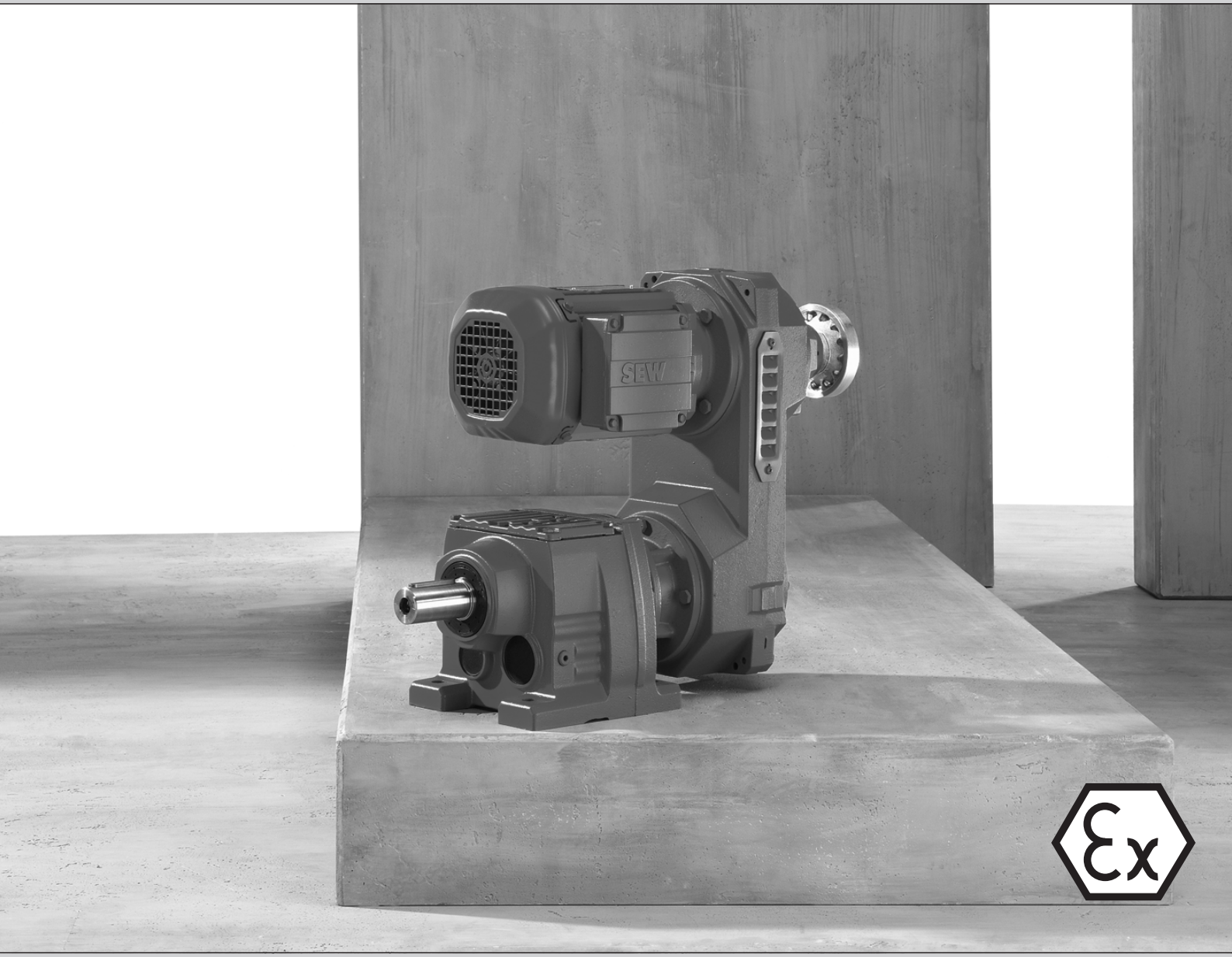
SEW EURODRIVE

Operating Instructions



VARIBLOC® Explosion-Protected Variable-Speed Gear Units and Accessories

Edition 01/2015

21242194/EN

Table of Contents

1 General information 6
1.1 About this documentation 6
1.2 Structure of the safety notes 6
1.2.1 Meaning of signal words 6
1.2.2 Structure of section-related safety notes 6
1.2.3 Structure of embedded safety notes 7
1.3 Rights to claim under limited warranty 7
1.4 Exclusion of liability 8
1.5 Product names and trademarks 8
1.6 Copyright notice 8

2 Safety notes 9
2.1 Preliminary information 9
2.2 Safety notes for carrying out work in potentially explosive atmospheres 9
2.3 General information 10
2.4 Target group 10
2.5 Designated use 11
2.6 Other applicable documentation 12
2.7 Transport/storage 12
2.8 Installation 12

3 VARIBLOC® in explosion-protected design 13
3.1 Unit structure 13
3.2 Nameplate 14
3.3 Type designation 15
3.4 Overview of mounting options for explosion-protected VARIBLOC® 16

4 Installation 17
4.1 Explosion marking 18
4.1.1 VARIBLOC® in explosion-protected design 18
4.1.2 General information 18
4.1.3 Ambient temperature 19
4.1.4 Temperature class 19
4.1.5 Surface temperature 19
4.1.6 Degree of protection 20
4.1.7 Ambient conditions 20
4.1.8 Output power and output torque 20
4.1.9 Special designs 20
4.2 Installation requirements 20
4.3 Permitted overhung loads without primary gear unit 21
4.4 Preliminary work following lengthy storage 22
4.5 Required tools/resources 23
4.6 Installation tolerances 23
4.7 Installing the variable-speed gear unit 24
4.7.1 Installation in damp locations or outdoors 25
4.7.2 Cable entry / cable gland 26

21242194/EN – 01/2015

4.8 Assembling input and output elements ... 26
4.8.1 Using a mounting device ... 27
4.8.2 Avoiding excessive overhung loads ... 27
4.9 Mounting of couplings ... 28
4.10 Accessory equipment ... 28

5 Startup ... 29
5.1 Prerequisites for startup ... 29
5.2 Before startup ... 30
5.3 Speed adjustment via handwheel ... 31
5.4 Speed monitoring ... 31
5.4.1 Standard version ... 31
5.4.2 Manufacturer's data ... 32
5.5 WEXA / WEX speed monitor ... 32
5.5.1 Front side of the speed monitor ... 33
5.5.2 Installing and setting the speed monitor ... 34
5.5.3 VARIBLOC® switching frequency ... 36
5.6 Voltage encoder IGEX ... 37
5.6.1 Mounting the voltage encoder ... 37
5.6.2 Changing switching interval x ... 38
5.7 Digital remote speed indicator ... 38
5.7.1 Front of the digital remote speed indicator ... 39
5.7.2 Mounting and setting the digital remote speed indicator ... 40
5.7.3 Calculating the measuring time ... 40
5.7.4 VARIBLOC® reference data ... 41
5.7.5 Calculation examples for the measuring time ... 41
5.8 Mounting and setting other speed monitors ... 43
5.9 TW right-angled tachometer, TA axial tachometer ... 44

6 Inspection and maintenance ... 45
6.1 Preliminary work regarding inspection/maintenance ... 46
6.2 Required tools/resources ... 46
6.3 Cleaning the variable-speed gear unit ... 46
6.4 Inspection and maintenance intervals ... 46
6.5 Checking wide V-belt ... 47
6.6 Replacing the wide V-belt ... 48
6.7 Regreasing adjustment spindle H, HS, NV ... 50
6.8 Measuring rolling bearing temperature ... 51
6.9 Completing inspection and maintenance work ... 53

7 Operation and service ... 54
7.1 Customer service ... 54
7.2 Malfunction of VARIBLOC® variable-speed gear units ... 55
7.3 Malfunctions of WEXA / WEX speed monitor ... 55
7.4 Waste disposal ... 56

8 Declarations of conformity ... 57
8.1 Variable-speed gear units in categories 2G and 2D ... 57

21242194/EN – 01/2015

8.2 Variable-speed gear units in categories 3G and 3D 58
9 Address List 59
Index 69

21242194/EN – 01/2015

1 General information

1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent hazard	Severe or fatal injuries.
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries.
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment.
NOTE ON EXPLOSION PROTECTION	Important information about explosion protection	Suspension of explosion protection and resulting dangers
INFORMATION	Useful information or tip: Simplifies handling of the drive system.	

1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

21242194/EN – 01/2015

Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Explanation
	General hazard
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Note on explosion protection
	Warning of automatic restart

1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- ⚠ **SIGNAL WORD** Type and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the hazard.

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the documentation. Read the documentation before you start working with the product.

21242194/EN – 01/2015

1.4 Exclusion of liability

You must comply with the information contained in this documentation to ensure safe operation and to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

1.6 Copyright notice

21242194/EN – 01/2015

2 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

2.1 Preliminary information

The following safety notes are primarily concerned with the use of variable-speed gear units. If you use gearmotors, also refer to the safety notes in the corresponding operating instructions for motors and/or gear units.

Also observe the additional safety notes provided in the individual chapters of this document.

2.2 Safety notes for carrying out work in potentially explosive atmospheres

⚠ WARNING

Explosion hazard.

Severe or fatal injuries.

- Bear in mind that hot, live, or moving parts of machines can lead to explosions in atmospheres with critical gas mixtures or concentrations of dust.

21242194/EN – 01/2015

2.3 General information

⚠ WARNING

Danger of electric shock, risk of crushing, or risk of burns during operation as the motors and gearmotors can have live, bare (in case of open connectors/terminal boxes) and movable or rotating parts as well as hot surfaces.

Severe or fatal injuries.

- All work related to transport, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel.
- For transport, storage, installation, assembly, connection, startup, maintenance and repair it is important that you adhere to the information in the following documents:
  - Warning and safety signs on the variable-speed gear unit / variable-speed gearmotor.
  - All the project planning documents, startup instructions and wiring diagrams related to the drive.
  - System-specific regulations and requirements.
  - National/regional safety and accident prevention regulations.
- Never install damaged products.
- Never operate or energize the unit without the necessary protection covers or the housing.
- Use the unit only according to its designated use.
- Make sure the unit is installed and operated properly.

This documentation provides additional information.

2.4 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and servicing of the product who possess the following qualifications:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Training in electrical engineering, e.g. as an electrician, electronics or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately.

All qualified personnel must wear appropriate protective clothing.

21242194/EN – 01/2015

2.5 Designated use

The gear units are intended for industrial systems and may only be used in accordance with the information provided in technical documentation of SEW-EURODRIVE and the information given on the nameplate. They meet the requirements set forth in Directive 94/9/EC and comply with the applicable standards and regulations.

The gear units are components for the installation in machines and plants according to the 2006/42/EC Machinery Directive. Within the scope of the Directive, you must not operate the machine in the designated fashion until you have established that the end product complies with Machinery Directive 2006/42/EC.

Optional equipment

In addition to general installation guidelines, the national applicable legal regulations (e.g. BetrSichV in Germany) must be observed when connecting additional units.

- EN 134631 Non-electrical equipment intended for use in potentially explosive atmospheres: Part 1: Basic methods and requirements
- EN 13463-5 Non-electrical equipment intended for use in potentially explosive atmospheres: Part 5: Protection by constructional safety "c"
- EN 50281-2-1 Electrical apparatus for use in the presence of combustible dust: Part 2-1: Test methods – Methods for determining the minimum ignition temperatures of dust
- EN 60079-0 Electrical apparatus for potentially explosive atmospheres: General requirements
- EN 60079-1 for protection type "d"
- EN 60079-7 for protection type "e"
- EN 60079-11 intrinsically safe "i"
- EN 60079-14 Electrical apparatus for potentially explosive atmospheres: Project engineering, selection and installation of electrical equipment.
- EN 60079-15 Electrical apparatus for potentially explosive atmospheres: Equipment protection by protection type "n"
- EN 60079-17 Explosive atmospheres: Part 17: Inspection and maintenance of electrical installations
- EN 60079-31 Electrical apparatus for use in atmospheres containing combustible dust: Protection through housing "t"
- DIN VDE 105-9 "Operating electrical equipment" or other national regulations
- DIN VDE 0100 "Erection of power installations with rated voltages below 1000 V" or other national regulations

Technical data and information on the permitted conditions are given on the nameplate and in the documentation; they have to be observed under all circumstances.

