

Motors

Synchronous Motors

Rotational



Type	URT	UAT	UBR1/UBR2	UDR	UDS
Dimensions (mm)	∅ 13 x 11	∅ 20 x 17.2	∅ 36 x 21	∅ 48 x 24	∅ 48 x 18.5
Voltage (V)	6-24	12-48	12-230	12-230	6-230
Speed 50 Hz (rpm)	600	600	250/500	500	500
60 Hz (rpm)	720	720	300/600	600	600
Pole number	10	10	12/24	12	12
Running torque (cNm)					
50 Hz	on request	0.31	0.75-0.9	1.5	0.95
60 Hz	on request	0.3	0.72-0.9	1.4	0.8
Power output (W)					
50 Hz	on request	0.19	0.24-0.39	0.77	0.5
60 Hz	on request	0.23	0.28-0.45	0.87	0.5
Gear combination	on request	on request	A, D, M, B, F, V, J	A, D, M, B, F, V, J	A, D, M, B, F, V, J
Page		11	13	17	19

Synchronous Motors

Rotational



Type	UFM/UFR	UHM
Dimensions (mm)	∅ 52 x 28 (56)	∅ 59 x 35 (70)
Speed 50 Hz (rpm)	250/500	250
Speed 60 Hz (rpm)	300/600	300
Voltage (V)	12-230	12-230
Pole number	12/24	24
Running torque		
50 Hz (cNm)	2.8-5.3	8.5-15
60 Hz (cNm)	2.6-4.7	6.6-9.5
Power output		
50 Hz (W)	1-2.8	2.2-3.9
60 Hz (W)	1.1-3	2.1-3
Gear combination	A, D, M, B, F, V, J	J
Page	21	27

Linear



Type	UBK
Dimensions (mm)	∅ 36 x 36
Travel (mm)	8; 13; 56
Speed by (mm/s)	
50 Hz	6.67/8.33
60 Hz	8/10
Pole number	12
Voltage (V)	12-230
Max. Force (N)	20
Page	30

Stepper Motors

Rotational



Type	URG	UAG	UBD/UBB	UDB	UFD/UFB
Dimensions (mm)	∅ 13 x 11	∅ 20 x 17.2	∅ 36 x 21	∅ 48 x 24	∅ 52 x 28 (56)
Step angle (degrees)	18	18	7.5/15	15	7.5/15
Holding torque (cNm)	0.25	0.7/0.5	1.0–1.9	2.7–2.2	4.3–10.4
Detent torque (cNm)	on request	0.14	0.22–0.36	0.35	0.45–0.8
Resistance per winding bipolar/unipolar 6 V (Ω)	on request	27/35	18.5/28	15/19	9.5 (5)/15 (7.5)
12 V (Ω)		150/170	100/120	78/75	52 (25.5)/61 (30.5)
24 V (Ω)		675/700	460/500	350/300	250 (125)/251 (125)
Gear combination	on request	on request	A, D, M, B, F, V	A, D, M, B, F, V, J	(A, D, M, B), F, V, J
Page		33	36	42	45

Stepper Motors

Rotational



Type	UHD
Dimensions (mm)	∅ 59 x 35 (70)
Step angle (degrees)	7.5
Holding torque (cNm)	13–45.5
Detent torque (cNm)	1.3–5.3
Resistance per winding bipolar/unipolar 6 V (Ω)	6.8/10
12 V (Ω)	36/45
24 V (Ω)	168/190
Gear combination	J
Page	52

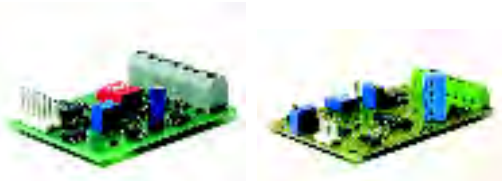
Linear



Type	UBL	UKE
Dimensions (mm)	∅ 36 x 36	∅ 57 x 45
Travel (mm)	8; 13; 56	13; 30
Travel per step (mm)	0.033/0.041	0.03125
Speed by 200 Hz (mm/s)	6.67/8.33	6.25
Resistance per winding bipolar/unipolar 6 V (Ω)	18.5/28	6.9/10
12 V (Ω)	100/120	36/44
24 V (Ω)	460/500	170/187
Max. force (N)	35	on request
Page	57	59

Electronics for Stepper Motors

Driver Boards



Type	SAMOTRONIC 101	SAMOTRONIC 102
Driver	for unipolar motors	for bipolar motors
Dimensions (mm)	55 x 40	84 x 54
Supply voltage (VDC)	10–24	■ standard version 10–24
Motor current	constant voltage drive	■ constant current drive (chopper controlled)
Step mode	full/half step	full/half step
Clock source	internal or external	internal or external
Control inputs to	<ul style="list-style-type: none"> ■ inhibit internal clock ■ inhibit motor current ■ change direction of rotation 	<ul style="list-style-type: none"> ■ inhibit internal clock ■ inhibit motor current ■ change direction of rotation
Configuration	via DIP-switch	via DIP-switch
Test pins		<ul style="list-style-type: none"> ■ motor current ■ step frequency
Page	62	63

Gearboxes



Type	UGA/UGD	UGM	UGB/UGF	UGV	UGJ
Dimensions (mm)	55 x 62.5 (65.6)	51 x 65.2	58 x 81	70 x 70	65 x 107
Maximal torque (cNm)	32	100	250/500	500	1500
Ratios	A: 4 ¹ / ₆ ...360.000 D: 4 ¹ / ₆ ...6.048.000	12.5...1500	B: 4 ¹ / ₃ ...345.600 F: 4 ¹ / ₆ ...5000	8 ¹ / ₃ ...2.000	4 ¹ / ₆ ...36.000.000 ≥ 2500 with UGD
Internal slipping clutch	optional	–	optional (UGB)	–	–
Standard shaft (mm)	∅ 4 x 10	∅ 4 x 10	∅ 8 x 12	∅ 8 x 12	∅ 12 x 20
Weight (g)	55/35	45	130	130	480
Page	65/67	69	72/74	76	78

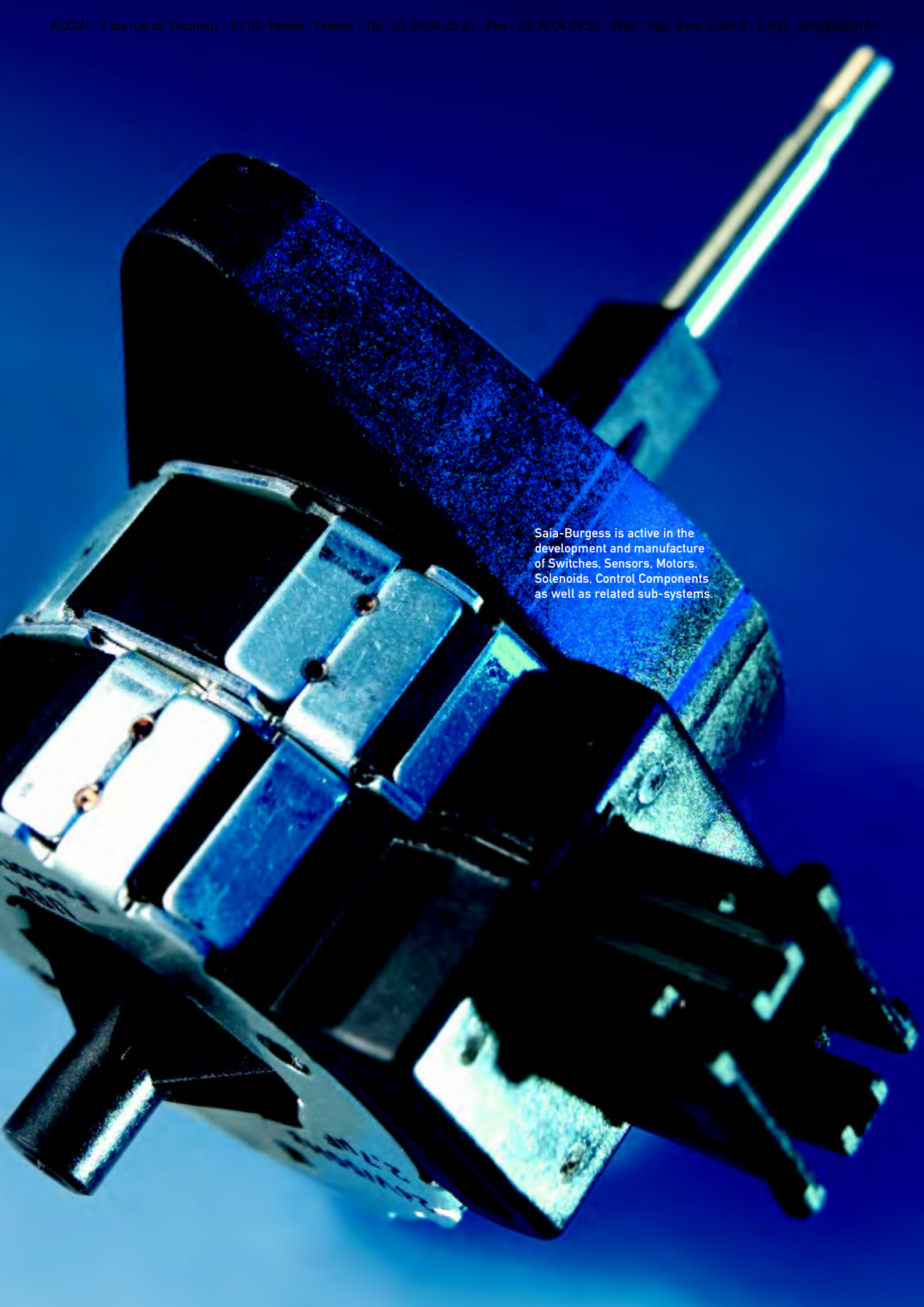
Solenoids

Rotary Solenoids

	Ultimag® Series	BTA® Series Brushless Torque	Rotary Solenoids
Type	EM	EVM	E, B, S
Dimensions (mm)	Ø 41 x 26 – Ø 59 x 41	Ø 30 x 18 – Ø 59 x 41	Ø 25 x 16 – Ø 70 x 45
Duty cycle	continuous or intermittent 100% 50% 25% 10%	continuous or intermittent 100% 50% 25% 10%	continuous or intermittent 50% 20% 10%
Life	over 100 million cycles	over 100 million cycles	1 million cycles; 50 million cycles on extended life types
Power (W)	14.5–320	13–320	10–100
Supply (V)	3.2–313 VDC	3.2–113 VDC	2.6–123 VDC
Housing	completely enclosed design	completely enclosed design	compact design with a variety of enclosures
Characteristics	<ul style="list-style-type: none"> ■ quiet, shock-free operation ■ fast energising time ■ high speed cycle rates ■ on/off or proportional mode operation 	<ul style="list-style-type: none"> ■ quiet, shock-free operation ■ high speed cycle rate ■ closed loop velocity ■ position control 	<ul style="list-style-type: none"> ■ “snap” acting engagement ■ maximum versatility ■ on/off operation

Linear Solenoids

	Soft Shift®	Tubular	Low Profile	Open Frame
Type	EP	STA	EC, EF, SF	B, C
Dimensions (mm)	Ø 29 x 25 – Ø 57 x 56	Ø 13 x 27 – Ø 38 x 63	Ø 19 x 13 – Ø 57 x 34	up to 51 x 44 x 77 mm
Duty cycle	continuous or intermittent	continuous or intermittent	continuous or intermittent	continuous or intermittent
Stroke	up to 10.7 mm	up to 63.5 mm	up to 10.1 mm	up to 25.4 mm
Force	up to 131 N	up to 43 N	up to 356 N	up to 48.9 N
Life	10 million cycles	25+ million cycles	1 to 5 million cycles	50.000 to 100.000 cycles
Power (W)	7–320	4–200	4.5–320	1.4–190
Supply (V)	2.2–394 VDC	2.4–534 VDC	1.6–394 VDC	6–388 VDC/240 VAC
Housing	completely enclosed design	shock and vibration integrity	completely enclosed design	compact box frame and C frame designs
Characteristics	<ul style="list-style-type: none"> ■ quiet operation with 3-5 time the starting force of standard solenoids ■ slow, smooth motion ■ snap action ■ closed loop velocity and position control 	<ul style="list-style-type: none"> ■ push/pull engagement; well-suited to lock/latch operations ■ multiple plunger designs ■ on/off operation 	<ul style="list-style-type: none"> ■ push/pull engagement; well-suited to lock/latch operations ■ high force ■ short stroke applications ■ on/off operation 	<ul style="list-style-type: none"> ■ pull-in engagement (push types available); well-suited to lock/latch operations ■ AC or DC activated ■ continuous or intermittent ■ on/off operation



Saia-Burgess is active in the development and manufacture of Switches, Sensors, Motors, Solenoids, Control Components as well as related sub-systems.

UAT

Synchronous Motors

Rotational

UAT1

Dimensions (mm)	∅ 20 x 17.2
Voltage (V)	12-48
Speed 50 Hz (rpm)	600
60 Hz (rpm)	720
Pole number	10
Running torque (cNm)	
50 Hz	0,31
60 Hz	0,3
Power output (W)	
50 Hz	0,19
60 Hz	0,23
Gear combination	on request



Standard Data

Climatic class	"wide-spread" according to DIN IEC 60721-2-1
Ambient temperature operation	°C -40 ... +60
Ambient temperature storage	°C -40 ... +100
Thermal resistance at f=0 R _{therm}	32 K/W
Thermal class	"B" according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	insulation displacement connection, pins, cable
Protection	IP 40 according to DIN EN 60529
Weight	25 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating

Order Reference

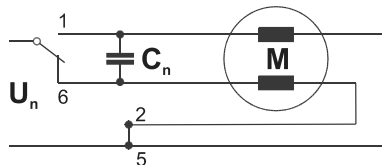
Type	Synchronous Motor	UAT1	0	N	24 V/50 Hz	R	E
Rotor shaft, mounting	0 centring 8 mm, screw plate with thread M2 3 centring 8 mm, screw plate with slotted hole A centring 6 mm, screw plate with thread M2 E centring 6 mm, screw plate with slotted hole						
Approval	N Approval Standard						
Voltage/Frequency	See page 12						
Direction	reversible						
Cable	E cable 150 mm with plug AMP MicroMatch 0-215083-6 (other on request)						

UAT

Technical Data

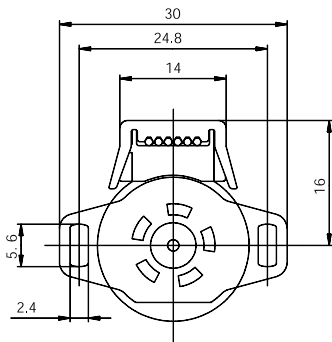
Rated frequency	Hz	50	60
Speed n	rpm	600	720
Power consumption	W	0.9	0.9
Power output	W	0.19	0.23
Running torque	cNm	0.3	0.3
Rotor inertia J_R	gcm^2	0.31	
Detent torque M_S	cNm	0.14	
Tolerance of voltage		standard power supply system + 10% / - 10%	
Duty cycle		100%	
Winding temperature T_{max}	°C	130	
Direction of rotation		reversible	
Capacitors			
Rated voltage U_N	V	24	48
Operation capacitor C_{50}	$\mu F/VAC$	2.2/40	0.68/80
Operation capacitor C_{60}	$\mu F/VAC$	2.2/40	0.68/80

Circuit diagram Parallel circuit

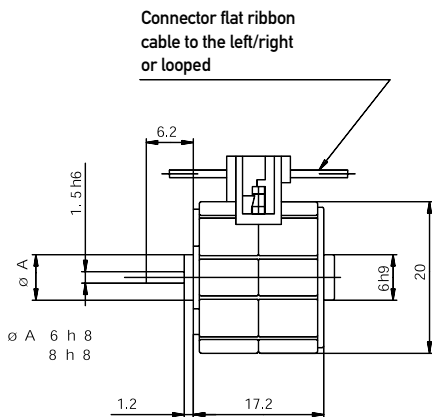


6 = clockwise rotations
1 = counter clockwise rotations

Dimensions

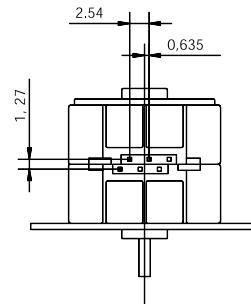
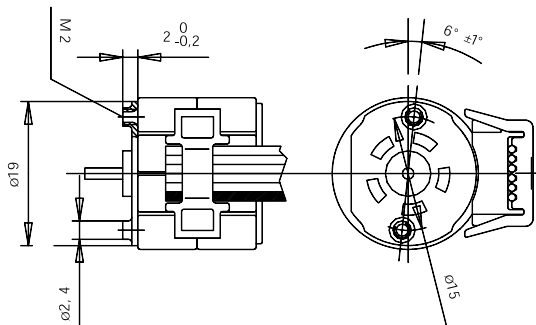
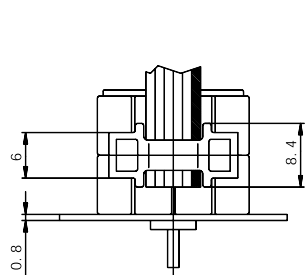
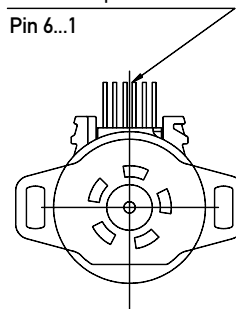


Mounting with screw plate



Connector option K with contact pin

Pin 6...1



UBR

Synchronous Motors

Rotational

UBR1

Dimensions (mm)	∅ 36 x 21
Voltage (V)	12-230
Speed (rpm.) 50 Hz	250
60 Hz	300
Pole number	24
Running torque (cNm)	
50 Hz	0,9
60 Hz	0,9
Power output (W)	
50 Hz	0,24
60 Hz	0,28
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	60 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

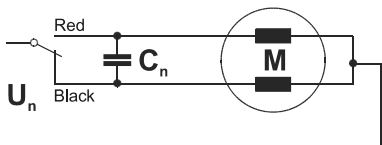
Type	Synchronous Motor	UBR1	0	N	24 V/50 Hz	R	E
Rotor shaft, mounting	0 centring 8 mm, shaft 2.0 mm, clip 1 centring 8 mm, shaft 1.5 mm, clip 3 centring 8 mm, shaft 2.0 mm, screw plate 4 centring 8 mm, shaft 1.5 mm, screw plate	A centring 10 mm, shaft 2.0 mm, clip C centring 10 mm, shaft 1.5 mm, clip E centring 10 mm, shaft 2.0 mm, screw plate K centring 10 mm, shaft 1.5 mm, screw plate					
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA						
Voltage/Frequency	See page 14						
Direction	reversible						
Cable	E cable 150 mm (other on request)						

UBR

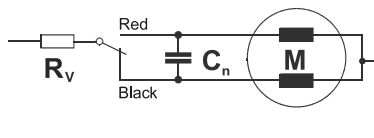
Technical Data

Rated frequency	Hz	50	60			
Speed n	rpm	250	300			
Power consumption	W	1,3	1,3			
Power output	W	0,24	0,28			
Running torque	cNm	0,9	0,9			
Rotor inertia J _R	gcm ²	2,8				
Detent torque M _S	cNm	0,22				
Tolerance of voltage		standard power supply system + 10% / - 10%				
Duty cycle		100%				
Winding temperature T _{max}	°C	105				
Direction of rotation		reversible				
Capacitors						
Rated voltage U _N	V	12	24	48	110	230
Operation capacitor C ₅₀	µF/VAC	12/20	3,3/40	0,82/200	0,15/200	0,22/200
Operation capacitor C ₆₀	µF/VAC	12/20	3,3/40	0,82/200	0,15/200	0,12/200

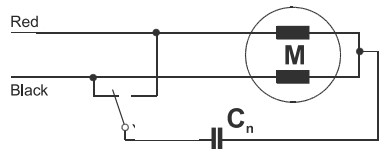
Circuit diagram Parallel circuit 12V, 24V, 48V, 110V



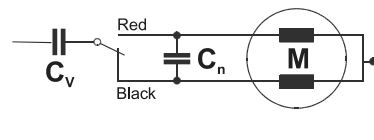
Parallel circuit 230V



Series circuit 230V

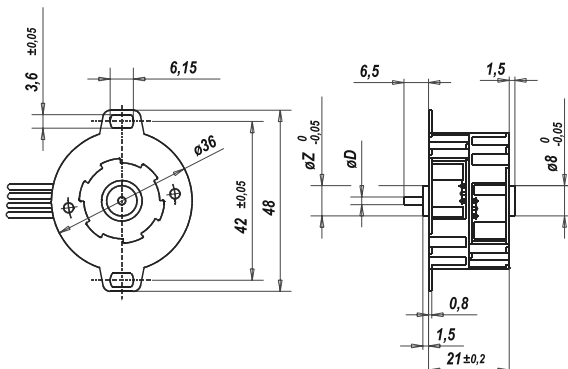


Parallel circuit 230V

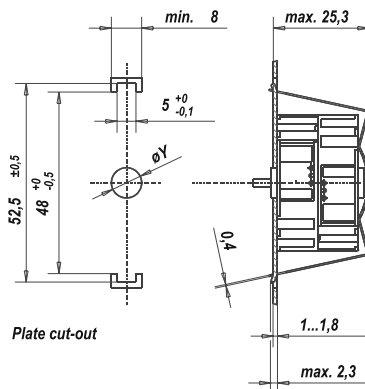


Red = clockwise rotations
Black = counter clockwise rotations

Dimensions Mounting with screw plate



Mounting with snap on clip



øD Rotor shaft
ø 2 h6
ø 1.5 js8

øZ	øY
8	8F8
10	10F8

UBR

Synchronous Motors

Rotational

UBR 2

Dimensions (mm)	∅ 36 x 21
Voltage (V)	12-230
Speed (rpm.) 50 Hz	500
60 Hz	600
Pole number	12
Running torque (cNm)	
50 Hz	0,75
60 Hz	0,72
Power output (W)	
50 Hz	0,39
60 Hz	0,45
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	60 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

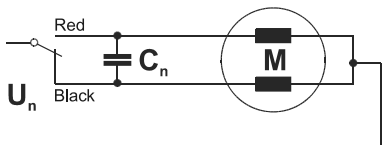
Type	Synchronous Motor		UBR2	0	N	24 V/50 Hz	R	E
Rotor shaft, mounting	0 centring 8 mm, shaft 2.0 mm, clip	A centring 10 mm, shaft 2.0 mm, clip						
	1 centring 8 mm, shaft 1.5 mm, clip	C centring 10 mm, shaft 1.5 mm, clip						
	3 centring 8 mm, shaft 2.0 mm, screw plate	E centring 10 mm, shaft 2.0 mm, screw plate						
	4 centring 8 mm, shaft 1.5 mm, screw plate	K centring 10 mm, shaft 1.5 mm, screw plate						
Approval	N Approval Standard							
	UL Approval UL							
	CSA Approval UL/CSA							
Voltage/Frequency	See page 16							
Direction	reversible							
Cable	E cable 150 mm (other on request)							

UBR

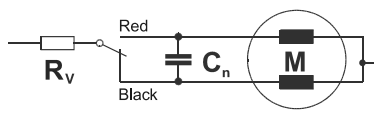
Technical Data

Rated frequency	Hz	50	60				
	Speed n	rpm	500	600			
	Power consumption	W	1,6	1,6			
	Power output	W	0,39	0,45			
	Running torque	cNm	0,75	0,72			
	Rotor inertia J_R	gcm ²	2,8				
	Detent torque M_S	cNm	0,25				
	Tolerance of voltage	standard power supply system + 10% / - 10%					
	Duty cycle	100%					
	Winding temperature T_{max}	°C	105				
Direction of rotation	reversible						
Capacitors	Rated voltage U_n	V	12	24	48	110	230
	Operation capacitor C_{50}	µF/VAC	15/20	3,9/40	1,0/70	0,18/170	0,27/170
	Operation capacitor C_{60}	µF/VAC	15/20	3,9/40	1,0/70	0,18/170	0,22/170

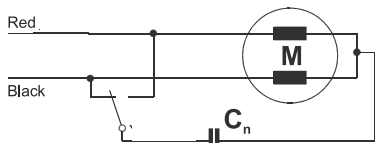
Circuit diagram Parallel circuit 12V, 24V, 48V, 110V



