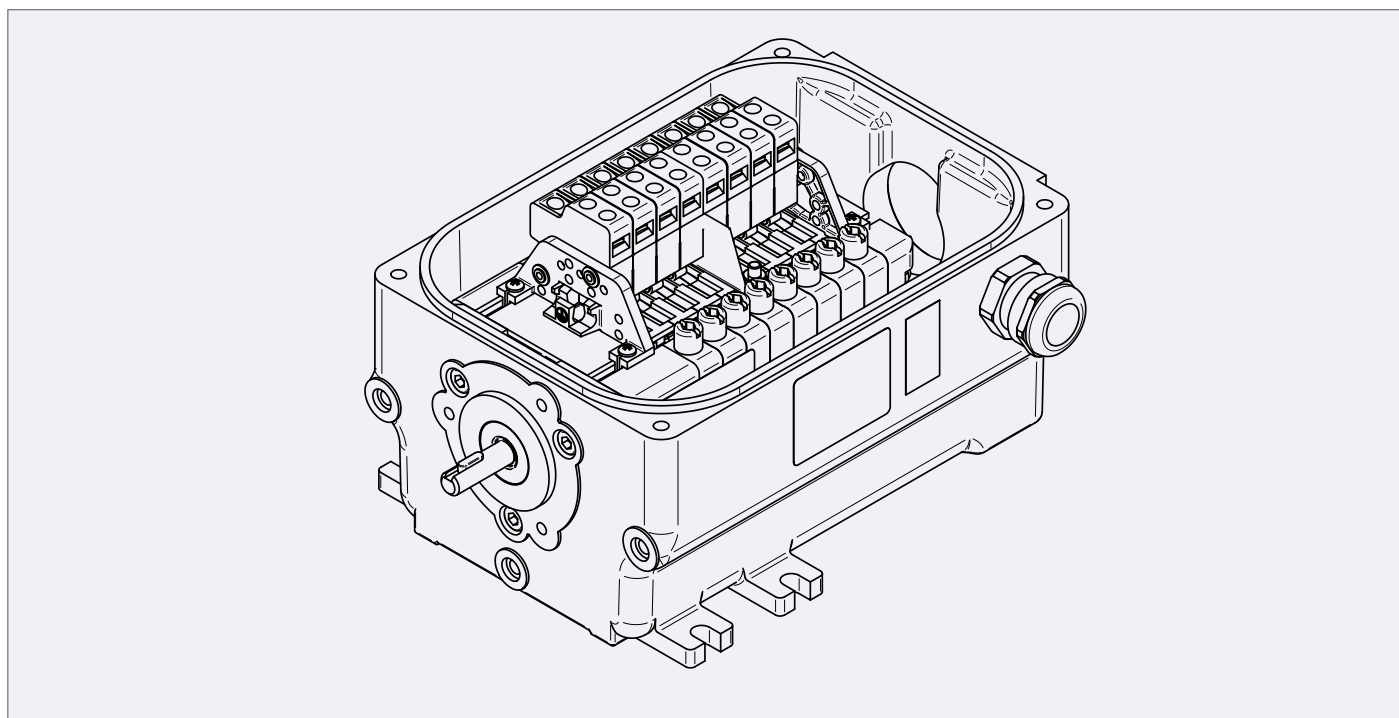
- Heavy duty aluminum housing
- IP65 Protection

Application

- Steel works

Additional information

- For external installation of large/heavy encoders
- Depending on size, installation of encoders inside is also possible



Standard-Gear	DZ-Gear	Gear size	2 Switching Contacts	4 Switching Contacts	6 Switching Contacts	8 Switching Contacts
4,1NM	67DZ	1	A	B	C	D
6,5NM	110DZ					
11NM	180DZ					
17,5BM	280DZ	2	A	B	C	D
29BM	470DZ					
48BM	770DZ					
75BM	1200DZ	3	A	B	C	D
125BM	2000DZ					
205BM	3300DZ					
323BM	5200DZ	4	A	B	C	not available
540BM	8700DZ					
880BM	14200DZ					
1384BM		5	A	B	C	not available
2288BM						
3735BM						
5900BM		6	A	B	not available	not available
9800BM						
16000BM						

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

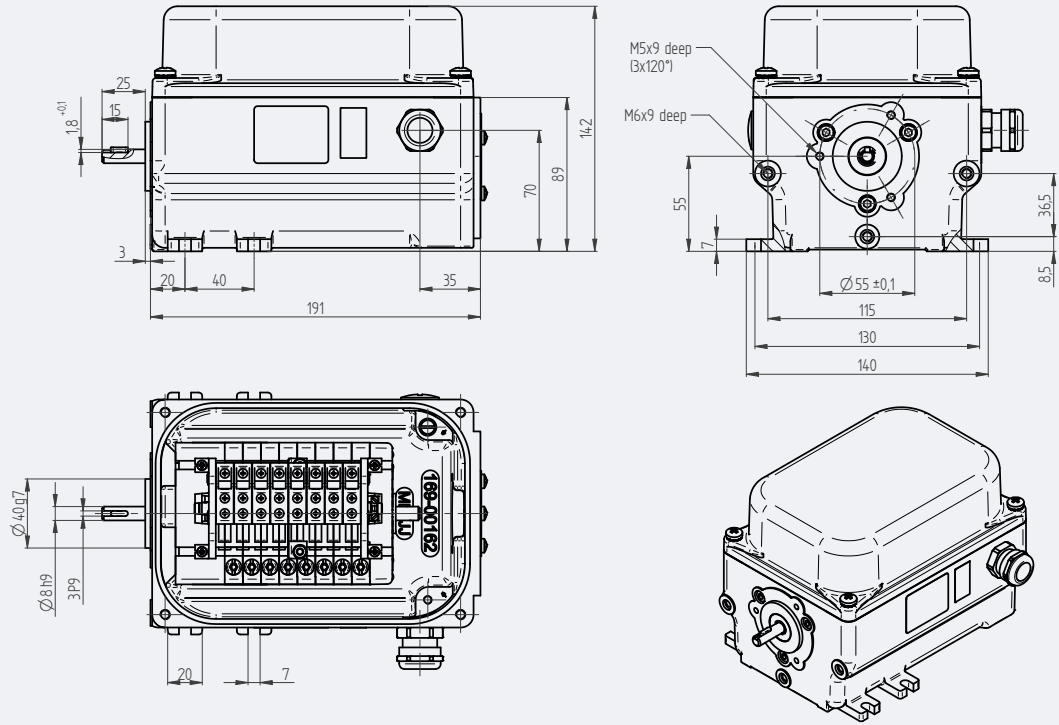
Planetary Gear Limit Switches

Series 51 – Protective housing “MH” (Aluminum IP65)

