

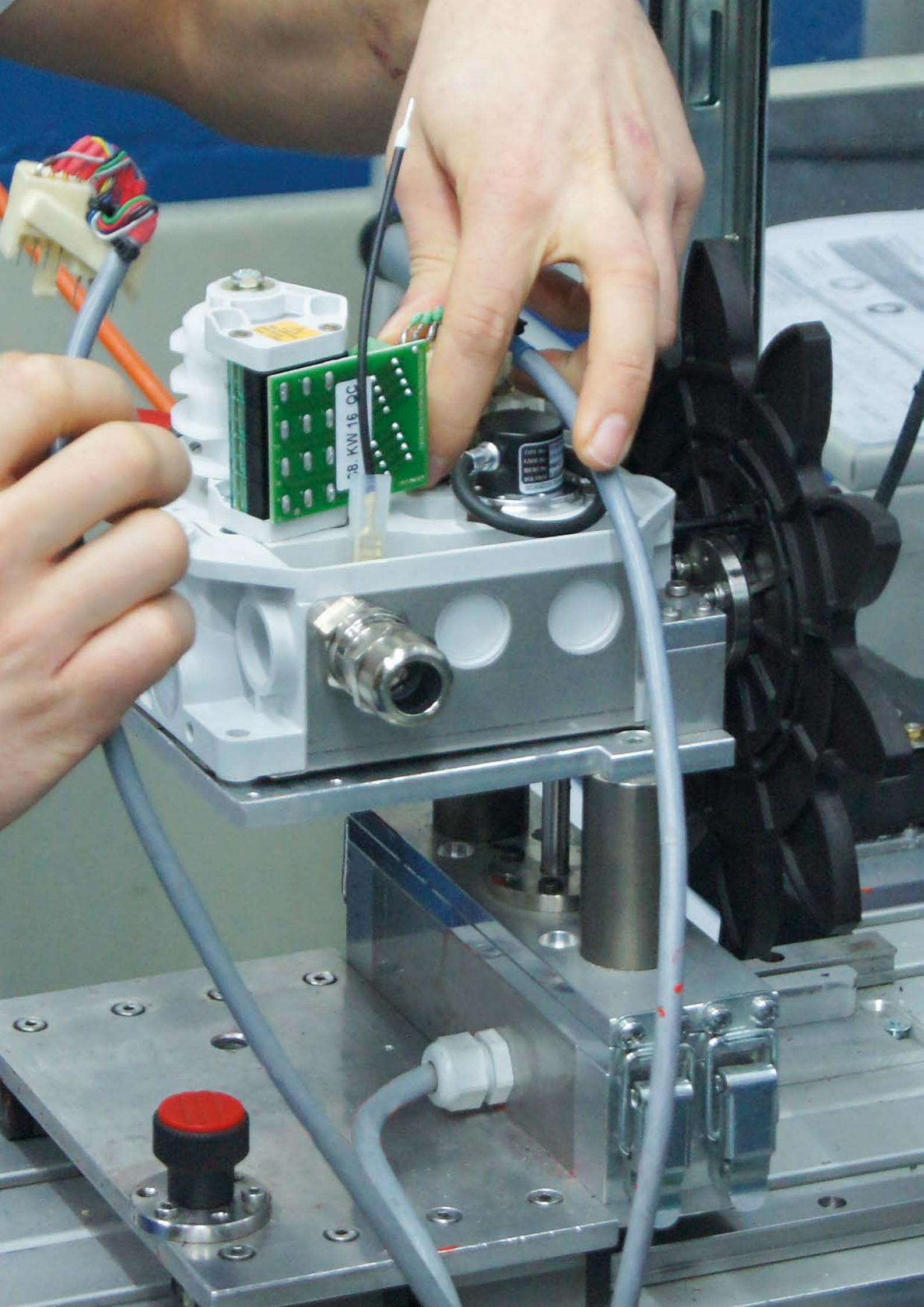
# Serie 51 / 51 DZ Geared Cam Limit Switches



 **Stromag**<sup>®</sup>  
Altra Industrial Motion



**DISTRIBUIDOR AUTORIZADO** MEX (55) 53 63 23 31 MTY (81) 83 54 10 18  
QRO (442) 1 95 72 60 [ventas@industrialmagza.com](mailto:ventas@industrialmagza.com)



## CONTENT

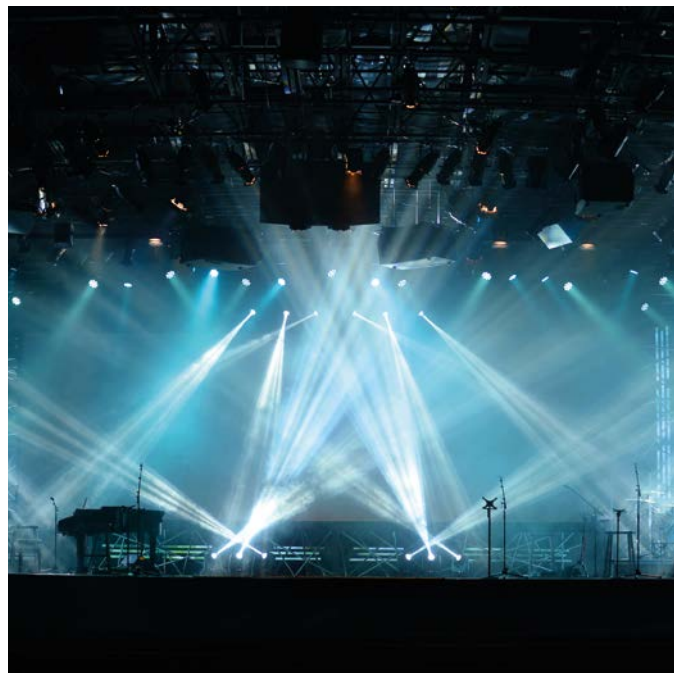
Catalog Serie 51 / 51 DZ: I

At a Glance	04
Basic Limit Switch	05
Gear Data	06
Switching Contacts	07
Protective Housing Compact (CxZ)	08
Protective Housing (MxZ)	10
Protective Housing Aluminum (H)	12
Option: Anti-Condensation-Heating	14
Customizable Cam Discs	15
Option: Drive Flanges	16
Option: Potentiometer	17
Option: Analog Encoder	18
Option: Analog Encoder (programmable)	19
Option: Incremental Encoder	20
Option: Absolute Encoder (SSI)	21
Option: CANopen Multiturn Encoder	22
Option: Smart Cam®	23
Option: Electromagnetic Tooth Clutch EZX	24
Key Of Types	25
Explosion Proof Type	26



# Stromag 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

## Limit Switch Control Current

## Planetary Gear Limit Switches

# Series 51 – Basic Limit Switch

Revision number: 3.1.1.1-01

Revision date: 19.11.2019

### Features

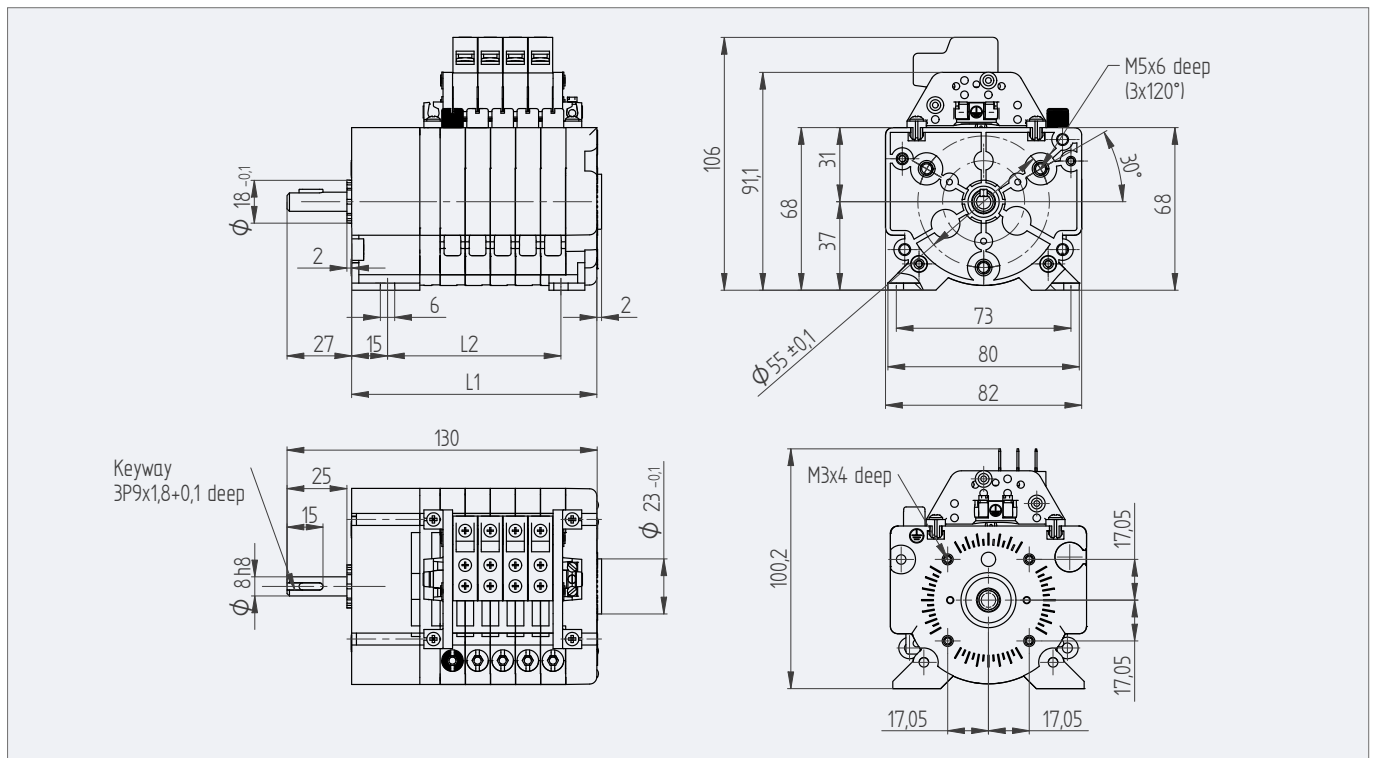
- Patent planetary gear form fit
- Modular design
- Large cam disc diameter 60 mm for high switching point repeatability