21242194/EN – 01/2015

2.6 Other applicable documentation

The following publications and documents have to be observed as well:

- "Explosion-Protected AC Motors EDR.71 − 225, 315" operating instructions
- "Gear Unit Series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W" operating instructions for gearmotors
- "Explosion-Protected AC Motors" catalog and/or
- "Explosion-Protected Drives" catalog

The complete range of technical documentation is available from our website: **www.sew-eurodrive.com**

2.7 Transport/storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Report any transport damage to the shipping company immediately. You may need to suspend startup.

Tighten the eyebolts securely. They are designed to only carry the weight of the gear unit/motor/gearmotor; do not attach any additional loads.

The installed lifting eyebolts are in accordance with DIN 580. The loads and regulations specified in that document must always be observed. If the gear unit/motor/gearmotor is equipped with two eyebolts, then both of these should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if required. Reattach these in the case of further transportation.

Store the gear unit/motor/gearmotor in a dry, dust-free environment if it is not to be installed straight away. You must not store the gear unit/motor/gearmotor outdoors or on the fan guard. The gear unit/motor/gearmotor can be stored for up to 9 months without requiring any special measures before startup.

2.8 Installation

Ensure that the unit is installed and cooled according to the regulations mentioned in this document.

Protect the unit from excessive strain. Ensure that components are not deformed and that insulation spaces are maintained, particularly during transportation. Electric components must not be mechanically damaged or destroyed.

The following applications are prohibited unless explicitly permitted:

- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 61800-5-1.

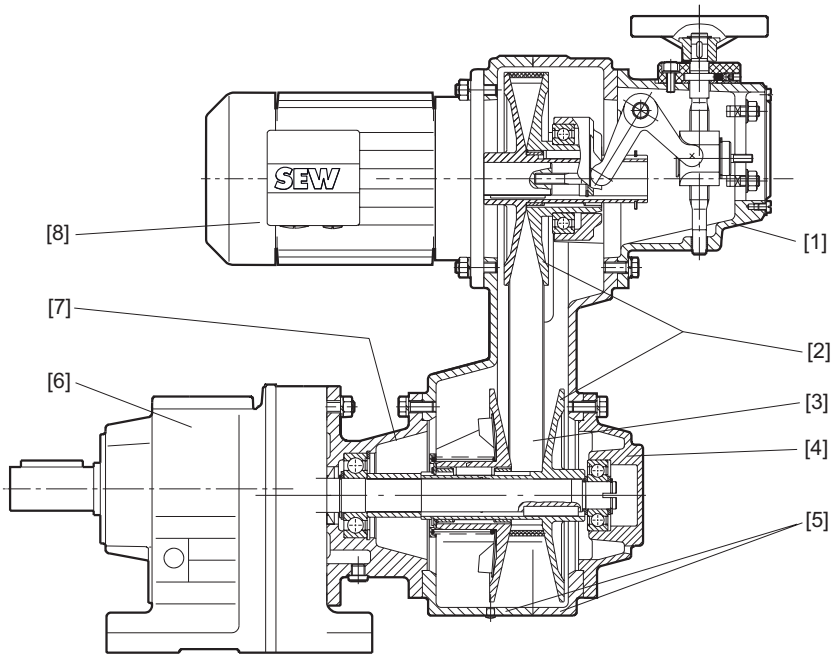
Observe the notes in chapter ""Installation"" (→ 🗎 17).

21242194/EN – 01/2015

3 VARIBLOC® in explosion-protected design

3.1 Unit structure

The figure below shows the structure of VARIBLOC® in explosion-protected design.



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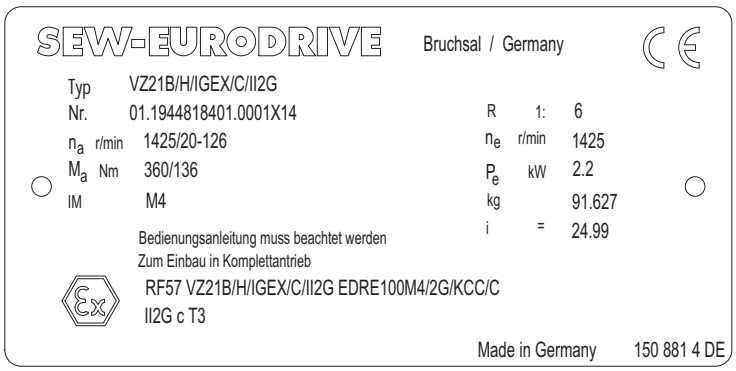
[1] Angle adjustment device
[2] Variable pulleys
[3] Wide V-belt
[4] Bearing cover with M12x1 tapped hole
[5] Two-part variable-speed gear unit housing
[6] Reduction gear unit coupled at the output end
[7] Output flange
[8] Driving motor

21242194/EN – 01/2015

3.2 Nameplate



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Typ	=	Type code with equipment category
Nr.	=	Customer order number
n_a	=	Minimum and maximum output speed
M_a	=	Output torque at minimum and maximum output speed
IM	=	Mounting position
R	=	Control range
n_e	=	Input speed
P_e	=	Drive power
kg	=	Weight of the complete drive
i	=	Gear unit ratio
T. or T...°C	=	Temperature class with explosive gas atmosphere or max. surface temperature with explosive dust atmosphere
c	=	Constructional safety
II2G	=	Equipment category

Information on X marking

INFORMATION

In some cases, SEW-EURODRIVE variable-speed gear units may only be operated in compliance with special measures. For these cases, there is a special marking on the nameplate: **"II..X"**.

A reason for the special measure can be the presence of a reduced output torque, for example. The customer has been informed about the required special measures on the initial distribution of the variable-speed gear unit. The customer is obliged to ensure compliance with this special measure.

21242194/EN – 01/2015

3.3 Type designation

The following table shows the type code structure:

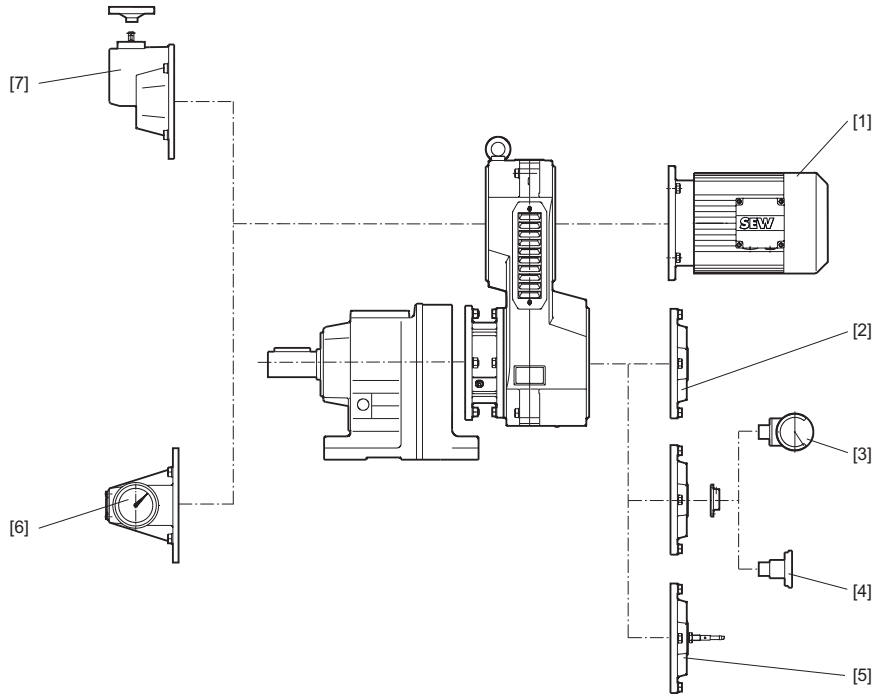
Example: VU21B/H/WEX/C/II2G		
Series	VU	• VU = VARIBLOC® variable-speed gear unit with U-shaped power flow • VZ = VARIBLOC® variable-speed gear unit with Z-shaped power flow
Size	21	Size 21 Possible sizes: 01, 11, 21, 31, 41, 51[1)]
Design	B	B = For use in wet areas
Adjusting part	H	• H = Angle adjustment with handwheel • NV = Fixture with exposed shaft end • HS = Handwheel with position indicator
Evaluation option	WEX	• WEX = Speed monitor with voltage encoder in explosion-protected areas • WEXA = Speed monitor with voltage encoder and digital remote speed indication in explosion-protected areas • IGEX = Voltage encoder in explosion-protected areas
Option	C	• C = With canopy (cannot be combined with TW and TA) • TW = Right-angled tachometer • TA = Axial tachometer
Explosion-protected design	II2G	Explosion-protected design according to equipment group II: • 2G = Category 2, explosive gas atmosphere • 2D = Category 2, explosive dust atmosphere • 3G = Category 3, explosive gas atmosphere • 3D = Category 3, explosive dust atmosphere

1) Not available in all explosion protection designs.

21242194/EN – 01/2015

3.4 Overview of mounting options for explosion-protected VARIBLOC®

The following figure shows the combination options for explosion-protected VARIBLOC® variable-speed gear units.



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[1] Driving motor
[2] Bearing cover with M12x1 tapped hole (standard equipment)
[3] Right-angled tachometer /TW
[4] Axial tachometer /TA
[5] Voltage encoder /IGEX
[6] Adjustment device with handwheel and position indication /HS
[7] Adjustment device with handwheel /H (standard version) or with exposed shaft end /NV

21242194/EN – 01/2015

4 Installation

⚠ CAUTION

Risk of injury due to protruding gear unit parts.

Minor injuries.

- Keep a sufficient safety distance to the gear unit and the gearmotor.

NOTICE

Improper assembly might damage the variable-speed gear unit.

Damage to the variable-speed gear unit.

- It is important that you observe the notes in this chapter.

NOTICE

Damages to the adjustment device and the wide V-belt due to adjustments to the variable-speed gear unit at standstill.

Damage to the adjustment device and the wide V-belt.

- Never adjust the variable-speed gear unit at standstill.

INFORMATION

VARIBLOC® as equipment of categories 2G and 2D must only be used with functioning speed monitoring. The speed monitor must be correctly mounted and set (see ""Speed monitoring"" (→ 🗎 31))

21242194/EN – 01/2015

4.1 Explosion marking

4.1.1 VARIBLOC® in explosion-protected design

Approval generally without the following designs:

- Front adjustment
- Mounted BMG disk brake
- Adapter with slip clutch and slip monitor.

Category	Zone	VARIBLOC® in potentially explosive atmospheres
2G	1	• Sizes VU/VZ01 to VU/VZ41, VU51 (not VU6) • Operation always with speed monitor • Starting compensation maximum 5 seconds • Switch-off when minimum speed drops 10% below minimum • Temperature class T3 • Control range 1:6
2D	21	• Sizes VU/VZ01 B to VU/VZ41B non-ventilated (not VU51 and VU6) • Operation always with speed monitor • Starting compensation maximum 5 seconds • Switch-off when minimum speed drops 10% below minimum • Maximum surface temperature 200 °C • Control range 1:6
3G	2	• Sizes VU/VZ01 to VU/VZ41, VU51 (not VU6) • Operation also permitted without speed monitor • Temperature class T4 • Control range 1:6
3D	22	• Sizes VU/VZ01 to VU/VZ41, VU51 (not VU6) • Operation also permitted without speed monitor • Maximum surface temperature 135 °C • Control range 1:6

INFORMATION

If overloading of the VARIBLOC® unit in category 3G or 3D occurs in normal operation, then use a VARIBLOC® with activated speed monitor.

4.1.2 General information

Standard feature of SEW-EURODRIVE explosion-protected variable-speed gear units of the VARIBLOC® 01-51 series is a M12x1 tapped hole for installing a voltage encoder.

Depending on the equipment and dimensioning, the following types are available according to the respective ATEX directive:

21242194/EN – 01/2015

Categories 2G and 2D

- SEW-EURODRIVE explosion-protected variable-speed gear units of the VARIBLOC® 01-41 series meet the design specifications of equipment group II, categories 2G (explosive gas atmosphere) and 2D (explosive dust atmosphere). These units are intended for use in zones 1 and 2, or in zones 21 and 22.
- SEW-EURODRIVE explosion-protected variable-speed gear units of the VARIBLOC® 51 series meet the design requirements of equipment group II, category 2G (explosive gas atmosphere). These units are intended for use in zones 1 or 2.

Categories 3G and 3D

- SEW-EURODRIVE explosion-protected variable-speed gear units of the VARIBLOC® 01-51 series meet the design specifications of equipment group II, categories 3G (explosive gas atmosphere) and 3D (explosive dust atmosphere). These units are intended for use in zones 2 or 22.

