DRIVES FOR AUTOMATION

e-line DRIVES

Servomotors

Overview

Synchronous
servomotors
Series DSM4
Rated torque from
0.5 to 15 Nm

Asynchronous
servomotors
Series ASM
Rated torque from
23 to 70 Nm

**The fast track to
your order**

LUST

Servo drive system

Dear Customer,

This brochure provides you with an overview of the comprehensive range of motors offered by LUST Servo Drive Systems.

It gives information on our synchronous and asynchronous servomotors and their specially designed accessories.

Our team will be happy to help you find your optimum system solution.

We look forward to receiving your call or e-mail.

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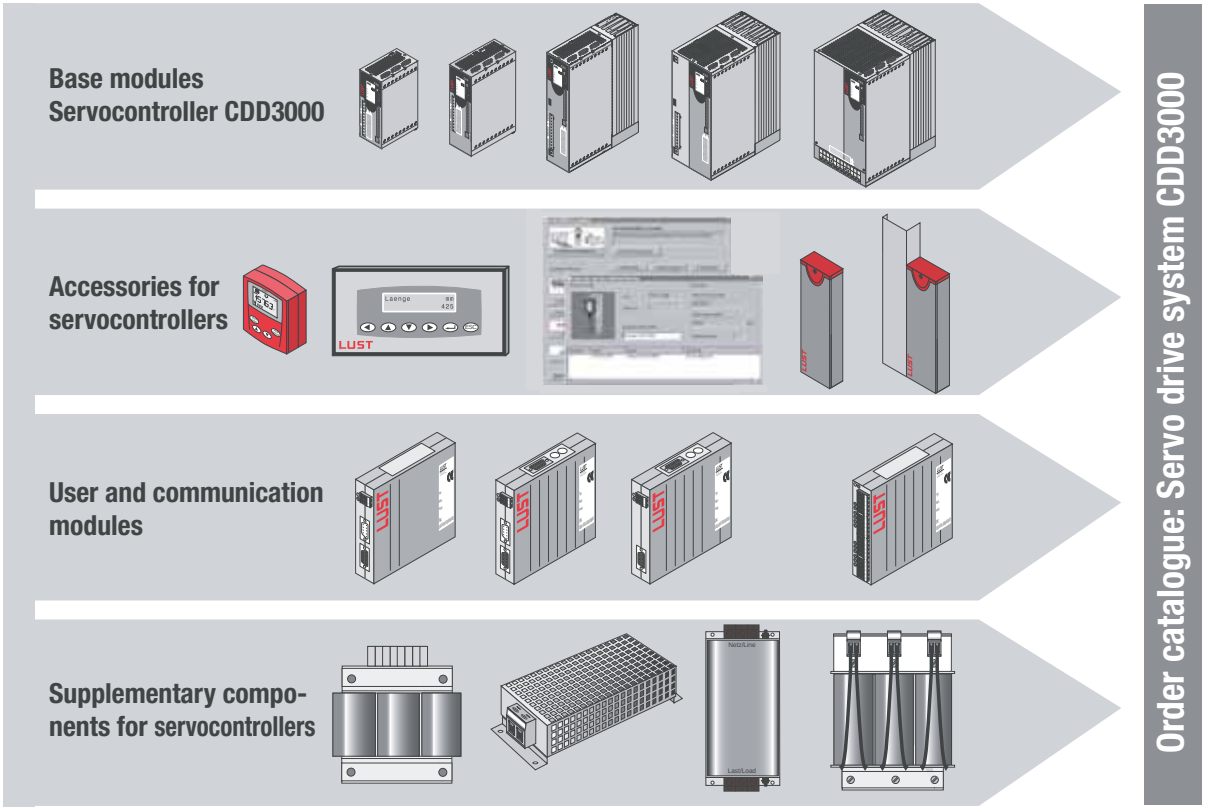

