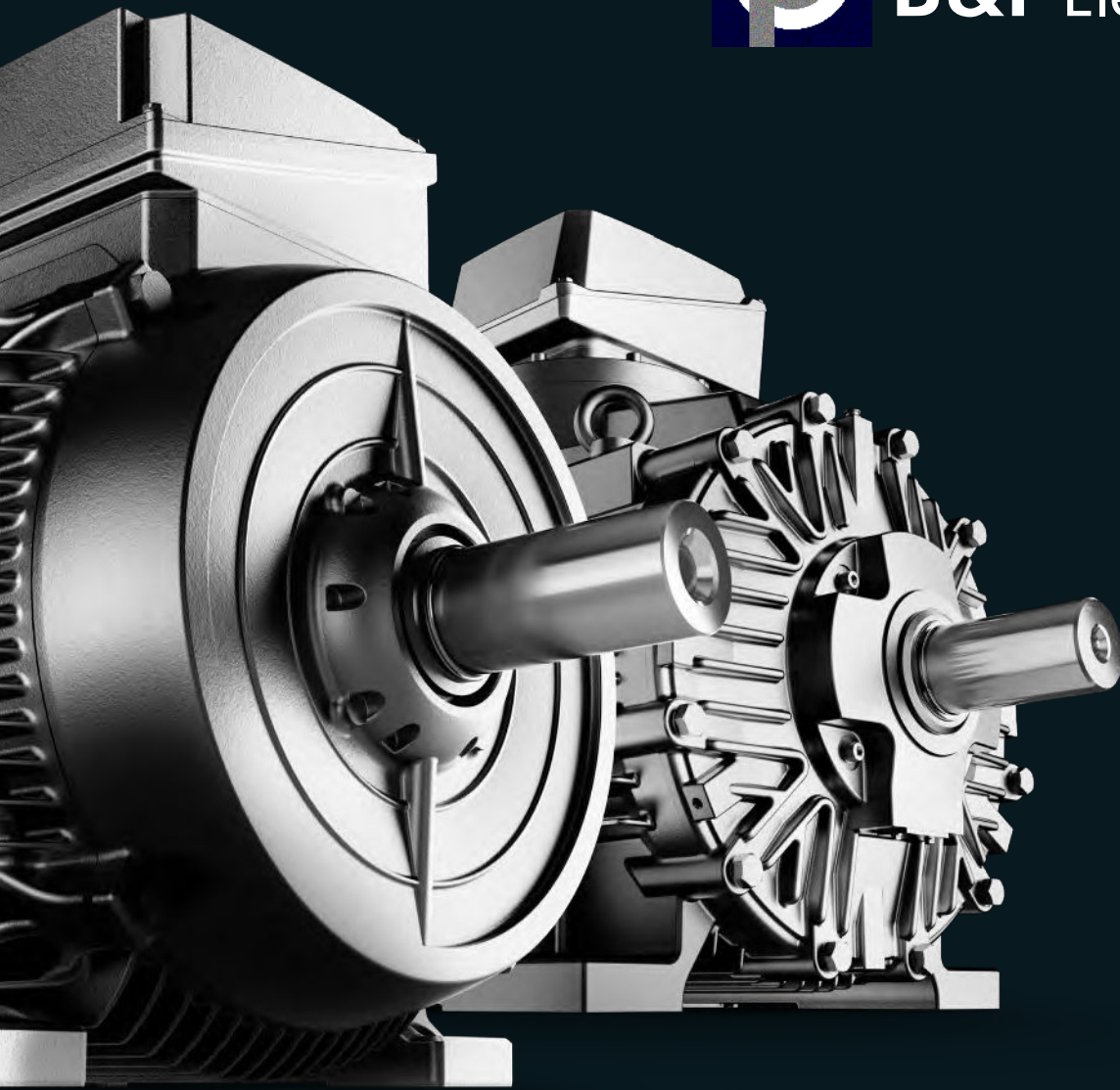




B&P Elektromotoren



# INNOMOTICS

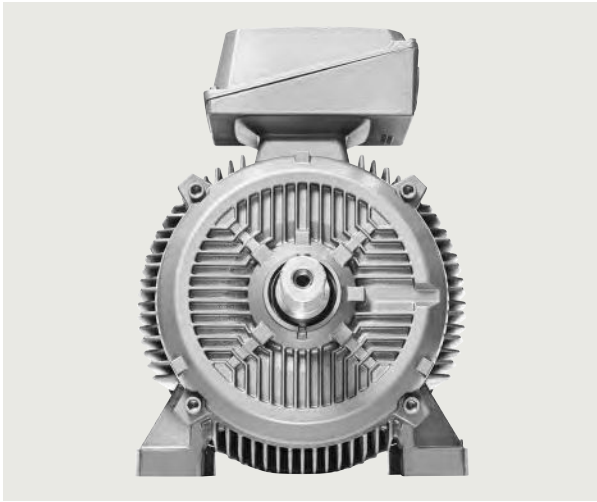
Catalog D 81.1 | Edition 04/2024

## Innomotics Moves!

Low Voltage Motors DP

# Innomotics DP Low-Voltage Motors

## Motors



Catalog D 81.1 · 04/2024

Supersedes:  
Catalog D 81.1 · 09/2023

**Innomotics DP application-specific motors**  
• Marine motors

The Siemens Businesses **Large Drives Applications** and **Low Voltage Motors** have been transferred to **Innomotics**. The brand change from Siemens to Innomotics is ongoing.

Siemens' or Innomotics' legal information, trademarks or logos contained in product related documents **do not necessarily represent the actual branding** used for the products. Any technical product information remains valid **independently of the brand**.

**Orders** received as of **August 1, 2024**, will be confirmed exclusively with the product mark "**Innomotics**" regarding the concerned products and services.

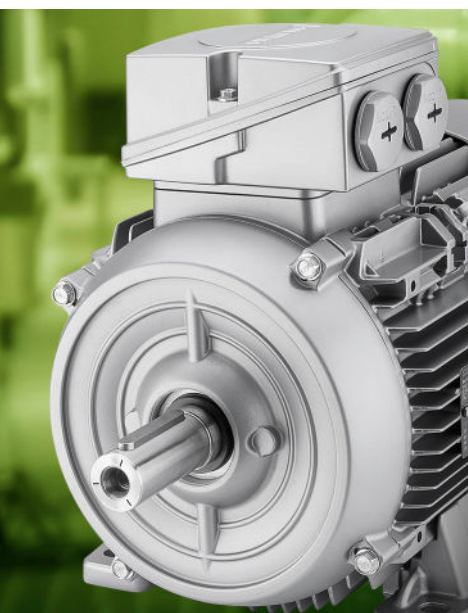
Independent of the order date, all ordered products or services with **delivery** dates from **April 1, 2025**, will be delivered with the product mark "Innomotics".

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**INNOMOTICS**

A Siemens Business

## Innomotics DP application-specific motors



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## Innomatics DP application-specific motors

### Introduction

#### Overview

With the designation Innomatics DP, Innomatics offers a number of industry and application specific (**D**efinite **P**urpose) motors that differ from standard motors in that they have special industry/ application-specific features:

#### *Innomatics DP marine motors*

Marine motors are exposed to air humidity and other hostile conditions on the high seas and must always perform their function reliably. Our marine motors meet the standards of the leading classification companies (DNV, BV, LR, RS, KR, ABS, RINA) and have type test certifications up to frame size 315 L. They are basically suitable for the higher ambient temperatures in engine rooms below deck. If requested, a representative of the marine classification society can be present in our factories to formally accept equipment.

You will find more information on marine motors on the following pages.

