Orientation

Technical specifications

Frame 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.

Regulations of the individual classification societies with order codes (options) for motors up to frame size 315 L

Classification society	Coolant temperature CT	Admissible temperature rise limit of the classification society		Rated power limit for individual acceptance test	Rated power limit for building inspection	Order codes for surface-cooled motors up to frame size 315L	
		Temperature class				With type test certificate	Without type test certificate
		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	≥ 100	–	E00
RINA	45	75	95	≥ 100	–	–	E00
CCS	45	75	100	All power ratings	All power ratings	–	E00

Type test certificates

Technical specifications (continued)

Regulations of the individual classification societies with order codes for ordering SIMOTICS N-compact Non-Standard Motors frame size 315 and above in marine version

SIMOTICS N-compact Non-Standard Motors frame size 315 and above in marine version

	Frame size – Motor type			
	315	355	400	450
Self-ventilated motors for mains-fed and converter-fed operation	1LA8 (cast-iron)			
Forced-air cooled motors with mounted separately driven fan for converter-fed operation	1PQ8 (cast-iron)			
Self-ventilated motors with through ventilation for mains-fed and converter-fed operation	1LL8 (cast-iron)			
Self-ventilated motors in Zone 22 with type of protection "n" or protection against dust explosions	1LA8 (cast-iron)			

Classification societies

Society	Abbreviation	Domicile
American Bureau Of Shipping	**ABS**	USA
Bureau Veritas	**BV**	France
China Classification Society	**CCS**	China
Det Norske Veritas	**DNV**	Norway
Germanischer Lloyd	**GL**	Germany
Korean Register	**KR**	Korea
Lloyds Register	**LR**	Great Britain

SIMOTICS N-compact Non-Standard Motors for marine applications must be ordered with classification-specific options. This ensures that both the mechanical design of the motor, and the tests are performed exactly in accordance with the instructions provided by the respective classification society.

There are 4 categories of classification-specific options:

- Design options define the marine-compatible technical design in accordance with the definitions of the classification society
- Certification options define the scope of the test certificates
- Test options define the scope of the individual tests
- Additional options for variations and special conditions: specify the customer's request for participation in the tests at the factory, or define coolant temperatures that differ from the requirements of the classification society (additional plain text required)

The options of the categories listed above are combined with each other depending on the class of importance, classification society and other conditions.

If motors are to be designed according to the specifications of several classification societies, a special inquiry is necessary.

Non-standard motors for Non-Essential Services

The technical design is in accordance with the ambient operating conditions specified by the classification society. The order option Marine version X00 to X06 must be specified depending on the classification society. Acceptance inspections are not required. There is no distinction between ordering an individual motor or several motors.

Non-Essential Service	Options according to classification society						
	ABS	**BV**	**CCS**	**DNV**	**GL**	**KR**	**LR**
Technical design	X00	X01	– [1]	X03	X04	X05	X06

Non-standard motors for Essential Services

The technical design is in accordance with regulations of the classification society: Order option X10 to X16. A "simple" acceptance test certificate 3.1 according to EN 10204 is included. Depending on the classification society, the test steps are controlled by options X30 to X42 for the first motor (even numbers) and X31 to X43 for the additional motors (uneven numbers). The options J70 to J82 or J71 to J83 define the scope of the test certificates.

Essential Service	Options according to classification society						
	ABS	**BV**	**CCS**	**DNV**	**GL**	**KR**	**LR**
Technical design	X10	X11	X12	X13	X14	X15	X16
Certification							
• First motor	J70	J72	J74	J76	J78	J80	J82
• Additional motors	J71	J73	J75	J77	J79	J81	J83
Scope of the tests and presence of representatives of the classification society							
• First motor	X30	X32	X34	X36	X38	X40	X42
• Additional motors	X31	X33	X35	X37	X39	X41	X43
Tests in presence of representatives of the customer (in addition to the inspector of the classification society)	X99						
Conditions deviating from classification requirements must be fulfilled	E80						

Non-standard motors for Essential Services for Propulsion

The technical design is in accordance with regulations of the classification society: Order option X20 to X26. An acceptance test certificate 3.2 according to EN 10204 is included. Depending on the classification society, the test steps are controlled by options X60 to X72 for the first motor (even numbers) and X61 to X73 for the additional motors (uneven numbers). The options N40 to N52 or N41 to N53 define the scope of the test certificates.