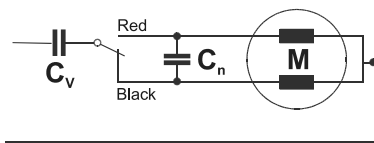
Parallel circuit 230V



Series circuit 230V

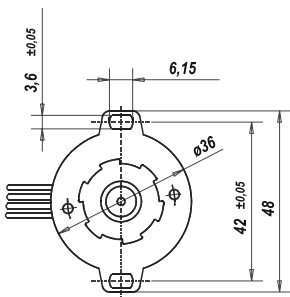


Parallel circuit 230V

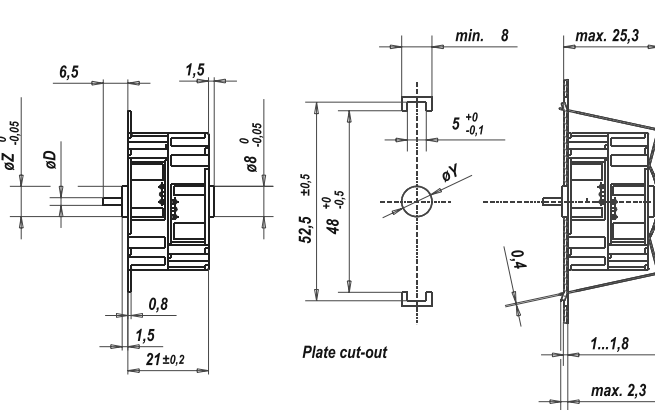


Red = clockwise rotations
Black = counter clockwise rotations

Dimensions Mounting with screw plate



Mounting with snap on clip



ØD Rotor shaft
Ø 2 h6
Ø 1.5 js8

ØZ ØY
8 8F8
10 10F8

UDR

Synchronous Motors

Rotational

UDR1

Dimensions (mm)	∅ 48 x 24
Voltage (V)	12-230
Speed (rpm.) 50 Hz	500
60 Hz	600
Pole number	12
Running torque (cNm)	
50 Hz	1,5
60 Hz	1,4
Power output (W)	
50 Hz	0,77
60 Hz	0,87
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	18 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	132 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

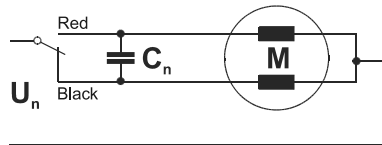
Type	Synchronous Motor	UDR1	0	N	24 V/50 Hz	R	N
Rotor shaft, mounting	0 centring 8 mm, shaft 1,5 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip						
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA						
Voltage/Frequency	See page 18						
Direction	reversible						
Cable	N cable 150 mm (other on request)						

UDR

Technical Data

Rated frequency	Hz	50	60				
	Speed n	rpm	500	600			
	Power consumption	W	2.1	2.2			
	Power output	W	0.77	0.87			
	Running torque	cNm	1.5	1.4			
	Rotor inertia J _R	gcm ²	6.3				
	Detent torque M _S	cNm	0.35				
	Tolerance of voltage	standard power supply system + 10% / - 10%					
	Duty cycle	100 %					
	Winding temperature T _{max}	°C	105				
Direction of rotation	reversible						
Capacitors	Rated voltage U _N	V	12	24	48	110	230
	Operation capacitor C ₅₀	µF/VAC	27/20	6,8/40	1,5/100	0,27/200	0,068/350
	Operation capacitor C ₆₀	µF/VAC	22/20	4,7/40	1,5/100	0,27/200	0,068/350

Circuit diagram Parallel circuit



Red = clockwise rotations
Black = counter clockwise rotations

Dimensions

Mounting with screw clip

Mounting with snap-on clip

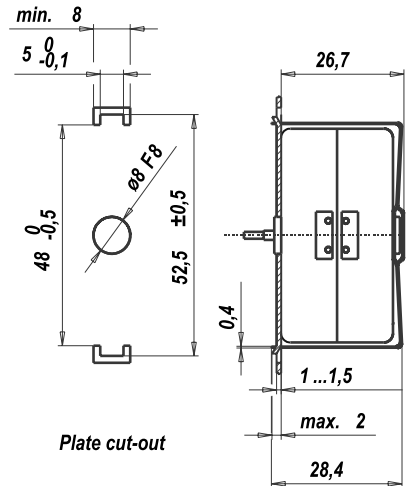
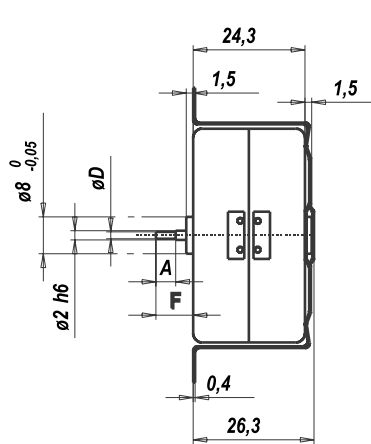
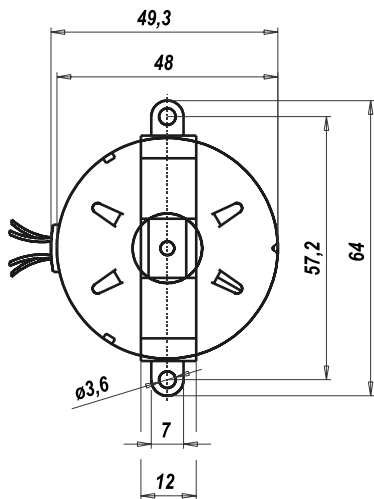


Plate cut-out

∅D Rotor shaft

∅ 1.5 js8

∅ 2 h6

Dimension A Dimension F

4,3 6,5

— 8,2

UDS

Synchronous Motors

Rotational

UDS1

Dimensions (mm)	∅ 48 x 18,5
Voltage (V)	6-230
Speed (rpm.) 50 Hz	500
60 Hz	600
Pole number	12
Running torque (cNm)	
50 Hz	0,95
60 Hz	0,8
Power output (W)	
50 Hz	0,5
60 Hz	0,5
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	17 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	102 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	plastic, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

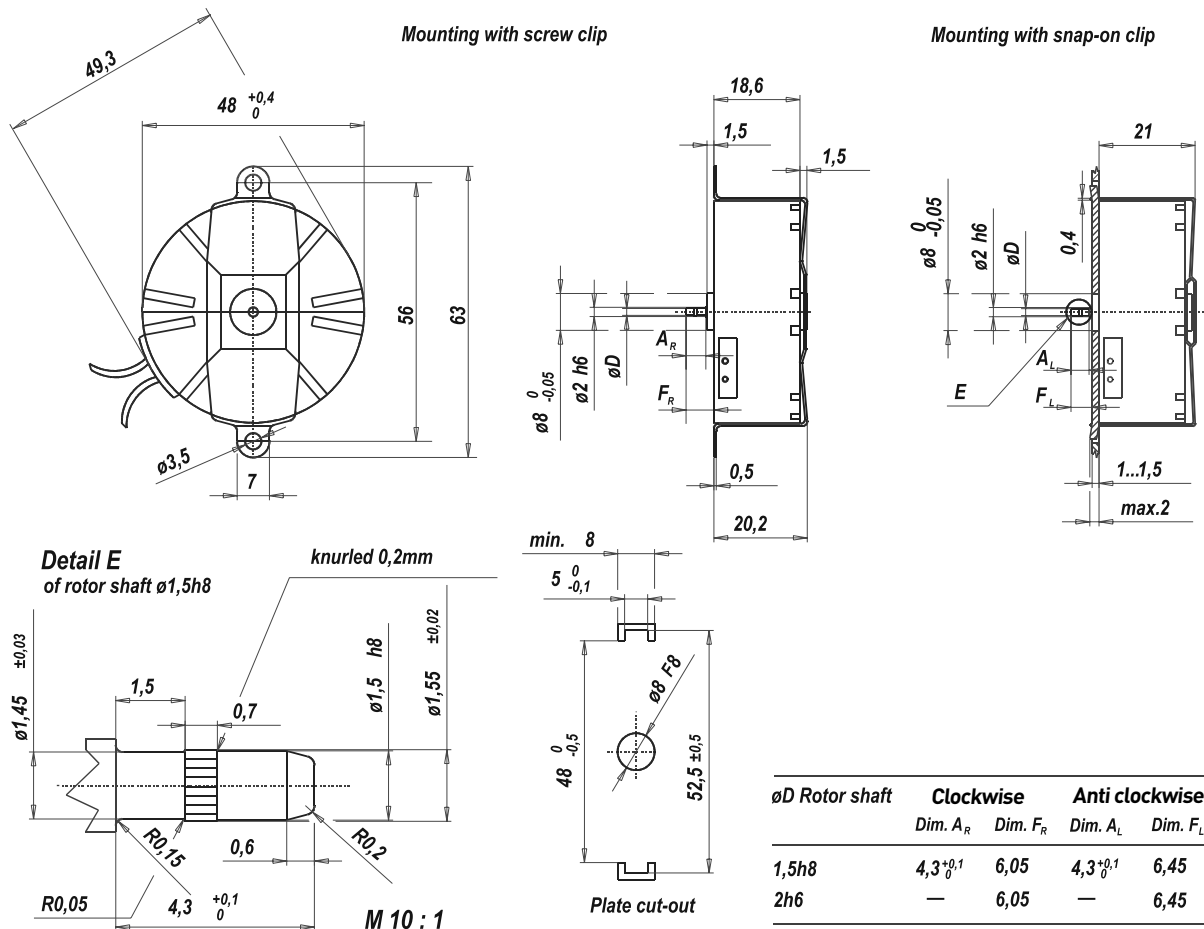
Type	Synchronous Motor	UDS1	0	N	24 V/50 Hz	R	N
Rotor shaft, mounting	0 centring 8 mm, shaft 1,5 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip						
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA						
Voltage/Frequency	See page 20						
Direction	R clockwise rotations L Counter-clockwise rotations						
Cable	N cable 150 mm (other on request)						

UDS

Technical Data

Rated frequency	Hz	50	60
Speed n	rpm	500	600
Power consumption	W	2.4	1.8
Power output	W	0.5	0.5
Running torque	cNm	0.95	0.8
Rated voltage U_N	V	6, 12, 24, 48, 110, 230	
Rotor inertia J_R	gcm ²	10.2	
Detent torque M_S	cNm	0.27 (in direction of rotation)	
Tolerance of voltage		standard power supply system + 10% / - 10%	
Duty cycle		100 %	
Winding temperature T_{max}	°C	105	
Direction of rotation		clockwise or counter-clockwise	

Dimensions



UFM

Synchronous Motors

Rotational

UFM1

Dimensions (mm)	∅ 52 x 28
Voltage (V)	12-230
Speed (rpm.) 50 Hz	250
60 Hz	300
Pole number	24
Running torque (cNm)	
50 Hz	3,8
60 Hz	3,5
Power output (W)	
50 Hz	1
60 Hz	1,1
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	13 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	185 g (without UFR 3/4)
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

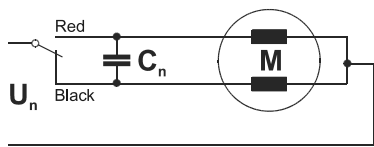
Type	Synchronous Motor	UFM1	0	N	24 V/50 Hz	R	N
Rotor shaft, mounting	0 centring 8 mm, shaft 3,0 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip 2 centring 8 mm, shaft 1,5 mm, clip 3 centring 8 mm, shaft 3,0 mm, screw plate 4 centring 8 mm, shaft 2,0 mm, screw plate 5 centring 8 mm, shaft 1,5 mm, screw plate	E centring 10 mm, shaft 3,0 mm, screw plate K centring 10 mm, shaft 2,0 mm, screw plate M centring 10 mm, shaft 1,5 mm, screw plate					
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA						
Voltage/Frequency	See page 22						
Direction	reversible						
Cable	N cable 150 mm (other on request)						

UFM

Technical Data

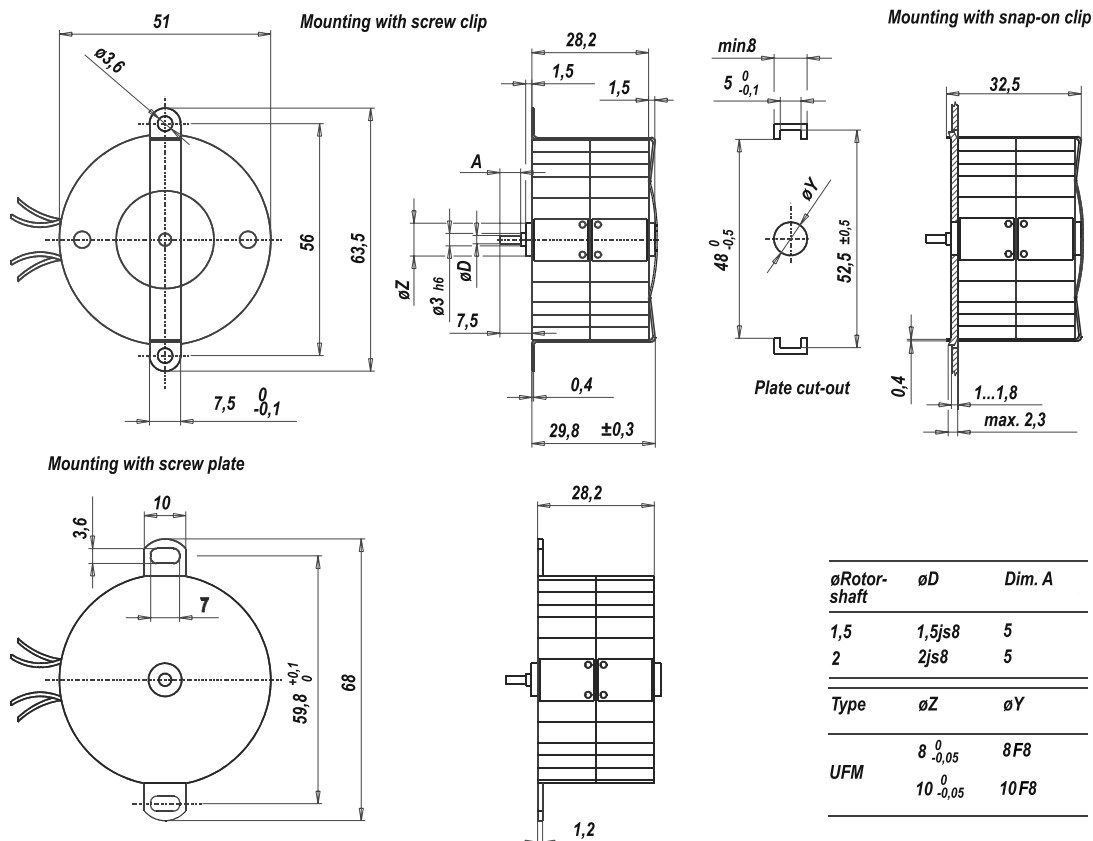
Rated frequency	Hz	50	60			
Speed n	rpm	250	300			
Power consumption	W	4	3.1			
Power output	W	1	1.1			
Running torque	cNm	3.8	3.5			
Rotor inertia J _R	gcm ²	14.4				
Detent torque M _S	cNm	0.45				
Tolerance of voltage		standard power supply system + 10% / - 10%				
Duty cycle		100%				
Winding temperature T _{max}	°C	105				
Direction of rotation		reversible				
Capacitors						
Rated voltage U _N	V	12	24	48	110	230
Operation capacitor C ₅₀	µF/VAC	39/24	10/45	2.2/90	0.39/240	0.1/440
Operation capacitor C ₆₀	µF/VAC	33/24	8.2/45	1.8/90	0.33/240	0.082/440

Circuit diagram Parallel circuit



Red = clockwise rotations
Black = counter clockwise rotations

Dimensions



UFR

Synchronous Motors

Rotational

UFR1/UFR3/UFR4

Dimensions (mm)	∅ 52 x 28 / ∅ 52 x 42 / ∅ 52 x 56
Voltage (V)	24-230
Speed (rpm.) 50 Hz	500
60 Hz	600
Pole number	12
Running torque (cNm)	
50 Hz	2,8 / 3,7 / 5,3
60 Hz	2,6 / 3,1 / 4,7
Power output (W)	
50 Hz	1,5 / 1,9 / 2,8
60 Hz	1,6 / 2 / 3
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	11 K/W (UFR1), 7 K/W (UFR4)
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cabl
Protection	IP 40 according to DIN EN 60529
Weight	180 g (UFR1), 370 g (UFR4)
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

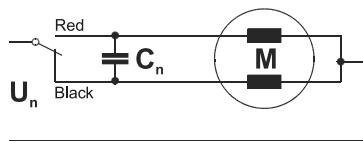
Type	Synchronous Motor	UFR	1	0	N	24 V/50 Hz	R	N
Configuration	1 Two coils 3 Three coils 4 Four coils							
Rotor shaft, mounting	0 centring 8 mm, shaft 3.0 mm, clip 1 centring 8 mm, shaft 2.0 mm, clip 2 centring 8 mm, shaft 1.5 mm, clip	3 centring 8 mm, shaft 3.0 mm, screw plate 4 centring 8 mm, shaft 2.0 mm, screw plate 5 centring 8 mm, shaft 1.5 mm, screw plate						
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA							
Voltage/Frequency	See page 24							
Direction	reversible							
Cable	N cable 150 mm (other on request)							

UFR

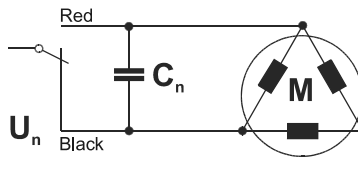
Technical Data

UFR1	Rated frequency	Hz	50	60		
	Speed n	rpm	500	600		
	Power output P_{mech}^*	W	1.5	1.6		
	Running torque M_n^*	cNm	2.8	2.6		
	Power consumption P_{el}^*	W	3.3	3.6		
	Detent torque M_S	cNm	0.46			
	Rotor inertia J_R	gcm ²	14.2			
	Capacitors at Rated voltage U_N	V	24	48	110	230
	Operation capacitor C_{50}	μF/VAC	10/45	2.7/90	0.47/200	0.1/400
	Operation capacitor C_{60}	μF/VAC	8.2/45	2.2/90	0.39/200	0.082/440
UFR3	Rated frequency	Hz	50	60		
	Speed n	rpm	500	600		
	Power output P_{mech}^*	W	1.9	2		
	Running torque M_n^*	cNm	3.7	3.1		
	Power consumption P_{el}^*	W	6.1	5.1		
	Detent torque M_S	cNm	0.54			
	Rotor inertia J_R	gcm ²	17			
	Capacitors at Rated voltage U_N	V	24	48	110	230
	Operation capacitor C_{50}	μF/VAC	39/24	10/50	1.8/110	0.39/240
	Operation capacitor C_{60}	μF/VAC	27/24	6.8/50	1.2/110	0.27/240
UFR4	Rated frequency	Hz	50	60		
	Speed n	rpm	500	600		
	Power output P_{mech}^*	W	2.8	3		
	Running torque M_n^*	cNm	5.3	4.7		
	Power consumption P_{el}^*	W	6.4	6.9		
	Detent torque M_S	cNm	0.8			
	Rotor inertia J_R	gcm ²	24.2			
	Capacitors at Rated voltage U_N	V	24	48	110	230
	Operation capacitor C_{50}	μF/VAC	18/45	7/90	0.82/200	0.22/440
	Operation capacitor C_{60}	μF/VAC	15/45	3.9/90	0.68/200	0.18/440
Tolerance of voltage	standard power supply system + 10% ... - 10%					
Winding temperature T_{max}	105°C					
Duty cycle	100%					
Direction of rotation	reversible					
* at rated voltage						

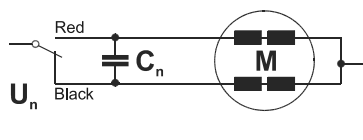
Circuit diagram UFR1 Parallel circuit



UFR3 Parallel circuit



UFR4 Parallel circuit

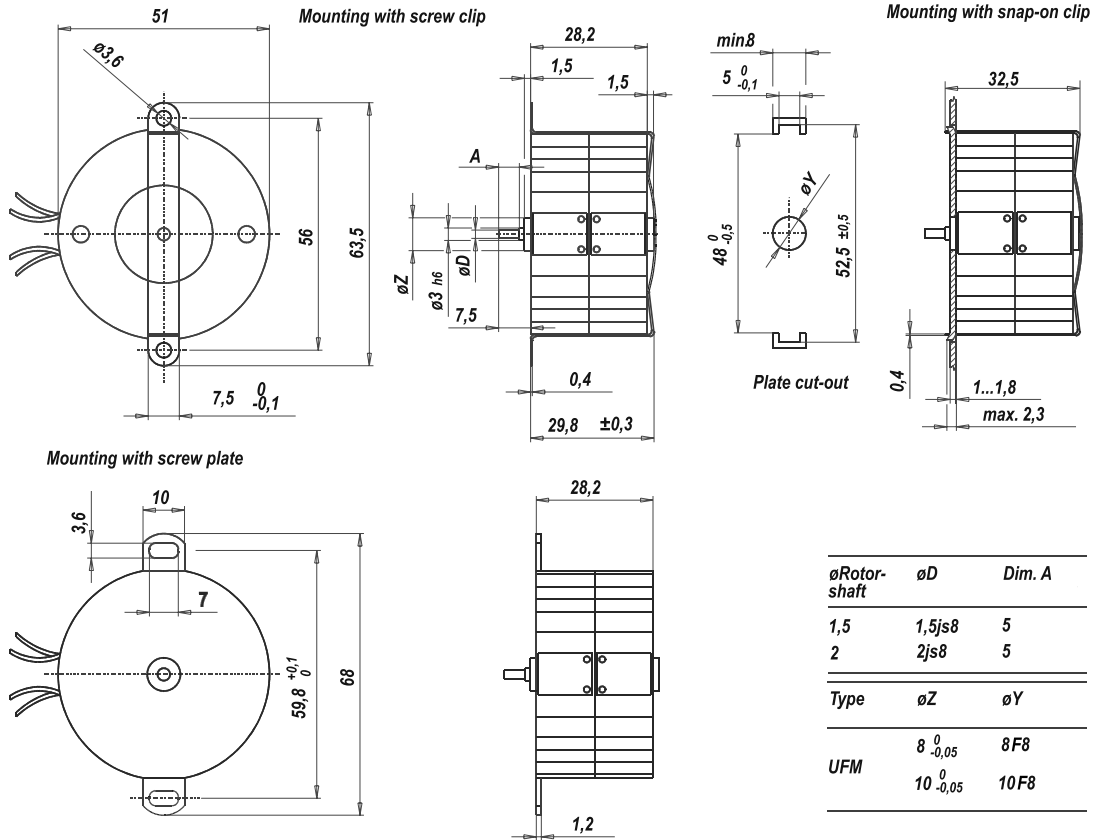


Red = clockwise rotations
Black = counter clockwise rotations

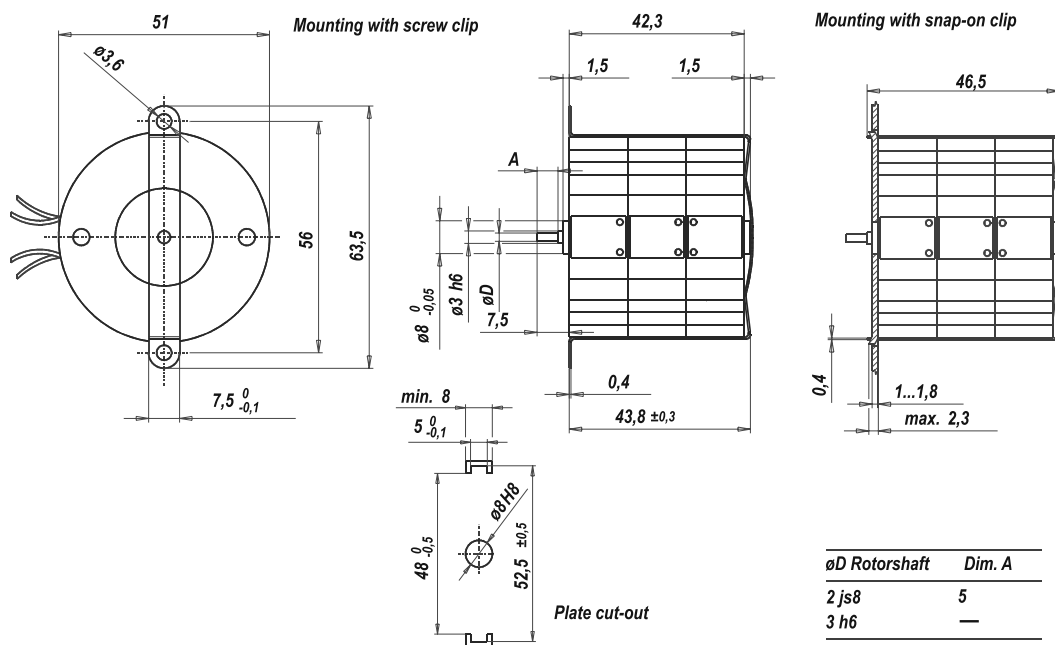
UFR

Dimensions

UFR1



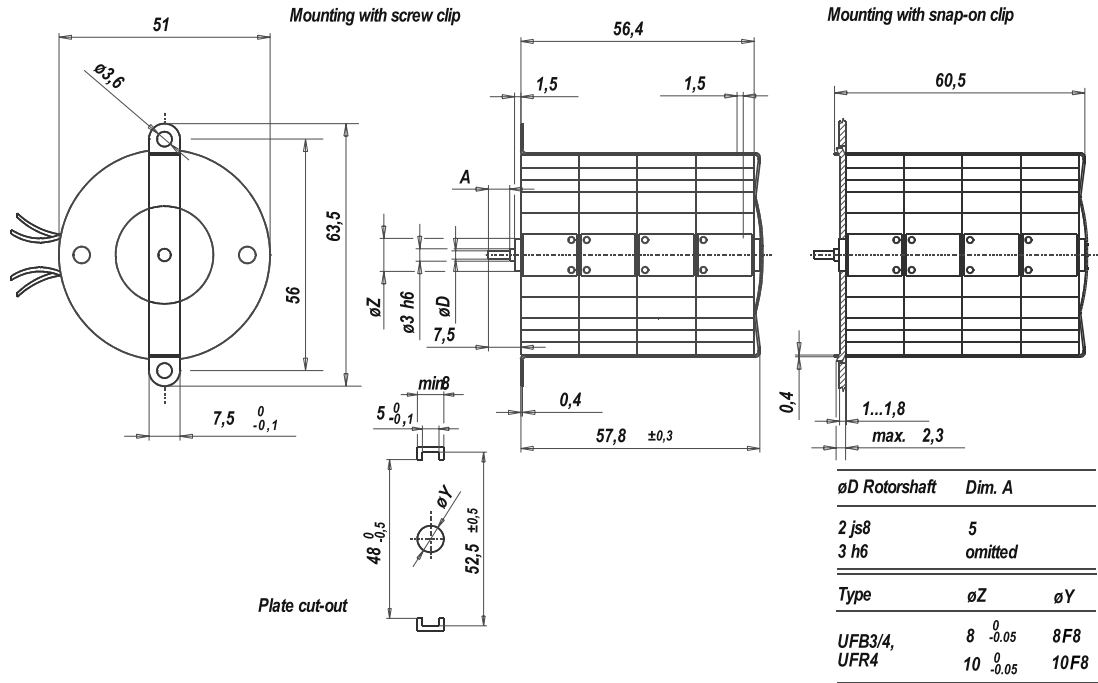
UFR3



UFR

Dimensions

UFR4



UHM

Synchronous Motors

Rotational

UHM1/5; UHM4/8

Dimensions (mm)	∅ 59 x 35 / ∅ 59 x 70
Voltage (V)	12-230
Speed 50 Hz (rpm)	250
60 Hz (rpm)	300
Pole number	24
Running torque (cNm)	
50 Hz	8,5-15
60 Hz	6,6-9,5
Power output (W)	
50 Hz	2,2-3,9
60 Hz	2,1-3
Gear combination	J



