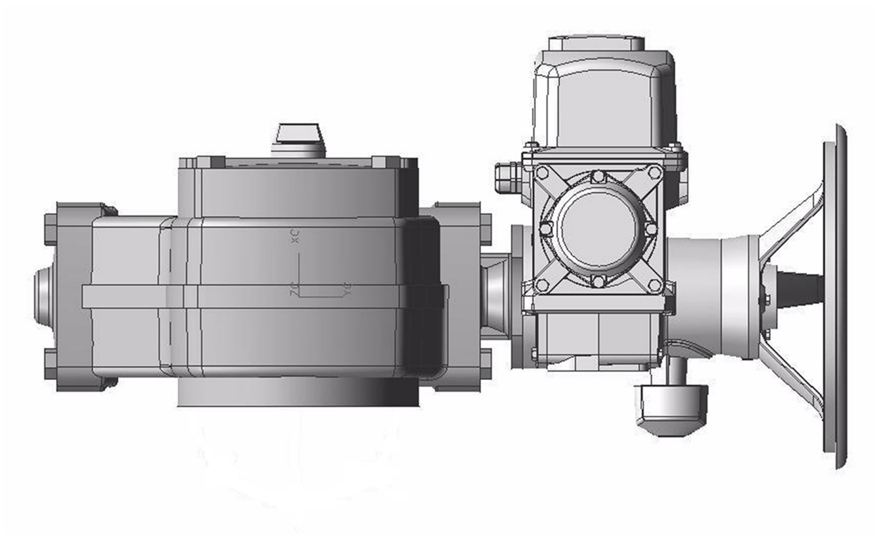
Electric Actuator

ACTELEC

Quarter-turn Actuator with Multi-turn Actuator
BERNARD

Type Series Booklet



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Type Series Booklet ACTELEC

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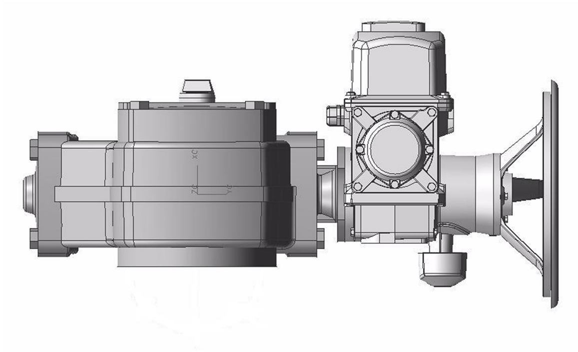
Contents

Electric Actuators

Electric Quarter-turn Actuators, Make BERNARD

ACTELEC 31 - 800



Main applications

- Water
- Waste water
- Energy
- Industry

Operating data

Table 1: Operating properties

Characteristic	Value
Min. permissible temperature [°C]	≥ -20
Max. permissible temperature [°C]	≤ +70
Enclosure	IP67 (standard)
	IP68 (optional)
Motor protection	Thermal class F
Power supply	400 V, 3~, 50 Hz

Design details

Design

- The electric actuators of the ACTELEC type series cover torques of up to 8000 Nm.
- Actuator/valve connection flange to ISO 5211
- They are suitable for all fields of application and all types of quarter-turn valves (centred-disc or offset-disc butterfly valves, ball valves, etc.).
- These electric actuators feature irreversible gear kinematics operated by a mounted multi-turn actuator.
- Force transmission:
  - ACTELEC 31: force transmission via rod-and-crank kinematics
  - ACTELEC 200 bis 800: force transmission via toggle-lever kinematics
- The standard version of the ACTELEC electric actuator is suitable for on/off duty (to EN 19714-2, Class A) or intermittent duty S4 - 30 % with 360 starts per hour (to EN 19714-2 Class B).
- Electrical remote control
- Actuator for continuous duty - repeated start-up (S4 - 50 % - 1200 starts/hour, to EN 19714-2 Class C).
- Integrated electrical control system for local and remote control, type INTEGRAL +

Coating:

- Gearbox: polyurethane coating, thickness 80 µm, colour: RAL 7016 anthracite grey
- Electric multi-turn actuator: epoxy coating, thickness 35 µm, colour: RAL 5002 blue

Electrical motor protection by:

- Integrated temperature switch
- Four electrical switches for stopping the multi-turn actuator when the limit position has been reached (two switches for Open and two switches for Closed)
- Heating resistor as corrosion protection
- Manual override by handwheel (to EN 12570)
- Position indicator
- One or several adjustable mechanical travel stops

Variants

- Control function with integrated 4 - 20 mA positioner
- Additional electrical switches, adjustable across the entire stroke, for remote position indication (limit positions and/ or intermediate position)
- Double contacts with torque switch
- Actual-position feedback via 1000-Ohm potentiometer or 4 - 20 mA signal
- Communication interface - Intelligence - Field buses
- Other supply voltages

Product benefits

- Actuator for all types of quarter-turn valves (butterfly valves, ball/plug valves)
- Complete type series available for different voltages and torques (900 Nm to 8000 Nm)
- For on/off duty or control duty (optional)
- Manual override function integrated
- Mounts on the valve either directly or via installation components

Product information

Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see https://www.ksb.com/ksb-en/About-KSB/Corporate-responsibility/reach/ .