### Application

- Crane
- Wind
- Stage

### Additional information

- Protection IP20
- 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										

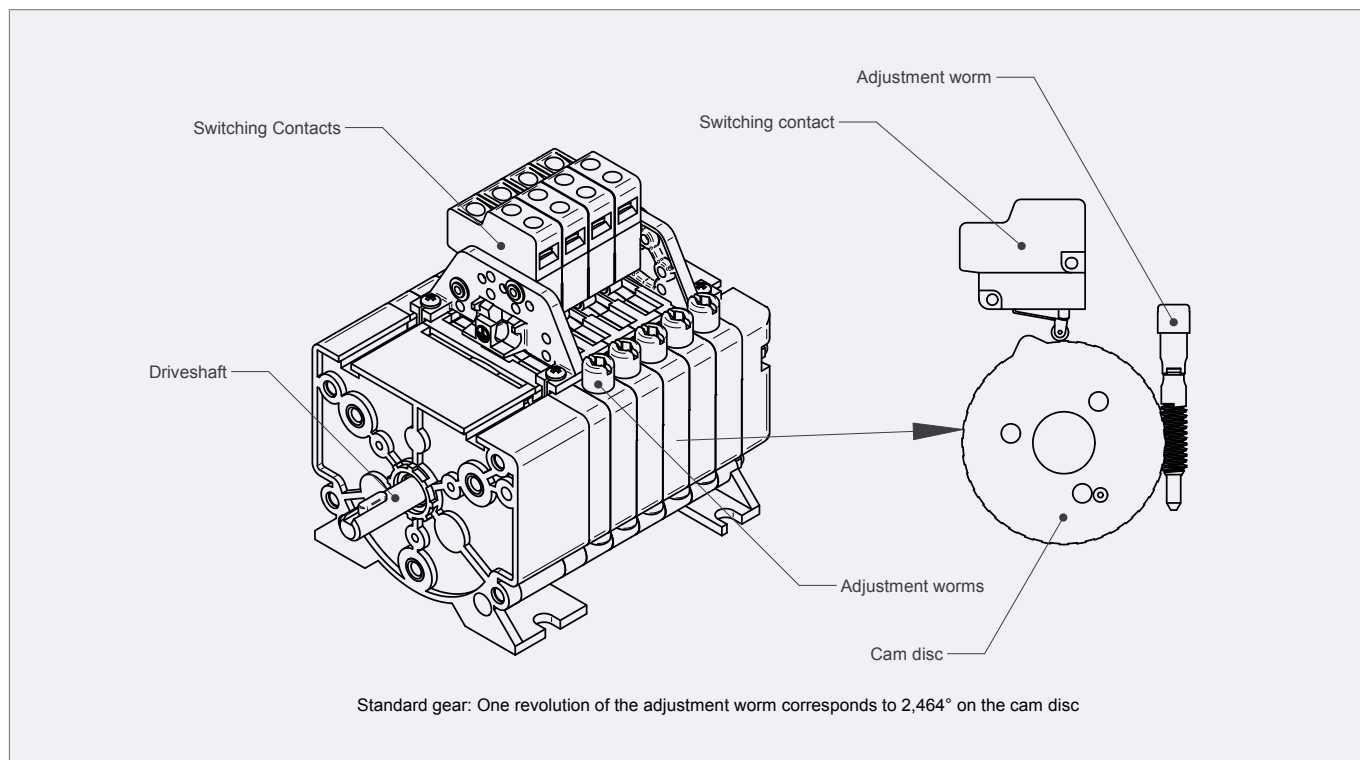
## Series 51 – Gear Data

Revision number: 3.1.1.2-01

Revision date: 19.11.2019

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

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

## Limit Switch Control Current

## Planetary Gear Limit Switches

# Series 51 – Switching Contacts

Revision number: 3.1.1.3-01

Revision date: 19.11.2019

### Features

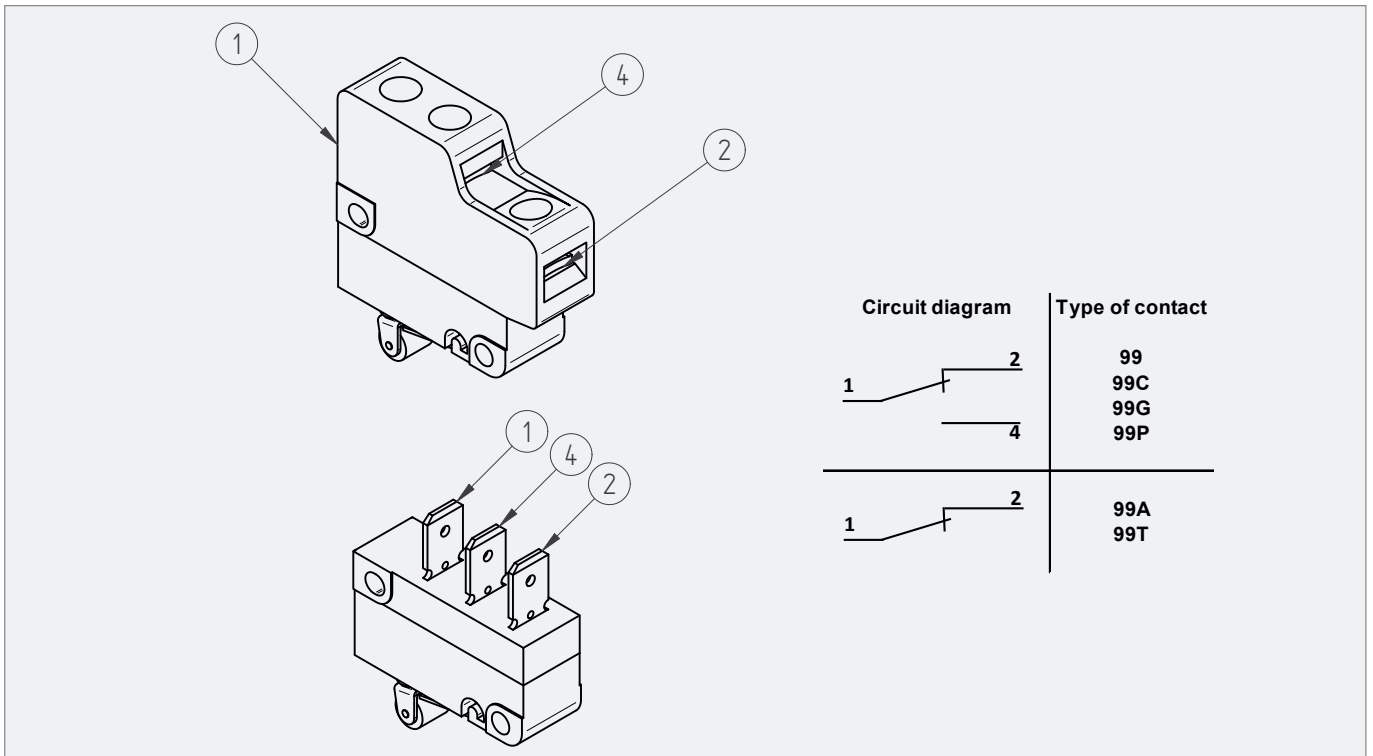
- Contacts with positive opening
- For up to 10 million switching operations
- Gold plated contacts on request
- Push or snap action contacts

### Application

- Silver contacts for relays
- Gold contacts for PLC

### Additional information

- Screw or flat plug connection
- Roller lever design for low wear



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 <sup>2</sup> / 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 Ith	Rated Insulation Voltage Ui
99	•		•		•						•	10 A gG	AC-15: 1.5 A, 230 V  DC-13: 0.5 A, 60 V	10 A	250 V
99P	•		•	•						•	10 A gG				
99G	•			•	•					•	2A gR				
99T		•	•			•				•	10 A gG				
99A		•		•	•					•	2A gR				
99C	•		•		•				•	•	10 A gG				

## Series 51 – Protective Housing Compact (CxZ) IP65

Revision number: 3.1.1.4-01

Revision date: 19.11.2019

### Features

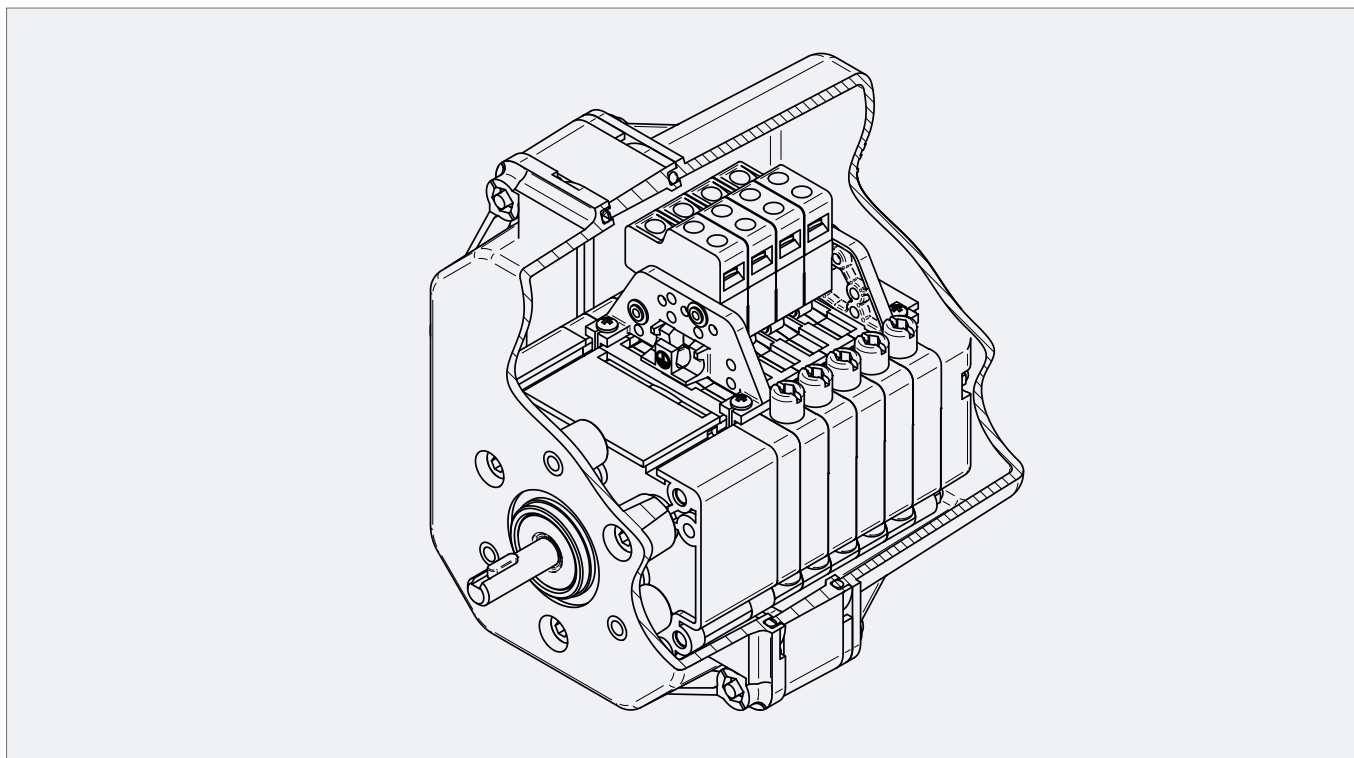
- Small modular housing for outdoor application
- Reinforced polycarbonate
- Protection IP65

### 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 Contactes A		4 Switching Contactes B		6 Switching Contactes C		8 Switching Contactes 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										

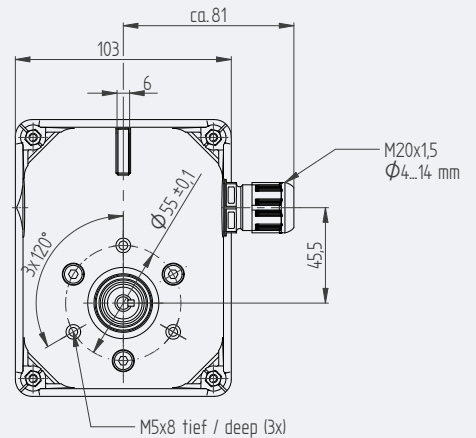
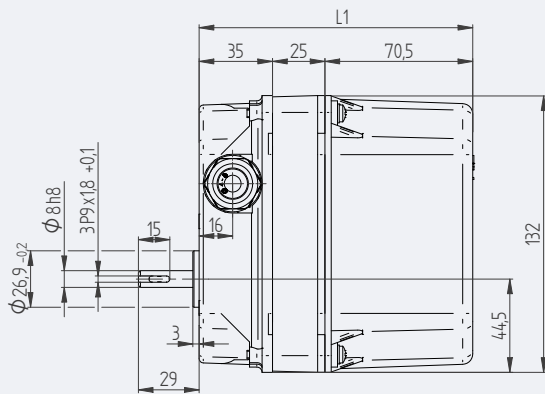


