SEW EURODRIVE

Operating Instructions

AR.. and AT.. Centrifugal and Friction Couplings

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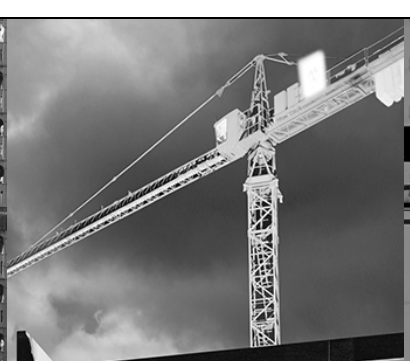
17036011 / EN

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1 General Information

1.1 How to use this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who assemble, install, startup, and service this product.

The documentation must be accessible and legible. 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 documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent danger	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
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of the section-related safety notes

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

This is the formal structure of a section safety note:

⚠ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of the embedded safety notes

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

This is the formal structure of an embedded safety note:

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

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the danger.

1.3 Rights to claim under 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 unit!

1.4 Exclusion of liability

You must comply with the information contained in this documentation to ensure safe operation of the electric motors 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 the documentation. In such cases, any liability for defects is excluded.

1.5 Copyright

1.6 Product name and trademarks

The brands and product names contained within this publication are trademarks or registered trademarks of the titleholders.

2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to. 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 the following components: AR.. and AT.. centrifugal and friction couplings. If using gearmotors, please also refer to the safety notes for gear units in the corresponding operating instructions.

Also observe the supplementary safety notes in the individual sections of this documentation.

2.2 General information

⚠ WARNING

During operation, the motors and gearmotors can have live, bare (in the event of open connectors/terminal boxes) and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Severe or fatal injuries.

- All work related to transportation, storage, installation, assembly, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observance of:
  - The relevant detailed operating instructions
  - The warning and safety signs on the motor/gearmotor
  - All other project planning documents, operating instructions and wiring diagrams related to the drive
  - The specific regulations and requirements for the system
  - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products
- Immediately report any damage to the shipping company

Removing the required protection cover or the housing without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

This documentation provides additional information.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified staff 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 further areas of transportation, storage, operation and waste disposal must only be carried out by persons who are trained appropriately.

All qualified personnel must wear appropriate protective clothing.

2.4 Designated use

These drives and couplings are intended for industrial systems.

When installed in machines, startup of the drives and couplings (i.e. start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in Directive 2006/42/EC (Machinery Directive).

Use in potentially explosive atmospheres is prohibited, unless measures are expressly taken to make it possible.

The ambient conditions must comply with all the specifications on the nameplate.

2.5 Other applicable documentation

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

- Wiring diagrams provided with the gearmotor
- "Gear Unit Series R..7, F..7, K..7, S..7, SPIROPLAN® W" operating instructions
- "DR.71 – 225, 315 AC Motors" operating instructions

2.6 Transport/storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

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

The built-in lifting eyebolts comply with DIN 580. Always observe the loads and regulations listed in this standard. If the 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 according to DIN 580.

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

Store the drive and the coupling in a dry, dust-free environment if they are not to be installed straight away. The drive and the coupling can be stored for one year without requiring any special measures before startup.

2.7 Installation

Make sure that the supports are even, the foot and flange mounting is correct and if there is direct coupling, align with precision. Resonances between the rotational frequency and the double network frequency caused by the structure are to be avoided. Release the brake (if installed), turn rotor manually, check for unusual grinding noise. Check the direction of rotation in decoupled status.

Only install or remove belt pulleys and couplings using suitable devices (heat up) and cover with a touch guard. Avoid improper belt tension.

Make the pipe connections that may eventually be required. Mounting positions with shaft ends pointing upwards should be equipped with a cover to prevent foreign objects from falling into the fan. Ensure that ventilation openings are not obstructed and that used air, including air from adjacent units, cannot be drawn in again straight away.

Observe the notes in the "Mechanical Installation" section.

2.8 Electrical connection

All work may only be carried out by qualified personnel. During work, the low-voltage machine must be on standstill, enabled, and safeguarded against an accidental restart. This also applies to auxiliary circuits (e.g. anti-condensation heating or forced cooling fan).

Check that the motor is de-energized!

Exceeding the tolerances in EN 60034-1 (VDE 0530, part 1) – voltage + 5%, frequency + 2%, curve shape, symmetry – increases the heating and influences electromagnetic compatibility. Also comply with EN 50110 (where necessary, observe other applicable national regulations, such as DIN VDE 0105 for Germany).

Observe the wiring information and differing data on the nameplate as well as the wiring diagram in the terminal box.

The connection should be a continuous secure electrical connection (no protruding wire ends); use the cable end equipment intended for this purpose. Establish a secure protective earth connection. When the motor is connected, the distances to non-insulated and live parts must not be shorter than the minimum values according to IEC 60664 and national regulations. With low voltage, the distances should be no shorter than the following values, in compliance with IEC 60664:

Nominal voltage V_N	Distance
≤ 500 V	3 mm
≤ 690 V	5.5 mm

The terminal box must be free of foreign objects, dirt and humidity. Unused cable entry openings and the box itself must be closed so that they are dust and water proof. Secure keys for test mode without output elements. When operating low-voltage machines with brakes, check that the brake is functioning correctly before startup.

Observe the notes in the "Electrical Installation" chapter.

2.9 Startup/operation

Whenever changes to normal operation occur, such as increased temperatures, noise, vibrations, etc., you should determine the cause. Consult the manufacturer if required. Never deactivate protection devices, even in test mode. Switch off the motor if you are not sure.

Regularly clean air ducts in dusty or dirty environments.

3 Structure

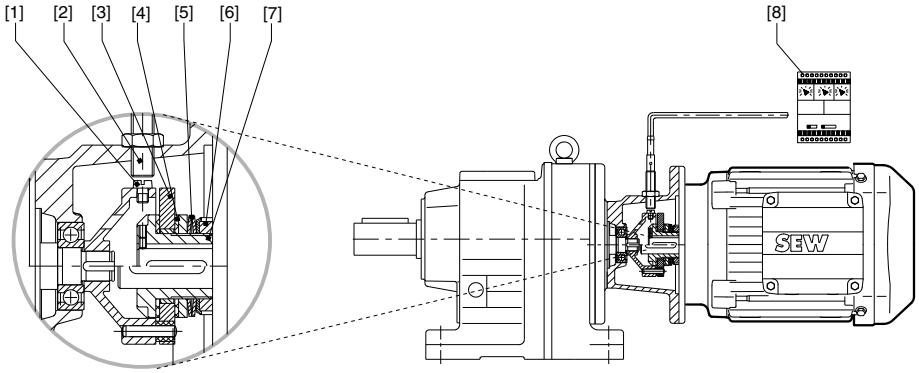
3.1 Drive with AR.. friction coupling

Drives with a torque limiting coupling consist of a standard gear unit and motor/variable speed gearmotor with an adapter installed between them. This adapter accommodates the friction coupling. In gearmotors with a multi-stage gear unit, the torque limiting coupling may be located between the first and second gear units.