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Technical data

Valve interface

Table 2: Valve interface

ACTELEC	Nominal output torque	Interface standardised to ISO[1]	Max. permissible shaft dimensions		
			Height	Square end	Flat end
	[Nm]	-			
31	900	-	40	36	36
200	2000	F16	80	60	55
400	4000	F16	80	60	55
500	5000	F16 - F25	95	70	75
800	8000	F16 - F25	95	70	75

Technical data of type series

ACTELEC 31 to 800 electric actuators feature irreversible gear kinematics operated by a BERNARD electric multi-turn actuator with ISO 5210 interface. The interface between the electric actuator and the valve complies with the ISO 5211 standard.

Table 3: Technical data of type series

ACTELEC	Gearbox	Output torque	Input torque	Number of turns of actuating stem	Electric multi-turn actuator	Interface of multi-turn actuator
	-	[Nm]	[Nm]	-	-	-
31	M 31	900	60	32	ASM6	ISO 5210 F10 B3
200	MR 400	2000	50	47	ASM6	
400	MR 400	4000	100	47	ASM10	
500	MR 800	5000	60	135	ASM6	
800	MR 800	8000	100	135	ASM10	

Actuating time

Other actuating times are possible using a special gearbox. Contact KSB.

Table 4: Actuating time [rpm]

ACTELEC	Output speed of the multi-turn actuator						
	5	10	17	26	35	51	122
31	6 min 24 s	3 min 12 s	1 min 53 s	1 min 14 s	55 s	37 s	-
200 and 400	9 min 24 s	4 min 42 s	2 min 46 s	1 min 48 s	1 min 20 s	55 s	-
500 and 800	-	-	7 min 56 s	5 min 11 s	3 min 51 s	2 min 39 s	1 min 04 s[2]

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1 Direct mounting in the case of identical interfaces. Mounting by means of intermediate flange in the case of different interface sizes and footprints

2 ACTELEC 500 only

Characteristics of multi-turn actuator

Table 5: Characteristics of multi-turn actuator

Electric multi-turn actuator	Output speed of multi-turn actuator	On/off duty Three-phase current, 400 V, 50 Hz			
		Speed of multi-turn actuator	Rated power	Rated current	Starting current
	[rpm]	[rpm]	[kW]	[A]	[A]
ASM6	5	750	0,10	0,6	1,0
	10	1500	0,06	0,3	0,8
	17	1500	0,10	0,6	1,2
	26	1500	0,10	0,6	1,2
	35	3000	0,14	0,7	2,8
	51	3000	0,10	0,7	3,0
	120	3000	0,50	1,6	5,0
ASM10	5	750	0,10	0,6	0,9
	10	1500	0,10	0,6	1,2
	17	1500	0,10	0,6	1,2
	26	1500	0,37	1,1	5,0
	35	3000	0,10	0,7	2,8
	51	3000	0,50	1,6	5,0

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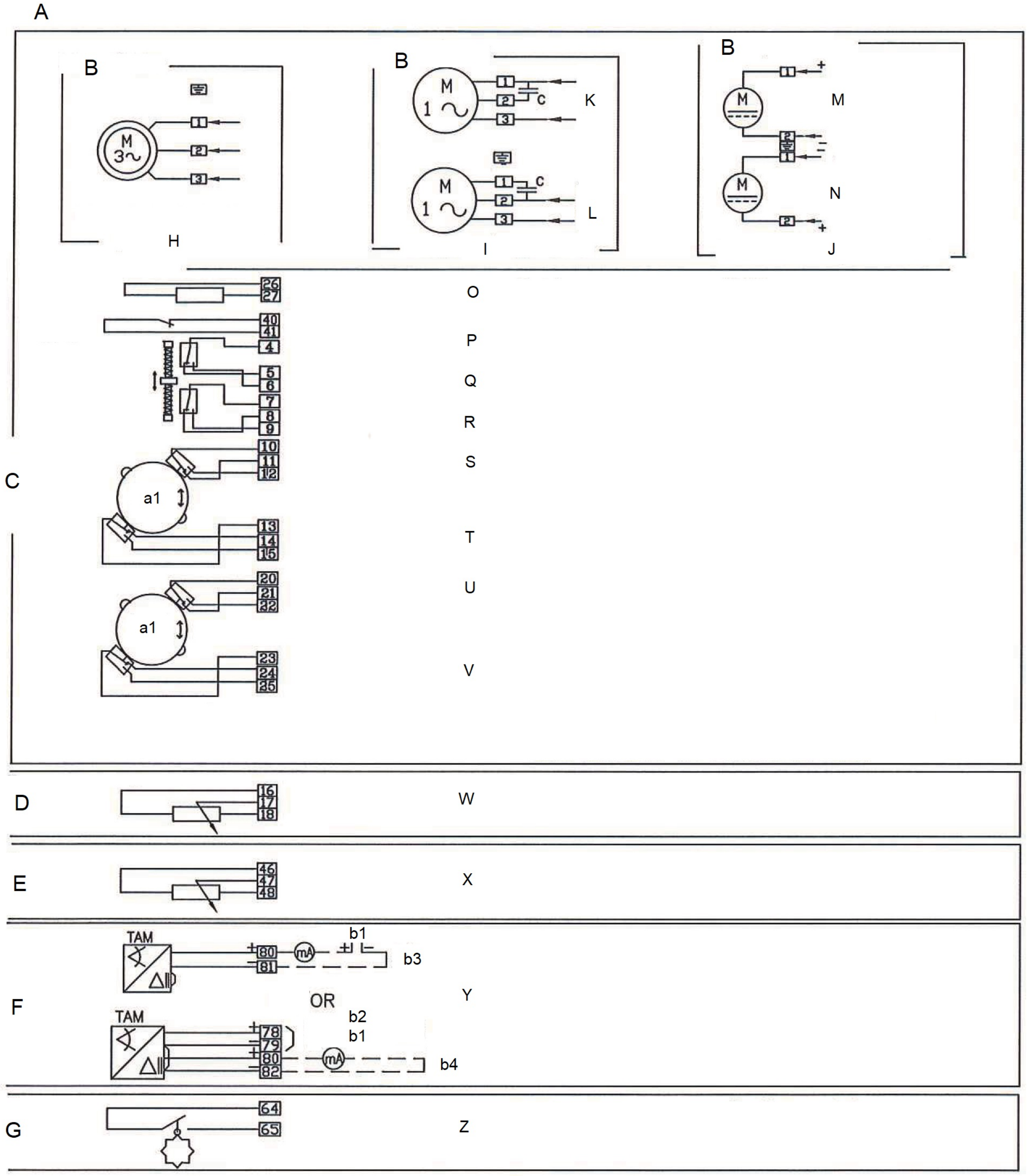
On/off duty