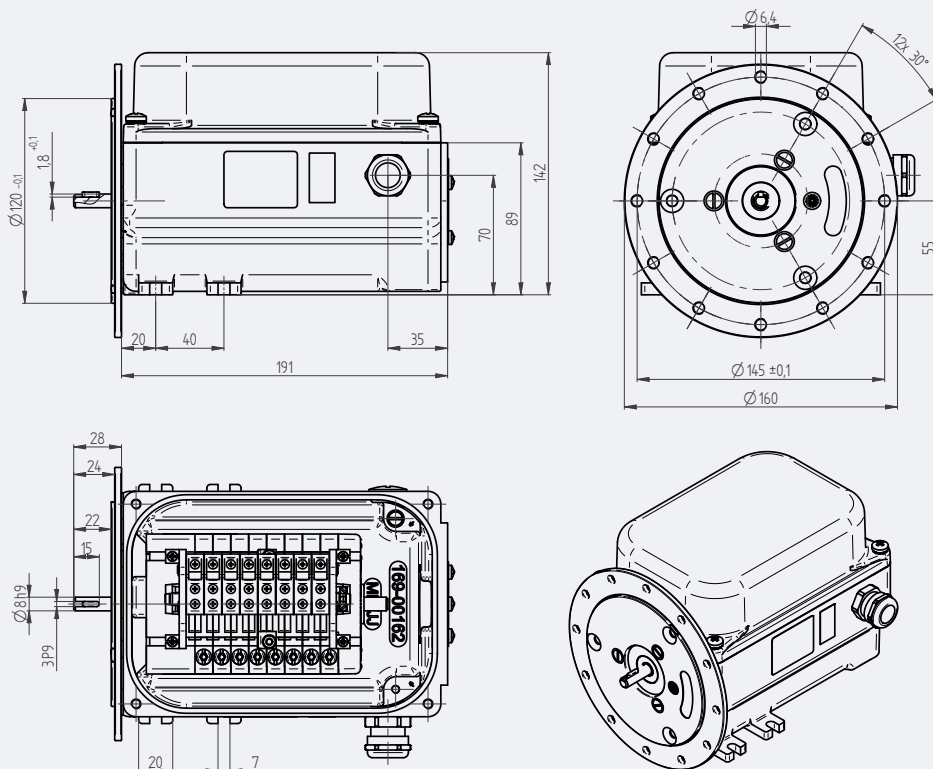
Revision number: 3.1.1.6-01

Revision date: 19.11.2019

Type B3



Type B3/B5



GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: Anti-Condensation Heating

Revision number: 3.1.1.7-03

Revision date: 06.09.2022

Features

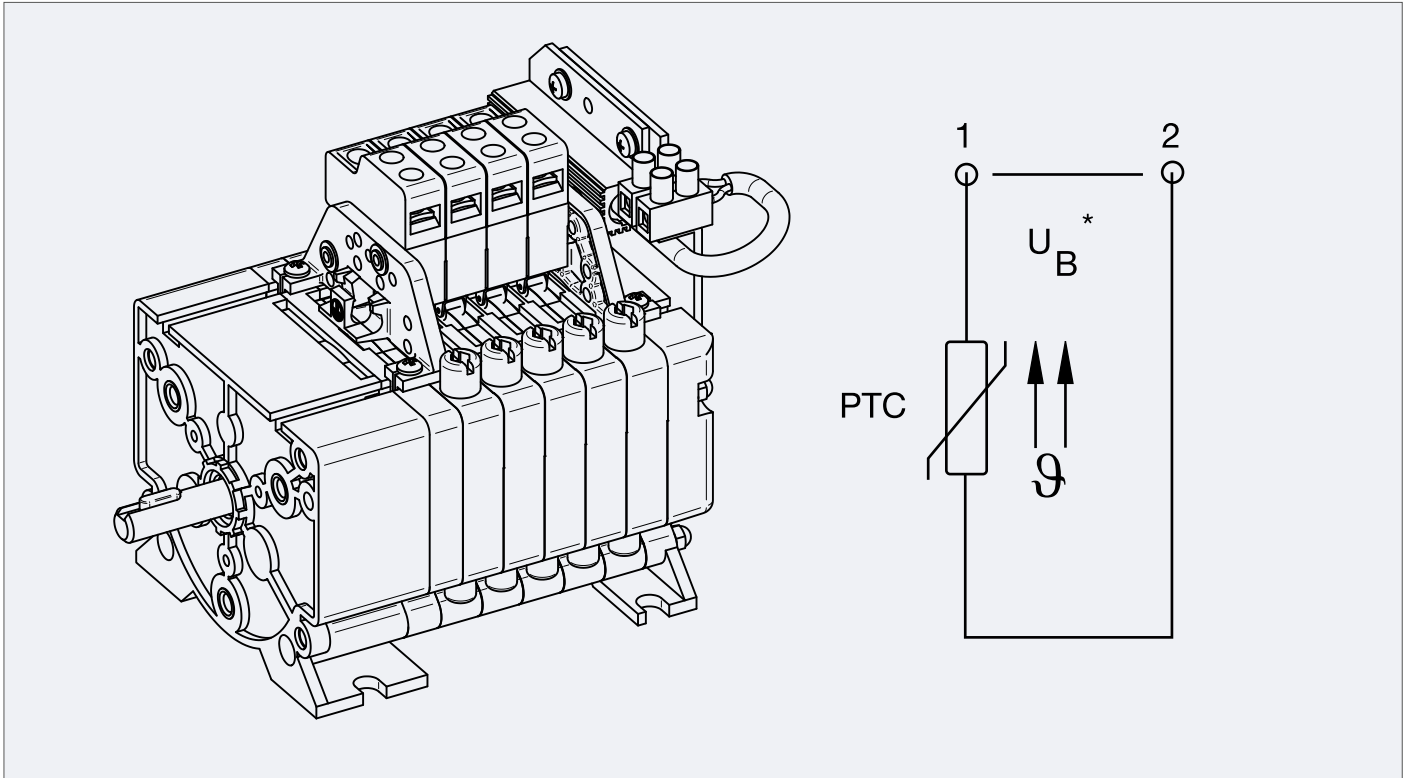
- PTC regulated heater
- 12 – 30 V or 110 -250 V AC/DC

Application

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

Additional information

- Can be integrated in all housings of the Series 51



Design: U ₃	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)	R ₂₅ = 20 Ω ± 35 %	R ₂₅ = 1500 Ω ± 35 %
PTC Reference temperature	50 °C	50 °C
Protection class (VDE 0100, 0160)	II	II
Radiator	Anodised aluminum	Anodised aluminum
Weight	approx. 40 g	approx. 40 g