Via the friction lining [4] of the driving disk [3], the input friction hub [7] with cup springs [5] and slotted nut [6] drives the output coupling plate with connecting pin. On delivery, the slip torque is set individually according to the drive specifications.

3.1.1 W speed monitor

The following figure shows a drive with friction coupling and W: speed monitor



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[1]	Trigger cam	[4]	Friction lining	[7]	Slip hub
[2]	Encoder	[5]	Spring washer	[8]	Speed monitor
[3]	Driving disk	[6]	Slotted nut		

The speed monitor [8] is used with constant-speed gearmotors and is connected to the encoder [2] in the adapter.

The speed of the coupling plate at the output end is picked up by an encoder [2] and passed on to a monitoring unit [8]. Speed monitors and slip monitors are used as monitoring units. You can install them together with contactors, safety devices, etc. on a 35 mm standard rail (according to DIN EN 50 022) in a control cabinet or mounted via 2 bores.

INFORMATION

For information on the W speed monitor, please refer to the separate operating instructions of the manufacturer.

3.1.2 WS slip monitor

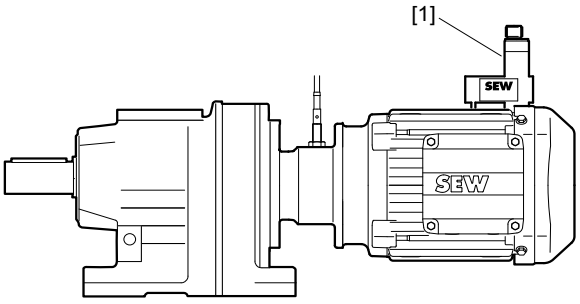
The slip monitor [8] is used with the following components:

- speed-controlled motors with speed sensor
- VARIBLOC® variable-speed gear units

Input 1 of the slip monitor is connected to the encoder of the adapter. Depending on the application, either the encoder of the speed-controlled motor or the VARIBLOC® variable speed gear unit is connected to input 2 of the slip monitor.

the input and output speed is compared in order to determine the slip of the frictional coupling. The slip monitor compares the pulses from input 1 and input 2. Slip is signaled when the difference between the pulses within a certain cycle time exceeds the specified sensitivity value.

The following figure shows an adapter with friction torque and WS slip monitor for speed-controlled motors:



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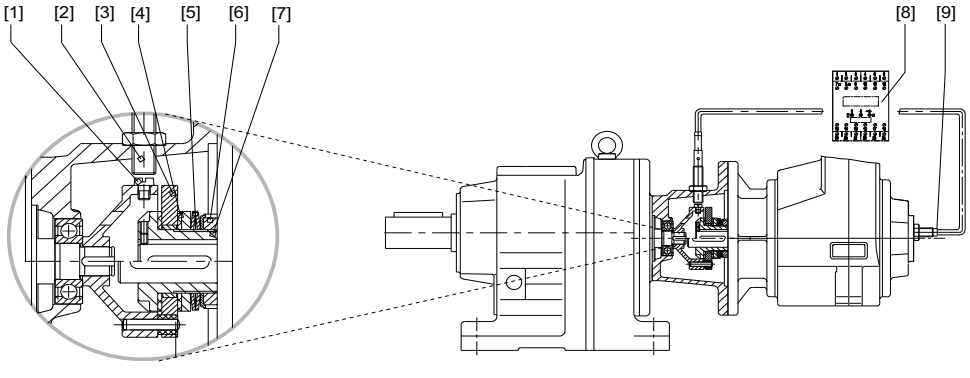
[1] Encoder

For speed-controlled motors with speed sensor, the slip monitor (input 2) is connected to the encoder [1].

The following figure shows an adapter with friction torque and WS slip monitor for VARIBLOC®:



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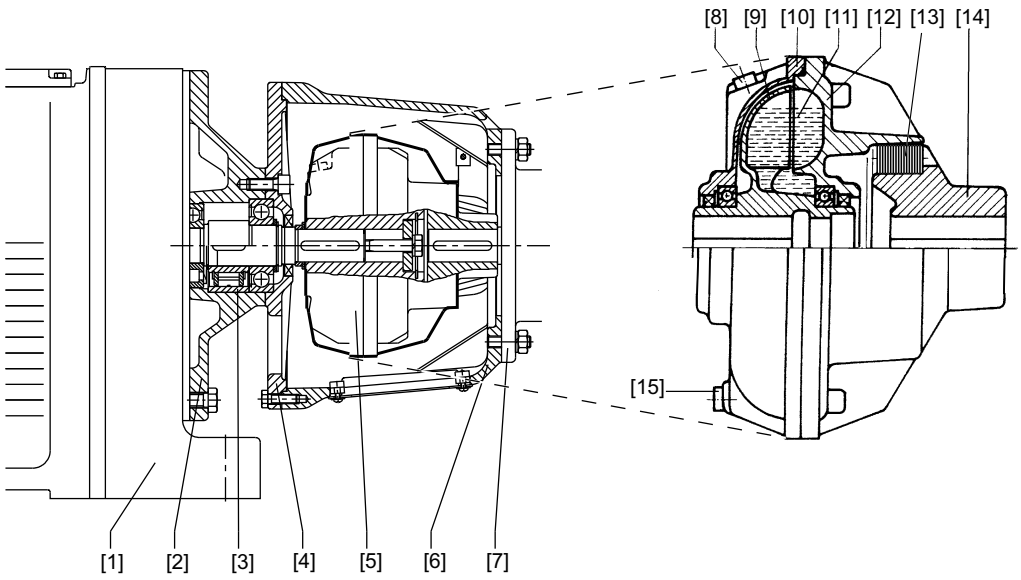
[1]	Trigger cam	[4]	Friction lining	[7]	Slip hub
[2]	Encoder	[5]	Spring washer	[8]	Slip monitor
[3]	Driving disk	[6]	Slotted nut	[9]	Encoder IG

INFORMATION

For information on the WS slip monitor, refer to the separate operating instructions of the manufacturer.

