



Actuator LA36

Data sheet

LA36

The actuator LA36 is one of the most solid and powerful LINAK actuators, designed to operate under extreme conditions. The LA36 is a maintenance-free product with a long lifetime and a high IP degree. This high-quality actuator offers a very strong alternative to hydraulic solutions.



This **TECHLINE**® actuator comes with IC - Integrated controller.

For more information on our IC options, please see: www.linak.com/techline



Features:

- 12, 24, 36 or 48 V DC Permanent magnetic motor (IC only 12/24 V DC)
- Thrust from 500 N - 6,800 N depending on gear ratio and spindle pitch
- Max. speed up to 160 mm/sec. depending on load and spindle pitch
- Stroke length from 100 to 999 mm
- Built-in endstop switches
- Non rotating piston rod eye
- Noise level: 73 dB (A) measuring method DS/EN ISO 3746 actuator not loaded
- Protection class: IP66 (dynamic) and IP69K (static)

Options in general:

- Mechanical overload protection through integrated slip clutch
- Exchangeable cables in different lengths
- Special anodised housing for extreme environments
- IECEx/ATEX certified for Zone 21
- Hall effect sensor
- Mechanical potentiometer (not with IC)
- IC options including:
 - IC - Integrated Controller
 - Integrated Parallel Controller
 - Modbus, LIN bus and CAN bus communication
 - Analogue or digital feedback for precise positioning
 - Endstop signals
 - PC configuration tool

Usage:

- Duty cycle at 600 mm stroke is max. 20%
- Duty cycle at 601-999 mm stroke is max. 15%
- Ambient operating temperature -30°C to +65°C, full performance from +5°C to +40°C
- For IECEx/ATEX:
Ambient operating temperature: -25°C to +65°C

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Chapter 1

Specifications

Motor:	Permanent magnet motor 12, 24, 36 or 48V DC*
Cable:	Motor: 2 x 14 AWG PVC cable Control: 6 x 20 AWG PVC cable**
Gear ratio:	6 different gear ratios available in steel (500 N, 1,700/2,600 N, 4,500 N and 6,800 N)
Slip clutch:	Mechanical overload protection through an integrated slip clutch
Brake:	Integrated brake ensures a high self-locking ability. The brake is deactivated when the actuator is powered in order to obtain a high efficiency
Hand crank:	As a standard feature the actuator can be operated manually
Housing:	The housing is made of casted aluminium, coated for outdoor use and in harsh conditions
Spindle part:	Outer tube: Extruded aluminium anodised Inner tube: Stainless steel AISI304/SS2333 Acme spindle: Trapezoidal spindle with high efficiency
Piston rod eye and back fixture:	When ordering AISI (304 and up) piston rod eye and back fixture, stainless steel screws are automatically included
Temperature range:	- 30° C to +65° C For IECEx/ATEX: - 25° C to +65° C - 22° F to +149° F - 13° F to +149° F Full performance +5° C to +40° C
Storage temperature:	-55° C to +105° C
Weather protection:	Rated IP66 for outdoor use. Furthermore, the actuator can be washed down with a high-pressure cleaner (IP69K).
Noise level:	73dB (A) measuring method DS/EN ISO 8746 actuator not loaded.

* Modbus actuators only 24V - please see the **Modbus installation guide <http://www.linak.com/techline/?id3=2363>**.

** Special control cables for the Modbus actuator - please see the **Modbus installation guide <http://www.linak.com/techline/?id3=2363>**.

Be aware of the following two symbols throughout this product data sheet:



Recommendations

Failing to follow these instructions can result in the actuator suffering damage or being ruined.



Additional information

Usage tips or additional information that is important in connection with the use of the actuator.

Technical specifications

LA36 with 12V motor

Order number	Push max. (N)	Pull max. (N)	*Self-lock min. (N) Push	*Self-lock min. (N) Pull	Pitch (mm/spindle rev.)	*Typical speed (mm/s) Load		Standard stroke lengths (mm) In steps of 50 mm	*Typical amp. (A) 12 V	
						No	Full		No load	Full load
36080xxxxxAxxxxHxxxxxxxxxxx	6800	6800	13000	13000	8	11	7	100 - 999**	4.5	17
36120xxxxxAxxxxFxxxxxxxxxxx	2600	2600	3400	3400	12	40.7	30.6	100 - 999	4.5	21
36120xxxxxAxxxxGxxxxxxxxxxx	4500	4500	5800	5800	12	23.1	17.8	100 - 999**	4.5	20.7
36120xxxxxAxxxxHxxxxxxxxxxx	6800	6800	8800	8800	12	15.5	11.9	100 - 999**	4.5	21
36160xxxxxAxxxxFxxxxxxxxxxx	2000	2000	2600	2600	16	54.3	43	100-999	4.5	21.5
36160xxxxxAxxxxGxxxxxxxxxxx	3400	3400	4400	4400	16	30.8	25	100-999**	4.5	21.4
36160xxxxxAxxxxHxxxxxxxxxxx	5600	5600	6600	6600	16	20.7	17	100-999**	4.5	21.5
36200xxxxxAxxxxFxxxxxxxxxxx	1700	1700	2200	2200	20	68	52	100 - 999	4.5	22
36200xxxxxAxxxxExxxxxxxxxxx	500***	500***	1000	1000	20	160	135	100 - 999	4.5	20

LA36 with 24V motor

Order number	Push max. (N)	Pull max. (N)	*Self-lock min. (N) Push	*Self-lock min. (N) Pull	Pitch (mm/spindle rev.)	*Typical speed (mm/s) Load		Standard stroke lengths (mm) In steps of 50 mm	*Typical amp. (A) 24 V	
						No	Full		No load	Full load
36080xxxxxBxxxxHxxxxxxxxxxx	6800	6800	13000	13000	8	11	7	100 - 999**	2.4	8
36120xxxxxBxxxxFxxxxxxxxxxx	2600	2600	3400	3400	12	41	32.3	100 - 999	2.4	10.4
36120xxxxxBxxxxGxxxxxxxxxxx	4500	4500	5800	5800	12	23.3	18.9	100 - 999**	2.4	10.2
36120xxxxxBxxxxHxxxxxxxxxxx	6800	6800	8800	8800	12	15.7	12.7	100 - 999**	2.4	10.3
36160xxxxxBxxxxFxxxxxxxxxxx	2000	2000	2600	2600	16	54.7	43	100-999	2.4	10.3
36160xxxxxBxxxxGxxxxxxxxxxx	3400	3400	4400	4400	16	31.1	25	100-999**	2.4	10.3
36160xxxxxBxxxxHxxxxxxxxxxx	5600	5600	6600	6600	16	21	17	100-999**	2.4	10.3
36200xxxxxBxxxxFxxxxxxxxxxx	1700	1700	2200	2200	20	68	52	100 - 999	2.4	10.3
36200xxxxxBxxxxExxxxxxxxxxx	500***	500***	1000	1000	20	160	135	100 - 999	2.4	10.0

