

Linear actuators UAL Series

4.2 TECHNICAL DATA - acme screw linear actuators UAL Series

SIZE		UAL 1	UAL 2	UAL 3	UAL 4	UAL 5	
Push rod diameter	[mm]	25	30	35	40	50	
Outer tube diameter	[mm]	36	45	55	60	70	
Attachment flange for IEC standard motor		56 B14	63 B14	71 B14	80 B14 90 B14	80 B14 90 B14	
Max. dynamic load	[N]	1 600	2 500	5 100	8 700	10 400	
Max. static load	pull [N]	4 000	6 000	10 000	12 000	15 000	
	push [N]	4 000	6 000	10 000	12 000	15 000	
Ratio	RV	1 : 1.33 (18 : 24)	1 : 1.4 (20 : 28)	1 : 1.04 (24 : 25)	1 : 1.07 (30 : 32)	1 : 1.07 (30 : 32)	
	RN	1 : 2.15 (13 : 28)	1 : 2.13 (15 : 32)	1 : 2 (16 : 32)	1 : 1.94 (18 : 35)	1 : 1.94 (18 : 35)	
	RL	1 : 3 (10 : 30)	1 : 2.83 (12 : 34)	1 : 2.92 (12 : 35)	1 : 2.93 (15 : 44)	1 : 2.93 (15 : 44)	
1-start acme screw		Tr 13.5×3	Tr 16×4	Tr 18×4	Tr 22×5	Tr 30×6	
Linear travel [mm] for 1 input shaft revolution	Ratio	RV1	2.25	2.86	3.84	4.69	5.63
		RN1	1.39	1.88	2	2.57	3.09
		RL1	1	1.41	1.37	1.70	2.05
2-start acme screw		Tr 14×8 (P4)	Tr 16×8 (P4)	Tr 18×8 (P4)	Tr 22×10 (P5)	Tr 30×12 (P6)	
Linear travel [mm] for 1 input shaft revolution	Ratio	RV2	6	5.71	7.68	9.38	11.25
		RN2	3.71	3.75	4	5.14	6.17
		RL2	2.67	2.82	2.74	3.41	4.09
Mass (actuator 100 mm stroke length, without motor, with lubricant)		[kg]	3.3	5	8	11	18
Extra-mass for each additional 100 mm stroke length		[kg]	0.3	0.5	0.8	0.9	2

Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series with AC 3-PHASE MOTOR
PERFORMANCE with: Duty Cycle $F_i = 30\%$ over 10 min at ambient temperature $25\text{ }^\circ\text{C}$