Standard Data

Climatic class	"wide-spread" according to DIN IEC 60721-2-1
Ambient temperature operation	-15 ... +55° C
Ambient temperature storage	-20 ... +100° C
Thermal resistance at f=0 (R _{therm})	10 (UHM 1/5), 6,5 (UHM 4/8) K/W
Thermal class	"B" according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight (g)	300 (UHM1/5), 580 (UHM4/8)
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

Type	Synchronous Motor		UHM	1	0	N	12V/50Hz	R	N
Configuration	1	two coils, standard magnet	4	four coils, standard magnet	8	four coils, stronger magnet			
Rotor shaft, mounting	0	centring 12 mm, shaft 6,35 mm, clip	3	centring 12 mm, shaft 6,35 mm, screw plate*	4	centring 12 mm, shaft 4,0 mm, screw plate*			
	1	centring 12 mm, shaft 4,0 mm, clip	5	centring 12 mm, shaft 3,0 mm, screw plate*					
Approval	N	Approval Standard							
Voltage/Frequency	See page 28								
Direction	reversible								
Cable	N	cable 150 mm (other on request)							

* not for UHM4/8

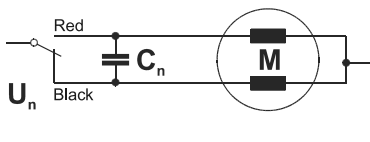
UHM

Technical Data

UHM1/5	Rated frequency	Hz	50			60	
	Speed n	rpm	250			300	
	Power output P_{mech}^*	W	2.2 (UHM 1); 2.5 (UHM 5)			2.1 (UHM 1)	
	Running torque M_n^*	cNm	8.5 (UHM 1); 9.5 (UHM 5)			6.6 (UHM 1)	
	Power consumption P_{el}^*	W	5			4.5	
	Detent torque M_S	cNm	1.3 (UHM1); 2.1 (UHM5)				
	Rotor inertia J_R	gcm ²	49 (UHM1); 56 (UHM5)				
Capacitors at Rated voltage U_N		V	12	24	48	110	230
Operation capacitor C_{50}	UHM1/5	$\mu F/VAC$	56/24	15/50	3.9/100	0.68/220	0.18/440
Operation capacitor C_{60}	UHM1/5	$\mu F/VAC$	39/24	10/50	2.7/100	0.47/220	0.12/440
UHM4/8	Rated frequency	Hz	50			60	
	Speed n	rpm	250			300	
	Power output P_{mech}^*	W	3.9 (UHM4); 3.9 (UHM8)			3.0 (UHM4)	
	Running torque M_n^*	cNm	15 (UHM4)			9.5 (UHM4); 14.7 (UHM8)	
	Power consumption P_{el}^*	W	10 (UHM4)			9.0 (UHM4)	
	Detent torque M_S	cNm	3.4 (UHM4); 5.3 (UHM8)				
	Rotor inertia J_R	gcm ²	135 (UHM4); 141 (UHM8)				
Capacitors at Rated voltage U_N		V	12	24	48	110	230
Operation capacitor C_{50}	UHM4/8	$\mu F/VAC$	100/24	27/50	6.8/100	1.2/220	0.33/440
Operation capacitor C_{60}	UHM4/8	$\mu F/VAC$	47/24	15/50	4.7/100	0.82/220	0.15/440
Tolerance of voltage		standard power supply system + 10% ... -10%					
Winding temperature T_{max}		130°C					
Duty cycle		100%					
Direction of rotation		reversible					

* at rated voltage

Circuit diagram Parallel circuit

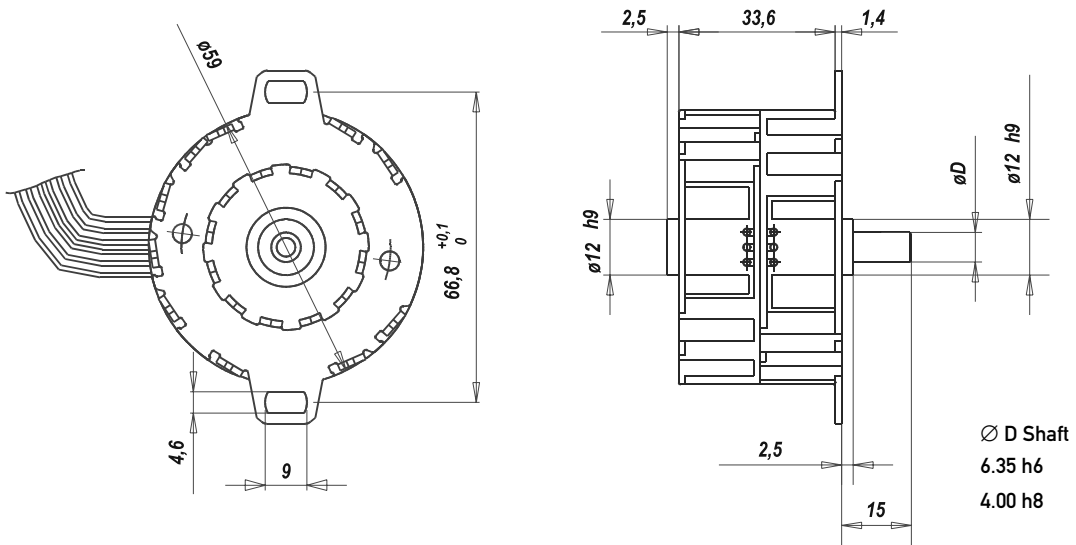


Red = clockwise rotations
Black = counter clockwise rotations

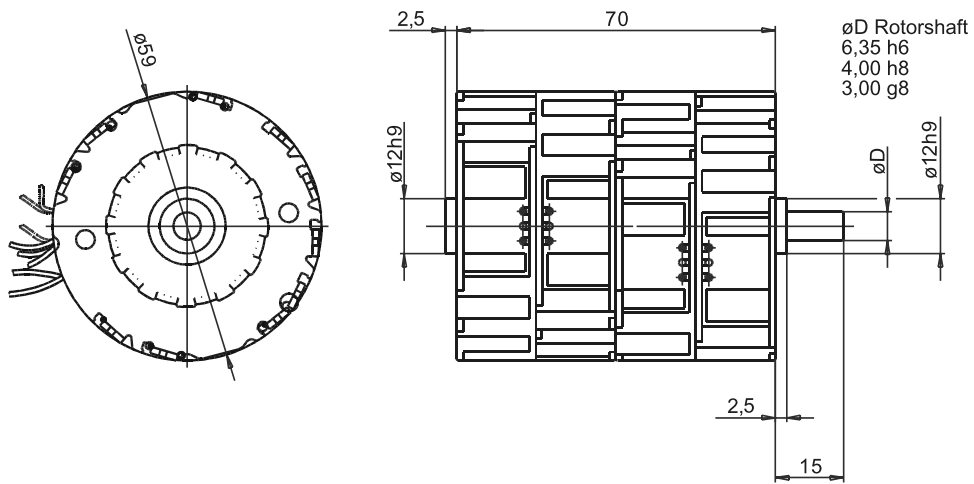
UHM

Dimensions

UHM1/5



UHM4/8



UBK

Synchronous Motors

Linear

UBK1

Dimensions (mm)	∅ 36 x 36
Travel (mm)	8; 13; 56 ± 0.7
Speed by (mm/s)	
50 Hz	6,67/8,33
60 Hz	8/10
Pole number	12
Voltage (V)	12 - 230
Max. Force (N)	20 (for special winding)
Lifetime	on request



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	F according to IEC 85
Approval	Standard
Mounting	any position
Electrical connection	jack connector
Protection	IP 40 according to DIN EN 60529
Weight	90 g
Rotor stalling	motor can be stopped when voltage is applied without being overheated, with controlled duty cycle
Bearings	ball bearing, for live time lubricated
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

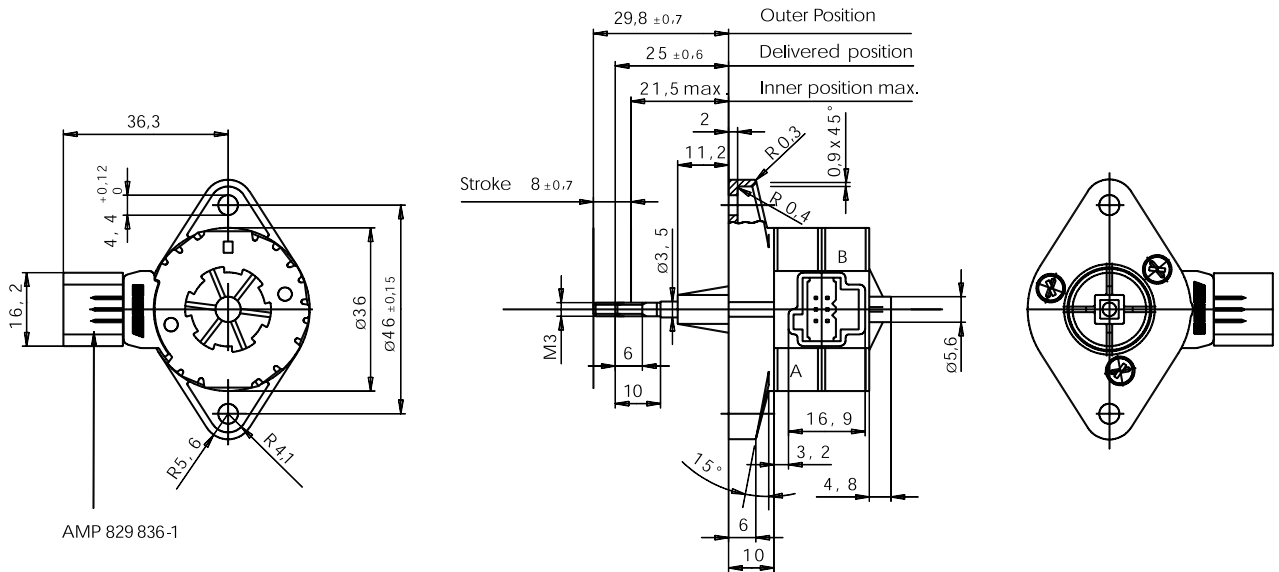
Type	Synchronous Motor	UBK1	N	12V/50Hz	B	1A
Approval	N Approval Standard					
Voltage/Frequency	See page 31					
Connector	6 pole connector (other on request)					
Shaft	1A Travel 8 mm ± 0.7 mm (other on request)					

UBK

Technical Data

Rated frequency	Hz	50	60	
Axial speed	mm/sec	6,67	8,0	
Tolerance of voltage		standard power supply system + 10% / - 10%		
Linear travel max.	mm	8; 13; 56 ± 0,7		
Axial play at 20 N force	mm	< 0,25		
Duty cycle		100%		
Winding temperature T _{max}	°C	155		
Capacitors	Rated voltage U _N	V	24	48
	Operation capacitor C ₅₀	µF/VAC	3,9/40	1,0/70
	Operation capacitor C ₆₀	µF/VAC	3,9/40	1,0/70

Dimensions





UAG

Stepper Motors

Rotational

UAG1/2



Dimensions (mm)	∅ 20 x 17.2
Step angle (grad)	18
Holding torque (cNm)	0.7 / 0.5
Detent torque (cNm)	0.14
Resistance per winding	
bipolar/unipolar 6 V (Ω)	27/35
12 V (Ω)	150/170
24 V (Ω)	675/700
Gear combination	on request

Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -40...+60
Ambient temperature storage	°C -40...+100
Thermal resistance at f=0 R _{therm}	32 K/W
Thermal class	B according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	insulation displacement connection, pins, cable
Protection	IP 40 according to DIN EN 60529
Weight	25 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating

Order Reference

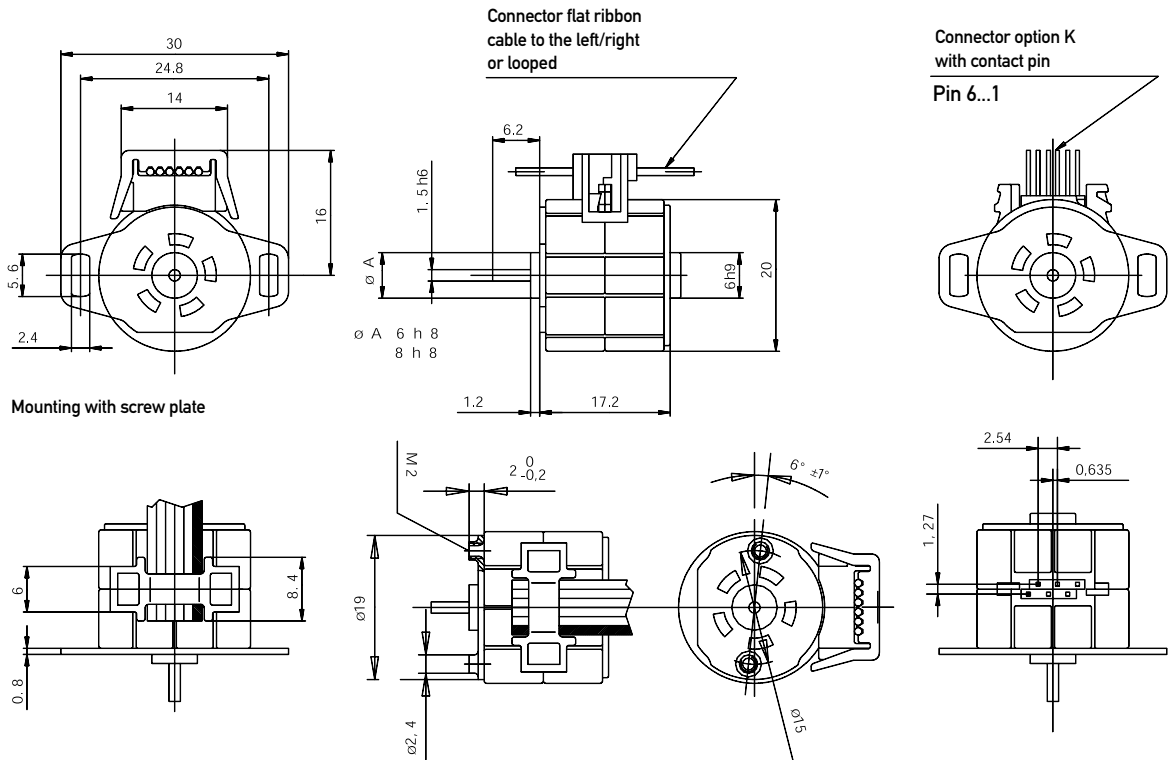
Type	Stepper Motor	UAG	1	0	N	27 Ω	R	E
Configuration	1 bipolar 2 unipolar							
Rotor shaft, mounting	0 centring 8 mm, mounting plate with screw M2 3 centring 8 mm, mounting plate with long holes A centring 6 mm, mounting plate with screw M2 E centring 6 mm, mounting plate with long holes							
Approval	N Approval Standard							
Resistance	See page 34 Resistance per winding for bipolar or unipolar.							
Direction	reversible							
Cable	E cable 150 mm with plug AMP MicroMatch 0-215083-6 (other on request)							

UAG

Technical Data

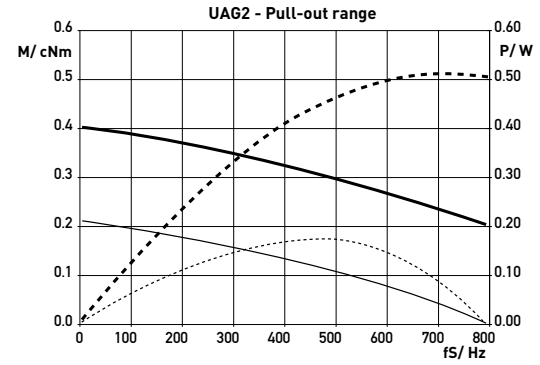
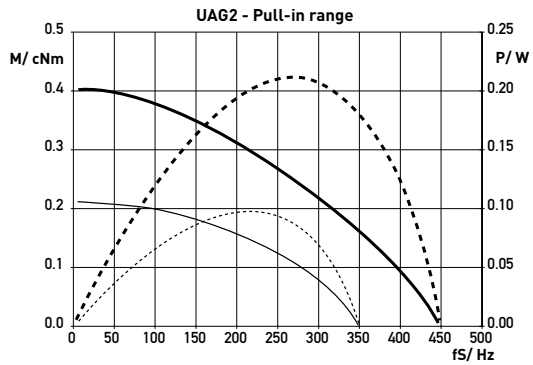
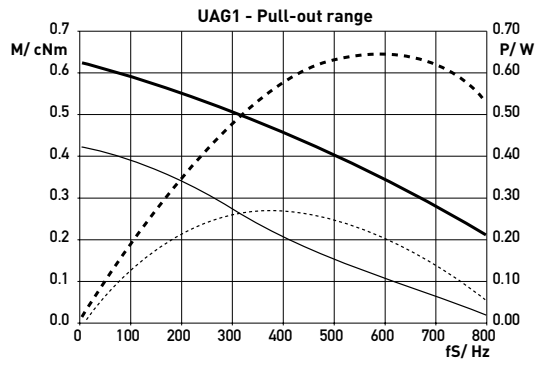
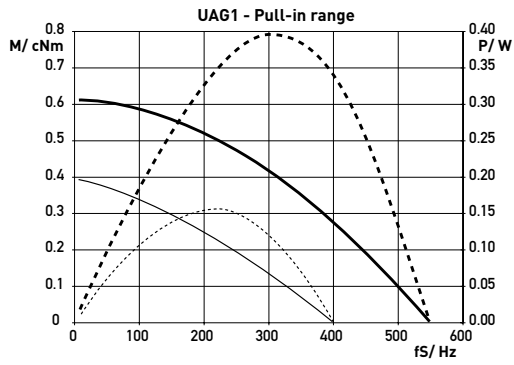
bipolar (UAG1)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	27	150	675
unipolar (UAG2)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	35	170	700
Steps per revolution			20		
Duty cycle			100%		
Winding temperature T_{max}			130° C		
Rotor inertia J_R			0.31 gcm ²		
Holding torque M_H			0.7 cNm (UAG1) 0.5 cNm (UAG2)		
Detent torque M_H			0.14 cNm		
Direction of rotation			reversible		

Dimensions



UAG

Performance Chart



— M - ED 100 %
 - - - M - ED 30 %

..... P - ED 100 %
 - - - P - ED 30 %

UBD

Stepper Motors

Rotational

UBD1/2/5/6

Dimensions (mm)	∅ 36 x 21
Step angle (grad)	7,5
Holding torque (cNm)	1,3 - 1,9
Detent torque (cNm)	0,22/0,27
Resistance perwinding	
bipolar/unipolar 6 V (Ω)	18,5 (UBD1/5); 28 (UBD2/6)
12 V (Ω)	100 (UBD1/5); 120 (UBD2/6)
24 V (Ω)	460 (UBD1/5); 500 (UBD2/6)
Gear combination	A, D, M, B, F, V



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	60 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

Type	Stepper Motor		UBD	1	0	N	18,5 Ω	R	E
Configuration	1 bipolar, standard magnet	5 bipolar, stronger magnet							
	2 unipolar, standard magnet	6 unipolar, stronger magnet							
Rotor shaft, mounting	0 centring 8 mm, shaft 2.0 mm, clip	A centring 10 mm, shaft 2.0 mm, clip							
	1 centring 8 mm, shaft 1.5 mm, clip	C centring 10 mm, shaft 1.5 mm, clip							
	3 centring 8 mm, shaft 2.0 mm, screw plate	E centring 10 mm, shaft 2.0 mm, screw plate							
	4 centring 8 mm, shaft 1.5 mm, screw plate	K centring 10 mm, shaft 1.5 mm, screw plate							
Approval	N Approval Standard								
	UL Approval UL								
	CSA Approval UL/CSA								
Resistance	See page 37 Resistance per winding for bipolar or unipolar.								
Direction	reversible								
Cable	E cable 150 mm (other on request)								

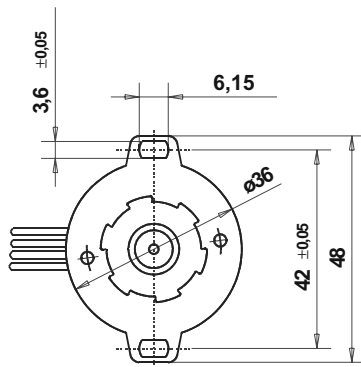
UBD

Technical Data

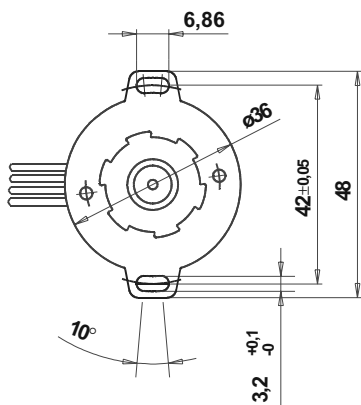
bipolar (UBD1/5)	Rated voltage U_N	V	3	6	12	24
	Resistance per winding	R_{20}	11,5	18,5	100	460
	Holding torque M_H	cNm	1.8 (UBD1); 1.9 (UBD5)			
	Detent torque M_S	cNm	0.22 (UBD1); 0.27 (UBD5)			
	Rotor inertia J_R	gcm^2	2.8 (UBD 1); 2.9 (UBD 5)			
unipolar (UBD2/6)	Rated voltage U_N	V	3	6	12	24
	Resistance per winding	R_{20}	12	28	120	500
	Holding torque M_H	cNm	1.3 (UBD2); 1.6 (UBD6)			
	Detent torque M_S	cNm	0.22 (UBD2); 0.27 (UBD6)			
	Rotor inertia J_R	gcm^2	2.8 (UBD2); 2.9 (UBD6)			
	Steps per revolution		48			
	Winding temperature T_{max}		105° C			
	Duty cycle		100%			
	Direction of rotation		reversible			