LA36 with 36V motor

Order number	Push max. (N)	Pull max. (N)	*Self-lock min. (N) Push	*Self-lock min. (N) Pull	Pitch (mm/spindle rev.)	*Typical speed (mm/s) Load		Standard stroke lengths (mm) In steps of 50 mm	*Typical amp. (A) 36 V	
						No	Full		No load	Full load
36080xxxxxCxxxxHxxxxxxxxxxx	6800	6800	13000	13000	8	11	7	100 - 999**	2.0	6.5
36120xxxxxCxxxxFxxxxxxxxxxx	2600	2600	3400	3400	12	41	33.5	100 - 999	2.0	8.0
36120xxxxxCxxxxGxxxxxxxxxxx	4500	4500	5800	5800	12	23.3	19.1	100 - 999**	2.0	8.0
36120xxxxxCxxxxHxxxxxxxxxxx	6800	6800	8800	8800	12	15.7	12.8	100 - 999**	2.0	8.0
36160xxxxxCxxxxFxxxxxxxxxxx	2000	2000	2600	2600	16	54.7	43	100-999	2.0	8.0
36160xxxxxCxxxxGxxxxxxxxxxx	3400	3400	4400	4400	16	31.1	25	100-999**	2.0	8.0
36160xxxxxCxxxxHxxxxxxxxxxx	5600	5600	6600	6600	16	21	17	100-999**	2.0	8.0
36200xxxxxCxxxxFxxxxxxxxxxx	1700	1700	2200	2200	20	68	52	100 - 999	2.0	8.0
36200xxxxxCxxxxExxxxxxxxxxx	500***	500***	1000	1000	20	160	135	100 - 999	2.0	8.0

LA36 with 48V motor

Order number	Push max. (N)	Pull max. (N)	*Self-lock min (N) Push	Self-lock min.(N)Pull	Pitch (mm/spindlerev.)	*Typical speed (mm/s) Load		Standard stroke lengths (mm) in steps of 50mm	*Typical amp. (A)	
						No	Full		36V	
									No load	Full load
36080xxxxxDxxxxHxxxxxxxxxxx	6800	6800	13000	13000	8	11.5	9.0	100-999**	1.5	5.5
36120xxxxxDxxxxFxxxxxxxxxxx	2600	2600	3400	3400	12	42.9	35.0	100-999	1.5	7
36120xxxxxDxxxxGxxxxxxxxxxx	4500	4500	5800	5800	12	25.7	20.0	100-999**	1.5	7
36120xxxxxDxxxxHxxxxxxxxxxx	6800	6800	8800	8800	12	17.4	15.0	100-999**	1.5	7
36160xxxxxDxxxxFxxxxxxxxxxx	2000	2000	2600	2600	16	57.2	35.0	100-999	1.5	7
36160xxxxxDxxxxGxxxxxxxxxxx	3400	3400	4400	4400	16	32.5	27.0	100-999**	1.5	7
36160xxxxxDxxxxHxxxxxxxxxxx	5600	5600	6600	6600	16	21.9	18.0	100-999**	1.5	7
36200xxxxxDxxxxFxxxxxxxxxxx	1700	1700	2200	2200	20	71.2	59.0	100-999	1.5	7
36200xxxxxDxxxxExxxxxxxxxxx	500***	500***	1000	1000	20	168	141	100-999	1.5	7

* The typical values can have a variation of $\pm 20\%$ on the current values and $\pm 10\%$ on the speed values. Measurements are made with an actuator in connection with a stable power supply and an ambient temperature at $20\text{ }^{\circ}\text{C}$.

** There are limitations on the stroke length if you need full load, please see "LA36 Load v. Stroke Length"

*** Fully loaded actuators need a soft start in order to prevent the clutch from slipping when starting (see speed and current curves).

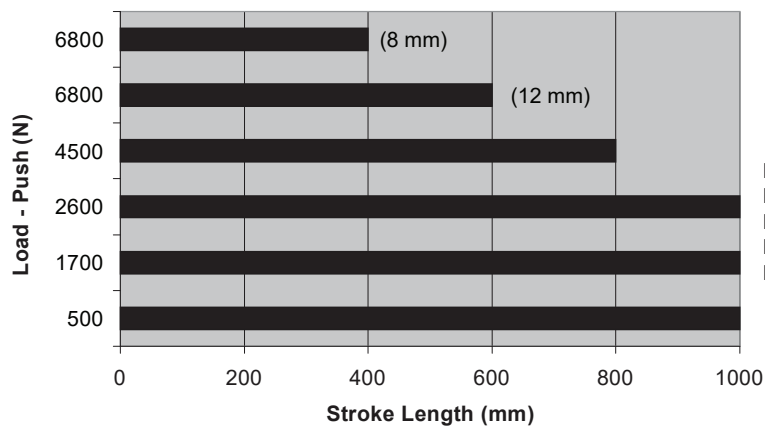


Self locking ability

To ensure maximum self-locking ability, please be sure that the motor is shorted when stopped. Actuators with integrated controller provide this feature, as long as the actuator is powered.

- When using soft stop on a DC-motor, a short peak of higher voltage will be sent back towards the power supply. It is important when selecting the power supply that it does not turn off the output, when this backwards load dump occurs.

LA36 Load versus stroke length



N.B.
 LA36 500 - 1,700 N is with 20 mm spindle pitch
 LA36 500 - 5,600 N is with 16 mm spindle pitch
 LA36 500 - 6,800 N is with 12 mm spindle pitch
 LA36 500 - 6,800 N is with 8 mm spindle pitch

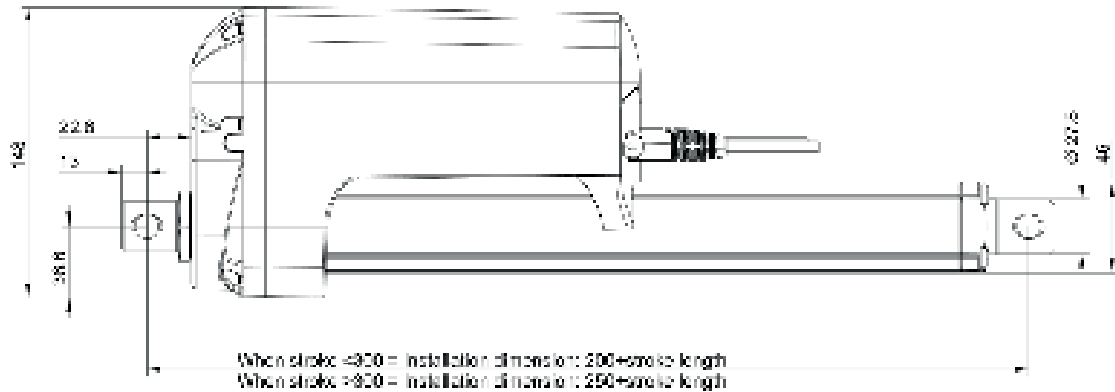


- For applications that only operate in pull the limitations are 999 mm stroke and 6,800 N load.
- Safety factor 2.

Stroke and built-in tolerances

End stop options E.g. 36XXXX+?XXXXXXXX	Descriptions	Stroke tolerance	Example for 200 mm stroke	BID tolerance	Example for 200 mm BID
? = 0	Without endstop switches Mechanical endstop	± 2 mm	198 to 202 mm	± 2 mm	198 to 202 mm
? = 1 to 4	With built-in limit switches	$+0/-4$ mm	196 to 200 mm	± 4 mm	196 to 204 mm
? = 7, 8, 9, A, B, C	Integrated controller Modbus LIN bus CAN bus	$\pm 2/-6$ mm	194 to 200 mm	± 4 mm	196 to 204 mm

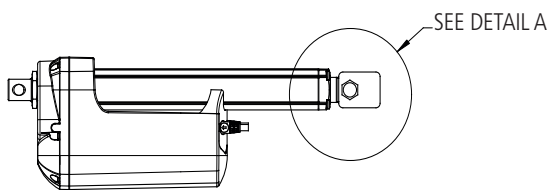
LA36 Dimensions



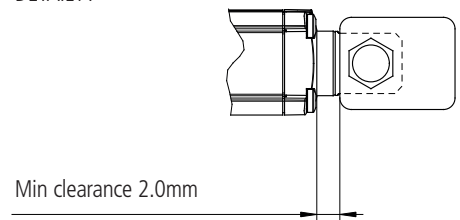
Keep a clearance when mounting a bracket



When mounting a custom bracket on the moving part of the actuator, please observe the minimum clearance between bracket and cylinder top, when fully retracted, to avoid jamming and destruction of actuator drive train.