Technical data

Table 6: Technical data

Description	ACTELEC 31	ACTELEC 200	ACTELEC 400	ACTELEC 500	ACTELEC 800
	ASM6	ASM6	ASM10	ASM6	ASM10
Basic equipment					
Electrical switches for stopping the multi-turn actuator	Standard				
Adjustable mechanical limit switches	-	Standard: for CLOSED only			
Torque switches for OPEN and CLOSED positions	Standard				
Heating resistor	Standard				
Manual override Number of handwheel turns	32,5	48		138	
Power supply	400 V, 3~				
On/off duty SA - 30 %	Yes – see the following circuit diagram				
Other variants					
Continuous duty: S4 - 50 %	Yes – see the following circuit diagram				
Local control system INTEGRAL +	Yes – see the following circuit diagram				

Circuit diagram "Switch"



Circuit diagram for on/off duty

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Table 7: Symbols key

A	Multi-turn actuator	Q	Torque switch, direction of rotation I
B	Motor	R	Torque switch, direction of rotation II
C	Standard	S	Limit switch 1, direction of rotation I
D	Option 1	T	Limit switch 1, direction of rotation II
E	Option 2	U	Limit switch 2, direction of rotation I
F	Option 3	V	Limit switch 2, direction of rotation II
G	Option 4	W	Potentiometer 1, 1000 Ohm
H	Three-phase	X	Potentiometer 2, 1000 Ohm
I	Single-phase	Y	Electronic position transmitter TAM 4 - 20 mA
J	Direct current	Z	Flashing contact (multi-turn actuator running)
K	Direction I	a1	Limit switch
L	Direction II	b1	12 to 32 V DC
M	Direction II	b2	Transmitter supply
N	Direction I	b3	2-wire system
O	Resistor	b4	3-wire or 4-wire system
P	Thermal motor protection (single-phase and three-phase)		

Note:
Three-phase, direct direction = direction II

Torque switch not provided for SQ4 to SQ15

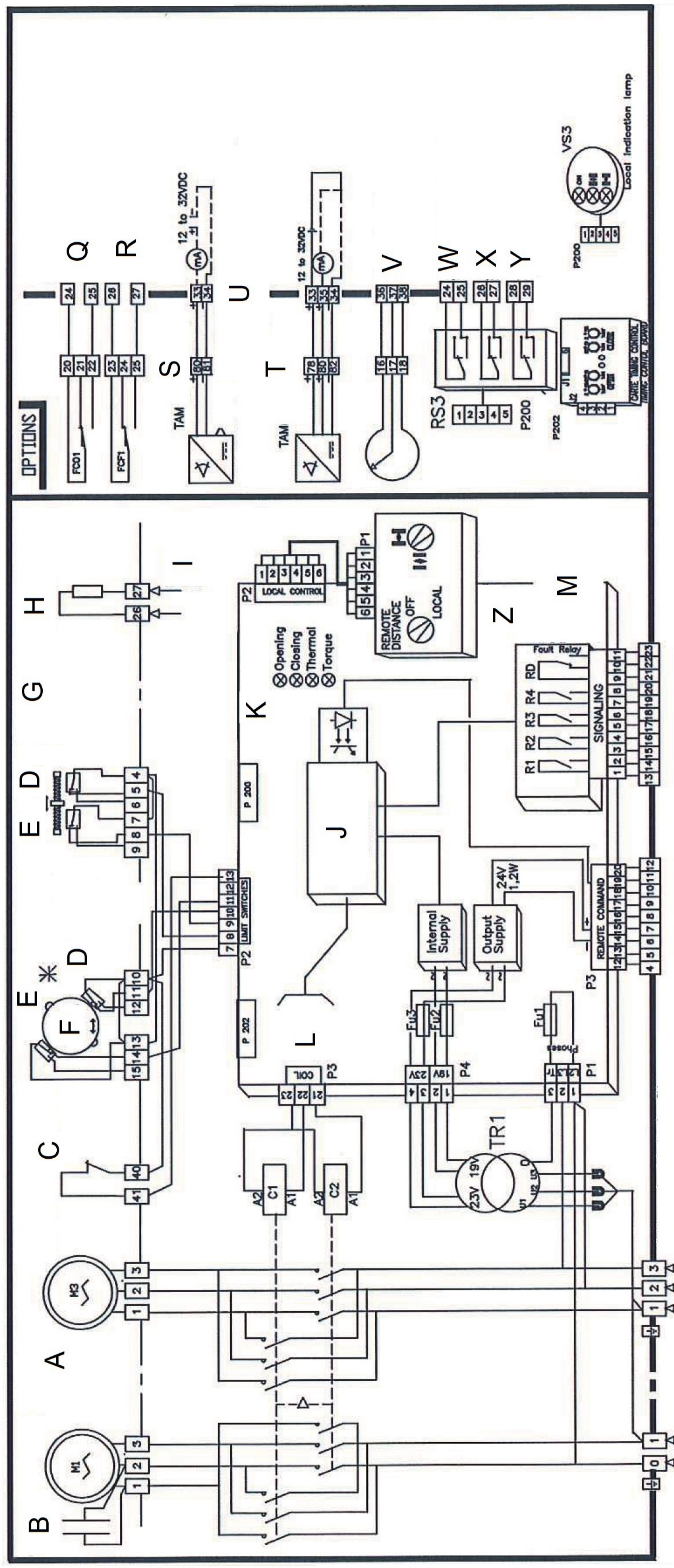
The torque switch contacts are of the momentary type.