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

Series 51 – Customizable Cam Discs

Revision number: 3.1.1.8-02

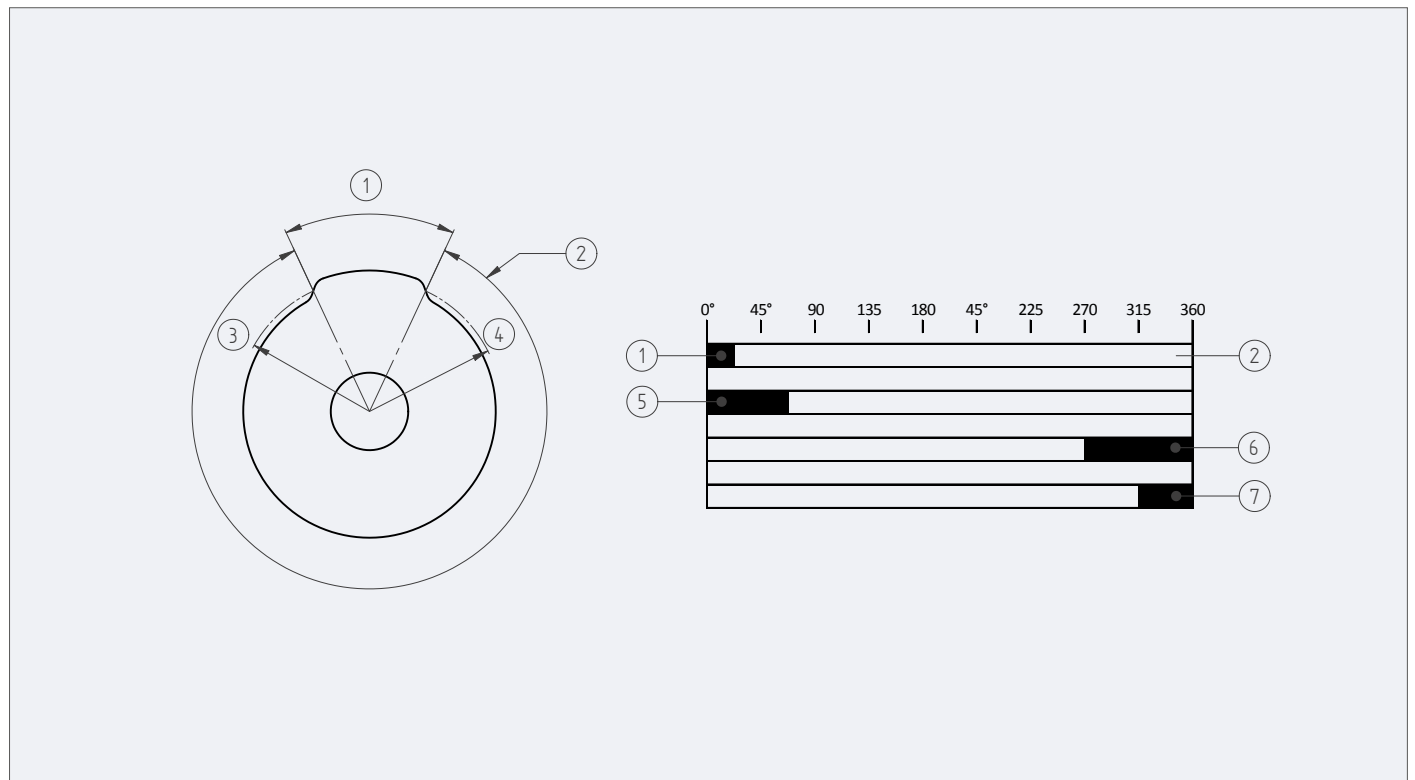
Revision date: 15.09.2021

Features

- 15 degree standard cam discs
- 40 degree cam discs free of charge on request
- Other cam angles on request

Application

- Cam discs with customized angles can be manufactured for different switching programs



A

B

- | | |
|---|------------------------|
| 1 | Effective cam angle |
| 2 | Effective cam angle β |
| 3 | Switching point radius |
| 4 | Reset point radius |

- | | |
|---|-------------------------|
| 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 51, this corresponds to the switching point angle on the switching point radius of the cam disc. Standard cam angle for Series 51 is 15°.

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

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

$$\text{Usable revolutions} = \frac{360^\circ - \text{Effective cam angle}}{360^\circ} \times \text{gear ratio}$$

Example for 17,5... with a gear ratio of $i = 18,367$ and usages of a 40° cam disc:

$$\text{Usable revolutions} = \frac{360^\circ - 40^\circ}{360^\circ} \times 18,367 = 16,3 \text{ (see page 6)}$$

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: Drive Flange

Revision number: 3.1.1.9-03

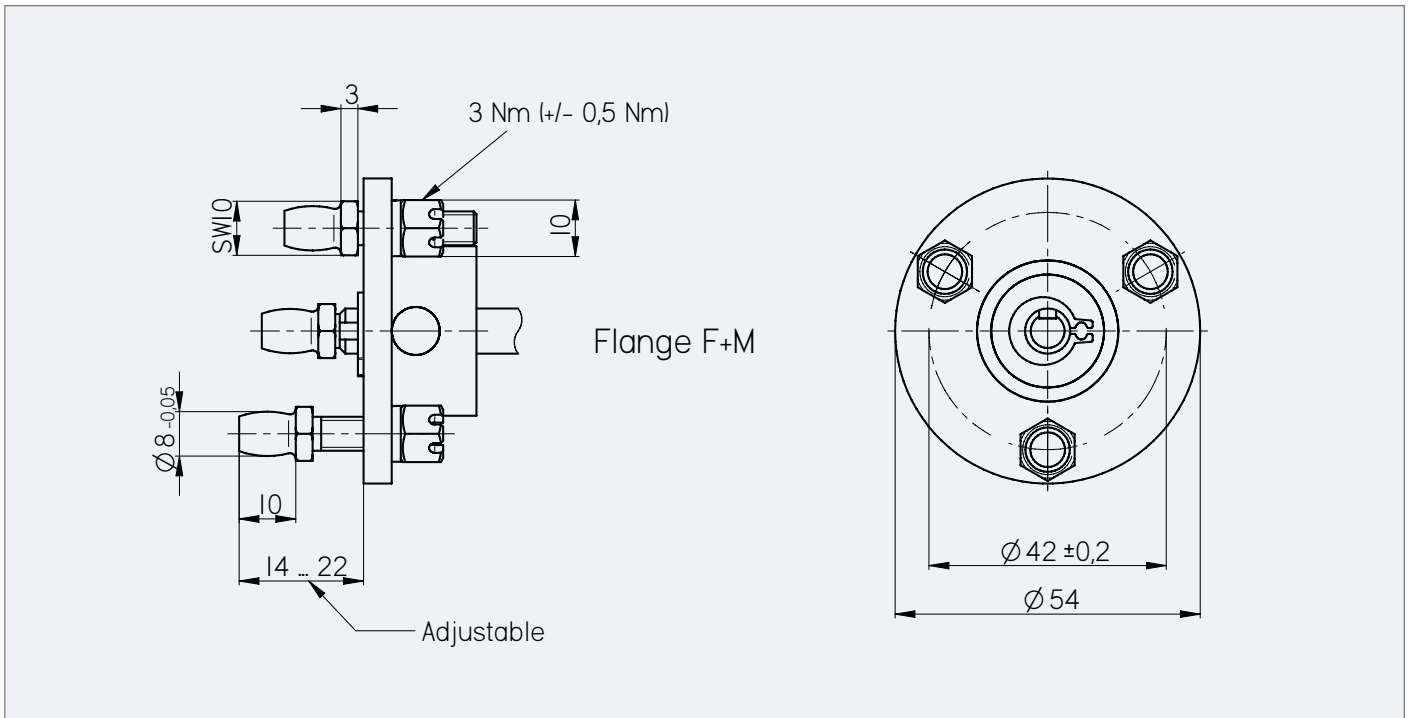
Revision date: 27.09.2021

Features

- Easy adaptation to crane hoists with flange F+M

Additional information:

- Flange F+M in elastic execution with positive drive



Use of flange F+M

Operating speed	Torsion angle (with a torque of 5 Nm)	Comment
$n_{\max} = 1000 \text{ rpm}$	$5 \pm 0.5^\circ$	not for MC/MK

Series 51 – Option: Potentiometer

Revision number: 3.1.1.10-01

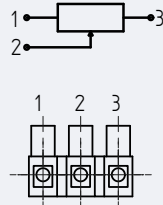
Revision date: 19.11.2019

Features

- Cost effective solution for analog measurements
- Singleturn version or 5 turn version available
- Two couplings possible:
 - "N" for max. 345° (turns synchronous with the cam discs)
 - "S" for max. 1478° (turns 4,285 faster than the cam discs)

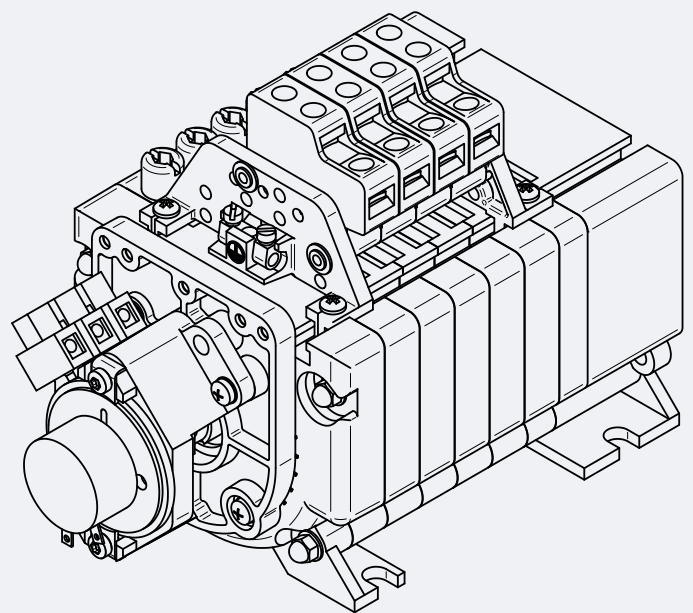
Application

- For simple measurements with less precise requirements



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							
	Singleturn					5-Turn	
Driven by Limit switch poti coupling	Type "N"					Type "S"	
Technology	wirewound					wirewound	
Effective electrical angle of rotation*	355° ±5°					1800° ±5°	
Rotational noise (ENR)	100 Ohm					100 Ohm	
Max. / recommended wiper current	35 mA / 2 µA					35 mA / 2 µA	
Power rating @ 70°C	0,5 W					1W	
Insulation Voltage	1000 VAC, 1 min					1000 VAC, 1 min	
Insulation Resistance	1000 Mohm @ 1000 VDC					1000 Mohm @ 500 VDC	
Lifetime (90% el. eff. angle half sine)	1 Mio. rotations*					500.000 rotations*	
Operating temperature range	-20 ... +80°C					-20 ... +80°C	
Vibration (IEC 68-2-6, Test Fc)	15g 10..2000Hz x 12h					15g 10..2000Hz x 12h	
Shock (IEC 68-2-27, Test Ea)	49g @ 11 ms x 18					49g @ 11 ms x 18	
Total resistance [kOhm]	1	2	5	10	20	1	10
Resistance tolerance	±3%					±5%	
Independent linearity (best straight line)	±0,35%	±0,25%	±0,25%	±0,25%	±0,25%	±0,25%	±0,25%
Number of wire turns	570	740	1000	1270	1670	2510	3900
Theoretical resolution	0,18%	0,14%	0,10%	0,08%	0,60%	0,717°	0,462°

* Referring to potentiometer shaft

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: Analog Encoders

Revision number: 3.1.1.11-01

Revision date: 15.09.2021

Features

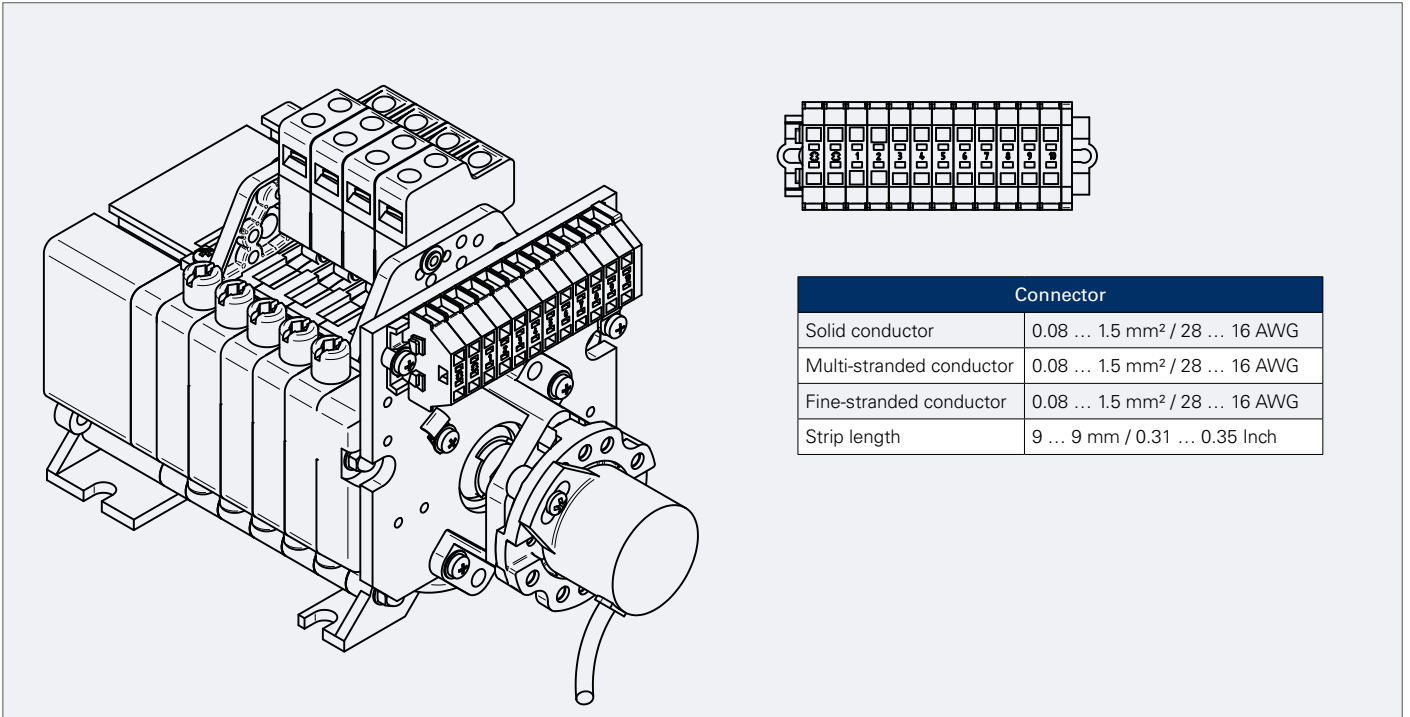
- Contactless measuring method
- Absolute position acquisition
- Long lifetime
- Turning synchronously with the cam discs

