

SIMOTICS DP Application-Specific Motors

Marine motors

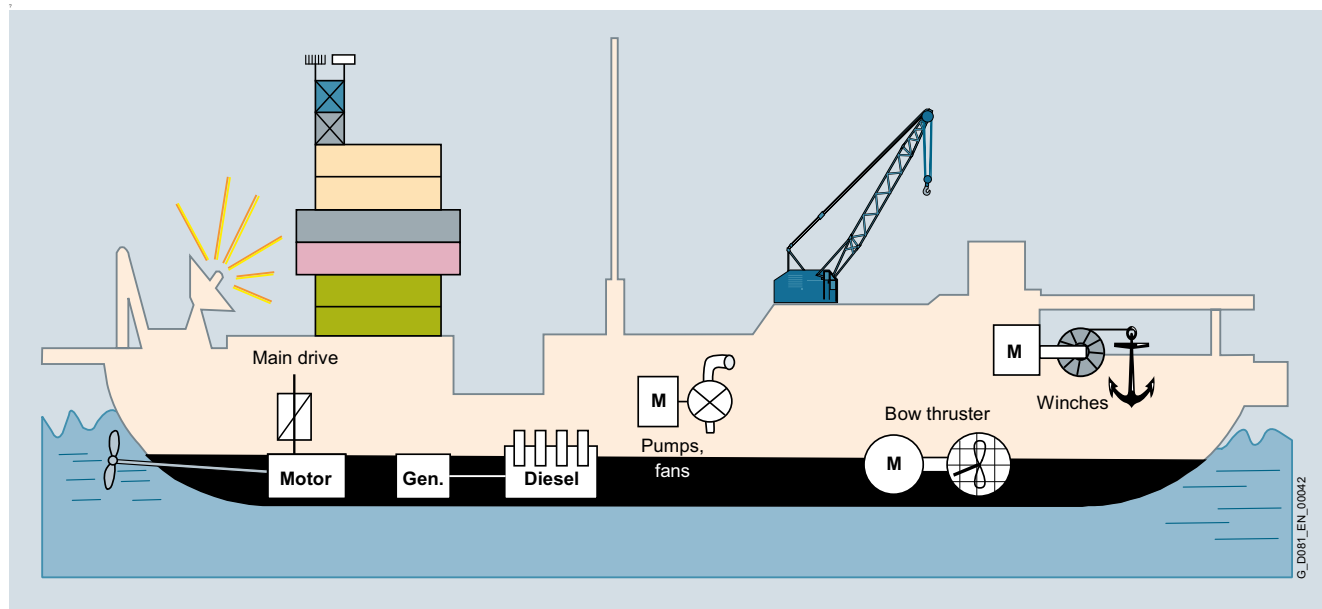
Orientation

Application

Our type tested marine motors are specially designed for use on board ship below deck and for the offshore industry:

- Applications onboard ships as main and auxiliary drives below deck, e.g.:
 - Fans (air conditioning systems, refrigeration plants)
 - Pumps (for fire-extinguishing water, fuels, oils)

- Winches (anchor winches, warping winches, lifting gear)
- Compressors
- Bow thruster drives
- Ex motors for hazardous zones
- Application in the offshore industry
 - Coastal areas, e.g. production platforms, production ships



Typical applications

Technical specifications

Housing design

Motors can be supplied depending on the motor series in a corrosion-resistant aluminum housing and in a rugged low-vibration cast-iron version.

Motor connection

Cable glands are not included in the standard scope of supply with the exception of explosion-proof motors (see "Special versions").

All marine motors generally have an external grounding terminal.

Mountings (encoder, separately driven fan, brake)

Brakes, encoders and separately driven fans from our basic series (1LE, 1MB) are accepted as mountings without a separate certificate from the marine classification societies by the following: GL, LR, RINA, RS, DNV, ABS and KR.

However, BV always demands separate certification for encoders. For this reason, 1LE1, 1MB1, 1PC1 and 1PC3 motors for BV can only be supplied in the "prepared for encoder mounting" condition. In this instance, the customer must bear responsibility for purchasing and installing a suitable encoder. With respect to brakes and separately driven fans, BV will also accept Siemens standard components.

Fan / fan cowl

Fans and fan cowls are made from the same materials as components from the basic series. BV stipulates that these components must be made of metal and they are automatically supplied in this material when order code **E31** is specified.

