PLETTENBERG
High End Elektromotoren-Manufaktur

Operating manual industrial motors

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1. Notes regarding this document

Legal provisions

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Scope of valididy

This document applies for the following device types:

Motor type
Nova 15
Nova 30
HP 370
HP 505
HP 600
HP 620

Target group

The activities described in this document may only be executed by qualified, skilled workers. The qualified, skilled workers must possess the following qualifications:

- Knowledge regarding the functional methods and operation for the product
- Knowledge and observation of these instructions with all safety notes

Updated additional information

Links regarding updated additional information can be found under www.Plettenberg-Motoren.com.

Symbols

Symbols	Clarification
	Warning, the non-observance of which leads directly to death or serious injury
	Warning, the non-observance of which may result in serious injury
	Warning, the non-observance of which may result in minor or moderate injury
	Warning, non-observance of which may result in damage to property
	Information which is important for a specific subject or goal, but not relevant to safety

Nomenclature

Complete designation	Designation in this document
Speedcontroller	Controller

2. Savety

Intended use

The motor series of the validity range are intended for this purpose:

- As drive unit

Unapproved use in the sense of a foreseeable misuse shall be deemed to be improper use:

- the drive unit in man-bearing devices
- the drive unit in public transport and means of transport
- the drive unit for toys
- use in potentially explosive atmospheres
- use by children under 14 years of age
- any use other than those provided for

Savety information

This chapter contains safety instructions which must always be observed when working on and with the product. In order to prevent personal injury and property damage and to ensure continuous operation of the product, always read this chapter carefully and follow all safety instructions at all times.

⚠ Danger

Slight, moderate or severe injuries

Malfunction due to electromagnetic interference. Communication equipment and other devices in the surroundings must not be exposed to impermissible electromagnetic interference.

- The control and phase cables must not be extended more than 20 cm. The product must be inspected and the fastening must be controlled again before commissioning
- Modifications to the product are not permitted
- The supply and return cables must be laid together
- Always shield all cables

⚠ Warning

Cut injuries, loss of eyesight

Parts can be ejected from the housing by rotation.

- It must be therefore be ensured that the product is only used in the closed place of destination. It must also be ensured that no magnetic or non-magnetic parts get into the motor during transport and assembly.
- The product must always be protected against heat, dirt and moisture, otherwise the adhesive strength of the components may be lost.
- Always ensure proper handling.
- The product must never be contaminated with foreign bodies / adhesives / paint during assembly.
- Modifications to the product are forbidden
- Always ensure that the motor is properly fastened.
- Always ensure that the controller settings are correct.
- The product must be sufficiently cooled.
- Operation of the motor at idling speed without load is prohibited.

⚠ Warning

Electric shock, burns, fire
caused by energised parts.

- The product must always be protected against overheating, dirt and moisture, otherwise the components will be damaged. This can cause short circuits.
- The product as well as the contacts must be inspected for overheating, soiling, deformation, fire and moisture before commissioning.
- Modifications to the product are not permitted.
- The maximum bending radius of the connecting cables must not be undershot. 6 x outer diameter.
- To prevent high-impedance connections, only gold contact plugs from Multi-Contact, Plettenberg or Schnepp are permitted.
- Assembly and/or dismantling only when de-energised.

⚠ Warning

Injuries due to crushing, being caught up
Malfunction due to electromagnetic interference.

- The control and phase cables must not be extended. The product must be inspected and the fastening must be controlled again before commissioning.
- Modifications to the product are not permitted.
- The supply and return cables must be laid together.
- Cables must be shielded.

⚠ Warning

Danger from magnetic radiation
Malfunction / destruction of magnetically sensitive parts.

- The motor must never come into contact with magnetically sensitive parts such as pacemakers or data carriers. The strong magnets can lead to damage and/or malfunction or extinction of these.

⚠ Warning

Crushing, pulling in / being caught up
Caused by careless touching and too small a distance from rotating parts.

- There must be sufficient distance retained to the motor so that no people or objects can be caught up or drawn in.

⚠ Caution

Burns
Caused by carelessly touching hot surfaces.

- After operation of the product, the surfaces may still be hot. Always allow the product to cool down.

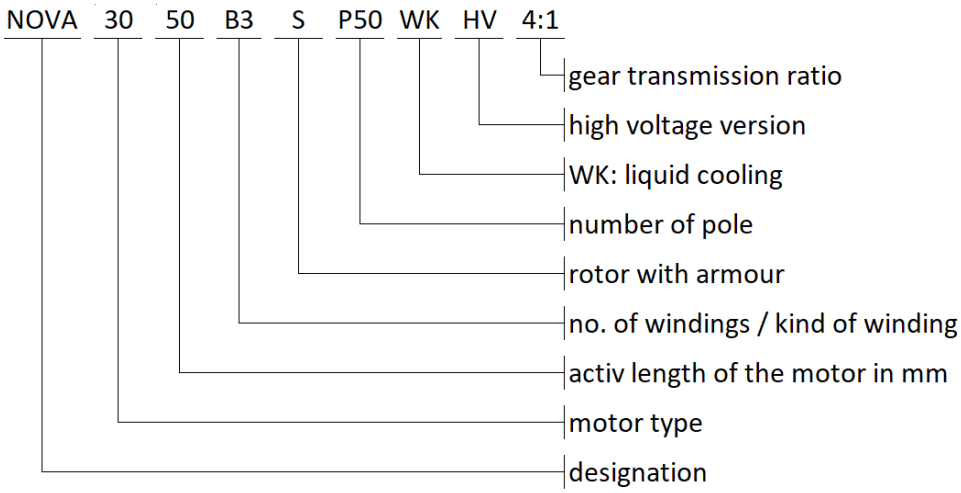
Notice

Thermal overload / destruction

- Always ensure sufficient cooling for the motor (air or water cooling).
- A high load on the motor is only permissible in short operation. Under no circumstances may the motor exceed the temperature of 100°C.
- After each use, the motor must cool down again to ambient temperature.
- Only control systems and regulators approved by us may be used. You will find an overview on our homepage.