Application

- For simple measuring of absolute signals

Additional information

- Programmable type on request
- Adjustment via additional adjustment worm possible on request



Connector	
Solid conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Multi-stranded conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Strip length	9 ... 9 mm / 0.31 ... 0.35 Inch

Technical Data		
	non-programmable type	programmable type
Drive	Coupling "N" (1:1 with cam discs)	Coupling "N" (1:1 with cam discs)
Measuring range*	360°	1 ... 360° programmable
Output signal	4 ... 20 mA	4 ... 20 mA
Turning direction	cw rising values	programmable
Resolution	12 Bit	14 Bit
Indep. linearity	± 0.3 % of measuring range	± 0.1 % of measuring range
Supply voltage	16 ... 35 V DC	16 ... 35 V DC
Current consumption without load (typ.)	19 mA	20 mA
Ohmic load at output	0 ... 500 Ohm	0 ... 500 Ohm
Max. capacitive load at output	100 nF	100 nF
Lifetime	50 mio. movements	50 mio. movements
Operating temperature	-40°C ... +85 °C	-40°C ... +85 °C

Pin Assignment			
Signal	Pin	Color (non-programmable type)	Color (programmable type)
Supply Voltage	1	brown	pink
Ground	2	green	black
Output signal	3	white	brown
Set 1	4	n/a	green
Set 2	5	n/a	yellow

* Referring to encoder shaft

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: Analog Encoder (programmable)

Revision number: 3.1.1.12-01

Revision date: 19.11.2019

Features

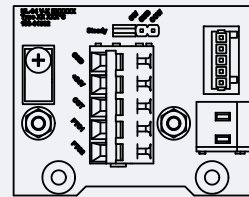
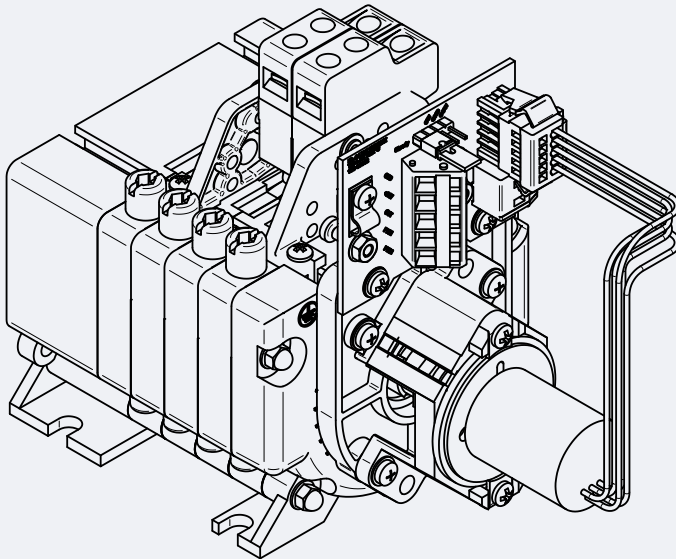
- Contactless measuring method
- Absolute value acquisition
- Long lifetime
- Turning synchronously with the cam discs

Application

- For simple measuring of absolute signals

Additional information

- Programmable type cw or ccw
- 0 point setting
- Adjustment via additional adjustment worm possible on request



Connector	
Multi-stranded conductor	0.08 ... 2.5 mm ² / 28 ... 12 AWG
Fine-stranded conductor	0.08 ... 2.5 mm ² / 28 ... 12 AWG
With end sleeve	0.25 ... 1.5 mm ²
Strip length	5 ... 6 mm / 0.2 ... 0.24 Inch

Pin Assignment	
GND	Ground
+24 V	Supply voltage
Out	Output signal
PTC1	For optional PTC-heating
PTC2	For optional PTC-heating

Technical Data		
	Current Output	Voltage Output
Drive	Coupling "N" (1:1 with cam discs)	Coupling "N" (1:1 with cam discs)
Measuring range*	360°	360°
Output signal	4 ... 20 mA	0 ... 10 V
Turning direction	programmable	programmable
Resolution	14 Bit	14 Bit
Indep. linearity	± 0.1 % of measuring range	± 0.1 % of measuring range
Supply voltage	18 ... 35 V DC	18 ... 35 V DC
Current consumption without load (typ.)	20 mA	20 mA
Ohmic load at output	0 ... 500 Ohm	> 10 kOhm
Max. capacitive load at output	100 nF	100 nF
Lifetime	360 mio. movements	360 mio. movements
Operating temperature	-40°C ... +85 °C	-40°C ... +85 °C

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: Incremental Encoder

Revision number: 3.1.1.13-01

Revision date: 19.11.2019

Features

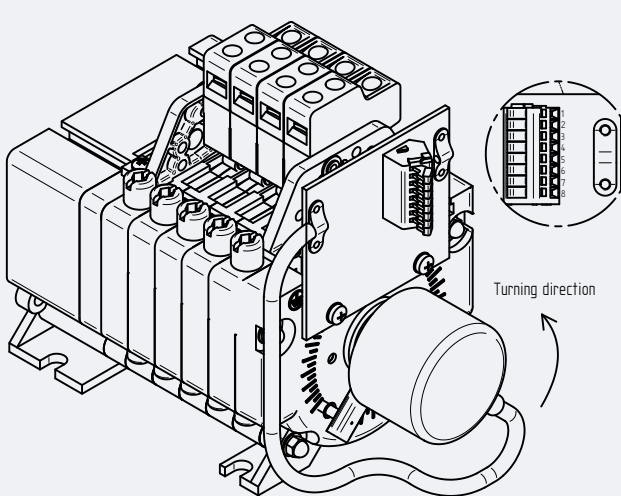
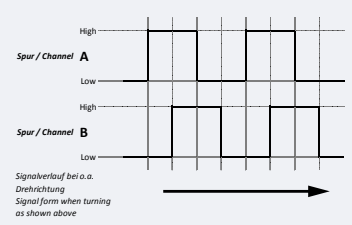
- Optical measuring
- Up to 3600 increments in small housing
- Already wired to squirrel cage tension
- 2 square signals, 90° phase shifted (+ inverted signals) for quadrature evaluation

Application

- For giving the information about speed

Additional information

- Driven 1:1 from the second shaft end

Connector	
Solid conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Multi-stranded conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Strip length	9 ... 9 mm / 0.31 ... 0.35 Inch

Technical Data	RS422	Push-Pull
Power supply UB	5 V ± 5% or 8...30 V	8 ... 30 V DC
Pulses / 360°	5 ... 3600	
Power consumption	Typ. 40 mA	< 40 mA
(without load)	Max. 90 mA	
Permissible load	± 20 mA	± 50 mA
Signal level "high"	> 2,5 V	> Vcc - 3 V
Signal level "low"	< 0,5 V	< 2,5 V
Max. frequency	300 kHz	200 kHz
Operating temperature	-40°C ... +85 °C (5...1024 pulses)	
	-30°C ... +85 °C (>1024 pulses)	