Dimensions

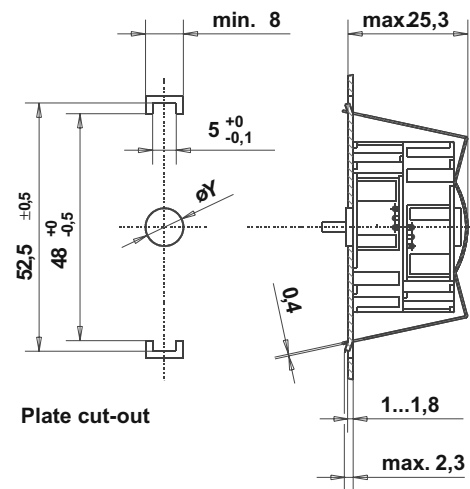
Mounting with screw plate



Mounting with screw plate



Mounting with snap on clip



øD Rotor shaft

ø 2 h6

ø 1.5 js8

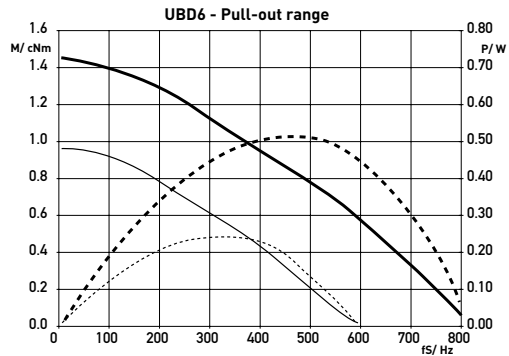
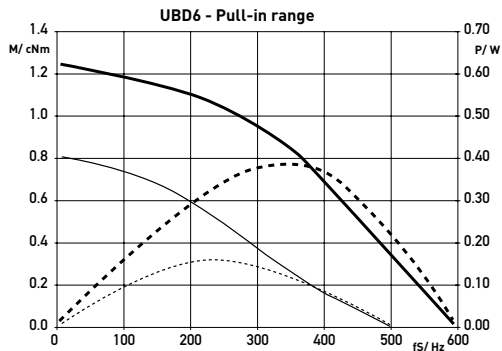
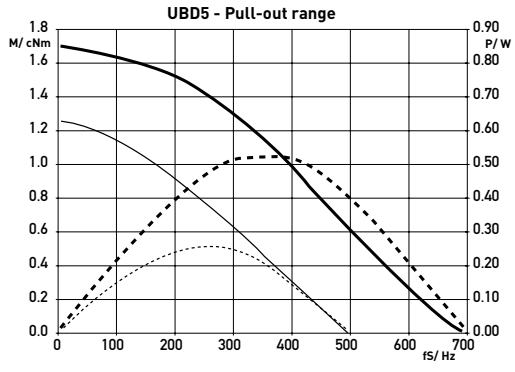
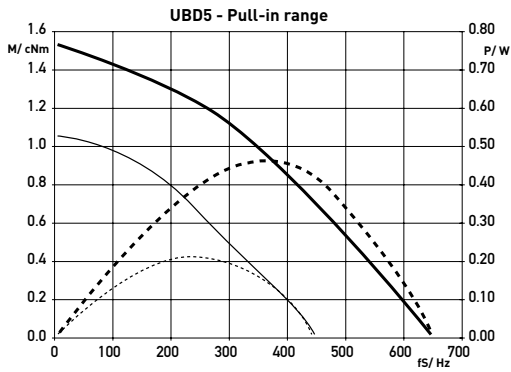
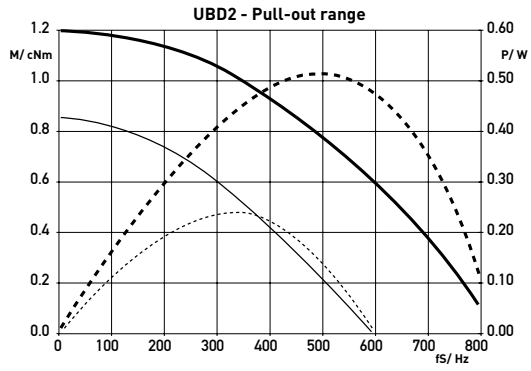
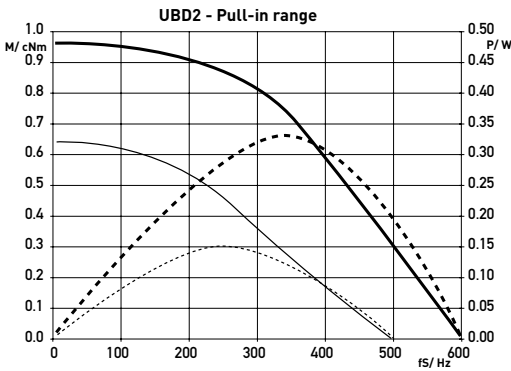
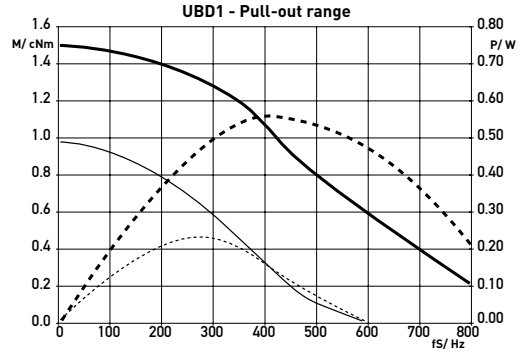
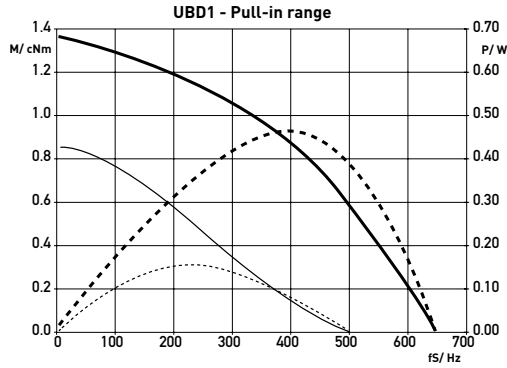
øZ øY

8 8F8

10 10F8

UBD

Performance Chart



— M - ED 100 %
 - - - M - ED 30 %

..... P - ED 100 %
 - . - . P - ED 30 %

UBB

Stepper Motors

Rotational

UBB1/2/5/6

Dimensions (mm)	∅ 36 x 21
Step angle (grad)	15
Holding torque (cNm)	1,0 - 1,9
Detent torque (cNm)	0,25 / 0,36
Resistance per winding	
6 V (Ω)	18,5 (UBB1/5); 28 (UBB2/6)
12 V (Ω)	100 (UBB1/5); 120 (UBB2/6)
24 V (Ω)	460 (UBB1/5); 500 (UBB2/6)
Gear combination	A, D, M, B, F, V



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	60 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

Type	Stepper Motor		UBB	1	0	N	18,5 Ω	R	E
Configuration	1 bipolar, standard magnet	5 bipolar, stronger magnet							
	2 unipolar, standard magnet	6 unipolar, stronger magnet							
Rotor shaft, mounting	0 centring 8 mm, shaft 2.0 mm, clip	A centring 10 mm, shaft 2.0 mm, clip							
	1 centring 8 mm, shaft 1.5 mm, clip	C centring 10 mm, shaft 1.5 mm, clip							
	3 centring 8 mm, shaft 2.0 mm, screw plate	E centring 10 mm, shaft 2.0 mm, screw plate							
	4 centring 8 mm, shaft 1.5 mm, screw plate	K centring 10 mm, shaft 1.5 mm, screw plate							
Approval	N Approval Standard								
	UL Approval UL								
	CSA Approval UL/CSA								
Resistance	See page 40 Resistance per winding for bipolar or unipolar.								
Direction	reversible								
Cable	E cable 150 mm (other on request)								

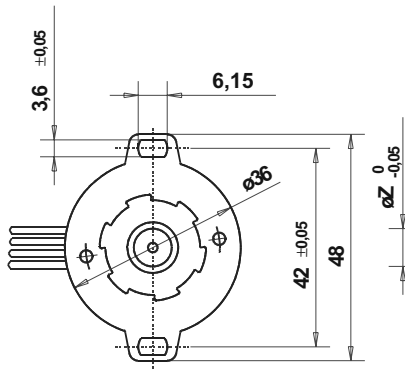
UBB

Technical Data

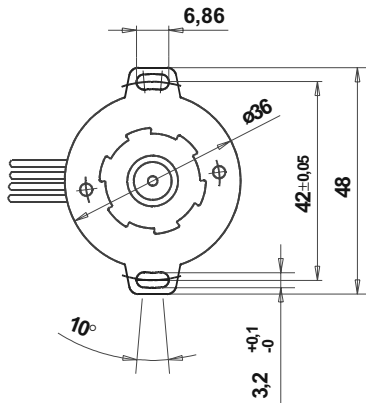
bipolar (UBB1/5)	Rated voltage U_N	V	3	6	12	24
	Resistance per winding	R_{20}	11,5	18,5	100	460
	Holding torque M_H	cNm	1.5 (UBB1); 1.9 (UBB5)			
	Detent torque M_S	cNm	0.25 (UBB1); 0.36 (UBB5)			
	Rotor inertia J_R	gcm^2	2.8 (UBB1); 2.9 (UBB5)			
unipolar (UBB2/6)	Rated voltage U_N	V	3	6	12	24
	Resistance per winding	R_{20}	12	28	120	500
	Holding torque M_H	cNm	1.0 (UBB2); 1.4 (UBB6)			
	Detent torque M_S	cNm	0.25 (UBB2); 0.36 (UBB6)			
	Rotor inertia J_R	gcm^2	2.8 (UBB2); 2.9 (UBB6)			
	Steps per revolution		24			
	Winding temperature T_{max}		105°C			
	Duty cycle		100%			
	Direction of rotation		reversible			

Dimensions

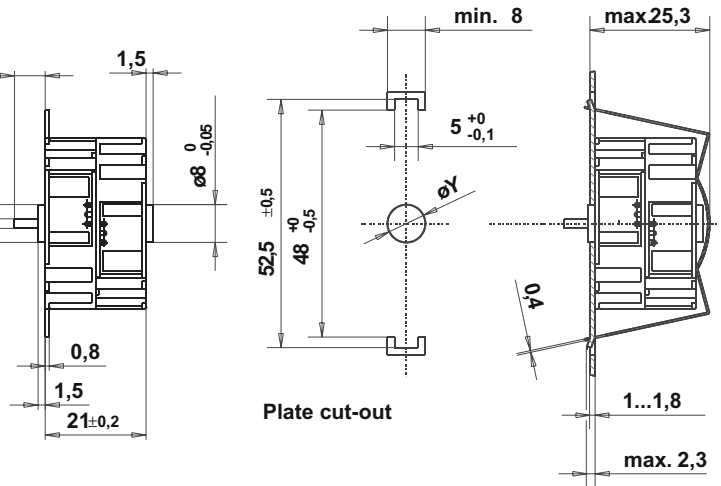
Mounting with screw plate



Mounting with screw plate



Mounting with snap on clip



∅D Rotor shaft

∅ 2 h6

∅ 1.5 js8

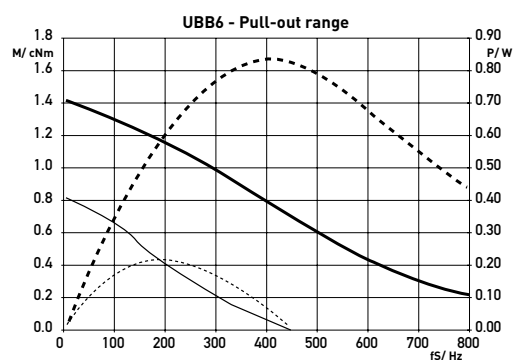
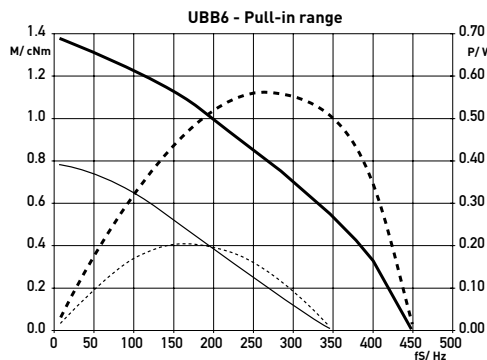
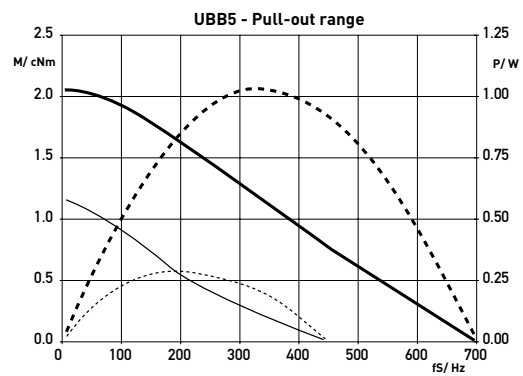
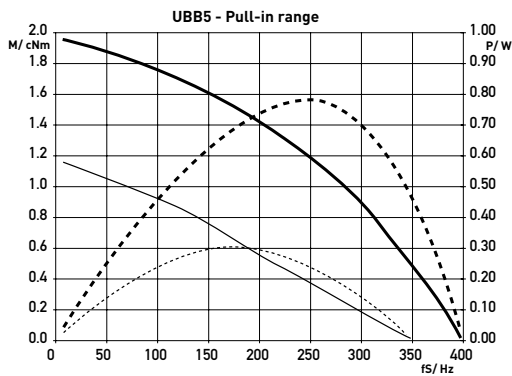
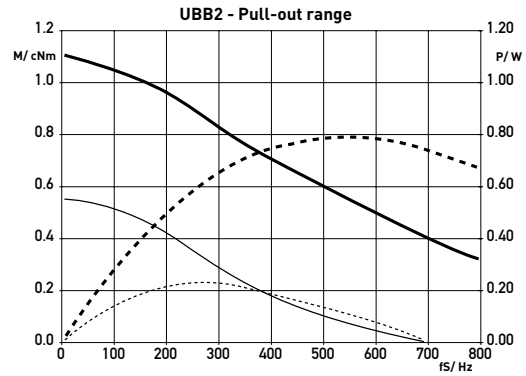
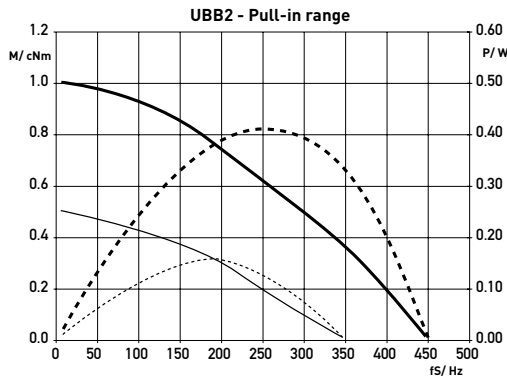
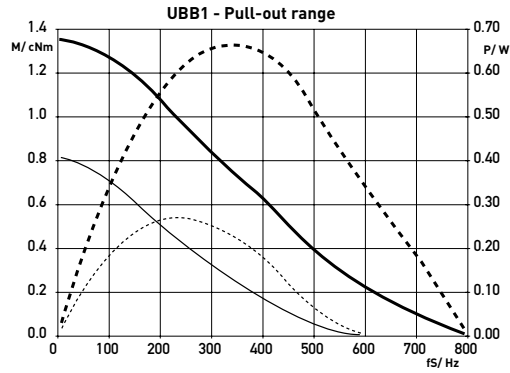
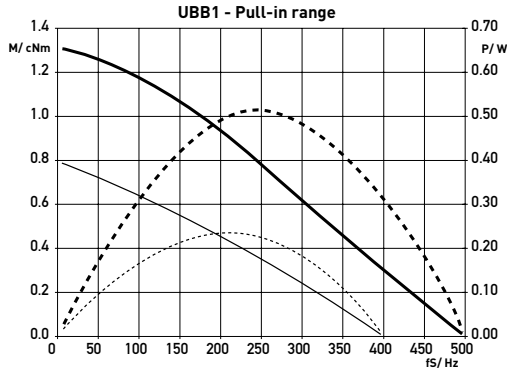
∅Z ∅Y

8 8F8

10 10F8

UBB

Performance Chart



— M - ED 100 %
 - - - M - ED 30 %

..... P - ED 100 %
 - . - . P - ED 30 %

UDB

Stepper Motors

Rotational

UDB1/2

Dimensions (mm)	∅ 48 x 24
Step angle (grad)	15
Holding torque (cNm)	2.7/2.2
Detent torque (cNm)	0,35
Resistance per winding	
6 V (Ω)	15 (UDB1); 19 (UDB2)
12 V (Ω)	78 (UDB1); 75 (UDB2)
24 V (Ω)	350 (UDB1); 300 (UDB2)
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	18 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	132 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

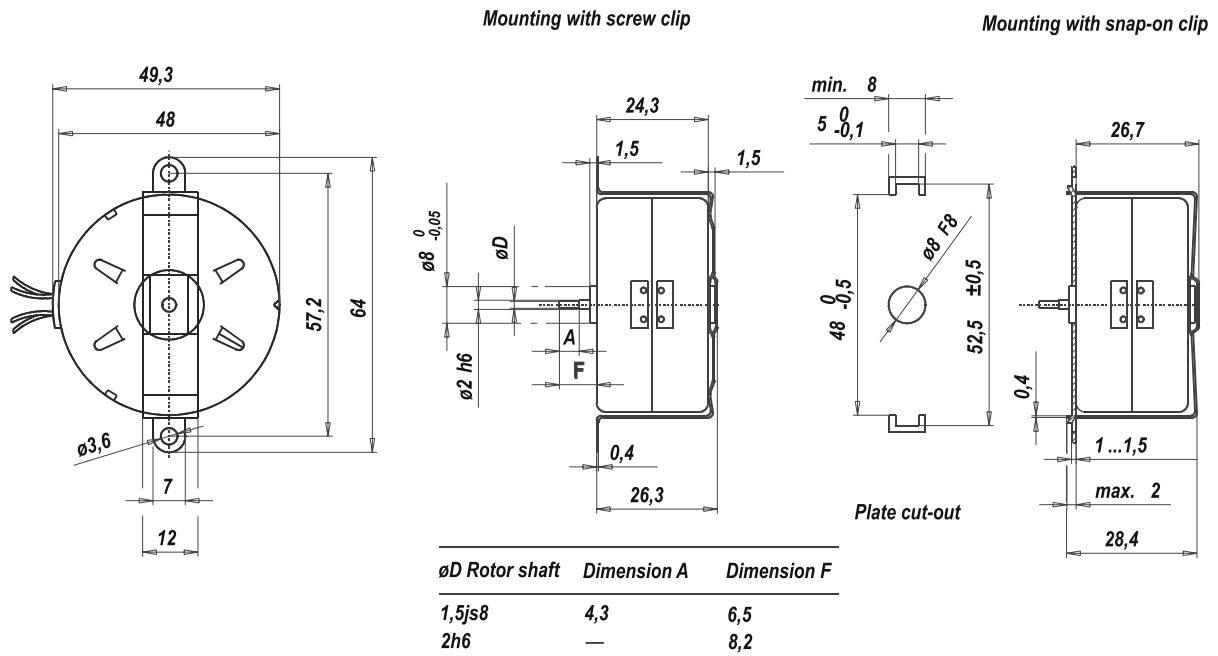
Type	Stepper Motor	UDB	1	0	N	78 Ω	R	N
Configuration	1 bipolar 2 unipolar							
Rotor shaft, mounting	0 centring 8 mm, shaft 1,5 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip							
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA							
Resistance	See page 43 Resistance per winding for bipolar or unipolar.							
Direction	reversible							
Cable	N cable 150 mm (other on request)							

UDB

Technical Data

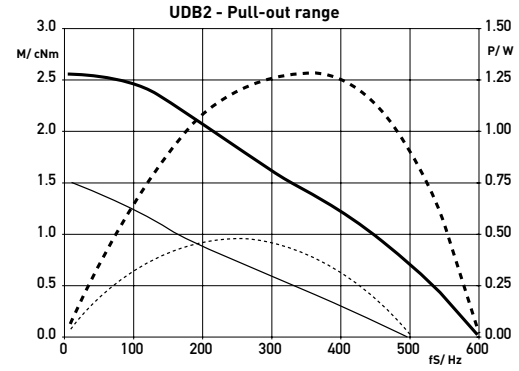
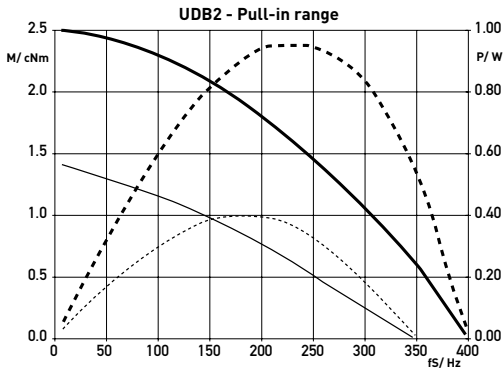
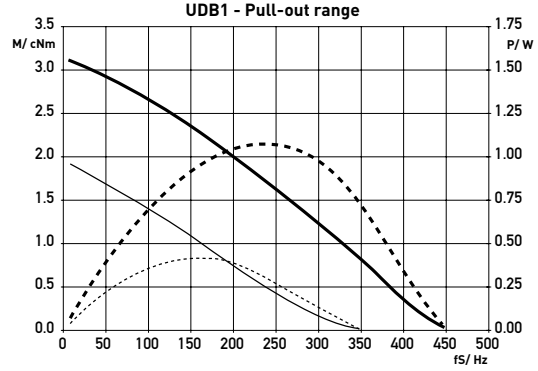
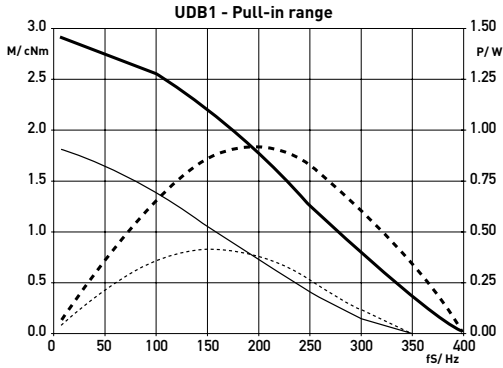
bipolar (UDB1)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	15	78	350
	Holding torque M_H	cNm	2.7		
	Detent torque M_S	cNm	0.35		
	Rotor inertia J_R	gcm^2	6.3		
unipolar (UDB2)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	19	75	300
	Holding torque M_H	cNm	2.2		
	Detent torque M_S	cNm	0.35		
	Rotor inertia J_R	gcm^2	6.3		
	Steps per revolution		24		
	Winding temperature T_{max}		105° C		
	Duty cycle		100%		
	Direction of rotation		reversible		

Dimensions



UDB

Performance Chart



— M - ED 100 %
 - - - M - ED 30 %

..... P - ED 100 %
 - . - . P - ED 30 %

UFD

Stepper Motors

Rotational

UFD1/2

Dimensions (mm)	∅ 52 x 28
Step angle (grad)	7,5
Holding torque (cNm)	6,4/4,6
Detent torque (cNm)	0,45
Resistance per winding	
6 V (Ω)	9,5 (UFD1); 15 (UFD2)
12 V (Ω)	52 (UFD1); 61 (UFD2)
24 V (Ω)	250 (UFD1); 251 (UFD2)
Gear combination	A, D, M, B, F, V, J



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	13 K/W
Thermal class	A according to IEC 85
Approval	standard/UL/CSA
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	180 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

