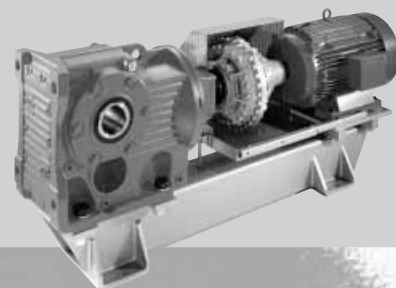
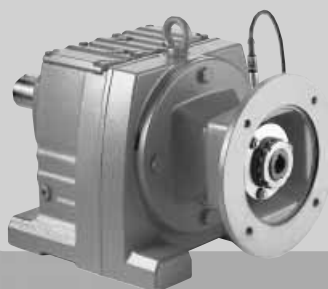


**AR/AT Centrifugal & Torque Limiting
Couplings - Swing Base for Motor MK**

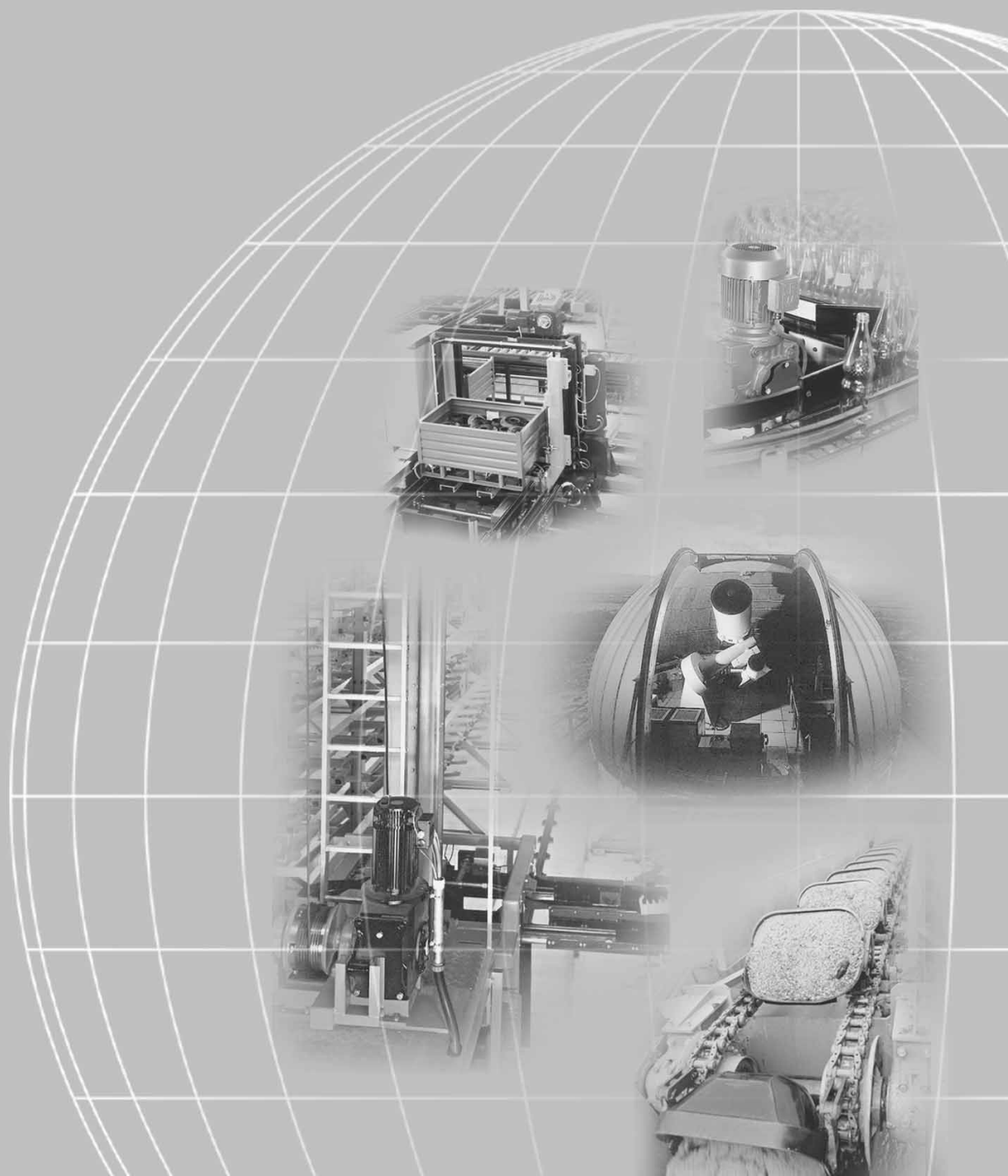
Edition

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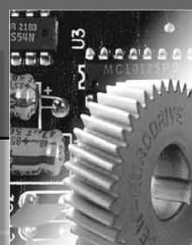


Operating Instructions

0918 6018 / EN



SEW-EURODRIVE





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1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions contained in this publication!



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard

Possible consequences: Severe or fatal injuries.



Hazardous situation

Possible consequences: Slight or minor injuries.



Harmful situation

Possible consequences: Damage to the unit and the environment.



Tips and useful information.



A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that the information in the operating instructions is adhered to. Consequently, read the operating instructions before you start working with the unit!

The operating instructions contain important information about servicing; as a result, they should be kept in the vicinity of the unit.

Waste disposal



Please follow the current instructions:

- Housing parts, gears, shafts and anti-friction bearings of the gear units must be disposed of as steel scrap. The same applies to gray cast iron castings unless there are separate collection arrangements.
- Some worm gears are made of non-ferrous metals and must be disposed of accordingly.
- Collect waste oil and dispose of according to environmental guidelines.



Live and moving parts of electrical motors can cause severe or fatal injuries.

Mounting, connection, startup, maintenance and repair may only be carried out by qualified specialists in accordance with

- these operating instructions,
- all other operating instructions / wiring diagrams appertaining to the drive,
- currently valid national/regional regulations.

Revisions to the 10/99 edition are indicated by a gray bar in the margin.



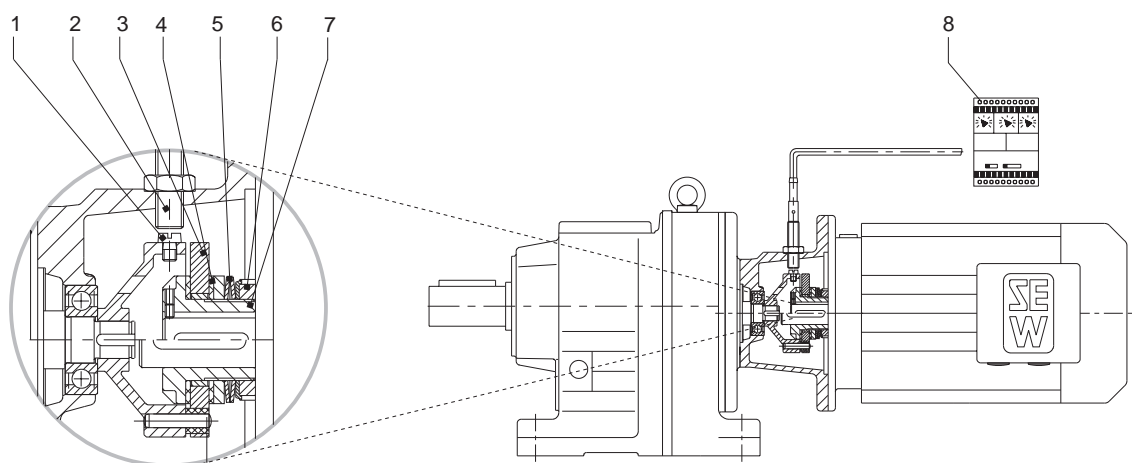
2 Description of Components

2.1 Drive with a torque limiting coupling AR

Drives with a torque limiting coupling consist of a standard gear unit and motor/variable speed geared motor with an adapter installed between them. The torque limiting coupling is installed in this adapter. In geared motors with a multi-stage gear unit, the torque limiting coupling may be located between the first and second gear unit.

The friction hub (7) at the motor end has cup springs (5) and a slotted round nut (6). It drives the coupling plate and connecting pin at the output end by means of the friction ring pads (4) of the carrier disk (3). The slip torque is individually set in the factory according to the specific drive selection.

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. These can be mounted in conjunction with contactors, fuse units, etc. on a standard 35 mm rail (to DIN EN 50022) in the switch cabinet or they can be attached using two holes.