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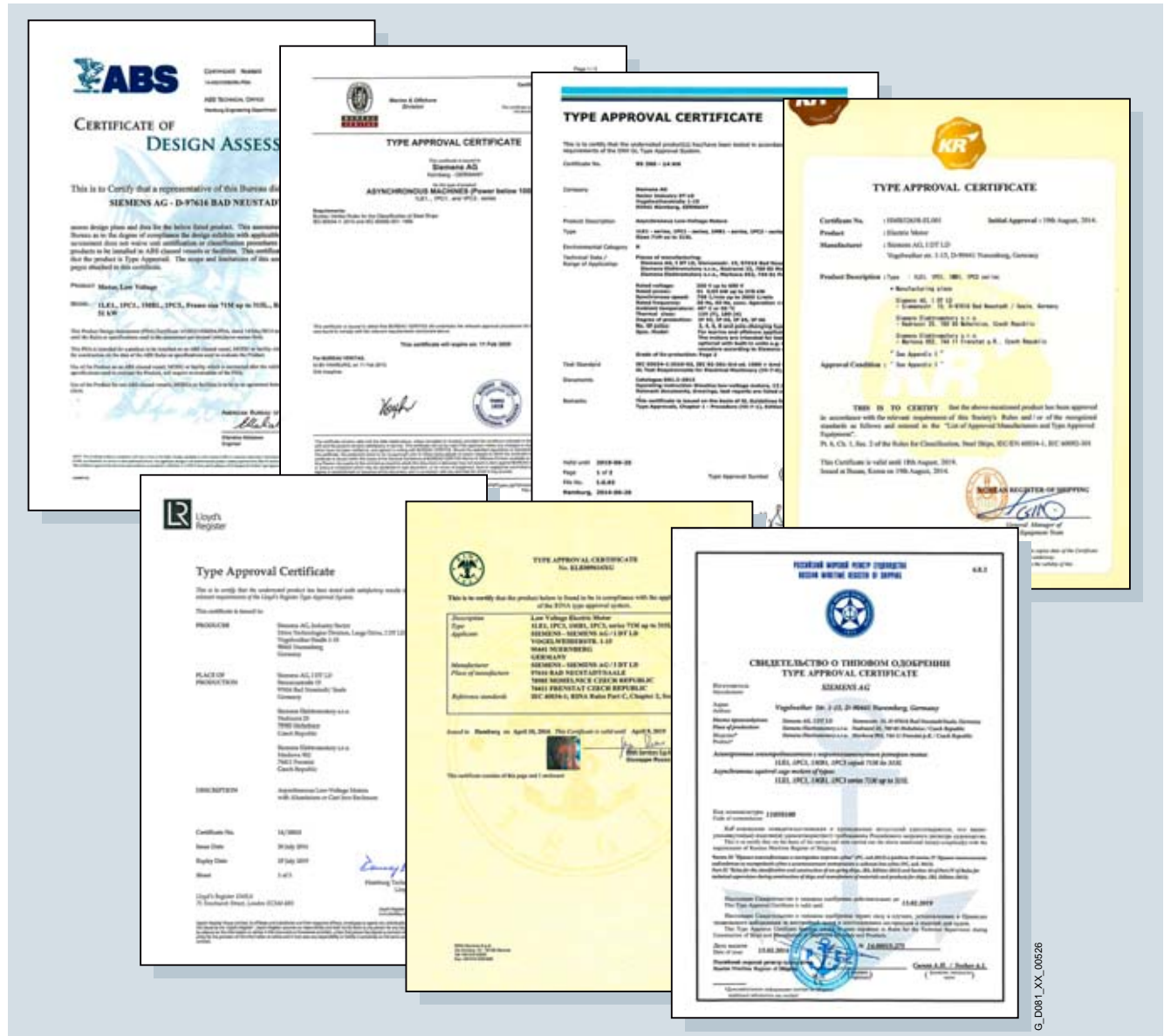
Orientation

Technical specifications (continued)

Specifications of the individual classification societies with order codes (options) for motors in frame sizes 71M- 315 L

Classification society	Coolant temperature CT	Admissible temperature rise limit according to the classification society		Rated power limit for individual acceptance test for essential service drive	Rated power limit for construction supervision for essential service drive	Order codes for surface-cooled motors up to frame size 315 L with type test certificate
		Temperature class				
		130 (B)	155 (F)			
	°C	K	K	kW	kW	
GL	45	75	100	≥ 50	–	E11
LR	45	70	95	≥ 100	≥ 100	E21
BV	45	75	100	≥ 100	–	E31
DNV	45	75	100	≥ 300	–	E51
ABS	50	70	95	≥ 100 ¹⁾	–	E52
RINA	45	75	100	≥ 100	–	E41
RS	45	75	95	≥ 20	–	E46
KR	45	75	95	≥ 7.5	–	E54

Type test certificate



¹⁾ Required for all ratings for ATEX compliance.