3.2 Drive with AT.. hydraulic centrifugal coupling

The following figure shows the structure of a drive with hydraulic centrifugal coupling:



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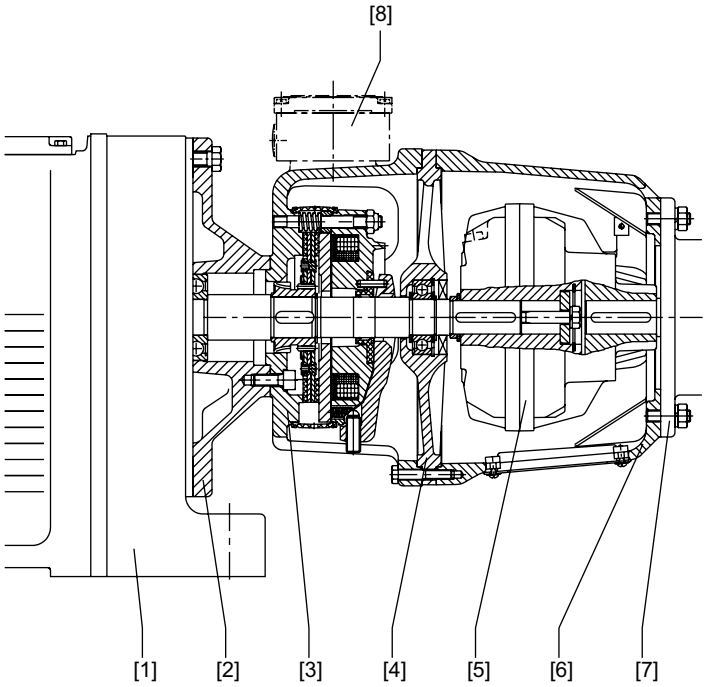
[1] Gear unit
[2] Basic flange complete
[3] Backstop (optional)
[4] Intermediate flange
[5] Hydraulic centrifugal coupling
[6] Extended housing complete
[7] Motor
[8] Filler plug
[9] Turbine wheel
[10] Coupling half
[11] Operating fluid (hydraulic oil)
[12] Pump wheel
[13] Elastic components
[14] Flexible connecting coupling
[15] Fusible safety plug

Hydraulic centrifugal couplings are fluid couplings based on the Föttinger principle. They consist of 2 hinged hemispheres with blades separated by a tight gap.

The applied torque is transmitted by the inertial force of the streaming fluid. This fluid circulates within a closed circuit, between the pump wheel (primary side) [12] on the driving shaft (motor shaft) and the turbine wheel (secondary side) [9] on the driven shaft (gear unit input shaft).

A speed difference (slip) is required in order to maintain the oil circulation, and thus to transmit the torque. The hydraulic centrifugal coupling will not transmit torque if the slip is zero.

The following figure shows the structure of a drive with hydraulic centrifugal coupling and BM(G) brake:

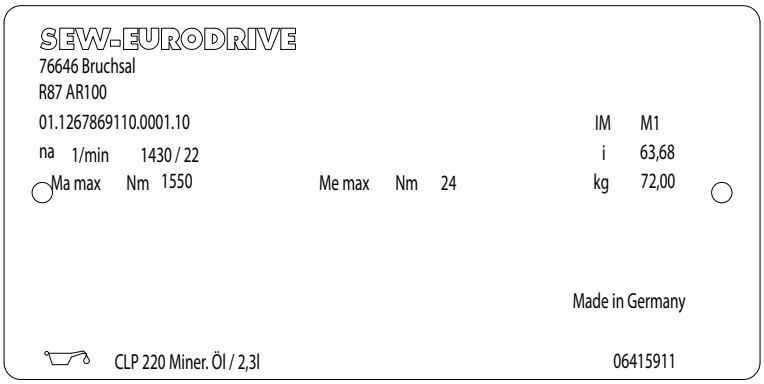


[1] Gear unit
[2] Basic flange complete
[3] Brake bearing flange with integrated brake complete
[4] Bearing flange
[5] Hydraulic centrifugal coupling
[6] Extended housing complete
[7] Motor
[8] Terminal box, brake

3.3 Nameplate

3.3.1 Adapter AR..

The following figure shows a sample nameplate for AR.. adapters:



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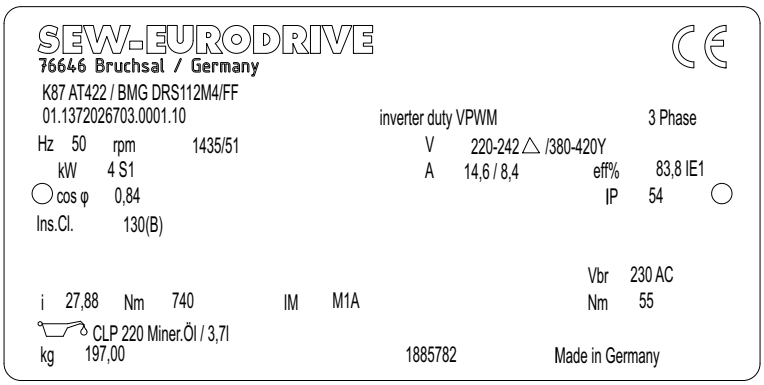
n_a	Permitted maximum input speed/output speed in rpm	IM	Mounting position
M_{amax}	Permitted maximum output torque in Nm	i	Gear unit reduction ratio
M_{emax}	Permitted maximum input torque in Nm	kg	Weight

3.3.2 Adapter AT..

The following figure shows a sample nameplate for AT.. adapters:



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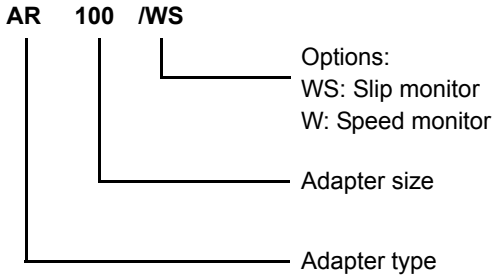
f	Frequency in Hz	M_{apk}	Permitted maximum output torque in Nm
n_{epk}	Permitted maximum input speed/output speed in rpm	IM	Mounting position
P_N	Nominal power P_N in kW	⅄ / △	Connection type
S	Operating mode	I	Current in A
cos φ	Power factor	eff%	Efficiency
Iso.Kl	Thermal class	IE	Efficiency class Standard Efficiency
i	Gear unit reduction ratio	IP	Degree of protection

3.4 Unit designation

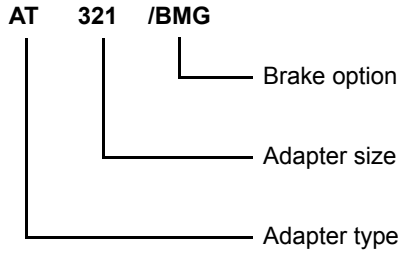
3.4.1 Adapter AR..