#### *Innomatics DP steel plant motors*

The steel plant motors are specially designed for applications in the steel industry with stringent requirements for vibrations and shocks according to class 3M4 (EN 60721-3-3). They provide an optimized technical and economic solution for numerous transportation tasks in the steel manufacturing process or in steel manufacturing facilities, in which no scale dust occurs. Steel plant motors can be operated at a constant speed directly on the line or are used together with the SINAMICS S120 converter for dynamic processes.

The ordering data for Innomatics DP steel plant motors can be found in the Catalog ME 81 – Motors for the steel industry.

#### *Innomatics DP roller table and steel plant motors*

Innomatics DP roller table and steel plant motors are designed for directly driving the rollers of working roller tables in reversing rolling mills. They are designed as completely enclosed three-phase induction motors, with a housing made of spheroidal graphite cast iron, ring ribs, and reinforced bearing shields. This makes the motors ideal for use with typical shocks and vibrations and severe dirt due to scale dust. On account of their special mechanical design, they meet the most stringent requirements demanded by this application. Of course, the motors are also designed for variable-speed reversing operation on frequency converters of the SINAMICS S and G series.

The ordering data for Innomatics DP roller table and steel plant motors can be found in the Catalog ME81 – Motors for the steel industry.

#### *Innomatics DP crane motors*

Like marine motors, crane motors are exposed to extreme climatic conditions and must meet tough operating requirements. Our crane motors stand up to high humidity levels, salt-laden air, and high wind speeds. They are characterized by high overload capability and a large speed setting range, for example, to operate hoist mechanisms efficiently in converter operation. Innomatics DP crane motors are reliably protected against corrosion with especially elaborate paint finishes and sealing. The rugged cast-iron motors are especially suitable for tough operation under hostile conditions, for indoor and outdoor use, e.g. in harbor facilities for rubber-tired gantry, rail-mounted gantry, and automatic stacking cranes. Special pulse encoders and brakes round off the product to form a perfectly adapted solution.

You can obtain further information on the Innomatics DP crane motors from your Siemens contact and found in the catalog CR\_81.

# Innomotics DP application-specific motors – Marine motors

## Orientation

### Overview



Low-voltage motors in the marine version can be used below deck on ships and in the offshore industry. The thermal utilization of the motors is adapted to the generally higher ambient temperatures onboard ships. If the application demands compliance with additional regulations, such as explosion protection (Directive 2014/34/EU (ATEX 95)), the appropriate motor series must be chosen.

The motors on board ships are generally subdivided into three classes of importance by the marine classification societies in cooperation with customers, depending on the field of application:

- **Essential Service for Propulsion** or also referred to as Primary Essential Service
- **Essential Service** or also referred to as Secondary Essential Service or Important Service
- **Non-Essential Service** or also referred to as Non-Important Service

**The class of importance must be specified by the customer (ordering party). Retrospective certification by means of individual acceptance test or construction supervision cannot be issued.**

The categories include the following requirements of the classification societies:

	Class of importance		
	<b>Essential Service for Propulsion</b>	<b>Essential Service</b>	<b>Non-Essential Service</b>
Typical applications	Propeller drive, thruster	Thrusters, lateral thrust units, anchor winches, bilge and ballast pumps, fire-fighting pumps	Pumps for service water
Version	In accordance with the regulations set up by the classification society		In accordance with ambient conditions set up by the classification society
Inspection certificate	Inspection certificate 3.2 in accordance with EN 10204	Inspection certificate 3.1 in accordance with EN 10204	None
Individual acceptance by classification society	Necessary if no type test certificate exists or the classification society has defined it based on the application		Not required
Type test	Not a requirement of the classification societies For standard motors up to frame size 355, a type test certificate is supplied. These motors can only be ordered with options E11 to E54 in accordance with the classification society.		
Ordering several identical motors	Differentiation between the first motor and additional ones must be realized when ordering using an order code		No distinction
Rating plate data	Information about ambient conditions of the classification society		
Stamp of the classification society	Stamp on shaft and housing		No stamp