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Fig. 1: Drive with a torque limiting coupling and speed monitor W

- | | | |
|---------------------|----------------------|-----------------|
| 1 Trip cam | 4 Friction ring pads | 7 Friction hub |
| 2 Encoder (adapter) | 5 Cup spring | 8 Speed monitor |
| 3 Carrier disk | 6 Slotted round nut | |

Speed monitor W (Fig. 1)

The speed monitor (8) is used with constant-speed geared motors and is connected to the encoder (2) in the adapter.

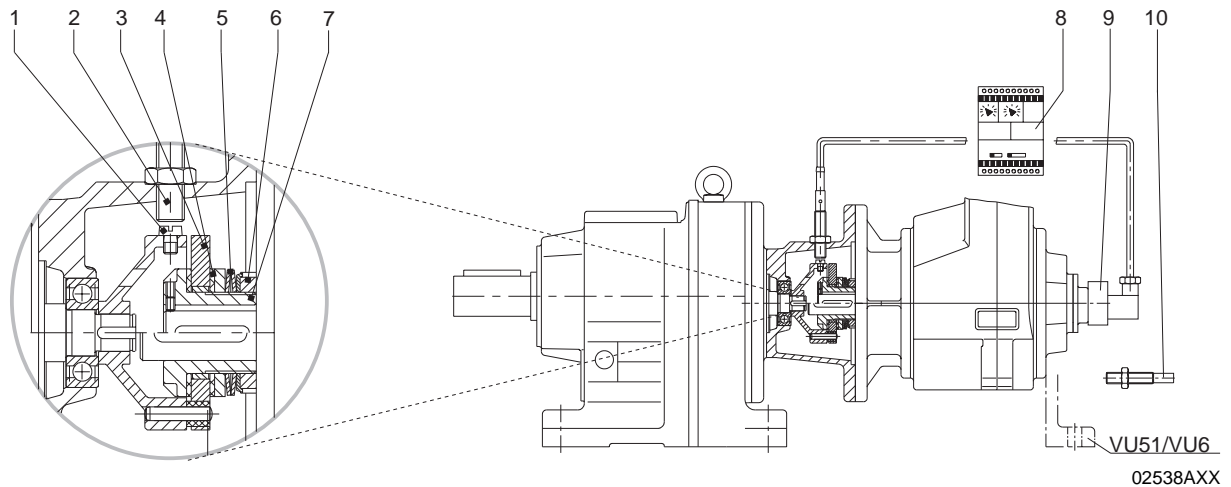


Fig. 2: Adapter with a torque limiting coupling and slip monitor WS

- | | | |
|----------------------|---------------------|--------------------------|
| 1 Trip cam | 5 Cup spring | 9 AC tachogenerator GW |
| 2 Encoder (adapter) | 6 Slotted round nut | 10 Encoder IG (only VU6) |
| 3 Carrier disk | 7 Friction hub | |
| 4 Friction ring pads | 8 Slip monitor | |

**Slip monitor WS
(Fig. 2)**

The slip monitor (8) is used with VARIBLOC® variable speed drives and is connected to the encoder (2) in the adapter (input 1) as well as to an encoder (10) or AC tachogenerator (9) of the variable speed gear unit (input 2).

The input and output speeds are compared in order to establish the slip in the torque limiting coupling. To achieve this, the slip monitor counts and compares the pulses coming 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.



2.2 Drive with a hydraulic centrifugal coupling

Hydraulic centrifugal couplings are fluid flow couplings which operate according to the Föttinger principle. They consist of two half ring shells on rotating bearings. The shells are equipped with blades and are mounted opposite one another with a narrow gap in between.

The torque applied is transmitted by the mass forces of the fluid flow. This fluid circulates within a closed circuit, between the pump impeller (primary side, 5) on the driving shaft (motor shaft) and the turbine wheel (secondary side, 2) on the driven shaft (gear unit input shaft).

A speed differential (slip) is required in order to maintain the integrity of the oil circuit and thus to transmit the torque. The hydraulic centrifugal coupling is unable to transmit torque if the slip is zero.



Consequently, make certain that the amount of heat generated by the power losses is less than or equal to the amount of heat which can be dissipated for the corresponding speed. The temperature is chiefly dependent on the local operating conditions (frequency of starts, ambient temperature) and should not exceed 90 °C in sustained operation.

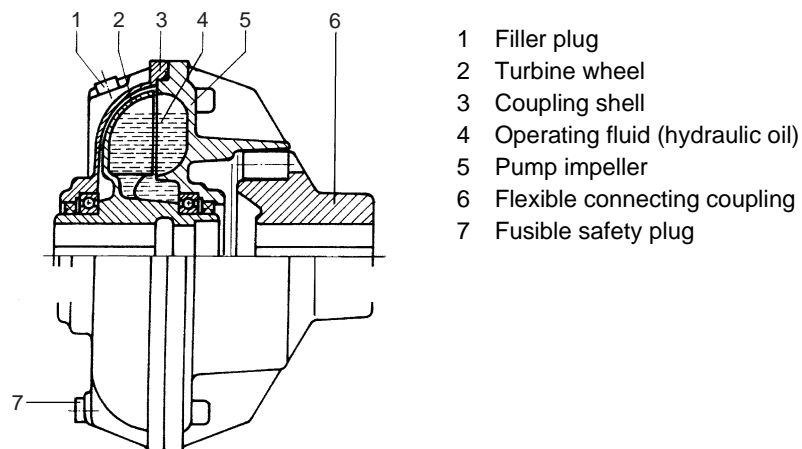


Fig. 3: Hydraulic centrifugal coupling

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**Drive with a
hydraulic
centrifugal
coupling AT**