An AR.. adapter, for example, has the following type designation:



3.4.2 Adapter AT..

An AT.. adapter, for example, has the following type designation:



4 Mechanical Installation

4.1 Required tools/resources

- Standard tools
- Spanner wrench
- Mounting/dismantling tool
- Torque wrench

4.2 Prerequisites for assembly

⚠ CAUTION

Risk of injury due to protruding gear unit parts.

Minor injuries.

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

4.3 Drive with AR.. friction coupling

⚠ NOTICE

Improper assembly may cause damages to the gear unit and the coupling.

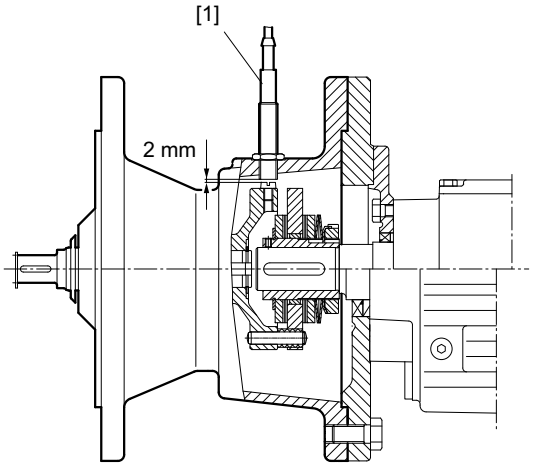
Possible damage to property

- Do closely observe the notes in this chapter.

- Make sure that the machine is at standstill before you work on the gear unit and the coupling. Secure the drive unit against unintentional power-up.
- Protect the gear unit from direct cold air currents. Condensation may cause water to accumulate in the oil.

4.3.1 Encoder installation

1. Remove the fan guard from the driving motor
2. Slowly turn the motor and adapter shaft end until you can see a control cam (= head of the pan head screw) in the tapped hole.
3. Screw in the encoder until contact is made with the control cam.
4. Turn the encoder [1] back by 2 turns (corresponds to a clearance of 2 mm)



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5. Secure the encoder with a lock nut on the outside of the encoder.
6. Check: Slowly turn the motor and adapter shaft end.

   The encoder is installed correctly if the control cams do not contact the encoder.
7. Mount fan guard.

4.3.2 Connecting monitoring devices

⚠ WARNING

Interference voltages due to improper cabling.

Severe or fatal injuries.

- Do not lay incoming cables in multicore cables.
- Do not exceed the maximum cable length of 500 m at a cross section of 1.5 mm^2.
- Use shielded cables if there is a risk of interference from power current or control cables and if the lines are longer than 10 m.

1. Encoder connection

   For version with W speed monitor:

   - Connect the encoder of the adapter to the speed monitor.
     - via three-core cable

   → Encoder generates 1 pulse per revolution

   For version with WS slip monitor:

   - Connect the encoders of the adapter and motor to the slip monitor.
     - Encoder of the adapter to terminals 4, 5, 6 (input 1) using a three-core cable
     - With speed-controlled motor:

       Encoder to terminals 5, 6, 11 (Input 2) via three-core cable
     - with VARIBLOC®:

       Encoder to terminals 5, 6, 11 (Input 2) via three-core cable

   → Depending on the respective encoder, the motor encoder generates the following pulses per revolution

Encoder type	EI71	EI72	EI76	NV11	NV12	NV16
Motors	DR.71 – 132			DT71 – DV132S		
Pulse(s)	1	2	6	1	2	6

2. Connect the speed or slip monitor according to the manufacturer instructions (refer to the enclosed operating instructions).

4.4 Drive with AT.. hydraulic centrifugal coupling

⚠ NOTICE

Improper assembly may cause damages to the gear unit and the coupling.

Possible damage to property

- Do closely observe the notes in this chapter.

- Make sure that the machine is at standstill before you work on the gear unit and the coupling. Secure the drive unit against unintentional power-up.
- Protect the gear unit and the coupling from direct cold air currents. Condensation may cause water to accumulate in the oil.

4.4.1 Brake connection

INFORMATION

Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification!

The brake is released electrically. The brake is applied mechanically when the voltage is switched off.

INFORMATION

In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 to EN 60947-4-1.

Proceed as follows to connect the brake:

1. Connect the brake according to the provided wiring diagram
2. **For variant with manual brake release:**
   - For variant with self-reengaging manual brake release: Screw in hand lever
   - For variant with lockable manual brake release: Screw in the setscrew

4.4.2 Brake control connection

The DC disk brake is powered from a brake control system with protection circuit. It is located in the terminal box/IS lower part or must be installed in the control cabinet. Observe the EMC notes in the "AC motors DR.71-225, 315" operating instructions.

1. Connect the brake controller according to the wiring diagram supplied with the brake.
2. Check cable cross sections – brake currents (see chapter "Technical Data" in the "AC motors DR.71-225, 315" manual)

5 Startup/Operation

⚠ WARNING

Thermal overload due to blocked drive.

Severe injuries.

- Switch off the drive immediately.

⚠ WARNING

Danger of burns and blindness due to spouting liquid from fusible screw plug.

Severe injuries.

- Switch off the drive immediately.
- Observe the permitted maximum ambient temperature.
- Wear safety goggles.
- Avoid contact with the lubricant

⚠ WARNING

Damage due to incorrect speed or incorrect coupling filling.

Possible injury.

- Do only operate the coupling with the fill quantity specified in the order confirmation.
- Never operate the coupling without lubricant.
- Consult SEW-EURODRIVE if you require a stationary operation with an operating point different from the specified one.
- The lubricant must correspond to the specifications in chapter "Lubricants".

⚠ WARNING

Danger of fire and explosion due to sparks caused by worn elastic components.

Serious injury.

- Check elastic components regularly and replace them if necessary.

⚠ WARNING

Damage due to high speeds.

Possible injury.

- Provide for a device that safely prevents excessive speeds, e.g. brake or backstop.

⚠ WARNING

Irreparable damage to the bearings of the hydraulic centrifugal coupling due to insufficient lubrication.

Serious injury.

- In order to ensure the lubrication of the bearings of adapter types AT311 – AT542, the drive unit must be set to standstill once a week.

NOTICE

Possible damage and danger of fire due to lubrication spouting from the fusible screw plug.

Possible damage to the unit.

- Switch off the drive immediately.
- Protect adjacent electric devices with a splash guard.
- Avoid hot machine parts, heating devices, sparks or open fire in the vicinity of fusible screw plugs.
- Immediately remove leaked oil and solder of the fusible screw and provide for a catch basin if required.
- Replace the fusible screw plug and the lubricant once the fusible screw plug has triggered.

NOTICE

Thermal overload during the starting phase of the coupling.