3. Product overview

Type designation



Technical data

type	weight: [kg]	voltage: [V]	max.RPM: [1/min]	Ø shaft: [mm]
Nova 15 (HV)	2,5 – 3,1	30 – 80 (120)	5000	18
Nova 15 „S“ (HV)	2,5 – 3,1	30 – 80 (120)	11000	18
Nova 30	5 – 6,5	30 - 140	5000	30 C=1:10
Nova 30 „S“	5 - 6,5	30 - 140	7000	30 C=1:10
Nova 30 WK	5 – 6,5	30 - 140	5000	32
Nova 30 „S“ WK	5 - 6,5	30 - 140	7000	32
HP 370	0,57 – 0,95	10-60	10000	5 oder 12
HP 370 „S“	0,57 – 0,95	10-60	20000	5 oder 12
HP 505	1,4 – 1,5	10-60	10000	12
HP 600 „S“	1,7 – 2,7	10-80	20000	15
HP 620	1,7 – 2,5	10-80	7000	15
HP 620 „S“	1,7 – 2,5	10-80	12000	15

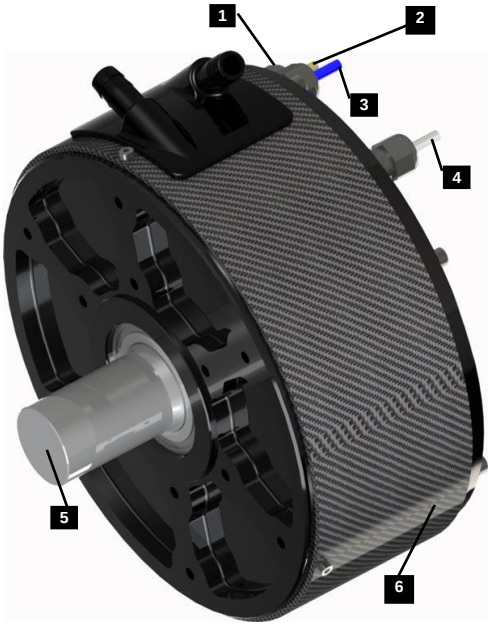
Environmental and climatic conditions

Ambient temperature:	-20°C up to +40°C
Permissible humidity:	Non-condensing
Protection class depending on type	IP 21 / IP53

Structure of in-running motor

The windings are located in the motor housing. Permanent magnets are attached to the axis and rotate in the magnetic field of the windings.

Type: Nova 30 mit Wasserkühlung



1: motor phase 1 (red)

2: motor phase 2 (yellow)

3: motor phase 3 (blue)

4: sensor wire

5: shaft

6: cooling (optionally)

4. Commissioning

Safety during commissioning

Danger

Severe, moderate or minor injuries.
Destruction or damage to the product.

Safety instructions from Chapter 2 must be complied with!

The motor phases must not be shortened without prior consultation. Crimping of connections may also not be executed without previous consultation.

The motor phases must not be shortened without prior consultation. Crimping of connections may also not be executed without previous consultation.

Test runs should only be executed outdoors in principle.

During motor operation, it is essential to ensure that no people are located to the side or in front of the rotation plane.

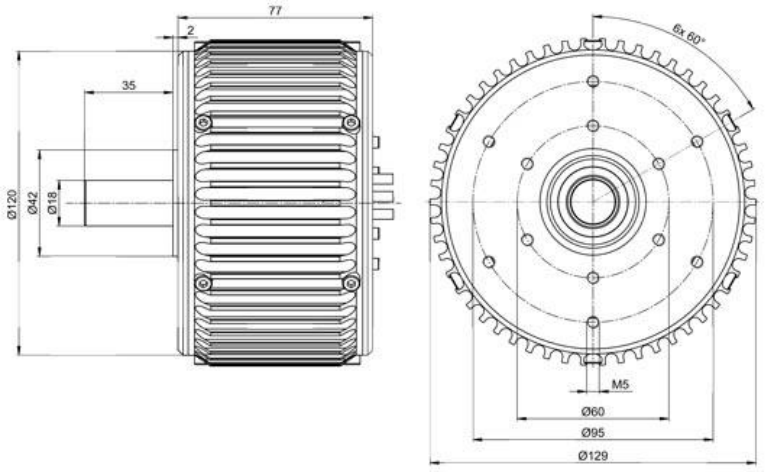
Assembly

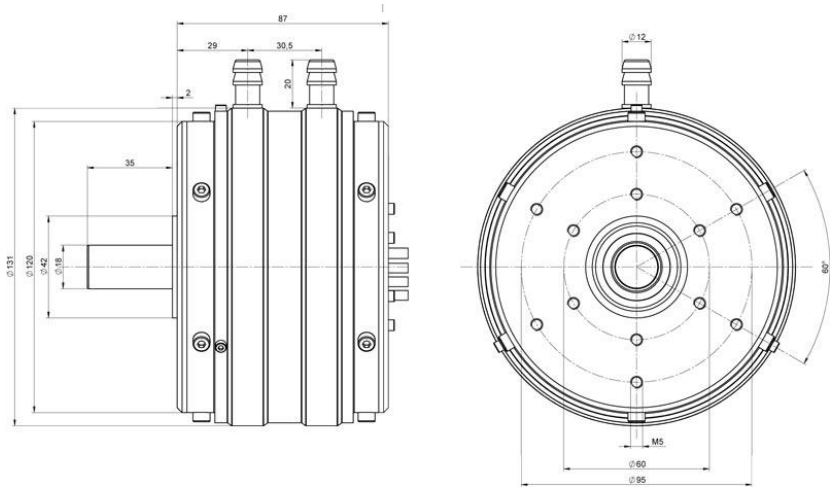
Notice

Destruction / damage of the motor.