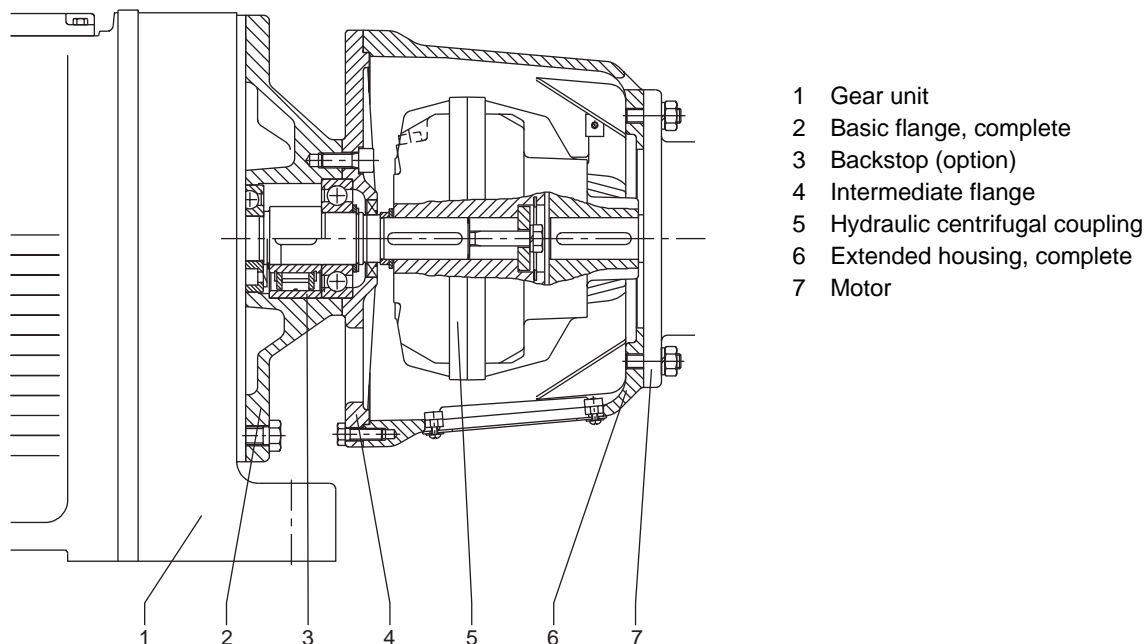


Fig. 4: Design of a drive with a hydraulic centrifugal coupling

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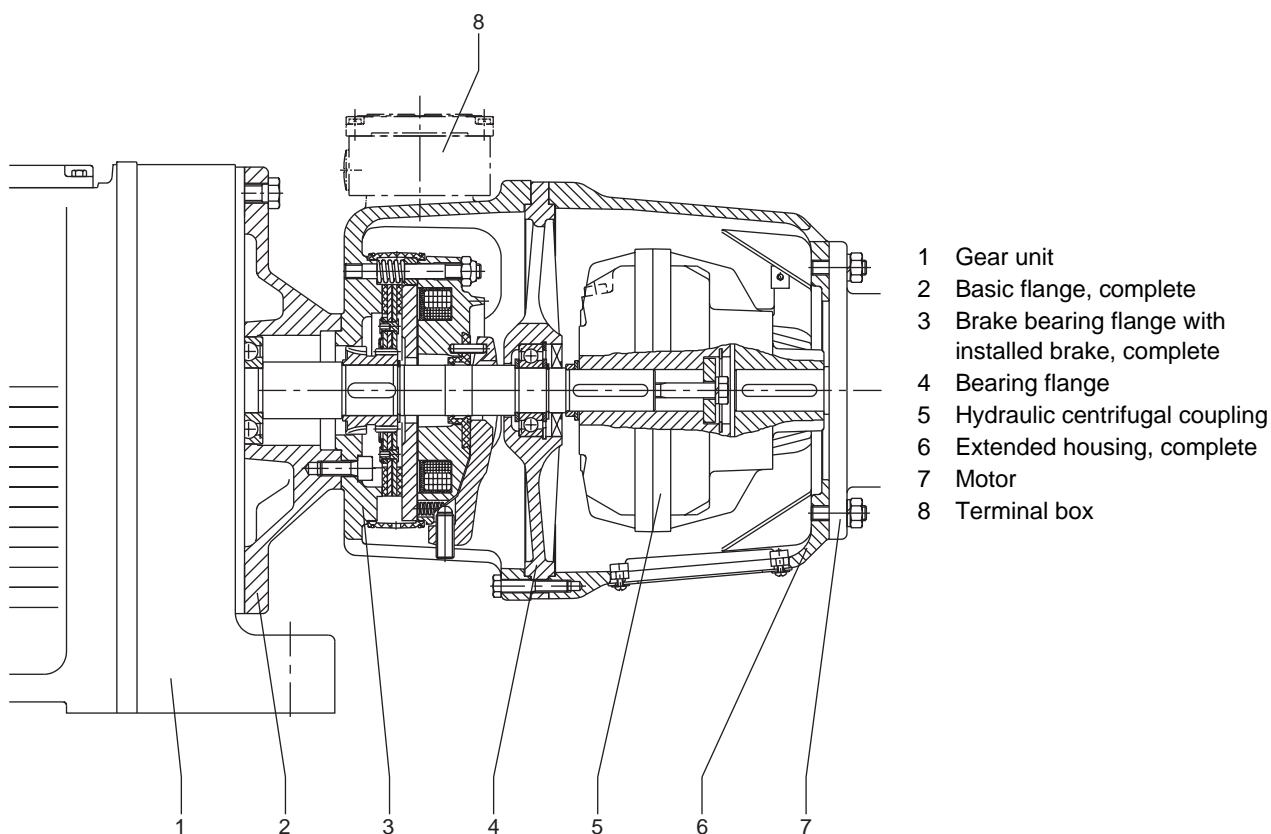


Fig. 5: Design of a drive with a hydraulic centrifugal coupling and brake BM(G)

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2.3 Drive on swing base for motor MK

Drive units on a swing base for motor are available especially for systems which are heavy starting. They consist of a helical-bevel gear unit, a hydraulic centrifugal coupling and an electric motor. All these components are mounted on a torsionally rigid swing base for motor. A protective cowl and collecting pan prevent anyone touching the rotating parts and protect the environment and people against oil from the centrifugal coupling.

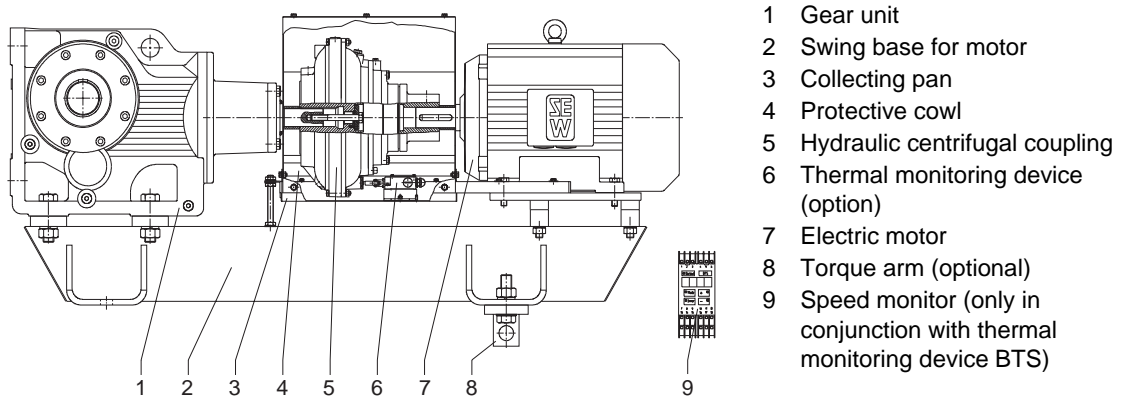


Fig. 6: Drive with hydraulic centrifugal coupling on swing base for motor

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Thermal monitoring device

The hydraulic centrifugal coupling is equipped with fusible safety plugs which allow hydraulic oil to be evacuated in the event of excessive temperature (severe overload, blockage). Oil evacuation can be prevented by using a thermal monitoring device (mechanical or proximity-type).

Despite the monitoring device, the centrifugal coupling is still fitted with fusible safety plugs. However, these react significantly later than the monitoring device.

Mechanical thermal monitoring device MTS

A switch bolt screwed into the coupling releases a spring-loaded switch pin if the temperature reaches an excessive level. This switch pin operates a switch by means of which a warning signal can be output or the machine can be switched off.

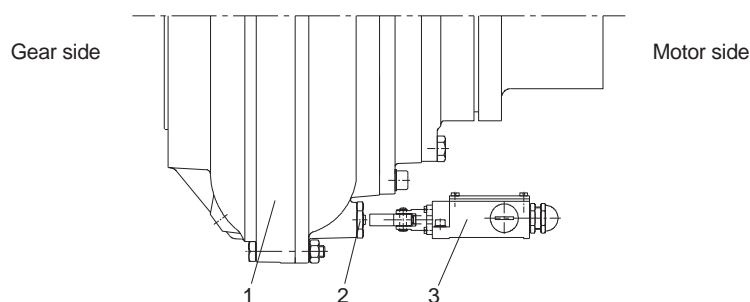


Fig. 7: Mechanical thermal monitoring device MTS

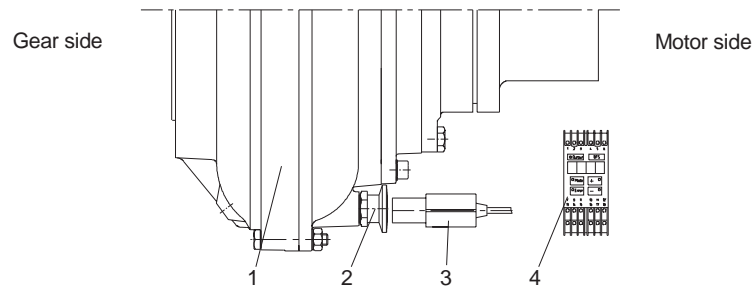
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- 1 Hydraulic centrifugal coupling
- 2 Switch bolt
- 3 Switch



**Proximity-type
thermal
monitoring
device BTS**

It consists of three components. A switch bolt which is screwed into the coupling and which changes its inductance value if the temperature reaches an excessive level. A switch which detects the change in the inductance of the switch bolt, and a speed monitor which evaluates the signals from the switch. In turn, a warning signal can be output via the speed monitor or the machine can be switched off.



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Fig. 8: Proximity-type thermal monitoring device BTS

- 1 Hydraulic centrifugal coupling
- 2 Switch bolt
- 3 Switch
- 4 Speed monitor

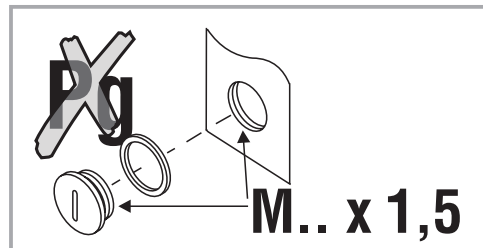


3 Installation

Changing over to metric cable screw fittings

The previously used cable screw fittings of sizes Pg 7 to Pg 48 have been phased out by new metric fittings with threads M12 x 1.5 to M63 x 1.5.

During the transition phase, our deliveries will include the appropriate metric to Pg adapter free of charge.



3.1 Installation of drive with torque limiting coupling AR

Installing the encoder

1. Remove the fan guard from the driving motor
2. Slowly turn the motor or adapter shaft extension until a trip cam (= head of the cheese head screw) becomes visible in the threaded hole
3. Install in the encoder until contact is made with the trip cam
4. Turn the encoder back by two turns (corresponds to a clearance of 2 mm)
5. Use a lock nut to secure the encoder on the outside of the adapter
6. Check: Slowly turn the motor or adapter shaft extension
Correct mounting: trip cams do not touch the encoder
7. Fit the fan guard

Connecting monitoring devices



The rated pulse frequency of the encoder is set in the factory.