Potential damage to property

- Make sure to provide for sufficient breaks between the starting phases.
- Set coupling to standstill at least once a week.

INFORMATION

Make sure that the heat caused by the power loss is ≤ the heat that can be dissipated for the corresponding speed. The temperature mainly depends on the local operating conditions (frequency of starts, ambient temperature, design of the fusible screw plug) and should not exceed -90 °C in continuous operation.

Prior to startup, make sure that

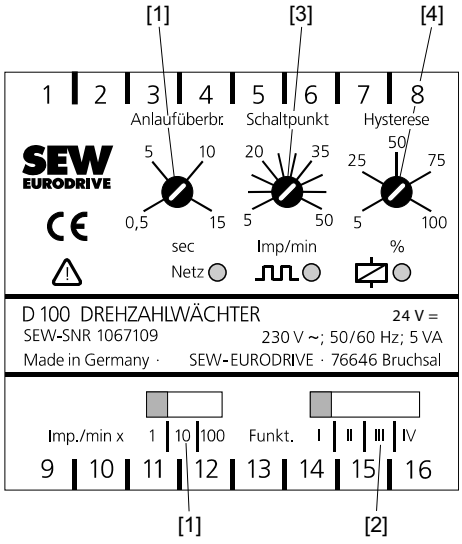
- all parts of the drive and the coupling (especially the protective covers) have been mounted properly.
- all connections are have been established properly.
- the drive is not blocked.
- no other sources of danger are present.
- the switching time between star and delta is a short as possible (2 – 5 s) if you operate the drive in star-delta connection.
- **for hydraulic centrifugal coupling:**

  that the fill quantity is correct after a longer storage period. The required oil quantity is specified on the order confirmation.

5.1 Drive with AR.. friction coupling

5.1.1 Setting the W speed monitor

The following figure shows the front of the speed monitor:



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[1] Switching speed
[2] Switching function
[3] Starting lag
[4] Hysteresis

1. Perform settings on the speed monitor according to the following table:

Settings		Description	Setting measures / values
[1]	Switching speed	allows for an exact setting of the desired value Note: If the drive stalls, you can achieve the shortest possible slip times by setting the switching speed slightly below the rated speed.	Rough adjustment with step switch (1, 10, 100) Fine adjustment with potentiometer (5 – 50) Example: Step switch "100", potentiometer setting "13": Switching speed = 100 x 13 = 1300 Imp/min
[2]	Switching function	Defines the properties of monitoring function II = speed below set speed; the LED lights up when relay has picked up.	setting to function II
[3]	Starting lag	You can avoid error messages during motor startup by setting a delay.	–
[4]	Hysteresis	Difference between the switch-on and switch-off point of the relay.	monitoring of the speed undercut: Potentiometer setting "5%"

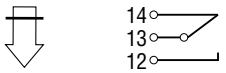
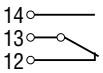
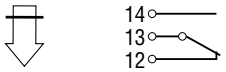
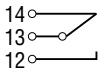
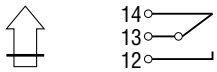
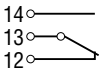
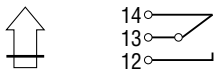
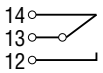
2. **Functional check**: Set the switching speed on the potentiometer in monitoring electronics. The value must exceed the rated speed.

   → The setting is correct if the relay in the speed monitor triggers.

LED messages:

LED	Message
1	lights up when relay has picked up
2	lights up if there is an input pulse
3	lights up if operating voltage is correct.

Relay position

Function	Relay position		
	when speed is		for normal operation and start bypass
	exceeded	too low	
I			
II			
III			
IV			

5.1.2 Setting the WS slip monitor

INFORMATION

- The specified parameters are recommendations for safe operation. Depending on the type of control of the existing plant, you may have to adjust the parameters.
- Observe the operating instructions of the slip monitor.

The parameters mentioned below cause a fast cut-off in the event of the slightest slip. If slip is intended temporarily during normal operation of the system, for instance with short torque impulses caused by load fluctuations, then the parameters must be modified accordingly.

The x in some parameter designations stands as placeholder for sensor input 1 or 2.

- The encoder of the adapter is connected to input 1.
- The encoder of the variable-speed gear unit or frequency-controlled motor is connected to input 2.

Parameters	Meaning	Value	Factory setting	Comment
FOx	Switching function of outputs 1 and 2	F4	Yes	Relay picked-up in normal operation and during start bypass.
CTx	Cycle time	0.0 (s)	Yes	
NCx	Number of trigger cams	NC1 1 NC2 2	No	Setting for operation of the adapter with VARIBLOC® variable-speed gear unit
	Number of trigger cams	NC1 1	No	Setting for operation of the adapter with motor. Number of pulses of input 2 depends on the proximity switch used on the motor (page 20).
		NC2 .	No	
STP	Start bypass time	3.0 (s)	No	Output relay remains picked-up during that time in order to allow for coupling slip during the start of a plant without cut-off. Under favorable conditions, i.e. with low external mass moments of inertia and low drive utilization in normal operation, this time can be reduced or even set to 0.0 s. This has to be evaluated vie tests under nominal load.
SOP	Memory function of the outputs	1	No	With this setting, after a cut-off, the outputs are reset via a reset on the front of the speed monitor. This function may have to be adapted to the respective plant control and processes.
OPP	Simultaneous switching of outputs 1 and 2	1	No	Both outputs drop in the event of slip.
DIM	Display format	0	Yes	Display in rpm
VER	Software version	-	-	Query option regarding the installed software version
SPx	Max. number of differential pulses	1	Yes	Slip is signaled after a differential pulse
DTx	Delay time of the outputs	0.0 (s)	Yes	No switch-off delay
FTx	Impulse relay function	0.0 (s)	Yes	Impulse time not active

6 Inspection/Maintenance

6.1 Preliminary work

Observe the following notes before you start with the inspection/maintenance work.

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.

⚠ WARNING

Danger of burns due to hot gear unit, hot coupling and hot gear unit oil.

Severe injuries.

- Let the gear unit cool and the coupling down before you begin with your work.
- Only remove the oil level and oil drain plug very carefully.

NOTICE

Filling in the wrong gear unit or coupling oil may result in significantly different lubricant characteristics.

Potential damage to property

- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Mineral oil is used as standard lubricant.
- The lubricant must correspond to the specifications in chapter "Lubricants".

NOTICE

Improper maintenance may cause damages to the gear unit and the coupling.

Possible damage to property.

- All work on the gear unit and the coupling may only be carried out by qualified personnel.
- Observe the notes in this chapter.

- Use original spare parts only.
- Strict adherence to the inspection and maintenance intervals is absolutely necessary to ensure safe working conditions.
- Before releasing shaft connections, be sure that there are no active torsional moments present (tensions within the system).
- Prevent foreign bodies from entering into the gear unit and the coupling during the maintenance/inspection work.