### Classification societies

Society	Abbreviation	Location
American Bureau of Shipping	<b>ABS</b>	USA
Bureau Veritas	<b>BV</b>	France
DNV Maritime	<b>DNV</b>	Germany
Korean Register	<b>KR</b>	Korea
Lloyds Register	<b>LR</b>	UK
Registro Italiano Navale	<b>RINA</b>	Italy
Russian Maritime Register of Shipping	<b>RS</b>	Russia

## Innomotics DP application-specific motors – Marine motors

### Orientation

#### Overview

##### Type test (type approval)

All 1LE1, 1LE5, 1MB1, 1PC1, 1PC3, 1PC4 motors are manufactured and type tested in accordance with the regulations set up by the following international classification societies:

- ABS (American Bureau of Shipping)



- BV (Bureau Veritas, France)



- DNV Maritime



- KR (Korean Register of Shipping)



- LR (Lloyds Register of Shipping)



- Registro Italiano Navale (RINA)



- Russian Maritime Register of Shipping (RS)



Special versions that differ from the range defined in the catalog are possible on request.

#### Benefits

The marine motors offer the user a number of advantages and benefits:

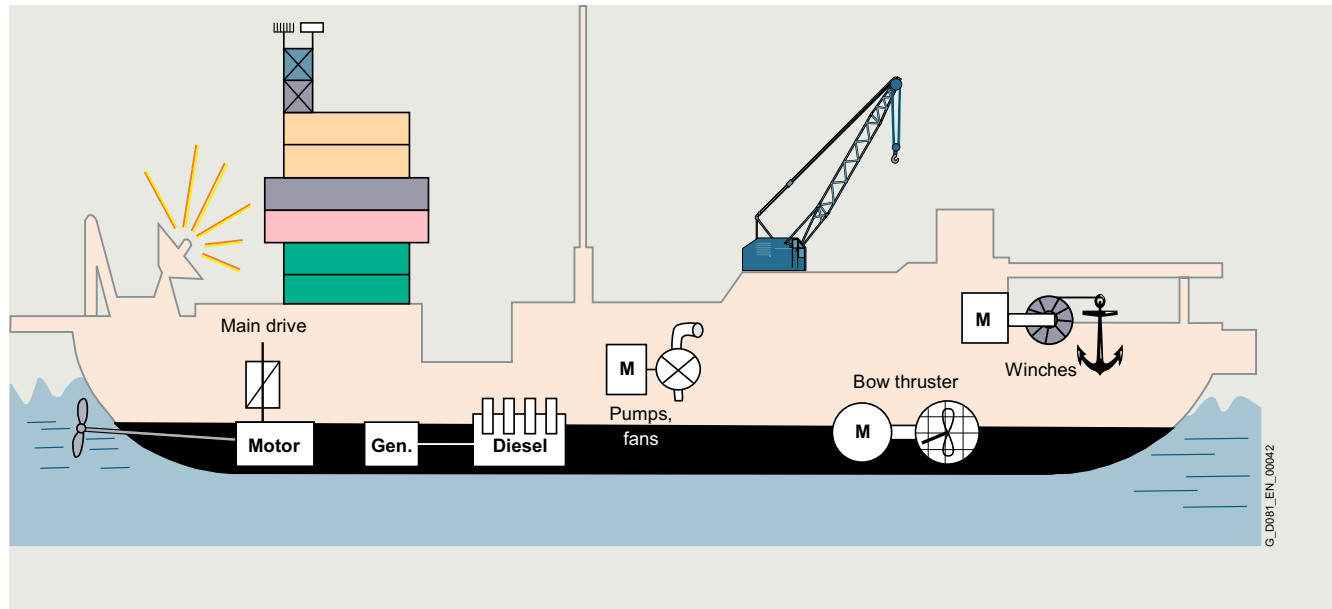
- Cast-iron versions can be supplied for corrosive atmospheres especially for high humidity levels and salty air
- Increased corrosion protection using specially designed paint finishes is available
- Certified marine motors can be supplied for use in areas to be protected against explosion (hazardous zones)
- Due to the existing type test, individual acceptance test in power ranges below the power limits defined by the classification societies is not required which means short delivery times
- In depth know-how regarding customer requirements
- Worldwide service network with 24 hour service hotline for motors and converters