Do not route the feeder lines in multicore cables in order to avoid interference from parasitic voltages. Maximum line lengths 500 m with core cross section 1.5 mm². Use shielded cables if there is a risk of interference from power current or control cables and if the line lengths are more than 10 m.

1. For version with speed monitor W

- Connect the encoder of the adapter to the speed monitor
- using a 3-core cable

For version with slip monitor WS

Make connections to the slip monitor as follows:

- Encoder of the adapter
to terminals 1, 2, 3 (input 1)
using a 3-core cable
 - AC tachogenerator GW / encoder IG
to terminals 4, 5 (input 2)
using a 2-core cable
2. Connect the speed monitor or slip monitor according to the circuit diagram supplied with the relevant unit.



3.2 Installation of drive with a hydraulic centrifugal coupling

Lubricant supply to the bearings

With **adapter types AT311 – AT542**, the drive unit must be stopped **once a week** in order to ensure that lubricant is supplied to the bearings of the hydraulic centrifugal coupling.

With **swing bases for motors MK../51 – MK../61**, the drive unit must be stopped **once a month** in order to ensure that lubricant is supplied to the bearings of the hydraulic centrifugal coupling.

Connecting the brake

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



Important:

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

1. Connect the brake according to the circuit diagram supplied with the brake



Note:

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.

2. If necessary, for version with manual brake release, screw in:
 - hand lever (for manually disengaging brake)
 - or manual brake release screw (for fixing brake in the disengaged position)

Connect the brake control system

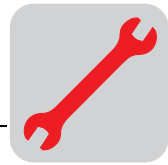
The DC disc brake is powered from a brake rectifier/control unit with protective circuitry. This is either accommodated in the terminal box or must be installed in the switch cabinet (comply with the EMC instructions in the “AC Motors/AC Brake Motors” operating instructions).

1. Connect the brake control system according to the circuit diagram supplied with the brake



Note:

Check the line cross sections – see the “AC Motors/AC Brake Motors” operating instructions for the brake currents (0919 8504)



3.3 Installation of drive on swing base for motor MK

Foot mounting

- The drive on swing base for motor may only be mounted or installed on a torsionally rigid support structure.
- Only clutch operation without transverse forces is permitted if the swing base for motor is attached to the foot surfaces.

Attachment of shaft-mounted version via torque arm

Gear units can be used either with a solid shaft or as shaft-mounted versions. A torque arm is available as an option for shaft-mounted gear units.

1. Use the supplied retaining screws to mount the torque arm onto the foot mounting rails of the swing base for motor
2. Secure the retaining screws to prevent them shaking loose
3. Do not exert strain on the swing base for motor through the torque arm

Setting the MTS/BTS operating distances

If the drive unit is fitted with a thermal monitoring unit, then the operating distances shown in Fig. 9 and Fig. 10 between the switch bolt and the switch must be maintained when the parts are installed. The operating distance can be adjusted by moving the switch and the retaining bracket.

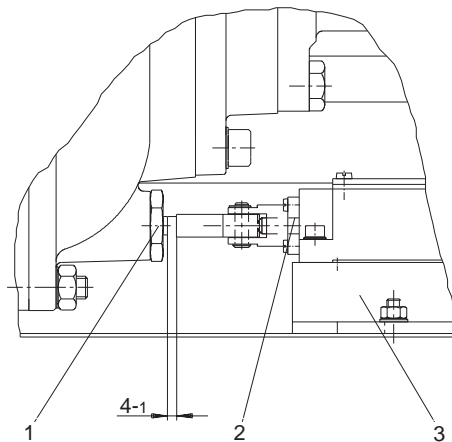


Fig. 9: MTS operating distance

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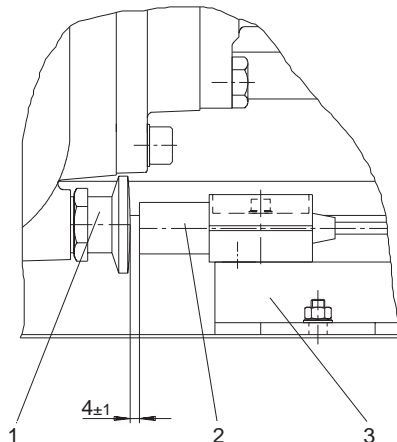


Fig. 10: BTS operating distance

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- 1 Switch bolt
- 2 Switch
- 3 Retaining bracket



Connecting the MTS switch

The switch can be used either as an NO or NC contact.

1. Connect the switch as shown in the wiring diagram (Fig. 11)
2. Check the operating distance after connecting (see "Setting the MTS/BTS operating distances" on page 13)

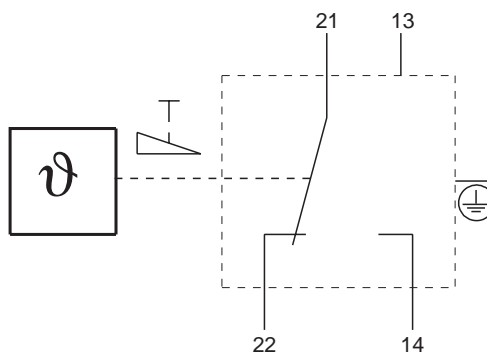
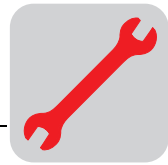


Fig. 11: Wiring diagram for MTS switch

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Connecting BTS speed monitor

1. Install the speed monitor in a suitable switch cabinet and connect as shown in the wiring diagram (Fig. 12).
2. The total resistance of an extension cable between the switch and the speed monitor must be < 5 ohms. Use a shielded cable if the distances are greater.

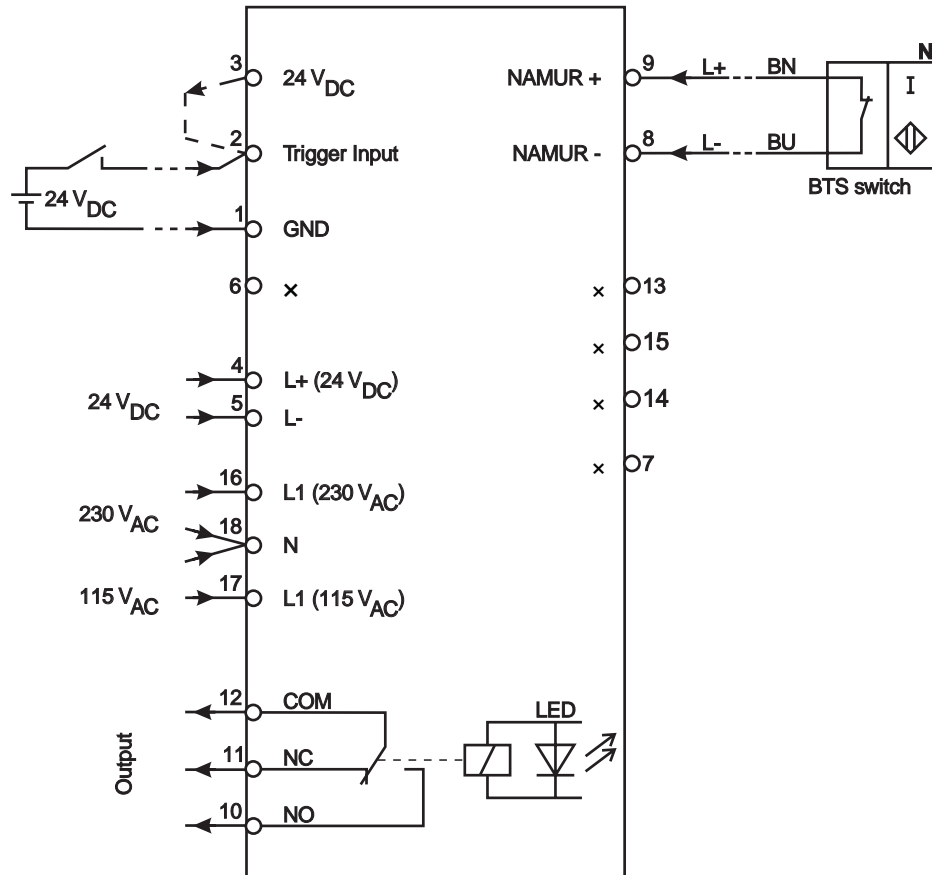


Fig. 12: Wiring diagram for BTS/MTS speed monitor

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- | | | |
|---|---|---|
| 1 GND for trigger input | 7 Do not connect! | 13 Do not connect! |
| 2 Trigger input for startup bypass | 8 Namur input L- | 14 Do not connect! |
| 3 Supply voltage for trigger input, for triggering by switching on the supply voltage
Jumper between terminals 3 and 2 | 9 Namur input L+ | 15 Do not connect! |
| 4 Supply voltage +24 V _{DC} | 10 Output relay
Normally open contact NO | 16 Supply voltage, 230 V _{AC} , L1 |
| 5 GND supply voltage | 11 Output relay
Normally closed contact NC | 17 Supply voltage, 115 V _{AC} , L1 |
| 6 Do not connect! | 12 Output relay
Root COM | 18 Supply voltage, N |