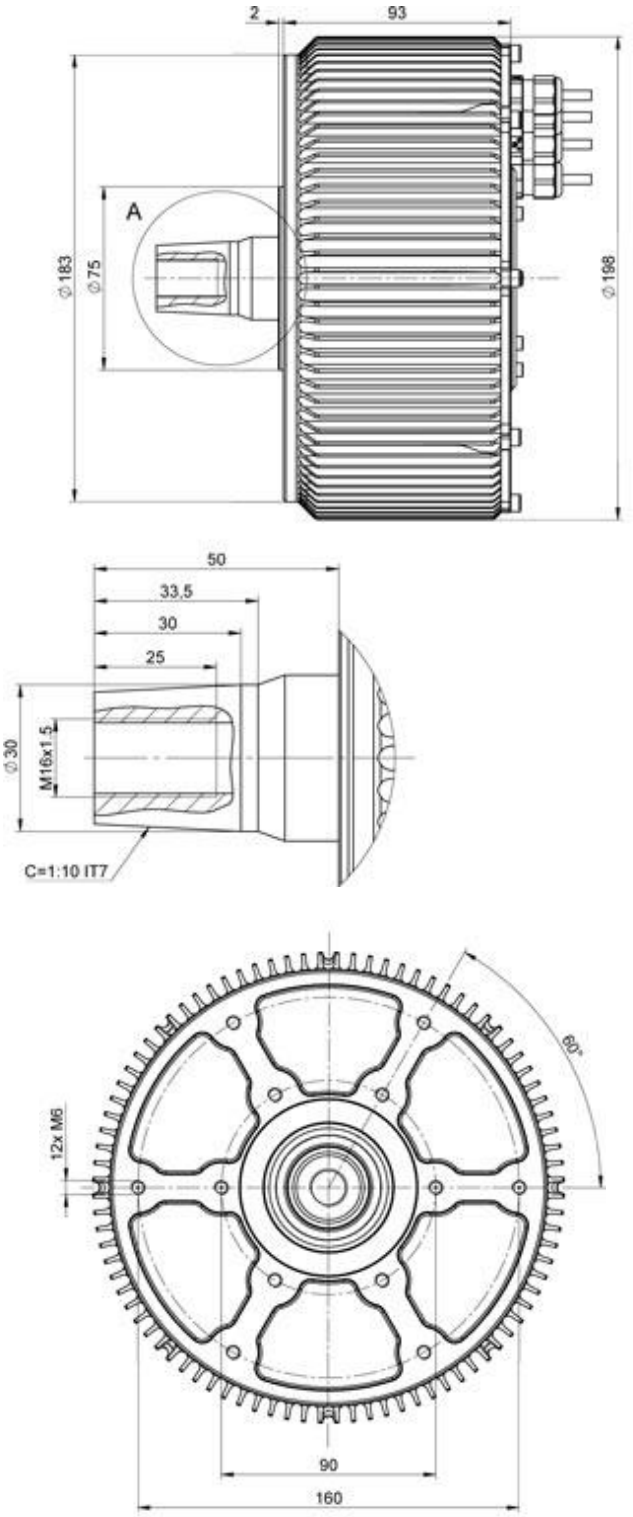
- Always use suitable screws or bolts.
- Sawed or ground screws or bolts can destroy the thread in the motor's bearing shield.
- After each use, the motor must cool down again to ambient temperature.
- Only control systems and regulators approved by us may be used. You will find an overview on our homepage.
- Never exceed the maximum screw-in depth. Screws or bolts which are screwed in too far will damage or destroy the motor.
- Only use original screws or bolts.
- Always position distance spacers between the screw or bolt and the head frame of the model.

Nova 15

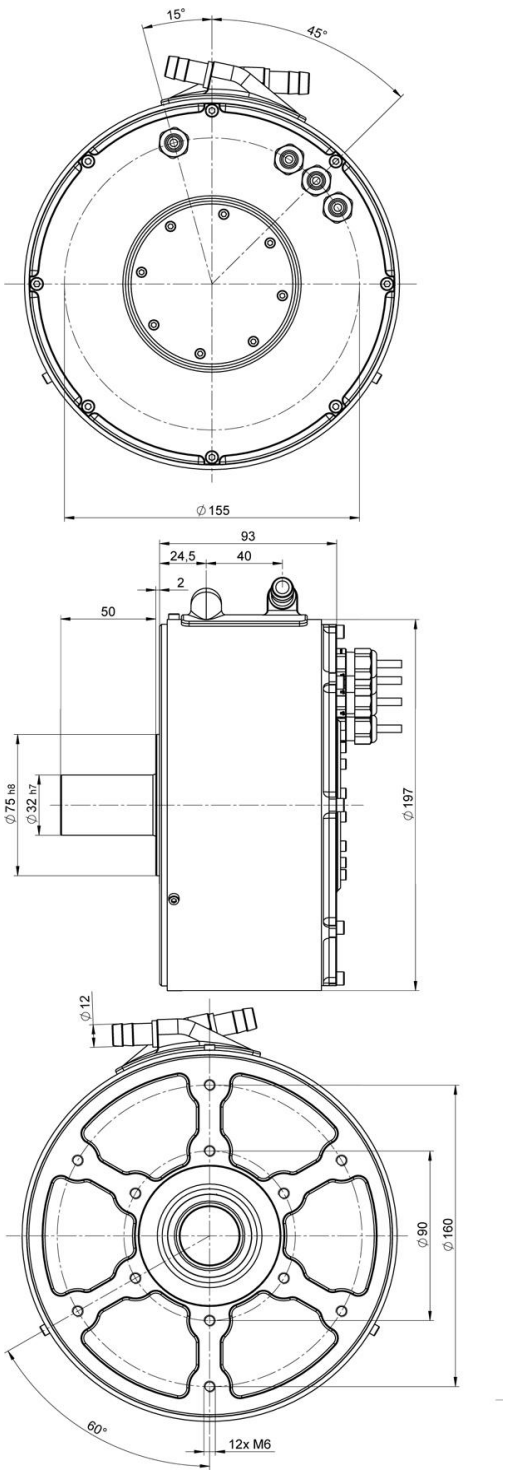
Nova 15/xx (30 = 77mm; 40 = 87mm; 50 = 97mm)
The motor is fixed with 6 M5 bolts. Maximum screw-in depth: 9 mm Maximum tightening torque: 6 Nm