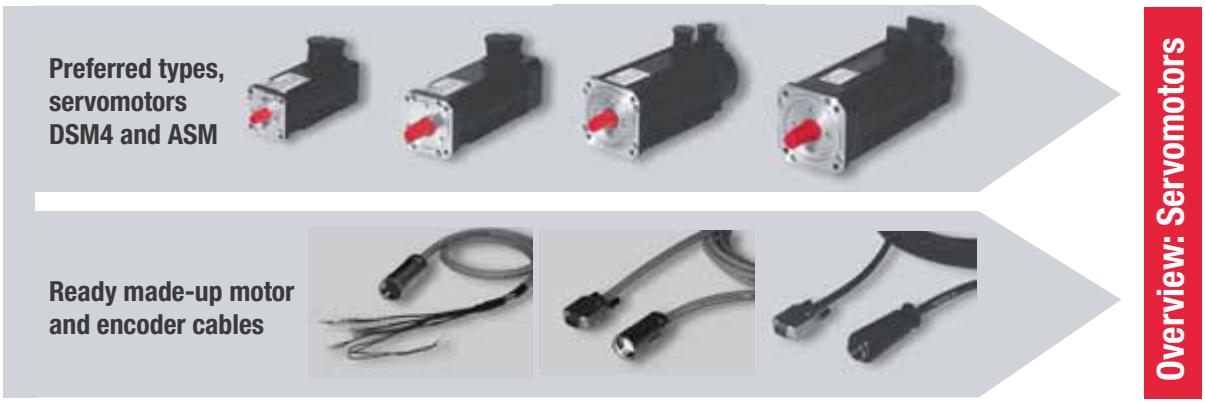

Overview: Servomotors

ID no.: 0814.24 B.0-00

Date: October 2002

Synchronous or asynchronous motor?

Selecting the right motor

The servomotors differ primarily in terms of rotor design:

- Squirrel-cage rotors in asynchronous servomotors (ASM)
- Permanent magnet rotors in synchronous servomotors (DSM4)

The question of whether synchronous or asynchronous is more suitable will be determined by your application.

If your application allows a little more space, the asynchronous motor is generally the most cost-effective solution. Another key feature of the ASM motor is its very high maximum speeds at constant maximum output.

If you need very compact design combined with high power density, or a low rotor moment of inertia for high dynamic demands, the permanent-field synchronous servomotor DSM4 is the right choice for your application.

Servomotor features

The synchronous and asynchronous servomotors are optimally attuned to the CDD3000 servocontroller. They offer high power density and are designed for long life. Low locking torques ensure outstanding smoothness of running.

Both servomotors series offer:

- optimum winding protection based on a built-in thermistor
- high IP65 protection (with IP64 shaft gland)
- resolvers as a low-cost measuring system for standard applications
- SIN-COS encoders as a measuring system for precision applications
- shaft end with featherkey way (optionally without groove)

DSM4 series synchronous servomotors:

- High-energy neodymium-iron-boron magnets
- Low rotor moments of inertia
- High overload capacity
- Excellent dynamic properties
- Vibration severity grade R to DIN ISO 2373 (optionally grade S possible)

ASM series asynchronous servomotors:

- Robust squirrel-cage rotor
- Field weakening range to 8000 rpm with constant output
- Vibration severity grade N to DIN ISO 2373 (optionally grade R possible)
- Outstanding value for money