DETAIL A



Cable conduits for an LA36 IECEx/ATEX actuator must be ordered separately, if needed.

To order a cable conduits kit, please choose one of the following item numbers:

Item number 0368536-00
 (compatible with one cable)

The kit contains:

- 1 Cable gland cover
- 1 Gland nut: M20 x 1.5 (for 3/8" conduit)
- 1 Screw: DIN 912 M5 x 65
- 1 Blind plug: M20 x 1.5

Item number 0368535-00
 (compatible with two cables)

The kit contains:

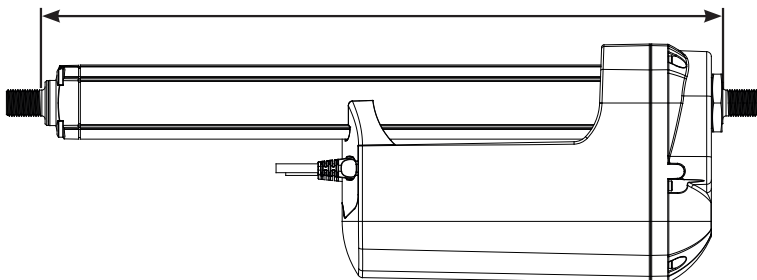
- 1 Cable gland cover
- 2 Gland nuts: M20 x 1.5 (for 3/8" conduit)
- 1 Screw: DIN 912 M5 x 65

Built-in dimensions

Piston rod	"0" /from the surface		"1" / to the centre of the hole		"2A" / to the centre of the hole	
	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
Back fixture	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
"0" / from the surface	189	239	194	244	194	244
"1" and "2" / to the centre of the hole	195	245	200	250	200	250
"4" / to the centre of the hole	195	245	200	250	200	250
"5" / from the surface	180	230	185	235	185	235
"6" / from the surface	180	230	185	235	185	235
"A" and "B" / to the centre of the hole	195	245	200	250	200	250
"C" and "D" / to the centre of the hole	195	245	200	250	200	250

Piston rod	"4" /from the surface		"5" / to the centre of the hole	
	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
Back fixture	Stroke <=300	Stroke > 300	Stroke <=300	Stroke > 300
"0" / from the surface	181	231	194	244
"1" and "2" / to the centre of the hole	187	237	200	250
"4" / to the centre of the hole	187	237	200	250
"5" / from the surface	172	222	185	235
"6" / from the surface	172*	222*	185	235
"A" and "B" / to the centre of the hole	187	237	200	250
"C" and "D" / to the centre of the hole	187	237	200	250

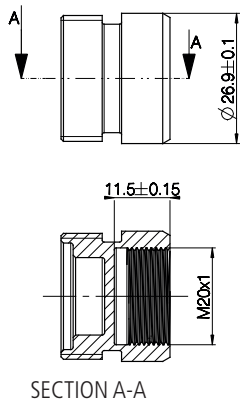
* These built-in dimensions are measured according to the illustration below.



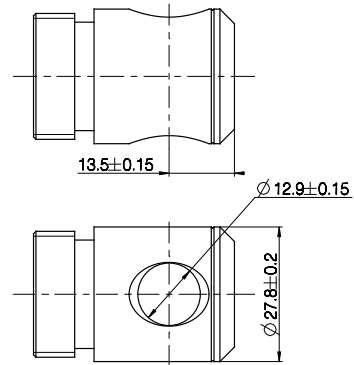
LA36 Piston Rod Eyes

When ordering AISI (304 and up) piston rod eye and back fixture, stainless steel screws are automatically included.

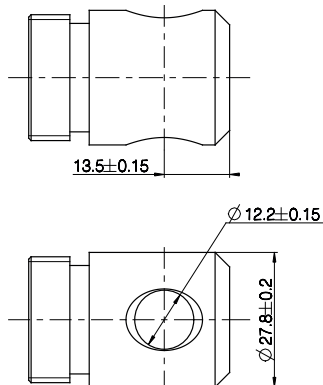
Option "0"
AISI 303



Option "1"
Free cutting steel galvanised surface

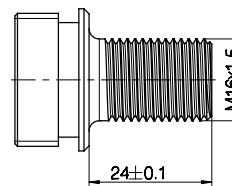


Option "2"
Free cutting steel galvanised surface

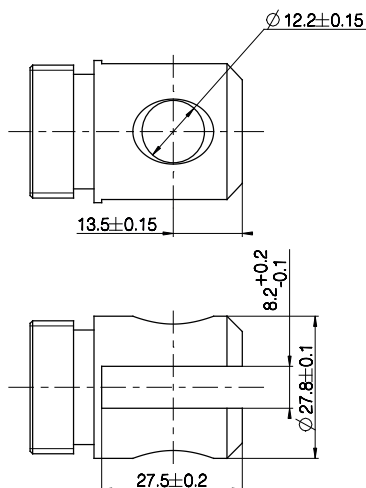


Option "4"
AISI 303

LINAK P/N: 0361135



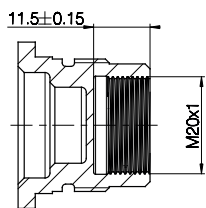
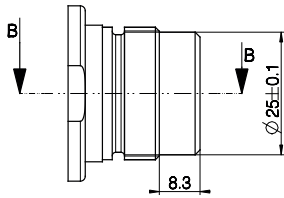
Option "5"
Free cutting steel galvanised surface



The Piston Rod Eye is only allowed to turn 0 - 90 degrees.

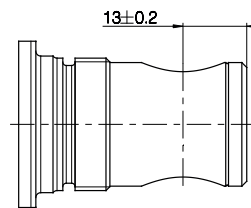
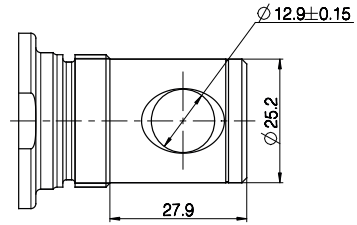
LA36 Back fixtures

Option "0"
AISI 303

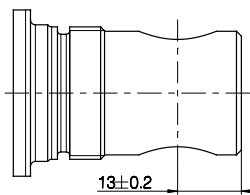
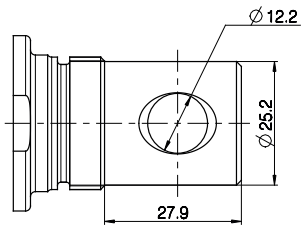


SECTION B-B

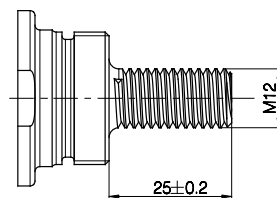
Option "1" Back fixture: 0° and "2" Back fixture: 90°
Free cutting steel galvanised surface