Nova 15/xx WK (40 = 87mm; 50 = 97mm)
The motor is fixed with 6 M5 bolts. Maximum screw-in depth: 9 mm Maximum tightening torque: 6 Nm


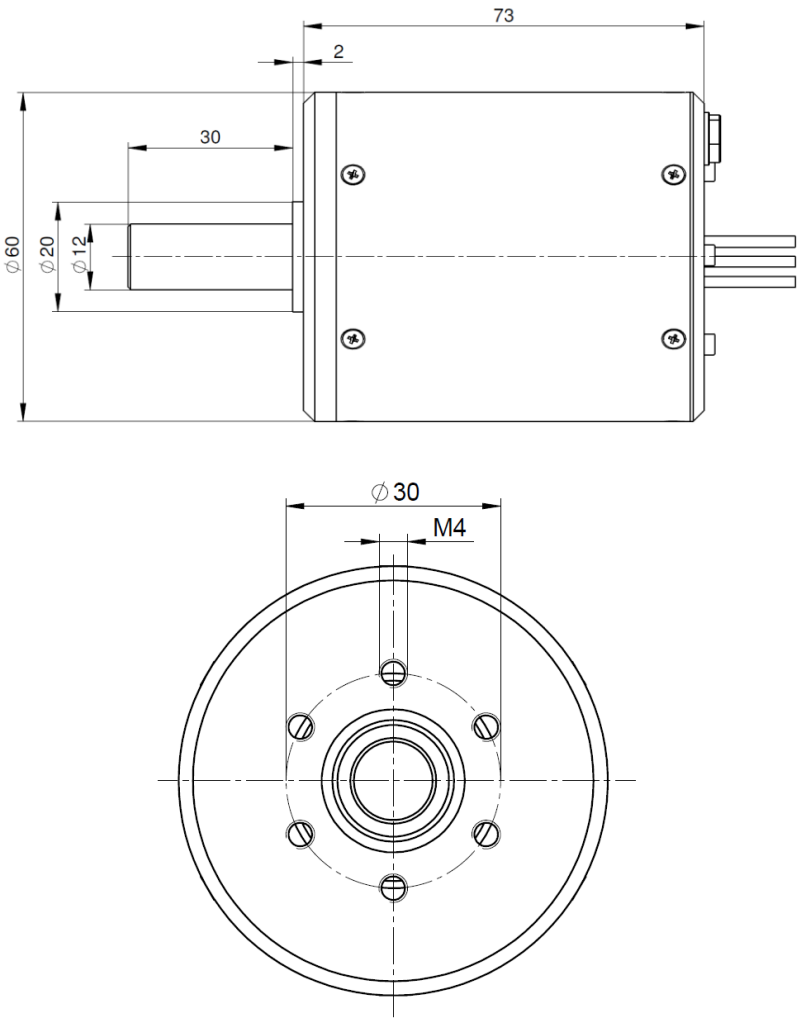
Nova 30

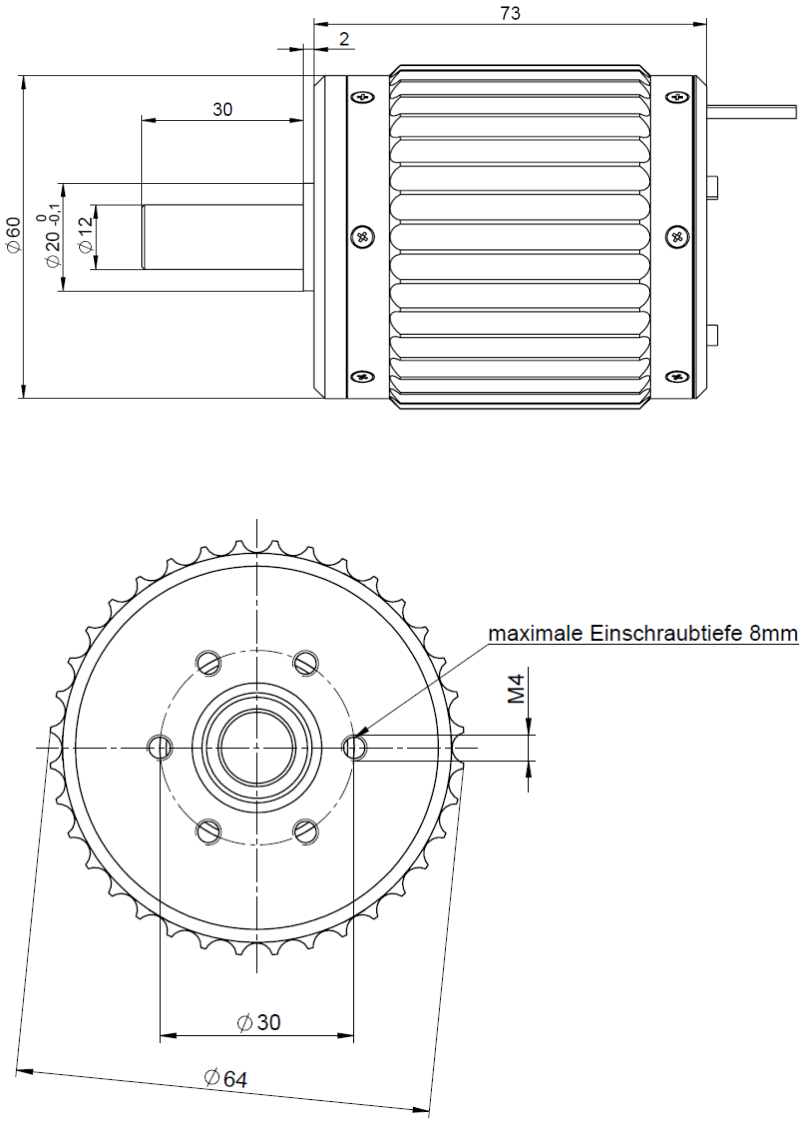
Nova 30/50
The motor is fixed with 6 M6 bolts. Maximum screw-in depth: 10 mm Maximum tightening torque: 10 Nm