4.1.3 Ambient temperature

Gear units in explosion-protected design may only be used at ambient temperatures of -20 °C to +40 °C unless specified otherwise on the nameplate.

If a mounted component limits the temperature range of the gear unit, then the data on the nameplate of this component applies.

INFORMATION

Any ambient temperatures deviating from this range are listed on the nameplate.

4.1.4 Temperature class

VARIBLOC® variable-speed gear units, category 2G (explosive gas atmosphere) are approved for temperature class T3.

VARIBLOC® variable-speed gear units in category 3G (explosive gas atmosphere) are approved for temperature class T4.

The temperature class of the variable-speed gear unit is indicated on the nameplate.

4.1.5 Surface temperature

The maximum surface temperature of VARIBLOC® variable-speed gear units, category 2D (explosive dust atmosphere) may not exceed 200 °C.

The maximum surface temperature of VARIBLOC® variable-speed gear units, category 3D (explosive dust atmosphere) may not exceed 135 °C.

Lower surface temperatures are only approved after further discussion with SEW-EURODRIVE and must be indicated on the nameplate. The system operator must guarantee that a possible accumulation of dust will not exceed a maximum thickness of 5 mm, in accordance with EN 50281-1-2.

21242194/EN – 01/2015

4.1.6 Degree of protection

In categories 3G, 2G and 3D, VARIBLOC® variable-speed gear units are not enclosed. This design meets degree of protection IP23 according to EN 60529.

In category 2D, only VARIBLOC® variable-speed gear units in enclosed design may be used. This design meets degree of protection IP65 according to EN 60529.

4.1.7 Ambient conditions

Provide for sufficient ventilation for the gear units and prevent external heat generation (for example by means of couplings).

4.1.8 Output power and output torque

It is essential that nominal values of output power or output torque are maintained. The unit operator must ensure that the output shaft of the variable-speed gear unit is not overloaded or blocked.

4.1.9 Special designs

Special designs (such as a modified output shaft) may only be operated in explosion-proof atmospheres after prior approval by SEW-EURODRIVE.

4.2 Installation requirements

Check that the following conditions have been met:

- The information on the nameplate of the variable-speed gear unit corresponds to the permitted conditions for potentially explosive atmospheres on site (voltage supply system, equipment group, category, zone, temperature class or maximum surface temperature).
- The drive has not been damaged during transportation or storage.
- Ensure that the following requirements have been met:

  For standard gear units:

  – Ambient temperature according to the technical documentation and the nameplate.

  – No harmful oils, acids, gases, vapors, radiation etc. in the vicinity.

  For special designs:

  – The drive is designed in accordance with the ambient conditions. Observe the information on the nameplate.
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.
- In vertical mounting positions, use a cover (canopy C) to prevent objects or fluids from entering.
- Cover the vent plate on top of the control box in level position (determined by the mounting position) with the cover plate included in the delivery.

21242194/EN – 01/2015

4.3 Permitted overhung loads without primary gear unit

NOTICE

Damage to the bearing, housing, or the shafts if the explosion-protected VARIBLOC® variable-speed gear unit is used without primary gear unit.

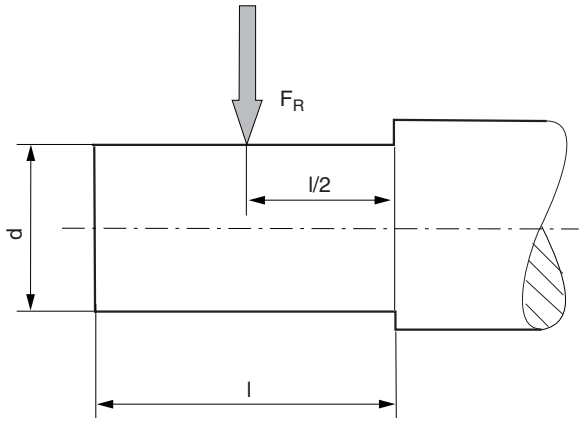
Damage to the variable-speed gear unit.

- Adhere to the permitted overhung loads on the output shaft.

The diagrams below show the permitted overhung loads depending on the speed.

Definition of force application of overhung loads

The behavior of the overhung load depicted in below diagrams refers to force applied to the center of the shaft end. If force is applied to areas other than the center of the shaft end, consult SEW-EURODRIVE for permitted overhung loads.



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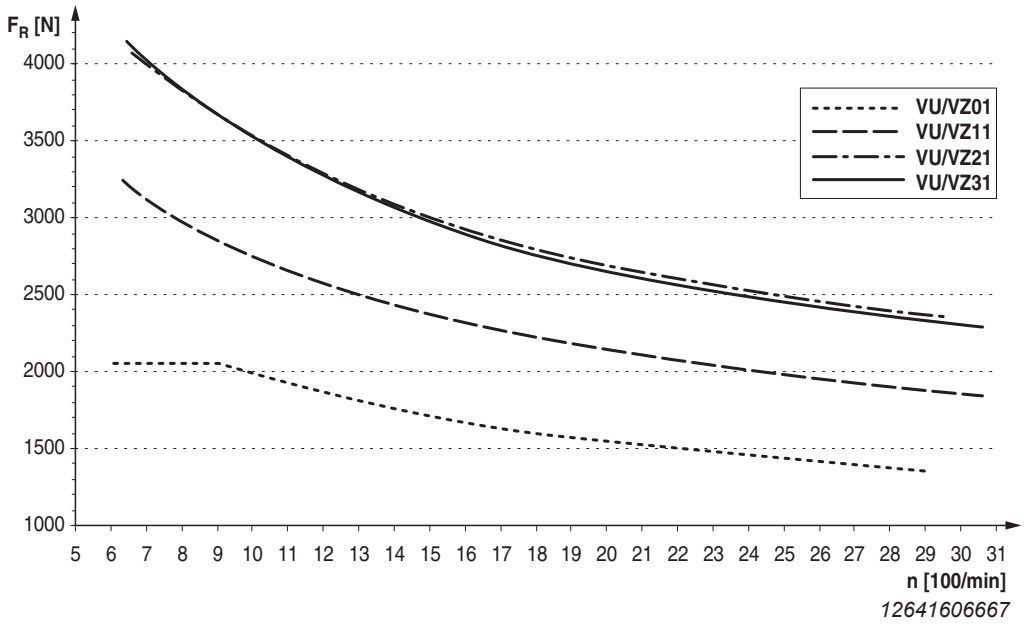
F_R = Permitted lateral force application point to the center of the shaft end



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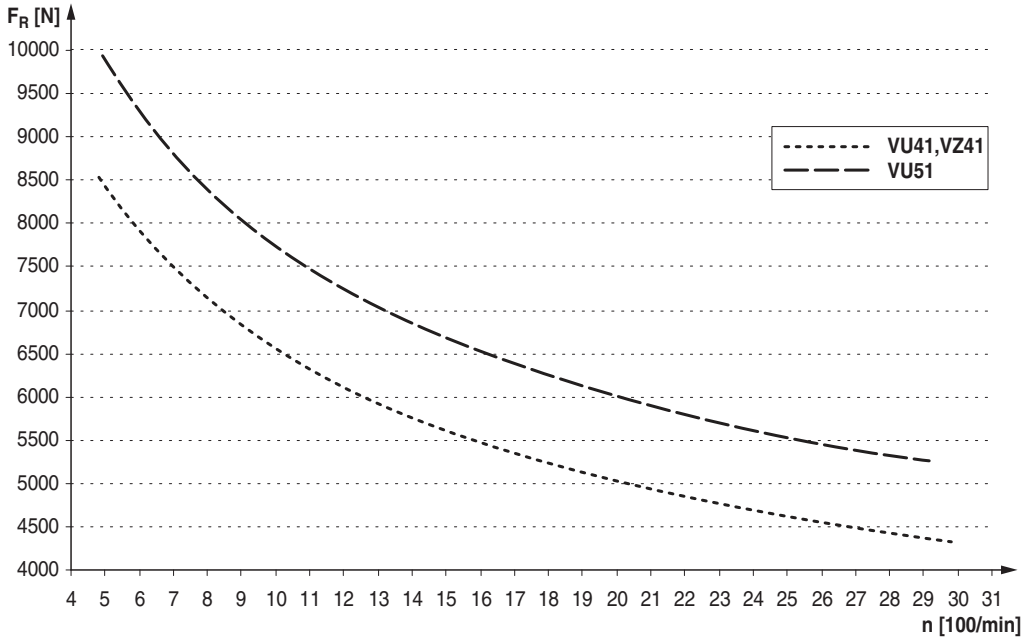

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4.4 Preliminary work following lengthy storage

NOTICE

Ingress of solvent at the sealing lips of the oil seals when removing anti-corrosion agent, dirt, or similar from the input shafts and flange surfaces.

Damage to the oil seals.

- Do not let solvent come into contact with the oil seals. Use a standard solvent.

21242194/EN – 01/2015

Note:

- The service life of the lubricant in the bearings is reduced if the unit is stored for ≥ 1 year.
- The enclosed wide V-belt must be installed.

Bearing greases

	Ambient temperature	Basis	Original filling	Manufacturer
Gear unit rolling bearings	-20 °C to +40 °C	synth.	Renolit CX − TOM 15 OEM	Fuchs

4.5 Required tools/resources

- Set of wrenches
- Mounting device
- Compensation elements (shims, spacer rings), if necessary
- Fasteners for input and output elements

4.6 Installation tolerances

Shaft end	Flanges
Diameter tolerance according to DIN 748 • ISO k6 for solid shafts with d, d_1 ≤ 50 mm • ISO k7 for solid shafts with d, d_1 > 50 mm • Center bore in accordance with DIN 332, shape DR.	Centering shoulder tolerance to DIN 42948 • ISO j6 at b_1 ≤ 230 mm • ISO h6 with b_1 > 230 mm

21242194/EN – 01/2015

4.7 Installing the variable-speed gear unit

⚠ CAUTION

Generation of sparks if the housing is not grounded additionally.

Generation of sparks.

- Ground the housing additionally. Use grounding screws on the motor.

⚠ CAUTION

Only carry out any work on the gear unit and additional equipment when the machine is at standstill. Prevent the drive unit from starting up unintentionally, for example by locking the keyswitch or by removing the fuses from the power supply. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

NOTICE

Improper assembly might damage the variable-speed gear unit.

Damage to the variable-speed gear unit.

- It is important that you observe the notes in this chapter.

NOTICE

Risk of corrosion of variable-speed gear units in categories 2G, 3G, and 3D if the breather valves are not freely accessible.

Damage to the variable-speed gear unit.

- Before startup, remove the plastic plug in the lowest condensation drain hole.

INFORMATION

With variable-speed gear units for use in category 2D, do not remove the plastic plug in the lowest condensation drain hole.

INFORMATION

Use only input and output elements with ATEX approval, if these are subject to Directive 94/9/EC.

INFORMATION

For flange-mounted gear units and for foot-/flange-mounted gear units in connection with VARIBLOC® variable-speed gear units, use quality 10.9 and suitable washers for connecting the customer flange.

To improve the friction contact between flange and mounting surface, SEW-EURODRIVE recommends anaerobic gaskets or an anaerobic glue.

21242194/EN – 01/2015

INFORMATION

Install VARIBLOC® in /HS design (handwheel and position display) in such a way that the adjustment spindle is in horizontal position as the position display does not work otherwise.

Install/mount the variable-speed gear unit or the variable-speed gearmotor only under the following conditions:

- Observe the information on the nameplate.
- Do not jolt or hammer the shaft end.
- Carefully align the variable-speed gear drive to avoid overloading the output shafts (observe permitted overhung loads and axial forces). Observe the "Project planning" chapter in the gear unit/gearmotor catalog for calculating the permitted overhung and axial loads.
- Protect the gear unit from direct cold air currents.
- Ensure there is sufficient clearance around the unit to allow for adequate cooling. Position the unit in such a way that the hot air from other units is not drawn in. The cooling air must not exceed a temperature of +40 °C.
- The support structure must have the following characteristics:
  - Level
  - Vibration damping
  - Torsionally rigid

  Do not tighten the housing legs and mounting flanges against one another and ensure that you comply with the permitted overhung and axial loads.

  Maximum permitted flatness defect for foot and flange mounting (guide values with reference to DIN ISO 1101): maximum 0.2 mm to 0.5 mm for a flange of 120 mm to 600 mm.
- Use plastic inserts (2 to 3 mm thick) if there is a risk of electrochemical corrosion between the gear unit and the driven machine. The material used must have an electrical leakage resistance < 10^9 Ω.