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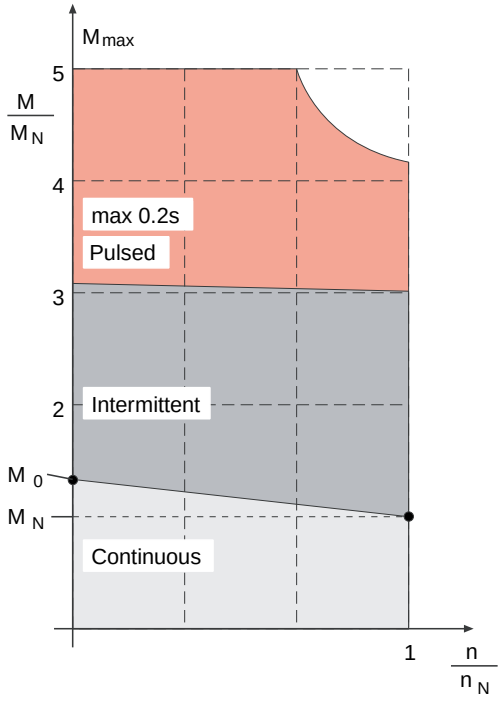
Basic configuration of servomotors

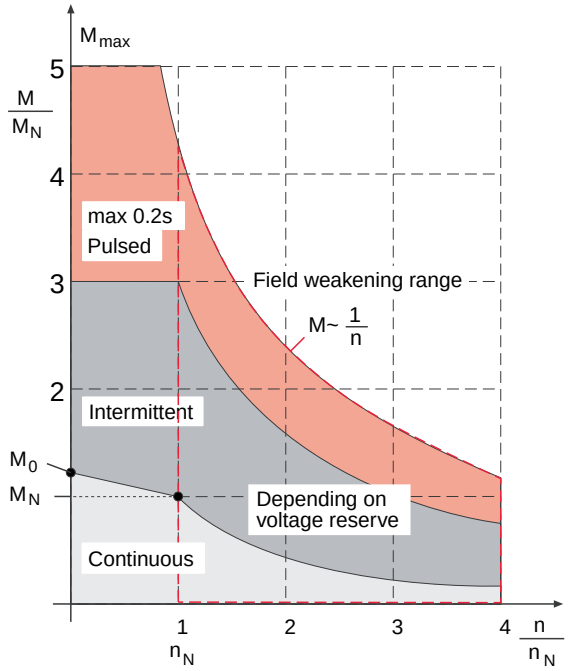
Characteristic	DSM4	ASM
Ambient conditions and acceptance tests		
Machine type	Permanent-field synchronous servomotor Series DSM4	Asynchronous servomotor Series ASM
Magnet material	Neodymium-iron-boron	-
Design (DIN 42948)	IM B35, IM B5, V1, V3	
Protection (DIN 40050)	IP65, shaft seal IP64 (option IP65)	
Insulating material class	Insulating material class F to VDE0530 Winding overtemperature $\Delta t = 105°C$, Ambient temperature $t_u = +40\ °C$	
Cooling	Self-cooling (IC 0041) IP65	
Coating	RAL 9005 (mat black)	
Shaft end on A (D) side	Featherkey and featherkey way to DIN 6885, tolerance field k6	
Flange dimension	DIN 42948 and IEC 72	
Smooth-running accuracy, coaxiality and concentricity to DIN 42955	Tolerance N (normal), R (reduced) on request	
Vibration severity to ISO 2373	Grade R, option S	Grade N, option R
Thermal motor monitoring	PTC thermistor in stator winding	
Torque load	To prevent thermal overloading of the motors, the effective load torque must not be greater than the nominal torque of the servomotor. $M_{eff} = \sqrt{\frac{\Sigma(M_n^2 \times t_n)}{t_{ges}}}$ $M_{eff} \leq M_0$	
Maximum pulse torque	Typically 2 to 5 times nominal torque, depending on controller assignment. 3 to 5 times nominal torque is permissible for max. 0.2 s.	
Termination mode		
Termination mode of motor, thermistor and holding	Plug connector; as from size DSM4-11.4 terminal box	Termination via terminal box
Termination mode of encoder system	Signal plug (mating plug not supplied)	