All options are compatible.

Contact functions
Direction of rotation:
- I - anti-clockwise (usual opening direction)
- II - clockwise (usual closing direction)
Standard direction of rotation, viewed from the side opposite the multi-turn actuator's mounting flange

On/off duty: INTEGRAL +

Circuit diagram



Circuit diagram on/off duty, version INTEGRAL+

Table 8: Symbols key

A	Motor	N	Single-phase alternating current
B	Capacitor	O	Three-phase current
C	Thermal motor protection	P	Wiring dependent on voltage of multi-turn actuator
D	Direction 1	Q	Additional limit switch for OPEN
E	Direction 2	R	Additional limit switch for CLOSED
F	Limit switch	S	2-wire system
G	Torque switch	T	3-wire / 4-wire system
H	Heating resistor	U	Actual-position feedback via 4 - 20 mA signal
I	Main power supply	V	Potentiometer
J	Control logic	W	Signal OPEN
K	Printed circuit board C12701	X	Signal CLOSED
L	Common / direction 1+ / direction 2+	Y	Signal "ready for operation"
M	RD: fault relay / contacts 21-23 closed / multi-turn actuator ready for operation	Z	Local control systems

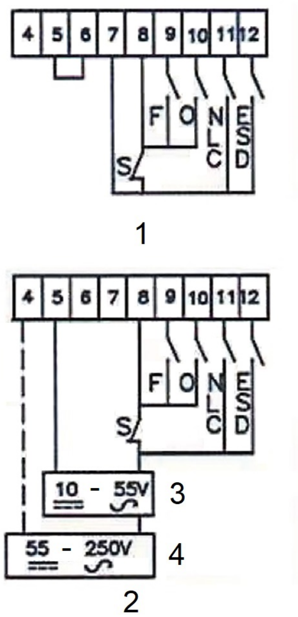
Comment:

For actual-position feedback by 4 - 20 mA signal (terminal U), power supply 24 V DC 6 - 7 can be used.

The phase sequence is irrelevant. If a phase is missing, the multi-turn actuator will not start again, and a fault message will be output (fault relay).

Table 9: Limit switch (F) configuration

Configuration	7A	7B
Direction 1	Open	Close
Direction 2	Close	Open



Annex: circuit diagram for on/off duty, version INTEGRAL+

Table 10: Symbols key

ESD	Emergency shutdown	S	Stop
F	Close	Tr	Transformer
Fu	Fuse	1	Wiring for control via contact
NLC	Local control system forbidden	2	Wiring for control via voltage
O	Open	3	10 to 55 V
R	Signalling	4	55 to 250 V

Note:

To prevent latching do not connect terminal 8.

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Table 11: Assignment of signals see configuration data sheet

Contact	Code	Description	Code	Description
R1	14 LSO	Limit switch Open	TSO	Torque switch Open
R2	15 LSC	Limit switch Closed	TSC	Torque switch Close
R3	16 LSO	Limit switch Open	TSO	Torque switch Open
	17 Local	Selector switch set to Local	Remote	Selector switch set to Remote
	18 Running	Actuation active	Opening	Actuator is opening
R4	19 LSC	Limit switch Closed	TSC	Torque switch Close
	20 ESD	Emergency shutdown	Closing	Actuator is closing
	21 Local	Selector switch set to Local	Remote	Selector switch set to Remote

Note:

Each contact can be configured to be normally open (NO = standard) or normally closed (NC). Only one setting can be selected per message. The contacts are open when de-energised.