4 Startup



Before startup, make sure that

- all connections have been made properly,
- the drive is not blocked,
- there are no other sources of danger present,
- if the drive is operated with star-delta connection, the switching time setting from star to delta is as short as possible (2 – 5 s)

With a hydraulic centrifugal coupling

- the fill volume is correct after lengthy storage (the necessary oil volume is indicated on the coupling)

With a swing base for motor

- the protective cowl is fitted correctly

4.1 Startup of a drive with a torque limiting coupling AR

Setting the speed monitor W

Settings	Description	Setting measures / values
Switching speed (1)	Permits the desired value to be set accurately Note: If the drive stalls, you can achieve the shortest possible slip times by setting the switching speed slightly below the rated speed	Rough setting with step switch (1, 10, 100) Fine tuning with potentiometer (scale 5 – 50) <u>For example:</u> Step switch “100”, potentiometer setting “13”: Switching speed = 100 x 13 = 1300 pulses/min
Switching function II (2)	Defines the properties of monitoring function II = speed below set speed (LED lights up when relay has picked up)	According to circuit diagram 08 115 _2 Setting to function II
Starting lag (3)	Fault messages can be prevented when the motor is starting by means of an adjustable delay time.	
Hysteresis (4)	Difference between the switch-on and switch-off point of the relay Monitoring for violation of lower speed limit: Potentiometer setting “5 %”	

Table 1: Speed monitor settings

Legend for Fig. 13:

- Anlaufüberbr. = Monitor delay action
 Schalterpunkt = Switching point
 Hysteresis = Hysteresis
 Netz = Power supply
 Imp/min = Pulses/min.
 Drehzahlwächter = Speed monitor
 Funktion = Function

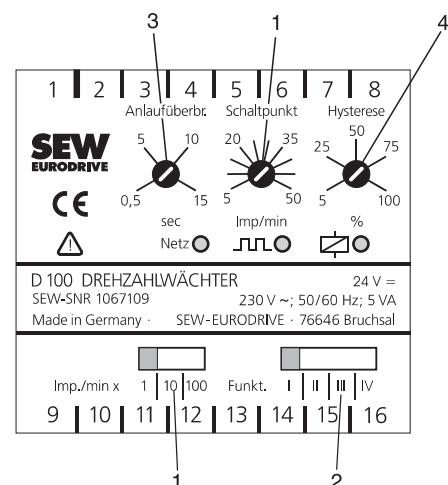
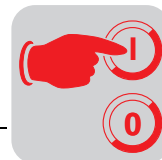


Fig. 13: Speed monitor

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1. Set the speed monitor according to Table 1
2. **Functional check**
Set the switching speed on the potentiometer in monitoring electronics:
 - Value > rated speed
 - **Correct:** Relay in speed monitor picks up
3. Messages:
 - LED1 lights up when the relay has picked up
 - LED2 signals input pulses
 - LED3 displays that the operating voltage is correct

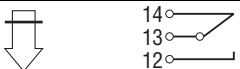
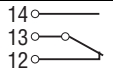
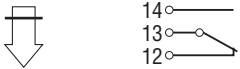
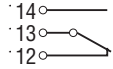
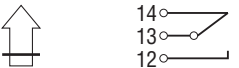
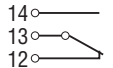
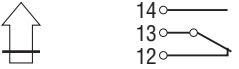
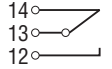
Function	Relay position		
	At speed		In normal mode with startup bypass
	Upper limit violation	Lower limit violation	
I			
II			
III			
IV			

Table 2: Relay positions



Setting slip monitor WS

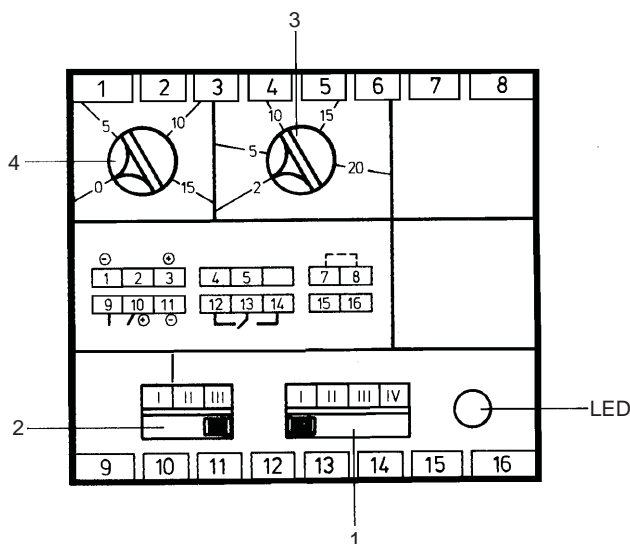


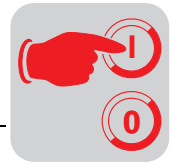
Fig. 14: Slip monitor

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Set the slip monitor according to Table 3.

Settings	Description	Setting measures / values
Switching function II (1)	Defines the properties of the monitoring function: Setting II = Slip monitor LED lights up: No-load current, relay picks up during starting lag	According to circuit diagram 08 756_5 Setting to function II
Sensitivity (2)	Defines at what differential pulse number the unit reacts.	According to circuit diagram 08 756_5 Setting to level II: 4 differential pulses
Cycle time (3)	Within the set cycle time, the pulses at inputs 1 and 2 are counted, compared and then cancelled. Adjustable from 2 – 20 s	$\text{Cycle time} = \frac{\text{Set sensitivity}}{\text{Perm. difference} \cdot \frac{1}{s} \cdot \text{Cam no.}}$ For example: Input speed 1500 rpm Max. permitted slip 2 % = 30 rpm = 0.5 rps (permitted differential pulses/s) Number of cams 4 $\text{Cycle time} = \frac{4 \text{ pulses}}{0.5 \frac{1}{s} \cdot 4} = 2 \text{ s}$
Starting delay (4)	Bypasses fault messages, e.g. during the startup phase; only valid once after the supply voltage has been applied	Time setting 0 – 15 s

Table 3: Slip monitor settings

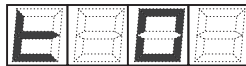


4.2 Startup of drive on swing base for motor MK

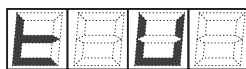
Setting BTS speed monitor

Displays on evaluation unit

- Operating mode



- Temperature ok
- standard operating condition



- Overheating
- speed of switch element < 60 rpm



- Startup bypass active
- no temperature monitoring!

Fig. 15: Operating mode displays on evaluation unit

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- Setting mode



- Setting of startup bypass interval





- Software version number

Fig. 16: Setting mode displays on evaluation unit

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Setting BTS speed monitor

1. Check the cabling according to the wiring diagram (see "Connecting BTS speed monitor" on page 15). Take particular care to check that the supply voltage is connected correctly.
2. Apply the supply voltage to the evaluation unit, initially without starting up the hydraulic centrifugal coupling. The unit displays  during the time interval when the startup bypass is active. The output relay has picked up and the LED on the front panel comes on.
3. The unit displays  after the startup bypass time has elapsed. The output relay drops out and the LED on the front panel goes out.
4. Set the startup bypass time if necessary (see "Setting the startup bypass time" on page 20)



Overheating of the hydraulic centrifugal coupling is not picked up during the startup bypass time!

5. A jumper is installed between terminals 2 and 3 of the evaluation unit (default factory setting). Remove this jumper for external triggering.
6. Start BTS with a hydraulic centrifugal coupling in the normal way. The speed of the hydraulic centrifugal coupling with the switch element must be markedly greater than 60 rpm after the startup bypass time has elapsed.
The evaluation unit displays if there is no overheating. The output relay remains picked up and the LED on the front panel is lit.
7. Switch off the drive with the hydraulic centrifugal coupling, leaving the BTS ready to operate. The evaluation unit displays if the speed of the hydraulic centrifugal coupling with the switch element is slower than 60 rpm. The output relay drops out and the LED on the front panel goes out.
8. Regular operation can be adopted.