Nova 30/50 WK
The motor is fixed with 6 M6 bolts. Maximum screw-in depth: 10 mm Maximum tightening torque: 10 Nm

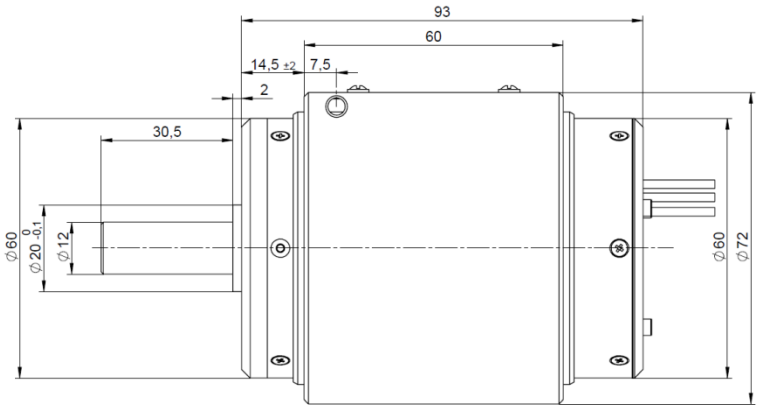


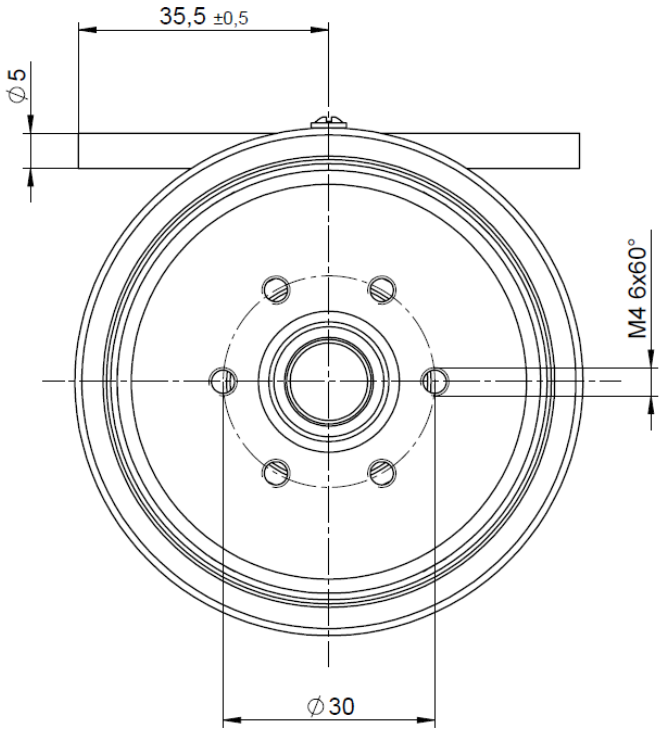
HP 370

HP 370/xx (30 = 73 mm; 40 = 83 mm; 50 = 93 mm)
The motor is fixed with 6 M4 bolts. Maximum screw-in depth: 8 mm Maximum tightening torque: 3 Nm


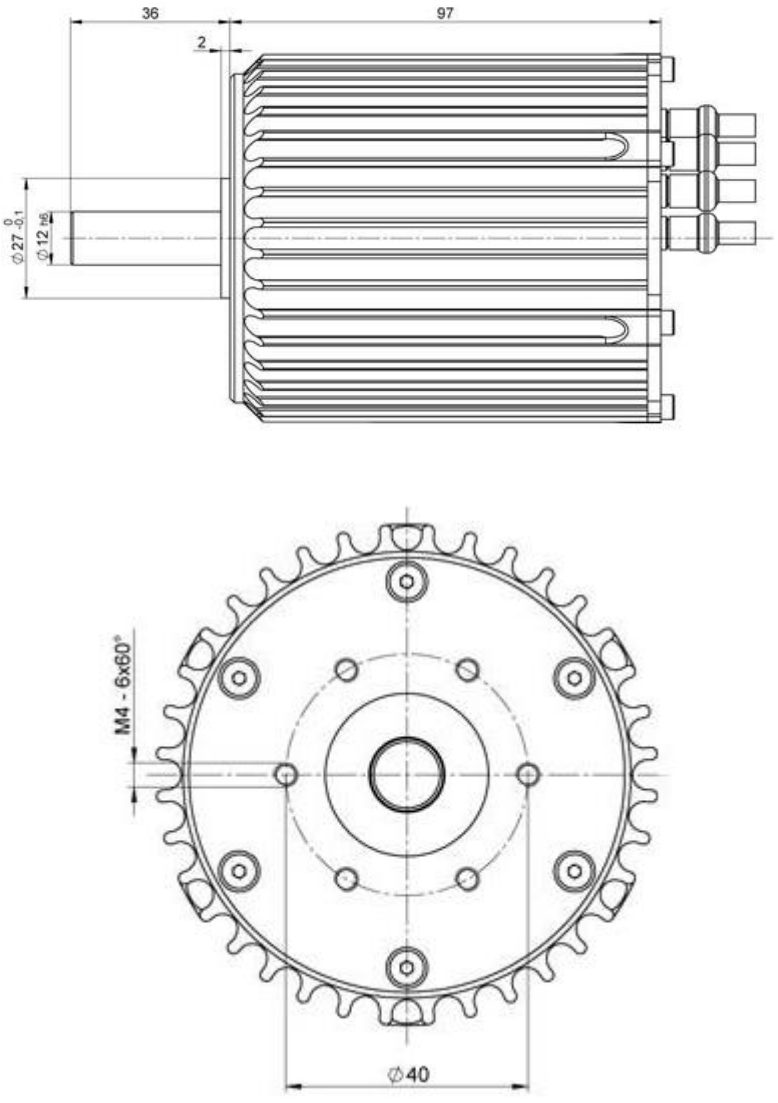
HP 370/XX MKR (30 = 73 mm; 40 = 83 mm; 50 = 93 mm)
The motor is fixed with 6 M4 bolts. Maximum screw-in depth: 8 mm Maximum tightening torque: 3 Nm