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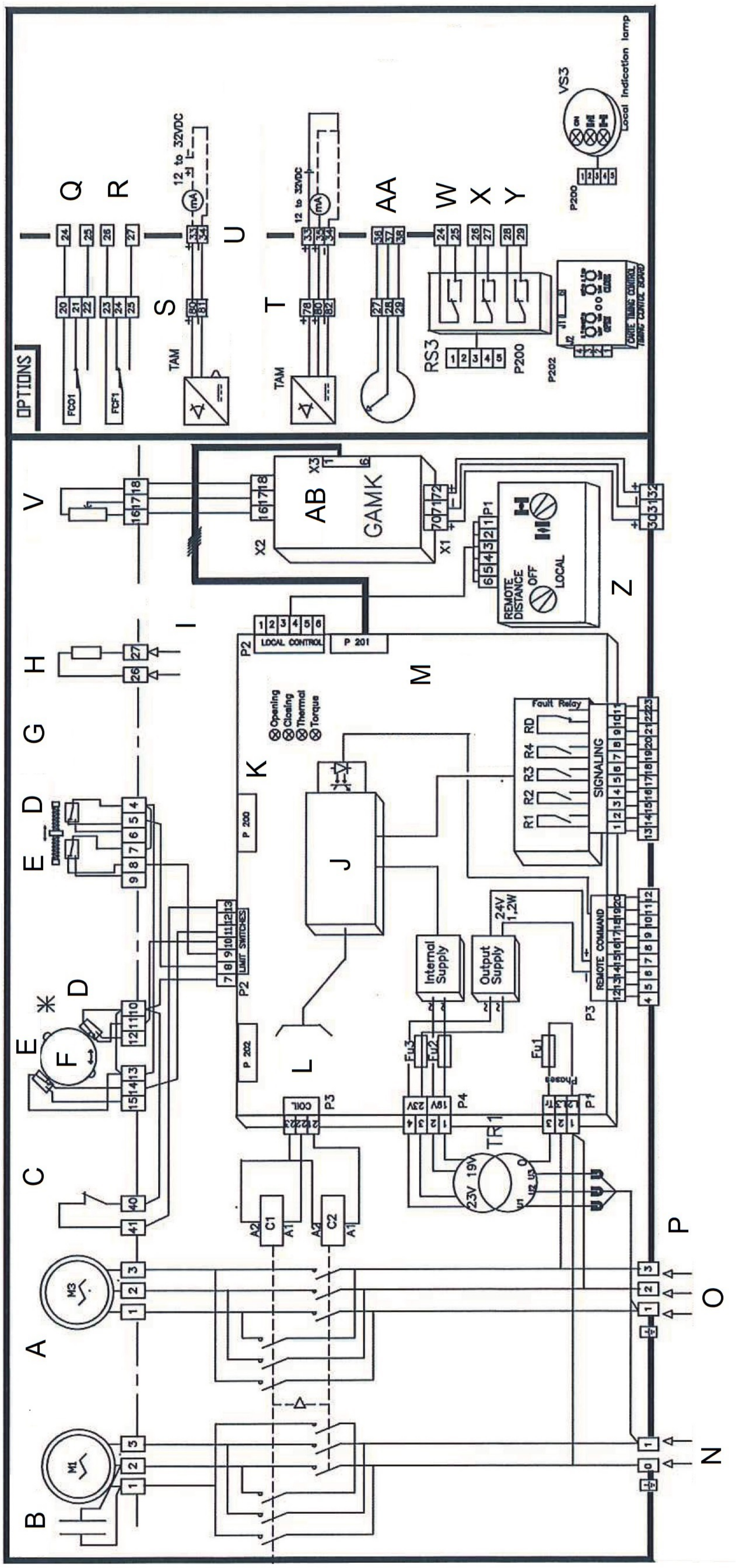
Control duty - Class III version INTEGRAL with positioner 4-20 mA

Technical data

Table 12: Technical data

Description	ACTELEC 31	ACTELEC 200	ACTELEC 400	ACTELEC 500	ACTELEC 800
	ASM6	ASM6	ASM10	ASM6	ASM10
Basic equipment					
Electrical switches for stopping the multi-turn actuator	Standard				
Adjustable mechanical limit switches	Standard: for CLOSED only				
Torque switches for OPEN and CLOSED positions	Standard				
Heating resistor	Standard				
Manual override Number of handwheel turns	Contact KSB.				
Integrated control system with integrated positioner 4 - 20 mA	Standard				
Power supply	400 V, 3~				
Power supply					
400 V, 3~	Standard				

Circuit diagram



Circuit diagram for closed-loop control

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Table 13: Symbols key

A	Motor	O	Three-phase current
B	Capacitor	P	Wiring dependent on voltage of multi-turn actuator
C	Thermal motor protection	Q	Additional limit switch for OPEN
D	Direction 1	R	Additional limit switch for CLOSED
E	Direction 2	S	2-wire system
F	Limit switch	T	3-wire / 4-wire system
G	Torque switch	U	Actual-position feedback via 4 - 20 mA signal
H	Heating resistor	V	Potentiometer
I	Main power supply	W	Signal OPEN
J	Control logic	X	Signal CLOSED
K	Printed circuit board C12701	Y	Signal "ready for operation"
L	Common / direction 1+ / direction 2+	Z	Local control systems
M	RD: fault relay / contacts 21-23 closed / multi-turn actuator ready for operation	AA	Second potentiometer
N	Single-phase alternating current	AB	Positioner

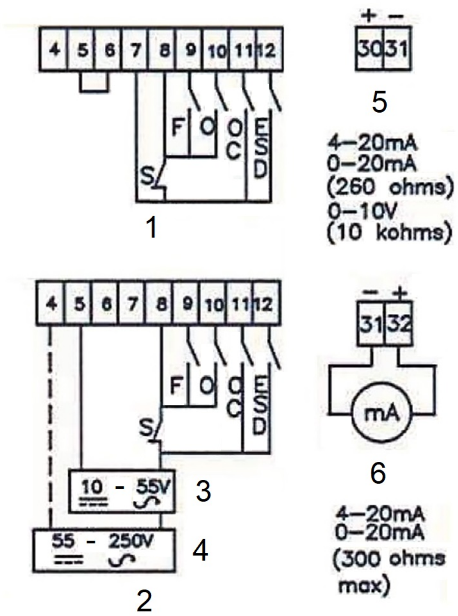
Note:

For actual-position feedback by 4 - 20 mA signal (terminal U), power supply 24 V DC 6 - 7 can be used.