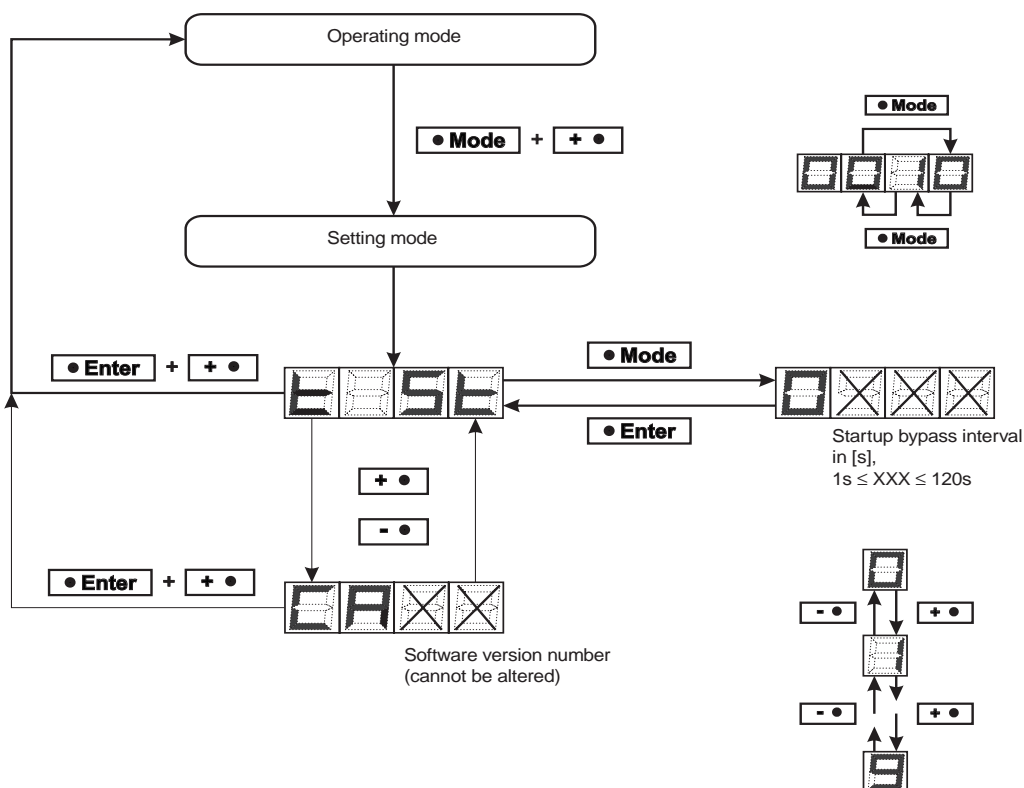
Setting the startup bypass time



Make the setting using the buttons on the front panel (Fig. 17).

Notes:

- The factory setting of the startup bypass time is 10 s.
- The startup bypass time starts when the startup bypass is triggered.
- Overheating of the hydraulic centrifugal coupling is **not** picked up during the startup bypass time!
- The speed of the hydraulic centrifugal coupling with the switch element should be markedly greater than 60 rpm after the startup bypass time has elapsed!



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Fig. 17: Setting the startup bypass time



5 Operation and Service

Please provide the following information if you require the assistance of our customer service:

- Nameplate data
- Type and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause

5.1 Malfunction of drive with torque limiting coupling AR

Malfunction	Possible cause	Solution
No display	Encoder on adapter is defective In VARIBLOC® with slip monitor: Encoder IG / AC tachogenerator GW defective	Measure input pulses, if necessary: – Change encoder on adapter, see “Changing the encoder on the adapter” on page 25 – Change encoder IG / AC tachogenerator GW
Slip torque is not reached	Cup springs burned out or installed incorrectly after maintenance	Inspect cup springs, see “Inspecting/changing the friction ring pads, adjusting the slip torque” on page 24

5.2 Malfunction of drive with hydraulic centrifugal coupling

Malfunction	Possible cause	Solution
Drive does not start up	Too little or too much oil	Check fill and correct → see “Inspecting/changing the oil” on page 26
Coupling gets too hot	Excessive coupling slip due to overload	Check motor current, reduce load if necessary
	Too little or too much oil	Check fill and correct → see “Inspecting/changing the oil” on page 26
Oil leaking	Fuse defective due to overheating	Check fuses and change if necessary → see “Changing defective fuses” on page 27, eliminate cause
	Coupling leaking	Tighten bolts, note tightening torques → see “Tightening torques” on page 26
Severe wear on flexible elements of hydraulic centrifugal coupling	Misalignment between motor and hydraulic centrifugal coupling when mounting or due to distortion during installation.	Check alignment. Install the drive without distortion.



5.3 Malfunction of drive on swing base for motor MK

Malfunction	Possible cause	Solution
Thermal monitoring device MTS trips	Overheating of coupling due to overload	Clarify what is leading to overload. Reduce load. Fit a new switch bolt → see "Fitting a new MTS switch bolt" on page 30
Thermal monitoring device BTS trips	Overheating of coupling due to overload	Clarify what is leading to overload, reduce load. Let coupling cool down.
	Startup bypass on speed monitor set too short.	Increase startup bypass time if necessary (speed of coupling > 60 rpm after startup bypass time has elapsed)
	Switch element defective	Check switch element, replace if necessary
No display on speed monitor of BTS	Operating distance between switch and switch element too large	Set operating distance → see "Setting the MTS/BTS operating distances" on page 13
	No supply voltage	Connect supply voltage according to wiring diagram
	Speed monitor defective	Fit new speed monitor



6 Inspection and Maintenance

6.1 Inspection and maintenance periods

Equipment/ components	Frequency	What to do	→ Section
Hydraulic centrifugal coupling	Every 500 operating hours, at the latest after 3 months	Inspect the drive for irregularities. Replace any worn flexible elements on the connection coupling.	see "Changing the flexible elements and changing the motor" on page 29
	Every 15,000 operating hours	Inspect the oil, change if necessary	see "Inspecting/ changing the oil" on page 26
Adapter with centrifugal couplings and 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 At least every 3000 operating hours	Inspecting the brake – Working air gap – Brake disc Extract the abraded matter Inspect the switch elements in the switch cabinet and change if necessary (e.g. in case of burn-out)	see "Removing the hydraulic centrifugal coupling" on page 28 and the "AC Motors/ AC Brake Motors" operating instructions
Adapter with torque limiting coupling		Inspect the friction ring pads and cup springs, change if necessary, adjust the slip torque	see "Inspection/ maintenance of the drive with torque limiting coupling AR" on page 24

Required tools / resources

- Standard tool
- Hook spanner
- Hydraulic press
- Puller/extractor (threaded spindle with diameter same as gear unit input shaft)
- Torque wrench



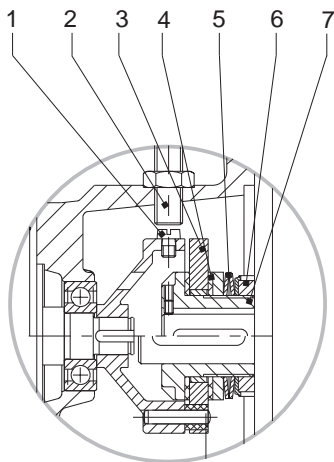
6.2 Inspection/maintenance of the drive with torque limiting coupling AR

**Inspecting/
changing the
friction ring pads,
adjusting the slip
torque**

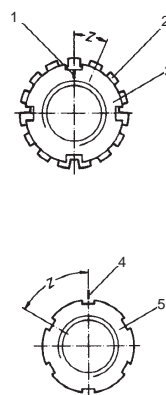


It is only possible to check and adjust the slip torque accurately by using a torque wrench with an appropriate connection piece. See Table 4 for the setting values.