### Application

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

- Applications on ships as main and auxiliary drives below deck, e.g.:
  - Fans (air conditioning systems, refrigeration systems)
  - 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. oil rigs, drilling ships



Typical below-deck applications

### Technical specifications

#### Housing design

Motors can be supplied depending on the motor series in a corrosion-resistant aluminum housing or 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-protected motors (see "Special versions").

All marine motors generally have an external grounding terminal.

#### Mountings (rotary pulse 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: 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 Innomatics standard components.

#### Fan / fan cover

Fans and fan covers 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.



# Innomotics DP application-specific motors – Marine motors Orientation

## Technical specifications

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	
LR	45	70	95	≥ 100	E21
BV	45	75	100	≥ 100	E31
DNV	45	75	100	≥ 300	E51
ABS	50	70	95	≥ 100 <sup>1)</sup>	E52
RINA	45	75	100	≥ 100	E41
RS	45	75	95	≥ 20	E46
KR	45	75	95	≥ 7.5	E54

## Type test certificates

The image displays several overlapping Type Approval Certificates (TACs) issued by various classification societies for Siemens AG asynchronous machines. The certificates are for power below 100 kW and cover different frame sizes (71M to 315L). Key details visible across the certificates include:

- Manufacturer:** Siemens AG, Industry Sector, Drive Technology Division, Large Drive, I DT LD, Vogelsheider Str. 1-15, D-90441 Nuremberg, Germany.
- Product Description:** Asynchronous Low-Voltage Motors, 315L series, IP23 series, 1000 - 1800 r/min, Frame 71M up to 315L.
- Technical Data:** Rated voltage (200 V up to 690 V), Synchronous speed (750, 1000, 1500, 1800, 2000, 3000 r/min), Ambient temperature (40°C for 30°C, 50°C for 40°C), No. of poles (2, 4, 6, 8 and pole-changing type).
- Approval Dates:** Various dates are listed, such as 11 Feb 2020, 16 Oct 2019, 16 Oct 2019, and 16 Oct 2019.
- Classification Societies:** ABS, Bureau Veritas, Lloyd's Register, RINA, KR, and others.

<sup>1)</sup> Required for all power ranges for ATEX compliance.

G\_D081\_XX\_00526

### Technical specifications

#### Temperature class and coolant temperature

Innomotics GP/SD standard motors and Innomotics XP explosion-proof motors up to frame size 355

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 power 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
<b>Temperature class 155 (F) used according to 155 (F)</b>				
Derating factor for line operation	1.00	0.96	0.92	0.87
<b>Temperature class 155 (F) used according to 130 (B)</b>				
Derating factor for line operation	0.90	0.86	0.83	0.78

More detailed information is available on request.

#### Rating plate and inspection certificate

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

V	Hz	A	kW	cosφ	NOM.EFF	1/min	IE-CL
400 Δ	50	275	160	0.87	95.8	1490	IE3
690 Y	50	161	160	0.87	95.8	1490	IE3
460 Δ	60	275	184	0.88	96.2	1788	IE3
460 Δ	60	240	160	0.87	96.2	1791	IE3

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 1LE1/1LE5/1MB1/1MB5/1PC1. With IP56, icing must be avoided.

#### Winding and motor protection

For monitoring the winding and bearings, the motors can be equipped with PTC 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 finish climate group "worldwide" 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 finish as standard (see "Special versions").

With particularly corrosive atmospheres, the sea-air-resistant special paint finish C4 (order code **S03**) or the offshore special paint finish C5 (order code **S04**) is recommended.