## Series 51 – Protective Housing Compact (CxZ) IP65

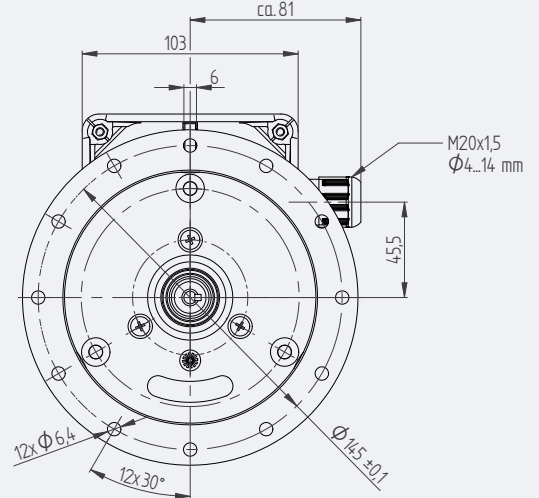
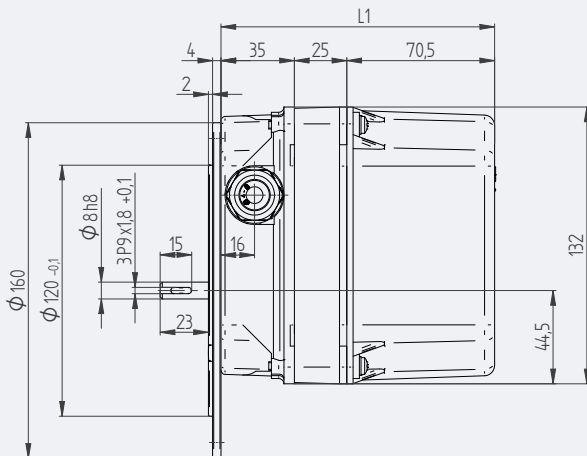
Revision number: 3.1.1.4-01

Revision date: 19.11.2019

Type B14



Type B5



## Series 51 – Protective Housing (MxZ) IP66

Revision number: 3.1.1.5-01

Revision date: 00000

### Features

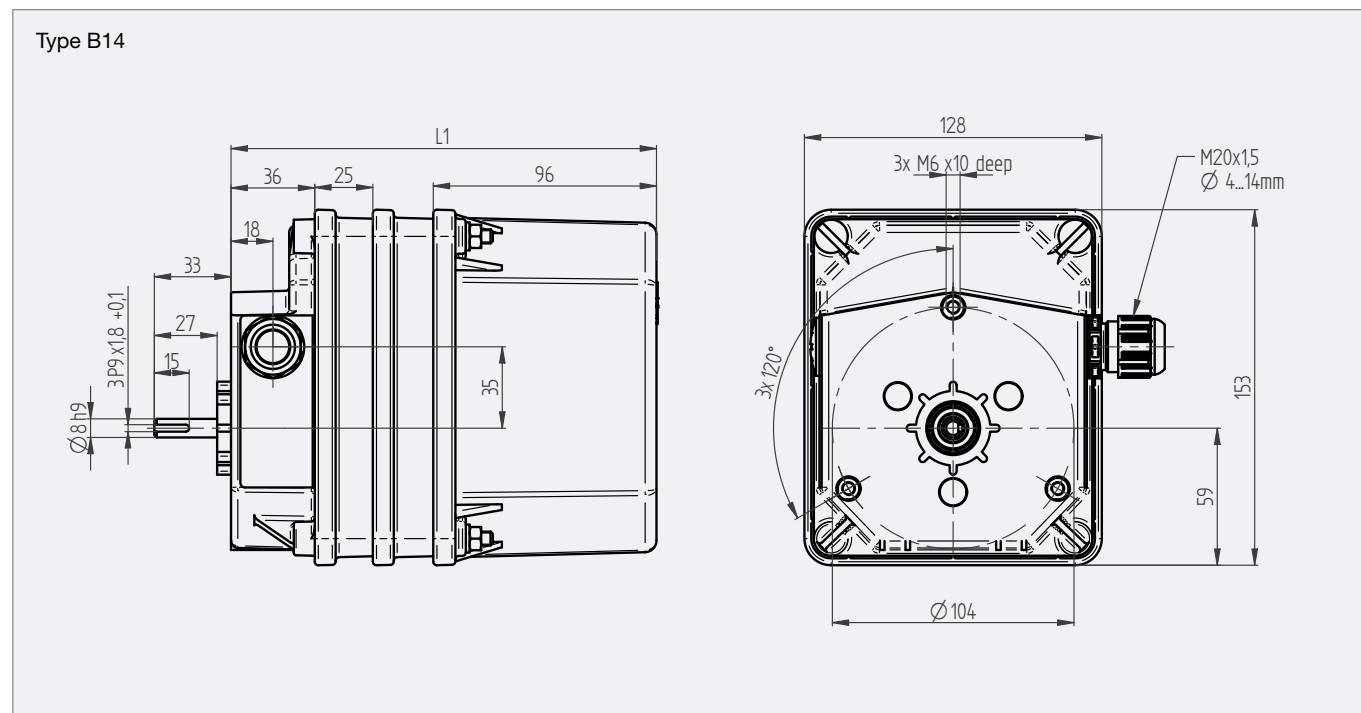
- Modular housing for outdoor application
- Reinforced polycarbonate
- Protection IP66

### 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

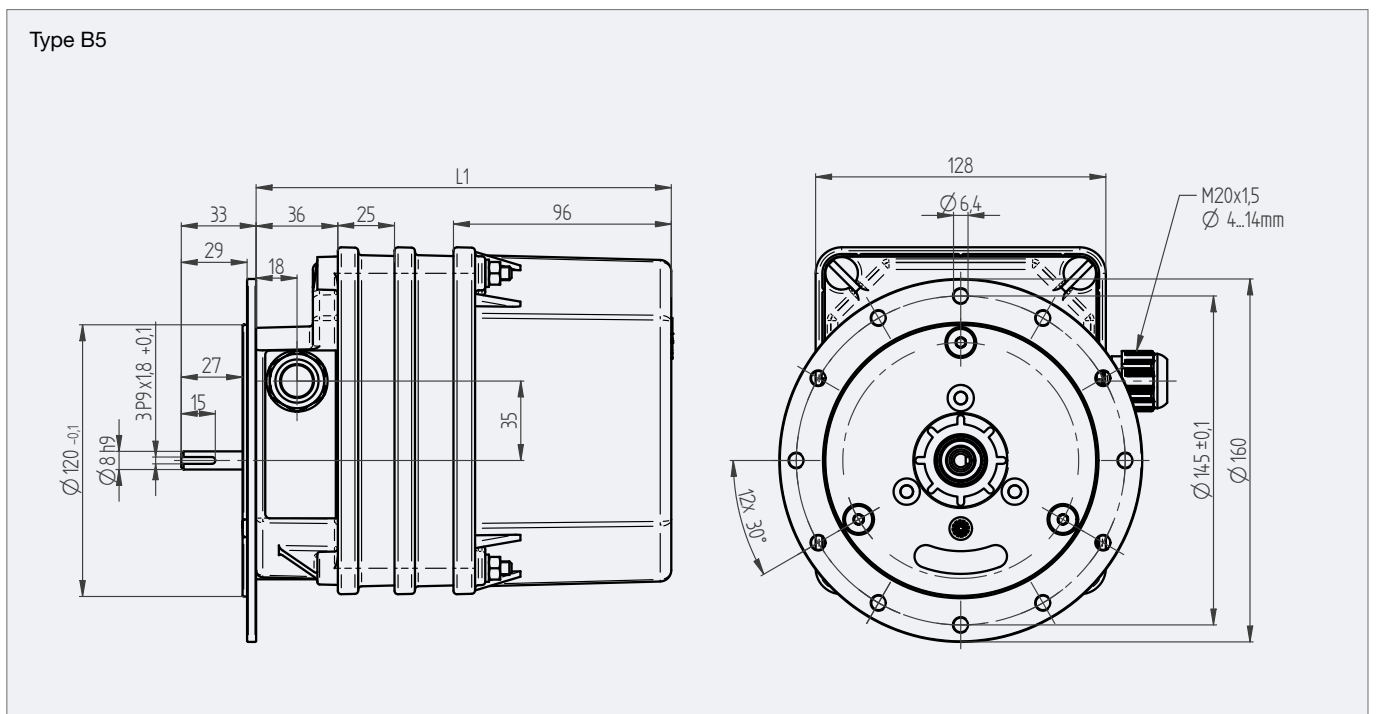
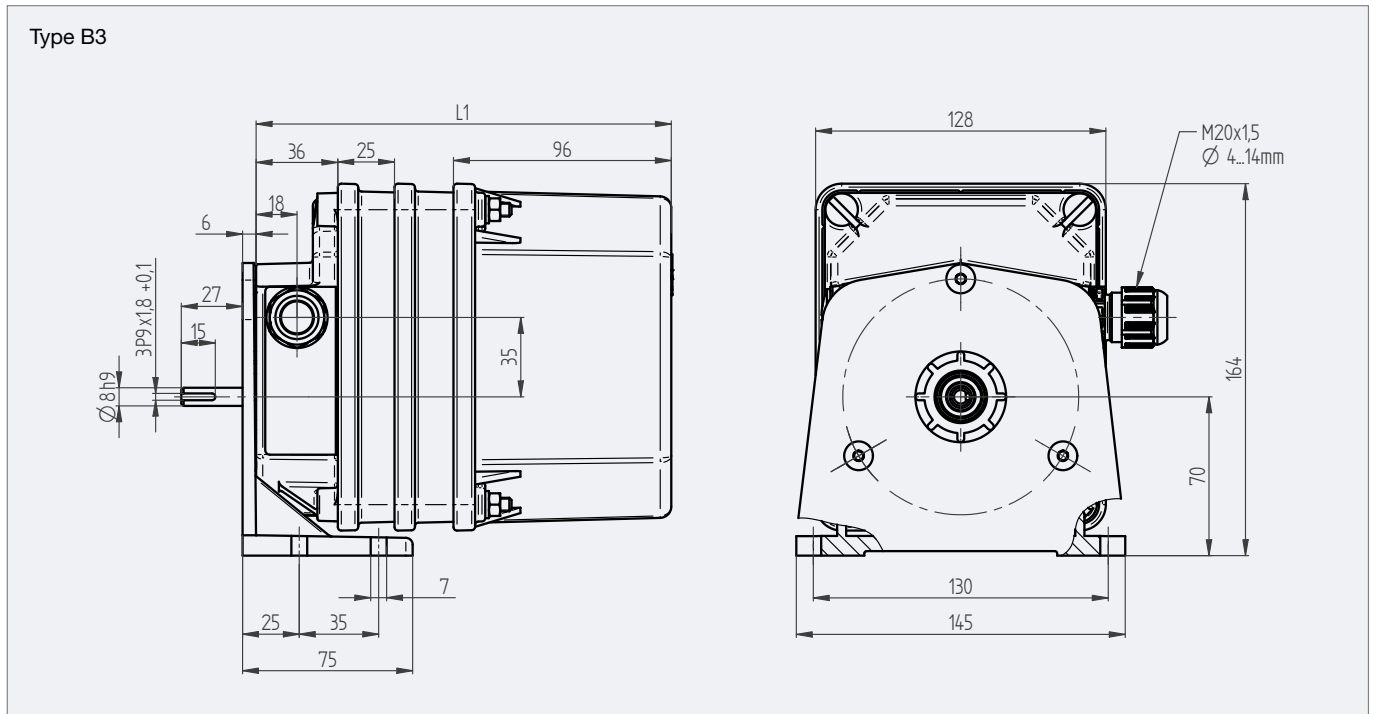


Standard gear	DZ gear	Gear size	2 Switching Contactes A		4 Switching Contactes B		6 Switching Contactes C		8 Switching Contactes D	
			L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers	L1 [mm]	# Spacers
4,1NM	67DZ	1	132	0	132	0	132	0	157	1
6,5NM	110DZ									
11NM	180DZ									
17,5BM	280DZ	2	132	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										