Assignment	Pin	Color
Ground	1	white
Supply-Voltage VCC	2	brown
A - Signal	3	green
B - Signal	4	yellow
0 - Signal	5	gray
A-Inv. - Signal	6	pink
B-Inv. - Signal	7	blue
0-Inv. - Signal	8	red

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: SSI Multiturn Encoder

Revision number: 3.1.1.14-01

Revision date: 19.11.2019

Features

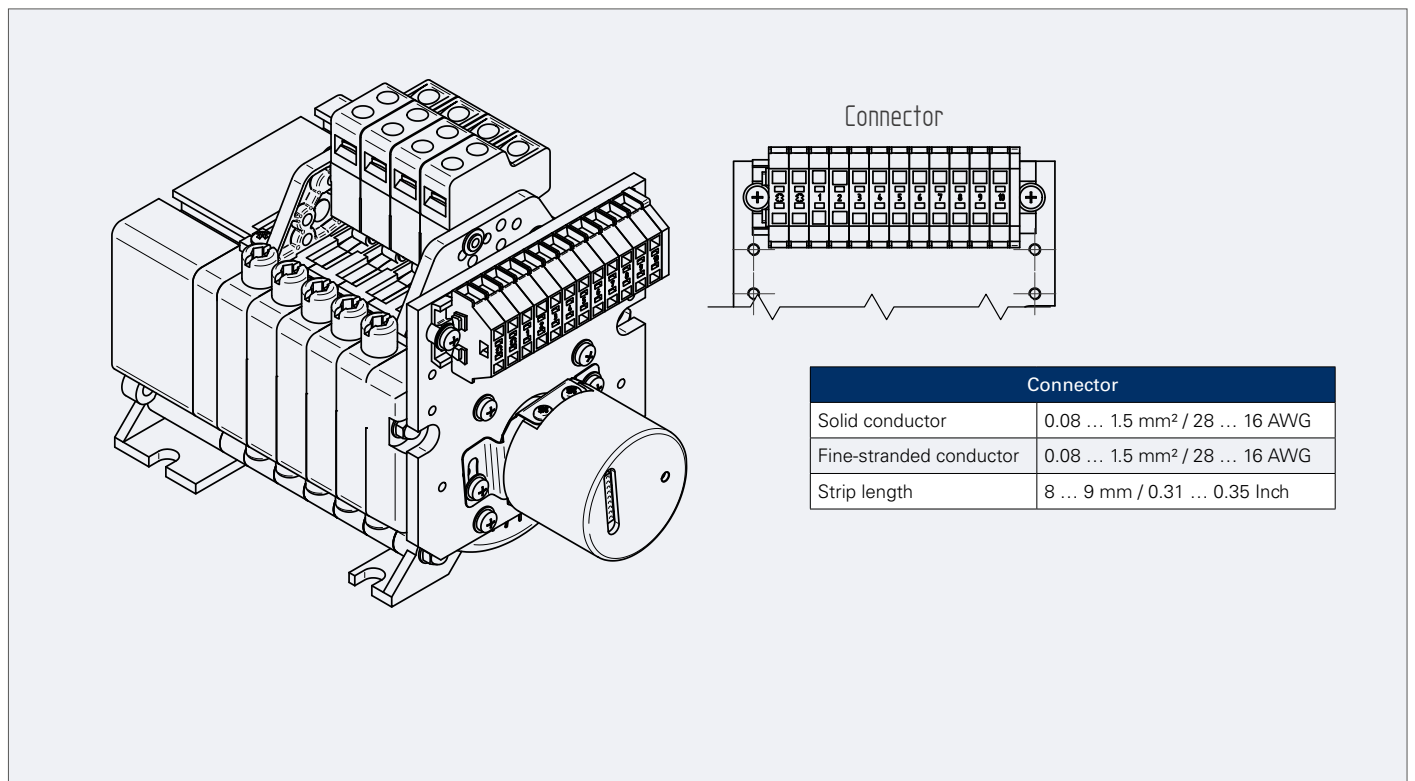
- Absolute value with high preciseness
- Without gear (Energy harvesting technology)
- Wired to squirrel cage tension

Application

- For very high accuracy demands

Additional information

- Without play driven 1:1 by the second shaft end
- Due to size it can be integrated in all types of housings



Technical Data	
Resolution singleturn	8 ... 14 Bit
Resolution multiturn	1 ... 39 Bit
Interface	SSI
Code	Gray / Binary
Clock frequency	100 kHz ... 500 kHz
Data output	RS485 comp.
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

Configuration	
Turning direction	CW : DIR = GND
(View on shaft)	CCW : DIR = +UB
Set to Zero	Preset = +UB (2s)
Deactivate	Preset = GND

LED -Behaviour	
At Boot-Up	red (< 2,3s)
Error	red (> 2,3s)
Normal function	green

Pin Assignment		
Signal	Pin	Color
Ground	1	white
Supply Voltage	2	brown
SSI CLK +	3	green
SSI CLK -	4	yellow
SSI DATA +	5	gray
SSI DATA -	6	pink
Preset	7	blue
DIR	8	red
Screen	9	violet

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Option: CANopen Multiturn Encoder

Revision number: 3.1.1.15-01

Revision date: 19.11.2019

Features

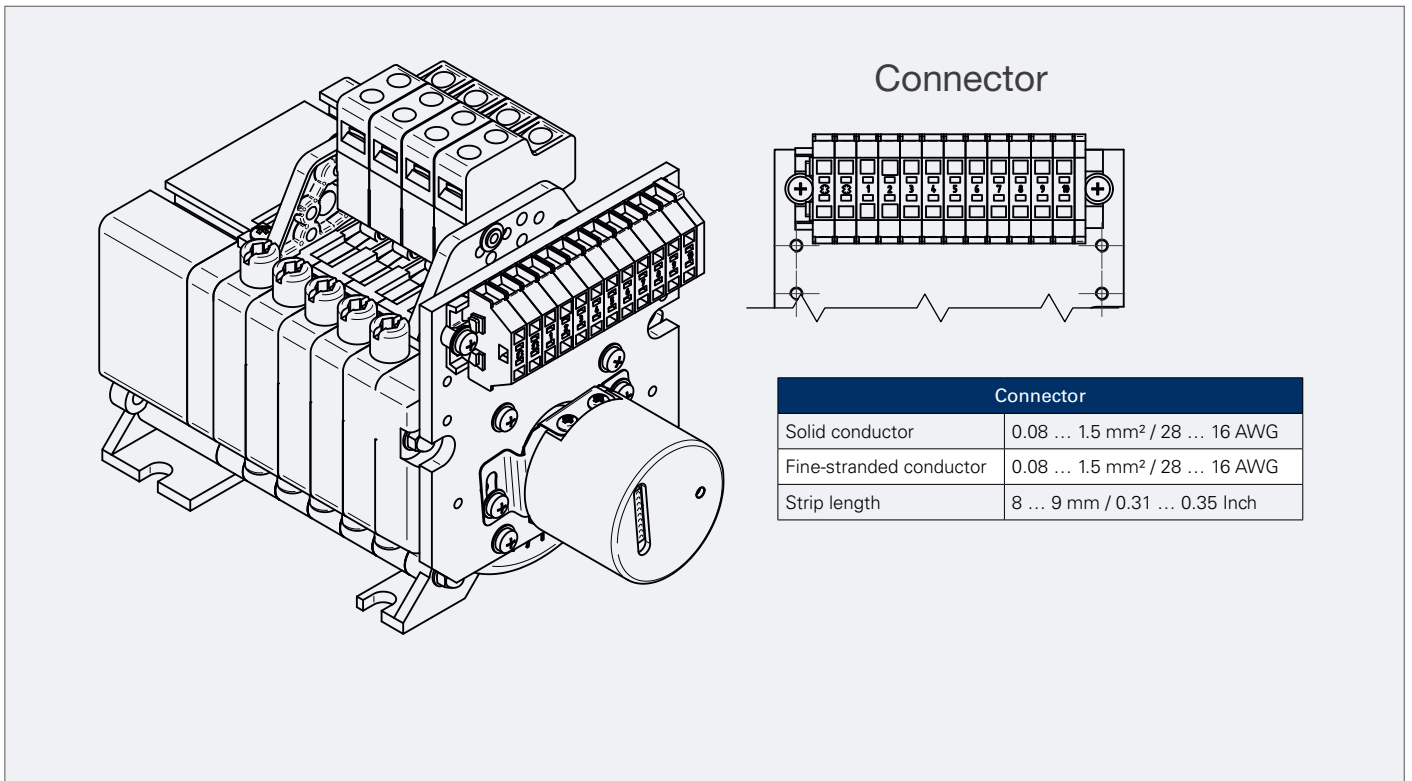
- Absolute value with high preciseness
- Without gear (Energy harvesting technology)
- Wired to squirrel cage tension

