

TPM



TPMA – TPM



TPM

TPM - Servo actuator

Operating Manual

WITTENSTEIN



motion control

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1.1 Service contact

Please contact our technical service department if you have any technical questions:

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Fax: +49/ (0) 79 31 / 493-903

E-Mail: service@w-m-c.de

Address:

WITTENSTEIN motion control GmbH

Walter-Wittenstein-Str. 1

D-97999 Igersheim

2 General Information

2.1 Description, designations

The AC servo actuator TPM / TPMA (hereafter referred to as gear drive), is a combination of a low-backlash planetary gearhead and an AC servomotor. The gear drive comes in various sizes and ratios.

The term "gearhead" refers to the planetary gearhead without the motor assembly.

2.2 Whom does this manual concern?

This manual concerns all persons who install, operate, or maintain this gear drive. They may only carry out work on the gear drive, if they have read and understood this operating manual. Please pass the safety instructions on to other persons as well.

2.3 Which signs and symbols are referred to in this manual?

- ➡ An "action instruction", which requires you to carry out an action.
- ▽ With a "check" you can specify whether the device is ready for the next work stage.
- ☺ A "usage tip" shows you an option of facilitating or improving operations.

The safety instructions symbols are described in section [3 "Safety"](#).

2.4 Exclusion of liability

The manufacturer does not accept liability for damage or injury ensuing from improper handling of the gear drive.

2.5 Modifications, reconstructions

Modifications or reconstructions of the gear drive may only be carried out with the express written authorisation of **WITTENSTEIN motion control**.

2.6 EC low-voltage directive

The gear drive has been constructed in accordance with EC directive 73/23/EEC. During installation and connection of the electrical components, the relevant regulations have to be observed (for example wire cross sections, fuse protection, etc.). Meeting all requirements for the entire system is the responsibility of the system's manufacturer. The EC declaration of conformity can be found in the appendix (see [10.3](#)).

2.7 Technical modifications

WITTENSTEIN motion control reserves the right of carrying out technical modifications to improve the product.

2.8 Copyright

© 2005, **WITTENSTEIN motion control GmbH**

3 Safety

3.1 Intended use

The gear drive is designed for industrial applications. Its purpose is to drive machines. Please refer to our catalogue or our Internet page for the maximum permitted speeds and torques: www.w-m-c.de.

- ➡ Please consult our technical service department (see [1.1](#)) if your gear drive is older than a year. In this way you receive valid data.

3.2 Improper use

Any use transgressing the above-named restrictions (especially higher torques and speeds) is not compliant with the regulations, and is thus prohibited.

The operation of the gear drive is prohibited if:

- It was not installed according to regulations (for example fastening bolts).
- The gear drive is very dirty, damaged or blocked.
- It is operated without lubricant.
- The cables are damaged or improperly connected.

3.3 Safety Instructions

The following symbols are used in this operating manual to warn you of hazards:



DANGER!

This symbol warns you of danger of injury to yourself and others.



Attention

This symbol warns you of the risk of damage to the gear drive.



Environment

This symbol warns of environmental pollution risk.

3.3.1 General safety instructions

Working on the gear drive



DANGER!

Inappropriately executed work can lead to injury and damage.

- ➔ Make sure that the gear drive is only installed, maintained, and dismantled by trained technicians.



DANGER!

Current-flow through the body or arcing can lead to grave injury and death.

- ➔ Only perform tasks on the electrical system if you are:
 - A trained electrician.
 - A person trained in electro-technology, working under the supervision of a specialist electrician.
- ➔ Always adhere to the five safety rules for the de-energised state:
 - De-energise
 - Secure against being turned on (for example by locking it)
 - Ensure that de-energised state exists.
 - Attach ground line and short-circuit the equipment.
 - Cover and safeguard any live parts in the immediate vicinity.



DANGER!

Impurities spinning through the air can cause grave injury.

- ➔ Before putting the gear drive into operation, check that there are no impurities or tools near the gear drive.



Attention

Loose or overloaded screw connections can cause damage.

- ➔ Always use a calibrated torque wrench to tighten and check all screw connections for which a tightening torque is specified.
- ➔ **Never** use the gearhead or the motor as a step, climbing aid, or fastening point.

Operation**DANGER!**

Touching hot surfaces can lead to burns.

- ➔ Do not touch the gear drives if their operating temperatures are too high, or use suitable safety equipment (e.g. gloves).

**DANGER!**

Rotating machinery may lead to injury. There is danger of being trapped or pulled in!

- ➔ Keep a sufficient distance to rotating machinery.

Maintenance**DANGER!**

An unintentional start of the machine during maintenance work can lead to serious accidents.

- ➔ Make sure no one can start the machine while you are working on it.

**DANGER!**

Even only briefly running the machine during maintenance work can lead to accidents if the safety devices are not operating.

- ➔ Make sure that all safety devices are mounted and active.

Lubricants**Environment**

Lubricants (oils and greases) are hazardous substances that can contaminate soil and water.

- ➔ Collect drained lubricant into suitable receptacles and dispose of it according to the valid national guidelines.