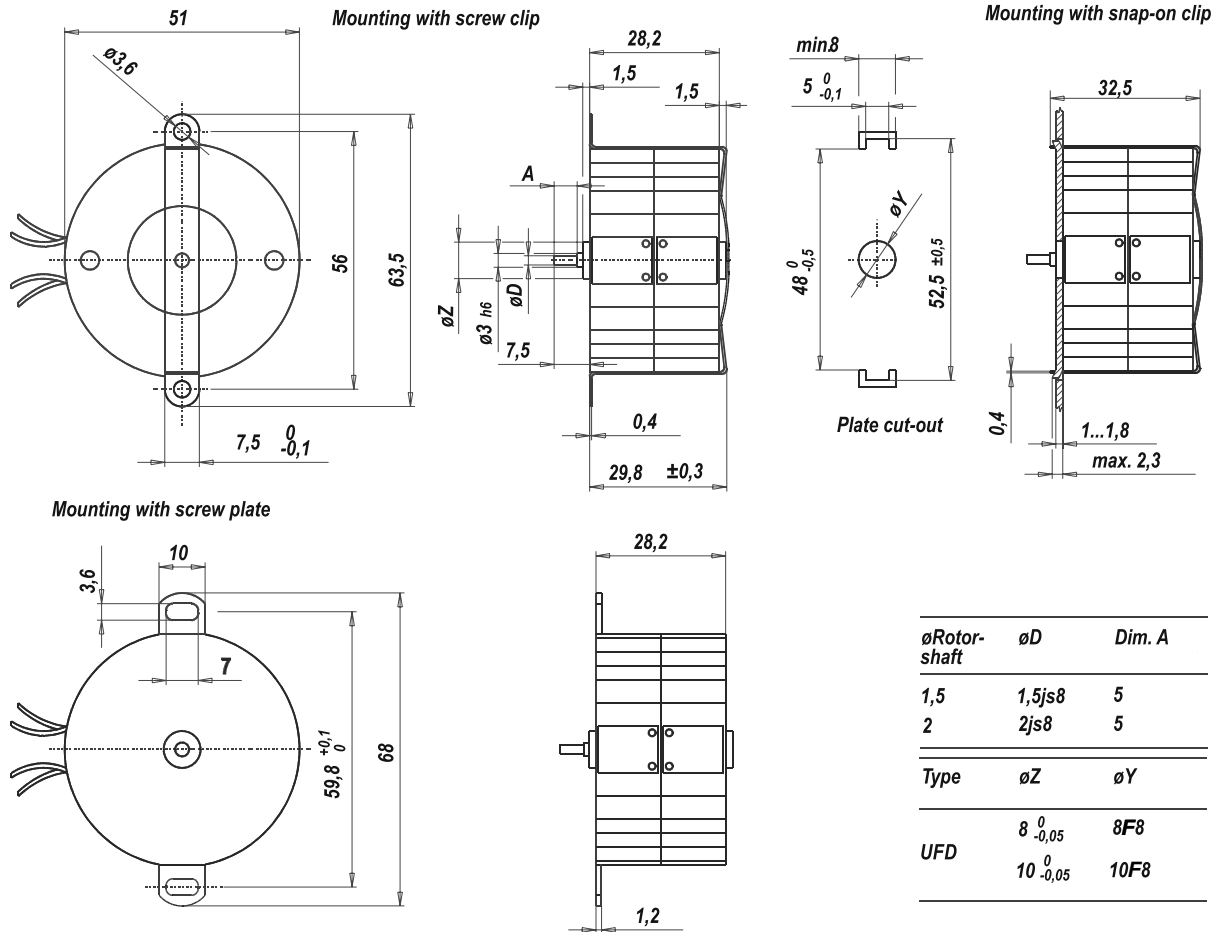
Type	Stepper Motor	UFD	1	0	N	52 Ω	R	N		
Configuration	1 bipolar, two coils 2 unipolar, two coils									
Rotor shaft, mounting	0 centring 8 mm, shaft 3,0 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip 2 centring 8 mm, shaft 1,5 mm, clip 3 centring 8 mm, shaft 3,0 mm, screw plate 4 centring 8 mm, shaft 2,0 mm, screw plate 5 centring 8 mm, shaft 1,5 mm, screw plate	E	centring 10 mm, shaft 3,0 mm, screw plate		K	centring 10 mm, shaft 2,0 mm, screw plate		M	centring 10 mm, shaft 1,5 mm, screw plate	
Approval	N Approval Standard UL Approval UL CSA Approval UL/CSA									
Resistance	See page 46 Resistance per winding for bipolar or unipolar.									
Direction	reversible									
Cable	E cable 150 mm (other on request)									

UFD

Technical Data

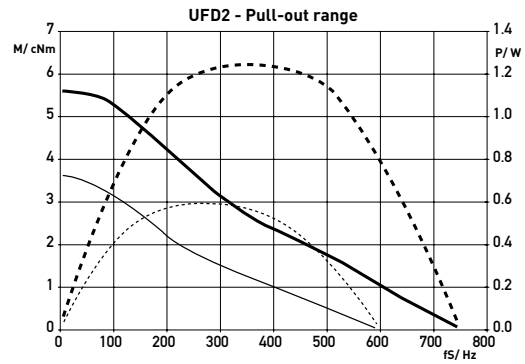
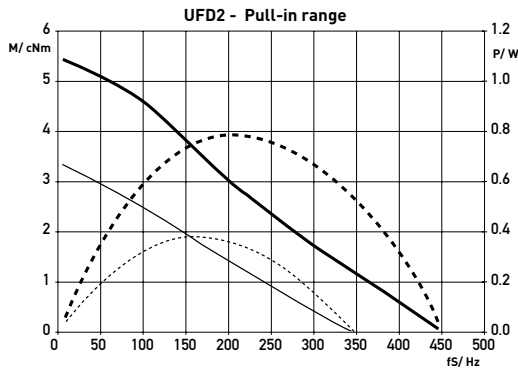
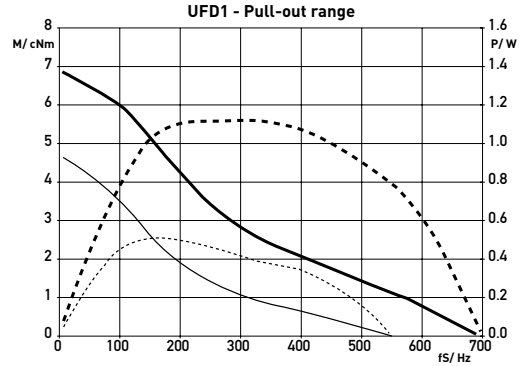
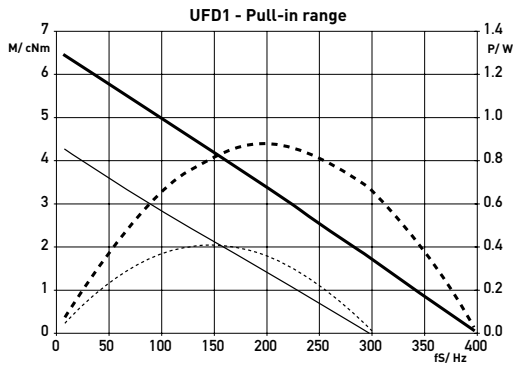
bipolar (UFD1)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	9,5	52	250
	Holding torque M_H	cNm	6,4		
	Detent torque M_S	cNm	0,45		
	Rotor inertia J_R	gcm^2	14,4		
unipolar (UFD2)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	15	61	251
	Holding torque M_H	cNm	4,6		
	Detent torque M_S	cNm	0,45		
	Rotor inertia J_R	gcm^2	14,4		
	Steps per revolution		48		
	Winding temperature T_{max}		105° C		
	Duty cycle		100%		
	Direction of rotation		reversible		

Dimensions



UFD

Performance Chart



— M - ED 100 %
 — M - ED 30 %

..... P - ED 100 %
 - - - - P - ED 30 %

UFB

Stepper Motors

Rotational

UFB1/2; UFB3/4



Dimensions (mm)	∅ 52 x 28 / 52 x 56
Step angle (grad)	15
Holding torque (cNm)	4,3–5,5 (UFB1/2); 7,6–10,4 (UFB3/4)
Detent torque (cNm)	0,46 (UFB1/2); 0,8 (UFB3/4)
Resistance per winding	
bipolar/unipolar 6 V (Ω)	9,5/15 (UFB1/2); 5/7,5 (UFB3/4)
12 V (Ω)	52/61 (UFB1/2); 25,5/30,5 (UFB3/4)
24 V (Ω)	250 (UFB1/2); 125 (UFB3/4)
Gear combination	A, D, M, B, F, V, J

Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+55
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	11 K/W (UFB1/2), 7 K/W (UFB3/4)
Thermal class	A according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	180 g (UFB1/2), 350 g (UFB3/4)
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

Type	Stepper Motor	UFB	1	0	N	52 Ω	R	N
Configuration	1 bipolar, two coils 2 unipolar, two coils	3 bipolar, four coils 4 unipolar, four coils						
Rotor shaft, mounting	0 centring 8 mm, shaft 3,0 mm, clip 1 centring 8 mm, shaft 2,0 mm, clip 2 centring 8 mm, shaft 1,5 mm, clip 3 centring 8 mm, shaft 3,0 mm, screw plate 4 centring 8 mm, shaft 2,0 mm, screw plate 5 centring 8 mm, shaft 1,5 mm, screw plate	A centring 12 mm, shaft 3,0 mm, clip E centring 10 mm, shaft 3,0 mm, screw plate K centring 10 mm, shaft 2,0 mm, screw plate M centring 10 mm, shaft 1,5 mm, screw plate						
Approval	N Approval Standard							
Resistance	See page 49 Resistance per winding for bipolar or unipolar.							
Direction	reversible							
Cable	N cable 150 mm (other on request)							

UFB

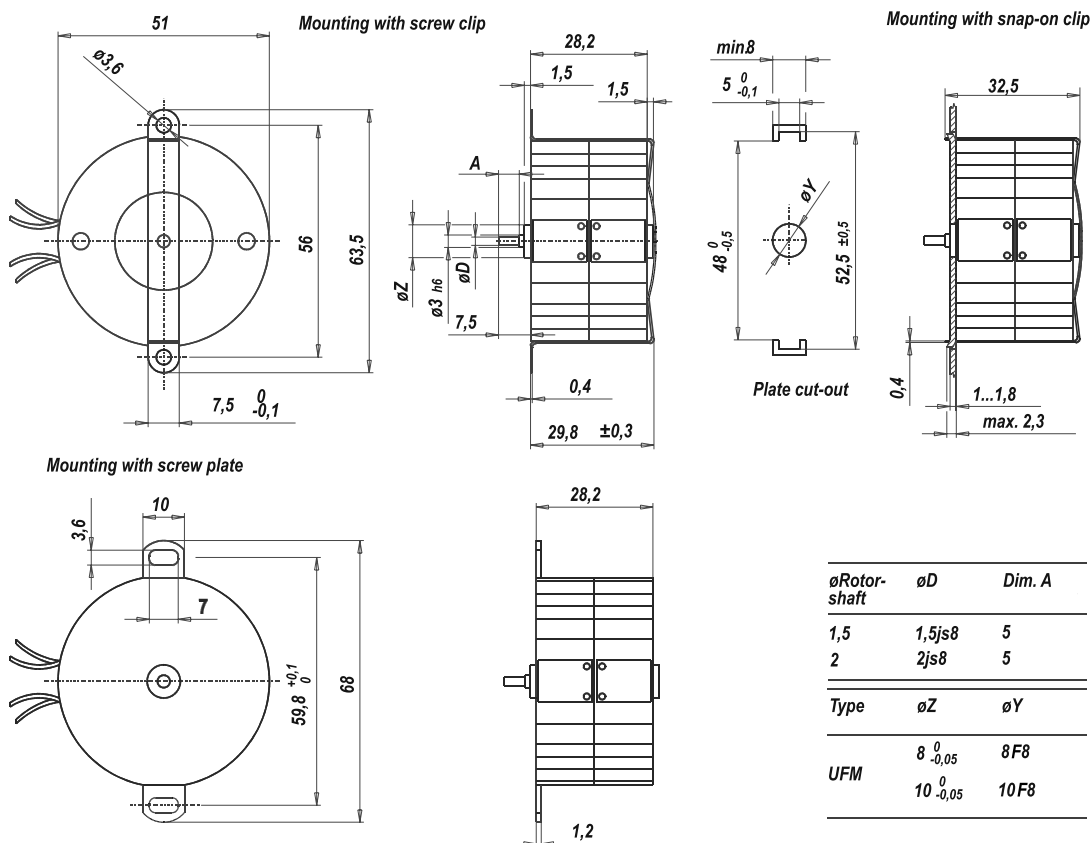
Technical Data

Bipolar (UFB1/3)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20} (UFB1)	Ω	9,5	52	250
	Resistance per winding R_{20} (UFB3)	Ω	5	25,5	125
	Holding torque M_H	cNm	5,5 (UFB1); 10,4 (UFB3)		
	Detent torque M_S	cNm	0,46 (UFB1); 0,8 (UFB3)		
	Rotor inertia J_R	gcm^2	14,2 (UFB1); 24,2 (UFB3)		
Unipolar (UFB2/4)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20} (UFB2)	Ω	15	61	251
	Resistance per winding R_{20} (UFB4)	Ω	7,5	30,5	125
	Holding torque M_H	cNm	4,3 (UFB2); 7,6 (UFB4)		
	Detent torque M_S	cNm	0,46 (UFB2); 0,8 (UFB4)		
	Rotor inertia J_R	gcm^2	14,2 (UFB2); 24,2 (UFB4)		
	Steps per revolution		24		
	Duty cycle		100%		
	Winding temperature T_{max}		105° C		
	Direction of rotation		reversible		

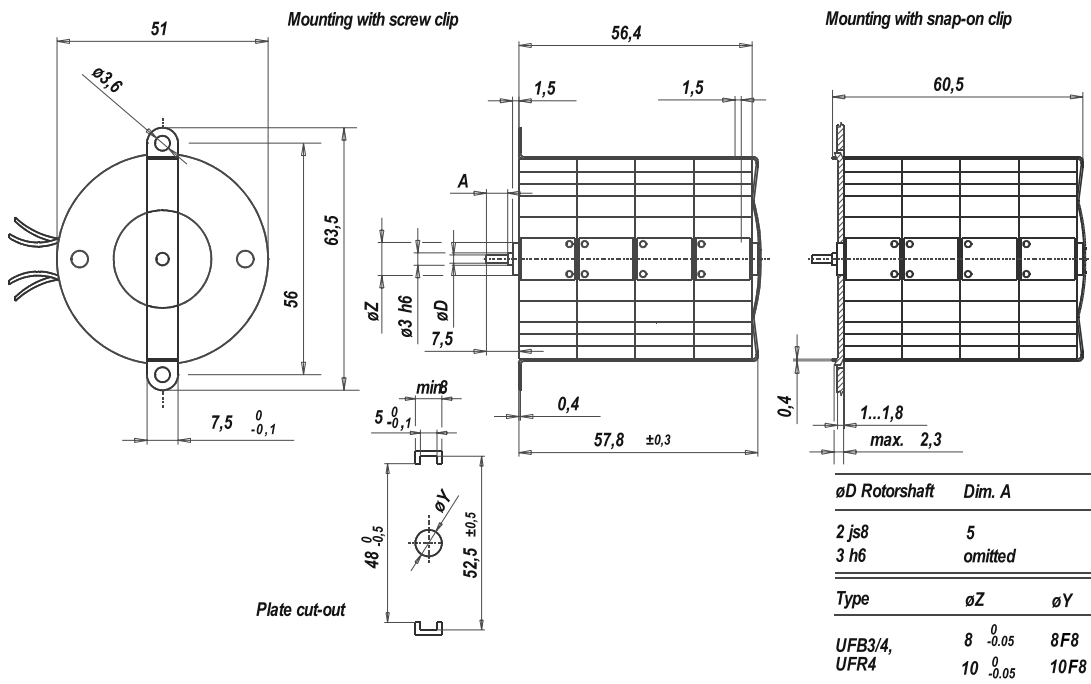
UFB

Dimensions

UFB1/2

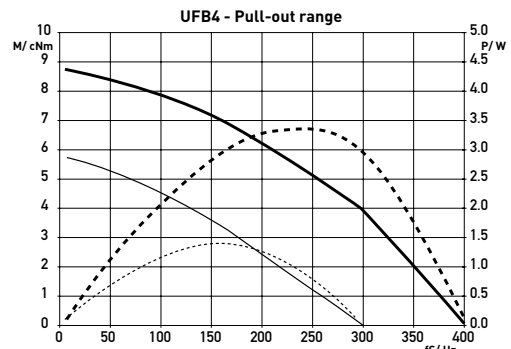
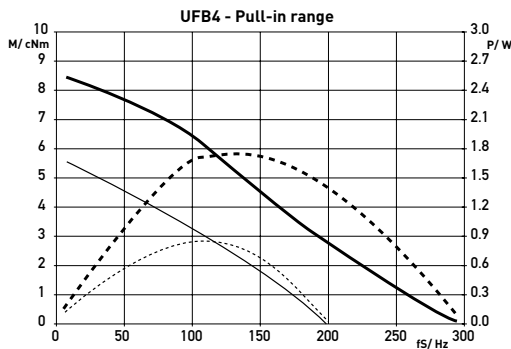
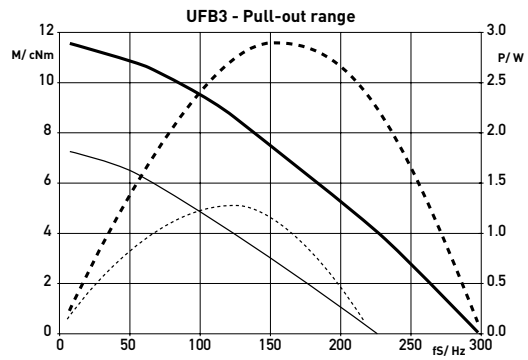
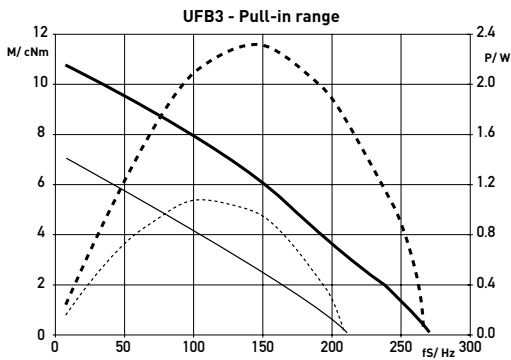
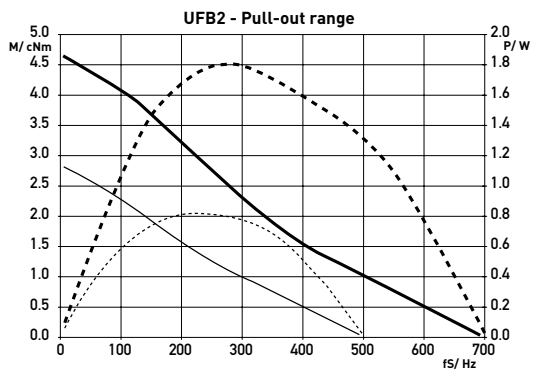
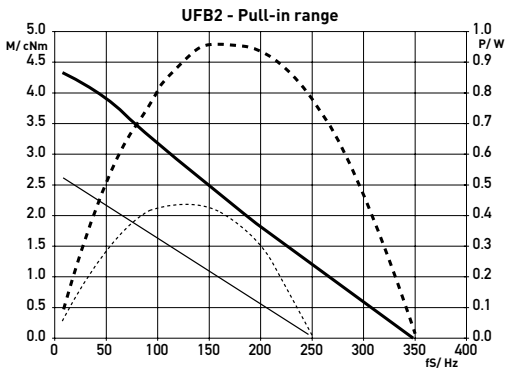
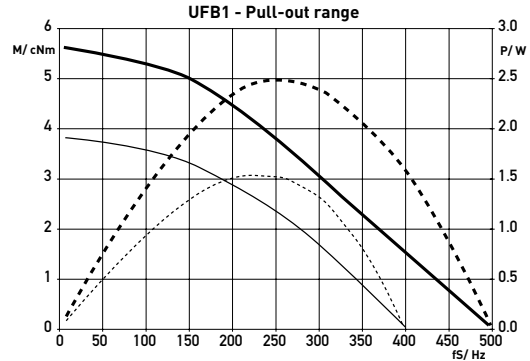
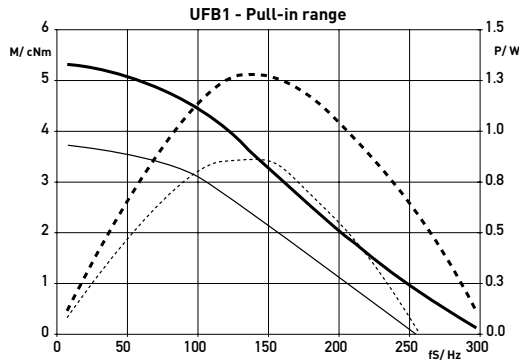


UFB3/4



UFB

Performance Chart



— M - ED 100 %
 — M - ED 30 %

..... P - ED 100 %
 - - - - - P - ED 30 %

UHD

Stepper Motors

Rotational

UHD1/2/5/6; UHD3/4/7/8

Dimensions (mm)	∅ 59 x 35 / ∅ 59 x 70
Step angle (grad)	7,5
Holding torque (cNm)	13–24 (UHD1/2/5/6); 27,5–45,5 (UHD3/4/7/8)
Detent torque (cNm)	1,3–2,1 (UHD1/2/5/6); 3,4–5,3 (UHD3/4/7/8)
Resistance per winding	
6 V (Ω)	6,8–10 (UHD1/2/5/6); 6,75 (UHD4/8)
12 V (Ω)	36–61 (UHD1/2/5/6); 20–28,5 (UHD3/4/7/8)
24 V (Ω)	168–251 (UHD1/2/5/6); 108–120 (UHD3/4/7/8)
46 V (Ω)	460 (UHD3/7)
Weight (g)	300 (UHD 1/2/5/6) 580 (UHD 3/4/7/8)
Gear combination	J



Standard Data

Climatic class	"wide-spread" according to DIN IEC 60721-2-1
Ambient temperature operation	-15 ... +55° C
Ambient temperature storage	-20 ... +100° C
Thermal resistance at f=0 (R _{therm})	9 K/W (UHD 1/2/5/6); 6,7 K/W (UHD 3/4/7/8)
Thermal class	B according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight (g)	300 (UHD 1/2/5/6), 580 (UHD 3/4/7/8)
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	sintered bronze, self-lubricating
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

Type	Stepper Motor		UHD	1	0	N	36 Ω	R	N	
Configuration	1	bipolar, two coils, standard magnet	3	bipolar, four coils, standard magnet						
	2	unipolar, two coils, standard magnet	4	unipolar, four coils, standard magnet						
	5	bipolar, two coils, stronger magnet	7	bipolar, four coils, stronger magnet						
	6	unipolar, two coils, stronger magnet	8	unipolar, four coils, stronger magnet						
	Rotor shaft, mounting	0	centring 12 mm, shaft 6,35 mm, clip	3	centring 12 mm, shaft 6,35 mm, screw plate*					
		1	centring 12 mm, shaft 4,0 mm, clip	4	centring 12 mm, shaft 4,0 mm, screw plate*					
2		centring 12 mm, shaft 3,0 mm, clip	5	centring 12 mm, shaft 3,0 mm, screw plate*						
Approval		N	Standard							
Resistance	See page 53/55 Resistance per winding for bipolar or unipolar.									
Direction	reversible									
Cable	N cable 150 mm (other on request)									

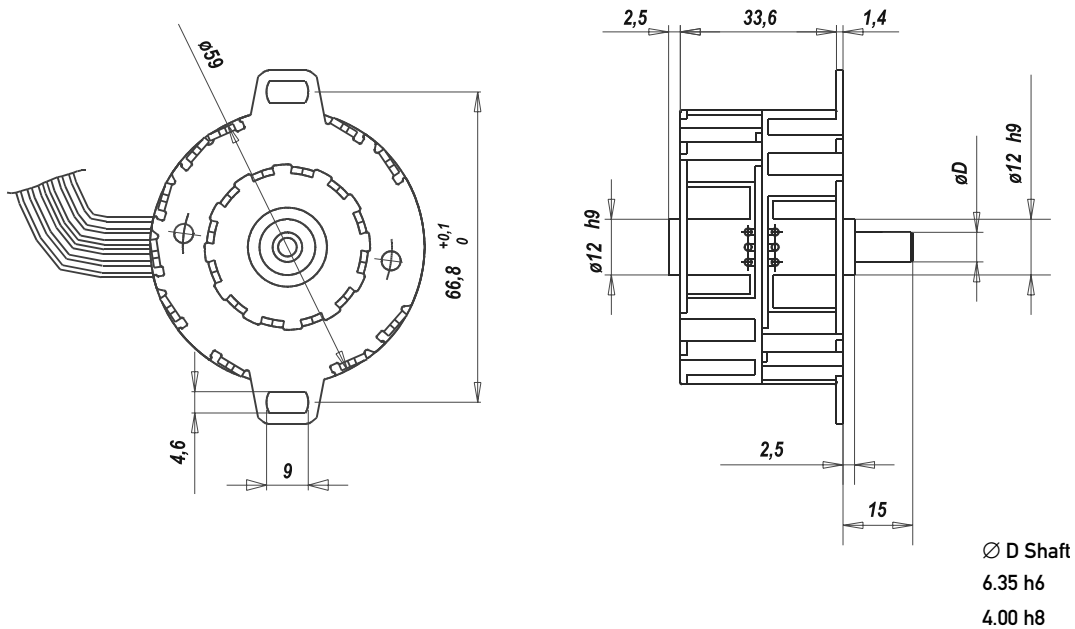
* not for UHD3/4/7/8)