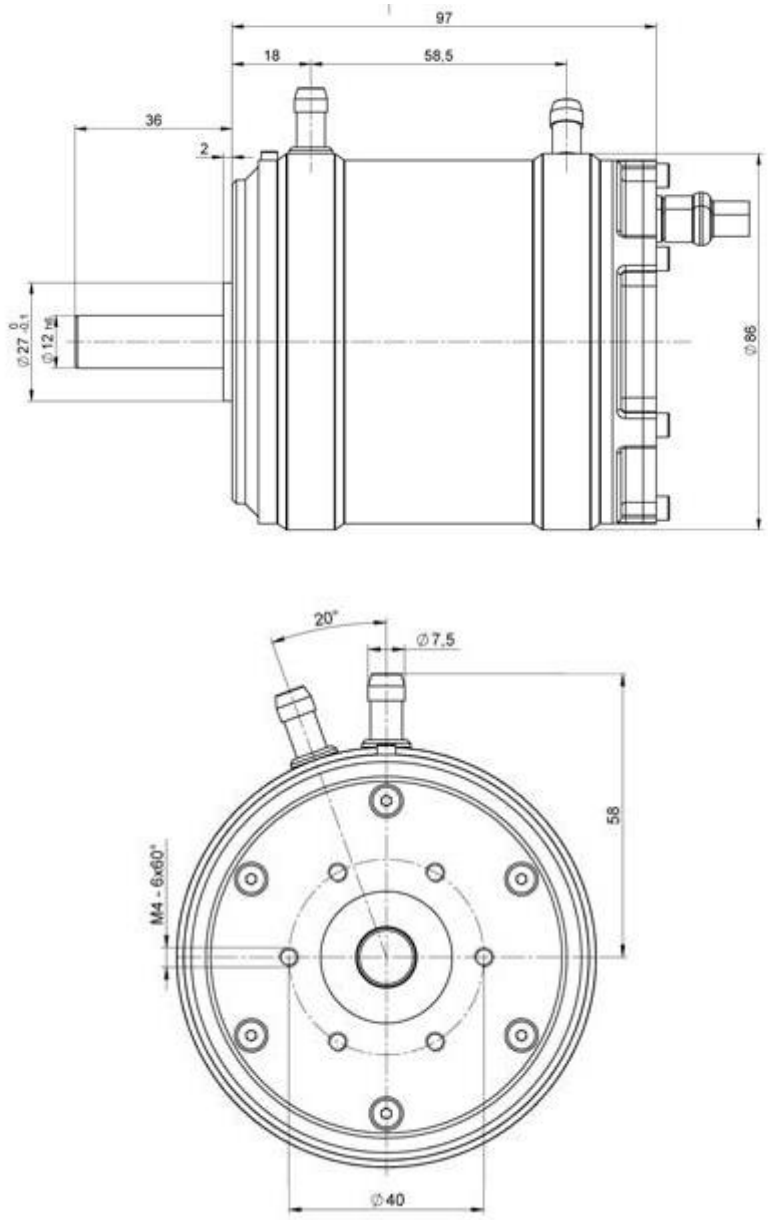
HP 370/50 WK
The motor is fixed with 6 M4 bolts. Maximum screw-in depth: 8 mm Maximum tightening torque: 3 Nm