LINEAR SPEED [mm/s]	DYNAMIC LOAD [N]	RATIO	MOTOR: POWER [kW] – N° of POLES SPEED [rpm]	SELF-LOCKING COEFFICIENT
UAL 1				
280	300 ¹⁾	RV2	0.12 kW 2-pole 2800	0.51
170	450 ¹⁾	RN2	0.12 kW 2-pole 2800	0.51
120	600 ¹⁾	RL2	0.12 kW 2-pole 2800	0.51
105	600 ¹⁾	RV1	0.12 kW 2-pole 2800	0.32
85	600 ¹⁾	RN2	0.09 kW 4-pole 1400	0.51
60	860 ¹⁾	RL2	0.09 kW 4-pole 1400	0.51
50	800 ¹⁾	RV1	0.09 kW 4-pole 1400	0.32
45	1200 ¹⁾	RL1	0.12 kW 2-pole 2800	0.32
32	1200 ¹⁾	RN1	0.09 kW 4-pole 1400	0.32
23	1600 ²⁾	RL1	0.09 kW 4-pole 1400	0.32
UAL 2				
265	650 ¹⁾	RV2	0.25 kW 2-pole 2800	0.48
175	950 ¹⁾	RN2	0.25 kW 2-pole 2800	0.48
130	1200 ¹⁾	RL2	0.25 kW 2-pole 2800	0.48
87	1300 ¹⁾	RN2	0.18 kW 4-pole 1400	0.48
65	1950 ¹⁾	RL1	0.25 kW 2-pole 2800	0.35
43	2000 ¹⁾	RN1	0.18 kW 4-pole 1400	0.35
32	2500 ²⁾	RL1	0.18 kW 4-pole 1400	0.35
UAL 3				
360	1000 ¹⁾	RV2	0.55 kW 2-pole 2800	0.46
180	1850 ¹⁾	RN2	0.55 kW 2-pole 2800	0.46
130	2600 ¹⁾	RL2	0.55 kW 2-pole 2800	0.46
90	3000 ¹⁾	RN1	0.55 kW 2-pole 2800	0.32
64	4100 ¹⁾	RL1	0.55 kW 2-pole 2800	0.32
46	3650 ¹⁾	RN1	0.37 kW 4-pole 1400	0.32
32	5100 ²⁾	RL1	0.37 kW 4-pole 1400	0.32
UAL 4				
440	1700 ¹⁾	RV2	1.1 kW 2-pole 2800	0.46
240	3000 ¹⁾	RN2	1.1 kW 2-pole 2800	0.46
160	4300 ¹⁾	RL2	1.1 kW 2-pole 2800	0.46
120	5000 ¹⁾	RN1	1.1 kW 2-pole 2800	0.32
80	7000 ¹⁾	RL1	1.1 kW 2-pole 2800	0.32
60	6200 ¹⁾	RN1	0.75 kW 4-pole 1400	0.32
40	8700 ²⁾	RL1	0.75 kW 4-pole 1400	0.32
UAL 5				
529	2000 ¹⁾	RV2	1.5 kW 2-pole 2800	0.44
292	3350 ¹⁾	RN2	1.5 kW 2-pole 2800	0.44
265	3350 ¹⁾	RV1	1.5 kW 2-pole 2800	0.30
193	4800 ¹⁾	RL2	1.5 kW 2-pole 2800	0.44
146	5500 ¹⁾	RN1	1.5 kW 2-pole 2800	0.30
97	7800 ¹⁾	RL1	1.5 kW 2-pole 2800	0.30
72	7300 ¹⁾	RN1	1.1 kW 4-pole 1400	0.30
48	10400 ²⁾	RL1	1.1 kW 4-pole 1400	0.30

1) value limited by electric motor power

The total dynamic efficiency (η) of UAL Series actuators, used to determine the DYNAMIC LOAD is calculated as follows:

$$\eta = \eta_1 \times \eta_2 \times \eta_3$$

where:

$\eta_1 = 0.95$ – timing belt transmission efficiency

η_2 – acme screw-bronze nut dynamic efficiency, calculated with reference to the speed

$\eta_3 = 0.9$ – bearings and sealing elements "efficiency"

2) limit value of linear actuator dynamic load capacity (see page 129)

Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series with AC 1-PHASE MOTOR
PERFORMANCE with: Duty Cycle $F_i = 30\%$ over 10 min at ambient temperature 25 °C

LINEAR SPEED [mm/s]	DYNAMIC LOAD [N]	RATIO	MOTOR: POWER [kW] – N° of POLES SPEED [rpm]	SELF-LOCKING COEFFICIENT
UAL 1				
280	300 ¹⁾	RV2	0.12 kW 2-pole 2800	0.51
170	450 ¹⁾	RN2	0.12 kW 2-pole 2800	0.51
120	600 ¹⁾	RL2	0.12 kW 2-pole 2800	0.51
105	600 ¹⁾	RV1	0.12 kW 2-pole 2800	0.32
85	600 ¹⁾	RN2	0.09 kW 4-pole 1400	0.51
60	860 ¹⁾	RL2	0.09 kW 4-pole 1400	0.51
50	800 ¹⁾	RV1	0.09 kW 4-pole 1400	0.32
45	1200 ¹⁾	RL1	0.12 kW 2-pole 2800	0.32
32	1200 ¹⁾	RN1	0.09 kW 4-pole 1400	0.32
23	1600 ²⁾	RL1	0.09 kW 4-pole 1400	0.32
UAL 2				
265	600 ¹⁾	RV2	0.25 kW 2-pole 2800	0.48
175	850 ¹⁾	RN2	0.25 kW 2-pole 2800	0.48
130	1100 ¹⁾	RL2	0.25 kW 2-pole 2800	0.48
87	1200 ¹⁾	RN2	0.18 kW 4-pole 1400	0.48
65	1800 ¹⁾	RL1	0.25 kW 2-pole 2800	0.35
43	2000 ¹⁾	RN1	0.18 kW 4-pole 1400	0.35
32	2500 ²⁾	RL1	0.18 kW 4-pole 1400	0.35
UAL 3				
360	900 ¹⁾	RV2	0.55 kW 2-pole 2800	0.46
180	1650 ¹⁾	RN2	0.55 kW 2-pole 2800	0.46
130	2350 ¹⁾	RL2	0.55 kW 2-pole 2800	0.46
90	2700 ¹⁾	RN1	0.55 kW 2-pole 2800	0.32
64	3700 ¹⁾	RL1	0.55 kW 2-pole 2800	0.32
46	3300 ¹⁾	RN1	0.37 kW 4-pole 1400	0.32
32	4600 ¹⁾	RL1	0.37 kW 4-pole 1400	0.32
UAL 4				
440	1550 ¹⁾	RV2	1.1 kW 2-pole 2800	0.46
240	2700 ¹⁾	RN2	1.1 kW 2-pole 2800	0.46
160	3900 ¹⁾	RL2	1.1 kW 2-pole 2800	0.46
120	4500 ¹⁾	RN1	1.1 kW 2-pole 2800	0.32
80	6300 ¹⁾	RL1	1.1 kW 2-pole 2800	0.32
60	5600 ¹⁾	RN1	0.75 kW 4-pole 1400	0.32
40	7900 ¹⁾	RL1	0.75 kW 4-pole 1400	0.32