Option "4" Back fixture: 90°
Free cutting steel galvanised surface

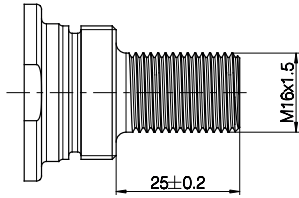


Option "5"
AISI 303

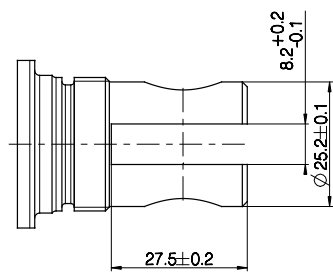
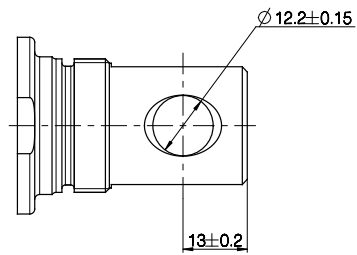


LA36 Back fixtures

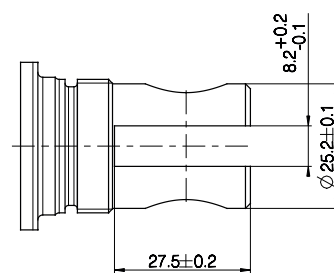
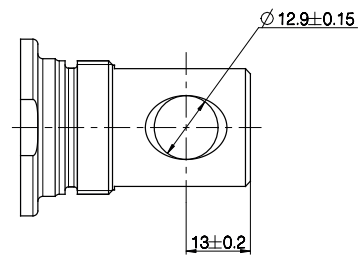
Option "6"
AISI 303



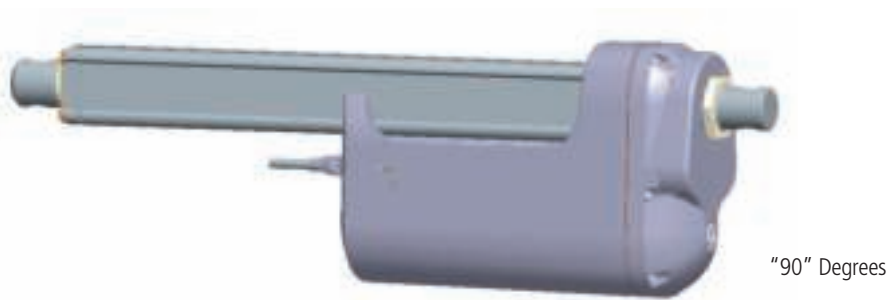
Option "A" Back fixture: 0° and "B" Back fixture: 90°
AISI 304



Option "C" Back fixture: 0° and "D" Back fixture: 90°
AISI 304



LA36 Back fixture orientation



NB. All with tolerance of $\pm 4^\circ$

Manual hand crank

The manual hand crank can be used in the case of power failure.

The cover over the Allen Key socket must be unscrewed before the Allen Key can be inserted and the Hand Crank operated.

Hand Crank Torque: 6-8 Nm

Hand Crank rpm: Max. 65

Piston Rod movement per turn

	8 mm	12 mm	20 mm
Gear A	-	11 mm	18 mm
Gear B	-	6 mm	10 mm
Gear C	3 mm	4 mm	7 mm
Gear F	-	-	27 mm

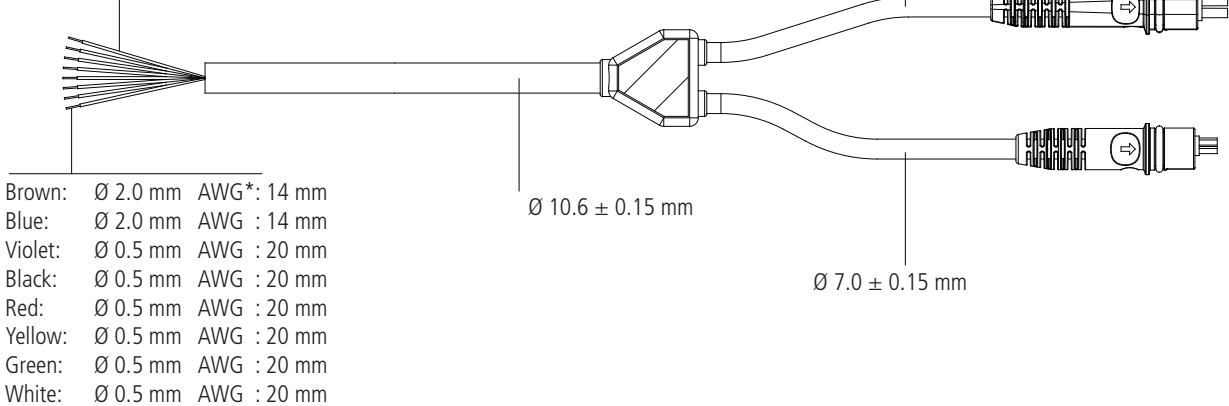


- The power supply has to be disconnected during manual operation.
- If the actuator is operated as a Hand crank, it must only be operated by hand, otherwise there is a potential risk of overloading and hereby damaging the actuator.

Cable dimensions

Y-cable dimensions:

Brown: Ø 2.8 mm
 Blue: Ø 2.8 mm
 Violet: Ø 1.5 mm
 Black: Ø 1.5 mm
 Red: Ø 1.5 mm
 Yellow: Ø 1.5 mm
 Green: Ø 1.5 mm
 White: Ø 1.5 mm

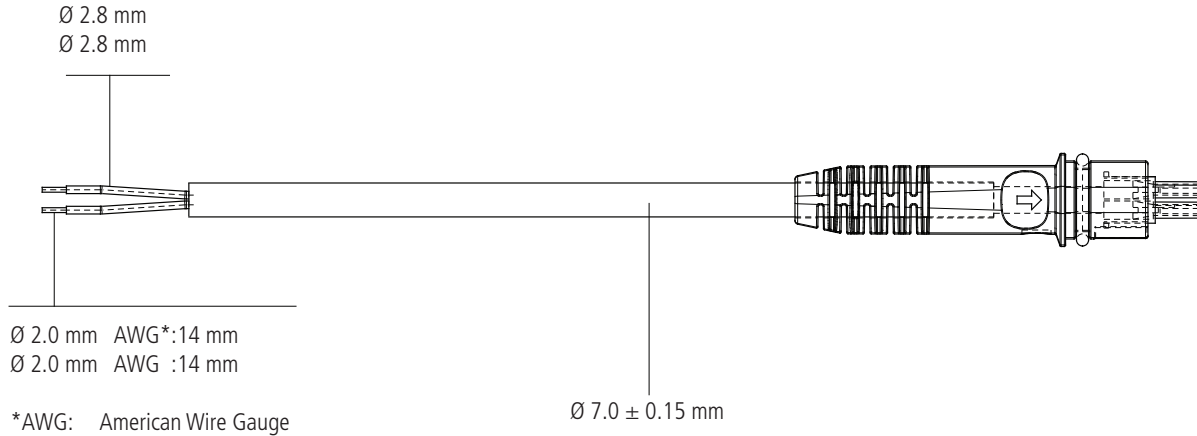


Brown: Ø 2.0 mm AWG*: 14 mm
 Blue: Ø 2.0 mm AWG : 14 mm
 Violet: Ø 0.5 mm AWG : 20 mm
 Black: Ø 0.5 mm AWG : 20 mm
 Red: Ø 0.5 mm AWG : 20 mm
 Yellow: Ø 0.5 mm AWG : 20 mm
 Green: Ø 0.5 mm AWG : 20 mm
 White: Ø 0.5 mm AWG : 20 mm

*AWG: American Wire Gauge

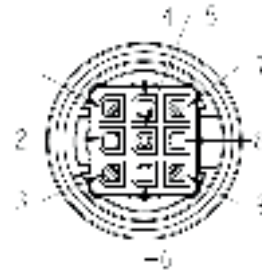
Cable dimensions

Power cable dimensions:



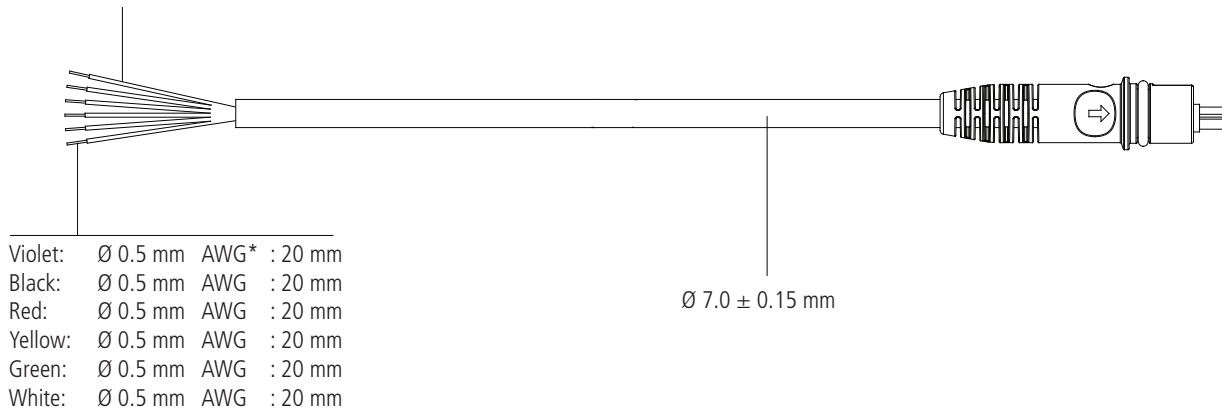
9 - pole signal cable dimensions LINAK P/N 0367281

J1:	Outer Ø:	Colour:	Conductor:
1:	Ø 1.5 mm	Gray:	0.5 mm ² / AWG*: 20
2:	Ø 1.5 mm	Orange:	0.5 mm ² / AWG : 20
3:	Ø 1.5 mm	Black:	0.5 mm ² / AWG : 20
4:	Ø 1.5 mm	White:	0.5 mm ² / AWG : 20
5:	Ø 1.5 mm	Violet:	0.5 mm ² / AWG : 20
6:	Ø 1.5 mm	Red:	0.5 mm ² / AWG : 20
7:	Ø 1.5 mm	Yellow:	0.5 mm ² / AWG : 20
8:	Ø 1.5 mm	Green:	0.5 mm ² / AWG : 20
9:	Ø 1.5 mm	Light blue:	0.5 mm ² / AWG : 20



Signal cable dimensions:

- Violet: Ø 1.5 mm
- Black: Ø 1.5 mm
- Red: Ø 1.5 mm
- Yellow: Ø 1.5 mm
- Green: Ø 1.5 mm
- White: Ø 1.5 mm

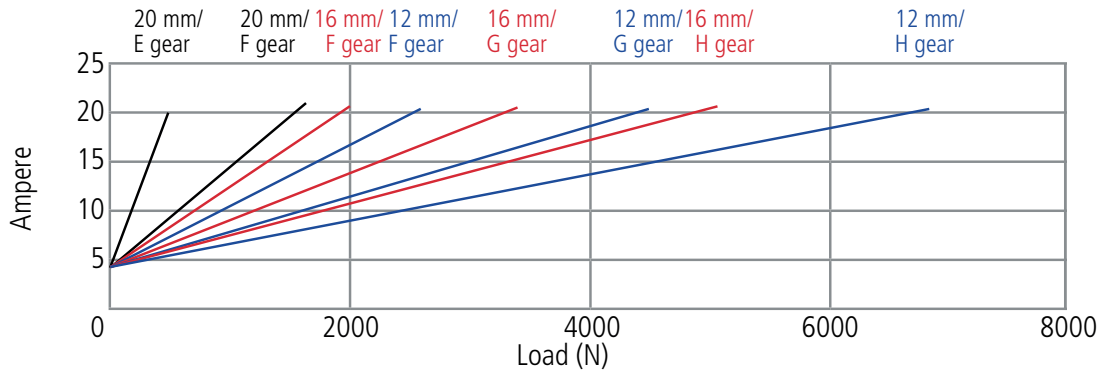


*AWG: American Wire Gauge

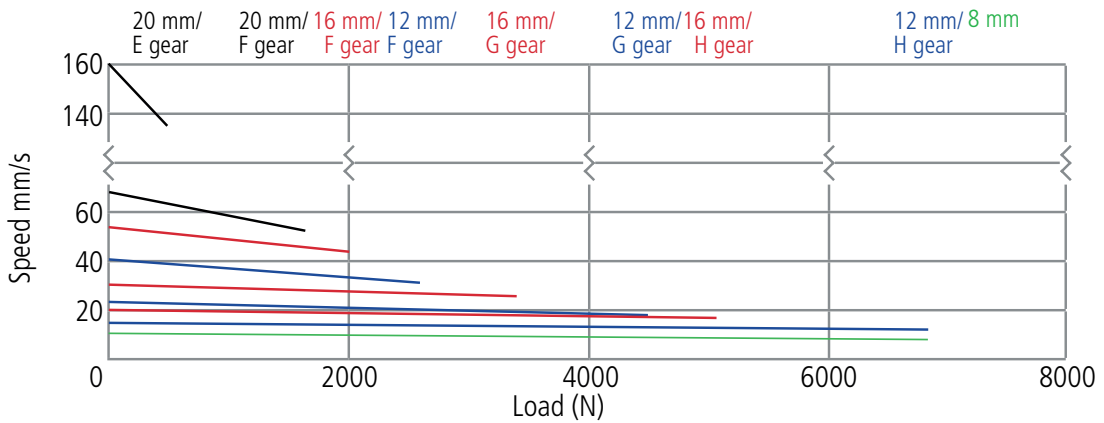
Speed and current curves - 12 V motor

The values below are typical values and made with a stable power supply and an ambient temperature of 20 °C.

12 V motor current vs. load



12 V motor speed vs. load



All measurements above describe the spindle pitch (e.g. 20 mm) and the gear type (e.g. E gear) of the actuator. Speed and current are based on a nominal power supply of 12 VDC.



When ordering LA36F

When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

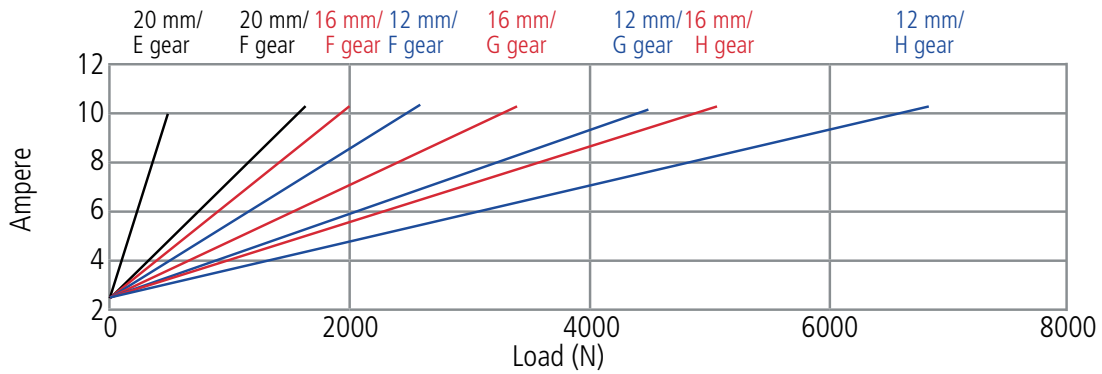


Please note that all actuators featuring 'IC Parallel', 'LINBUS', 'CAN bus', 'MODBUS' or 'IC Advanced with softstop towards end stop' will run at a regulated speed, which is typically around 80 % of the nominal speed.