1. **De-energize the drive and secure it to prevent it from being switched on inadvertently**
2. Disconnect the motor/variable speed geared motor from the adapter
3. Unscrew the safety screw, pull the friction hub off the shaft extension
4. Clamp the friction hub (7) in a vise (Fig. 18)
5. **With AR 71–115:** Unscrew the multi-tang washer (3)
With AR 132–195: Unscrew the clamping screw on the slotted round nut (6)
6. Unscrew the slotted round nut somewhat until you can easily adjust the torque limiting coupling by hand
7. **With AR 71–115:** Mark the position of the slotted round nut (Fig. 19)
With AR 132–195: Mark the carrier disc
8. Unscrew and remove the slotted round nut, remove the cup springs (5)
Note: Note the sequence of the cup springs!
9. Inspect the friction ring pads (4): change them if they are worn
Note: Do not allow any lubricants to get onto the friction surface – this will irreparably damage the surface!
10. Inspect the cup springs: change them if they are burned out
11. Put the cup springs back in (in the same sequence as before)
12. Screw on the slotted round nut up to the mark
13. **Measuring/setting 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 setting without torque wrench (Fig. 19)**
 - Use the hook spanner to set the torque limiting coupling
 - Slip torque according to value “Z” (Table 4), calculated from the mark
 - **With AR 71–115:** = Number of tangs on the multi-tang washer
 - **With AR 132–195:** = Number of slots in the slotted round nut
14. Secure the slotted round nut using the multi-tang washer or clamping screw
15. Assemble the drive in reverse order



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Fig. 18: Inspecting/changing the friction ring pads



- 1 Markings
- 2 Multi-tang washer (tangs)
- 3 Slotted round nut
- 4 Markings (carrier disk)
- 5 Slotted round nut

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Fig. 19: Rough torque setting
(top: AR71–115, bottom AR 132–195)



Adapter type	Cup springs			Setting range	No. of tangs or slots “Z”																				
	Number	Thick ness	Sequen ce		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		mm	Fig.		Nm	Slip torque M _R in Nm																			
AR71	4	0.6	1	1–2						1.0	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.95	2.0					
			2	2.1–4			2.1	2.6	3.0	3.5	3.7	4.0													
	3	3	4.1–6						3.9	4.4	4.8	5.2	5.5	5.8	6.0										
AR80	4	0.6	1	1–2						1.0	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.95	2.0					
			2	2.1–4			2.1	2.6	3.0	3.5	3.7	4.0													
	3	3	4.1–6						4.4	4.8	5.2	5.5	5.8	6.0											
	4	0.9	2	6.1–16				6	8	9	10	11	12	12.5	13	13.5	14	14.5	15	15.3	15.4	15.5	15.7	16	
AR85 AR90 AR95	4	0.6	2	2–4			2.1	2.6	3.0	3.5	3.7	4.0													
	3		3	4.1–6						4.4	4.8	5.2	5.5	5.8	6.0										
	4	0.9	2	6.1–16				6	8	9	10	11	11.7	12.5	13	13.5	14	14.5	15	15.3	15.4	15.5	15.7	16	
	2	1.1	3	17–24			16	21	24																
AR100	6	0.7	2	5–13				5	6	7	8	9	9.5	10	11	12	12.2	12.4	12.6	12.8	13				
AR105	2	1.45	2	14–35					14	16	18	20	22	23	25	27	28	29	31	32	33	35			
AR112			3	36–60			32	40	46	54	60														
AR115																									
AR132S/M AR132ML AR135 AR145	4	1.5	1	15–32					15	18	20	22	25	26	27	29	30	32							
			2	33–65		26	37	45	52	58	63	67													
			3	66–130	52	90	115	130																	
AR160	4	1.5	1	30–45										30	32	34	36	38	39	40	41	42	43	44	45
		2	2	46–85			41	50	58	65	70	75	79	81	85										
	2	2.7	2	86–200				80	95	115	125	135	150	160	170	180	190	200							
AR165 AR180 AR185 AR195	4	1.5	1	30–45										30	32	34	36	38	39	40	41	42	43	44	45
		2	2	46–85			41	50	58	65	70	75	79	81	85										
	2	2.7	2	86–200				80	95	115	125	135	150	160	170	180	190	200							
			3	201–300	80	165	215	270	300																



6.3 Inspection/maintenance of drive with hydraulic centrifugal coupling

Tightening torques

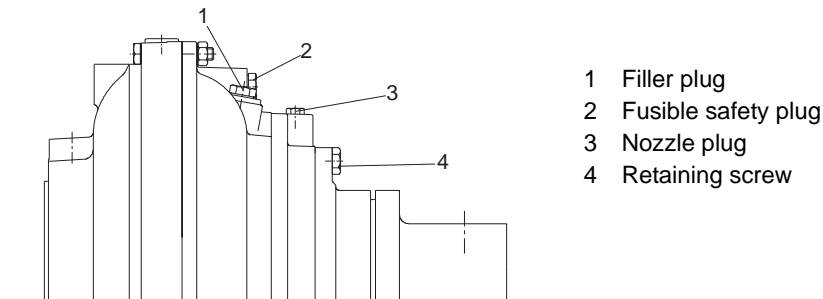
The hydraulic centrifugal coupling is equipped with fusible safety plugs, filler plugs, nozzle plugs and retaining screws. These prevent overheating and make sure the coupling is filled correctly. During maintenance, it is important to adhere to the tightening torques in Table 5 precisely in order to make sure the coupling does not leak.

Adapter type	Fusible safety plug ¹⁾			Filler plug		Nozzle plug		Retaining screw	
	Bolt size	Response temp. [°C] / color	Tighten torque [Nm]	Bolt size	Tighten torque [Nm]	Thread size	Tighten torque [Nm]	Thread size	Tighten torque [Nm]
AT311 – 312	M10	(110 / yellow) 140 / red (160 / green) ²⁾	22	M10	22	-	-	M6	9
AT321 - 522				M12x1.5	31			M8	23
AT541 – 542				M14x1.5	39			M12	62
MK.../51	M18x1.5		60	M24x1.5	144	M16x1.5	48	M12	74
MK.../61								M12	62

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

2) Standard in conjunction with thermal switching device MTS/BTS

Table 5 : Tightening torques



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Fig. 20: Position of plugs on the hydraulic centrifugal coupling

Inspecting/ changing the oil

Only use hydraulic oils in accordance with Table 6. Do not intermix lubricants! The required oil volume is indicated on the coupling.

Requirements for hydraulic oil	
Viscosity	ISO VG 32
Pour point	<-24 °C
Starting viscosity	< 15,000 mm ² /s
Flash point	≥ 175 °C / ≥ 200 °C ¹⁾
Raffinate	Highly resistant to aging
Compatibility	With seals made from Perbunan and Viton

1) With fusible safety plugs ≥ 160 °C

Table 6



1. De-energize the drive, secure it to prevent inadvertent startup, wait until the coupling has cooled down – risk of burns!
2. Remove the cover, place a collecting vessel underneath
3. Remove the filler plug and fusible safety plug (air pressure equalization)



4. Drain some used oil and test it
 - If it is OK, refit the filler plug and fusible safety plug, put the cover back on
 - Drain all the oil if it is contaminated

In addition, for drives on a swing base for motor:

- The hydraulic centrifugal coupling used here has an additional deceleration chamber with an oil space which must be drained separately:
 - Remove the nozzle plug and drain the oil from the deceleration chamber
 - Tighten the nozzle plug to the appropriate tightening torque (Table 5)
 - Drain the coupling once again through the filler and fusible safety plugs
5. If the coupling is installed horizontally
 - Turn the coupling until the opening for the filler plug is vertical
 - Fill with new oil
 - Screw in the filler plug
 6. If the coupling is installed vertically
 - Screw in the filler plug
 - Fill with new oil through the opening for the fusible safety plug
 7. Screw in the fusible safety plug and put the cover back on

Changing defective fuses

The fuse trips after a corresponding time interval if a malfunction occurs on the machine leading to inadmissible heating of the centrifugal coupling. This causes the coupling housing to be drained. The drive is thus protected against damage.
Only use genuine fuses in accordance with Table 5.

1. Sec. "Inspecting/changing the oil" on page 26, points 1 and 2
2. Remove the filler plug and defective fusible safety plug
3. Drain all the remaining oil
4. Sec. "Inspecting/changing the oil" on page 27, point 5
5. Screw in a new fusible safety plug and put the cover back on, adhere to the tightening torques

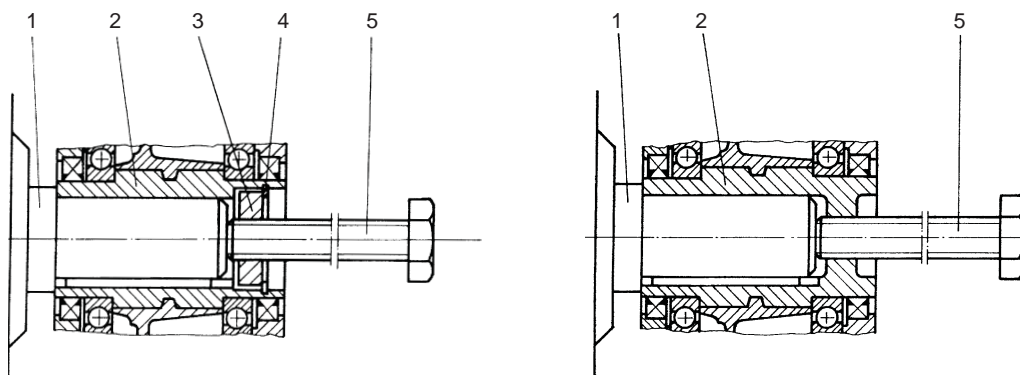


Removing the hydraulic centrifugal coupling



Never use the housing to pull the coupling off or on – this will damage the material or lead to leakage!