1) value limited by electric motor power

The total dynamic efficiency (η) of UAL Series actuators, used to determine the DYNAMIC LOAD is calculated as follows:

$$\eta = \eta_1 \times \eta_2 \times \eta_3$$

where:

$\eta_1 = 0.95$ – timing belt transmission efficiency

η_2 – acme screw-bronze nut dynamic efficiency, calculated with reference to the speed

$\eta_3 = 0.9$ – bearings and sealing elements "efficiency"

2) limit value of linear actuator dynamic load capacity (see page 129)

Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series with DC MOTOR
PERFORMANCE with: Duty Cycle $F_i = 30\%$ over 10 min at ambient temperature 25 °C

LINEAR SPEED [mm/s]	DYNAMIC LOAD [N]	RATIO	MOTOR: POWER [kW] – N° of POLES SPEED [rpm]	SELF-LOCKING COEFFICIENT
UAL 1 with DC motor 24 V 3000 rpm 150 W 8.4 A				
300	350 ¹⁾	RV2	9	0.51
185	500 ¹⁾	RN2	9	0.51
130	700 ¹⁾	RL2	9	0.51
112	700 ¹⁾	RV1	9	0.32
70	1000 ¹⁾	RN1	9	0.32
50	1400 ¹⁾	RL1	9	0.32
UAL 2 with DC motor 24 V 3000 rpm 300 W 15.6 A				
285	700 ¹⁾	RV2	16	0.48
185	1050 ¹⁾	RN2	16	0.48
140	1350 ¹⁾	RL2	16	0.48
93	1700 ¹⁾	RN1	16	0.35
70	2200 ¹⁾	RL1	16	0.35
UAL 3 with DC motor 24 V 3000 rpm 500 W 25 A				
384	900 ¹⁾	RV2	26	0.46
200	1600 ¹⁾	RN2	26	0.46
137	2300 ¹⁾	RL2	26	0.46
100	2600 ¹⁾	RN1	26	0.32
68	3600 ¹⁾	RL1	26	0.32
UAL 4 with DC motor 90 V 3000 rpm 750 W 10.6 A				
470	1100 ¹⁾	RV2	11	0.46
250	2000 ¹⁾	RN2	12	0.46
170	2750 ¹⁾	RL2	11	0.46
125	3150 ¹⁾	RN1	11	0.32
85	4500 ¹⁾	RL1	11	0.32

1) value limited by electric motor power

The total dynamic efficiency (η) of UAL Series actuators, used to determine the DYNAMIC LOAD is calculated as follows:

$$\eta = \eta_1 \times \eta_2 \times \eta_3$$

where:

$\eta_1 = 0.95$ – timing belt transmission efficiency

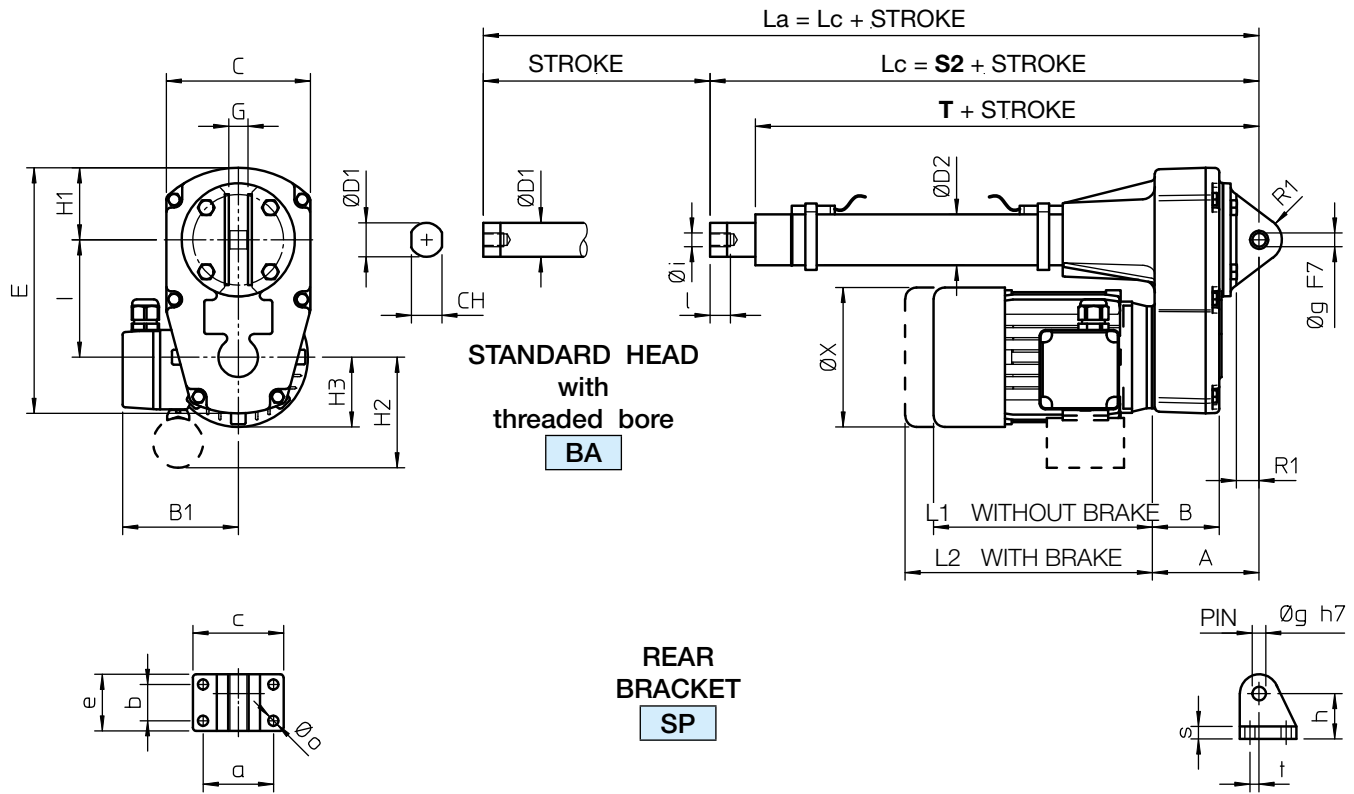
η_2 – acme screw-bronze nut dynamic efficiency, calculated with reference to the speed

$\eta_3 = 0.9$ – bearings and sealing elements "efficiency"