The phase sequence is irrelevant. If a phase is missing, the multi-turn actuator will not start again, and a fault message will be output (fault relay).

Table 14: Limit switch (F) configuration

Configuration	7A	7B
Direction 1	Open	Close
Direction 2	Close	Open



Annex: Circuit diagram for closed-loop control

Table 15: Symbols key

ESD	Emergency shutdown	Tr	Transformer
F	Close	1	Wiring for control via contact
Fu	Fuse	2	Wiring for control via voltage
OC	Contact closed = on/off duty	3	10 to 55 V
O	Open	4	55 to 250 V
R	Signalling	5	Input signal
S	Stop	6	Output signal

Note:

To prevent latching do not connect terminal 8.

Table 16: Assignment of messages see configuration data sheet

Contact	Code	Description	Code	Description
R1	14 LSO	Limit switch Open	TSO	Torque switch Open
R2	15 LSC	Limit switch Closed	TSC	Torque switch Close
R3	16 LSO	Limit switch Open	TSO	Torque switch Open
	17 Local	Selector switch set to Local	Remote	Selector switch set to Remote
	18 Running	Actuation active	Opening	Actuator is opening
R4	19 LSC	Limit switch Closed	TSC	Torque switch Close
	20 ESD	Emergency shutdown	Closing	Actuator is closing
	21 Local	Selector switch set to Local	Remote	Selector switch set to Remote

Note:

Each contact can be configured to be normally open (NO = standard) or normally closed (NC). Only one setting can be selected per message. The contacts are open when de-energised.

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Materials

ACTELEC 31

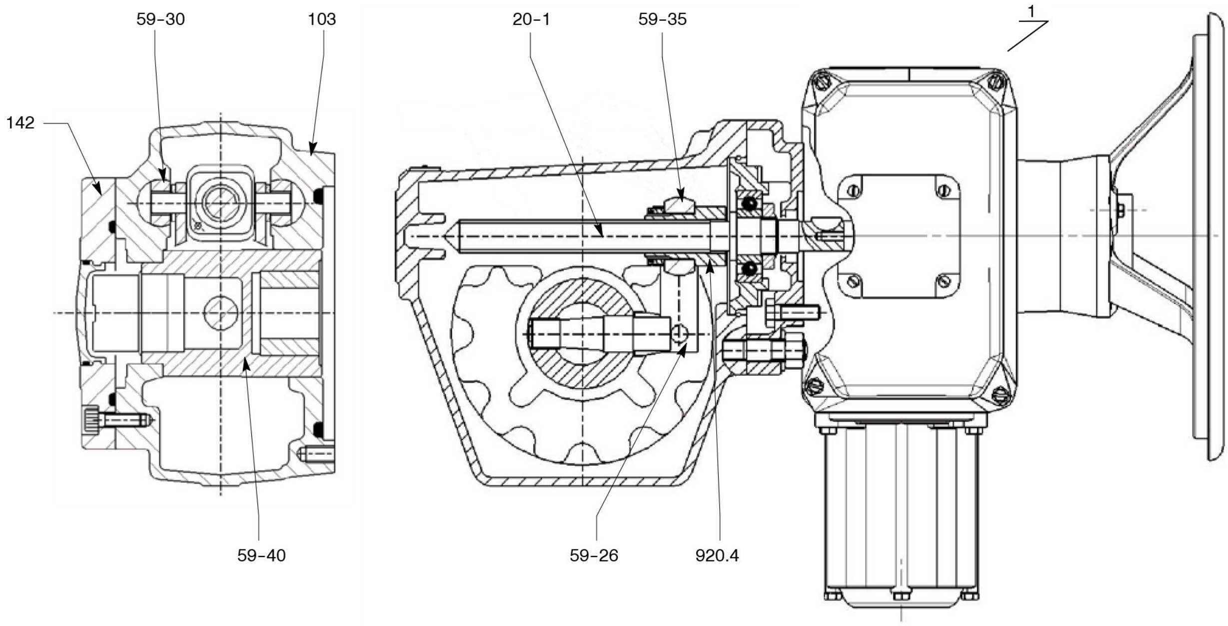

Fig. 1: ACTELEC 31

Table 17: List of components

Part No.	Description	Materials
1	Electric multi-turn actuator	
20 - 1	Actuating stem	Phosphate steel, nickel-plated
59 - 26	Connecting rod	Steel
59 - 30	Roller	Tempered steel with PTFE coating
59 - 35	Socket	Steel
59 - 40	Actuating bush	Steel
103	Gear housing	Lamellar graphite cast iron JL1040[3)]
142	Cap	Thermosetting plastics
920.4	Threaded nut	Bronze
-	Housing of electric multi-turn actuator	Lamellar graphite cast iron and light metal alloy

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3 * Previous standards: DIN GG 25 / NF FGL 250