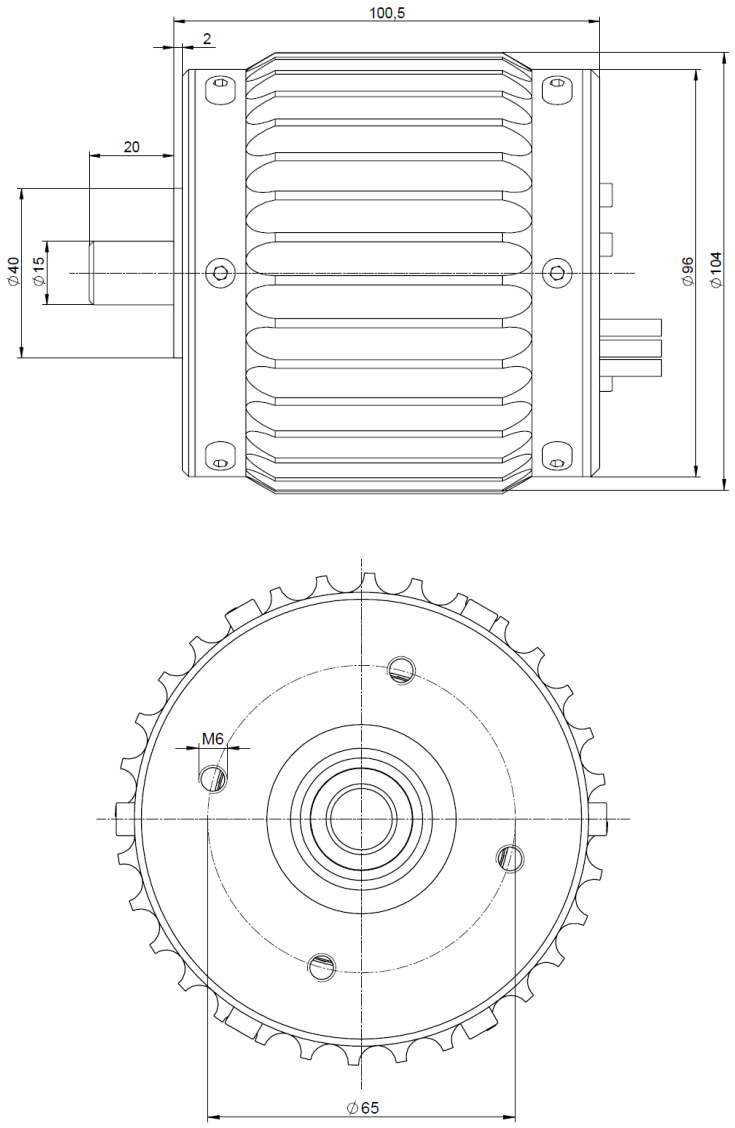


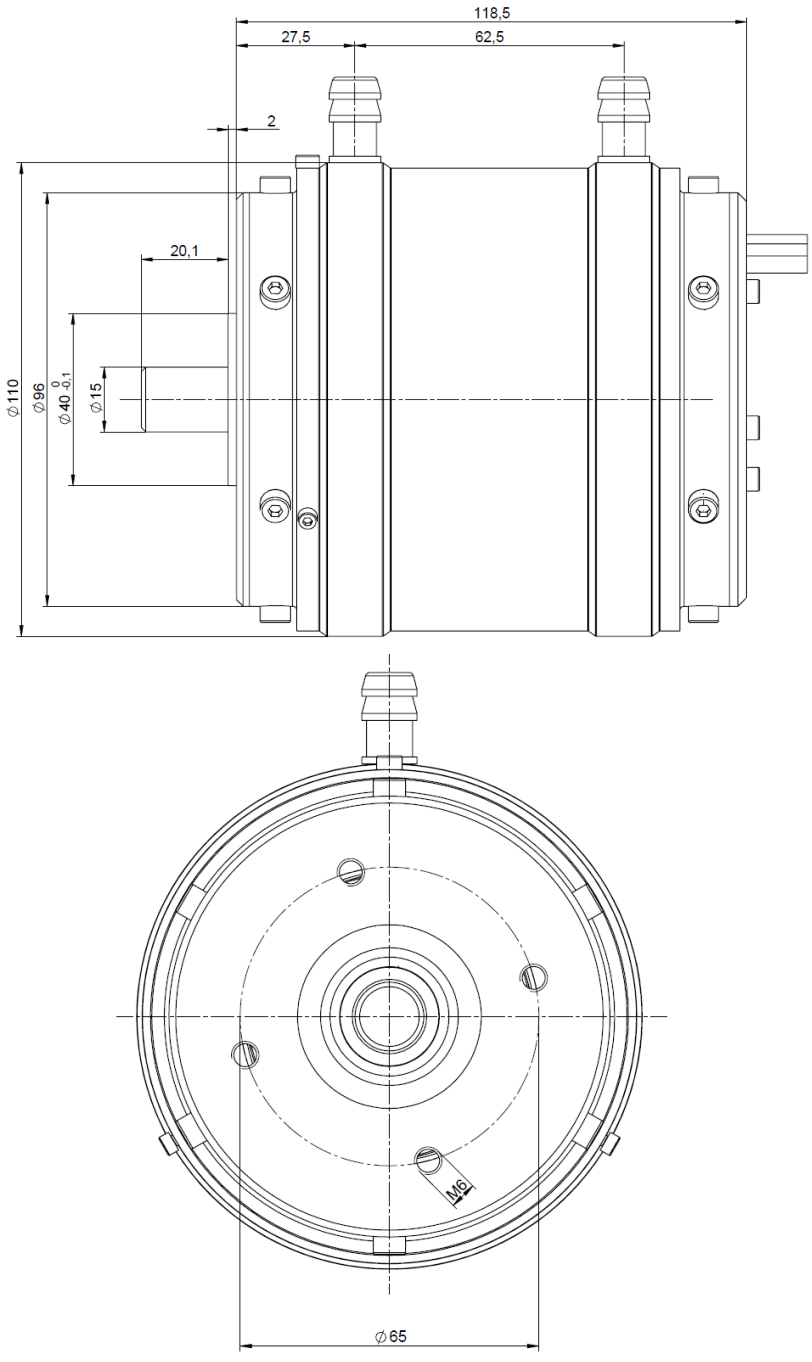
HP 505

HP 505
The motor is fixed with 6 M4 bolts. Maximum screw-in depth: 8 mm Maximum tightening torque: 3 Nm


HP 505/50 WK
The motor is fixed with 6 M4 bolts. Maximum screw-in depth: 8 mm Maximum tightening torque: 3 Nm


HP 600 / HP 620

HP 600/xx / HP 620/xx (30 = 100,5 mm; 37 = 110,5 mm; 40 = 110,5 mm; 50 = 118,5 mm)
The motor is fixed with 4 M6 bolts. Maximum screw-in depth: 12 mm Maximum tightening torque: 10 Nm


HP 600/xx WK; HP 620/xx WK (40 = 108,5 mm; 50 = 118,5 mm)
The motor is fixed with 4 M6 bolts. Maximum screw-in depth: 12 mm Maximum tightening torque: 10 Nm


Cable connections

Only control systems and regulators approved by us may be used. You can read about them in the catalogue or on our current homepage. If other control systems or regulators are used, then we cannot assume any guarantee or liability in the event of destruction of the motor, regulator or the controller.

Motor connection cables must never be shortened or extendeds:

Firma **Plettenberg Elektromotoren GmbH & Co. KG**

The three motor phases must be connected to the controller according to the manufacturer's instructions:

The sensor cable must be connected to the controller in accordance with the regulator manufacturer's specifications.

The brush-free Plettenberg motors with sensors are either equipped with 3 hall sensors or with 3 fork light barriers with 120° electrical angle. The maximum current draw of the sensor is 25mA, for motors with Hall sensors the typical current consumption 10mA The sensors have open-collector outputs with pull-up resistors. 6.2K Ohm pull-up resistors are normally installed, but older motors can also have 10k Ohm or 12k Ohm pull-up resistors. For motors with fork light barriers, no additional external pull-up resistors may be used otherwise the output will not switch cleanly to 0 V. The pull-up resistance can be easily determined by measuring the resistance of the sensor VCC (red) against sensor A (orange) with an ohmmeter.