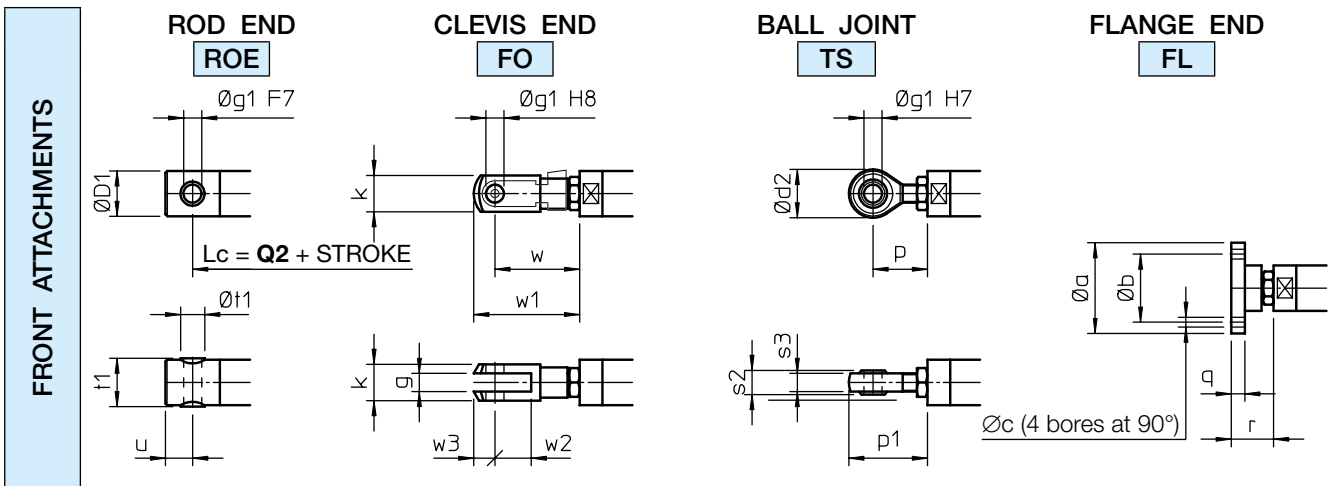
2) limit value of linear actuator dynamic load capacity (see page 129)

Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series, size 1 – 2 – 3 – 4
 AC 3-phase or 1-phase MOTOR – with Magnetic Stroke Limit Switches FCM

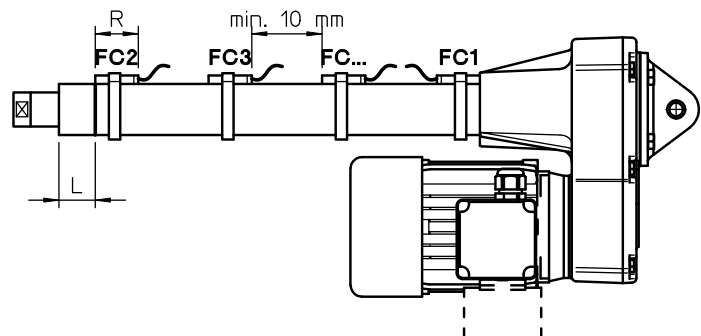


Lc - RETRACTED ACTUATOR length
 La - EXTENDED ACTUATOR length



MAGNETIC STROKE LIMIT SWITCHES FCM Dimensions

	L	
	REED CONTACT NC or (NC+NO)	NO
UAL 1	42	47
UAL 2	51	56
UAL 3	59	64
UAL 4	69	74



Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series, size 1 – 2 – 3 – 4
AC 3-phase or 1-phase MOTOR – with Magnetic Stroke Limit Switches FCM

STANDARD STROKE LENGTHS

	STROKE CODE	C100	C200	C300	C400	C500	C600	C700	C800	S2	T	Q2
UAL 1	STROKE [mm]	100	200	300	400	500	600	700	800	265	232	265
UAL 2										284	244	287
UAL 3										317	274	324
UAL 4										377	323	389

NOTE: Different stroke lengths available on request. $L_a = L_c + \text{STROKE}$

For stroke lengths longer than 800 mm it is necessary to increase the guided length between push rod and outer tube to avoid axial backlash. Dimensions **S2**, **T** and **Q2** shall be considered increased by 200 mm for stroke lengths up to 1500 mm.

For stroke lengths longer than 1500 mm, please, contact SERVOMECH.