  Electrochemical corrosion can occur between various metals, for example, cast iron and high-grade steel. Also install the bolts with plastic washers.

4.7.1 Installation in damp locations or outdoors

VARIBLOC® variable-speed gear units are supplied in corrosion-resistant versions (B version) with an according surface protection for use in damp areas or outdoors.

Painting the gear unit

Repair any damage to the paint work (such as on the breather valve or the lifting eyes).

NOTICE

Ingress of paint at the breather valve and the sealing lips of the oil seals when painting the or repainting the gear unit.

Damage to the oil seals.

- Thoroughly cover the breather valves and sealing lip of the oil seals with strips before painting.
- Remove the strips after painting.

Installation outdoors

Units installed outdoors must be protected from the sun. Provide for suitable protective devices, such as covers, roofs, or similar. Avoid the accumulation of heat. The operator must ensure that foreign objects do not impair the function of the gear unit (such as falling objects or coverings).

4.7.2 Cable entry / cable gland

All cable entries are supplied with ATEX certified closing plugs.

- The closing plugs are replaced by ATEX certified cable glands with strain relief for establishing the correct cable entry.
- Select the cable gland according to the outer diameter of the cable used.
- After installation, seal all unused cable entries with an ATEX certified plug.
- Apply sealing compound to the threads of the cable glands and filler plugs and tighten the thread properly. Then apply another coat.
- Seal the cable entry properly.
- Thoroughly clean the sealing surfaces of the terminal box and the terminal box cover prior to reassembly. Replace any brittle seals.

4.8 Assembling input and output elements

NOTICE

Improper mounting can damage bearings, housing, or shafts.

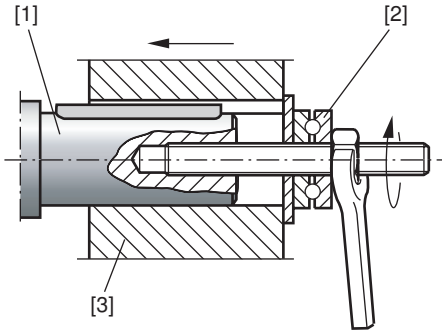
Possible damage to property.

- Use a mounting device to mount input and output elements. Use the center hole with thread on the shaft end for positioning.
- Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer.
- When mounting belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions.
- Make sure that transmission elements are balanced so they do not give rise to impermissible radial or axial forces. For permitted values, refer to the "Gearmotors" or "Explosion-Protected Drives" catalog.

21242194/EN – 01/2015

4.8.1 Using a mounting device

The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.

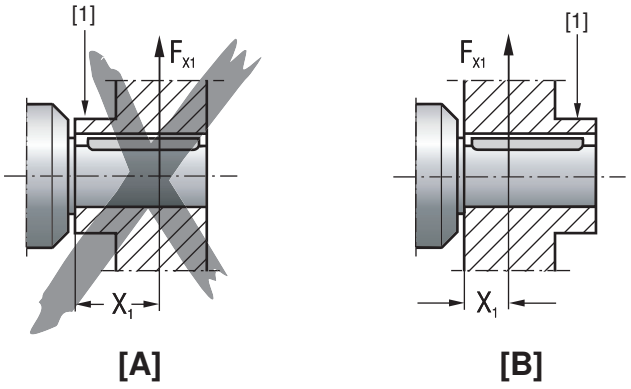


211368587

[1] Gear shaft end
[2] Thrust bearing
[3] Coupling hub

4.8.2 Avoiding excessive overhung loads

To avoid high overhung loads: Install the gear or chain sprocket according to figure **B** if possible.



211364235

[1] Hub

[A] Unfavorable

[B] Correct

INFORMATION

Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80 - 100 °C).

4.9 Mounting of couplings

⚠ CAUTION

Risk of injury due to moving drive elements, such as belt pulleys or couplings, during operation.

Risk of jamming and crushing.

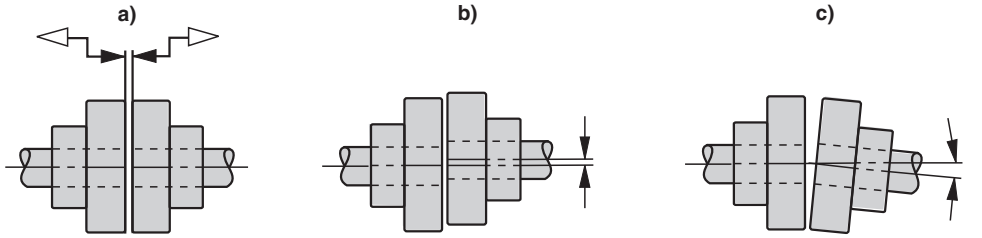
- Cover input and output elements with a touch guard.

Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings:

a) Maximum and minimum clearance

b) Axial misalignment

c) Angular misalignment



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4.10 Accessory equipment

The following designs are available:

Optional equipment	Type
WEXA	With this type, the delivery includes the speed monitor (including evaluation electronics) and an IGEX voltage encoder with DA digital remote speed indication.
WEX	With this type, the delivery includes the speed monitor (including evaluation electronics) and an IGEX voltage encoder.
IGEX	With this type, the delivery includes only the voltage encoder. The speed monitor must be supplied and installed by the operator of the device.
H	Adjustment device with handwheel.
NV	Adjustment device with handwheel and exposed shaft end.
HS	Adjustment device with handwheel and position indication.
TW	Right-angled tachogenerator, does not comprise any other types.
TA	Axial tachogenerator, does not comprise any other types.
C	Canopy (cannot be combined with TW and TA).

For more information, refer to chapter ""Startup"" (→ 🗎 29).

21242194/EN – 01/2015

5 Startup

NOTICE

Improper assembly might damage the variable-speed gear unit.

Damage to the variable-speed gear unit.

- Adhere to the notes in this chapter.

NOTICE

Damage to the adjustment device and the wide V-belt when adjusting the variable-speed gear unit at standstill.

Damage to the adjustment device and the wide V-belt.

- Never adjust the variable-speed gear unit at standstill.

5.1 Prerequisites for startup

This checklist includes all activities that have to be performed before starting up a gear unit according to Directive 94/9/EC for operation in a potentially explosive atmosphere.

Check prior to startup in potentially explosive atmospheres	Checked
Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. You may need to suspend startup. Remove securing devices used for transportation prior to startup.	
Does the following information on the gear unit nameplate correspond with the permitted conditions for potentially explosive atmospheres on site? • Equipment group • ATEX category • Temperature class • Maximum surface temperature	
Have arrangements been made to prevent explosive atmospheres, oils, acids, gases, vapors or radiation during installation of the gear unit?	
Is the ambient temperature maintained according to the lubricant table?	
Have arrangements been made for sufficient ventilation and that there will be no external heat generation (e.g. via couplings)? The cooling air must not exceed a temperature of 40 °C.	
Does the mounting position on the gear unit nameplate correspond to the indicated mounting position? The mounting position may only be changed after consultation with SEW-EURODRIVE. ATEX approval will become void without prior consultation.	
Are all oil check and drain plugs as well as breather plugs and valves freely accessible?	
Do all input and output elements to be installed have ATEX certification?	
Has the cover been mounted properly of gear units with hollow shaft and shrink disk?	
Has the speed monitoring function been verified for properer functioning?	

21242194/EN – 01/2015

5.2 Before startup

Adhere to the following notes:

- Remove transport protection prior to startup.
- Observe the most important technical data indicated on the nameplate. Additional data relevant for operation is available in drawings and in the order confirmation.
- Check for proper direction of rotation in decoupled state. Listen for unusual grinding noise as the shaft rotates.
- Check the degree of protection.
- Secure the key for test mode without output elements.
- After having installed the gear unit, check to see that all retaining screws are tight.
- Make sure that the alignment has not changed after tightening the mounting elements.
- Before startup, ensure that rotating shafts as well as couplings are equipped with suitable protective covers.
- It is essential that there is no open fire or risk of sparks when working on the gear unit.
- Protect the gear unit from falling objects.
- Check that there is sufficient clearance around the motor to provide for adequate cooling, and that the motor does not suck in hot exhaust air from other devices.

INFORMATION

When installing a variable-speed gear unit in a potentially explosive atmosphere, Directive 94/9/EC stipulates that you measure the surface temperature after about 3 hours. Measure the surface temperature at the connection between motor flange and variable-speed gear unit. Do not exceed a temperature difference of 70 K compared to the ambient temperature.

If the value exceeds 70 K, stop the drive immediately and contact SEW-EURODRIVE.

21242194/EN – 01/2015

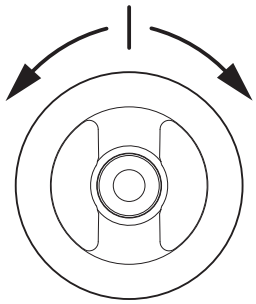
5.3 Speed adjustment via handwheel

Turning the handwheel changes the speed range as follows:

- CCW rotation decreases the drive speed.
- CW rotation increases the drive speed.

The following figure shows the directions:

Decreasing speed | Increasing speed



The setting range is limited mechanically.

5.4 Speed monitoring

INFORMATION

VARIBLOC® as equipment of categories 2G and 2D must only be used with functioning speed monitoring. The speed monitor must be properly installed and set.

5.4.1 Standard version

The standard version of the VARIBLOC® explosion-protected variable-speed gear unit comes equipped with an M12x1 thread for mounting a voltage encoder in the bearing cover of the variable-speed gear unit. Speed monitor and voltage encoder must be supplied and installed by the operator of the device.

21242194/EN – 01/2015

5.4.2 Manufacturer's data

Speed monitor of the type WEXA / WEX:

Manufacturer:	Pepperl + Fuchs
Type:	KFU8-UFC-Ex1.D
Auxiliary voltage:	DC 20 V to 90 V / AC 48 V to 253 V
ATEX certification number:	TÜV 99 ATEX 1471

Data of voltage encoder types WEXA / WEX / IGEX:

Manufacturer:	Pepperl + Fuchs
Type:	NCB2-12GM35-N0 according to DIN 19234 (NAMUR)
Enclosure:	M12x1
Ex marking	II 1G EEx ia IIC T6
ATEX certification number:	TÜV 99 ATEX 1471

Data of remote speed indication of the type WEXA:

Manufacturer:	Dr. Horn
Type:	HDA 4110-50
Display unit:	Digital
Line connection:	115 V or 230 V, 50 Hz to 60 Hz
Power consumption:	About 4.2 VA
Encoder connection:	With two-core cable, shielded

5.5 WEXA / WEX speed monitor

INFORMATION

The speed monitor must be located outside the potentially explosive atmosphere.

INFORMATION

All the following notes regarding installation and setting refer to the speed monitor or voltage encoder of the type WEXA/WEX specified in the manufacturer's data (see ""Manufacturer's data"" (→ 🗎 32)).

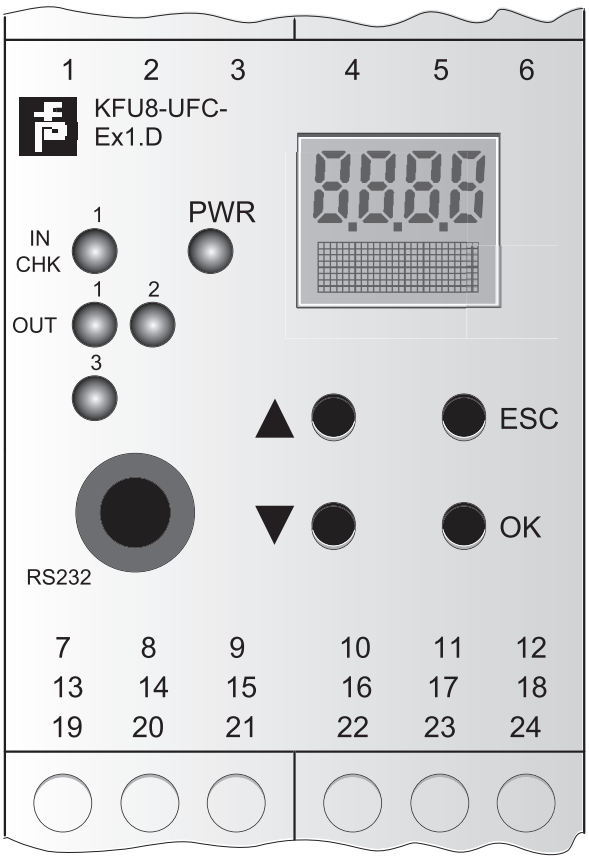
INFORMATION

If other speed monitors are used, they must be installed and started up as described in the manufacturer's documentation. In this case, refer to section ""Installing and adjusting other speed monitors"" (→ 🗎 43) for notes on determining the switching speed or switching frequency.