Wiring**DANGER!**

Incorrect wiring can lead to injuries and damage.

- ➔ Only use power and signal cables recommended by **WITTENSTEIN motion control**.
- ➔ Do not cut off power and signal cables, and do not insert extensions.
- ➔ Make sure that the U-U, V-V and W-W motor phases are correctly connected.
- ➔ Make sure that the motor encoder interface of the servo controller is compatible to the gear drive.
- ➔ Observe the prescribed voltage for the brakes (usually 24 V direct voltage) and the polarity.

3.4 In case of fire

The gear drive itself is not combustible. However, it usually contains a synthetic gear oil (polyglycol).

Please observe the following instructions, if the gear reducer is situated in a burning environment.

3.4.1 Suitable extinguishing agents, protective equipment

Powder, foam, fog, in certain cases carbon dioxide

**DANGER!**

High temperatures produce irritating steam.

- ➔ Use a protective breathing apparatus.

3.4.2 Unsuitable extinguishing agents

Do not spray with water!

3.4.3 Additional Information



Environment

➡ Prevent the penetration of the lubricant in drains, sewers, and water resources.

For additional information on RENOLIN PG 220 gear reducer oil, refer to:
FUCHS MINERALOELWERKE GmbH, Mannheim Tel.: +49 (0) 621 / 3701-333

4 Technical Specifications

4.1 Design

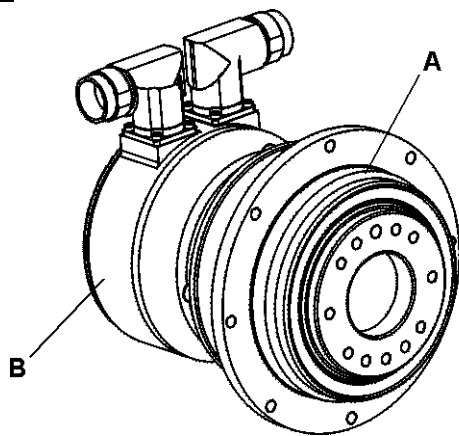


Fig. 4.1

The gear drive is a combination of a low-planetary gearhead (A) and an AC servomotor (B).
The output bearing is designed to receive high external tilting moments and axial forces. The output flange, in accordance with ISO 9409, has two centring mechanisms and a bore hole for an indexing pin so that the gearhead (or the application) can be zeroed mechanically.

The AC servo motor is a brushless 3-phase synchronous motor, with excitation by means of permanent magnets located on the rotor. A resolver or optical encoder takes care of the commutation or speed control.
An optional permanent-magnet holding brake is integrated into the motor.

4.2 Weight

The weight of the gear drive ranges from 2.4 to 46.0 kg.

- ☺ The [Table 5.1](#) in section 5.2 helps you in a more exact specification of the weights.

4.3 Lubricant quantity and types



Attention

No change of lubricant in gear drives of this design!

- ➡ **Never** open the gear drive, as this would nullify the guarantee.

The gear drive is filled with synthetic gear oil of viscosity class ISO VG 220 (Fuchs, Renolin PG 220) by the manufacturer. Renolin PG 68 or Optimol PD1 grease is also used in special cases. The filled lubricant and the required lubricant quantities are specified on the type plate.

The ambient temperature may not be under -10°C and not over $+40^{\circ}\text{C}$. Operating temperature may not exceed $+90^{\circ}\text{C}$.

Divergent operating conditions may make different lubricant quantities and different lubricants necessary.

- ➡ In these cases, please contact **WITTENSTEIN motion control**.

4.4 Performance Statistics

Please refer to our catalogue or our Internet page for the maximum permitted speeds and torques: www.w-m-c.de.

- ➡ Please consult our technical service department (see [1.1](#)) if your gear drive is older than a year.

4.5 Identification plate, designation

WITTENSTEIN  motion control		WITTENSTEIN Motion Control GmbH 97999 Iggersheim/Germany	
A	Typ:	TPM 010-091M-600K-BP1-015IFSTD	
B	Serial No.:	302866	Artikelcode: 40010248
C	U _D [V]:	600	Date: KW 19/02
D	I _{max} [A _{rms}]:	1,5	n _{2max} [rpm]: 77
E	I ₀ [A _{rms}]:	0,8	T ₀ [Nm]: 34
F	U _{brake} [V]:	24	T _{2max} [Nm]: 80
G	Back EMF	Inverter Duty VPWM	Constant Torque (CT)
H	Protection class:	IP64	Insulation class: F
I	Lubrication:	Oil Renolin PG 220	Pos B5 Qty 35 ccm
		CE	VDE 0530/0730 file E 222/60 C  US