Application

- For very high accuracy demands

Additional information

- Without play driven 1:1 by the second shaft end
- Due to size it can be integrated in all types of housings



Connector	
Solid conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm ² / 28 ... 16 AWG
Strip length	8 ... 9 mm / 0.31 ... 0.35 Inch

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.).

Series 51 – Option: Electromagnetic Tooth Clutch EZX

Revision number: 3.1.1.17-01

Revision date: 19.11.2019

Features

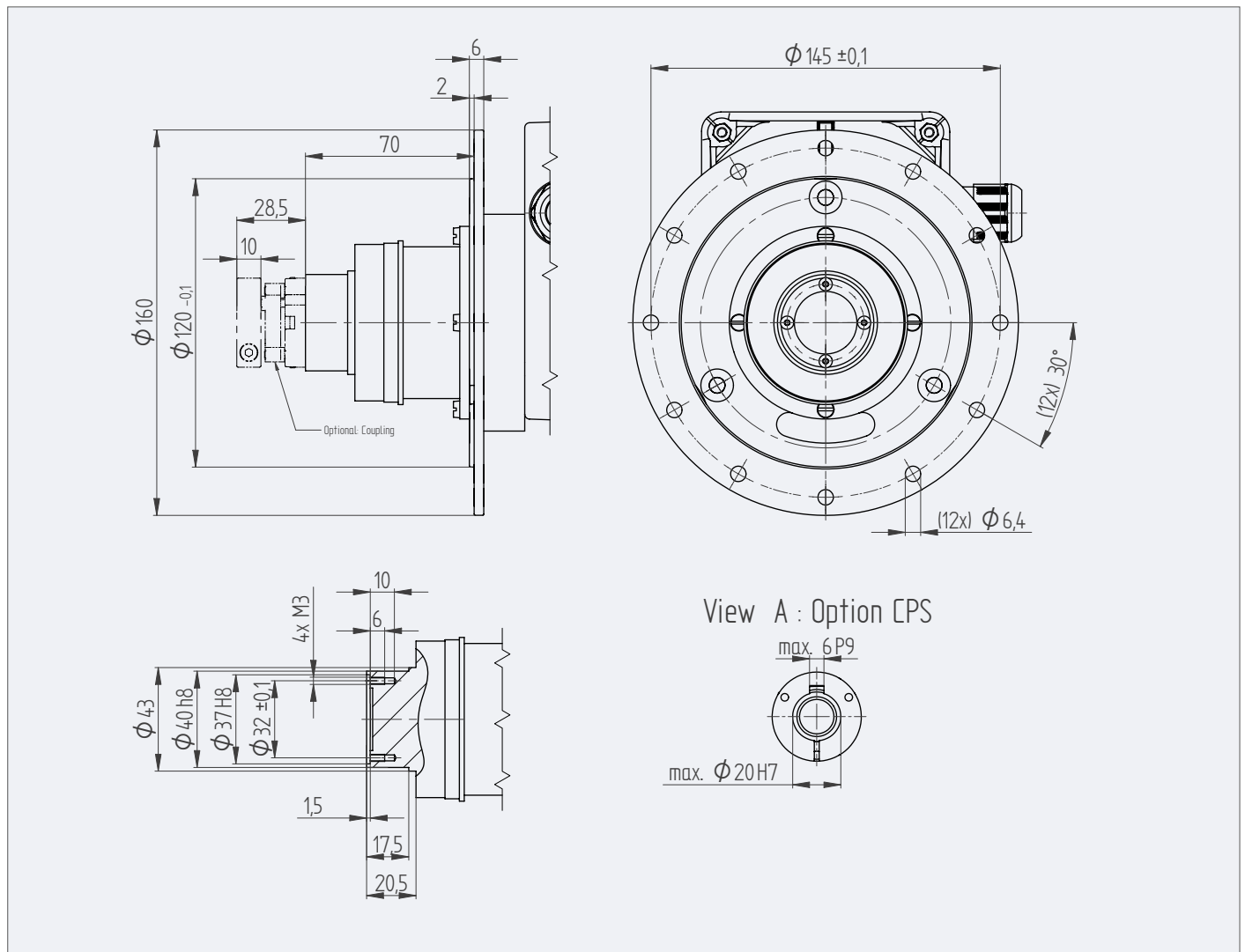
- Form fit connection inside
- High number of teeth for highest possible accuracy
- Safety related function, closed without current

Application

- For point hoist in theatres

Additional information

- Can be used together with all types of housing Series 51



Technical Data EZX 0,1	
Maximum torque	1 Nm
Supply Voltage	24 V DC
Power consumption	25 W
Air gap off	0,85 ... 0,95 mm
No. of teeth	204

GEARED CAM LIMIT SWITCHES

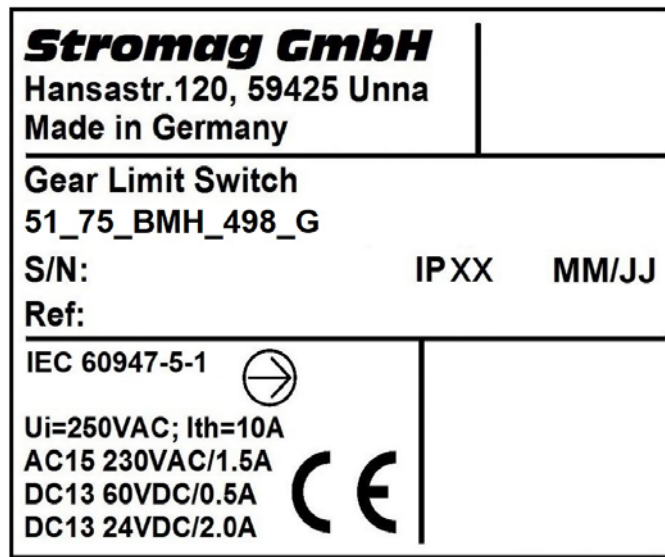
Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Key Of Types