21242194/EN – 01/2015

5.5.1 Front side of the speed monitor

The following figure shows the front of the speed monitor:



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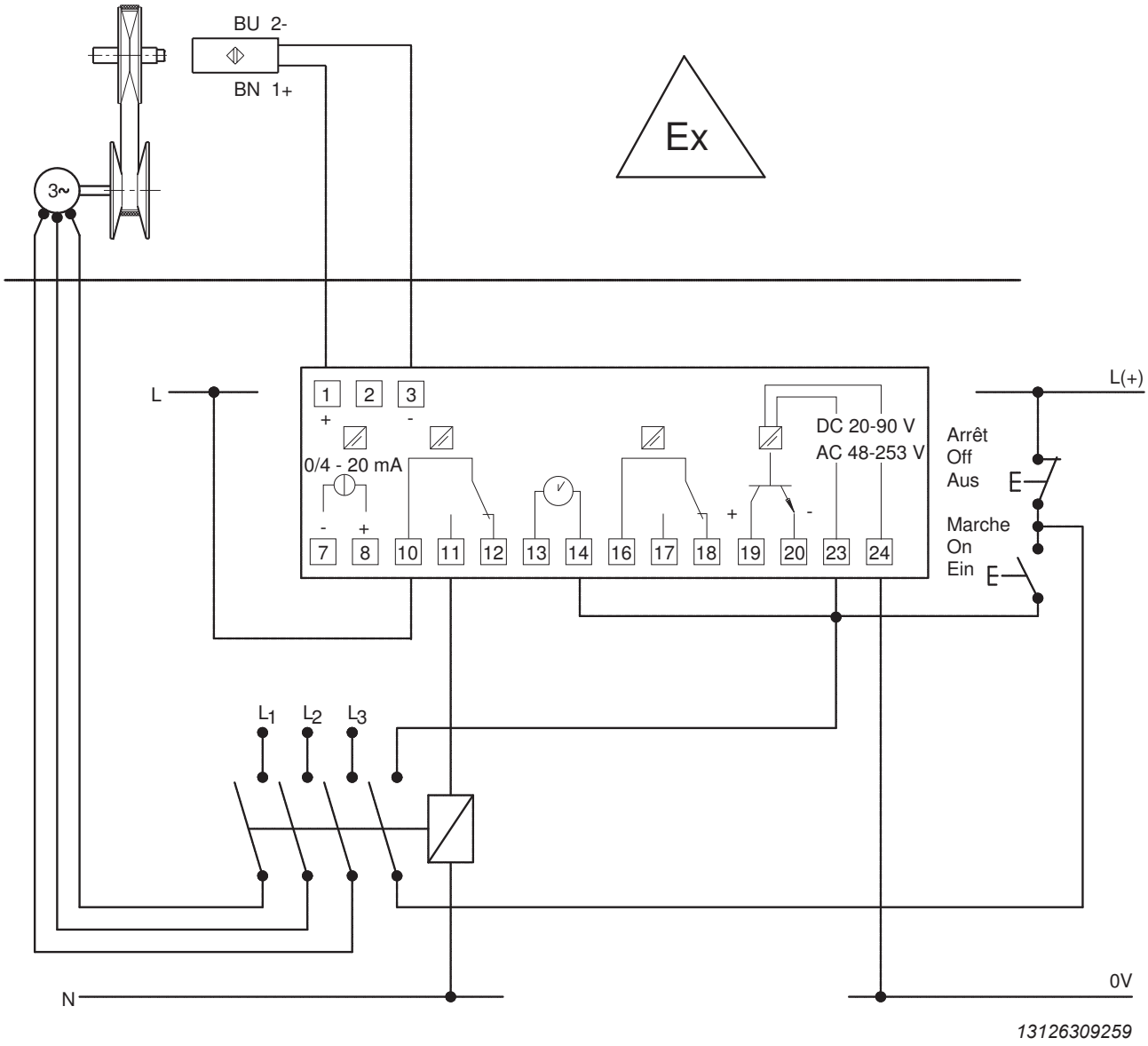
LED in CHK 1 (yellow/ red):	Input pulses (flashing yellow in sync)
	Input malfunction (flashing red)
	Device malfunction (permanently red)
LED PWR (green):	Supply voltage
LED OUT 1 (yellow):	Relay 1 active
LED OUT 2 (yellow):	Relay 2 active
LED OUT 3 (yellow):	Transistor active
RS232:	Serial RS232 interface for connecting a PC for setting parameters and diagnosing the UFC with PACTware.
Display:	For indicating measured values and faults in parameter setting mode.

21242194/EN – 01/2015

5.5.2 Installing and setting the speed monitor

The wiring diagram below shows the possible wiring of a speed monitor:



[1] Sensor +

[3] Sensor -

[10] Relay 1 (common wiring)

[11] Relay 1 (normally open contact)

[12] Relay 1 (normally closed contact)

[14] Startup bypass

[23] DC 24 V supply, +

[24] DC 24 V supply, -

[19] Auxiliary output for customer application, +

[20] Auxiliary output for customer application, -

21242194/EN – 01/2015

Relay 2 can be used for creating a warning signal or for machine control (terminal assignment 16 to 18).

1. Read the operating instructions of the speed monitor manufacturer before you begin with the installation.
2. Perform the basic adjustment of the speed monitor in accordance with the operating instructions of the speed monitor manufacturer.
   ⇨ Perform adjustment in such a way that the drive switches off when the frequency or speed drops below the limit values listed in the table (see ""VARIBLOC® switching frequencies" (→ 🗎 36)").
   ⇨ The sensor built in the variable-speed gear unit generates 2 pulses per revolution of the variable-speed gear shaft.

NOTICE

Damage to the speed monitor if the starting bypass duration is exceeded by 5 seconds.

Damage to the speed monitor.

- Make the setting carefully.
- Check the setting by measuring it.

NOTICE

Damage to the drive motor if the switching speed of the variable-speed gear unit drops below the limit.

Damage to the driving motor.

- Immediately disconnect the driving motor from the power supply.
- Eliminate the fault.
- Stop operation of the variable-speed gear unit for at least 15 minutes before taking it into operation again. If incorrect operation by the operating personnel cannot be ruled out, this interval must be triggered by an automatic restart lock.
- If vibrations or increased operating noise is noticeable after restarting the variable-speed gear unit, the wide V-belt was damaged during blocking. If this is the case, replace the wide V-belt (see ""Replacing the wide V-belt" (→ 🗎 48)").

21242194/EN – 01/2015

5.5.3 VARIBLOC® switching frequency

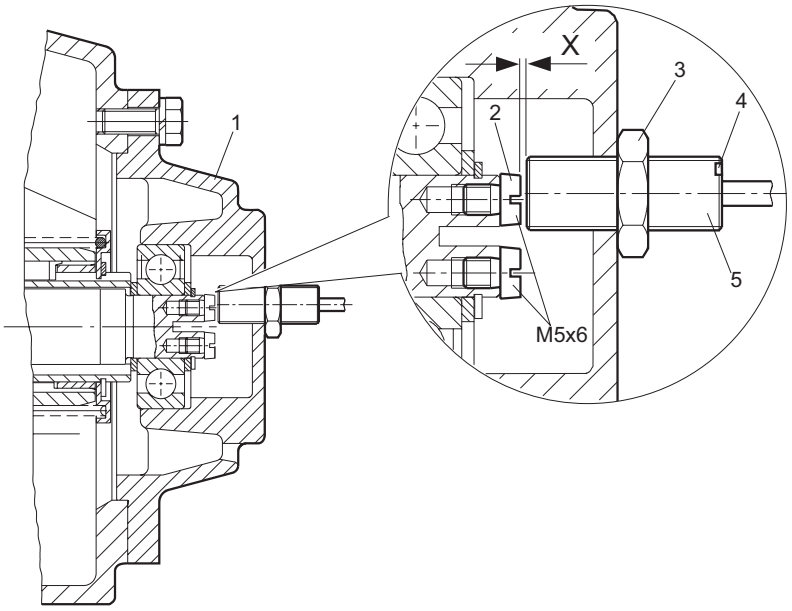
Type	Motor frequency Hz	Motor pole number	Switching frequency IGEX Hz	Output speed of the variable-speed gear unit rpm
VU/VUF01 VZ/VZF01	50	4	18	535
	50	6	12	356
	50	8	9	267
	60	4	22	635
	60	6	14	416
	60	8	11	327
VU/VUF11 VZ/VZF11	50	4	15	446
	50	6	10	297
	50	8	8	238
	60	4	19	564
	60	6	13	386
	60	8	9	267
VU/VUF21 VZ/VZF21	50	4	15	446
	50	6	10	297
	50	8	7	208
	60	4	18	535
	60	6	12	356
	60	8	9	267
VU/VUF31 VZ/VZF31	50	4	15	446
	50	6	10	297
	50	8	7	208
	60	4	18	535
	60	6	12	356
	60	8	9	267
VU/VUF41 VZ/VZF41	50	4	15	446
	50	6	10	297
	50	8	7	208
	60	4	18	535
	60	6	12	356
	60	8	9	267
VU51	50	4	15	446
	50	6	10	297
	50	8	7	208
	60	4	18	535
	60	6	12	356
	60	8	9	267

21242194/EN – 01/2015

5.6 Voltage encoder IGEX

5.6.1 Mounting the voltage encoder

The following illustration shows the installation of the voltage encoder and the setting of the switching interval x.



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[1] Bearing cover
[2] Screw head
[3] Lock nut
[4] LED
[5] Voltage encoder

1. Rotate the output shaft of the variable-speed gear unit until the slotted screw head can be seen through the tapped hole in the bearing cover.
2. Voltage encoder:
   - ⇨ Carefully screw the voltage encoder into the bearing cover [1] of the variable-speed gear unit until the voltage encoder [5] rests on the screw head [2].
   - ⇨ Turn the encoder back by one turn and secure with lock nut [3].

The switching interval is now set to 1 mm. During operation, the voltage encoder supplies 2 pulses per revolution at this switching interval.

5.6.2 Changing switching interval x

If no circuit state change occurs at the voltage encoder (LED display) with rotating shaft of the variable-speed gear unit operating with switching interval x = 1 mm, then the switching interval can be changed as follows.

NOTICE

Damage to the voltage encoder due to collision with the slotted screw heads.

Damage to the voltage encoder.

- Do not turn in the voltage encoder by more than half a revolution.

- When the voltage encoder LED [4] is constantly lit, turn the voltage encoder by half a revolution counterclockwise at a time and check its function.
- When the LED [4] is not lit, turn the voltage encoder clockwise by 90 degrees but no more than once.

INFORMATION

If a circuit state still does not occur, check the voltage supply of the WEXA/WEX type voltage encoder using the evaluation electronics.

5.7 Digital remote speed indicator

INFORMATION

The contactless, digital remote speed indicator must be located outside the potentially explosive atmosphere.

INFORMATION

All the following notes regarding installation and setting refer to the speed monitor or voltage encoder of the type WEXA/WEX, and to the remote speed indicator of the WEXA type. For technical data, refer to the manufacturer's data (see ""Manufacturer's data"" (→ 🗎 32)).

The digital display unit with 4-digit display (red 7-segment LEDs) is used for connection to the speed monitor or voltage encoder.

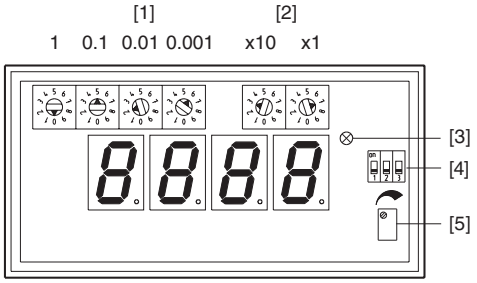
The unit is suitable for use as a time-based counter for representing all measured quantities that have a measurement signal in the form of a frequency as pulses or as AC voltage.

The universal adjustment function for the calibration values makes it possible to assign the input frequency (speed of the output shaft of the variable-speed gear unit) to the required display.