- Do not clean the gear unit and the coupling with a high-pressure cleaning system as water might enter and the seals might be damaged.
- Perform safety and function tests following all maintenance and repair work.

6.2 Inspection and maintenance intervals

Unit / unit part	Time interval	Required steps	Chapter
Hydraulic centrifugal coupling	every 500 operating hours, at the latest after 3 months.	Check drive for irregularities.	–
	3 months after startup at the latest, then annually, however, after 4000 hours of operation at the latest[1)]	replace worn elastic components of the coupling if required.	see, "Adjusting and changing elastic components" (page 33)
	after 5 years	Change elastic components	see, "Adjusting and changing elastic components" (page 33)
	every 15000 hours of operation	Inspect oil and change it if necessary	see "Inspecting/changing the oil" (page 34)
Adapter with centrifugal coupling with brake BM(G)	The periods of wear are affected by many factors and may be short. Calculate the required inspection/maintenance intervals in accordance with the project planning documents.	Inspect the brake • Working air gap • Brake disk Suck off any abrasion Inspect the switch elements and replace them if necessary (e.g. in case of burn-out)	see "Removing the hydraulic centrifugal coupling" (page 36) and operating instructions "AC Motors DR.71 – 225, 315"
Adapter with frictional coupling	at least every 3 000 hours of operation	Inspect and replace the friction lining and cup springs, adjust the slip torque if necessary	See "Inspection/maintenance of the drive with AR.. frictional coupling" (page 29)

1) Should you, based on the existing wear, expect the elastic components to show a wear of 80% of the tabular value (page 33) by the next check, you have to replace the elastic components or plan shorter maintenance intervals. Observe increased wear due to changing operating conditions.

6.3 Drive with AR.. friction coupling

6.3.1 Inspecting/replacing the friction lining, adjusting the slip torque

⚠ WARNING

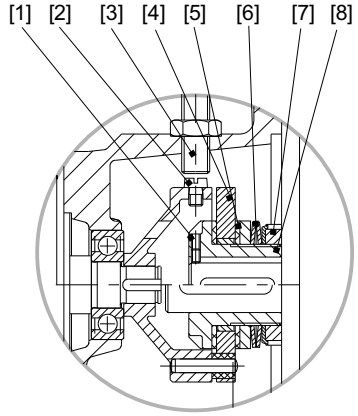
Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor and, if installed, the forced cooling fan from the power supply.
- Safeguard against accidental startup.
- Carefully observe the steps described below.

Use a torque wrench with a suitable connection piece for checking and adjusting the slip torque, see table (page 31) for setting values.

The following figure shows the structure of the frictional coupling:

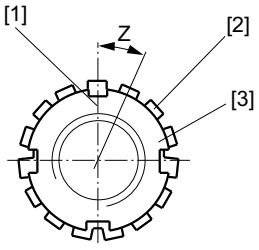


1926826763

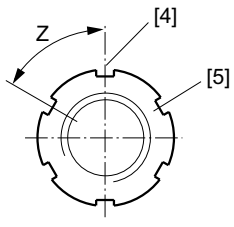
[1] Locking screw
[2] Cylinder head screw
[3] Proximity switch
[4] Friction disk
[5] Friction lining
[6] Spring washer
[7] Slotted nut
[8] Slip hub

The following figure shows the rough torque adjustment:

AR71 – 115



AR132 – 195



1926829451

[1] Marking
[2] Lock washer (cam)
[3] Slotted nut
[4] Markings (driving disk)
[5] Slotted nut

1. Disconnect the motor/variable speed gearmotor from the adapter
2. Unscrew the safety screw [1], pull the friction hub [8] off the shaft extension.
3. Clamp the friction hub [8] in a vise.
4. **with AR 71 – 115:** Unscrew the lock washer [10].

   with AR 132 – 195: Unscrew the clamping screw on the slotted round nut [7]
5. Loosen the slotted round nut until you can easily adjust the frictional coupling manually.
6. **with AR 71 – 115:** Mark the position of the slotted round nut [11].

   with AR 132 – 195: Mark the driving disk [12].
7. Unscrew and remove the slotted round nut, remove the cup springs [6].

   Important: Note the sequence of the cup springs.
8. Inspect the friction lining [5]: replace if worn.

   ⚠ **NOTICE** Irreparable damage to the surface due to lubricant on the friction surface.

   Potential damage to property.

   - Do not allow any lubricants to get onto the friction surface.
9. Inspect the cup springs [6]: replace if burned out.
10. Reinstall the cup springs [6] (in the same sequence as before).
11. Screw on the slotted round nut up to the mark.
12. Measure and adjust if required

    with a torque wrench

    - Connect the torque wrench to the hole in the hub
    - Measure the torque (in both directions), if necessary readjust using the slotted round nut

    Rough adjustment without torque wrench

    - Use the hook spanner to set the torque limiting coupling.
    - Slip torque according to value "Z" (see the following table), calculated from the marking

      with AR 71 – 115: = Number of cams on the lock washer

      with AR 132 – 195: = Number of slots in the slotted nut
13. Secure the slotted round nut with the lock washer or clamping screw.
14. Proceed the other way round to assemble the drive.

6.3.2 Slip torques AR..

Adapter type	Cup springs			Setting range in	No. of cams or slots "Z"																				
	Number	Thickness in mm	Sequence [1)]	Nm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
					Slip torque M_R in Nm																				
AR71	4	0.6	1	1.0-2.0						1.0	1.4	1.6	1.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
AR80	4	0.6	1	1.0-2.0						1.0	1.4	1.6	2.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4.0								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
AR85 AR90 AR95	4	0.6	2	2.0-4.0				2.0	2.4	3.0	3.6	3.8	4.0												
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
	2	1.1	3	17-24			16	20	24																
AR100	6	0.7	2	5.0-13							5.0	6.0	8.0	9.0	10	11	12	13							
AR105 AR112 AR115	2	1.45	2	14-35						14	16	17	18	20	22	23	24	26	27	28	-	30	31	32	35
			3	36-80						36	41	45	48	54	58	60									
AR132S/M AR132ML AR135 AR145	4	1.5	1	15-32				15	18	22	24	26	-	28	30	32									
			2	33-65			33	40	50	58	67														
			3	66-130		68	100	120	135																
AR160	4	1.5	1	30-45										32	36	38	40	41	42	40	44	45			
			2	46-85			46	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	180	190	200							
AR165 AR180	4	1.5	1	30-45										32	36	38	40	41	42	44	45				
			2	46-85			40	48	60	65	70	75	80	85											
AR185 AR195	2	2.7	2	86-200					86	90	110	125	135	150	160	170	180	190	200						
			3	201-300			200	280	300																

1) For sequence of cup springs, refer to the legend below

1 Double alternating sequence ()()
2 Alternating sequence ()
3 Aligned sequence))

6.3.3 Replacing the encoder of the adapter

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor and, if installed, the forced cooling fan from the power supply.
- Safeguard against accidental startup.
- Carefully observe the steps described below.