Revision number: 3.1.1.18-02

Revision date: 25.06.2024



51	Switch type: Series 51	
75	Nominal Revolutions	Gear type N: 4.1, 6.5, 11
		Gear type B: 17.5, 29, 48, 75, 125, 205, 323, 540, 880, 1384, 2288, 3735, 5900, 9800, 16000
		Gear type DZ: 67, 110, 180, 280, 470, 770, 1200, 2000, 3300, 5200, 8700, 14200
B	Gear type	N: Without block adjustment
		B: Block adjustment
		DZ: Differential tooth gear
MH	Housing type	MH: IP65, GTES mounted in an aluminum housing
		MC: IP55, GTES mounted in a plastic housing with a short housing cover
		MK: IP55, GTES mounted in a plastic housing with a long housing cover
		M: IP00/IP20, without a protective housing
		MxZ: IP66, GTES mounted in a glass fibre reinforced polycarbonate housing x: Number of intermediate pieces (0...9)
CxZ: IP65, GTES mounted in a glass fibre reinforced polycarbonate housing (compact) x: Number of intermediate pieces (0...9)		
4	Number of contacts fitted	1 - 14
98	Type of switching contact	98: Contact (changeover) with screw connections, contact material: Silver (standard)
		98G: Contact (changeover) with screw connections, contact material: Gold
		98P: Contact (changeover) with flat plug connections, contact material: Silver
		99T: Contact (push action) with screw connections, contact material: Silver
		99A: Contact (push action) with screw connections, contact material: Gold
G	Additional components	G With encoder / sensor
		P With potentiometer

GEARED CAM LIMIT SWITCHES

Limit Switch Control Current

Planetary Gear Limit Switches

Series 51 – Explosion Proof Type

Revision number: 3.1.1.19-01

Revision date: 19.11.2019

Features

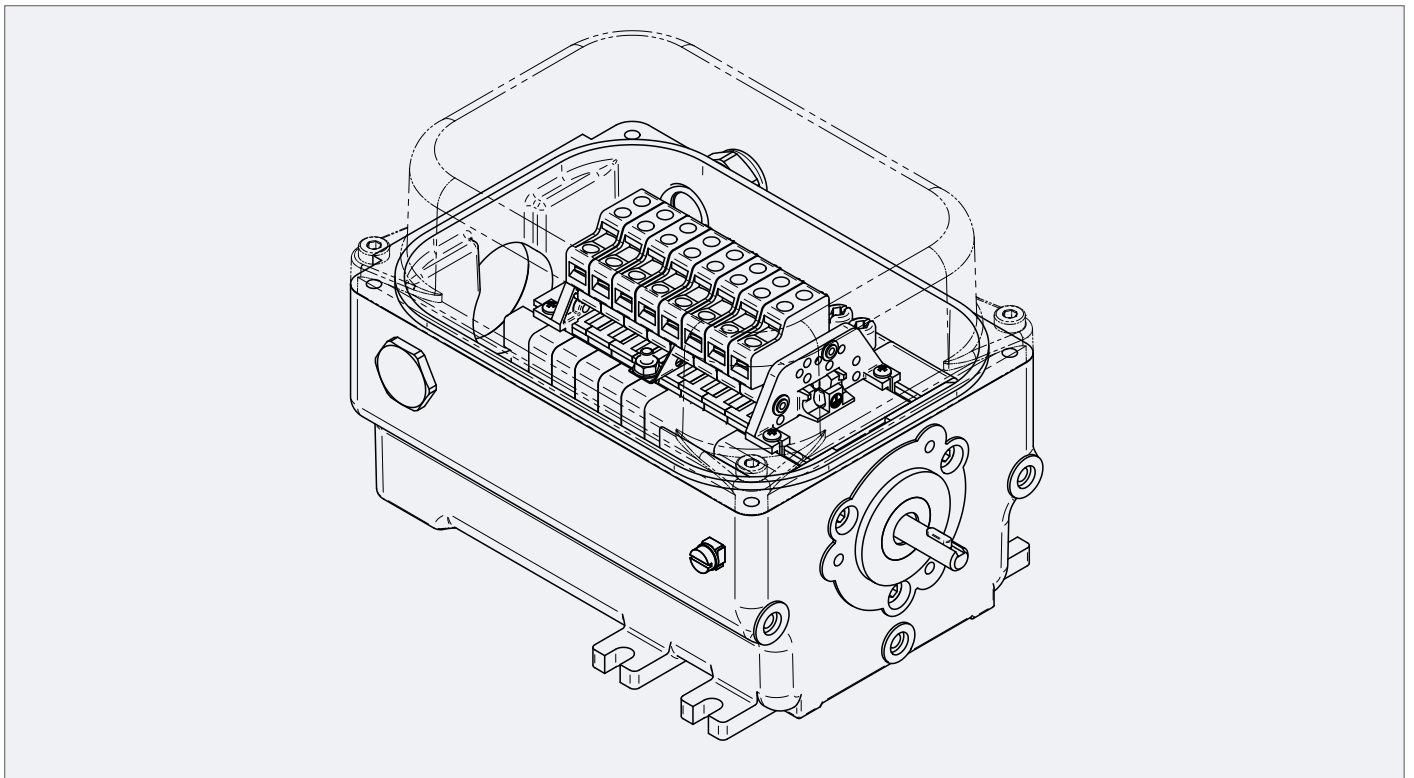
- IP65 aluminum housing
- Built in sensors and potentiometers possible (max. power loss 4 W -> safety barrier)

Application

- Usable for conductive and non-conductive dust in zone 21 and 22
Zone 21 (category 2D dust occasionally), zone 22 (category 3D, dust rarely)

Additional information

- Certification according to directive 2014/34/EU
- Certification according to IECEx



ATEX marking

II 2D Ex tb IIIC T100°C Db

IECEx marking

Ex tb IIIC T100°C Db

Explanation of markings

II	Group II, devices for use above ground
2D	Device category (for use in Zone 21 and 22)
tb	Type of protection tb, protection via housing (EN 60079-31)
IIIC	Dust group IIIC, conductive dust (includes group IIIB and IIIA)
T100°C	Maximum permitted surface temperature
Db	Equipment protection level (EPL) as per EN 60079-0

Technical details

Temperature range:	-25°C to 60°C at a maximum input rotation speed of 1000 rpm
	-25°C to 40°C at a maximum input rotation speed of 1800 rpm
Number of contacts:	1 – 8 Contacts (without encoder) 1 – 4 Contacts (with encoder)
Cable cross-section:	1 – 1,5 mm ² (AWG 16 –18)
Electrical data:	Nominal voltage AC-15: 230V Nominal current AC-15: 1,5A Nominal voltage DC-13: 60V 24V Nominal current DC-13: 0,5A 2A Continuous thermal current max. 2A



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