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Technical specifications (continued)

Temperature class and coolant temperature

SIMOTICS GP/SD standard motors and SIMOTICS XP explosion-proof motors up to frame size 315 L

In general, marine motors are designed for a coolant temperature CT 45 °C in temperature class 155 (F) – used according to 155 (F) – with thermal reserve. When motors are used according to temperature class 130 (B) (order code **N05**), derating is required. For standard motors up to frame size 315 L, the derating is approx. 4 % (for order codes **E52** and **E21** approx. 8 %).

1MB1 motors in Zones 2, 21 and 22 are designed for temperature class 155 (F) – used according to temperature class 130 (B) – with derating of approx. 4 % (with order code **E52** approx. 8 %). Motors with increased output in temperature class 155 (F) – used according to temperature class 155 (F) – are also derated by approx. 4 % (with order code **E52** and **E21** approx. 8 %). If temperature class 155 (F) is to be used according to 130 (B), further derating of approximately 10 % is required.

Coolant temperatures that exceed CT 45 °C require derating in accordance with the following table:

	Coolant temperature CT			
	45 °C	50 °C	55 °C	60 °C
Temperature class 155 (F) used according to 155 (F)				
Derating factor for line operation	1.00	0.96	0.92	0.87

Non-standard motors SIMOTICS N-compact

For the non-standard motors 1LA8, 1PQ8 the following derating factors apply for increased coolant temperatures and with line operation:

	Coolant temperature CT			
	45 °C	50 °C	55 °C	60 °C
Temperature class 155 (F) used according to 155 (F)				
Derating factor for line operation	1.00	0.96	0.92	0.87
Temperature class 155 (F) used according to 130 (B)				
Derating factor for line operation	0.90	0.86	0.83	0.78

For the non-standard motors 1LA8, 1PQ8 the following derating factors apply for increased coolant temperatures and converter operation:

	Coolant temperature CT			
	45 °C	50 °C	55 °C	60 °C
Temperature class 155 (F) used according to 155 (F)				
Derating factor for converter operation	0.96	0.92	0.87	0.82
Temperature class 155 (F) used according to 130 (B)				
Derating factor for converter operation	0.82	0.78	0.74	0.70

More detailed information is available on request.

Rating plate and acceptance test certificate

The rating plate indicates the relevant classification society and the associated coolant temperature

SIEMENS									
Made in Germany									
3-Mot. 1AV2090B 1LE10410EB034AB4-Z E 1411/5409856_01 001									
IEC/EN 60034 90S IMB3 IP55									
13kg Th.Cl.155(F) -20°C<= TAMB<=45°C									
DNV-GL Bearing									
DE 6205-2ZC3									
NE 6004-2ZC3									
V	Hz	A	kW	cosφ	NOM.EFF	1/min	IE-CL		
400 Δ	50	2.50	1.1	0.78	81.4	1425	IE2		
690 Y	50	1.45	1.1	0.78	81.4	1425	IE2		
460 Δ	60	2.45	1.27	0.78	84.0	1725	IE2		
460 Δ	60	2.20	1.1	0.74	84.0	1740	IE2		

Rating plate for a marine motor according to DNV

Degree of protection

The protection classes applicable here are specified in the catalog sections for basic series 1LE1/1MB1/1PC1. With IP56, icing must be avoided.

Winding and motor protection

For monitoring the winding and bearings, the motors can be equipped with thermistors, temperature sensors and resistance thermometers. Anti-condensation heaters can also be fitted to the marine motors to prevent condensation building up on the winding.

Paint finish

The standard paint finish is suitable for indoor installations or outdoor installations which are roof-protected against weathering.

When installing the standard motors in sea air or in rooms with permanent moisture, the special paint type climate group "world-wide" according to IEC 60721-2-1 is appropriate, because this ensures a higher degree of corrosion protection. Most marine motors are finished in this special paint type as standard (see "Special versions").

With particularly corrosive atmospheres, the sea-air-resistant special finish (order code **S03**) or the offshore special paint system (order code **S04**) is recommended.

Special paint colors and increased film thicknesses are available on request.