## Series 51 – Protective Housing (MxZ) IP66

Revision number: 3.1.1.5-01

Revision date: 00000



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

Revision number: 3.1.1.6-01

Revision date: 19.11.2019

### Features

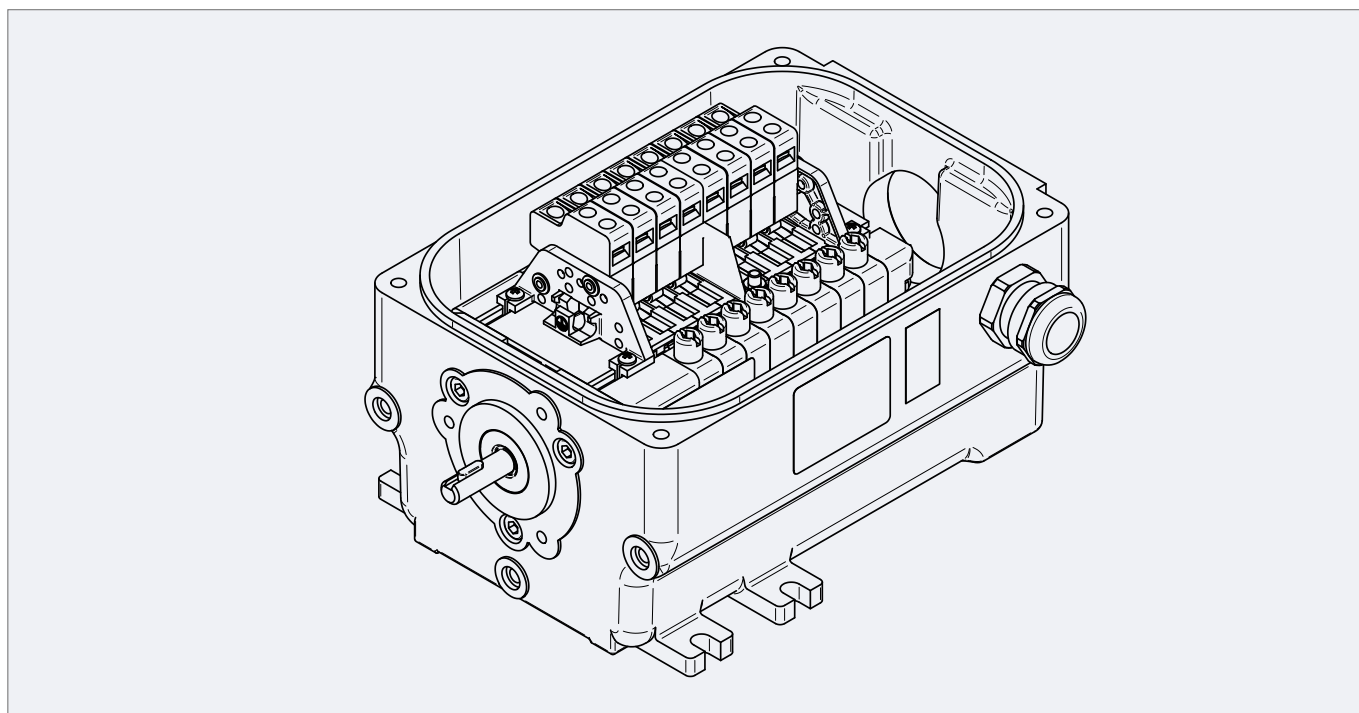
- Heavy duty aluminum housing
- Protection IP65

### Application

- Steel works

### Additional information

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



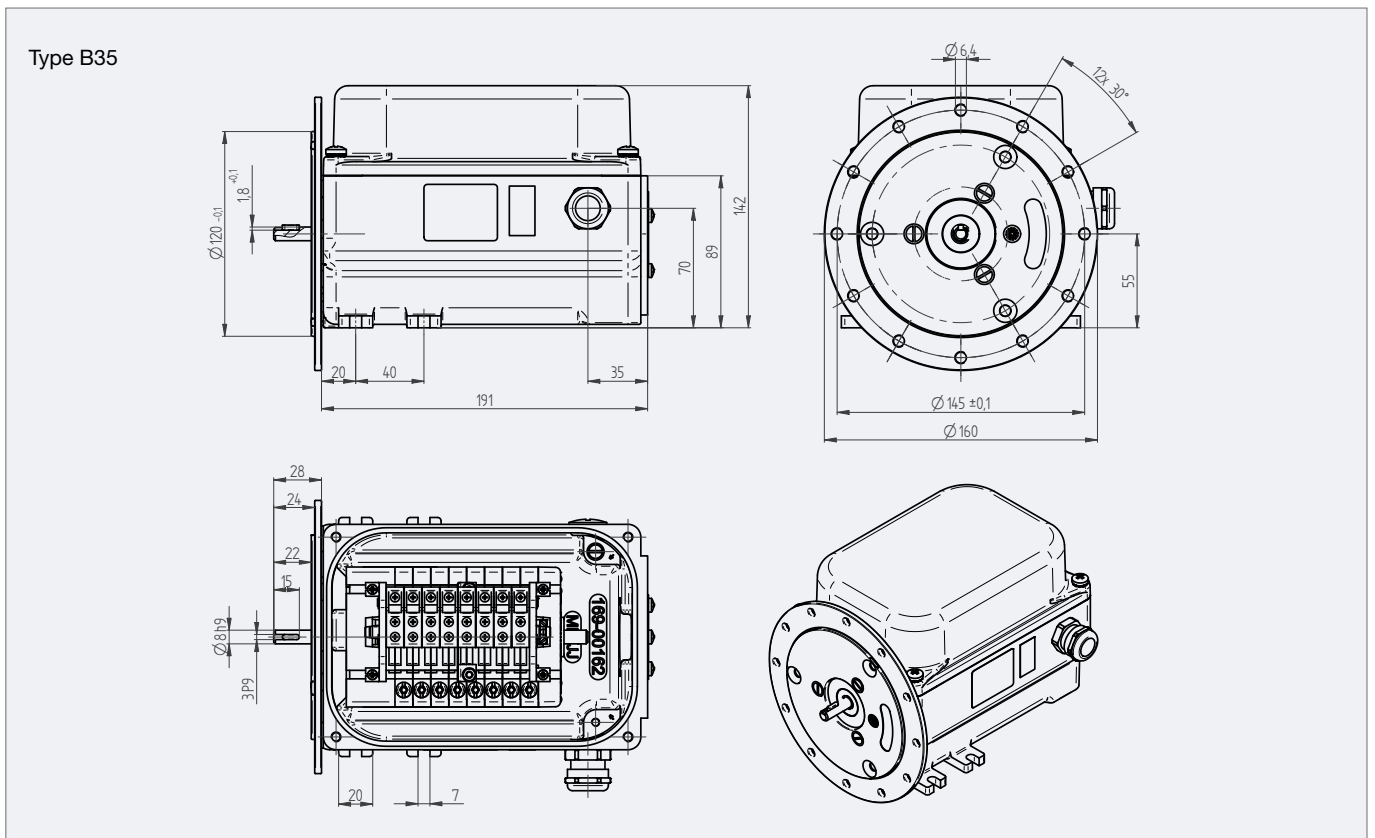
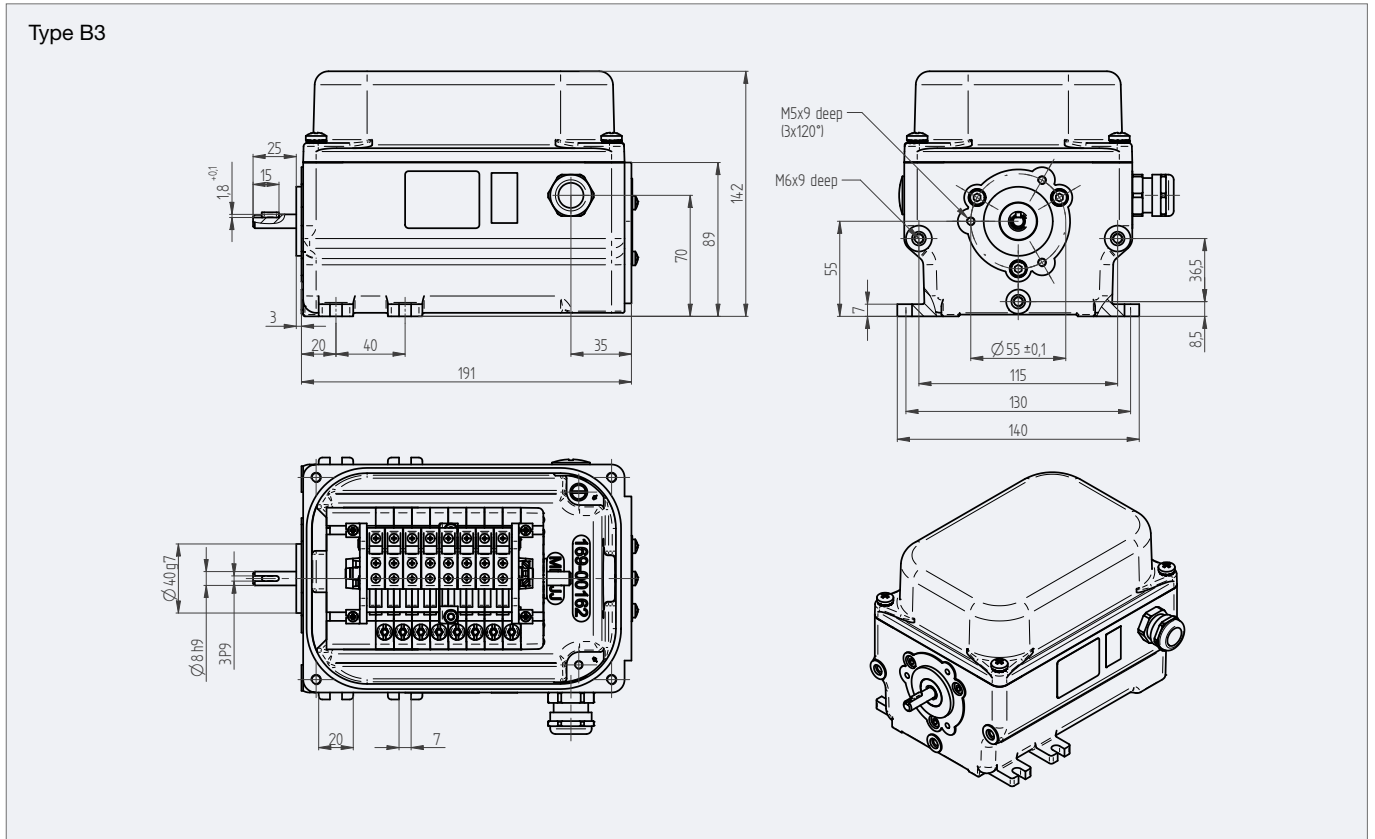
Standard-Gear	DZ-Gear	Gear size	2 Switching Contacts	4 Switching Contacts	6 Switching Contacts	8 Switching Contacts
4,1NM	67DZ	1	A	B	C	D
6,5NM	110DZ					
11NM	180DZ					
17,5BM	280DZ	2	A	B	C	D
29BM	470DZ					
48BM	770DZ					
75BM	1200DZ	3	A	B	C	D
125BM	2000DZ					
205BM	3300DZ					
323BM	5200DZ	4	A	B	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						