ACTELEC 200 - 800

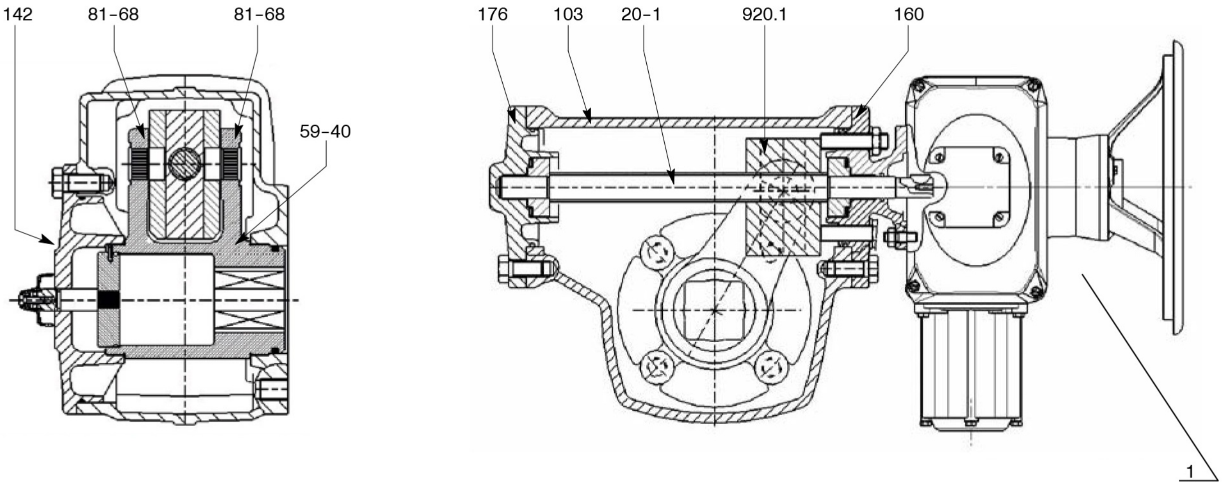

Fig. 2: ACTELEC 200 - 800

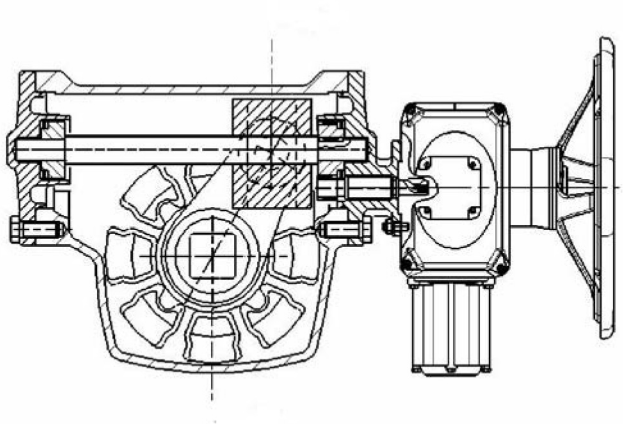

Fig. 3: ACTELEC 500 - 800 (Die ACTELEC 500 bis 800 sind mit einem eingangseitigem Untersetzungsgetriebe ausgestattet.)

Table 18: List of components

Part No.	Description	Materials
1	Electric multi-turn actuator	
20 - 1	Actuating stem	Phosphate steel, nickel-plated
59 - 40	Actuating bush/indicator shaft assembly	Nodular cast iron JS1030[4] / stainless steel
81 - 68	Sliding pad	Nitrided steel
103	Gear housing	Lamellar graphite cast iron JL1040[5] or nodular cast iron JS1030[4]
142	Cap	
160	Cover	
176	Bottom	
920.1	Sliding nut	Bronze
-	Housing of electric multi-turn actuator	Lamellar graphite cast iron and light metal alloy

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4 Previous standards: DIN GGG 40 / NF FGS 400- 15
5 * Previous standards: DIN GG 25 / NF FGL 250

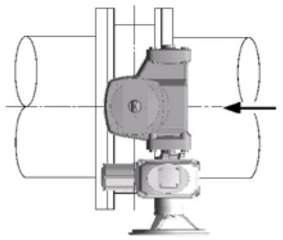
Variants

Mounting onto the valve

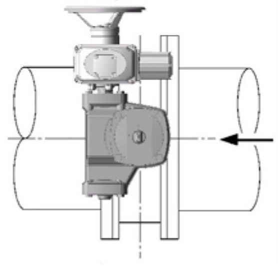
The actuator can be mounted onto the valve in 4 different positions, offset by 90°. Unless otherwise specified in the purchase order, the actuator is mounted onto the valve according to mounting option N, position 1.