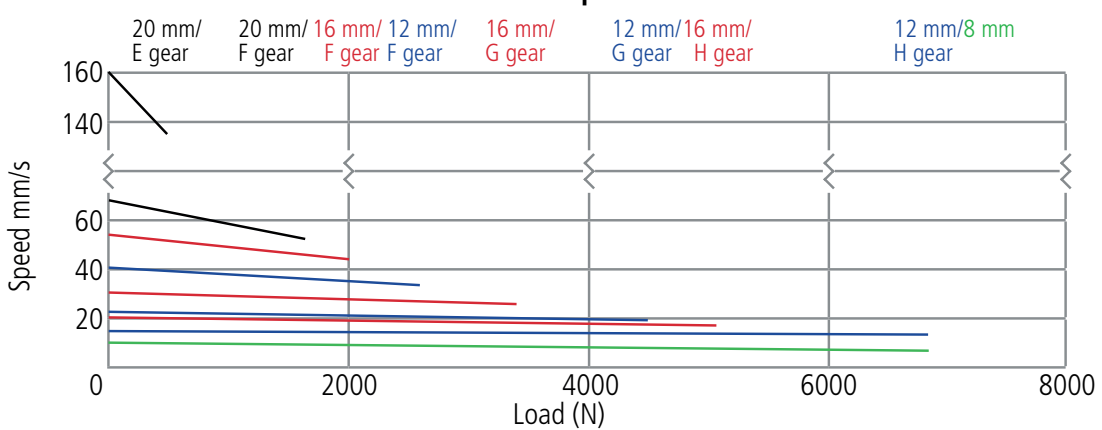
Speed and current curves - 24 V motor

The values below are typical values and made with a stable power supply and an ambient temperature of 20 °C.

24 V motor current vs. load



24 V motor speed vs. load



All measurements above describe the spindle pitch (e.g. 20 mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 24 VDC.

When ordering LA36F



When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

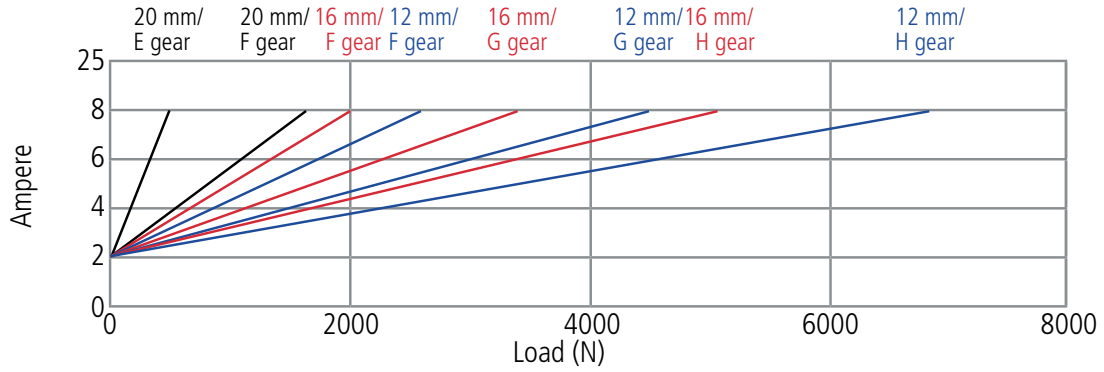


Please note that all actuators featuring 'IC Parallel', 'LINBUS', 'CAN bus', 'MODBUS' or 'IC Advanced with softstop towards end stop' will run at a regulated speed, which is typically around 80% of the nominal speed.

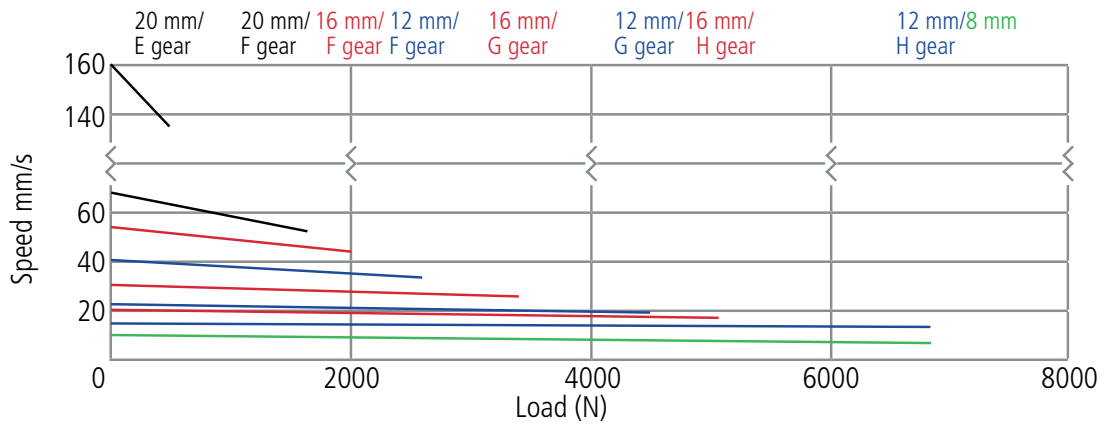
Speed and current curves - 36 V motor

The values below are typical values and made with a stable power supply and an ambient temperature of 20 °C.

36 V motor current vs. load



36 V motor speed vs. load



All measurements above describe the spindle pitch (e.g. 20 mm) and the gear type (e.g. E gear) of the actuator. Speed and current are based on a nominal power supply of 36 VDC.



When ordering LA36F

When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.

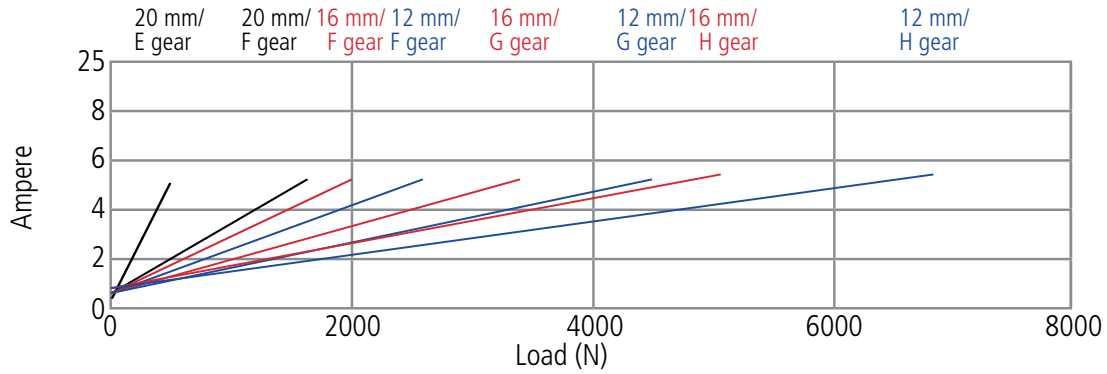


Please note that all actuators featuring 'IC Parallel', 'LINBUS', 'CAN bus', 'MODBUS' or 'IC Advanced with softstop towards end stop' will run at a regulated speed, which is typically around 80% of the nominal speed.