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

Revision number: 3.1.1.6-01

Revision date: 19.11.2019



## Series 51 – Option: Anti-Condensation Heating

Revision number: 3.1.1.7-01

Revision date: 19.11.2019

### Features

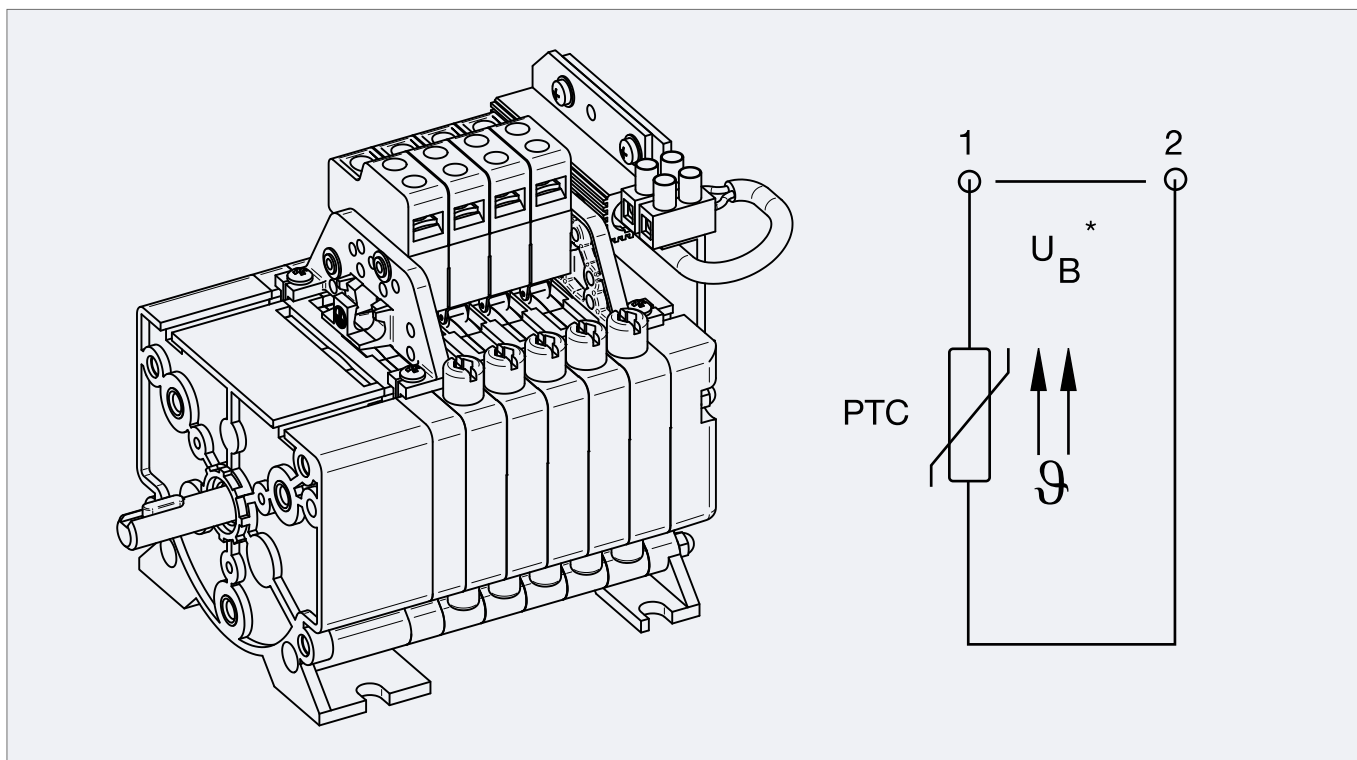
- PTC regulated heater
- 12 – 36 V or 110 -250 V AC/DC

### Application

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

### Additional information

- Can be integrated in all housings of the Series 51



Design: UB	12 – 36 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)	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 51 – Customizable Cam Discs

Revision number: 3.1.1.8-01

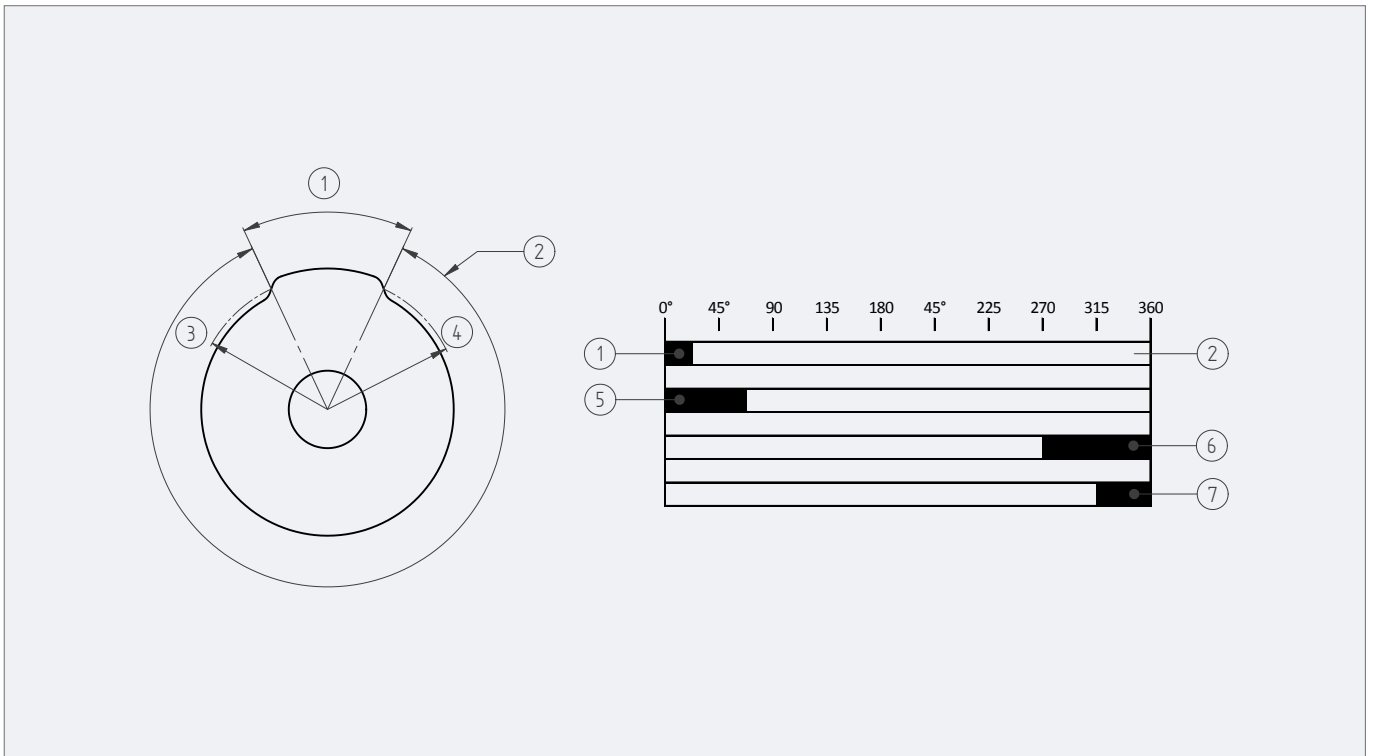
Revision date: 19.11.2019

### Features

- 15 degree standard cam discs
- 40 degree cam discs free of charge on request
- 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  $\alpha$  (=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 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:

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

U = Usable revolutions

$\alpha$  = Effective cam angle

$\beta$  = Usable cam angle ( $\beta = 360^\circ - \alpha$ )

i = Gear ratio

## Series 51 – Option: Drive Flanges

Revision number: 3.1.1.9-01

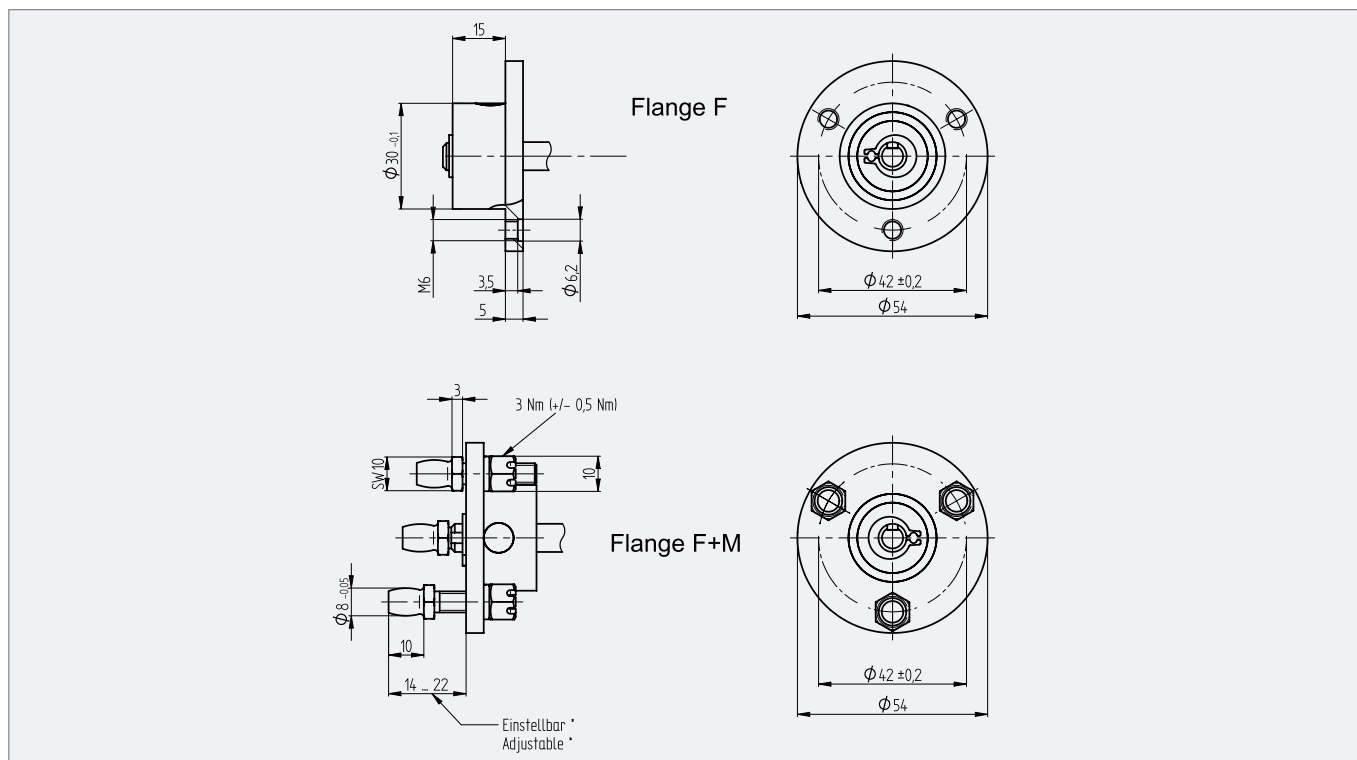
Revision date: 19.11.2019

### Features

- Easy adaptation to crane hoists with flange F+M
- Flange F for pinion wheels or belt drives