Mounting option N

Position 1



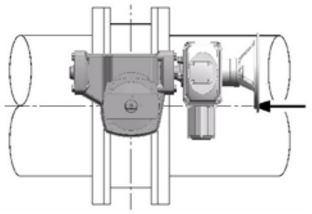
Position 2



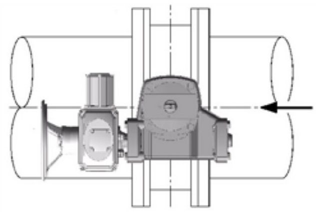
ACTELEC, mounting option N

Mounting option M

Position 1



Position 2



ACTELEC, mounting option M

Flow direction of fluid handled – Valve shown in closed position

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Dimensions and weights

ACTELEC 31 - 800

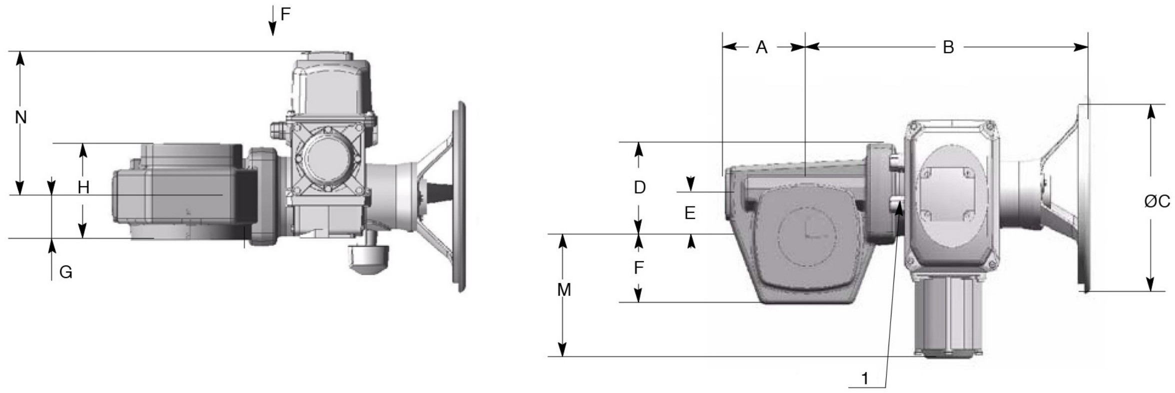

Fig. 4: ACTELEC 31

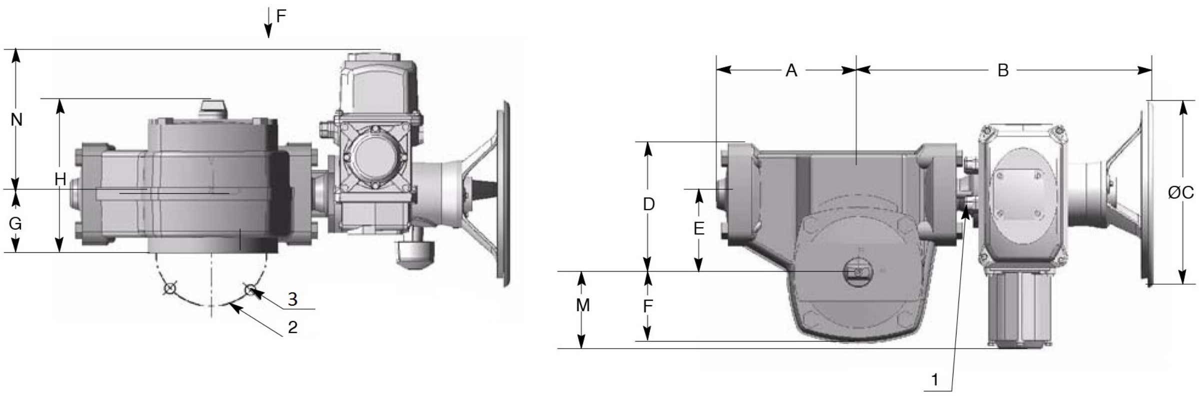

Fig. 5: ACTELEC 200 and 400

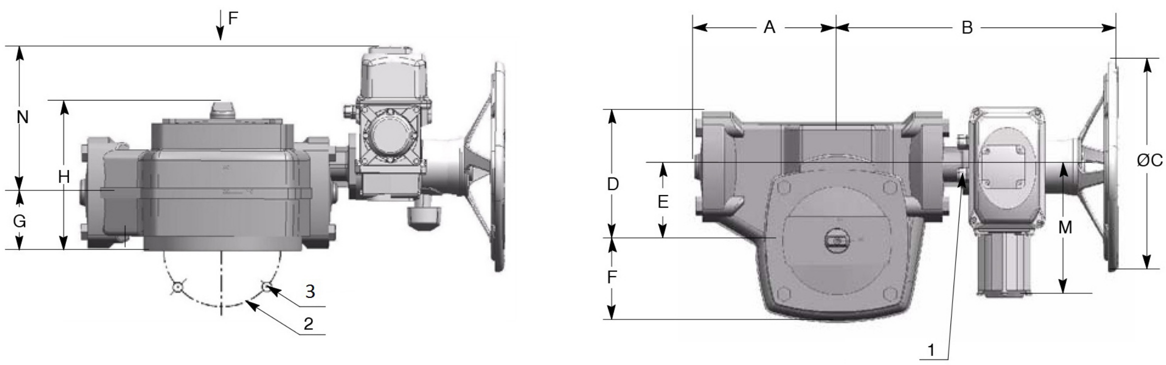

Fig. 6: ACTELEC 500 and 800

Table 19: Dimensions [mm] and weights [kg]

ACTELEC	Multi-turn actuator	A	B	Ø C	D	E	F	G	H	M	N	Mounting flange ISO 5211				Weight
												Ref.	1[6]	2[7]	3[8]	
													n	Ø d1	Ø d2	
31	ASM6	125	401	300	145	65	102	69	152	292	211	-	-	-	-	42
200	ASM6	229	460	300	208	125	115	95	246	292	211	F16	4	165	M20	72
400	ASM10	229	460	400	208	125	115	95	246	292	211	F16	4	165	M20	74
500	ASM6	271	535	300	245	140	155	109	280	292	211	F16	4	165	M20	124

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6 Two M20 cable glands
7 Hole diameter Ød1
8 n evenly spaced holes ød2

ACTELEC	Multi-turn actuator	A	B	Ø C	D	E	F	G	H	M	N	Mounting flange ISO 5211				Weight
												Ref.	1[6)]	2[7)]	3[8)]	
													n	Ø d1	Ø d2	
500	ASM6	271	535	300	245	140	155	109	280	292	211	F25	8	254	M16	124
800	ASM10	271	535	400	245	140	155	109	280	292	211	F16	4	165	M20	126
800	ASM10	271	535	400	245	140	155	109	280	292	211	F25	8	254	M16	126

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