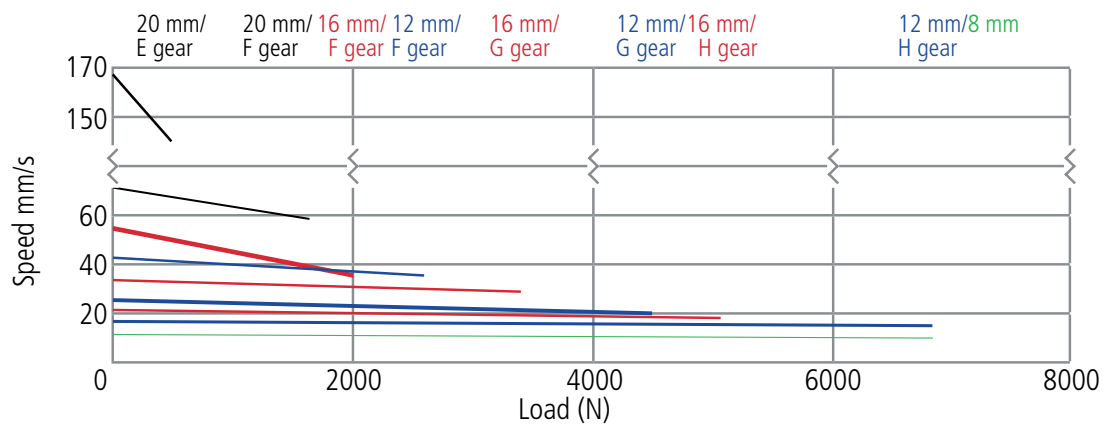
Speed and current curves - 48 V motor

The values below are typical values and made with a stable power supply and an ambient temperature of 20 °C.

48V motor current vs. load



48 V motor speed vs. load



All measurements above describe the spindle pitch (e.g. 20 mm) and the gear type (e.g. E gear) of the actuator.

Speed and current are based on a nominal power supply of 48 VDC.

When ordering LA36F



When purchasing the LA36 actuator with fast gear and slide for the end-stop function, the customer has been informed that there is an increased risk that the activation arm for end-stop can be damaged during use, especially if the actuator runs to limit switch without load, both in the inner or outer position. A defective activation arm will inevitably lead to an inoperative end-stop function.



Please note that all actuators featuring 'IC Parallel', 'LINBUS', 'CAN bus', 'MODBUS' or 'IC Advanced with softstop towards end stop' will run at a regulated speed, which is typically around 80% of the nominal speed.

Chapter 2

IC options overview

	Basic	Advanced	Parallel	LIN bus	CAN bus
Control					
12V, 24V supply	√	√	√	√	√
H-bridge	√	√	√	√	√
Manual drive in/out	√	√	√	√	√
Endstop Signal in/out	√	√	√	√	-
Soft start/stop	√	√	√	√	√
Feedback					
Voltage	-	√ *	-	-	-
Current	-	√ **	-	-	-
Single Hall	-	√	-	-	-
PWM	-	√	-	-	-
Position (mm)	-	-	-	√	√
Custom feedback type	-	√	-	-	-
Monitoring					
Temperature monitoring	√	√	√	√	√
Current cut-off	√	√	√	√	√
Ready signal	-	-	-	-	-
BusLink <...>					
Service counter	-	√	√	√	√
Custom soft start/stop	-	√ ***	√ ***	√ ***	√ ***
Custom current limit	-	√	√	√	√
Speed setting	-	√	√	√	√
Virtual end stop	-	√	√	√	√

* Configure any high/low combination between 0 - 10 V

** Configure any high/low combination between 4 - 20 mA

*** Configure any value between 0 - 30 s

Feedback configurations available for IC Advanced and Parallel

	Pre-configured	Customised range	Pros	Cons
None			N/A	N/A
PWM Feedback	10 – 90 % 75 Hz	0 – 100 % 75 – 150 Hz	Suitable for long distance transmission. Effectual immunity to electrical noise.	More complex processing required, compared to AFV and AFC.
Single Hall*	N/A	N/A	Suitable for long distance transmission.	No position indication.
Analogue Feedback Voltage (AFV)*	0 - 10 V	Any combination, going negative or positive. E.g. 8.5 – 2.2 V over a full stroke.	High resolution. Traditional type of feedback suitable for most PLCs. Easy faultfinding. Independent on stroke length, compared to a traditional mechanical potentiometer.	Not recommended for applications with long distance cables or environments exposed to electrical noise.
Analogue Feedback Current (AFC)	4 - 20 mA	Any combination, going negative or positive. E.g. 5.5 – 18 mA over a full stroke.	High resolution. Better immunity to long cables and differences in potentials than AFV. Provides inherent error condition detection. Independent on stroke length, compared to a traditional mechanical potentiometer.	Not suitable for signal isolation. Only to be used on differential input card. Do not use single ended input card. Do NOT connect or put the white wire anywhere near GND, as this will create ground loops, disturbing the mA-signal.
Endstop signal in/out**	At physical end stops. Default for IC Advanced.	Any position. (Not IC Basic)	Can be set at any position over the full stroke length. (Not IC Basic)	Only one endstop can be customised. (Not IC Basic)



All feedback configurations are available for IC Advanced.