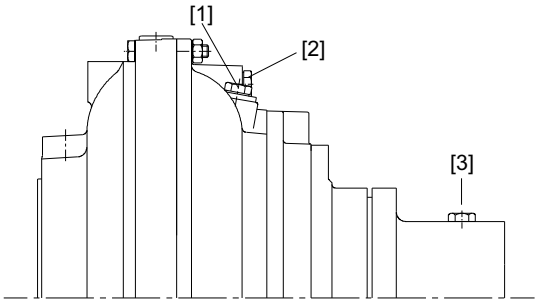
The switching output of the encoder is contactless, thus the service life is not limited by the switching frequency. Proceed as follows if you have to replace it anyway:

1. Remove the fan guard from the driving motor.
2. Remove the encoder connection.
3. Loosen the lock nut on the encoder and remove the old encoder.
4. Install the new encoder, see chapter "Assembly" > "Installing the encoder" (page 19)
5. Connect the encoder to the speed and slip monitor.
6. Mount fan guard.

6.4 Drive with AT.. hydraulic centrifugal coupling

6.4.1 Tightening torques of the screws

The following figure shows an AT..centrifugal coupling:



[1] Filler screw
[2] Fusible screw plug
[3] Retaining screw

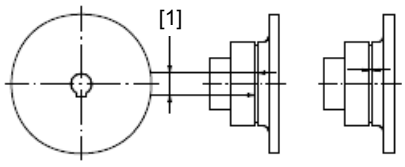
The hydraulic centrifugal coupling is equipped with fusible screw plugs, filling plugs and retaining screws. During maintenance, it is important to adhere to the tightening torques specified in the table below precisely to ensure the coupling is working and does not leak.

Adapter type	Fusible screw plug			Filling plug		Retaining screw	
	Screw size	Trigger temperature[1] [°C] / color	Tightening torques [Nm]	Screw size	Tightening torques [Nm]	Screw size	Tightening torques [Nm]
AT311 - 312	M8	(110 / Yellow) 140 / red (160 / Green)	8	M10	13	M6	9
AT321 - 522	M10		13	M12x1.5	20	M8	23
AT541 - 542				M14x1.5	30	M12	68

1) Fusible screw plugs for the temperatures in brackets are available on request

6.4.2 Check and replace elastic components

1. Turn the coupling until the elastic components are free from load.
2. Provide for markings on the coupling and the coupling half on the motor side.
3. Turn the coupling in the opposite direction until the elastic components are free from load.
4. Measure the distance between the markings in circumferential direction on the outside diameter of the coupling and the coupling half on the moor side.
5. Note down the measured distance.



3374766347

[1] Measured distance

The following table shows the permitted distance values:

Coupling size	Measured distance in mm
AT311, AT312	< 6
AT421, AT422, AT522	< 6
AT541, AT542	< 8

You must replace the elastic components if the measured distance exceeds the listed values.

Proceed as follows to replace the elastic components:

1. Remove the motor.
2. Remove the old elastic components
3. Install new elastic components.
4. Reattach the motor.

6.4.3 Inspecting/changing the oil

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor and, if installed, the forced cooling fan from the power supply.
- Safeguard against accidental startup.
- Carefully observe the steps described below.

⚠ WARNING

The surface temperatures on the coupling can be very high during operation.

Danger of burns.

- Let the motor and the coupling cool down before you start your work.

Only use hydraulic oils that correspond to the specified technical data (page 40).

1. Remove the cover, place a collecting vessel underneath
2. Remove the filling plug and the fusible screw plug for the air balance
3. Drain some oil at the filling plug or the fusible screw plug.
4. Check the oil properties.
   - Viscosity
   - Oil ageing
   - If OK, close the filling plug and the fusible screw plug and install the cover
5. **With horizontal coupling**
   - Turn the coupling until the hole of the filling plug is in a vertical position and drain old oil
   - fill in new oil
   - Screw in filling plug

   With vertical coupling
   - Drain old oil
   - Screw in filling plug
   - Fill in new oil via the opening of the fusible screw plug
6. Screw in fusible screw plug and install the cover.

6.4.4 Replacing defective fuses

⚠ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before starting work, isolate the motor and, if installed, the forced cooling fan from the power supply.
- Safeguard against accidental startup.
- Carefully observe the steps described below.

⚠ WARNING

The surface temperatures on the coupling can be very high during operation.

Danger of burns.

- Let the motor and the coupling cool down before you start your work.

The fuse trips in the event of a malfunction of the working machine that causes the centrifugal coupling to heat up excessively. This empties the coupling housing, and prevents damage to the drive.

Proceed as follows to replace the fusible screw plugs:

1. Remove the cover, place a collecting vessel underneath
2. Remove the filling plug and the defective fusible screw plug.
3. drain the remaining oil
4. **With horizontal coupling**
   - Turn the coupling until the hole of the filling plug is in a vertical position
   - fill in new oil
   - Screw in filling plug

   With vertical coupling
   - Screw in filling plug
   - Fill in new oil via the opening of the fusible screw plug
5. Screw in new fusible screw plug

   Use original fuses (page 32) only.
6. Mount the cover, observe the tightening torques (page 32)

6.4.5 Replacing the hydraulic centrifugal coupling

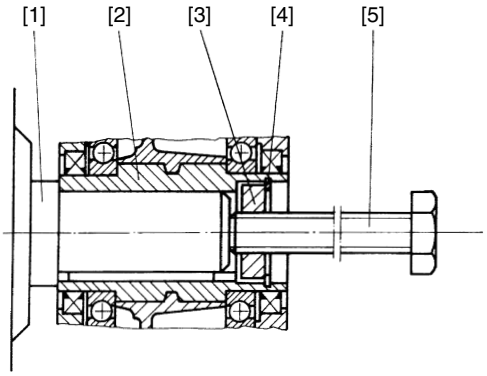
NOTICE

Material damage or leakage due to improper coupling assembly.

Potential damage to property.

- Never install or remove the coupling via the housing.