Fig. 4.2

- The following specifications can be found on the identification plate:
- A Designation:** (see below)
 - B Serial number:** e.g. 302866
 - C Intermediate voltage:** e.g. 600 V
 - D Max. permissible current:** e.g. 1.5 A_{eff}
 - E Continuous stall current:** e.g. 0.8 A_{eff}
 - F Brake voltage:** e.g. 24 V
 - G Specifications for UL approval**
 - H Type of protection:** e.g. IP64
 - I Lubricant:** e.g. Renolin PG 220
 - J Mounting position:** e.g. B5
 - K Lubricant quantity:** e.g. 35 ccm
 - L UL logo:** optional
 - M Insulation class:** e.g. F
 - N Max. torque at gear output:** e.g. 80 Nm
 - O Continuous stall torque at gear output:** e.g. 34 Nm
 - P Max. output speed:** e.g. 77 min⁻¹
 - Q Date:** e.g. Week 19/02
 - R Article code:** e.g. 40010248

Designation:

TPM 010-091 M-600 K-BP 1-015 IF STD

Size
TPM 004 / 010 / 025 / 050 / 110
TPMA 025 / 050 / 110

Ratio
21 / 31 / 61 / 91 (TPM)
110 / 220 (TPMA)

Motor encoder
R = Resolver
S = Singleturn Heidenhain EnDat®
M = Multiturn Heidenhain EnDat®
N = Singleturn Stegmann Hiperface®
K = Multiturn Stegmann Hiperface®
I = Heidenhain incremental encoder

Intermediate voltage
320
600

Temperature sensor
P = PTC STM 160 in accordance with DIN 44081 / 44082
N = NTC
K = KTY 84-130

Plug form
STD = angle
SEG = straight
XXX = custom

Standard
IF = industry standard
UL = UL recognised file E220160

Stator length

Clearance specification
1 = Standard < 3 arcmin (TPM 004: < 5 arcmin)
0 = Reduced < 1 arcmin (TPM 004: < 3 arcmin)

Brake
BP = Permanent magnetic brake
OH = Without brake

5 Delivery Status, Transport, Storage

5.1 Delivery Status

The gear drives are packed in film and boxes. The film and boxes can be recycled. All gear drives are treated with an anti-corrosion agent at the gear output. All gear drives are filled with lubricant during manufacture.

5.2 Transport

No special direction or position is prescribed for transporting the gear drive. The following tables are designed to help you determine the weight of your gear drive.

Weight [kg]										
Type/ size		TPM 004	TPM 010	TPM 025	TPM 050	TPM 110		TPMA 025	TPMA 050	TPMA 110
With- out brake	i=21 i=31	2.6	4.9	9.0	21.3	37.1	i=110 i=220	8.4	17.6	43.6
	i=61 i=91	2.4	4.4	7.6	15.1	35.9				
With brake	i=21 i=31	3.0	5.3	9.8	23.7	39.6	i=110 i=220	9.3	18.8	46.0
	i=61 i=91	2.7	4.9	8.4	16.2	38.3				

Table 5.1

5.2.1 Transport using hoisting equipment



DANGER!

Falling loads or breakage of fastening equipment can cause injury.

- ➔ Do not stand under suspended loads.
- ➔ Keep as safe a distance as possible from securing equipment.



Attention

Falling or hard dropping can damage the gear drive.

- ➔ Only use hoisting and securing equipment which is permitted for the size / weight of your gear drive.
- ➔ Ensure that the load is slowly and carefully handled and placed.

5.3 Storage

The gear drive can be stored dry and in a horizontal position in the original packing for a maximum of 2 years at a temperature between 0°C and +30°C. As storage logistic, we recommend the "first in - first out" principle.

6 Mounting, Putting into Operation

- ➔ Please observe the instructions in the ["General safety instructions"](#) in section [3.3.1](#).

6.1 Preparing mounting

All gear drives are treated with an anti-corrosion agent at the gear output.

- ➔ Remove all traces of the anti-corrosion agent before mounting the gear drive.



Attention

Pressurised air can damage the gear drive seals, and thus lead to leakage.

- ➔ Do not blow out the flanges with pressurised air when cleaning.

Through-holes are available in the gear unit housing for bolting it to your machine (refer to [Table 6.1](#)).

Through-holes in gear unit housing				
Type/size	Bore Ø	Quantity x Diameter	For bolt size / property class	Tightening torque
	[mm]	[] x [mm]		[Nm]
TPM 004	79	8 x 4.5	M4 / 10.9	4.1
TPM 010	109	8 x 5.5	M5 / 10.9	8.1
TPM 025	135	8 x 5.5	M5 / 10.9	8.1
TPM 050	168	12 x 6.6	M6 / 10.9	14
TPM 110	233	12 x 9.0	M8 / 10.9	34
TPMA 025	135	16 x 5.5	M5 / 10.9	8.1
TPMA 050	168	24 x 6.6	M6 / 10.9	14
TPMA 110	233	24 x 9.0	M8 / 10.9	34

Table 6.1

There are threaded bores on the output flange. Only the TPM model additionally has an indexing borehole (see [Table 6.2](#)).