	A	B	B1	C	CH	∅ D1	∅ D2	E	G	H1	H2	H3	I	L1	L2
UAL 1	85	52	110	114	22	25	36	189	15	58	75	55	90	167	193
UAL 2	94	60	115	127	27	30	45	217	17	64	90	62	104	193	229
UAL 3	106	71	124	135	30	35	55	247	20	68	90	75	121	215	304
UAL 4	120	77	141	161	36	40	60	293	24	81	95	90	138	235	340

	R1	∅ X	a	b	c	e	∅ g	h	∅ i	l	∅ o	r1	s	t
UAL 1	17	110	54	28	73	46	10	36	M10×1.5	17	9	18	10	4
UAL 2	20	123	62	32	80	50	12	40	M12×1.75	18	9	20	11	8
UAL 3	20	150	72	38	90	58	14	45	M14×2	24	9	22	12	8
UAL 4	22	170	85	55	110	81	20	58	M20×1.5	27	11	29	15	15

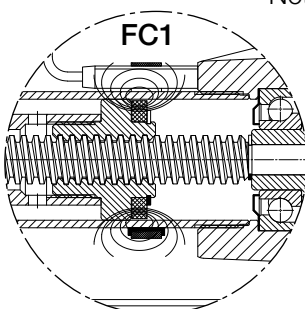
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FRONT ATTACHMENT Dimensions

	∅ a	∅ b	∅ c	∅ D1	∅ d2	g	∅ g1	k	p	p1
UAL 1	55	40	5.5	25	28	10	10	20	31	45
UAL 2	60	45	6.5	30	32	12	12	24	36	52
UAL 3	65	50	6.5	35	36	14	14	27	36	54
UAL 4	80	60	8.5	40	50	20	20	40	53	78

	q	r	s2	s3	t1	∅ t1	u	w	w1	w2	w3
UAL 1	8	27	14	11	26	14	15	49	61	20	12
UAL 2	9	28	16	12	32	16	18	56	70	24	14
UAL 3	9	32	19	14	36	18	21	65	81	28	16
UAL 4	10	42	25	18	42	25	27	90	115	40	25

MAGNETIC STROKE LIMIT SWITCHES FCM Technical features and dimensions



Note: - Additional extra magnetic REED SWITCHES are available for intermediate positions.

- The minimum distance between the REED SWITCHES must be of at least 10 mm.

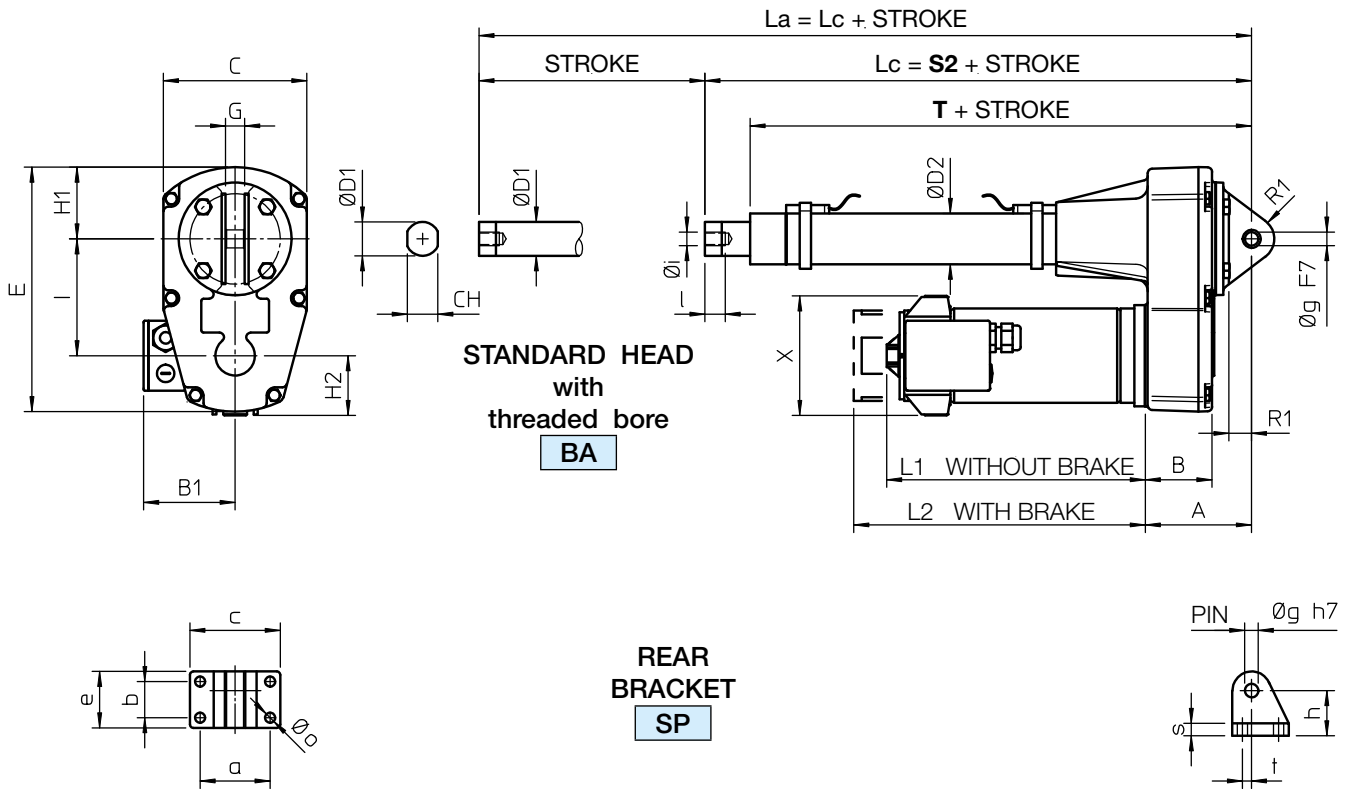
- REED SWITCH Normally Closed (NC) R = 39 mm