### Additional information:

- Flange F+M/F in elastic execution with forced slaving



### Use of flange A / B

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



## Limit Switch Control Current

## Planetary Gear Limit Switches

## Series 51 – Option: Potentiometer

Revision number: 3.1.1.10-01

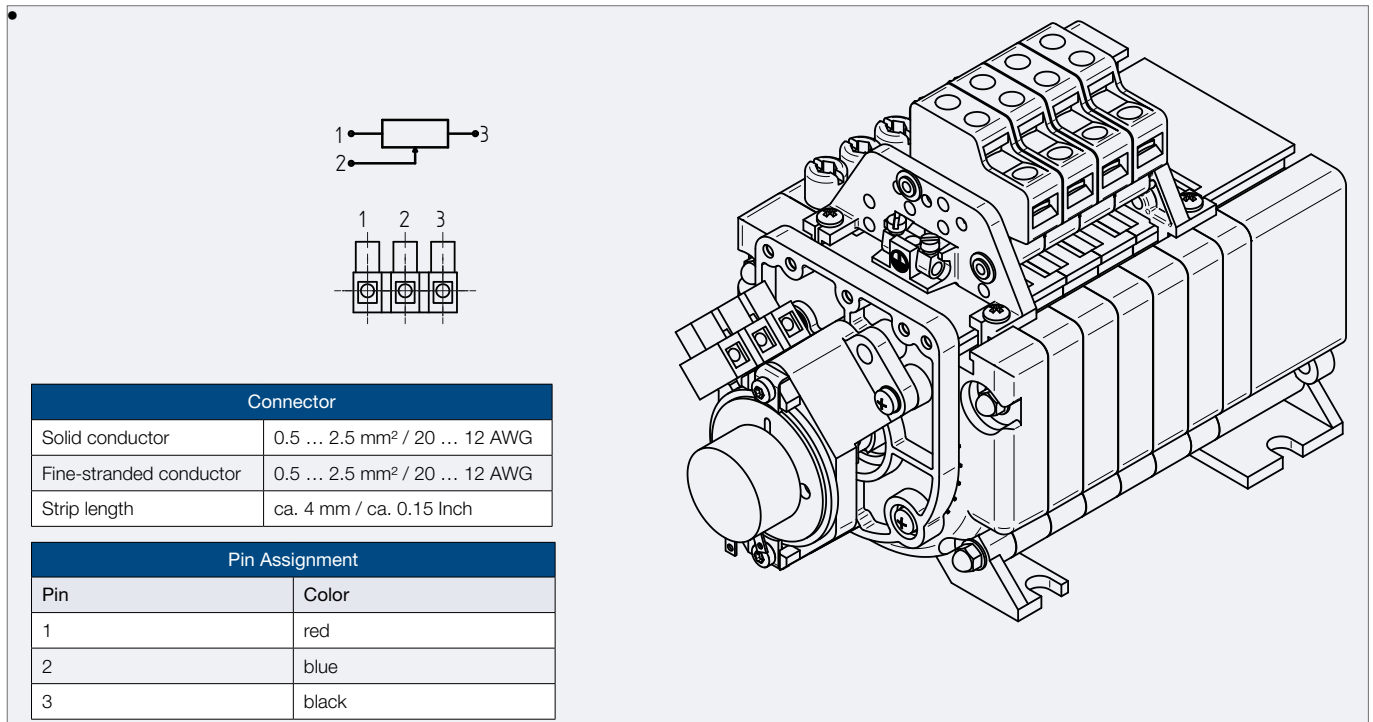
Revision date: 19.11.2019

## 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



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

## Series 51 – Option: Analog Encoders

Revision number: 3.1.1.11-01

Revision date: 19.11.2019

### Features

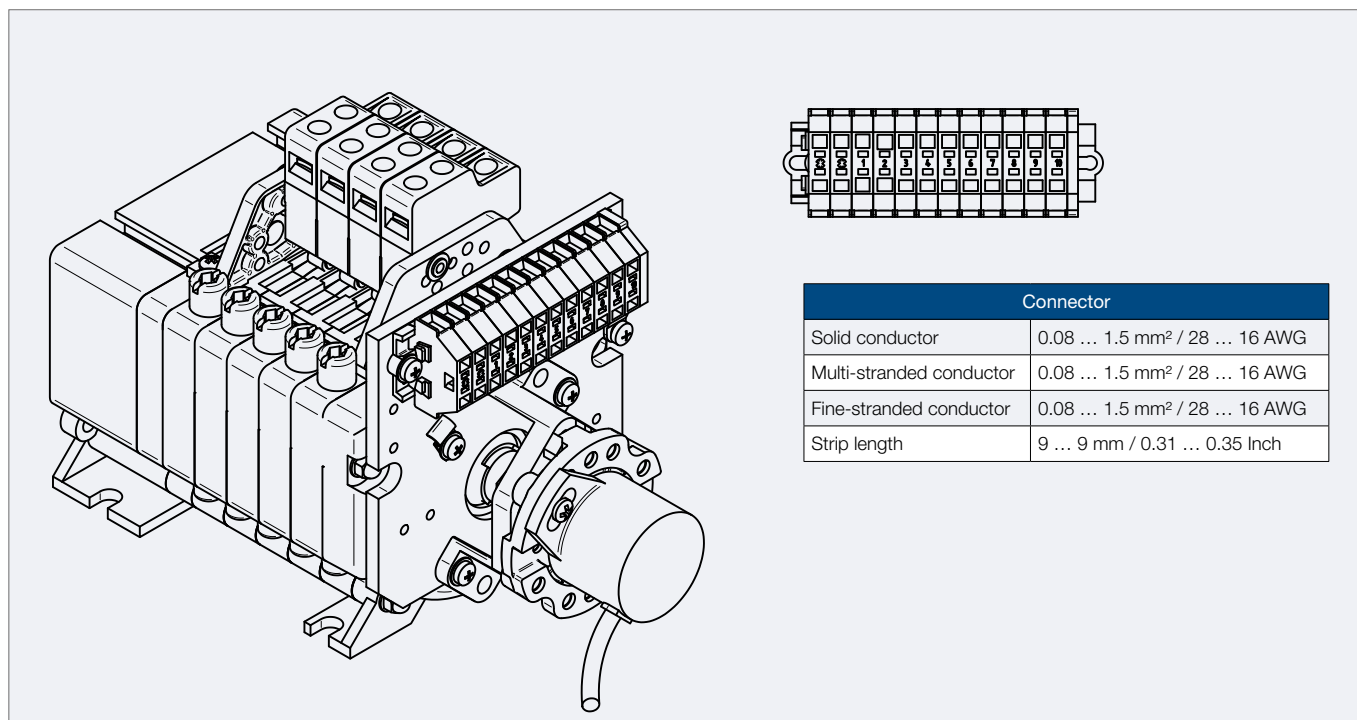
- Contactless measuring method
- Absolute position acquisition
- Long lifetime
- Turning synchronously with the cam discs

### 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 <sup>2</sup> / 28 ... 16 AWG
Multi-stranded conductor	0.08 ... 1.5 mm <sup>2</sup> / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm <sup>2</sup> / 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	red
Ground	2	green	black
Output signal	3	white	brown
Set 1	4	n/a	green
Set 2	5	n/a	yellow
Cut	6	n/a	white

\* Referring to encoder shaft

## 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

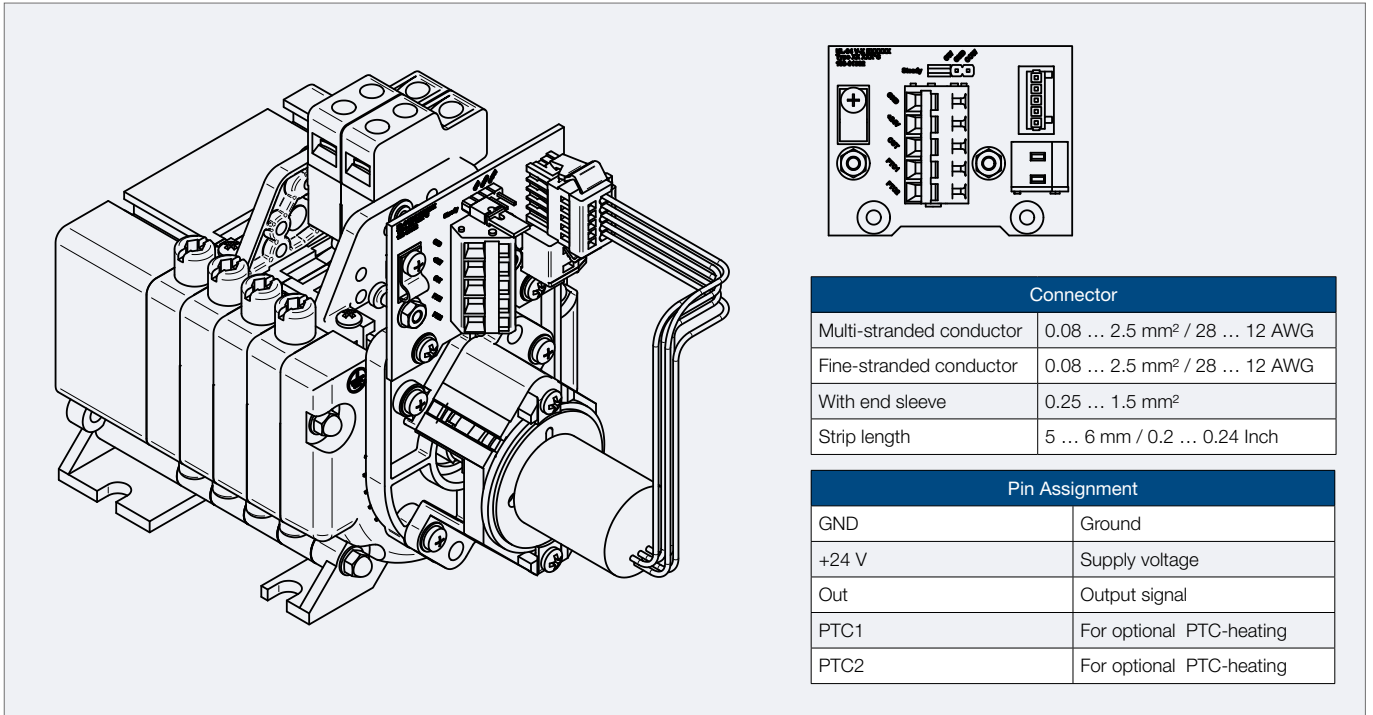
- Contactless measuring method
- Absolute value acquisition
- Long lifetime
- Turning synchronously with the cam discs

### 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



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

## Series 51 – Option: Incremental Encoder

Revision number: 3.1.1.13-01

Revision date: 19.11.2019

### Features

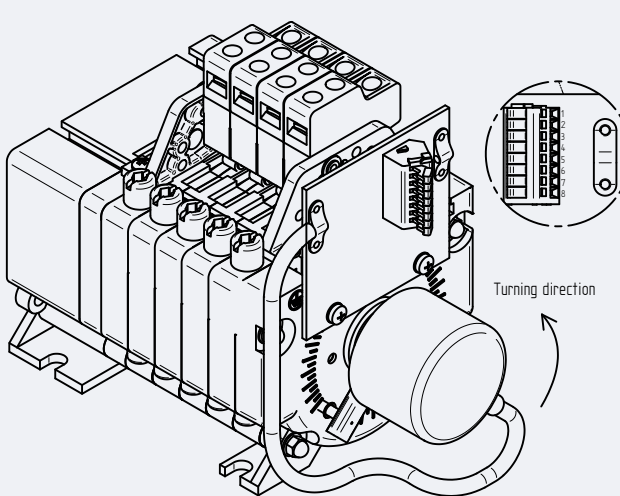
- Optical measuring
- Up to 3600 increments in small housing
- Already wired to squirrel cage tension
- 2 square signals, 90° phase shifted  
(+ inverted signals) for quadrature evaluation

### Application

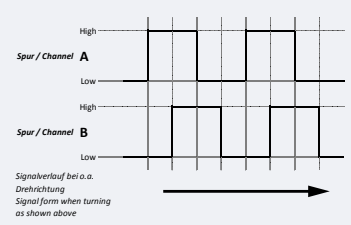
- For giving the information about speed

### Additional information

- Driven 1:1 from the second shaft end



Turning direction



High  
Low  
Spur / Channel A

High  
Low  
Spur / Channel B

Signalverlauf bei o.a. Drehrichtung  
Signal form when turning as shown above

Connector	
Solid conductor	0.08 ... 1.5 mm <sup>2</sup> / 28 ... 16 AWG
Multi-stranded conductor	0.08 ... 1.5 mm <sup>2</sup> / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm <sup>2</sup> / 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



## 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

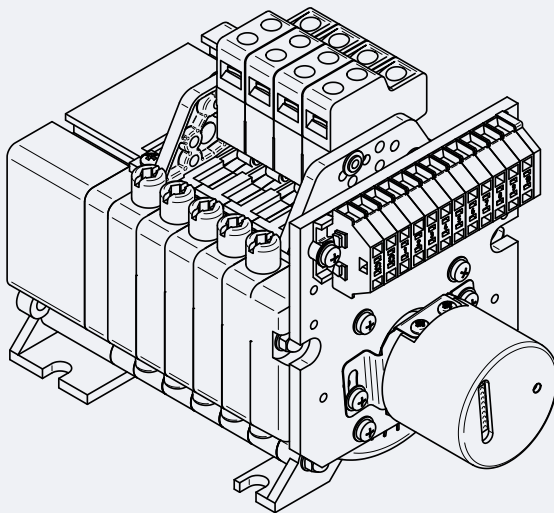
- Absolute value with high preciseness
- Without gear (Energy harvesting technology)
- Wired to squirrel cage tension

### Application

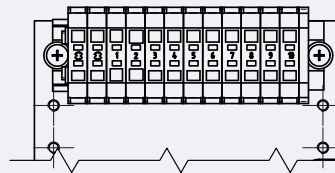
- For very high accuracy demands

### Additional information

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



Connector



Connector	
Solid conductor	0.08 ... 1.5 mm <sup>2</sup> / 28 ... 16 AWG
Fine-stranded conductor	0.08 ... 1.5 mm <sup>2</sup> / 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
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 funktion	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