UHD

Technical Data UHD1/2/5/6

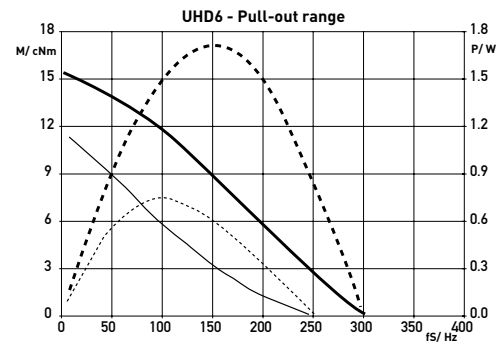
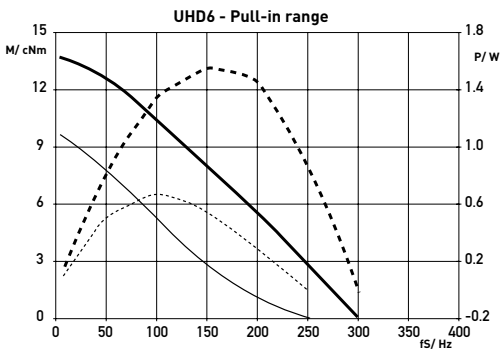
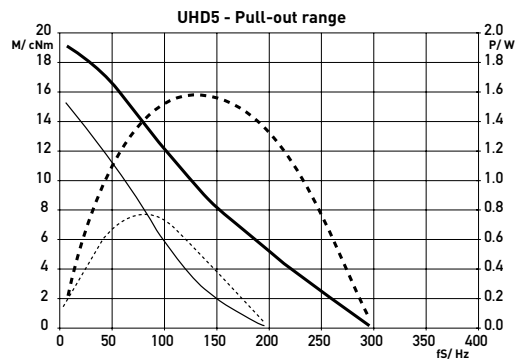
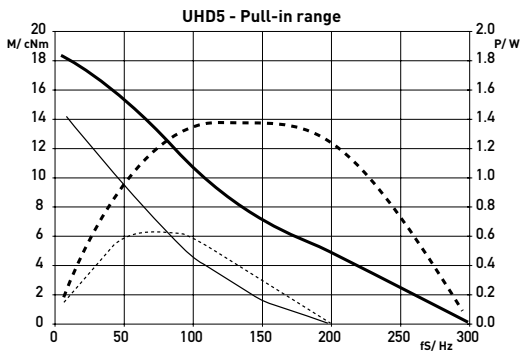
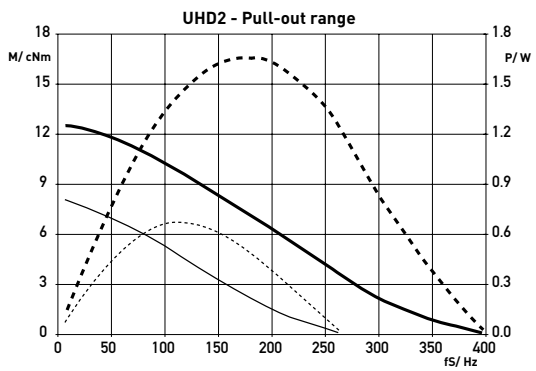
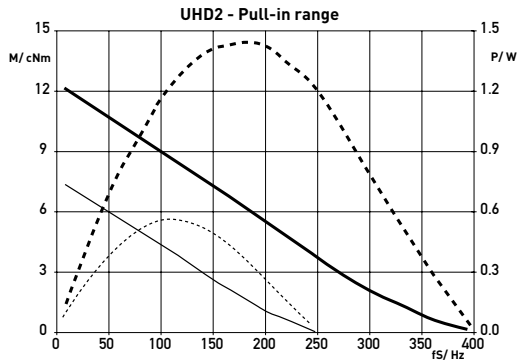
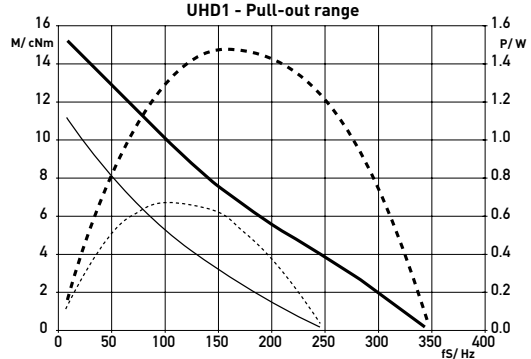
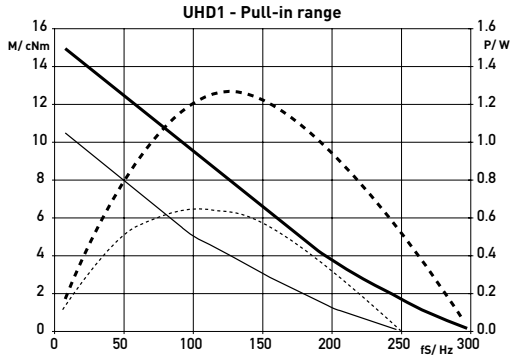
Bipolar (UHD1/5)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20}	Ω	6,8	36	168
	Holding torque	cNm	17,1 (UHD1); 24 (UHD5)		
	Detent torque M_S	cNm	1,3 (UHD1/2); 2,1 (UHD5/6)		
	Rotor inertia J_R	gcm^2	49 (UHD1/2); 56 (UHD5/6)		
Unipolar (UHD2/6)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20}	Ω	10	45	190
	Holding torque	cNm	13 (UHD2); 17,3 (UHD6)		
	Detent torque M_S	cNm	1,3 (UHD1/2); 2,1 (UHD5/6)		
	Rotor inertia J_R	gcm^2	49 (UHD1/2); 56 (UHD5/6)		
	Steps per revolution		48		
	Duty cycle		100%		
	Winding temperature T_{max}		130° C		
	Direction of rotation		reversible		

Dimensions



UHD

Performance Chart



— M - ED 100 %
 — M - ED 30 %

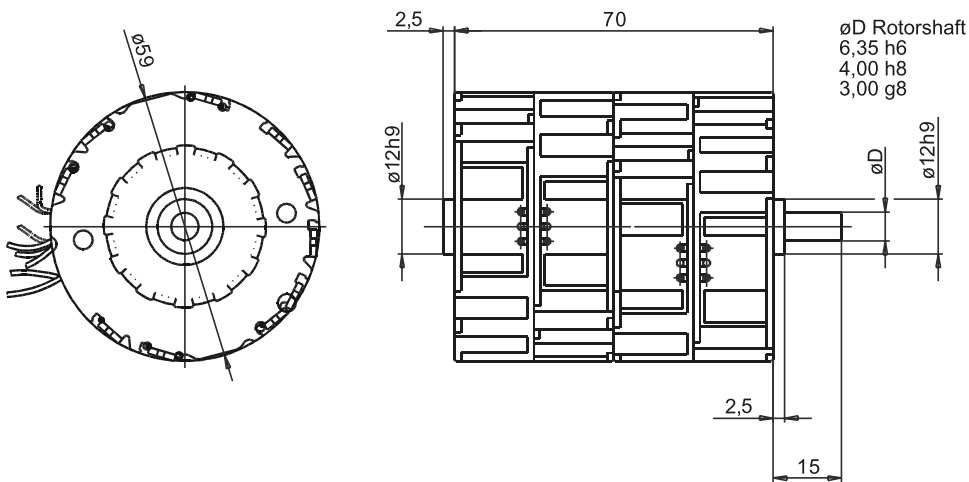
..... P - ED 100 %
 - - - - - P - ED 30 %

UHD

Technical Data UHD3/4/7/8

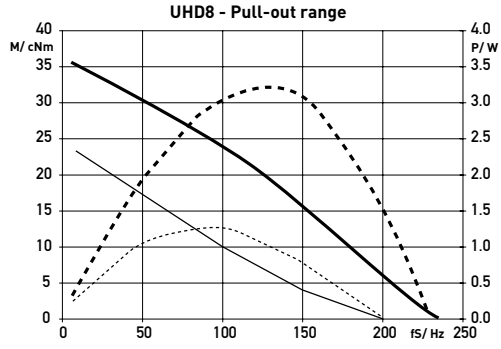
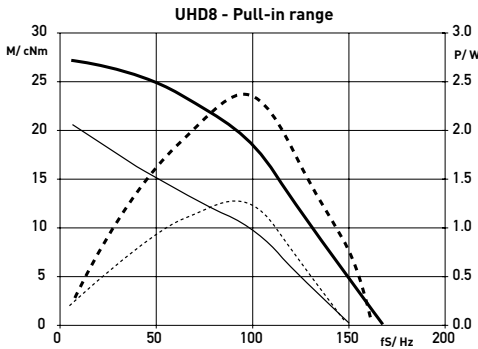
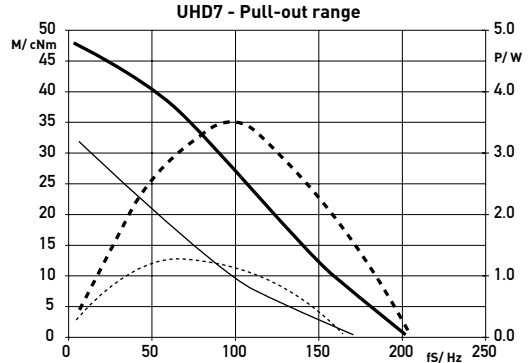
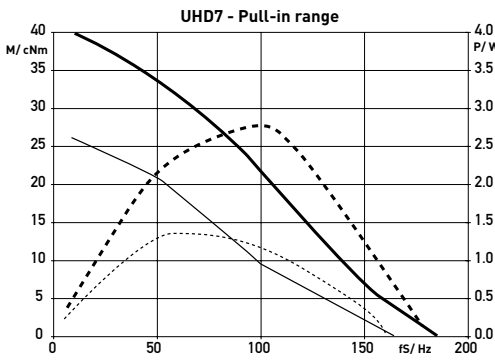
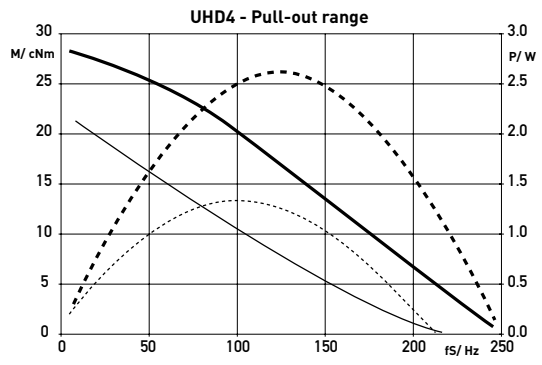
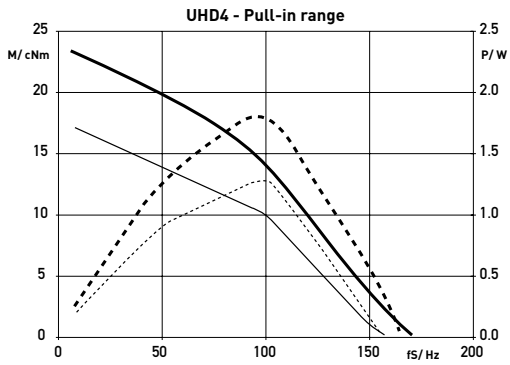
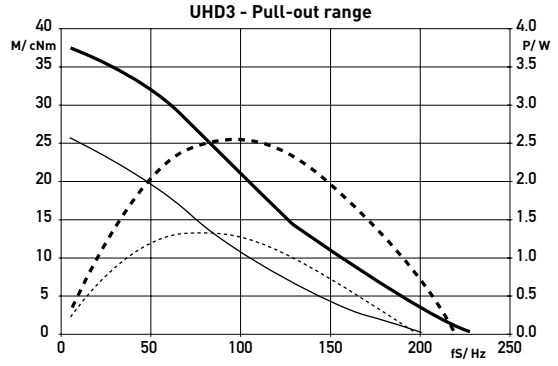
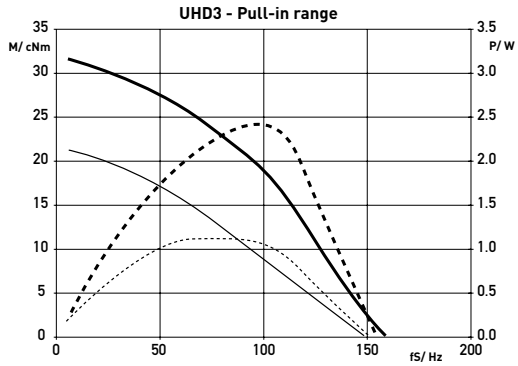
Bipolar (UHD3/7)	Rated voltage U_N	V	12	24	48
	Resistance per winding R_{20}	Ω	20	108	460
	Holding torque	cNm	37,5 (UHD3); 45,5 (UHD7)		
	Detent torque M_S	cNm	3,4 (UHD3/4); 5,3 (UHD7/8)		
	Rotor inertia J_R	gcm^2	135 (UHD3/4); 141 (UHD7/8)		
Unipolar (UHD4/8)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20}	Ω	6,75	28,5	120
	Holding torque	cNm	27,5 (UHD4); 33,5 (UHD8)		
	Detent torque M_S	cNm	3,4 (UHD3/4); 5,3 (UHD7/8)		
	Rotor inertia J_R	gcm^2	135 (UHD3/4); 141 (UHD7/8)		
Steps per revolution			48		
Duty cycle			100%		
Winding temperature T_{max}			130° C		
Direction of rotation			reversible		

Dimensions



UHD

Performance Chart



— M - ED 100 %
 — M - ED 30 %

..... P - ED 100 %
 - - - - - P - ED 30 %

UBL

Stepper Motors

Linear

UBL1/2

Dimensions (mm)	∅ 36 x 36
Travel (mm)	8; 13; 56 ± 0.7
Travel per step (mm)	0.033/0.041
Speed by 200 Hz (mm/s)	6.67/8.33
Resistance per winding	
bipolar/unipolar 6 V (Ω)	18.5/28
12 V (Ω)	100/120
24 V (Ω)	460/500
Max. Force (N)	35 (for special winding, lower lifetime)
Lifetime	on request



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	27 K/W
Thermal class	F according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	jack connector
Protection	IP 40 according to DIN EN 60529
Weight	90 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	ball bearing, for live lubricated
Electric strength	according to EN 60 034-1/EN 60335-1

Order Reference

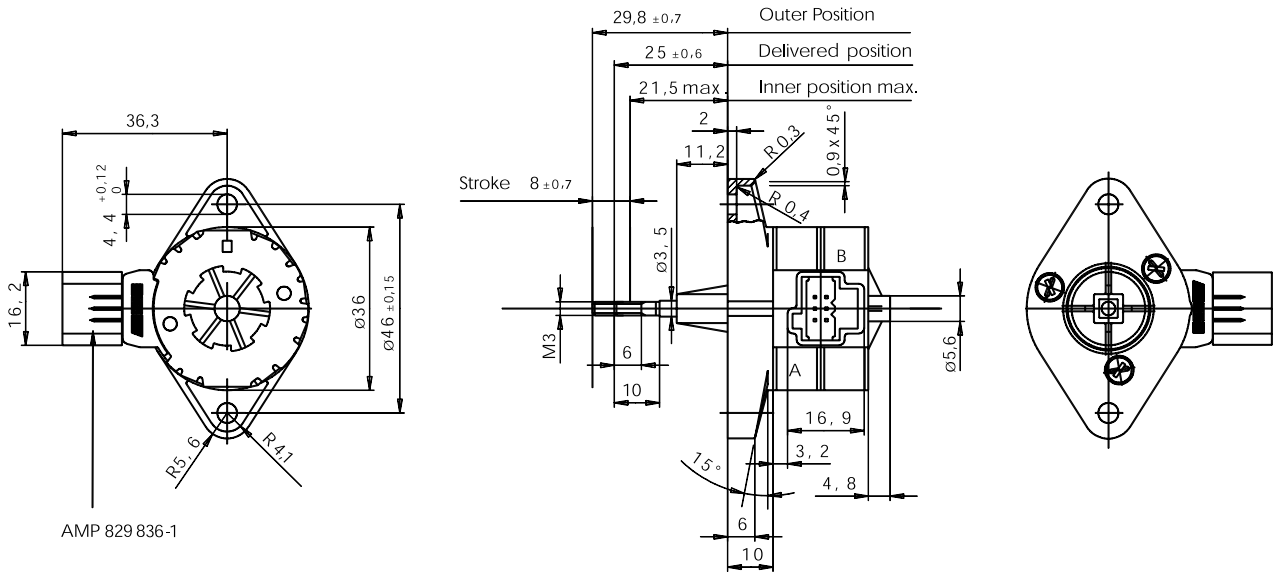
Type	Stepper Motor	UBL	13	N	100 Ω	B	1A
Configuration	13 bipolar 23 unipolar						
Approval	N Approval Standard						
Resistance	See page 58 Resistance per winding for bipolar or unipolar.						
Connection	Jack connector 6 pin (other on request)						
Shaft	1A Travel 8 mm ± 0.7 mm (other on request)						

UBL

Technical Data

bipolar (UBL1)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	18,5	100	460
unipolar (UBL2)	Rated voltage U_N	V	6	12	24
	Resistance per winding	R_{20}	28	120	500
Steps per revolution			24		
Steps per mm			30/24		
Winding temperature T_{max}			155° C		
Duty cycle			100%		
Linear travel max.			8; 13; 56 ± 0,7		
Axial play at 20 N force			< 0,25 mm		
Axial force at 200 Hz F_A			10 N		

Dimensions



UKE

Stepper Motors

Linear

UKE1/2

Dimensions (mm)	∅ 57 x 45
Travel (mm)	13, 30
Travel per step (mm)	0,03125
Speed by 200 Hz (mm/s)	6,25
Resistance per winding	
bipolar/unipolar 6 V (Ω)	6,9/10
12 V (Ω)	36/44
24 V (Ω)	170/187
Max. Force (N)	on request



Standard Data

Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15...+60
Ambient temperature storage	°C -20...+100
Thermal resistance at f=0 R _{therm}	K/W
Thermal class	A according to IEC 85
Approval	standard
Mounting	any position
Electrical connection	cable
Protection	IP 40 according to DIN EN 60529
Weight	325 g
Rotor stalling	motor can be stopped when voltage is applied, without being overheated
Bearings	ball bearing, for live lubricated

Order Reference

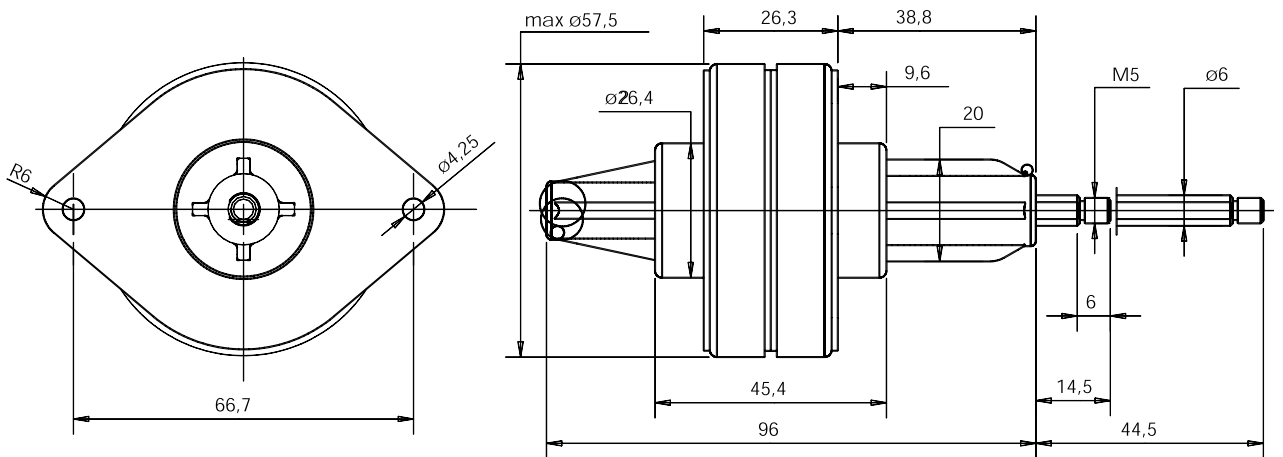
Type	Stepper Motor	UKE	13	N	36 Ω	N	1A
Configuration	13 bipolar 23 unipolar						
Approval	N Approval Standard						
Resistance	See page 60 Resistance per winding for bipolar or unipolar.						
Connection	N cable 150 mm other on request						
Shaft	1A Travel 30 mm (other on request)						

UKE

Technical Data

bipolar (UKE1)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20}		6,9	36	170
unipolar (UKE2)	Rated voltage U_N	V	6	12	24
	Resistance per winding R_{20}		10	44	187
Steps per revolution			48		
Steps per mm			32		
Winding temperature T_{max}			105° C		
Duty cycle			100%		
Linear travel max.			13, 30 mm		
Axial play at 20 N force			< 0,25 mm		

Dimensions UKE13N...1A (travel 30 mm)



SAMOTRONIC 101

Electronics for Stepper Motors

Driver Board

SAMOTRONIC 101

Driver	for unipolar motors
Dimensions (mm)	55 x 40
Supply voltage (VDC)	10-24
Motor current	constant voltage drive
Step mode	full/half step
Clock source	internal or external
Control inputs to	<ul style="list-style-type: none"> ■ inhibit internal clock ■ inhibit motor current ■ change direction of rotations
Configuration	via DIP-switch



Preferred Range

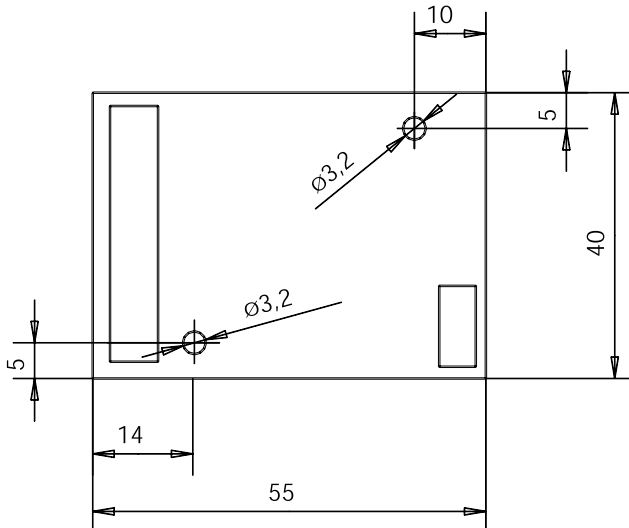
Ordering Reference

4 636 6608 0 If motors are also to be ordered please state: "with MTA-100 receptacles for use with SAMOTRONIC101".

Technical Data

Supply voltage	10-24 VDC
Phase current	≤ 350 mA
Control signal level	LS-TTL (0-5V) for all control inputs
Internal clock	50-300 Hz
External clock	up to 2 kHz
Dimensions	55 x 40 mm
Operating temperature	-15 to +50 °C
Storage temperature	-20 to +80 °C

Dimensions



SAMOTRONIC 102

Electronics for Stepper Motors

Driver Board with microcontroller for customised control features

SAMOTRONIC 102

Driver	for bipolar motors
Dimensions (mm)	∅ 84 x 54
Supply voltage (VDC)	<ul style="list-style-type: none"> ■ standard version 10–24 ■ enhanced version 10–42
Motor current	<ul style="list-style-type: none"> ■ constant current drive (chopper controlled) ■ adjustable via potentiometer
Step mode	full/half step
Clock source	internal or external
Control inputs to	<ul style="list-style-type: none"> ■ inhibit internal clock ■ inhibit motor current ■ change direction of rotations
Configuration	via DIP-switch
Test pins	<ul style="list-style-type: none"> ■ motor current ■ step frequency



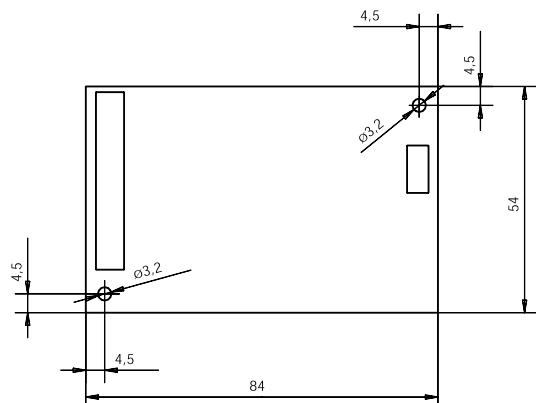
Preferred Range

Ordering Reference	
4 636 6733 0	10-24VDC supply voltage (standard version)
4 636 6733 3	10-42VDC supply voltage (enhanced version)
If motors are also to be ordered please state: "with MTA-100 receptacles for use with SAMOTRONIC102".	