Essential Service for Propulsion	Options according to classification society						
	ABS	**BV**	**CCS**	**DNV**	**GL**	**KR**	**LR**
Technical design	X20	X21	X22	X23	X24	X25	X26
Certification							
• First motor	N40	N42	N44	N46	N48	N50	N52
• Additional motors	N41	N43	N45	N47	N49	N51	N53
Scope of the tests and presence of representatives of the classification society							
• First motor	X60	X62	X64	X66	X68	X70	X72
• Additional motors	X61	X63	X65	X67	X69	X71	X73
Tests in presence of representatives of the customer (in addition to the inspector of the classification society)	X99						
Conditions deviating from classification requirements must be fulfilled	E80						

The option E80 is used if a different coolant temperature CT is required. The CT must also be specified in plain text, e.g. CT55.

[1] Non-Essential Service must be handled by CCS as an Essential Service.

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 C22, derating is required. For standard motors up to frame size 315 L, the derating is approx. 4 % (for E00 and E21 approx. 8 %).

1MA and 1MJ motors as well as motors in Zone 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 E00 approx. 8 %). 1MA motors are designed for the maximum possible and certified output.

1LA9 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 E00/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 mains-fed operation	1.00	0.96	0.92	0.87

SIMOTICS N-compact Non-Standard Motors

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

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

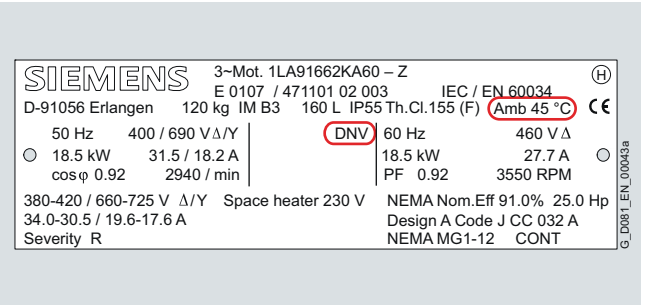
For the non-standard motors 1LA8, 1PQ8 the following derating factors apply for increased coolant temperatures and with converter-fed operation:

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

More detailed information is available on request.

Rating plate and acceptance test certificate

The metal rating plate indicates the relevant classification society and the associated coolant temperature (exception: Non-Essential Services).



Rating plate for a marine motor according to DNV

Degree of protection

The protection classes are applicable here as specified in catalog sections 1 to 4. 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 "worldwide" according to DIN 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 M94) or the offshore special paint type (order code M91) is recommended.

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

Technical specifications (continued)

Recommended special versions

- Motor protection with PTC thermistors with 3 embedded temperature sensors for tripping – Order code A11
- Mounting of PT100 resistance thermometers for winding temperature monitoring – Order codes A60, A61
- Specially for motor series 1LA8, 1PQ8 and 1LL8: Mounting of 2 screw-in PT100 resistance thermometers in basic circuit for roller bearings – Order code A72
- Anti-condensation heating for 230 V – Order code K45
- Anti-condensation heating for 115 V – Order code K46
- IP56 degree of protection (non-heavy-sea) for protection against harmful dust deposits, protection against water jets from any direction – Order code K52
- IP65 degree of protection for complete protection against dust deposits, protection against water jets from any direction – Order code K50
  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 K36,
  for non-standard motors on request
- Metal external fan for self-ventilated motors – Order code K35