21242194/EN – 01/2015

5.7.1 Front of the digital remote speed indicator

The following figure shows the front of the digital remote speed indication indicator:



4544974987

[1] Time base in s

[2] Pulse multiplier

[3] Pulse monitoring

[4] Decimal point setting

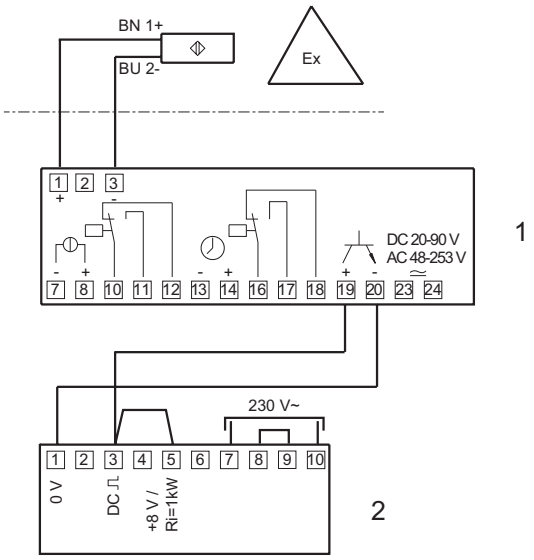
[5] Input sensitivity

You can set the standard values on the remote speed indicator as follows:

Indicating accuracy	±1 of last digit
Measuring interval (time base: quartz)	Adjustment in increments of 0.001 s in the range of 0.010 s to 9.999 s after removing the front panel. Recommended measuring interval: 0.5 s to 2 s
Pulse multiplier	Adjustment in increments in the range from 1 to 99 after removing the front panel.
Decimal point setting [4]	By means of the DIP switch after removing the front panel.

5.7.2 Mounting and setting the digital remote speed indicator

The diagram below shows the wiring diagram of the digital remote speed indicator at the pulse output of the speed monitor:



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[1] Speed monitor type KFU8-UFC-Ex1.D (Pepperl + Fuchs)

[2] Digital remote speed indicator type HDA 4110-50 (Dr. Horn)

1. Connect the unit according to the wiring diagram.
2. Note the jumpers:
   - ⇨ Between terminals 3 and 5
   - ⇨ Between terminals 8 and 9 for AC 230 V auxiliary voltage

NOTICE

Damage to the remote speed indicator due to incorrect connection of terminals 7 to 10 at an auxiliary voltage of AC 115 V.

Damage to the remote speed indicator.

- With an auxiliary voltage of AC 115 V, change the wiring of terminals 7 to 10 according to the manufacturer's documentation.

3. Set the measuring time:
   - ⇨ Calculation based on the formula (see "Calculating the measuring time")
   - ⇨ Data according to the table ""VARIBLOC® reference data"" (→ 🗎 41).
4. Set the input sensitivity: Turn the "input sensitivity" potentiometer to the right until the pulse monitoring light just lights up.

5.7.3 Calculating the measuring time

Use the following formula to calculate the measuring time set on the remote speed indicator:

$$M = \frac{60 \times A}{n \times k \times z \times f}$$

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21242194/EN – 01/2015

The following quantities are used in the formula:

M = Measuring time in seconds

A = Four-digit display (at maximum speed), without decimal point indication

n = Speed in rpm (see ""VARIBLOC® reference data"" (→ 🗎 41))

k = Pulse multiplier 1

z = Pulses/revolution (see ""VARIBLOC® reference data"" (→ 🗎 41))

f = Calculation factor at 50 Hz = 1 and at 60 Hz = 1.2

5.7.4 VARIBLOC® reference data

The following table shows the reference speed of VARIBLOC® variable-speed gear units:

Gear unit type/size	Pulses/revolution	VARIBLOC® reference speed in rpm		
		R = 1:6/6:1		
		4-pole	6-pole	8-pole
VUF/VZF 01	2	3312	2088	1632
VUF/VZF 11		3250	2160	1615
VUF/VZF 21		3100	2050	1530
VUF/VZF 31		3100	2050	1540
VUF/VZF 41		3053	2035	1505
VUF/VZF 51		3106	2056	1526

5.7.5 Calculation examples for the measuring time

	Example 1		Example 2	
Drive	R107 R77 VU21WEXA/II2G EDRE90L4		R107 R77 VU21WEXA/II2G EDRE90L4	
Data (see ""VARIBLOC® reference data"" (→ 🗎 41))	Output speed	n_a = 1.0 – 6.3	Output speed	n_a = 1.0 – 6.3
	Number of pulses	z = 2	Number of pulses	z = 2
	Max. speed of variable-speed gear unit	n = 3100 rpm	Max. speed of variable-speed gear unit	n = 3100 rpm
Required indication	Output speed	A = 1.0 to 6.3 rpm	Belt velocity	A = 0.114 to 0.72 m/min
$M=\frac{60\times A}{n\times k\times z\times f}$	$M=\frac{60\times 6300}{3100\times 1\times 2\times 1}=60.96\,s$		$M=\frac{60\times 720}{3100\times 1\times 2\times 1}=6.968\,s$	
Recommended measuring time	0.5 to 2 s (max. 9.999 s)			
Calculation with new pulse multiplier	k = 50 $M=\frac{60\times 6300}{3100\times 50\times 2\times 1}=1.219\,s$		k = 8 $M=\frac{60\times 720}{3100\times 8\times 2\times 1}=0.871\,s$	

21242194/EN – 01/2015

	Example 1		Example 2	
Device setting	M = Measuring time	[1] [2] [1] [9]	M = Measuring time	[0] [8] [7] [1]
	Pulse multiplier	[5] [0]	Pulse multiplier	[0] [8]
	Decimal point setting	1	Decimal point setting	1

21242194/EN – 01/2015

5.8 Mounting and setting other speed monitors

INFORMATION

Other speed monitors must have an intrinsically safe sensor input (identification color: blue) for evaluation of sensors according to DIN 19234 (NAMUR) and be approved for use of this sensor in potentially explosive atmospheres.

INFORMATION

The voltage encoder (sensor) generally features a blue connection lead and must conform to DIN 19234 (NAMUR). The corresponding inspection number may be attached to the voltage encoder or the connection cable.

NOTICE

Damage to the driving motor if the switching speed of the variable-speed gear unit drops below a certain value.

Damage to the driving motor.

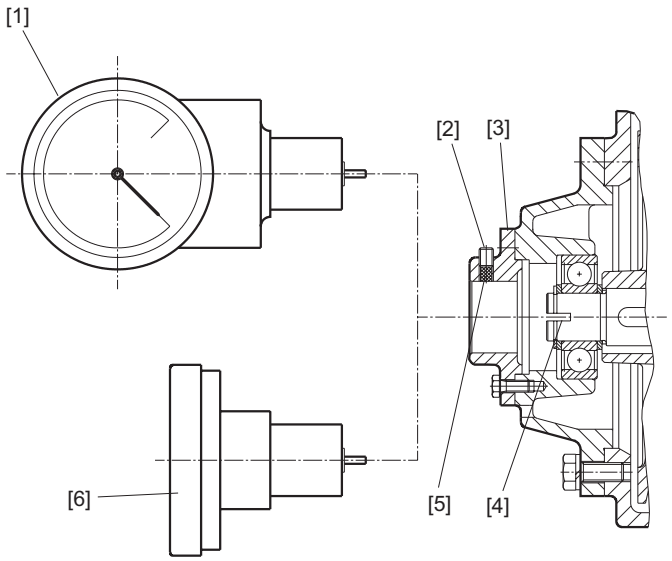
- Immediately disconnect the driving motor from the supply voltage.
- Eliminate the fault.
- Stop operation of the variable-speed gear unit for at least 15 minutes before taking it into operation again. If incorrect operation by the operating personnel cannot be ruled out, this interval must be triggered by an automatic restart lock.
- If vibrations or increased operating noise is noticeable after restarting the variable-speed gear unit, the wide V-belt was damaged during blocking. If this is the case, replace the wide V-belt (see ""Replacing the wide V-belt"" (→ 🗎 48)).

21242194/EN – 01/2015

5.9 TW right-angled tachometer, TA axial tachometer

INFORMATION

The TW and TA tachometers may only be installed in category 3D/3G variable-speed gear units if a voltage encoder (WEXA / WEX, IGEX type) is not necessary.



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[1] Right-angled tachometer TW
[2] Set screw
[3] Tacho flange
[4] Shaft groove
[5] Blanking plug
[6] Axial tachometer TA

1. Install the right-angled tachometer TW [1] or axial tachometer TA [6] in the tacho flange [3]: The tongue must engage in the shaft groove [4].
2. Insert the blanking plug [5].
3. Secure the TW or TA tachometer with a set screw [2].

21242194/EN – 01/2015

6 Inspection and maintenance

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before carrying out any inspection of maintenance work, de-energize the gear-motor and secure it against starting up unintentionally, for example by locking the keyswitch or removing the fuses in the power supply.

⚠ WARNING

Risk of burns due to hot gear unit.

Severe injuries.

- Let the gear unit cool down before you start working on it.

⚠ CAUTION

Have all service and maintenance work carried out by qualified personnel.

⚠ CAUTION

Carry out work on the gear unit and additional equipment only when the machine is at standstill. Prevent the drive unit from starting up unintentionally, for example, by locking the keyswitch or removing the fuses from the power supply. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ CAUTION

Use only genuine spare parts in accordance with the valid spare parts list.

NOTICE

Damage to the variable-speed gear unit due to improper inspection and maintenance work.

Damage to the variable-speed gear unit.

- Strictly observe the notes in this chapter.

21242194/EN – 01/2015

6.1 Preliminary work regarding inspection/maintenance

Observe the following notes before you start with inspection and maintenance work on the variable-speed gear unit.

- Before releasing shaft connections, make sure there are no active torsional moments present (tensions within the system).
- Prevent foreign particles from entering into the variable-speed gear unit during maintenance and inspection work.

6.2 Required tools/resources

- Set of wrenches
- Hammer
- Punch and/or piercer
- Retaining ring pliers
- Lubricant

6.3 Cleaning the variable-speed gear unit

INFORMATION

Do not use materials or methods for cleaning (such as compressed air) that result in processes causing electrical charge on the coating.

NOTICE

Ingress of water at the sealing lips of the oil seals when cleaning the variable-speed gear units with a high-pressure cleaning device.

Damage to the oil seals.

- Do not clean the variable-speed gear unit with a high-pressure cleaning device.

6.4 Inspection and maintenance intervals

INFORMATION

Strict adherence to the inspection and maintenance intervals is absolutely necessary to ensure safe working conditions and explosion protection.

The following table lists the inspection and maintenance intervals:

Time interval	What to do?
As needed	Eliminate dust accumulation > 5 mm through cleaning
Weekly	Pass through speed range

21242194/EN – 01/2015

Time interval	What to do?
Every 3000 hours of operation, at least every 6 months	• Check the wide V-belt (see ""Checking the wide V-belt"" (→ 🗎 47)) • Clean ventilation openings • Check bearings; lubricate, clean if necessary • Check oil seals and replace with original SEW spare parts in case of heavy wear (porous, brittle) • VARIBLOC® category 2D: Check seals of cover plates and replace with original SEW spare parts in case of heavy wear (porous, brittle) • Check running noise / rolling bearing temperature (see ""Measuring rolling bearing temperature"" (→ 🗎 51)) Interior of the variable-speed gear unit: • Check for dust accumulation. • Remove existing dust deposits.
Every 6000 operating hours	• Replace wide V-belt (see ""Replacing wide V-belt"" (→ 🗎 48))
Every 20 000 operating hours	• Replace bearings • Check adjustment spindle: – Clean and grease – In case of wear, replace adjustment spindle (see ""Relubricating adjustment spindle"" (→ 🗎 50)).

6.5 Checking wide V-belt

If one or more of the following test questions are answered positively ("Yes"), the wide V-belt must be replaced.

Type of check	For VUF 01-51 / VZF 01-41, check the following
Function test	• Do you notice a loud noise? • Did the maximum attainable speed drop by more than 10% compared to the nameplate data? • Are there any speed fluctuations?
Visual inspection	Remove vent plates: • Is there a lot of abraded dust noticeable at the vent plates or in the entire housing? • Are the sides of the belt frayed? • Is the wide V-belt cracking between the ribs or is it already torn?