Thread in output flange (ISO9409)				
Type/size	Indexing bore hole Ø	Quantity x thread X depth	For property class	Tightening torque
	[mm]	[] x [mm] x [mm]		[Nm]
TPM 004	5 H 7	7xM5x7	10.9	8.1
TPM 010	6 H 7	7xM6x10	10.9	14
TPM 025	6 H 7	11xM6x12	10.9	14
TPM 050	8 H 7	11xM8x15	10.9	34
TPM 110	10 H 7	11xM10x20	10.9	67
TPMA 025	-	12xM8x12	10.9	34
TPMA 050	-	12xM10x15	10.9	67
TPMA 110	-	12xM12x19	10.9	117

Table 6.2

- Preposition the assembled cables for installing the electrical equipment (refer to [6.4.3 „Assembled cables“](#)).

6.2 Mounting the gear drive

- Thoroughly clean the output flange or shaft, centring, and fitting surface.

6.2.1 Mountings on the output flange



Attention

Distortions during mounting operations can damage the gear reducer.

- Mount gearwheels and toothed belt pulleys onto the output flange without forcing.
- Do not on any account attempt an assembly by force or hammering.
- Only use suitable tools and equipment.
- ☺ You can find the prescribed tightening torques in [Table 6.2](#).

6.3 Mounting the gear drive onto your machine

- ☺ Mount the gear drive in such a way that the type plate remains legible.
- Coat the screws with screw-bonding agent (e.g. Loctite 243), and screw the gear unit housing and your machine together.
- ☺ You can find the prescribed screw sizes and tightening torques in [Table 6.1](#).

6.4 Installing the electrical equipment

6.4.1 Connection overview: Resolver

Power

Resolver (Singletorn)

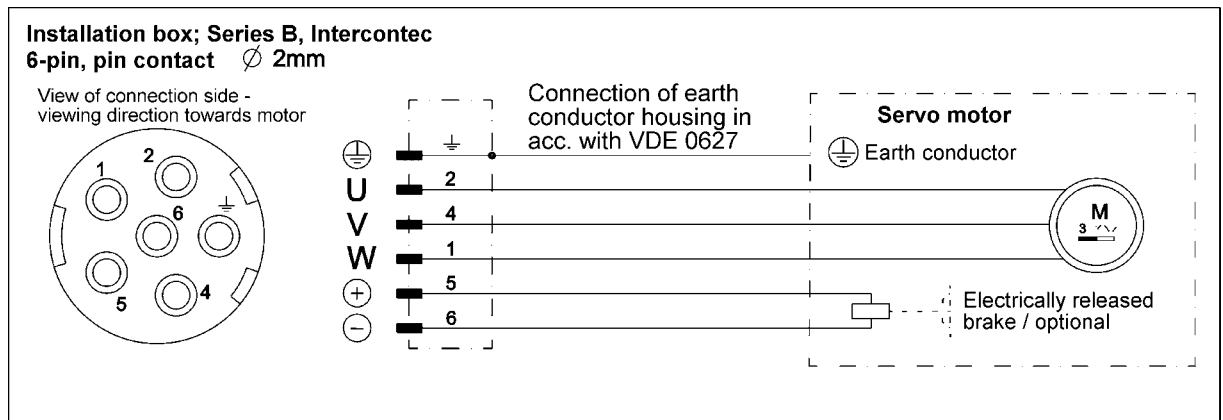


Fig. 6.1

Signal

Resolver (Singletorn)