Typical torque characteristic of servomotors

M-n characteristic for synchronous motors



M-n characteristic for asynchronous motors



Term	Explanation
M_0 Standstill torque	Thermal limit torque of the motor at standstill. The motor can deliver this torque for an unlimited length of time.
I_0 Standstill current	Effective value of the motor phase current required to generate the standstill torque.
M_N Rated torque	Thermal limit torque of the motor at rated speed n_N.
I_N Rated current	Effective value of the motor phase current required to generate the nominal torque.
P_N Rated power	Continuous power output of the motor at the nominal operation point (M_N, n_N) at rated current I_N and rated voltage U_N.
M_{max}, I_{max} Limit characteristic	A maximum of five times the rated current may be applied to the motors.
Field weakening range	The maximum peak torque output in the field weakening range depends on the voltage reserve. The typical torque characteristic is proportional to the function 1/f or 1/n respectively.

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Selection list for preferred servomotor/servocontroller type

Synchronous servomotors for 230 V

Fitting window [mm]	Motor type	Standstill torque M_0 [Nm]	Rated torque M_N [Nm]	Rated speed n_N [rpm]	Servo-controller[1)] 	Rated current	0[2)]
 55 x 55	DSM4-05.3-10R86-2	0.65	0.6	6000	CDD 32.003	2.4	1.9
 70 x 70	DSM4-07.2-10R84-2	1.5	1.3	4000	CDD 32.004	4.0	2.5
 70 x 70	DSM4-07.3-10R84-2	2.3	2	4000	CDD 32.006	5.5	2.1
 92 x 92	DSM4-09.3-10R83-2	4.5	3.9	3000	CDD 32.006	5.5	2.2
 92 x 92	DSM4-09.4-10R83-2	6.0	5	3000	CDD 32.008	7.1	2.0

Synchronous servomotors for 400 V

Fitting window	Motor type	Standstill torque M_0 [Nm]	Rated torque M_N [Nm]	Rated speed n_N [rpm]	Servo-controller[1)] 	Rated current	0[2)]
 55 x 55	DSM4-05.4-20R86-2	1.0	0.8	6000	CDD 34.003	2.2	2.3
 70 x 70	DSM4-07.1-20R84-2	0.65	0.6	4000	CDD 34.003	2.2	4.4
 70 x 70	DSM4-07.1-20R86-2	0.65	0.5	6000	CDD 34.003	2.2	3.3
 70 x 70	DSM4-07.2-20R84-2	1.5	1.3	4000	CDD 34.003	2.2	2.8
 70 x 70	DSM4-07.3-20R84-2	2.3	2.0	4000	CDD 34.003	2.2	2.0
 92 x 92	DSM4-09.3-20R83-2	4.5	3.9	3000	CDD 34.005	4.1	2.7
 92 x 92	DSM4-09.4-20R83-2	6.0	5	3000	CDD 34.005	4.1	2.0

1) Assigned servocontroller with rating 1:1 (motor rated current ≤ servocontroller rated current)

2) O = Overload capacity of system

Fitting window	Motor type	Standstill torque M_0 [Nm]	Rated torque M_N [Nm]	Rated speed n_N [rpm]	Servo-controller[1)] 	Rated current	0[2)]
 110 x 110	DSM4-11.2-20R83-2	7	6.1	3000	CDD 34.006	5.7	2.3
 110 x 110	DSM4-11.3-20R83-2	10	8.4	3000	CDD 34.008	7.8	2.2
 110 x 110	DSM4-11.4-20R830	12	9.9	3000	CDD 34.008	7.8	1.9
 140 x 140	DSM4-14.3-20R830	19	14.6	3000	CDD 34.010	10	1.8

Asynchronous servomotors for 400 V

Fitting window [mm]	Motor type	Standstill torque M_0 [Nm]	Rated torque M_N [Nm]	Rated speed n_N [rpm]	Servo-controller[1)] 	Rated current	0[2)]
 190 x 190	ASM33-20R21-0	27.5	23.0	1500	CDD 34.010	10	2.1
 190 x 190	ASM34-20R21-0	42.0	35.0	1500	CDD 34.014	14	2.0
 260 x 260	ASM41-20R21-0	47.0	40.0	1500	CDD 34.024	24	2.4
 260 x 260	ASM42-20R21-0	70.0	60.0	1500	CDD 34.032	32	2.3
 260 x 260	ASM43-20R21-0	85.0	70.0	1500	CDD 34.032	32	1.9

1) Assigned servocontroller with rating 1:1 (motor rated current ≤ servocontroller rated current)

2) 0 = Overload capacity of system

 Other motor types on request.