- REED SWITCH Change-over (NC+NO) R = 39 mm

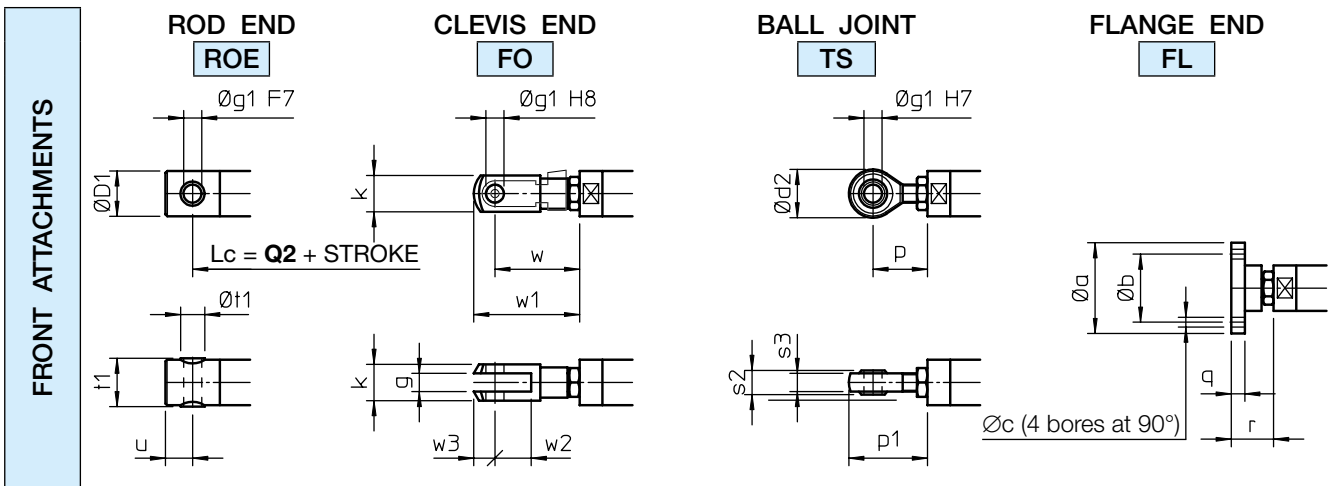
- REED SWITCH Normally Open (NO) R = 29 mm

Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series, size 1 – 2 – 3 – 4
DC MOTOR – with Magnetic Stroke Limit Switches FCM