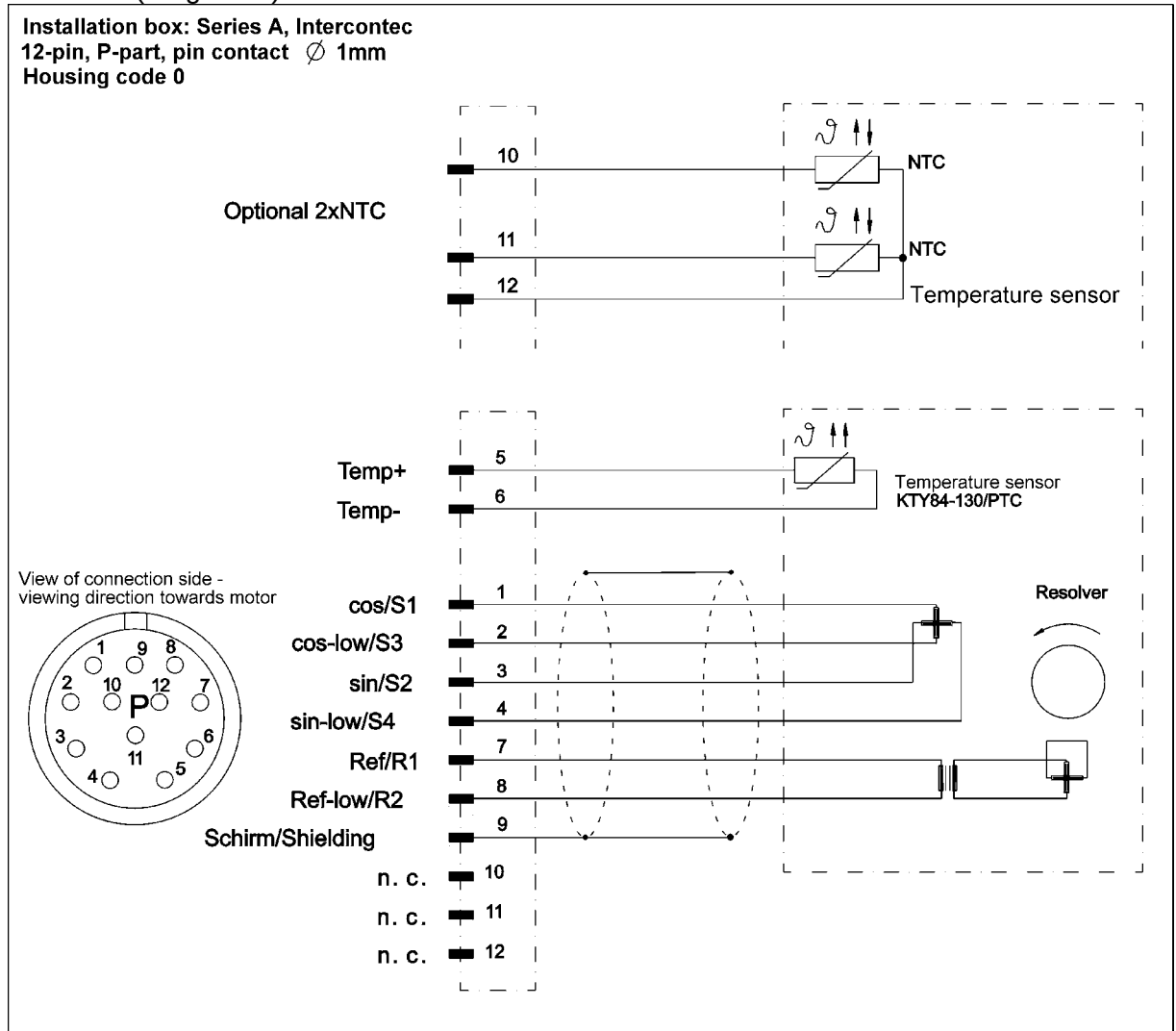


Fig. 6.2

6.4.2 Connection overview: Optical Encoders

Power
Optical Encoders

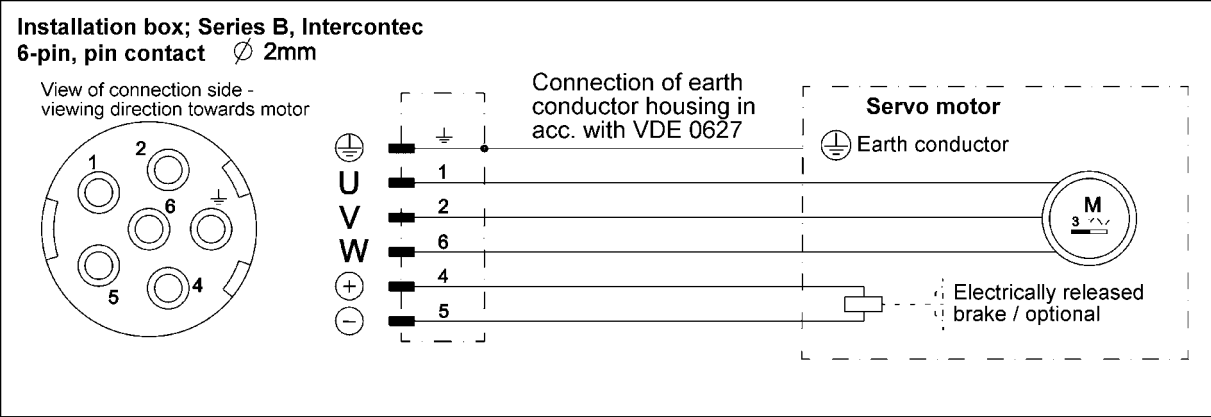


Fig. 6.3

Signal
Stegmann encoder (Singleturn SRS50 and Multiturn SRM50, Hiperface®)