Technical data of motors

Synchronous servomotors for 230 V

 Designation	Standstill torque M_0 [Nm]	Nominal torque M_N [Nm]	Max. torque M_{max} [Nm]	Voltage constant k_e $\left[\frac{V}{1000\,min^{-1}}\right]$	Standstill current I_0 [A]	Rated current I_N [A]	Max. current (peak value) I_{max} [A]	Nominal speed n_N [min^{-1}]	Max. perm. speed n_{max} [min^{-1}]	Moments of inertia of rotor J_L [kgcm²]	Overall length l [mm]	Mass m [kg]
DSM4-05.3-10R86-2	0.65	0.6	3.2	20	2.0	2.3	15.3	6000	9000	0.31	145	1.4
DSM4-07.2-10R84-2	1.5	1.3	7.2	27.7	3.2	2.9	27.2	4000	9000	0.36	160	2.1
DSM4-07.3-10R84-2	2.3	2.0	11.0	26.3	5.5	4.7	46.7	4000	9000	0.57	196	2.9
DSM4-09.3-10R83-2	4.5	3.9	20.3	49.1	5.1	4.6	36.0	3000	6000	4.2	214	5.2
DSM4-09.4-10R83-2	6.0	5.0	27.0	47.9	7.1	6.3	50.2	3000	6000	5.4	248	6.6

Synchronous servomotors for 400 V

 Designation	Standstill torque M_0 [Nm]	Nominal torque M_N [Nm]	Max. torque M_{max} [Nm]	Voltage constant k_e $\left[\frac{V}{1000\,min^{-1}}\right]$	Standstill current I_0 [A]	Rated current I_N [A]	Max. current (peak value) I_{max} [A]	Nominal speed n_N [min^{-1}]	Max. perm. speed n_{max} [min^{-1}]	Moments of inertia of rotor J_L [kgcm²]	Overall length l [mm]	Mass m [kg]
DSM4-05.4-20R86-2	1.0	0.8	5.0	40.0	1.6	1.7	12.0	6000	9000	0.45	170	1.8
DSM4-07.1-20R84-2	0.65	0.6	3.1	47.9	0.9	0.9	7.6	4000	9000	0.22	136	1.5
DSM4-07.1-20R86-2	0.65	0.5	3.1	32.1	1.3	1.2	11.1	6000	9000	0.22	136	1.5
DSM4-07.2-20R84-2	1.5	1.3	7.2	57.2	1.6	1.4	13.6	4000	9000	0.36	160	2.1
DSM4-07.3-20R84-2	2.3	2.0	11.0	60.4	2.4	2.0	20.4	4000	9000	0.57	196	2.9
DSM4-09.3-20R83-2	4.5	3.9	20.3	83.5	2.9	2.7	20.5	3000	6000	4.2	214	5.2
DSM4-09.4-20R83-2	6.0	5.0	27.0	79.9	4.2	3.7	29.7	3000	6000	5.4	248	6.6
DSM4-11.2-20R83-2	7.0	6.1	31.5	84.7	4.8	4.5	32.5	3000	6000	7.4	248	7.9
DSM4-11.3-20R83-2	10.0	8.4	45.0	84.7	7.2	6.3	48.8	3000	6000	9.8	278	9.6
DSM4-11.4-20R830	12.0	9.9	54.0	85.9	8.5	7.3	57.7	3000	6000	12.7	308	11.2
DSM4-14.3-20R830	19.0	14.6	85.0	92.5	12.4	9.9	84.0	3000	4000	26.7	291	15.5