1. De-energize the drive and secure it to prevent it from being switched on inadvertently
2. Disconnect the driving motor at the flange
3. Remove the holding screw and holding disk
4. Pull off the coupling (Fig. 21)
 - with the puller/extractor
 - using the coupling hub

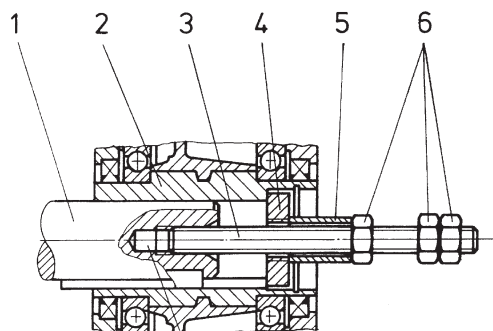


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Fig. 21: Pulling off the centrifugal coupling (left AT311 – AT522, right AT541 – AT542, MK 51– MK 61)

- | | | |
|--|--------------------------------|------------------------------|
| 1 Gear unit input shaft | 3 Pull-off disk (holding disk) | 5 Threaded spindle of puller |
| 2 Hydraulic centrifugal coupling (steel hub) | 4 Circlip | |

5. Inspect/maintain the brake if fitted
 - See the “AC Motors/AC Brake Motors” operating instructions
6. Install:
 - Coupling (Fig. 22), holding disk, holding screw, driving motor



- | |
|----------------------------------|
| 1 Gear unit input shaft |
| 2 Hydraulic centrifugal coupling |
| 3 Threaded spindle of puller |
| 4 Holding disk |
| 5 Distance piece |
| 6 Hex nut |

Centering bore acc. to
DIN 332, sheet 2

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Fig. 22: Pulling on the hydraulic centrifugal coupling

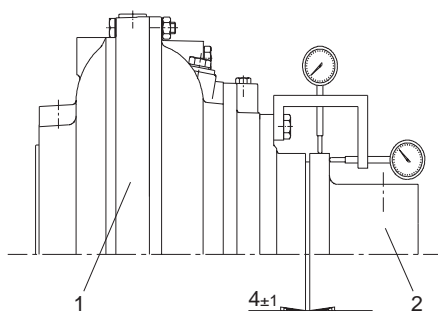


6.4 Inspection/maintenance of the drive on swing base for motor MK

Changing the flexible elements and changing the motor



1. **De-energize the drive, secure it to prevent inadvertent startup, wait until the coupling has cooled down – risk of burns!**
2. Remove the cover and, if necessary, the collecting pan
3. Remove the driving motor
4. Inspect the oil and change if necessary (see "Inspecting/changing the oil" on page 26)
5. Check the flexible elements of the hydraulic centrifugal coupling and replace them as a set if required
6. If changing the motor:
 - Pull the coupling half from the motor end off the motor shaft and pull it onto the new motor.
 - Mounting is easier if you first apply lubricant to the coupling half or heat it up briefly (to 80 – 100 °C).
7. Mounting the driving motor:
 - Bring the hydraulic centrifugal coupling and the flexible connection coupling into mesh and align them roughly.
 - The gap between the two coupling halves should be about 4 mm.
8. Use a dial indicator to line up the driving motor accurately:
 - The deflection on the dial indicator must not exceed 0.2 mm when measuring on the circumference at the indicated points (Fig. 23).
 - Misalignment may lead to bearing damage on the hydraulic centrifugal coupling.
9. Tighten the retaining screws on the driving motor and check its alignment
10. Fit the collecting pan; check the operating distance if there is an MTS/BTS thermal switching device (see "Setting the MTS/BTS operating distances" on page 13)



- 1 Hydraulic centrifugal coupling
- 2 Connection coupling

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Fig. 23: Using a dial indicator to line up the driving

**Fitting a new MTS switch bolt**

Fit a new switch bolt in the hydraulic centrifugal coupling if the thermal monitoring device MTS has tripped.



1. **De-energize the drive, secure it to prevent inadvertent startup, wait until the coupling has cooled down – risk of burns!**
2. Remove the cover
3. Check the oil and change if necessary (see "Inspecting/changing the oil" on page 26)
4. Turn the coupling until the switch bolt is vertical
5. Remove the tripped switch bolt
6. Install a new switch bolt and tighten to the tightening torque for the fusible safety plug (see "Tightening torques" on page 26)
7. Reactivate the switch, line up the switch tab with the switch bolt until the switch tab clips in
8. Check the operating distance (see "Setting the MTS/BTS operating distances" on page 13)
9. Fit the cover

7 Revision Status

- New installation / startup of drives with hydraulic centrifugal coupling on swing base for motor
- Inspection of drive with torque limiting coupling AR: Updated table of slip torques
- New inspection and maintenance work for drives with hydraulic centrifugal coupling with and without swing base for motor

Revisions to the 10/99 edition are indicated by a gray bar in the margin.

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Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Phone: (09) 2 74 56 272 74 00 77 Fax: (09) 274 0165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Phone: (09) 3 84 62 51 Fax: (09) 3 84 64 55 sales@sew-eurodrive.co.nz
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1539 Moss	Phone: (69) 2410 20 Fax: (69) 2410 40
Peru			
Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos # 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Phone: (511) 349-52 80 Fax: (511) 349-30 02
Poland			
Sales	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Pojezierska 63 91-338 Lodz	Phone: (042) 6 16 22 00 Fax: (042) 6 16 22 10 sew@sew-eurodrive.pl



Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Phone: (0231) 20 96 70 Fax: (0231) 20 36 85 infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Madrid nr.4 71222 Bucuresti	Phone: (01) 2 30 13 28 Fax: (01) 2 30 71 70 sialco@mediasat.ro
Russia			
Sales	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 193 193015 St. Petersburg	Phone: (812) 3 26 09 41 + 5 35 04 30 Fax: (812) 5 35 22 87 sewrus@post.spbnit.ru
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644 Jurong Point Post Office P.O. Box 813 Singapore 91 64 28	Phone: 8 62 17 01-705 Fax: 8 61 28 27 Telex: 38 659
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 27032 2011 Benrose, Johannesburg	Phone: (11) 49 44 380 Fax: (11) 49 42 300
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens, 7441 Cape Town P.O.Box 53 573 Racecourse Park, 7441 Cape Town	Phone: (021) 5 11 09 87 Fax: (021) 5 11 44 58 Telex: 576 062
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 39 Circuit Road Westmead, Pinetown P.O. Box 10433, Ashwood 3605	Phone: (031) 700 34 51 Telex: 622 407
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Phone: 9 44 31 84 70 Fax: 9 44 31 84 71 sew.spain@sew-eurodrive.es
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Phone: (036) 34 42 00 Fax: (036) 34 42 80 www.sew-eurodrive.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein near Basel	Phone: (061) 4 17 17 17 Fax: (061) 4 17 17 00 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly Sales Service	Chon Buri	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, M007, Tambol Bonhwaroh Muang District Chon Buri 20000	Phone: 0066-38 21 45 29/30 Fax: 0066-38 21 45 31



Turkey			
Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Phone: (0216) 4 41 91 63 + 4 41 91 64 + 3 83 80 14 + 3 83 80 15 Fax: (0216) 3 05 58 67 seweurodrive@superonline.com.tr
Uruguay			
	Please contact our office in Argentina.		
USA			
Production Assembly Sales Service	Greenville	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Phone: (864) 4 39 75 37 Fax: Sales (864) 439-78 30 Fax: Manuf. (864) 4 39-99 48 Fax: Ass. (864) 4 39-05 66 Telex: 805 550
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	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 200 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Phone: (856) 4 67-22 77 Fax: (856) 8 45-31 79
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Phone: (9 37) 3 35-00 36 Fax: (9 37) 4 40-37 99
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Phone: (214) 3 30-48 24 Fax: (214) 3 30-47 24
	Additional addresses for service in the USA provided on request!		
Venezuela			
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia	Phone: (041) 32 95 83 + 32 98 04 + 32 94 51 Fax: (041) 32 62 75 sewventas@cantr.net sewfinanzas@cantr.net



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