Converter operation

The standard insulation of the motors is designed such that converter operation is permissible at line voltages up to $U_{rated} \leq 500$ V. Compliance with the following limit values is essential (voltage values are peak values):

$U_{phase-to-phase} \leq 1500$ V,
 $U_{phase-to-ground} \leq 1100$ V, voltage rise times of $t_s > 0.1$ μs.
 Operation at higher voltage peaks (e.g. on a converter with controlled input, AFE, ALM) requires motors with increased insulation strength.
 Please inquire in this case.

During installation, the EMC guidelines must be complied with. This does not apply to motors in type of protection Ex e according to IEC/EN 60079-2 that are certified only for line operation.

It is important to note the extent to which the converter used must also be acceptance tested by the marine classification authority.

Technical specifications (continued)**Recommended special versions:**

- Motor protection by PTC thermistor with 3 embedded temperature sensors for tripping – 15th position of Article No. **"B"**
- Installation of Pt100 resistance thermometers for winding temperature monitoring – 16th position of Article No. **"H"**
- Specially for motor series 1LA8, 1PQ8 and 1LL8: Installation of 2 Pt100 screw-in resistance thermometers in basic circuit for roller bearings – order code **A72**
- Anti-condensation heating for 230 V – order code **Q02**
- Anti-condensation heating for 115 V – order code **Q03**
- IP56 degree of protection for protection against harmful dust deposits, protection against water jets from any direction – order code **H22**

- IP65 degree of protection for complete protection against dust deposits, protection against water jets from any direction – order code **H20**
Not possible for 1LA8, 1PQ8 and 1LL8 non-standard motors
- Special bearing for drive-end (DE) and non-drive-end (NDE), bearing size 63 – order code **L25**, for non-standard motors on request
- Metal external fan for self-ventilated motors – order code **F76** (standard with order code **E31**)

Additional notes**Order information**

The fees levied by the classification societies for individual acceptance testing are included in order code **E09** or **B10** for motor types 1LE1, 1MB1, 1PC1 and 1PC3.

When ordering, add the supplement **-Z** to the Article No. and state details in plain text if required.

For information about other special versions, refer to the appropriate sections under "SIMOTICS GP/SD 1LE1/1PC1 standard motors" and "SIMOTICS XP 1MB1 explosion-proof motors".

In addition to this, for marine motors, the following special versions are the "Standard version" and therefore included in the order codes for the basic marine version.

Standard version:

Designation	Order code
Acceptance test certificate 3.1 in accordance with EN 10204	B02
Note: The delivery time for the factory test certificate may differ from the delivery time for the motor.	
External grounding terminal	H04

Ordering example

Selection criteria	Requirement	Structure of the Article No.
Motor type	SIMOTICS SD Basic Line, efficiency class IE3 Premium Efficiency, degree of protection IP55, type of construction IM B3, without winding protection, terminal box at top	1LE1503
No. of poles, speed, rated output	4-pole, 1500 rpm, 55 kW	1LE1503-2CB2
Voltage, frequency	400 VΔ/690 VY, 50 Hz	1LE1503-2CB23-4
Type of construction	IM B3	1LE1503-2CB23-4A
Motor protection	3 PTC thermistors for tripping	1LE1503-2CB23-4AB
Terminal box position	Terminal box right	1LE1503-2CB23-4AB5
Paint finish	Finish in "Brilliant blue" RAL 5007	1LE1503-2CB23-4AB5-Z Y53 Plain text: RAL5007
Marine version	Drive for "essential services" with type test certificate according to Germanischer Lloyd with coolant temperature CT 45 °C	1LE1503-2CB23-4AB5-Z Y53+E11 Plain text: RAL5007
	Individual acceptance (by marine classification society)	1LE1503-2CB23-4AB5-Z Y53+E11+B10 Plain text: RAL5007
Motor order		
	Type test with temperature-rise run for horizontal motors, with acceptance	1LE1503-2CB23-4AB5-Z Y53+E11+B10+B83 Plain text: RAL5007

The ordering example is valid for an order quantity of 1 item. For larger order quantities, a type test with heat run (order code **B83**) only has to be ordered for one motor. It is not necessary to specify order code **B83** for any further identical motors (in the same order). The order must be divided into two order items; see "Example for 5 identical motors".

Example for 5 identical motors

Order item	Quantity (items)	Article No.
1	1	1LE1503-2CB23-4AB5-Z Z=Y53+E11+B10+B83 Plain text: RAL 5007
2	4	1LE1503-2CB23-4AB5-Z Z=Y53+E11+B10 Plain text: RAL 5007