21242194/EN – 01/2015

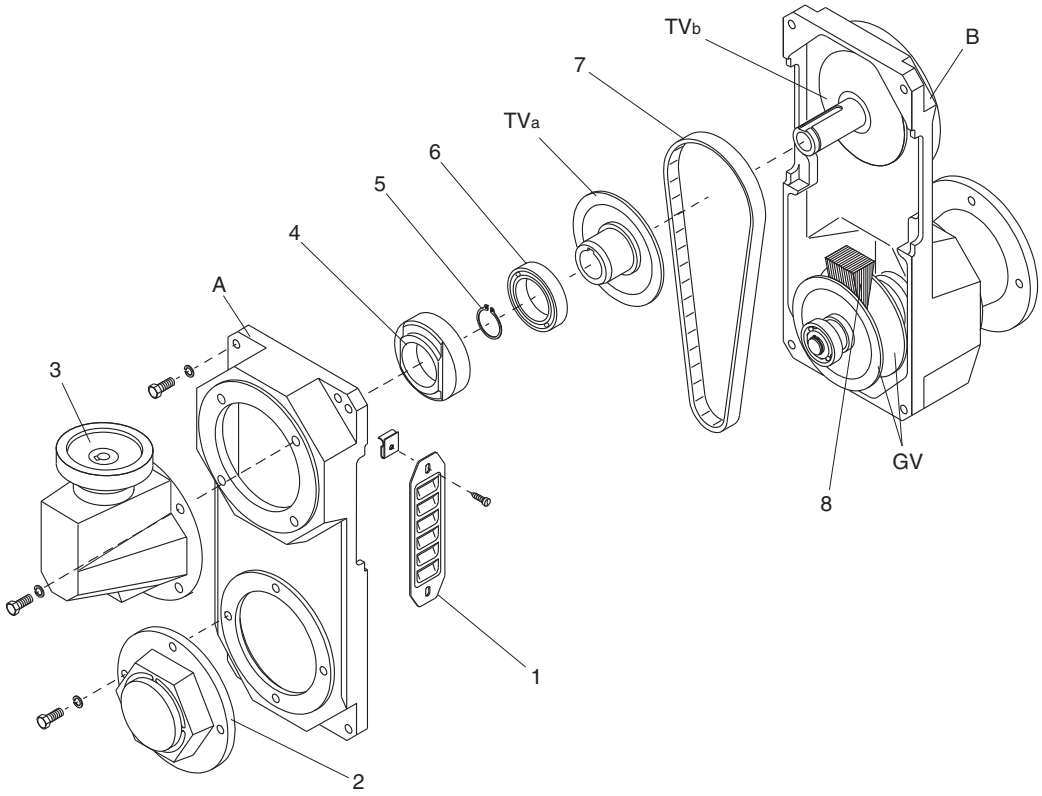
6.6 Replacing the wide V-belt

⚠ CAUTION

Use only genuine spare parts in accordance with the valid spare parts list.

Replacing wide V-belt of VUF01-51 and VZF01-41

The following figure shows the structure of a variable-speed gear unit:



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[1]	Vent plate	[7]	Wide V-belt
[2]	Bearing cover	[8]	Wooden wedge
[3]	Angular adjustment unit	[A]	Casing half A
[4]	Adjusting ring	[B]	Casing half B
[5]	Retaining ring	[TV]	Driving adjustment disc
[6]	Ball bearing	[GV]	Driven adjustment disc

1. Set the variable-speed gearmotor to the highest speed and lock it.
2. **DANGER** Unintended start-up of the machine.

   Severe or fatal injuries.
   - De-energize the gearmotor
   - Block the output side

3. Remove the two vent plates [1].
4. Remove the bearing cover [2] and the adjusting device [3].
5. Loosen the housing screws and separate the casing halves [A] and [B].
6. Secure the driven, spring-loaded variable pulley [GV] with the wooden wedge [8].

   DANGER Risk of crushing as the spring load might pull the disk halves back together.

   Possible injury.

   - Secure the driven spring-loaded variable pulley [GV] with the wooden wedge [8].
7. Disassemble:
   - Adjusting sleeve [4] (only for variant with front adjustment)
   - Retaining ring [5]
   - Driving variable pulley halves [TV_a]
8. Remove the existing wide V-belt [7] and insert the new wide V-belt.
9. Assemble:
   - Driving variable pulley halves [TV_a]
   - Ball bearing [6]
   - Retaining ring [5]
   - Adjustment sleeve [4]
10. Remove the wooden wedge.
11. Install the belt casing halves [A] and [B].
12. Assemble the adjustment device and the bearing cover.
13. Fasten the mounting vent plates.
14. Fix the wide V-belt via the adjustment device [3] by turning the adjustment spindle in CW direction until you feel a resistance.
15. Remove the blocking on the input side.

    DANGER Unintended start-up of the machine.

    Severe or fatal injuries.

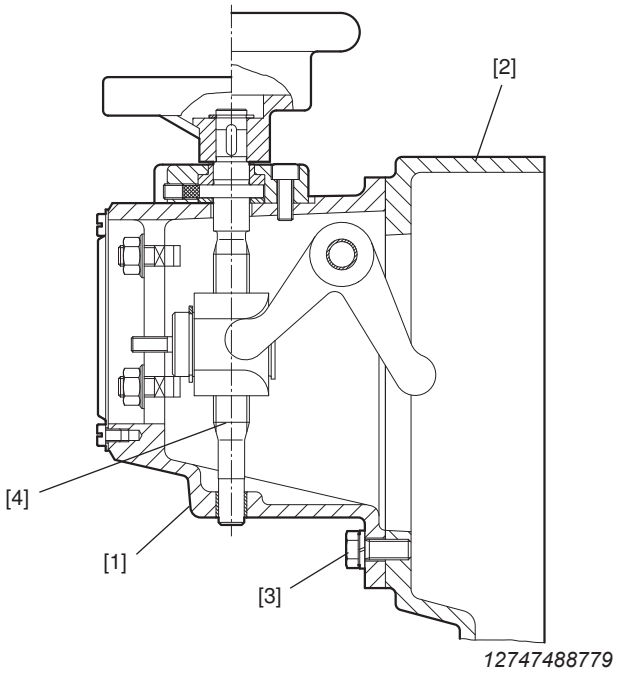
    - Ensure that the gearmotor is de-energized.
16. Switch on the gearmotor.
17. Slowly move through the speed range.
    - The drive must run smoothly and evenly;

      If the drive does not run smoothly and evenly, check the correct installation of the drive.

21242194/EN – 01/2015

6.7 Regreasing adjustment spindle H, HS, NV

The following figure shows an example of an adjustment spindle:



[1]	Control head of belt casing	[3]	Screw
[2]	Belt casing	[4]	Adjustment spindle

1. Remove the adjustment head [1] from the belt casing [2].
   - Loosen the screws [3].
2. Lubricate the adjustment spindle [4] with well-adhering lubricant, such as "Never Seez normal".
3. Assemble the adjustment head in opposite order.

21242194/EN – 01/2015

6.8 Measuring rolling bearing temperature

⚠ CAUTION

Carry out work on the gear unit and additional equipment only when the machine is at standstill. Prevent the drive unit from starting up unintentionally, for example by locking the keyswitch or by removing the fuses from the power supply. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

INFORMATION

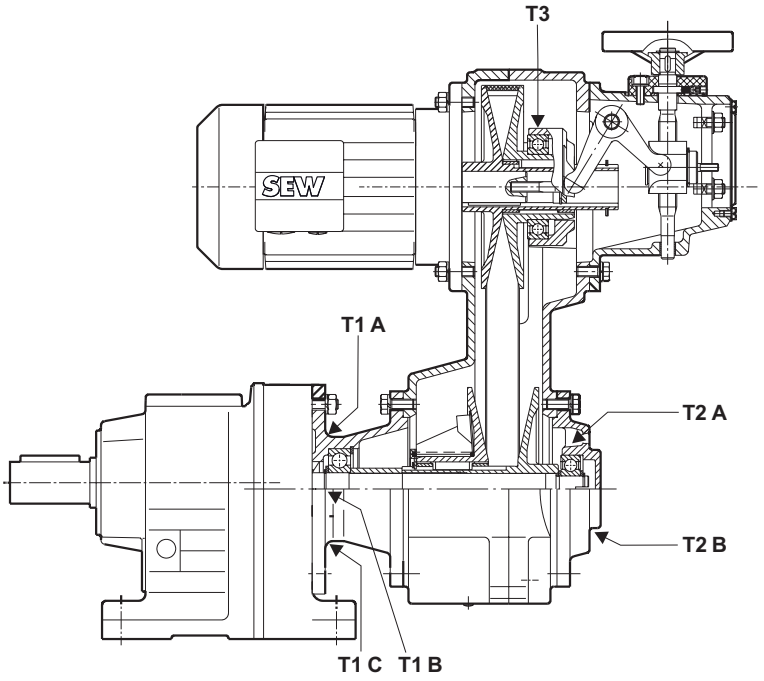
To ensure safe working conditions and explosion protection, it is necessary that the difference between the temperature of the rolling bearing and ambient temperature does not exceed the following values at the indicated test points.

- If the permitted temperature difference is exceeded, replace the affected rolling bearing.

Measuring point	Temperature difference
T1 (A, B, C)	40 K
T2A	50 K
T2B	40 K
T3	50 K

INFORMATION

The temperature of the rolling bearing can be measured with commercially available thermometers. Select a thermometer of sufficient length.



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21242194/EN – 01/2015

⚠ CAUTION

The bearing temperature of bearing 1 can be measured during operation depending on mounting position and accessibility at one of the measuring points T1A, T1B or T1C.

The bearing temperature of bearings 2 and 3 may only be measured during standstill at measuring points T2A and T3.

Measuring the rolling bearing temperature of bearing 2 (T2A, T2B)

If a design-specific protective cover is attached to bearing 2, remove this cover first.

1. With ventilated variable-speed gear units, test point T2A is located about 15 to 20 mm behind the vent slot.
2. For non-ventilated variable-speed gear units, test point T2A is not accessible. In this case, the temperature of the rolling bearing can be measured during operation at test point T2B.

Measuring the rolling bearing temperature of bearing 3 (T3)

3. Change the setting range until measuring point T3 is accessible.
4. Shut down the variable-speed gear unit and secure it against unintentional restart.
5. Remove the vent plate (see Fig. Replacing wide V-belt, pos. [1]).
6. Measure the temperature of the rolling bearing at measuring point T3.
7. Re-adjust the setting range.

Limiting the speed range for designs NV, H, HS

INFORMATION

The limit speeds n_{min} and n_{max} are factory set and may not be changed.

INFORMATION

If the maximum speed should drop by more than 10% due to wear of the wide V-belt, then replace the wide V-belt with an original SEW-EURODRIVE spare part.

21242194/EN – 01/2015

6.9 Completing inspection and maintenance work

INFORMATION

- It is important that you re-assemble the variable-speed drive properly and carefully seal all apertures after maintenance and repair work on variable-speed drives in category 2D. In this case, explosion protection is particularly dependent on the IP degree of protection.
- Make sure that ventilation openings of the bearing cover for variable-speed drives of categories 2G, 3G, and 3D that are located on top are protected by a canopy in the area of the bearing cover to prevent foreign particles from entering.
- If the mounting position requires for the belt casing to be mounted horizontally, then the vent plate located on the top must be covered by the cover plate that is included in the delivery.
- For variable-speed drives of category 2D, all ventilation openings must be closed dust-tight.
- Perform safety and function tests following all maintenance and repair work.

21242194/EN – 01/2015

7 Operation and service

⚠ CAUTION

Carry out work on the gear unit and additional equipment only when the machine is at standstill. Prevent the drive unit from starting up unintentionally, for example, by locking the keyswitch or removing the fuses from the power supply. Attach an information sign near the ON switch to warn that the gear unit is being worked on.

⚠ CAUTION

Use only genuine spare parts in accordance with the valid spare parts list.

NOTICE

Damage to the variable-speed gear unit due to improper operation and service work.

Damage to the variable-speed gear unit.

- Strictly observe the notes in this chapter.