Asynchronous servomotors for 400 V

 Designation	Standstill torque M_0 [Nm]	Nominal torque M_N [Nm]	Rated power P_N [kW]	Standstill current I_0 [A]	Rated current I_N [A]	Nominal speed n_N [min^{-1}]	Max. perm. speed n_{max} [min^{-1}]	Moments of inertia of rotor J_L [kgcm²]	Overall length l [mm]	Mass m [kg]
ASM33-20R21-0	27.5	23	3.6	10.3	8.7	1500	8000	130	387	41.5
ASM34-20R21-0	42.0	35	5.5	15.1	12.6	1500	8000	209	482	56.6
ASM41-20R21-0	47.0	40	6.3	21.0*	17.9*	1500	8000	450	408	87
ASM42-20R21-0	70.0	60	9.4	30.0	25.5	1500	8000	740	498	113
ASM43-20R21-0	85.0	70	11.0	37.0	30.4	1500	8000	960	568	135

* U_N = 310 V

Order code for synchronous servomotors DSM4

	DS	M	4-	07	.	3	-	2		0		R8		4	-	2		0		0
Synchronous servomotor																				
Motor type																				
Design: flange, self-cooling		M																		
Design: flange and foot, self-cooling		H																		
Design																				
Flange 55 x 55 mm				05																
Flange 70 x 70 mm				07																
Flange 92 x 92 mm				09																
Flange 110 x 110 mm				11																
Flange 140 x 140 mm				14																
Flange 190 x 190 mm				19																
Flange																				
Length 1						1														
Length 2						2														
Length 3						3														
Length 4						4														
Length																				
3 x 230 V								1												
3 x 400 V								2												
System voltage																				
with holding brake										1										
Without holding brake										0										
Holding brake																				
Resolver 6-pole												R8								
ECN 1313												G5								
Hiperface												G6								
Encoder																				
1500 rpm														1						
2000 rpm														2						
3000 rpm														3						
4000 rpm														4						
6000 rpm														6						
Nominal speed																				
Power connection terminal box, encoder straight plug-in																0				
Power connection straight plug-in, encoder straight plug-in																2				
Power connection 90° plug-in, encoder 90° plug-in																4				
Termination technique																				
with featherkey, IP64																		0		
without featherkey, IP64																		1		
with featherkey, IP65																		2		
without featherkey, IP65																		4		
Shaft end																				
Vibration severity N, smooth-running accuracy N																				0
Vibration severity S, smooth-running accuracy N																				2
Vibration severity N, smooth-running accuracy R																				3
Vibration severity S, smooth-running accuracy R																				5
Vibration severity, smooth-running accuracy																				

Red = preferred type

Motor sizes	DSM4-05	DSM4-07	DSM4-09	DSM4-11	DSM4-14
Standstill torque	0.65 ... 1.0 Nm	0.65 ... 2.3 Nm	4.5 ... 6 Nm	7 ... 12 Nm	19 Nm
Nominal torque	0.6 ... 0.8 Nm	0.5 ... 2.0 Nm	3.9 ... 5.0 Nm	6.1 ... 9.9 Nm	14.6 Nm
Mains voltage	3 x 230 V / 3 x 400 V			3 x 400 V	
Fitting window	55 mm	70 mm	92 mm	110 mm	140 mm

Order code for asynchronous servomotors ASM

AS	M	3	4	-	2	0	R2	1	-	0

Asynchronous servomotor

Motor type

Design: flange, self-cooling	M
Design: flange, forced cooling	F
Design: flange and foot, self-cooling	H
Design: flange and foot, forced cooling	V

Design / Cooling type

Flange 110 x 110 mm	1
Flange 140 x 140 mm	2
Flange 190 x 190 mm	3
Flange 260 x 260 mm	4