Special paint colors with the order codes **Y53** and **Y56** 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  $U_{\text{rated}} \leq 500$  V. The following limit values (voltage values are peak values) must be maintained:  $U_{\text{phase-to-phase}} \leq 1500$  V,  $U_{\text{phase-to-ground}} \leq 1100$  V, voltage rise times of  $t_s > 0.1$  μs. Operation of motors at higher voltage peaks (e.g. on converters with controlled input, e.g. AFE, ALM) requires motors with higher insulation resistance. 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 eb 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.

# Innomotics DP application-specific motors – Marine motors

## Orientation

### Technical specifications

#### Recommended special versions

- Motor protection with 1 or 3 PTC thermistors – for tripping (2 terminals) – 15th position of the Article No. **B**
- Installation of Pt100 resistance thermometers for winding temperature monitoring – 16th position of the Article No. **"H"**
- Especially for the motor series 1LE5:  
Installation of 2 Pt100 resistance thermometers in basic circuit for rolling-contact bearings – order code **Q72**
- 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**
- 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 codes **F74** and **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 **B10** for motor types 1LE1, 1LE5, 1PC5, 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 "Innomotics GP/SD 1LE1/1PC1 standard motors" and "Innomotics XP 1MB1 explosion-protected 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
Inspection certificate 3.1 in accordance with EN 10204 Note: The delivery time for the manufacturer's test certificate may differ from the delivery time for the motor.	<b>B02</b>
External grounding terminal	<b>H04</b>

#### Ordering example

Selection criteria	Requirement	Structure of the Article No.
Motor type	Innomotics SD Basic Line, efficiency class IE3 Premium Efficiency, IP55 degree of protection, IM B3 type of construction, without winding protection, terminal box at top	<b>1LE1503</b>
No. of poles, speed, rated power	4-pole, 1500 rpm, 55 kW	<b>1LE1503-2CB2</b>
Voltage, frequency	400 VΔ/690 VY, 50 Hz	<b>1LE1503-2CB23-4</b>
Type of construction	IM B3	<b>1LE1503-2CB23-4A</b>
Motor protection	1 or 3 PTC thermistors – for tripping (2 terminals)	<b>1LE1503-2CB23-4AB</b>
Terminal box position	Terminal box right	<b>1LE1503-2CB23-4AB5</b>
Paint finish	Paint finish in "Brilliant blue" RAL 5007	<b>1LE1503-2CB23-4AB5-Z Y53</b> Plain text: <b>RAL5007</b>
Marine version	Drive for "Essential Services" with type test certificate according to <b>DNV Maritime</b> with coolant temperature CT 45 °C	<b>1LE1503-2CB23-4AB5-Z Y53+E51</b> Plain text: <b>RAL5007</b>
	Individual acceptance (by marine classification society)	<b>1LE1503-2CB23-4AB5-Z Y53+E51+B10</b> Plain text: <b>RAL5007</b>
<b>Motor order</b>	Type test with temperature-rise run for horizontal motors, with acceptance	<b>1LE1503-2CB23-4AB5-Z Y53+E51+B10+B83</b> Plain text: <b>RAL5007</b>

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**) has only to be ordered for one motor. It is not necessary to specify order code **B83** for any further identical motors (included 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 in units	Article No.
1	1	<b>1LE1503-2CB23-4AB5-Z Z=Y53+E51+B10+B83</b> Plain text: <b>RAL 5007</b>
2	4	<b>1LE1503-2CB23-4AB5-Z Z=Y53+E51+B10</b> Plain text: <b>RAL 5007</b>

## Innomatics DP application-specific motors – Marine motors Special versions · Options

### Aluminum series 1LE10

#### Selection and ordering data

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Frame size										Motor version	
		63	71	80	90	100	112	132	160	180	200		
						1LE1004						IEC	IE4
			1LE1003										IE3
	1LE1001												IE2
	1LE1002												IE1
			1LE1023									Eagle Line	NPE (NEMA)
				1LE1021									NEE (NEMA)
						1LE1011						Pole-changing	
						1LE1012							
<b>1LE10 . . . . . -Z Order code</b>													