Technical Data

Supply voltage	10-24 (42)VDC
Phase current	71-500 mA, on request max. 735mA/ph
Chopper frequency	typ. 20kHz
Control signal level	LS-TTL (0-5V) for all control inputs
Internal clock	50-1325 Hz
External clock	up to 2 kHz
Dimensions	84 x 54 mm
Operating temperature	-20 to +60 °C
Storage temperature	-20 to +80 °C

Dimensions





UGA

Gearboxes

UGA

Dimensions (mm)	55 x 62
Maximum torque(cNm)	32
Ratios	4 1/6 ... 360.000
Internal slipping clutch	optional
Standard shaft (mm)	∅ 4 x 10
Weight (g)	55
Motor combination	Series UB and UD; Series UF without UFR3/4 and UFB3/4



Standard Data

Mounting	any position
Axial thrust F _A	20 N
Lateral force F _r	60 N
Slipping clutches/free wheel	single-way clockwise/counter clockwise function and two way
Slipping-/free wheel torque	0.5 ... 32 cNm
Output shafts	∅ 4 x 10, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	-15 ... +55° C
Ambient temperature storage	-40 ... +80° C

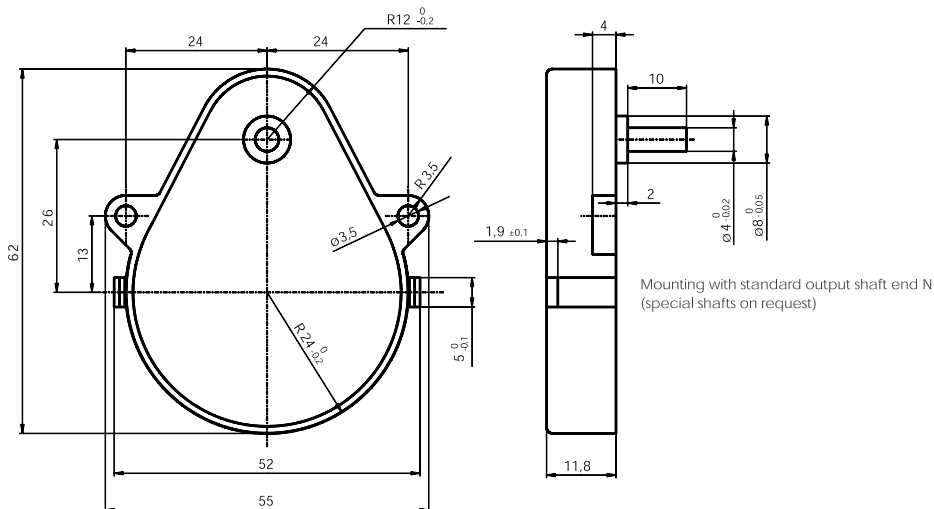
Ratios	4 1/6	5	8 1/3	10	12 1/2	15	16 2/3	20 5/6	25	30	31 1/4	33 1/3	37 1/5
	41 2/3	45	50	60	62 1/2	75	83 1/3	100	112 1/2	120	125	135	140 5/6
	150	166 2/3	187 1/2	200	250	277 7/9	300	375	416 2/3	450	500	600	625
	750	900	937 1/2	1000	1125	1200	1250	1500	1800	1875	2250	2500	3000
	3600	3750	4500	5000	5400	7200	7500	9000	11250	12000	12500	15000	18000
	18750	22500	27000	300000	36000	375000	450000	54000	60000	72000	75000	90000	108000
	112500	120000	135000	150000	180000	216000	240000	360000					

Order Reference

Type	Gearbox	UGA	100	N	5cNm	N
Ratio	100					
Slipping clutch	N Without slipping clutch ER One-way slipping clutch, clockwise EL One-way slipping clutch, counter clockwise Z Two-way slipping clutch					
Slipping torque	5 cNm					
Shaft end	N ∅ 4 x 10, other on request					

UGA

Dimensions

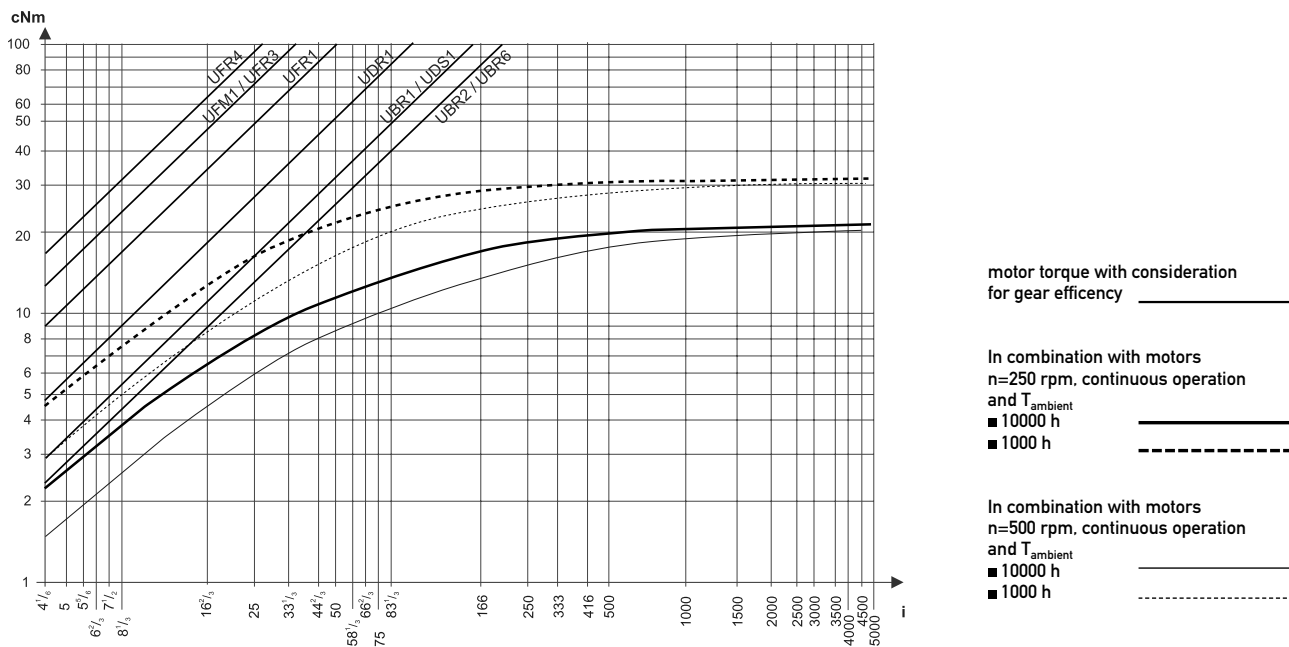


Mounting with standard output shaft end N
(special shafts on request)

Slipping clutches

	max. torque available at output shaft (cNm)	free wheel- / clutch torque (cNm)
Roller-type free wheel	32	0.5 ... 1
Single-way slipping clutches	32	2 ... 32 (counter clockwise or clockwise direction possible)
Two-way slipping clutches	1,5 ... 10	2 ... 36

Torque / ratio / life graph



UGD

Gearboxes

UGD

Dimensions (mm)	55 x 65,6
Max. torque (cNm)	32
Ratios	4 1/6 ... 6.048.000
Internal slipping clutch	optional
Standard shaft (mm)	∅ 4 x 10
Weight (g)	35
Motor combination	Series UB and UD; Series UF without UFR3/4 and UFB3/4



Standard Data

Mounting	any position
Axial thrust F _A	10 N
Lateral force F _R	50 N
Slipping clutches/free wheel	single-way clockwise/counter clockwise function and two way
Slipping-/free wheel torque	1 ... 32 cNm
Output shafts	∅ 4 x 10, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +55
Ambient temperature storage	°C -40 ... +80

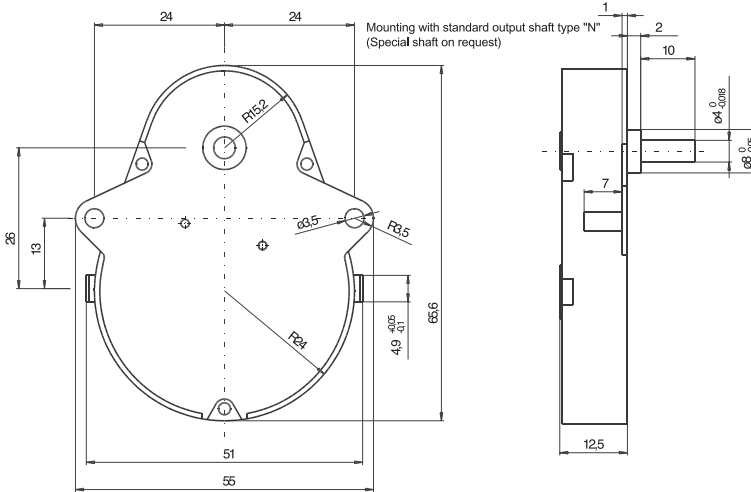
Ratios	4 1/6	5	8 1/3	10	12 1/2	15	16 2/3	20 5/6	25	30	33 1/3	40		
	41 2/3	45	50	60	62 1/2	83 1/3	100	120	125	150	166 2/3	200	250	
	300	375	500	600	625	750	900	1000	1200	1500	1800	2000	2400	
	2500	3000	3600	3750	4500	5000	6000	7500	9000	10000	12000	15000	18000	
	21600	22500	30000	36000	45000	54000	60000	72000	90000	108000	112500	120000	180000	
	216000	225000	270000	300000	360000	432000	450000	720000	864000	1800000	5040000	6048000		

Order Reference

Type	Gearbox	UGD	100	N	5cNm	N
Ratio	100					
Slipping clutch	N Without slipping clutch ER One-way slipping clutch, clockwise EL One-way slipping clutch, counter clockwise Z Two-way slipping clutch					
Slipping torque	5 cNm					
Shaft end	N ∅ 4 x 10, other on request					

UGD

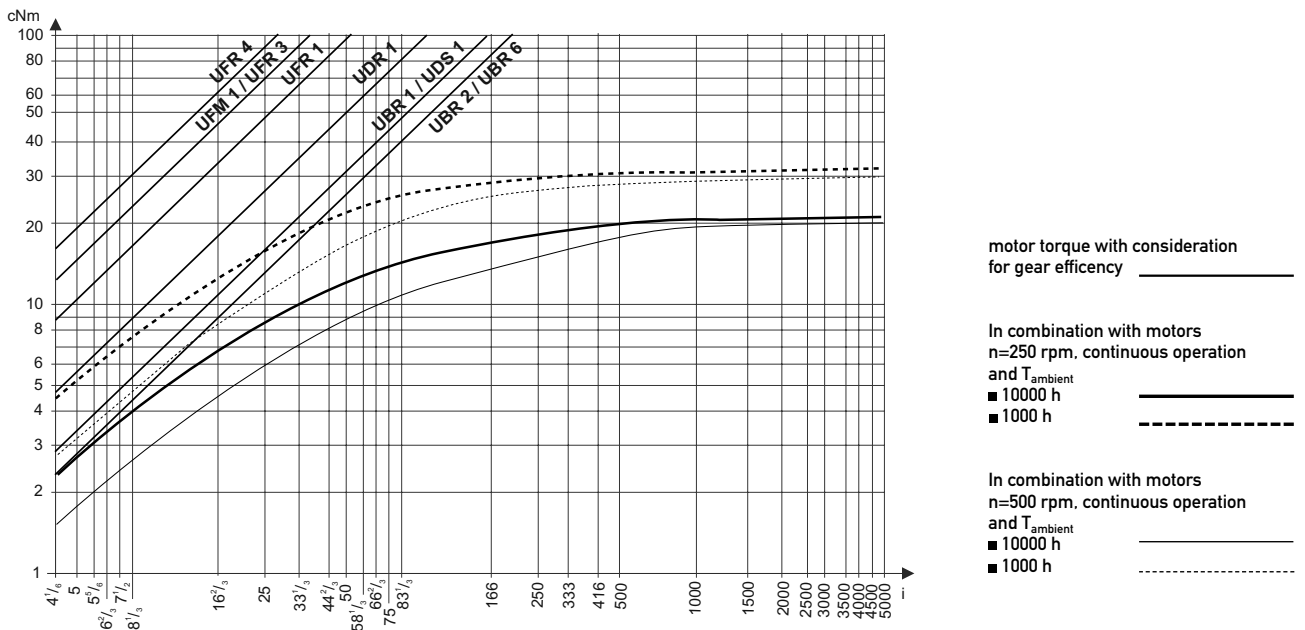
Dimensions



Slipping clutches

	max. torque available at output shaft (cNm)	free wheel-/clutch torque (cNm)
Roller-type free wheel	32	1
Single-way slipping clutches	32	4 ... 25 counter clockwise or clockwise function
Two-way slipping clutches	3 ... 15	2 ... 32

Torque / ratio / life graph



UGM

Gearboxes

UGM

Dimensions (mm)	51 x 65,2
Max. torque (cNm)	100
Ratios	12,5 ... 4800
Internal slipping clutch	none
Standard shaft (mm)	∅ 4 x 10
Weight (g)	45
Motor Combination	Series UB and UD; Series UF without UFR3/4 and UFB3/4



Standard Data

Mounting	any position
Axial thrust F_A	20 N
Lateral force F_R	100 N
Output shafts	∅ 4 x 10, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +60
Ambient temperature storage	°C -40 ... +80

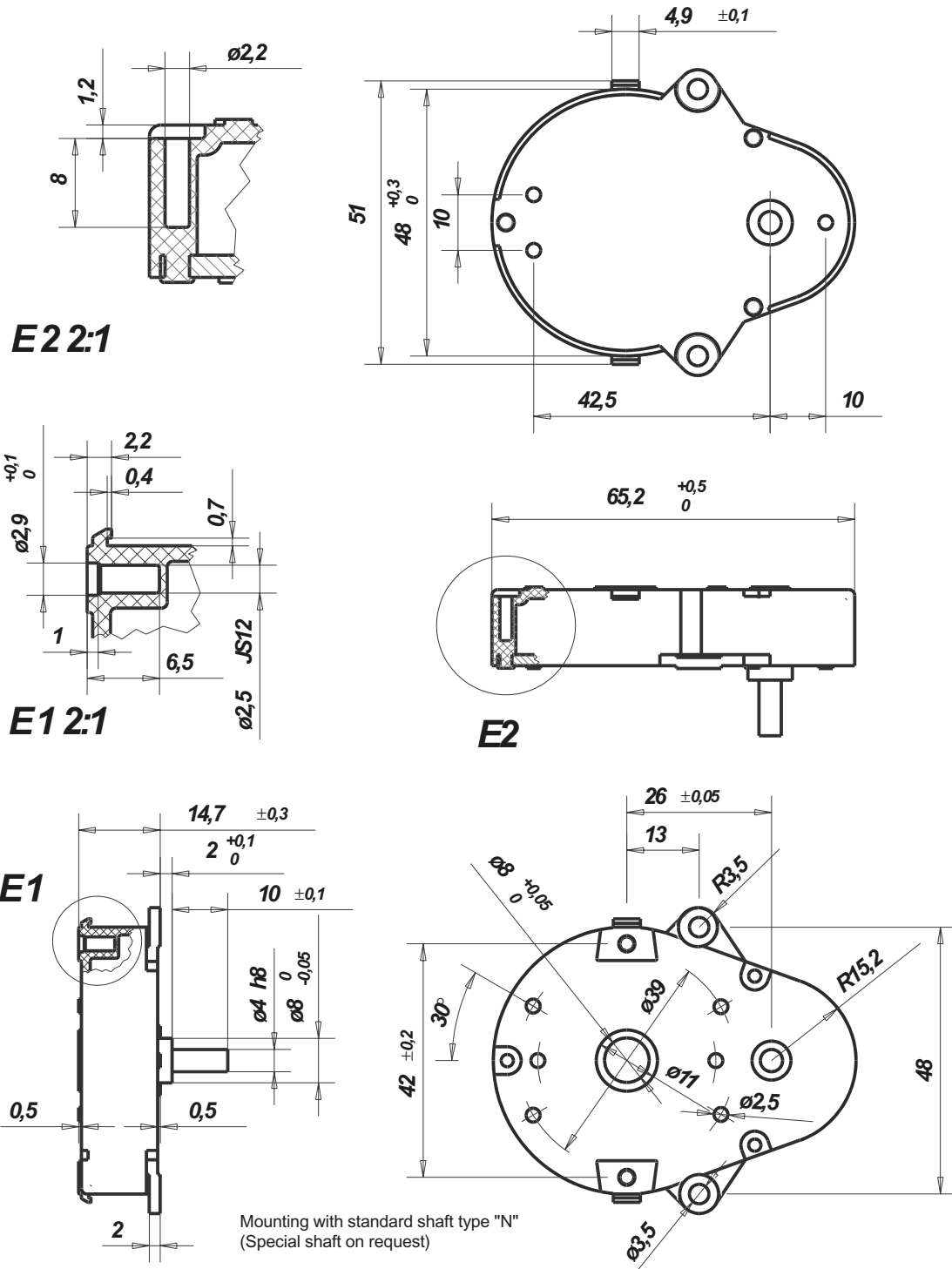
Ratios	12 1/2	16 2/3	25	50	100	120	150	200	240	300	400	500	600
	750	1000	1200	1500	4800								

Order Reference

Type	Gearbox	UGM	100	N	N
Ratio	100				
Slipping clutch	N Without slipping clutch				
Shaft end	N ∅ 4 x 10, other on request				

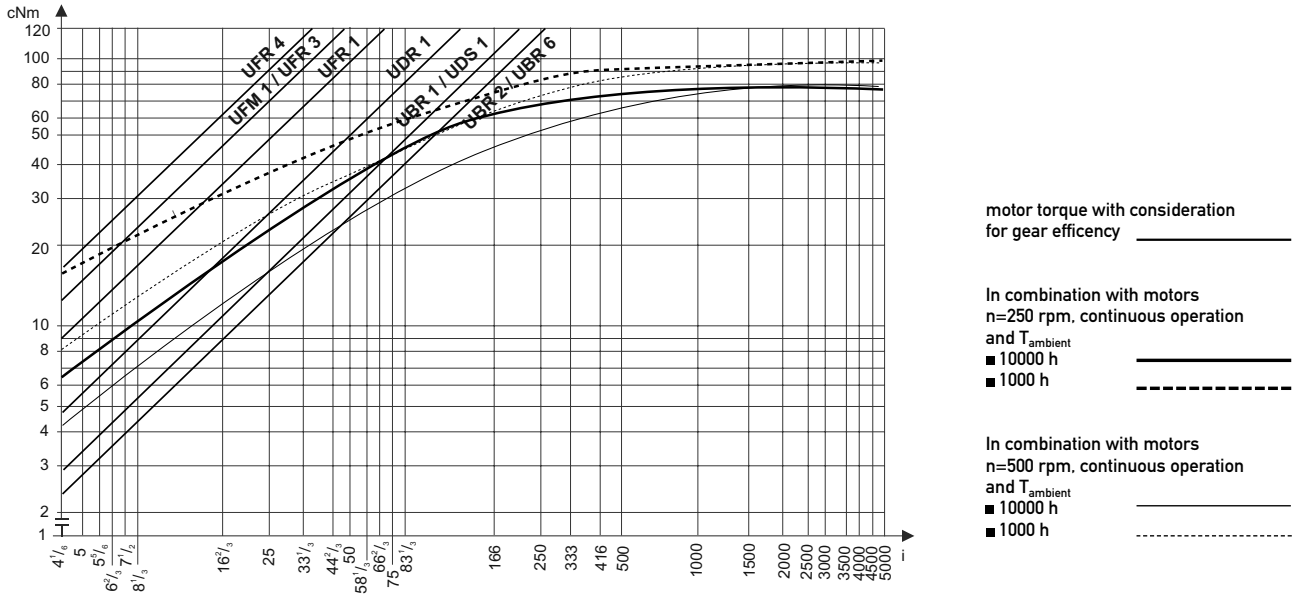
UGM

Dimensions



UGM

Torque / ratio / life graph



UGB

Gearboxes

UGB

Dimensions (mm)	58 x 81
Max. torque (cNm)	250
Ratios	41 ² / ₃ ... 345.600
Internal slipping clutch	optional
Standard shaft (mm)	∅ 8 x 12
Weight (g)	130
Motor combination	Series UB and UD; Series UF without UFR3/4 and UFB3/4



Standard Data

Mounting	any position
Axial thrust F _A	100 N
Lateral force F _R	300 N
Slipping clutches/free wheel	single-way clockwise/counter clockwise function and two way
Slipping-/free wheel torque	4 ... 220 cNm
Output shafts	∅ 8 x 12, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +55
Ambient temperature storage	°C -40 ... +80

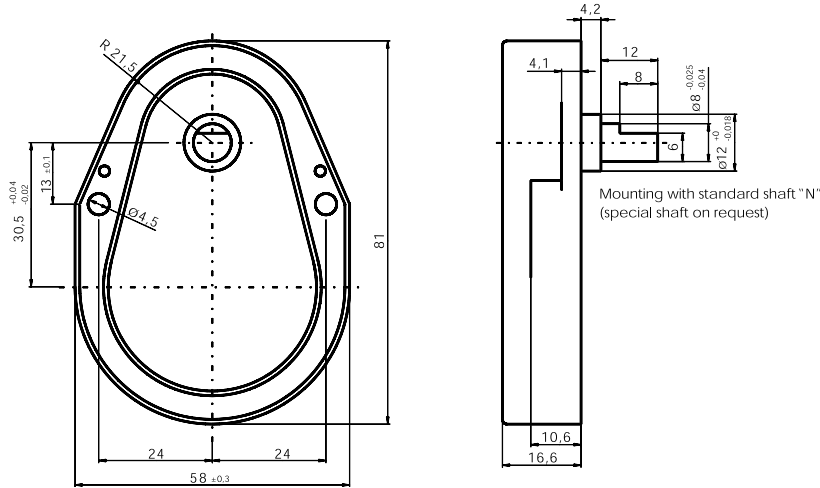
Ratios	41 ² / ₃	83 ¹ / ₃	100	125	150	166 ² / ₃	200	250	300	500	600	750	900
	1000	1200	1500	1800	2000	2500	3000	3750	5000	6000	7500	12000	15000
	18000	30000	36000	60000	120000	266666 ² / ₃	288000	320000	345000				

Order Reference

Type	Gearbox	UGB	100	N	5cNm	N
Ratio	100					
Slipping clutch	N Without slipping clutch ER One-way slipping clutch, clockwise EL One-way slipping clutch, counter clockwise Z Two-way slipping clutch					
Slipping torque	5 cNm					
Shaft end	N ∅ 8 x 12, other on request					

UGB

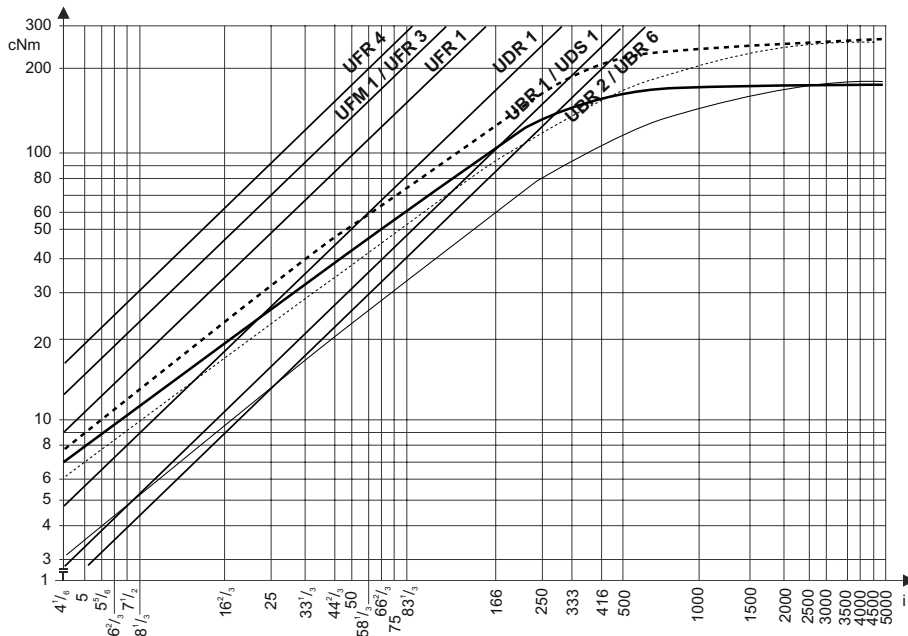
Dimensions



Slipping clutches

	max. torque available at output shaft (cNm)	free wheel-/clutch torque (cNm)
Roller-type free wheel		
Single-way slipping clutches	150	4 ... 50 counter clockwise or clockwise direction possible
Two-way slipping clutches	40 ... 70	60 ... 175