## Series 51 – Option: CANopen Multiturn Encoder

Revision number: 3.1.1.15-01

Revision date: 19.11.2019

### Features

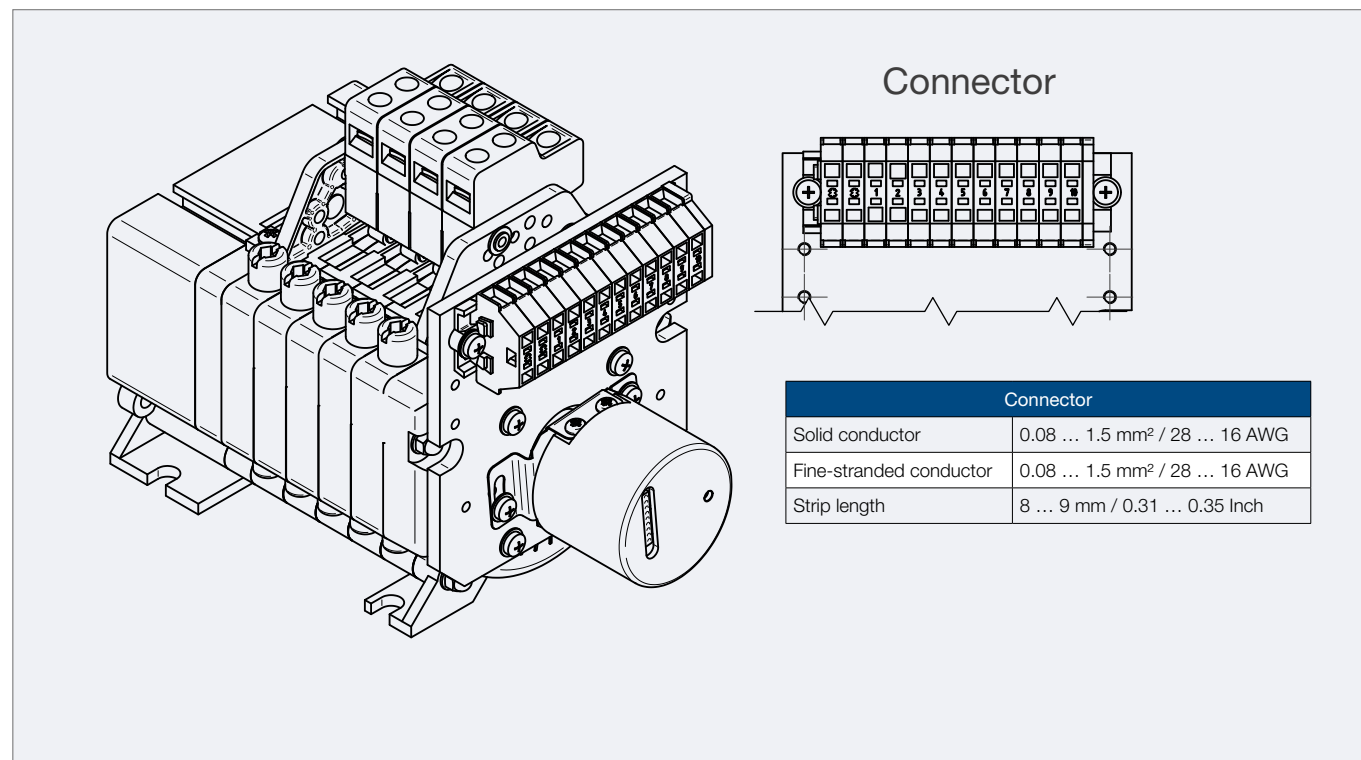
- Absolute value with high preciseness
- Without gear (Energy harvesting technology)
- Wired to squirrel cage tension

### 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



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.).

## Limit Switch Control Current

## Planetary Gear Limit Switches

# Series 51 – Option: Smart Cam®

Revision number: 3.1.1.16-01

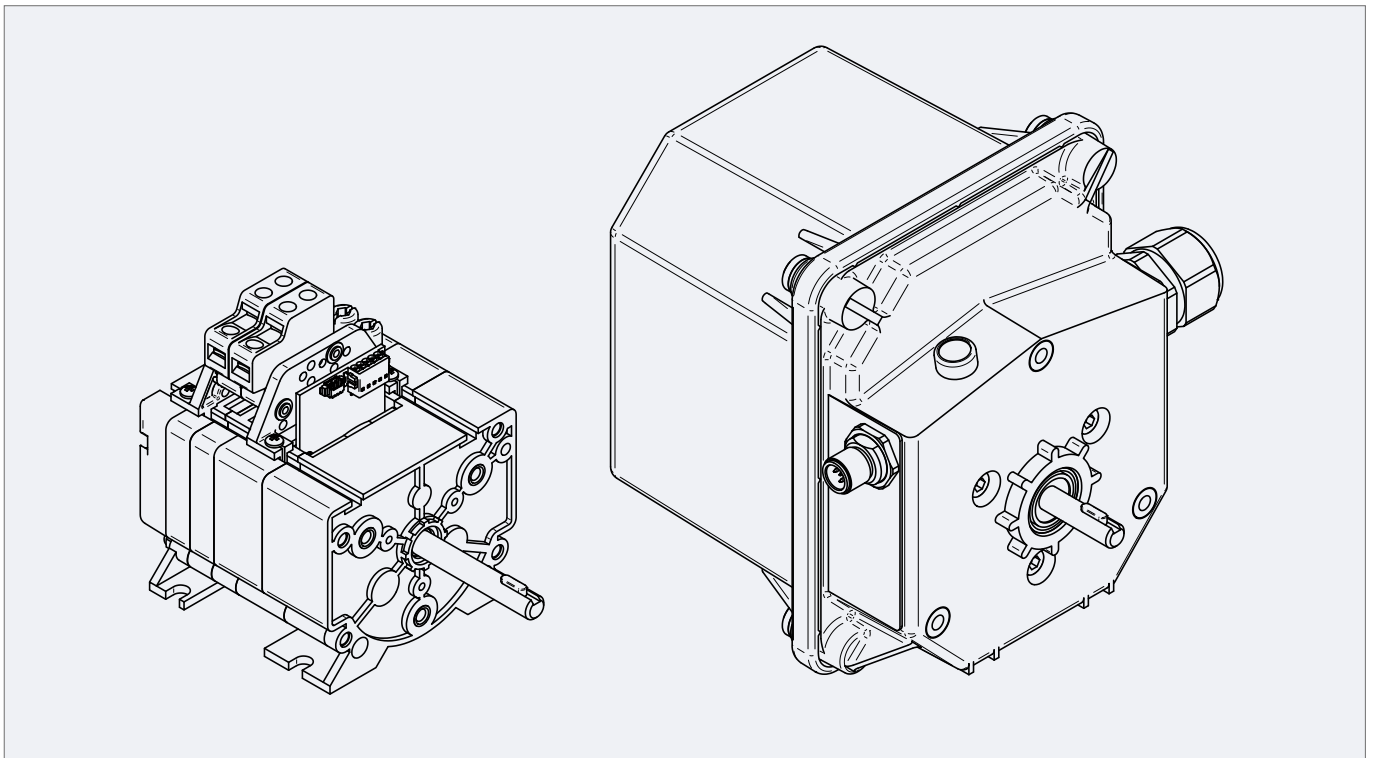
Revision date: 19.11.2019

### Features

- Multiturn absolute encoder which can be fully integrated inside of the Series 51 Limit Switch
- Only little space needed (21 mm) additional to the limit switch

### Additional information:

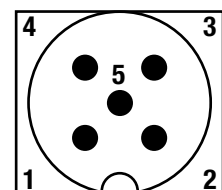
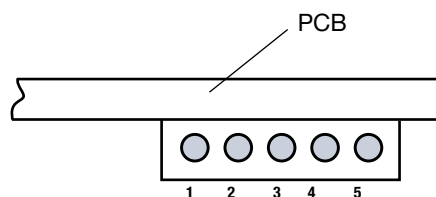
- Can be adapted to customer needs e.g. cable length measuring, speed or acceleration
- Resolution depending on gear
- Connected via M12 plug



Technical Data	
Resolution singleturn	10 Bit
Resolution multiturn	70 Revolutions
Interface	CAN (ISO 11898)
Protocol	CANopen CiA DS 301 and DS406
Speed	Up to 1 Mbaud
Node ID	1 ... 127
Configuration	LSS & LDO
Power supply	10 ... 30 V DC
Operating temperature	-40°C ... +85 °C

Pin Assignment (PCB Connector)	
Signal	Pin
CAN High	1
CAN Low	2
GND	3
CAN V+	4
CAN Shield	5

Pin Assignment (M12 Connector)	
Signal	Pin
CAN Shield	1
CAN V+	2
GND	3
CAN High	4
CAN Low	5



## Series 51 – Option: Electromagnetic Tooth Clutch EZX

Revision number: 3.1.1.17-01

Revision date: 19.11.2019

### Features

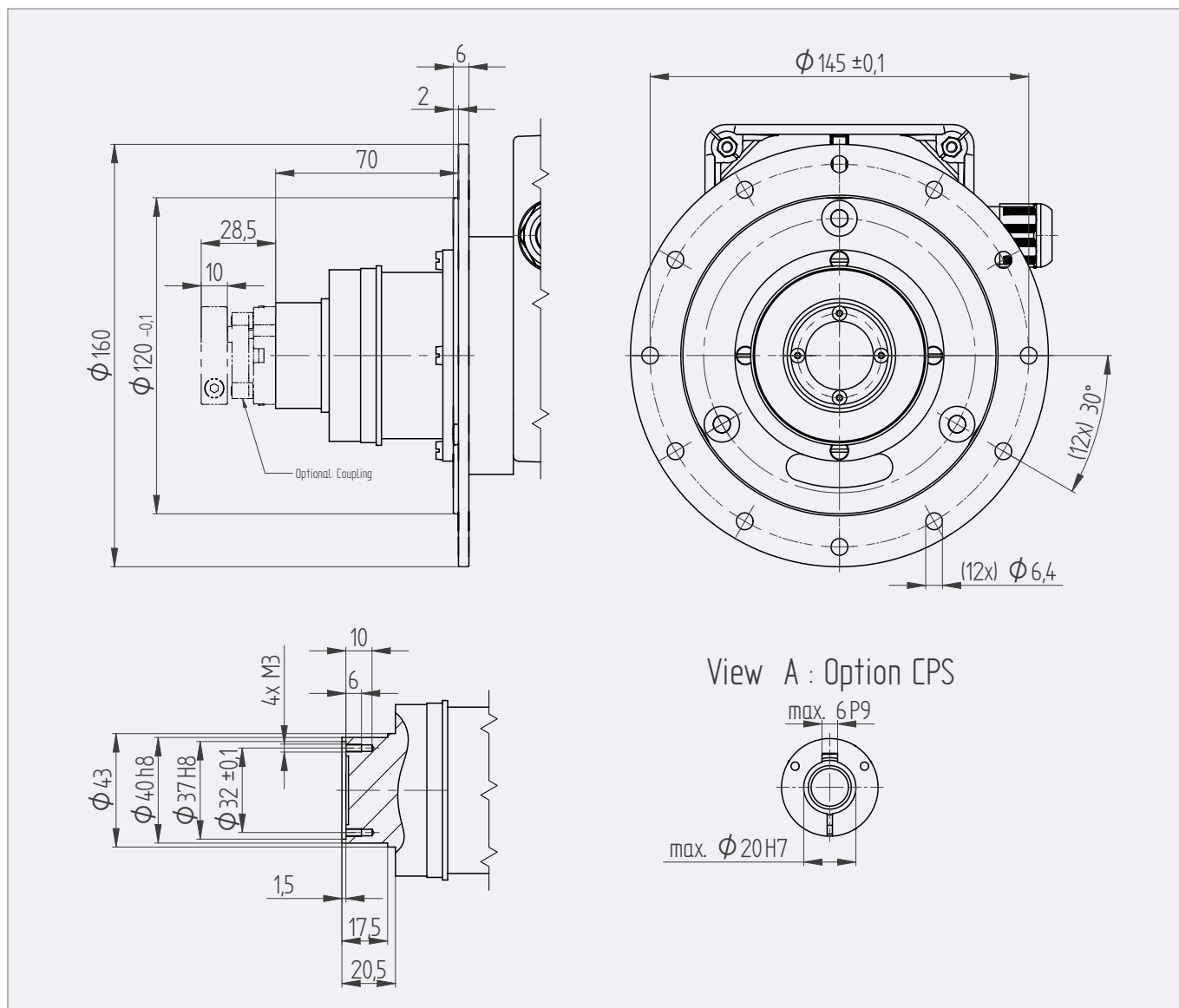
- Form fit connection inside
- High number of teeth for highest possible accuracy
- Safety related function, closed without current