#### Marine version – Basic version

With type test certificate according to Lloyds Register (LR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E21</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to Bureau Veritas (BV), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E31</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to Registro Italiano Navale (RINA), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E41</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to Russian Maritime Register (RS), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E46</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to DNV Maritime, CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E51</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to American Bureau of Shipping (ABS), CT 50 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E52</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		
With type test certificate according to Korean Register of Shipping (KR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E54</b>		✓	✓	✓	✓	✓	✓	✓	✓	✓		

#### Marine version – Acceptance/certification

Individual acceptance by marine classification society	<b>B10</b>		–	–	✓	✓	✓	✓	✓	✓	✓		
Type test with heat run for horizontal motors, with acceptance	<b>B83</b>		–	✓	✓	✓	✓	✓	✓	✓	✓		

- ✓ With additional charge
- Not possible

# Innomatics DP application-specific motors – Marine motors

Special versions · Options

## Cast-iron series 1LE15/1LE16 Basic/Performance Line

### Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Frame size											Motor version			
		71	80	90	100	112	132	160	180	200	225	250	280	315		
					1LE1504 Basic Line								IEC	IE4		
					1LE1604 Performance Line											
				1LE1503 Basic Line											IE3	
				1LE1603 Performance Line												
				1LE1583												
				1LE1501 Basic Line											IE2	
				1LE1601 Performance Line												
				1LE1523 Basic Line											Eagle Line	NPE (NEMA)
				1LE1623 Performance Line												
				1LE1521 Basic Line									NEE (NEMA)			

1LE1 ..... -Z Order code

### Marine version – Basic version

Additional description	Code	71	80	90	100	112	132	160	180	200	225	250	280	315
With type test certificate according to Lloyds Register (LR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to Bureau Veritas (BV), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to Registro Italiano Navale (RINA), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E41	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to Russian Maritime Register (RS), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E46	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to DNV Maritime, CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E51	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to American Bureau of Shipping (ABS), CT 50 °C, temperature class 155 (F), utilized according to 155 (F)	E52	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
With type test certificate according to Korean Register of Shipping (KR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	E54	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

### Marine version – Acceptance/certification

Additional description	Code	71	80	90	100	112	132	160	180	200	225	250	280	315
Individual acceptance by marine classification society	B10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Type test with heat run for horizontal motors, with acceptance	B83	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- ✓ With additional charge
- Not possible

## Innomatics DP application-specific motors – Marine motors

Special versions · Options

### Cast-iron series 1LE55/1LE56 Basic/Performance Line

#### Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Frame size				Motor version	
		250	280	315	355	IEC	IE4
		1LE55.4 Basic Line				IEC	IE4
		1LE56.4 Performance Line					
		1LE55.3 Basic Line					
<b>1LE5</b> . . . . . -Z	Order code			1LE56.3 Performance Line			IE3