The following figure shows how to remove the centrifugal coupling:



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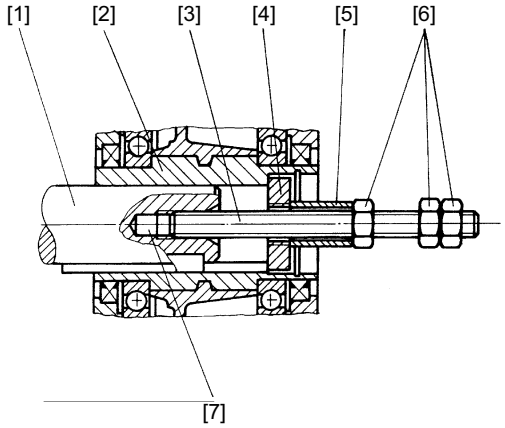
[1] Gear unit input shaft
[2] Hydraulic centrifugal coupling (steel hub)
[3] Puller disk (holding disk)
[4] Retaining ring
[5] Threaded puller spindle

1. Remove drive motor.
2. Remove holding screw.
3. Use the mounting/dismantling tool to remove the coupling via the coupling hub.
4. **With brakemotors:** Brake inspection/maintenance, see "DR.71-225, 315 AC Motors" operating instructions.

The following figure shows how to install the centrifugal coupling:



1926867979

[1] Gear unit input shaft
[2] Hydraulic centrifugal coupling
[3] Threaded pusher spindle
[4] Holding disk
[5] Spacer tube
[6] Hex nut
[7] Center hole in accordance with DIN 332, sheet 2

Proceed as follows to install the centrifugal coupling:

1. Mount the coupling.
2. Mount the holding disk.
3. Mount the drive motor.

7 Malfunctions

7.1 Drive with AR.. friction coupling – malfunctions

Malfunction	Possible causes	Solution
No display	Encoder on adapter is defective	Measure input pulses, • replace encoder of the adapter if required, see chapter "Inspection/ Maintenance", "Changing the encoder of the adapter" (page 32)
	For VARIBLOC® with slip monitor: • Encoder defective • Sensing distance of proximity switch too big With speed-controlled motor: • Encoder defective	• Replace encoder of the motor
Slip torque is not reached	Cup springs burned out or installed incorrectly after maintenance	Inspect cup springs, see chapter "Inspection/Maintenance", "Inspecting/replacing friction lining, adjusting the slip torque" (page 29)
	Friction lining worn	Inspect friction lining, see "Inspecting/ replacing friction lining, adjusting the slip torque" (page 29)

7.2 Drive with AT.. hydraulic centrifugal coupling – malfunctions

Malfunction	Possible causes	Solution
Drive does not start up	too little or too much oil	Check and correct filling, see "Inspecting/ changing the oil" (page 34)
Coupling heats up excessively	Too much slip at the coupling due to overload	Check motor current and reduce load if necessary
	too little or too much oil	Check and correct filling see "Inspecting/changing the oil" (page 34)
Oil leaking	Defective fuse due to overheating	Check and replace fuse, see chapter "Inspection/Maintenance", "Replacing defective fuses" (page 35) Replace lubricant Remove cause of overheating
	Coupling leaking	Tighten the screws, observe the tightening torques see chapter "Inspection/Maintenance", "Tightening torques" (page 32)
Significant wear of the elastic components of the hydraulic centrifugal coupling	Excessive temperatures	avoid/remove cause of excessive temperature Check and replace elastic components (page 33)
	Contact with aggressive media	Avoid/remove aggressive media Check and replace elastic components (page 33) Check coupling parts for damages and replace them, if necessary
Wear or breakage of the coupling drivers	Worn elastic components	replace damaged coupling parts and check and replace elastic components (page 33) Reduce maintenance intervals for elastic components
Plant with hydraulic centrifugal coupling does not run smoothly	Defective or worn elastic components	Check and replace elastic components (page 33)

7.3 Customer service

Have the following information to hand if you require the assistance of our customer service:

- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Fill quantity specifications of the AT.. coupling (see order confirmation)
- Assumed cause
- Environmental conditions e.g.:
  - Ambient temperature
  - Humidity
  - Installation altitude
  - Dirt
  - etc.

7.4 Disposal

Dispose of the parts in accordance with the material structure and the regulations in force for instance as:

- Iron
- Aluminum
- Copper
- Plastics
- Electronic parts
- Oil and grease (not mixed with solvents)

8 Technical Data

8.1 Lubricants

On delivery, the couplings are filled with the required lubricant type and quantity.

⚠ WARNING

Tripping fusible screw plugs due to incorrect lubricant type or quantity.

Serious injury.

- Observe the fill quantity specified on the order confirmation.
- Observe the following specifications regarding hydraulic oils.

Only use hydraulic oils that comply with the specifications in the following table. Do not mix different lubricants. The required oil quantity is specified on the order confirmation.

Requirements for hydraulic oil	
Viscosity	ISO VG 32
Pour point	< -24 °C
Starting viscosity	< 15 000 mm^2/s
Flash point	≥ 180 °C / ≥ 200 °C[1)]
Raffinate	Highly age-resistant
Compatibility	NBR and FPM/FKM gaskets

1) Fusible screw plug ≥ 160 °C

9 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	**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	**Central**	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
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	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 München)	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
	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 Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **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	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **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

France			
	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 provided on request!		

Algeria			
Sales	**Alger**	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			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **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

Austria			
Assembly **Sales** **Service**	**Wien**	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

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

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW Caron-Vector** Research park Haasrode 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 Gears**	**SEW Caron-Vector** 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
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao 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

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@mail.bg

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 **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
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **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 **Assembly** **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.com.cn
Assembly **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	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	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	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn

China			
	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
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	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 sewcol@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

Czech Republic			
Sales	**Prague**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **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

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

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	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
Production **Assembly**	**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 Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 Normanton, West-Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**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

Hong Kong			
Assembly **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

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 office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **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 c.v.shivkumar@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	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **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 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **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

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

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	**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
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

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brussels**	**SEW Caron-Vector** Research park Haasrode Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	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

Mexico			
Assembly **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

Morocco			
Sales	**Casablanca**	Afit Route D'El Jadida KM 14 RP8 Province de Nouaceur Commune Rurale de Bouskoura MA 20300 Casablanca	Tel. +212 522633700 Fax +212 522621588 fatima.haquiq@premium.net.ma http://www.groupe-premium.com

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **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

Norway			
Assembly **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

Pakistan			
Sales	**Karachi**	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

Peru			
Assembly **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

Poland			
Assembly **Sales** **Service**	**Lodz**	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 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	24 Hour Service		Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **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. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

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	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapore			
Assembly **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

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	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 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	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

South Africa			
Assembly **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

South Africa			
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 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 **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	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

Spain			
Assembly **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

Sweden			
Assembly **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 **Sales** **Service**	**Basel**	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

Thailand			
Assembly **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

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 **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

United Arab Emirates			
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