Flange size

Length 1	1
Length 2	2
Length 3	3
Length 4	4
Length 5	5

Length

3 x 190 V	1
3 x 330 V	2
3 x 480 V	4

System voltage

with holding brake permanent-field	1
Without holding brake	0

Holding brake

Resolver 4-pole	R2
ECN 1313	G5
Without encoder	00

Encoder system

1500 rpm	1
2000 rpm	2
3000 rpm	3

Rated speed

Power connection terminal box, encoder straight plug-in	0
Power connection straight plug-in, encoder straight plug-in	2
Power connection 90° plug-in, encoder 90° plug-in	4

Termination technique

Red = preferred type

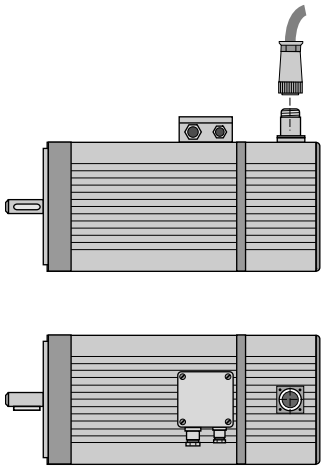
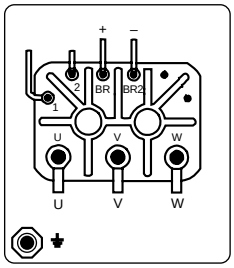
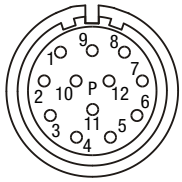
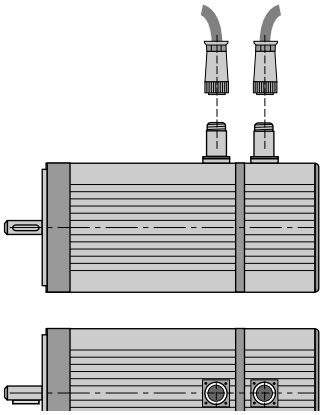
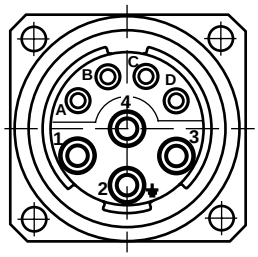
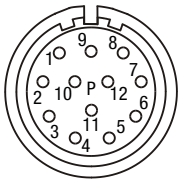
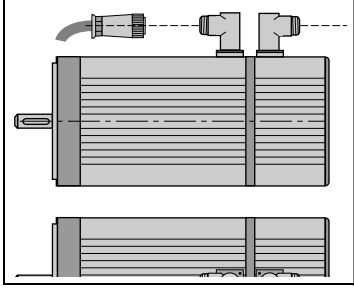
Motor sizes	ASM33	ASM34	ASM41	ASM42	ASM43
Standstill torque	27.5 Nm	42 Nm	47 Nm	70 Nm	85 Nm
Nominal torque	23 Nm	35 Nm	40 Nm	60 Nm	70 Nm
Mains voltage	3 x 400 V				
Fitting window	190 mm		260 mm		

Termination technique

Order code

DSM4 - XX . X - X 0 R8 X - ☐

Termination technique

Diagram	Code	Power connection		Encoder connection
	**0**		Power connection via terminal box	 Resolver Contact pins for 12-pole junction box: ∅ 1 mm
		1/2 - Thermal protection PTC BR - Holding brake (option) U V W - Motor ⏚ - Ground	Ring size: DSM4 = M4 ASM = M6 PTC/brake = M3	1 - SIN- (S4) 2 - COS+ (S1) 5 - REF+ (R1) 7 - REF- (R2) 10 - SIN+ (S2) 11 - COS- (S3) 3,4,6,8,9,12 - Vacant
	**2**		Plug-in power connection	 Resolver Contact pins for 12-pole junction box: ∅ 1 mm
	**4**	1 - U 2 - PE 3 - W 4 - V A - Brake + B - Brake - C/D - PTC	Contact pins for contact 1 ... 4 ∅ 2 mm Contact pins for contact A ... D ∅ 1 mm	1 - SIN- (S4) 2 - COS+ (S1) 5 - REF+ (R1) 7 - REF- (R2) 10 - SIN+ (S2) 11 - COS- (S3) 3,4,6,8,9,12 - Vacant