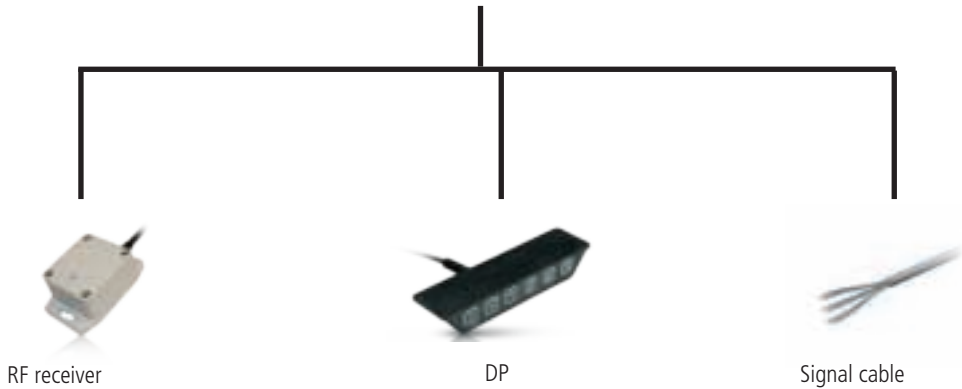
* IC Basic has no feedback

** Parallel feedback configurations available: Endstop Signal

Actuator configurations available for IC Advanced and Parallel

	Pre-configured	Customised range (Not IC Basic)	Description
Current limit inwards	20 A for both current limit directions. (When the current outputs are at zero, it means that they are at maximum value 20 A). Be aware: When the actuator comes with current cut-off limits that are factory pre-configured for certain values, the pre-configured values will be the new maximum level of current cut-off. This means that if the current cut-off limits are pre-configured to 14 A, it will not be possible to change the current limits through BusLink to go higher than 14 A.	Recommended range: 4 A to 20 A If the temperature drops below 0 °C, all current limits will automatically increase to approximately 30 A, for 12 V and 25 A for 24 V, independent of the pre-configured value.	The actuator's unloaded current consumption is very close to 4 A, and if the current cut-off is customised below 4 A there is a risk that the actuator will not start. The inwards and outwards current limits can be configured separately and do not have to have the same value.
Current limit outwards			
Max. speed inwards/ outwards	100 % equal to full performance	Lowest recommended speed at full load: 60 % It is possible to reduce the speed below 60 %, but this is dependable on load, power supply and the environment.	The speed is based on a PWM principle, meaning that 100 % equals the voltage output of the power supply in use, and not the actual speed.
Virtual endstop inwards	0mm for both virtual endstop directions. (When the virtual endstops are at zero, it means that they are not in use).	It is only possible to run the actuator with one virtual endstop, either inwards or outwards. Scaling of feedback when choosing analogue feedback. All Absolute feedback levels must follow the chosen virtual end-stop, if any are set. When virtual end-stop is chosen through the bus link, the actuator will need initialisation and feedback will be adjusted accordingly to the virtual end-stop.	The virtual endstop positions are based on hall sensor technology, meaning that the positioning needs to be initialised from time to time. One of the physical endstops must be available for initialisation.
Virtual endstop outwards			
Soft stop inwards	0.3 sec. for both soft stop directions.	0.3 sec. to 30 sec. 0 sec. can be chosen for hard stop.	It is not possible to configure values between 0.01 sec. to 0.29 sec. This is due to the back-EMF from the motor (increasing the voltage). Be aware that the soft stop value equals the deceleration time after stop command.
Soft stop outwards			
Soft start inwards	0.3 sec. for both soft start directions.	0 sec. to 30 sec.	Be aware that the soft start value equals the acceleration time after start command. To avoid stress on the actuator, it is not recommended to use 0 sec. for soft start, due to higher inrush current.
Soft start outwards			

System combination possibilities for LA36 IC Advanced



Chapter 3

Environmental tests - Climatic

Test	Specification	Comment
Cold test	EN60068-2-1 (Ab)	<p><u>Storage at low temperature:</u> Temperature: -40 °C Duration: 72 h Not connected Tested at room temperature.</p>
	EN60068-2-1 (Ad)	<p><u>Storage at low temperature:</u> Temperature: -30 °C Duration: 2 h Actuator is not activated/connected Tested at low temperature.</p>
Dry Heat	EN60068-2-2 (Bb)	<p><u>Storage at high temperature:</u> Temperature: +90 °C Duration: 72 h Actuator is not activated/connected. Tested at room temperature</p> <p><u>Storage at high temperature:</u> Temperature: +70 °C Duration: 1000 h Actuator is not activated/connected Tested at high temperature.</p>
	EN60068-2-2 (Bd)	<p><u>Operating at high temperature:</u> Temperature: +60 °C Int. max. 17 % Duration: 700 h Actuator is activated Tested at high temperature.</p>
Change of temperature	EN60068-2-14 (Na)	<p><u>Rapid change of temperature:</u> High temperature: +100 °C in 60 minutes. Low temperature: -30 °C in 60 minutes. Transition time: < 10 seconds Duration: 100 cycles Actuator is not activated/connected. Tested at room temperature.</p>
	EN60068-2-14 (Nb)	<p><u>Controlled change of temperature:</u> Temperature change 5 °C pr. minute High temperature: +70 °C in 60 minutes. Low temperature: -30 °C in 30 minutes. 130 minutes pr. Cycle. Duration: 1.000 cycles (90days) Actuator is not activated/connected. Tested at 250, 500 and 1,000 cycles at low and high temperatures.</p>
Damp heat	EN60068-2-30 (Db)	<p><u>Damp heat, Cyclic:</u> Relative humidity: 93-98 % High temperature: +55 °C in 12 hours Low temperature: +25 °C in 12 hours Duration: 21 cycles * 24 hours Actuator is not activated/connected Tested within 1 hour after condensation, That means after upper temperature has been reached.</p>
	EN60068-2-3 (Ca)	<p><u>Damp heat, Steady state:</u> Relative humidity: 93-95 % Temperature: +40 ±2 °C Duration: 56 days Actuator is not activated/connected. Tested within one hour after exposure.</p>
Salt mist.	EN60068-2-52 (Kb)	<p><u>Salt spray test:</u> Salt solution: 5 % sodium chloride (NaCl) 4 spraying periods, each of 2 hours. Humidity storage 7 days after each. Actuator not activated/connected. Exposure time: 500 hours</p>

Environmental tests - Climatic

Degrees of protection	EN60529 – IP66 DIN40050 – IP69K	<p><u>IP6X - Dust:</u> Dust-tight, No ingress of dust. Actuator is not activated.</p> <p><u>IPX6 – Water:</u> Ingress of water in quantities causing harmful effects is not allowed. Duration: 100 litres pr. minute in 3 minutes Actuator is not activated.</p> <p><u>IPX6 –Connected actuator:</u> Actuator is driving out and in for 3 min. 100 (l/min) jet of water is placed at the wiper ring for 3 (min).</p> <p><u>IPX6 –Connected actuator and push 6800 (N)</u> Actuator is driving out and in for 3 min. and Push 6800 (N) at the end-pos. 100 (l/min.) jet of water is placed at the wiper ring for 3 min.</p> <p><u>High pressure cleaner:</u> Water temperature: +80 °C Water pressure: 80 bar Spray angle: 45 ° Spray distance: 100 mm Duration: From any direction 10 seconds of spraying followed by 10 seconds rest. Actuator is not activated. Ingress of water in quantities causing harmful effects is not allowed.</p>
	DUNK test	<p>The actuator has been warmed up to 115 °C for 20 hours. After this it is cooled down in 20 °C saltwater. Cooling time: 5 minutes Opened for checking salt deposit and water.</p>
Chemicals	BS7691 / 96hours	<p>Diesel 100 % Hydraulic oil 100 % Ethylene Glucol 50 % Urea Nitrogen saturated solution Liquid lime 10 % (Super- Cal) NPK Fertilizer (NPK 16-4-12) saturated Tested for corrosion.</p>

Environmental tests - Mechanical

Test	Specification	Comment
Free fall		Free fall from all sides: Height of fall: 0.4 meter onto steel. Actuator not activated/connected.
Vibration	EN60068-2-36 (Fdb) EN 60068-2-6 (Fc)	<u>Random vibration:</u> Short time test: 6.29 g RMS Actuator is not connected Long time test: 7.21 g RMS Actuator is not connected Duration: 2 hours in each direction <u>Sinus vibration:</u> Frequency 5-25 Hz: Amplitude = 3.3 mm pp Frequency 25-200 Hz: Acceleration 4 g Number of directions: 3 (X-Z-Y) Duration: 2 hours in each direction. Actuator is not activated
Bump	EN60068-2-29 (Eb)	<u>Bump test:</u> Level: 40 g Duration: 6 milliseconds Number of bumps: 500 shocks in each of 6 directions. Actuator is not connected.
Shock	EN60068-2-27 (Ea)	<u>Shock test:</u> Level: 100 g Duration: 6 milliseconds Number of bumps: 3 shocks in each of 6 directions. Actuator is not connected.

Environmental tests - Electrical

Test	Specification	Comment
Power supply	ASAE EP455 (1990)	Operating voltages +10 V - +16 V Over voltage +26 (V) / 5 min. Reverse polarity -26 (V) / 5 min. Short circuit to ground 16 (V) / 5 min. Short circuit to supply 16 (V) / 5 min.
HF-immunity	EN61000-6-2	Level: 30 V/m. at 26 MHz – 1000 mHz 80% 1 KHz
Emission	EN61000-6-4	Level is inside limits for 12 V motor
Automotive transients	ISO 7637	Load dump test only accepted on motor power connection.
IECEX / ATEX (Ex)	EN60079-0:2012 EN60079-31:2014	This Ex certification allows the actuator to be mounted in Ex dust areas: II 2D Ex tb IIIC T135 °C Db Tamb -25°C to +65 °C
Regulation No. 10		Directive on electromagnetic compatibility of sub-assembly for automotive applications



All electrical tests are conducted and radiated emission (EMC) tests.

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