#### Marine version – Basic version

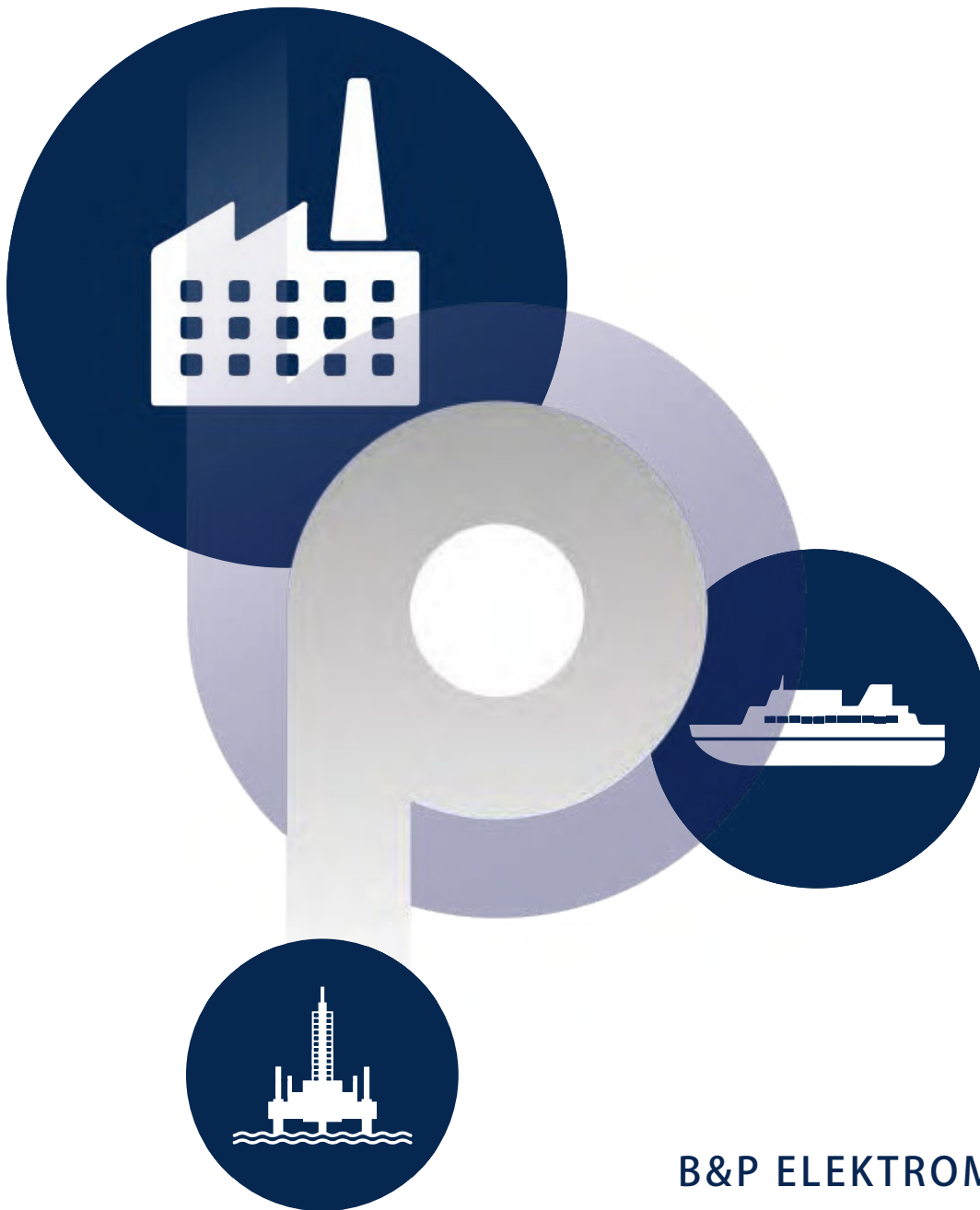
With type test certificate according to Lloyds Register (LR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E21</b>	–	✓	✓	✓	
With type test certificate according to Bureau Veritas (BV), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E31</b>	–	✓	✓	✓	
With type test certificate according to Registro Italiano Navale (RINA), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E41</b>	–	✓	✓	✓	
With type test certificate according to Russian Maritime Register (RS), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E46</b>	–	–	✓	✓	
With type test certificate according to DNV Maritime, CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E51</b>	–	✓	✓	✓	
With type test certificate according to American Bureau of Shipping (ABS), CT 50 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E52</b>	–	✓	✓	✓	
With type test certificate according to Korean Register of Shipping (KR), CT 45 °C, temperature class 155 (F), utilized according to 155 (F)	<b>E54</b>	–	✓	✓	–	

#### Marine version – Acceptance/certification

Individual acceptance by marine classification society	<b>B10</b>	–	✓	✓	✓	
Type test with heat run for horizontal motors, without acceptance	<b>B82</b>	✓	✓	✓	✓	
Type test with heat run for horizontal motors, with acceptance	<b>B83</b>	–	✓	✓	✓	

✓ With additional charge





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