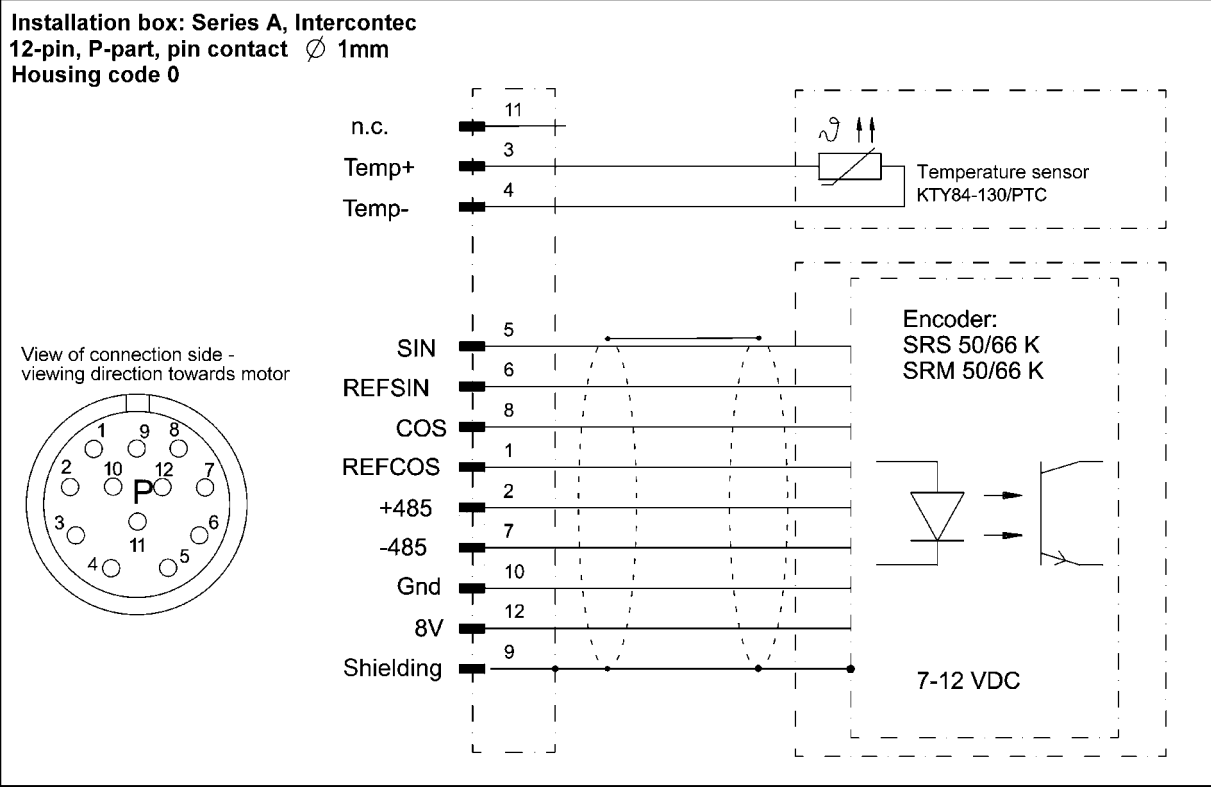


Fig. 6.4

Heidenhain encoder (Singleturn ECN1313 and Multiturn EQN 1325, EnDat®)

Installation box: Series A, Intercontec
17-polig, E-part, pin contact $\varnothing$ 1mm
Housing code 0