Torque / ratio / life graph



motor torque with consideration for gear efficiency _____

In combination with motors n=250 rpm, continuous operation and T_{ambient}

■ 10000 h _____
 ■ 1000 h _____

In combination with motors n=500 rpm, continuous operation and T_{ambient}

■ 10000 h _____
 ■ 1000 h _____

UGF

Gearboxes

UGF

Dimensions (mm)	58 x 81
Max. torque (cNm)	500
Ratios	4 1/6 ... 5.000
Internal slipping clutch	none
Standard shaft (mm)	∅ 8 x 12
Weight (g)	130
Motor combination	Series UB, UD, UF



Standard Data

Mounting	any position
Axial thrust F _A	100 N
Lateral force F _R	400 N
Slipping clutches/free wheel	none
Slipping-/free wheel torque	cNm
Output shafts	∅ 8 x 12, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +55
Ambient temperature storage	°C -40 ... +80

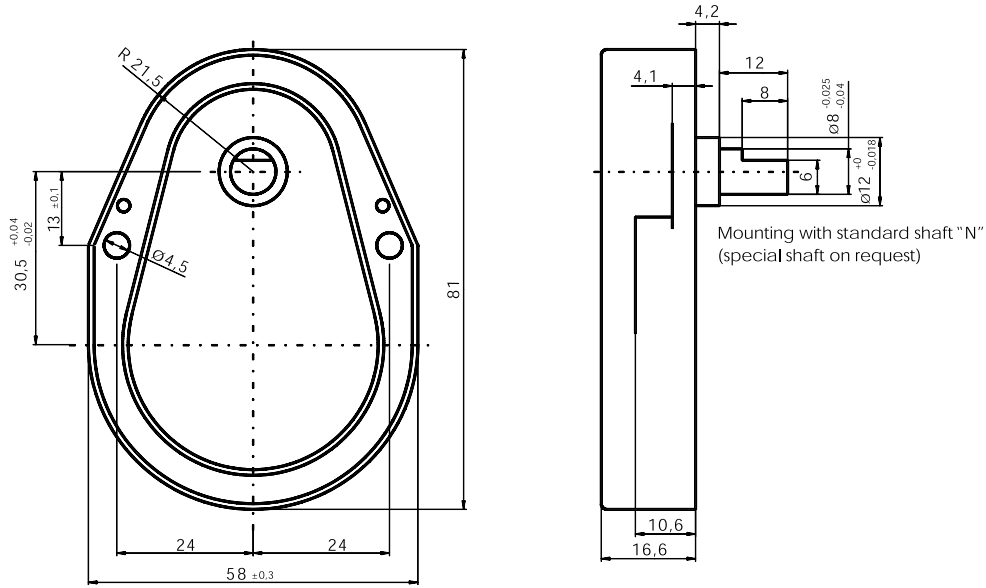
Ratios	4 1/6	8 1/3	16 2/3	20 5/6	25	30	41 2/3	50	62 1/2	83 1/3	100	125	166 2/3
	0 250	333 1/3	500	600	750	1000	1200	1500	4000	5000			

Order Reference

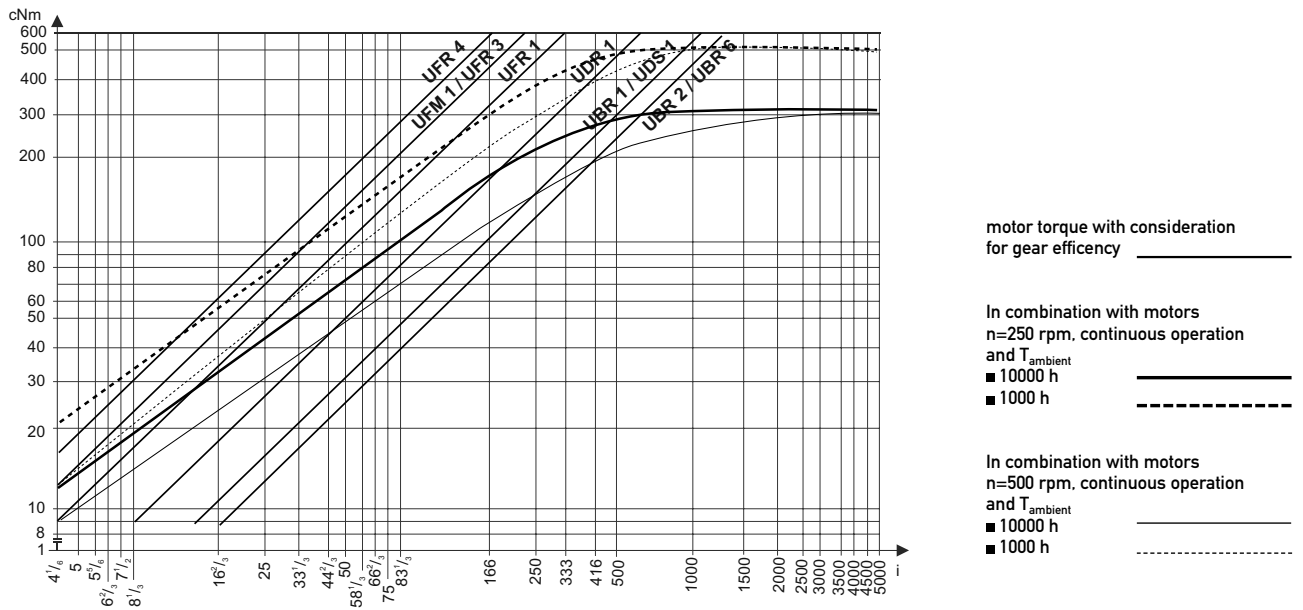
Type	Gearbox	UGF	100	N	N
Ratio	100				
Slipping clutch	N Without slipping clutch				
Shaft end	N ∅ 8 x 12, other on request				

UGF

Dimensions



Torque / ratio / life graph



UGV

Gearboxes

UGV

Dimensions (mm)	70 x 70
Max. torque (cNm)	500
Ratios	8 ¹ / ₃ ... 2.000
Internal slipping clutch	none
Standard shaft (mm)	∅ 8 x 12
Weight (g)	130
Motor combination	Series UB, UD, UF



Standard Data

Mounting	any position
Axial thrust F _A	100 N
Lateral force F _R	400 N
Output shafts	∅ 8 x 12, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +55
Ambient temperature storage	°C -40 ... +80

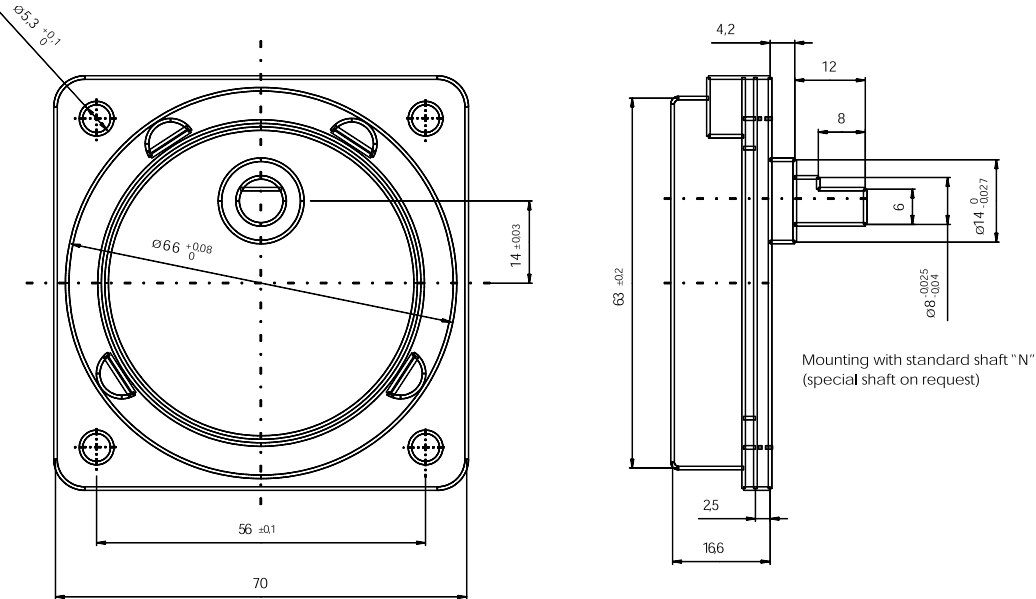
Ratios 8¹/₃ 16²/₃ 25 41²/₃ 83¹/₃ 100 125 250 500 2000

Order Reference

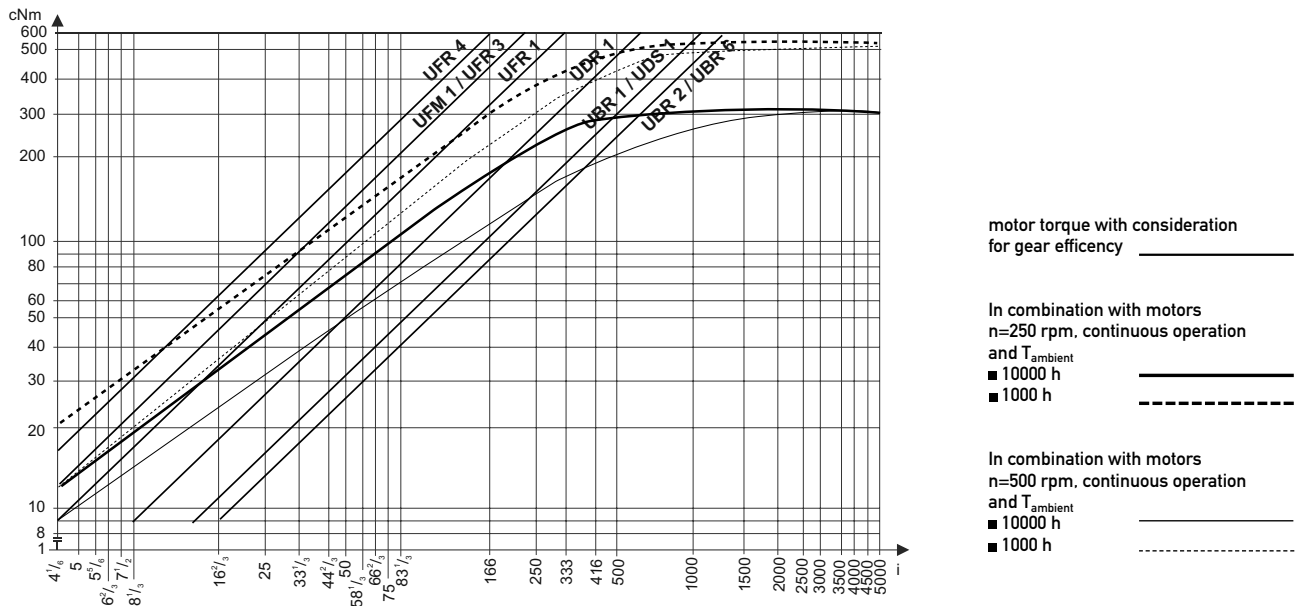
Type	Gearbox	UGV	100	N	N
Ratio	100				
Slipping clutch	N	Without slipping clutch			
Shaft end	N	∅ 8 x 12, other on request			

UGV

Dimensions



Torque / ratio / life graph



UGJ

Gearboxes

UGJ

Dimensions (mm)	65 x 107
Max. torque (cNm)	1500
Ratios	4 1/6 ... 36.000.000
Internal slipping clutch	none
Standard shaft (mm)	Ø 12 x 20
Weight (g)	480
Motor combination	series UB, UD, UF, UH



Standard Data

Mounting	any position
Axial thrust F _A	400 N
Lateral force F _R	600 N
Output shafts	Ø 12 x 20, other on request
Climatic class	wide-spread according to DIN IEC 60721-2-1
Ambient temperature operation	°C -15 ... +55
Ambient temperature storage	°C -40 ... +80

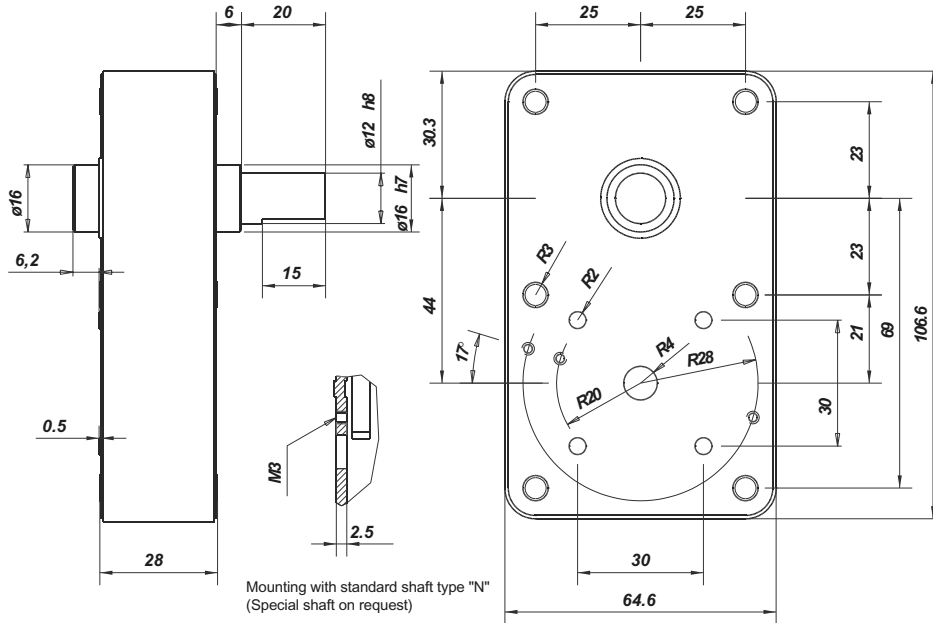
Ratios	4 1/6	8 1/3	16 2/3	33 1/3	41 2/3	50	66 2/3	83 1/3	100	125	150	166 2/3	200
	250	500	1000	2000	2500	3000	4000	5000	6250	8333 1/3	10000	12500	15000
	20000	25000	30000	37500	60000	75000	120000	150000	300000	375000	750000	1500000	1800000
	2250000	3000000	3600000	4500000	6000000	9000000	11250000	212000000	18000000	36000000			

Order Reference

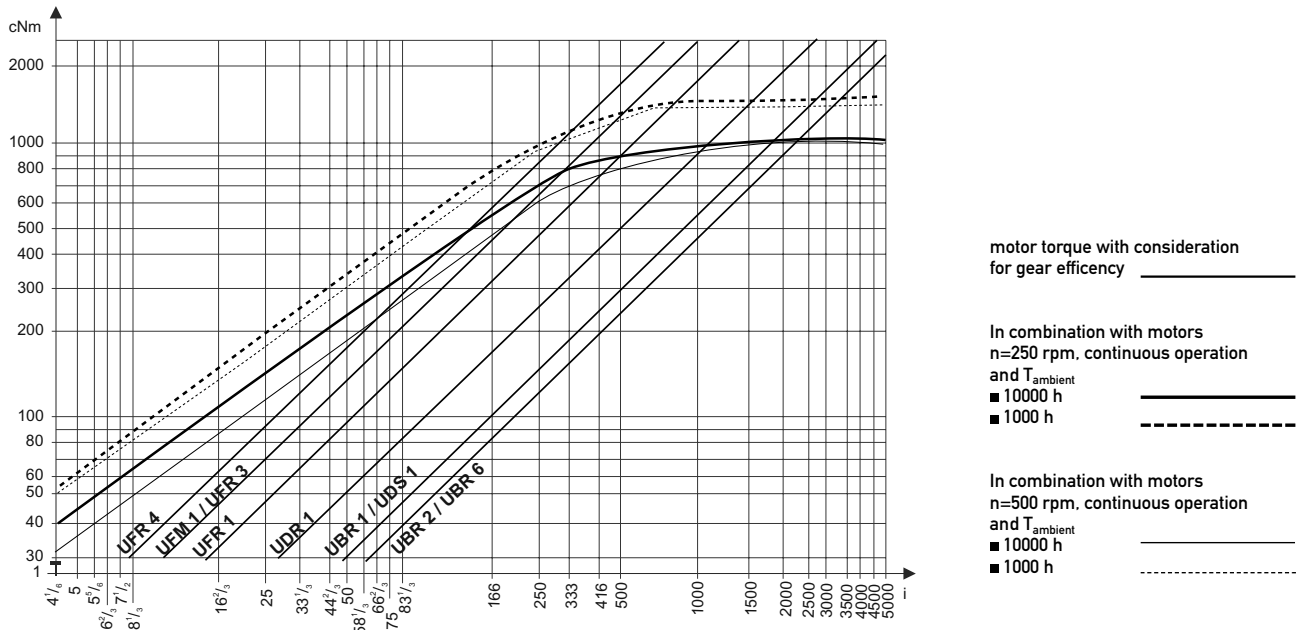
Type	Gearbox	UGJ	100	N	N
Ratio	100				
Slipping clutch	N Without slipping clutch				
Shaft end	N Ø 12 x 20, other on request				

UGJ

Dimensions



Torque / ratio / life graph



Saia-Burgess Motors Important notes

Stepper motors

Specified data for torque values are valid for

- a duty cycle of 100%, in Performance Charts additionally for 50% (cycle time: consult Saia-Burgess)
- an ambient temperature of $25 \pm 5^{\circ}\text{C}$
- a defined driver circuitry, with constant voltage supply
- at rated voltage

If duty cycle or actual maximum ambient temperature is lower, the motor can be designed for higher performance (torque and power) by using a different winding.

Chopper driver circuits can be applied alternatively to a driver with constant voltage supply. They are more expensive, but bring higher performance. Additionally, they eliminate the effects of temperature and supply voltage change.

Performance charts available on request.

Some basic terms:

Holding torque: Max. torque the motor can hold, during standstill, coils energised.

Detent torque: Max. torque the motor can hold, during standstill, coils de-energised.

pull-in torque: Operation torque when switching on step frequency at once, without a ramp.

pull-out torque: Operation torque when applying an acceleration/deceleration ramp.

Synchronous motors

Specified data for torque/power values are valid for

- a duty cycle of 100%
- an ambient temperature of $25 \pm 5^{\circ}\text{C}$
- at rated voltage

Torque is specified with maximum values, overloading is not permissible.

If duty cycle or actual maximum ambient temperature is lower, the motor can be designed with higher performance by using a different winding.

The basic design is the same as for our stepper motors, but the motors are operated by a sinus waveform voltage.

A capacitor, connected to one of the motor coils, is necessary for rotation in the appropriate direction.

Motor type UDS is a special design: It has only one coil, but is fitted with an internal ratchet. This ratchet determines the direction of rotation. A capacitor is not necessary.

Mechanical and electrical connections

On request we can deliver other options, e. g.

- special motor shafts
- pinions on shaft
- special cable lengths
- connectors

General

All specifications for torque, force and power are representative only and maybe subject to variation due to manufacturing tolerances.

Please consult Saia-Burgess if your power supply doesn't meet requirements of safety extra-low voltage (SELV) according to EN 60335.

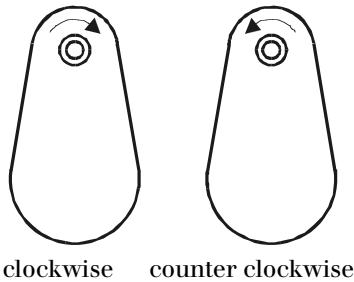
Saia-Burgess Gearboxes Important notes

Saia-Burgess gearboxes are available in a variety of sizes to meet a wide range of torque requirements. Ratios from 4 1/6 to 6.048.000 are available. The basic design is a helical gearbox with gear wheels in metal, plastics and combinations of the two materials. A particular feature is the availability of freewheels and slipping clutches.

The gearboxes are turned by the motor, energy flow is from input to output shaft. That means, they are not allowed to be driven by the output shaft (for instance turning manually). This can lead to damage of some internal components!

Direction of rotation

As a function of the number of stages, the direction of rotation can be either clockwise or counter clockwise. The direction of rotation of motor gearbox units is generally specified by the gearbox output shaft (drive-side, see DIN EN60034-7, IEC 60050-411).



clockwise counter clockwise

Ratio

A gearbox is characterised by its gear ratio i or its time T . Gear ratio i is the ratio of input speed n_e and output speed n_a . T is the time for one revolution of the output shaft.

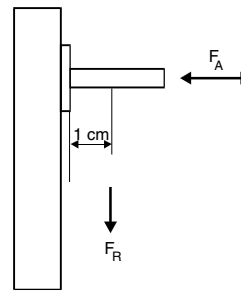
$$i = \frac{n_e}{n_a} \qquad T = \frac{i \times 60}{n_e}$$

With n in rpm
 T in seconds

Permissible force FA and FR at the output shaft

Permissible force loads at the output shaft are:

- Axial load F_A , pulling or pushing in axial direction of the shaft
- Radial load F_R acting laterally on the shaft. The catalogue value is referred to a distance of 1 cm to the bearing



Permissible Torque

The lifetime of a gearbox is determined by the load on the gear teeth and the number of revolutions of the gear wheels.

The maximum permissible torque M_n is defined by the load on the final stage of the gearbox and the stability of the housing.

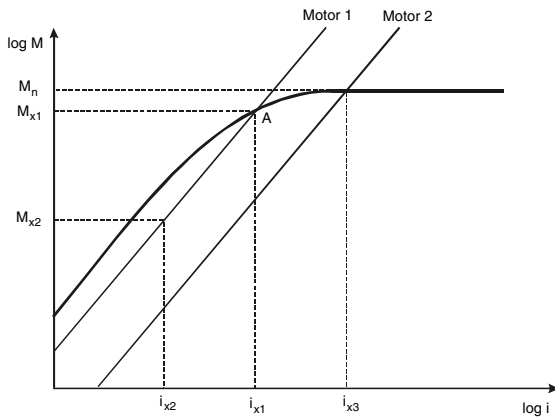
The lifetime graph of a gearbox shows the relationship between ratio i and the associated torque for a fixed period of time, e.g. 1000 or 10000 hours. A conditional parameter is the input speed (equivalent to motor speed) corresponding to the total number of revolutions of all gear wheels. In the catalogue we show therefore two curves - for a motor having 250/300 rpm and 500/600 rpm.

For example: Max.output torque M_{x1} is permissible at a ratio of $i \times 1$. With smaller ratios the max. permissible torque has to be reduced, because otherwise the first stages of the gearbox would be overloaded.

Additionally to the lifetime curve the motor torque M_m , multiplied by gear ratio and reduced by the gear efficiency, is shown (resulting in output torque M_i).

Saia-Burgess Gearboxes Important notes

$$M_i = M_m \times i \times \eta_G$$



Example 1: The application of motor 1 combined with a gearbox of ratio i_{x1} leads to an output torque M_{x1} at point A. The gearbox can transmit this torque, meeting its lifetime.

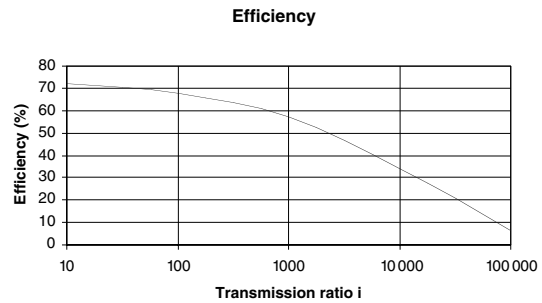
If a ratio of $i > i_{x1}$ is selected, actual torque would be $M > M_{x1}$. However lifetime cannot be guaranteed, as the operating point now lies above of the lifetime curve.

Example 2: Motor 1 with a ratio of i_{x2} . Torque generated is M_{x2} . This is below of the lifetime curve. The transmission can operate for an extended period without difficulty.

Example 3: Motor 2 and a ratio of i_{x3} give a torque of M_n . When using a ratio of $i > i_{x3}$ - the gearbox cannot be loaded more than M_n .

Efficiency

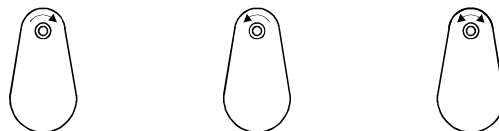
The number of stages in the gearbox determines the efficiency. With high ratios of i this factor will decrease below 10%, as the graph below shows.



Clutches

Gearbox types UGA, UGB and UGD can be fitted with freewheels or slipping clutches. Freewheels transmit the max. torque M in the locked direction, < 1 cNm in the opposite direction. One way slipping clutches behave similarly except that the slip torque has a higher value. Two way slipping clutches can only transmit a limited torque value in either direction lower than the slip torque.

Slipping clutches are used to: Protect the gearbox against torque overloads, or to adjust the load by turning from the load side (remember: turning the output shaft directly can otherwise damage the gearbox).



Slipping clutch	One way	One way	Two way
Freewheel	yes	yes	no
Torque, clockwise	full torque	< slipping torque	< slipping torque
Torque counter-clockwise	< slipping torque	full torque	< slipping torque
Output shaft turning, clockwise	slipping possible	blocking	slipping possible
Output shaft turning, counter-clockwise	blocking	slipping possible	slipping possible