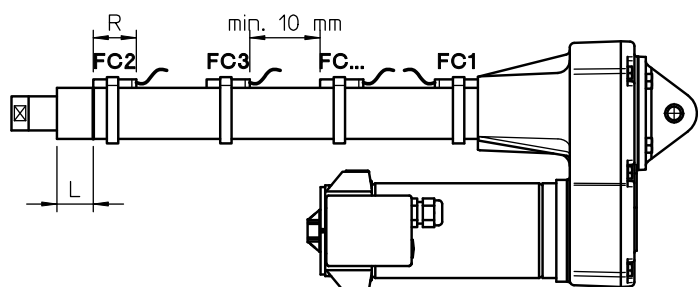


Lc - RETRACTED ACTUATOR length
 La - EXTENDED ACTUATOR length



MAGNETIC STROKE LIMIT SWITCHES FCM Dimensions

	L	
	REED CONTACT NC or (NC+NO)	NO
UAL 1	42	47
UAL 2	51	56
UAL 3	59	64
UAL 4	69	74



Linear actuators UAL Series

ACME SCREW LINEAR ACTUATORS UAL Series, size 1 – 2 – 3 – 4 DC MOTOR – with Magnetic Stroke Limit Switches FCM STANDARD STROKE LENGTHS

	STROKE CODE	C100	C200	C300	C400	C500	C600	C700	C800	S2	T	Q2
UAL 1	STROKE [mm]	100	200	300	400	500	600	700	800	265	232	265
UAL 2										284	244	287
UAL 3										317	274	324
UAL 4										377	323	389

NOTE: Different stroke lengths available on request. $L_a = L_c + \text{STROKE}$

For stroke lengths longer than 800 mm it is necessary to increase the guided length between push rod and outer tube to avoid axial backlash. Dimensions **S2**, **T** and **Q2** shall be considered increased by 200 mm for stroke lengths up to 1500 mm.

For stroke lengths longer than 1500 mm, please, contact SERVOMECH.

	A	B	B1	C	CH	∅ D1	∅ D2	E	G	H1	H2	H3	I	L1	L2
UAL 1	85	52	110	114	22	25	36	189	15	58	75	55	90	167	193
UAL 2	94	60	115	127	27	30	45	217	17	64	90	62	104	193	229
UAL 3	106	71	124	135	30	35	55	247	20	68	90	75	121	215	304
UAL 4	120	77	141	161	36	40	60	293	24	81	95	90	138	235	340

	R1	∅ X	a	b	c	e	∅ g	h	∅ i	l	∅ o	r1	s	t
UAL 1	17	110	54	28	73	46	10	36	M10×1.5	17	9	18	10	4
UAL 2	20	123	62	32	80	50	12	40	M12×1.75	18	9	20	11	8
UAL 3	20	150	72	38	90	58	14	45	M14×2	24	9	22	12	8
UAL 4	22	170	85	55	110	81	20	58	M20×1.5	27	11	29	15	15

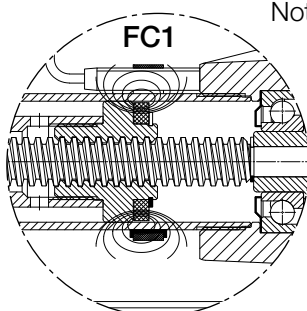
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FRONT ATTACHMENT Dimensions

	∅ a	∅ b	∅ c	∅ D1	∅ d2	g	∅ g1	k	p	p1
UAL 1	55	40	5.5	25	28	10	10	20	31	45
UAL 2	60	45	6.5	30	32	12	12	24	36	52
UAL 3	65	50	6.5	35	36	14	14	27	36	54
UAL 4	80	60	8.5	40	50	20	20	40	53	78

	q	r	s2	s3	t1	∅ t1	u	w	w1	w2	w3
UAL 1	8	27	14	11	26	14	15	49	61	20	12
UAL 2	9	28	16	12	32	16	18	56	70	24	14
UAL 3	9	32	19	14	36	18	21	65	81	28	16
UAL 4	10	42	25	18	42	25	27	90	115	40	25

MAGNETIC STROKE LIMIT SWITCHES FCM Technical features and dimensions



- Note: - Additional extra magnetic REED SWITCHES are available for intermediate positions.
 - The minimum distance between the REED SWITCHES must be of at least 10 mm.
- | | | | |
|---------------|-----------------|---------|-----------|
| - REED SWITCH | Normally Closed | (NC) | R = 39 mm |
| - REED SWITCH | Change-over | (NC+NO) | R = 39 mm |
| - REED SWITCH | Normally Open | (NO) | R = 29 mm |