### 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

## Series 51 – Key Of Types

Revision number: 3.1.1.18-01

Revision date: 19.11.2019

<b>Stromag GmbH</b> Hansastr. 120, 59425 Unna Tel. +49(0)2303102-0 Made in Germany		 Ui=250VAC Ith=10A	
<b>Getriebeendschalter</b> <b>Typ</b> 51_75_BMH_499_G <b>Auftr.Nr.:</b> xxxxx <b>Nr.:</b> xxxxxx <b>Ref.Nr.:</b> xxxxxx			
IP XX	230VAC/1A	60VDC/0,5A	
<b>Baujahr</b> XX / XX			

51	Switch type: GCLS 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
99	Type of switching contact	99: Contact (changeover) with screw connections, contact material: Silver (standard)
		99G: Contact (changeover) with screw connections, contact material: Gold
		99L: Contact (changeover) with soldering pins (for PCB), contact material: Silver
		99P: 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
		99B: Contact (changeover) with soldering pins, contact material: Gold
		99C: Contact (changeover) with stranded wire output, contact material: Silver
G	Additional components	G With encoder / sensor
		P With potentiometer

## Series 51 – Explosion Proof Type

Revision number: 3.1.1.19-01

Revision date: 19.11.2019

### Features

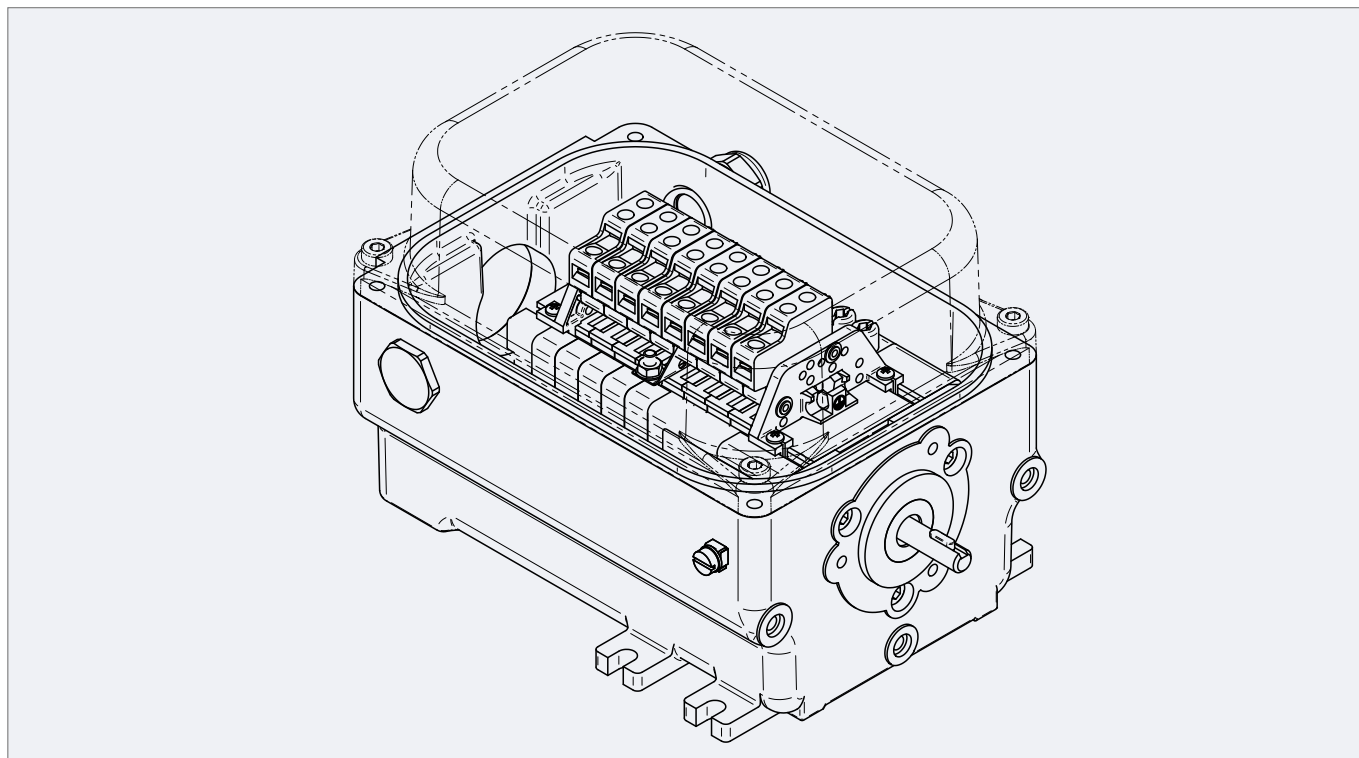
- Aluminum housing IP 65
- Built in sensors and potentiometers possible (max. power loss 4 W -> safety barrier)

### 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	Durst 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 <sup>2</sup> (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



# Premier Industrial Company Leading Brands

## OTHER PRODUCT SOLUTIONS FROM **ALTRA MOTION**

Our comprehensive product offerings include various types of clutches and brakes, overrunning clutches, engineered bearing assemblies, gearing and gear motors along with linear motion products, belted drives, couplings, limit switches, precision motors, drives & controls, miniature motors and engine braking systems. With thousands of product solutions available, Altra provides true single source convenience while meeting specific customer requirements. Many major OEMs and end users prefer Altra products as their No. 1 choice for performance and reliability.

[WWW.ALTRAMOTION.COM](http://WWW.ALTRAMOTION.COM)



### **Electric Clutches & Brakes**

Inertia Dynamics  
Matrix  
Stromag  
Warner Electric



### **Precision Motors & Automation**

Kollmorgen



### **Heavy Duty Clutches & Brakes**

Industrial Clutch  
Stromag  
Svendborg Brakes  
Twiflex  
Wichita Clutch



### **Miniature Motors**

Portescap



### **Overrunning Clutches**

Formsprag Clutch  
Marland Clutch  
Stieber



### **Linear Systems**

Thomson



### **Engineered Couplings & Universal Joints**

Ameridrives  
Bibby Turboflex  
Guardian Couplings  
Huco  
Lamiflex Couplings  
Stromag  
TB Wood's



### **Engine Braking Systems**

Jacobs Vehicle Systems



### **Gear Drives & Gear Motors**

Bauer Gear Motor  
Boston Gear  
Delroyd Worm Gear  
Nuttall Gear



### **Specialty Components**

Kilian  
Stromag  
TB Wood's



DISTRIBUIDOR AUTORIZADO MEX (55) 53 63 23 31 MTY (81) 83 54 10 18 QRO (442) 1 95 72 60 ventas@industrialmagza.com

## Stromag Facilities

### Europe

#### Germany

Hansastraße 120  
59425 Unna - Germany  
+49 (0) 23 03 102 0

*Clutches & Brakes, Couplings,  
Geared Cam Limit Switches, Discs,  
Wind Brakes*

Dessauer Str. 10  
06844 Dessau-Roßlau - Germany  
+49 (0) 340 2190 0

*Electromagnetic Clutches & Brakes*

#### France

Avenue de l'Europe  
18150 La Guerche sur L'Aubois - France  
+33 (0)2 48 80 72 72

*Disc Brakes & Drum Brakes*

#### Great Britain

Amphill Road  
Bedford, MK42 9RD - UK  
+44 (0)1234 324347

*Electromagnetic Clutches & Brakes,  
Industrial Caliper Brakes*

### North America

#### USA

31 Industrial Park Road  
New Hartford, CT 06057 - USA  
860-238-4783

*Electromagnetic Clutches & Brakes*

300 Indiana Highway 212  
Michigan City, IN 46360 - USA  
219-874-5248

*Couplings*

2800 Fisher Rd.  
Wichita Falls, TX 76302 - USA  
940-723-3400

*Geared Cam Limit Switches,  
Industrial Caliper & Drum Brakes*

#### South America

#### Brasil

Avenida João Paulo Ablas, 2970  
Jardim da Glória, Cotia - SP,  
06711-250 - Brasil  
+55 (11) 4615-6300

*Flexible Couplings, Bearing  
Isolators, and Coupling Guards*

### Asia Pacific

#### China

T40B -5, No. 1765 Chuan Qiao Road  
Pudong 201206, Shanghai - China  
Tel +86 21-60580600

*Clutches & Brakes, Electromagnetic  
Clutches & Brakes, Couplings, Industrial  
Caliper & Drum Brakes, Discs, Geared  
Cam Limit Switches, Wind Brakes*

#### India

Gat No.: 448/14, Shinde Vasti, Nighoje  
Tal Khed, Pune- 410 501  
+91 2135 622100

*Clutches & Brakes, Electromagnetic  
Clutches & Brakes, Couplings, Industrial  
Caliper & Drum Brakes, Discs,  
Cam Limit Switches, Wind Brakes*

## The Brands of Altra Motion

### Couplings

**Ameridrives**  
www.ameridrives.com

**Bibby Turboflex**  
www.bibbyturboflex.com

**Guardian Couplings**  
www.guardiancouplings.com

**Huco**  
www.huco.com

**Lamiflex Couplings**  
www.lamiflexcouplings.com

**Stromag**  
www.stromag.com

**TB Wood's**  
www.tbwoods.com

### Linear Systems

**Thomson**  
www.thomsonlinear.com

### Geared Cam Limit Switches

**Stromag**  
www.stromag.com

### Engineered Bearing Assemblies

**Kilian**  
www.kilianbearings.com

### Electric Clutches & Brakes

**Matrix**  
www.matrix-international.com

**Stromag**  
www.stromag.com

**Warner Electric**  
www.warnerelectric.com

**Deltran**  
www.thomsonlinear.com

### Belted Drives

**TB Wood's**  
www.tbwoods.com

### Heavy Duty Clutches & Brakes

**Twiflex**  
www.twiflex.com

**Stromag**  
www.stromag.com

**Svendborg Brakes**  
www.svendborg-brakes.com

**Wichita Clutch**  
www.wichitaclutch.com

### Gearing & Specialty Components

**Bauer Gear Motor**  
www.bauergears.com

**Boston Gear**  
www.bostongear.com

**Delevan**  
www.delevan.com

**Delroyd Worm Gear**  
www.delroyd.com

**Nuttall Gear**  
www.nuttallgear.com

### Engine Braking Systems

**Jacobs Vehicle Systems**  
www.jacobsvehiclesystems.com

### Precision Motors & Automation

**Kollmorgen**  
www.kollmorgen.com

### Miniature Motors

**Portescap**  
www.portescap.com

### Overrunning Clutches

**Formsprag Clutch**  
www.formsprag.com

**Marland Clutch**  
www.marland.com

**Stieber**  
www.stieberclutch.com

Neither the accuracy nor completeness of the information contained in this publication is guaranteed by the company and may be subject to change in its sole discretion. The operating and performance characteristics of these products may vary depending on the application, installation, operating conditions and environmental factors. The company's terms and conditions of sale can be viewed at <http://www.altramotion.com/terms-and-conditions/sales-terms-and-conditions>. These terms and conditions apply to any person who may buy, acquire or use a product referred to herein, including any person who buys from a licensed distributor of these branded products.

©2019 by Stromag LLC. All rights reserved. All trademarks in this publication are the sole and exclusive property of Stromag LLC or one of its affiliated companies.