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Ready made-up encoder cables

Encoder cable KGS-KS 005

Encoder cable KRY_KS 005

Order code

	K	RY	-	KS	005
Encoder cable					
Ready made-up cable					
Resolver R1, R2, R8		RY			
Encoder cable SSI or ECN1313		GS			
Encoder cable Hiperface		GH			
Encoder system					
Festoon-compatible				KS	
Version					
Length 2 m					002
Length 3 m					003
Length 5 m					005
Length 8 m					008
Length 10 m					010
Length 15 m					015
Length 20 m					020
Cable length					

Technical data:

		KRY-KSxxx	KGS-KSxxx	KGH-KSxxx
Servocontroller type			CDD3000	
Motors with encoder system		R1, R2, R8 (resolver with 1, 2 or 3 pole pairs)	G5 (single- or multi-turn encoder with SSI interface)	G6 (single- or multi-turn encoder with Hiperface interface)
Festoon-compatible			yes	
Minimum bending radius:	in fixed installation	-	40 mm	-
	in flexible use	90 mm	100 mm	90 mm
Temperature range:	in fixed installation		-35 ... +80 °C	-40 ... +85 °C
	in flexible use	-40 ... +85 °C	-35 ... +80 °C	
Cable diameter approx.		8.8 mm	8.0 mm	8.8 mm
Material of outer sheath		PUR	PUR	PUR
Resistance		Resistant to oil, hydrolysis and microbic attack (VDE0472)	Resistant to oil, hydrolysis and microbic attack (VDE0472)	Resistant to oil, hydrolysis and microbic attack (VDE0472)
Approvals		UL-Style 20233, 80 °C - 300 V, CSA-C22.2N.210 -M90, 75 °C - 300 V FT1	-	UL-Style 20233, 80 °C - 300 V, CSA-C22.2N.210 -M90, 75 °C - 300 V FT1

Ready made-up motor cables

Order code

KM 2	-	KS	005
Motor cable			
Ready made-up cable			
Festoon-compatible		KS	
Version			
Length 2 m			002
Length 3 m			003
Length 5 m			005
Length 8 m			008
Length 10 m			010
Length 15 m			015
Length 20 m			020
Cable length			

Technical data:

		KM2-KSxxx
Motor type		Motors up to 16 A rated current with plug-in power connection
Minimum bending radius:	in fixed installation in flexible use	60 mm 120 mm
Temperature range:	in fixed installation in flexible use	-50 ... +90 °C -50 ... +90 °C
Cable diameter approx.		∅ 12 mm
Material of outer sheath		PUR
Resistance		Resistant to oil, hydrolysis and microbic attack (VDE0472), UL 20233, 80 °C - 300 V
Wiring		U = 1 V = 2 W = 3 Ground = ye/gn PTC = 5 PTC = 6 Brake + = 7 Brake - = 8
Approval		UL-Style 20234, 80° C - 1000 V CSA-C22.2 N.210-M90, 80° C - 1000V FT1

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Overview: Servomotors

c-line DRIVES

Lust Antriebstechnik – Your expert partner for specific drive solutions with c-line DRIVES.

CDA3000
Inverter drive system from 0.75 to 132 kW

CDD3000
Servo drive system from 2.2 to 170 A

CTC3000 TORQUE CHAMPION
Direct drive system from 20 to 50 Nm

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