Phase A: red, Phase B: white, Phase C: blue/black

Sensor A: orange, Sensor B: white, Sensor C: green, VCC = 5 V: red, GND = 0 V: black.

Temperature sensor NTC47K ***optional***: blue

The shield of the sensor cable should be connected to the sensor GND. The shield should not be connected to the motor housing or motor control housing.

Commutation sequence forwards

	Step1	Step2	Step3	Step4	Step5	Step6	Error1	Error2
Phase A(U)	+	Z	-	-	Z	+	Z	Z
Phase B(V)	Z	+	+	Z	-	-	Z	Z
Phase C(W)	-	-	Z	+	+	Z	Z	Z
Sensor A	1	1	0	0	0	1	0	1
Sensor B	0	1	1	1	0	0	0	1
Sensor C	0	0	0	1	1	1	0	1

Commutation sequence backwards

	Step1	Step 2	Step 3	Step 4	Step 5	Step 6	Error1	Error2
Phase A(U)	-	-	Z	+	+	Z	Z	Z
Phase B(V)	Z	+	+	Z	-	-	Z	Z
Phase C(W)	+	Z	-	-	Z	+	Z	Z
Sensor A	1	1	0	0	0	1	0	1
Sensor B	0	0	0	1	1	1	0	1
Sensor C	0	1	1	1	0	0	0	1

Z: High impedance, +:Plus, -:Minus, 1:>3 V, 0:<2 V

Settings

The motor speed must be controlled with a revolution speed measuring device.

Visual inspection and mechanical inspection

All fastening screws or bolts for the motor must be checked for tightness before commissioning.

It must always be ensured that all energised cables or plugs and sockets are insulated so that unintentional switching on of the motor by cable contact is impossible.

The position of the water cooling ring and its tightness must be inspected before the initial commissioning of water-cooled motors. All indicated dimensions are in mm.

5. Troubleshooting

It is absolutely necessary to install the receiver as far away as possible from the motor, regulator, controller and/or its current-carrying cables. The aerial must not be laid past the motor and its current-carrying cables. If this is not possible for structural reasons, then these elements must be shielded with sheet steel or foil.

6. Repetetive handling

Care

The housing surfaces can be cleaned with compressed air and a dry, lint-free cloth.

The motor must never be oiled. If this is not observed, then the correct functioning of the motor cannot be guaranteed or irreparable damage may occur.

7. Disposal

A motor with exceeded service life is electronic scrap. E-scrap consists on the one hand of valuable materials which can be recovered as secondary raw materials and, on the other hand, it contains environmentally hazardous substances.

Information regarding optimum material recycling is available from commercial waste disposal companies.

8. Service / Contact

Should, despite proper handling and sufficient care, problems should still occur or the motor will be damaged, then please send the motor back to our address stating the problem, defect or damage.

Plettenberg Elektromotoren GmbH & Co. KG

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9. EU-Declaration of Conformity

In the sense of the EU Directives

- **EMC Directive 2014/30/EU Appendix IV**
- **Low Voltage Directive 2014/35/EU Appendix IV**
- **RoHS Directive 2011/65/EU Appendix I**

CE

Plettenberg Elektromotoren GmbH & Co. KG

Rostocker Straße 30

34225 Baunatal – Großenritte

hereby declares, as the manufacturer, that the articles and objects described below comply with the provisions of the relevant community harmonisation legislation referred to above.

Motor type	Motor type
Nova 15	HP 600/30
Nova 30	HP 600/37
	HP 600/40
HP 370/30	HP 600/50
HP 370/40	
HP 370/50	HP 620/30
	HP 620/40
HP 505	HP 620/50

Interference emission	**EMC Directive Article 6 Appendix I.1.a**
DIN EN 61000-6-3:2011-09	Electromagnetic Compatibility (EMC)- Part 6-3: Generic standards - Interference emission for residential areas, business and commercial areas as well as small businesses (IEC 61000-6-3:2006 + A1:2010); German Edition EN 61000-6-3:2007 + A1:2011

Interference immunity	**EMC Directive Article 6 Appendix I.1.b**
DIN EN 61000-6-1:2007-10	Electromagnetic Compatibility (EMC)- Part 6-1: Generic standards - Immunity for residential environments, business and commercial areas as well as small businesses (IEC 61000-6-1:2005);

Device safety	**Low Voltage Directive 2014/35/EU Anhang I**
DIN EN 60335-1:2012-10	Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2010, modified);

Safety of machinery	
DIN EN 60335-1:2012-10	Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2010, modified);
DIN EN ISO 12100:2010	General principles for design - Risk assessment and risk mitigation ISO 12100:2010 (): German Edition EN ISO 12100
DIN EN 60204-11:2014-10	Safety for Machinery – Electrical Equipment for Machinery – Part 1: General requirements (IEC 44/709/CDV:2014); German Edition FprEN 60204-1:2014

Maximum permissible concentrations in homogeneous materials in % by weight	**RoHS Directive Appendix II**
Lead	0,1%
Cadmium	0,01%
Polybrominated biphenyl (PBB)	0,1%
Polybrominated diphenyl ether (PBDE)	0,1%
Mercury	0,1%
Hexavalent chromium	0,1%

Note:

The sole responsibility for drawing up this declaration of conformity lies with the manufacturer. This declaration of conformity will lose its validity when the product is converted, extended or altered in any other manner without the express consent of Plettenberg Elektromotoren GmbH & Co. KG and when components, not belonging to Plettenberg Elektromotoren GmbH & Co. KG, or accessories are installed in the product as well as in the event of improper connection or improper use of the product.

Baunatal, 12 April 2016 .....

(Uwe Plettenberg, Director)