7.1 Customer service

Please have the following information available if you require customer service assistance:

- Nameplate data (complete)
- Nature and extent of the problem
- Time the failure occurred and any accompanying circumstances
- Presumed cause

A digital photograph if possible

21242194/EN – 01/2015

7.2 Malfunction of VARIBLOC® variable-speed gear units

Fault	Possible cause	Measure
Drive slips or speed monitoring is triggered	• Wide V-belt is worn	• Replace wide V-belt. See chapter ""Replacing wide V-belt"" (→ 🗎 48)
	• Wide V-belt or face of adjustment disk is contaminated	Clean contaminated part: • Clean wide V-belt with dry cloth or paper • Clean adjustment disk with solvent or similar product
	• Load is too high	• Check picked off power and reduce to catalog values.
Drive warms up excessively	• Load is too high	• Check picked off power and reduce to catalog values.
Drive is too loud	• Wide V-belt is damaged Damage can occur after brief blocking or impulsive load of the drive, for example.	• Eliminate the cause • Replace wide V-belt, see chapter ""Replacing wide V-belt"" (→ 🗎 48)
Meshing/grinding noise	• Bearing damage	• Change bearing (call service)

7.3 Malfunctions of WEXA / WEX speed monitor

Fault	Possible cause	Measure
No function of the voltage encoder	• Voltage encoder is not properly connected	Check voltage supply of voltage encoder using the evaluation electronics With correct voltage supply: • Consult manufacturer's documentation! • Voltage encoder is not suitable for connection to the evaluation electronics (IGEX design) • Replace voltage encoder
LED on voltage encoder is not lit or is lit constantly	• Sensing distance is too large or too small	• Set sensing distance (see respective chapter)
No display	• Device is not connected properly • Voltage supply is missing or interrupted	• Connect device correctly according to wiring diagram • Check voltage supply according to wiring diagram
Incorrect display	• Display not adjusted properly	• Check settings. See respective chapter.

21242194/EN – 01/2015

7.4 Waste disposal

Dispose gear units in accordance with the regulations in force regarding respective materials:

- Steel scrap
  - Housing parts
  - Gears
  - Shafts
  - Rolling bearings
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears appropriately.
- Collect used oil and dispose of it according to the regulations in force.

21242194/EN – 01/2015

8 Declarations of conformity

8.1 Variable-speed gear units in categories 2G and 2D

EC Declaration of Conformity

Translation of the original text **900630210**

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the

Gear units of the series	**VARIBLOC® VU.. or VZ..**	
variant	**/II2G or /II2D**	
Category	**2G 2D**	
Designation	**II 2G c T3 or II 2G c T3 X II 2D c T200°C or II 2D c T200°C X**	
are in conformity with		
ATEX Directive	**94/9/EC**	**2)**
Applied harmonized standards:	**EN 13463-1:2009 EN 13463-5:2011**	

2) SEW-EURODRIVE lodges the documents required by 94/9/EC, appendix VIII, with the notified body: FSA GmbH, EU ID No.: 0588

Bruchsal	**14.11.2014**	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents with same address as manufacturer

21242194/EN – 01/2015

8.2 Variable-speed gear units in categories 3G and 3D

EC Declaration of Conformity

Translation of the original text **900590210**

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the

Gear units of the series	**VARIBLOC® VU.. or VZ..**
variant	**/II3G or /II3D**
Category	**3G or 3D**
Designation	**II 3G c T4 or II 3G c T4 X II 3D c T135°C or II 3D c T135°C X**
are in conformity with	
ATEX Directive	**94/9/EC**
Applied harmonized standards:	**EN 13463-1:2009 EN 13463-5:2011**

Bruchsal	**14.11.2014**	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents with same address as manufacturer

21242194/EN – 01/2015

9 Address List

Germany			
Headquarters **Production plant** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. box address Postfach 3023 • 76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.com sew@sew-eurodrive.de
Production plant / industrial gear units	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Competence Center	**Mechanical/ Mechatronic components**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hanover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near Munich)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 h hotline		+49 800 SEWHELP +49 800 7394357
	Additional addresses for service in Germany is provided on request.		
France			
Production plant **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production plant	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly plant **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France are provided on request.		
Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

21242194/EN – 01/2015

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com
Argentina			
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Australia			
Assembly plants **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Belgium			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial gear units**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production plant **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br
Assembly plants **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br
Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg
Chile			
Assembly plant **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production plant **Assembly plant** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn

21242194/EN – 01/2015

China			
Assembly plant **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530, China	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141, China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan, China	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Please contact us for other service center addresses in China.		
Denmark			
Assembly plant **Sales** **Service**	**Copenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Côte d'Ivoire			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci
Estonia			
Sales	**Tallinn**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa, Estonia	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee
Finland			
Assembly plant **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production plant **Assembly plant**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabon	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr
Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

21242194/EN – 01/2015

Great Britain			
Assembly plant **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24 h hotline		Tel. 01924 896911
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Assembly plant **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
India			
Registered office **Assembly plant** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243, India Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly plant **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie
Israel			
Sales	**Tel Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon, Israel	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly plant **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Japan			
Assembly plant **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Cameroon			
Sales	**Douala**	Electro Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr
Canada			
Assembly plants **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Please contact us for more addresses of service centers in Canada.		

21242194/EN – 01/2015

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke
Colombia			
Assembly plant **Sales** **Service**	**Bogota**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax: +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax: +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com
Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be
Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg
Malaysia			
Assembly plant **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

21242194/EN – 01/2015

Mexico			
Assembly plant **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn
Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax: +264 64 462 734 sales@dbmining.in.na
New Zealand			
Assembly plants **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
The Netherlands			
Assembly plant **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800 SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl
Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 (0)1 217 4332 team.sew@eisnl.com http://www.eisnl.com
Norway			
Assembly plant **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Austria			
Assembly plant **Sales** **Service**	**Vienna**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Pakistan			
Sales	**Karatschi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py
Peru			
Assembly plant **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

21242194/EN – 01/2015

Poland			
Assembly plant **Sales** **Service**	**Łódź**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly plant **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax: +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly plant **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax: +260 212 210 645 sales@ecmining.com http://www.ecmining.com
Sweden			
Assembly plant **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax: +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly plant **Sales** **Service**	**Basle**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax: +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax: +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com
Serbia			
Sales	**Belgrade**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax: +381 11 347 1337 office@dipar.rs
Singapore			
Assembly plant **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

21242194/EN – 01/2015

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 831 06 Bratislava, Slovakia	Tel. +421 2 33595 202 Fax: +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 010 01 Žilina, Slovakia	Tel. +421 41 700 2513 Fax: +421 41 700 2514 sew@sew-eurodrive.sk
	Banska Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 974 11 Banská Bystrica, Slovakia	Tel. +421 48 414 6564 Fax: +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 040 01 Košice, Slovakia	Tel. +421 55 671 2245 Fax: +421 55 671 2254 sew@sew-eurodrive.sk
Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
Spain			
Assembly plant **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
South Africa			
Assembly plants **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town, South Africa P.O.Box 36556 Chempet 7442 Cape Town, South Africa	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax: +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
South Korea			
Assembly plant **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax: +268 2 518 5033 engineering@cgtrading.co.sz

21242194/EN – 01/2015

Tanzania			
Sales	**Dar es Salaam**	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 uroos@sew.co.tz
Thailand			
Assembly plant **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Czech Republic			
Sales **Assembly plant** **Service**	**Hostivice**	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax: +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 h hotline	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax: +420 235 358 218 servis@sew-eurodrive.cz
Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn
Turkey			
Assembly plant **Sales** **Service**	**Kocaeli-Gebze**	SEW-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Ukraine			
Assembly plant **Sales** **Service**	**Dnipropetrowsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
USA			
Production plant **Assembly plant** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly plants **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544, USA	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Please contact us for other service center addresses in the USA.		

21242194/EN – 01/2015

Venezuela			
Assembly plant **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo, Venezuela	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net
United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
Vietnam			
Sales	**Ho-Chi-Minh City**	**All sectors except for ports and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Ports and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax: +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn
Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

21242194/EN – 01/2015

Index

C

Copyright notice 8
Customer service 54

D

Designated use 11
Digital remote speed indicator 38
  Calculating the measuring time 40

E

Embedded safety notes 7
Exclusion of liability 8

F

Fault elimination 55
  WEXA / WEX speed monitor 55
Flatness defect 25

G

Gear unit
  Cleaning 46
  Installation 24

I

Input and output elements
  Mounting 26
  Using a mounting device 27
Inspection/maintenance 45
Installation 17

M

Measuring rolling bearing temperature 51
Mounting
  Couplings 28
  Input and output elements 26
Mounting options 16

N

Nameplate 14
Notes
  Designation in the documentation 6

O

Operation and service 54
Other applicable documentation 12
Output torque 20

P

Permitted overhung loads 21
Product names 8

R

Regreasing adjustment spindle 50
Replacing wide V-belt 48
Rights to claim under limited warranty 7

S

Safety notes 9
  Designation in the documentation 6
  Structure of embedded 7
  Structure of the section-related 6
  Transport 12
Section-related safety notes 6
Signal words in the safety notes 6
Special designs 20
Speed adjustment via handwheel 31
Speed monitoring
  Voltage encoder 37
  WEXA / WEX 31
speed monitors
  Other 43
Startup 29

T

Tachometer
  Axial tachometer 44
  Right-angled tachometer 44
Trademarks 8
Transport 12
Type designation 15

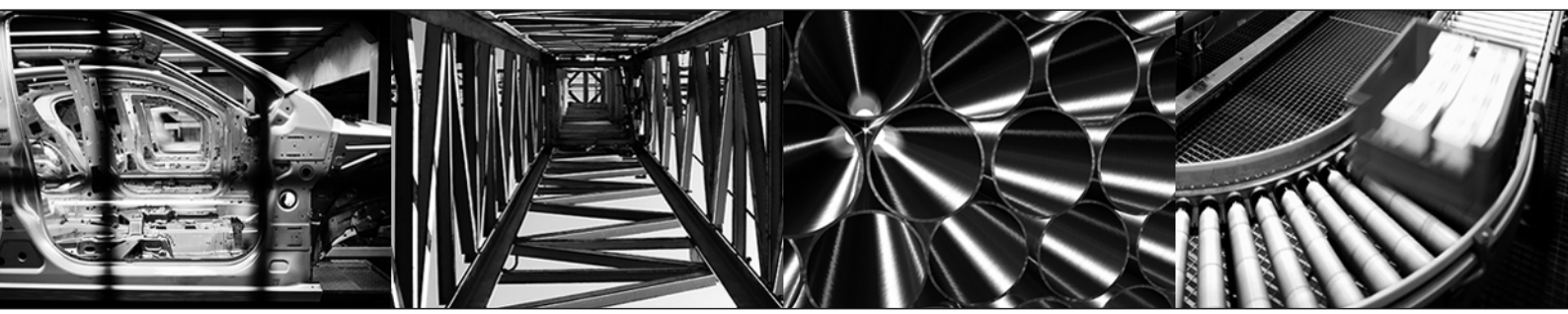
U

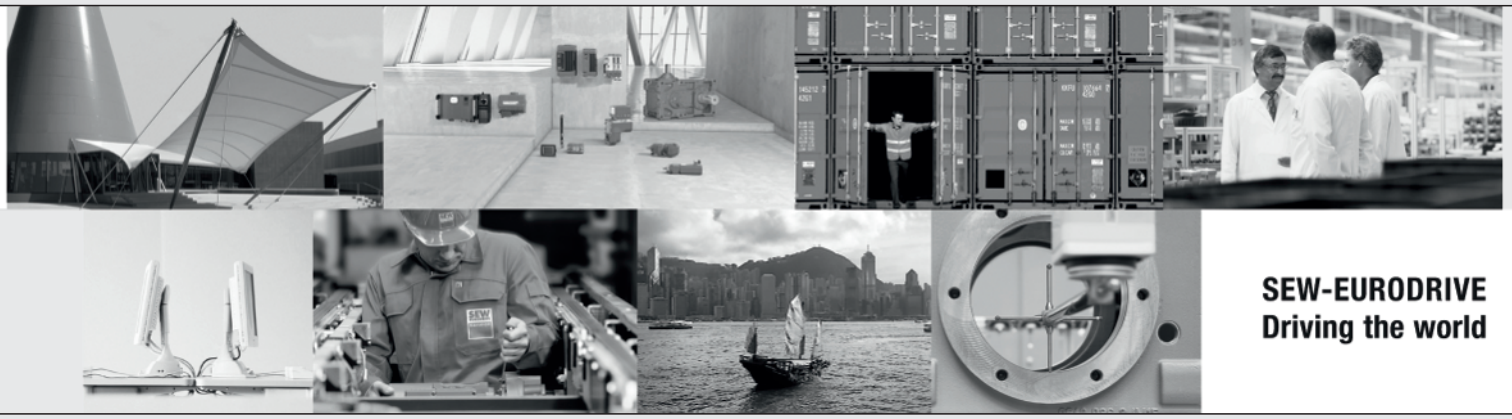
Unit structure 13
Using a mounting device 27

W

Waste disposal 56

21242194/EN – 01/15





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