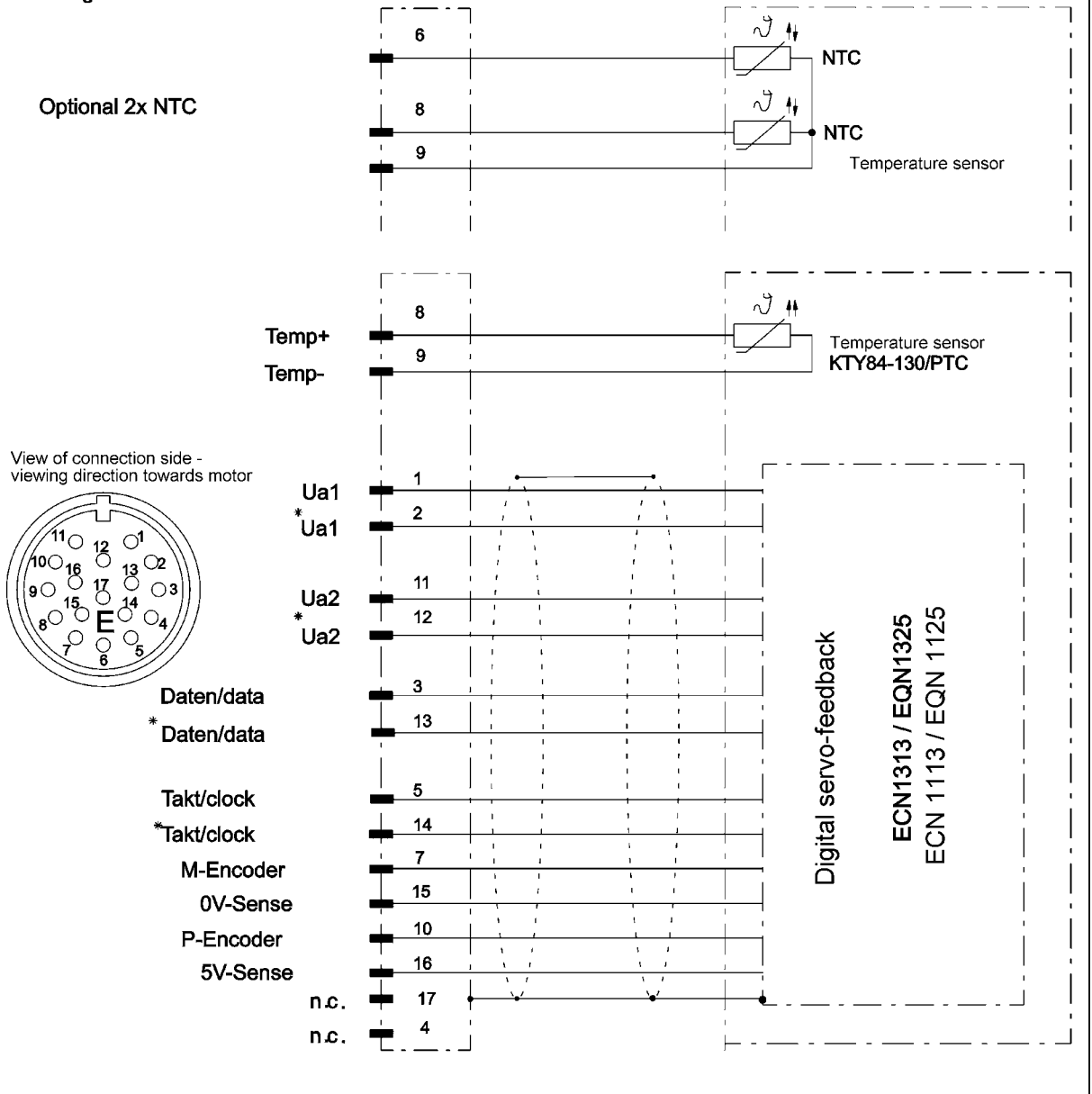


Fig. 6.5

Heidenhain encoder (ERN1387 incremental encoder)

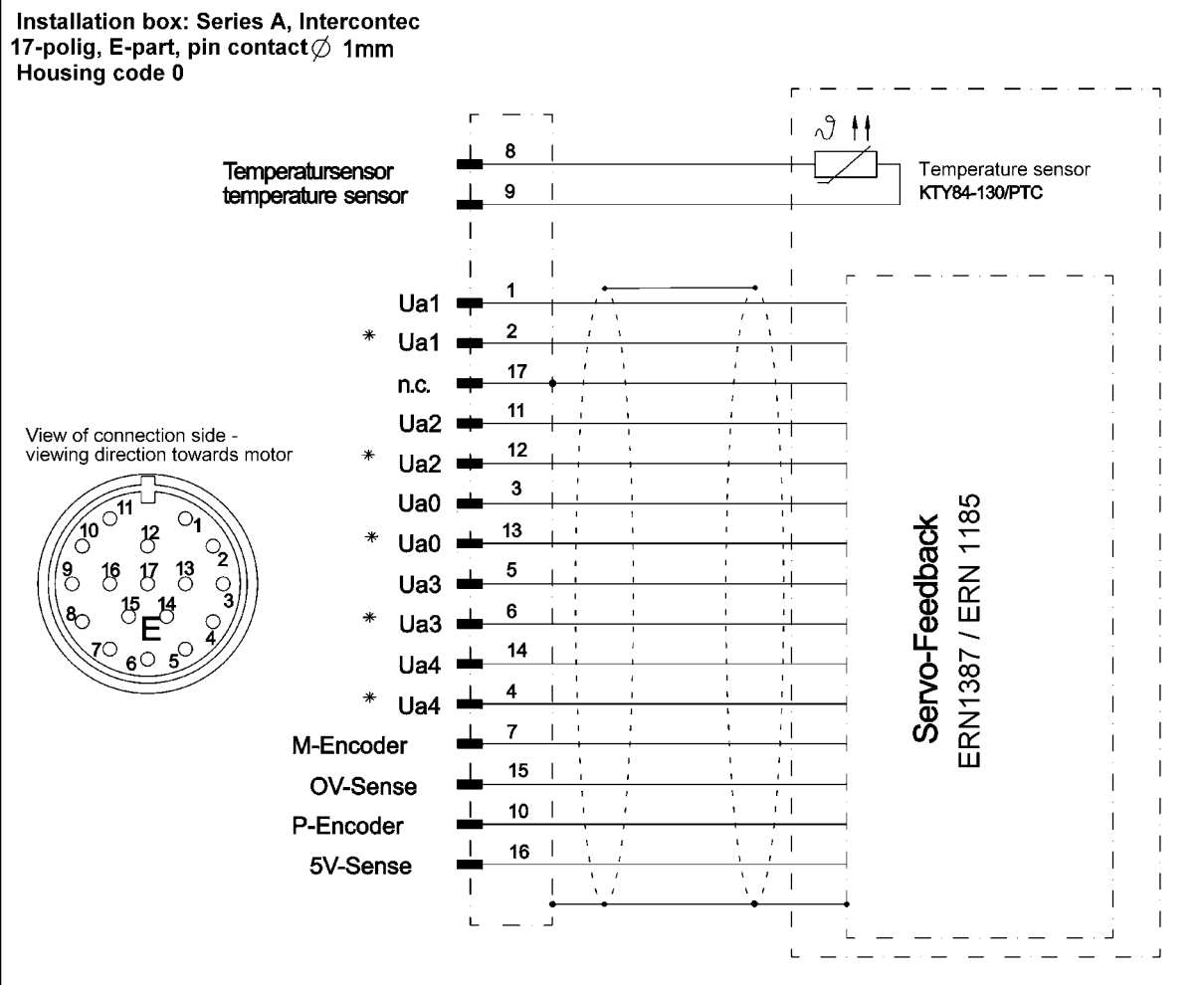


Fig. 6.6

6.4.3 Assembled cables

For the electrical installation of the gear drive, **WITTENSTEIN motion control** offers the following power and signal cables for the servo controller:

Manufacturer	Series/Type
AMK	AMKKASYN KU
Atlas Copco	DMC 2
Berger Lahr	Twin Line
B & R	AcoPos
CT	UniDrive Classic
	UniDrive SP
ESR Pollmeier	Trio-/Mididrive Digital
Hauser Hannifin	Compax
Bosch Rexroth (Indramat)	Ecodrive 03
	Ecodrive 03, 16A
	DIAX 04
	Servo Dyn D
KEB	Combivert
Lenze	Global Drive 93xx
Nord	SK 1000 E
Danaher Motion (Seidel Kollmorgen)	Servostar 600/400
Siemens	SimoDrive 611U
	SimoDrive 611D / 840D
	Master Drive MC
S.B.C.	HPD
	LVD

Table 6.3

Mechanical characteristics of the cable	
Conductor cross-section of power cables up to 16 A continuous stall current) ¹	4 x 1,5mm ² & 2 x 0,75mm ² D= 12,2mm
Conductor cross-section of power cables above 16 A continuous stall current) ¹	4 x 2,5mm ² & 2 x 1mm ² D= 15,1mm
Max. tensile strength	Static 50 N/mm ² cross-section Dynamic 20 N/mm ² cross-section
Max. permissible torsion	±30°/m
Permissible operating temperature	Unmoved: -50°C to +80°C Moved: -20°C to +70°C
Min. permissible bending radius	10 x D (outer diameter of cable)
Number of bending cycles	5 million (for bending radius 10 x D)
Max. permissible acceleration	5 m/sec ²
Max. permissible speed	180 m/min

Table 6.4

)¹ applies to ambient temperatures up to +30°C

7 Operation

7.1 Operating conditions

- ➔ Please observe the instructions in section [3.3.1 "General safety instructions"](#).
- ☉ The specifications for lubricants and operating temperatures can be found in section [4.3](#).

Divergent operating conditions may make different lubricant quantities and different lubricants necessary.

- ➔ In these cases, please contact **WITTENSTEIN motion control**.

8 Maintenance

8.1 Shutdown, preparation

- ➔ Please observe the instructions in section [3.3.1 "General safety instructions"](#).
- ➔ Shut down the machine in which the gear drive is installed.
- ➔ Disconnect the machine from the mains, before starting maintenance work.

8.2 Inspection schedule

Maintenance work / See section...	Maintenance periods		
	At start-up	After 500 operating hours or 3 months	Yearly
Visual inspection / 8.3.1	X	X	X
Checking the tightening torques / 8.3.2	X	X	X

Table 8.1

8.3 Maintenance Work

8.3.1 Visual inspection

- ➔ Check the entire gear drive, as well as the cables, by carrying out a thorough visual inspection for exterior damage.
- ➔ The radial shaft seals are subject to wear. Therefore also check the gear drive for leakage and untight fitting during each visual inspection.

8.3.2 Checking the tightening torques

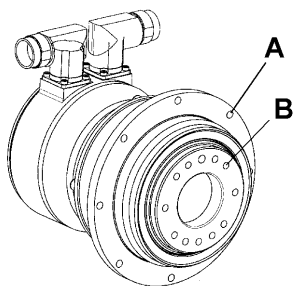


Fig. 8.1

- ➔ Check the tightening torques of the securing screws on the gear unit housing (A) and on the output flange (B).
- ☺ You can find the prescribed tightening torques in [Table 6.1](#) and [Table 6.2](#) in section 6.

8.4 Start-up after maintenance work

- ➔ Clean the outside of the gear drive.
- ➔ Assemble all safety devices.
- ➔ Do a test run, before re-releasing the machine for operation.

8.5 Malfunction list (troubleshooting)

- ➔ Seek an immediate solution if you notice oil loss, increased noise during operation or higher operating temperatures.

Malfunction	Possible cause	Solution
Higher operating temperature	Selected construction too weak for task, nominal operating exceeded.	Check the technical data
	Motor is heating the gearhead	Check the controller's settings
	Ambient temperature too high	Ensure adequate cooling
Increased noise during operation	Damaged bearings	Please consult our technical service department.
	Damaged gear teeth	
Loss of lubricant	Lubricant quantity too high	Wipe off discharged lubricant and continue to watch the gearhead. Lubricant discharge must stop after a short time.
	Seals not tight	Please consult our technical service department.
Motor does not start	Power supply interrupted	Check the connections
	Wiring of motor and/or encoder not correct	Check the wiring of the motor phases and the motor encoder
	Blown fuse	Check for errors and replace the fuse.
	Incorrect controller parameters	Check that the motor parameters are suitable for the implemented gear drive.
	Motor protection has been triggered	Check for errors. Check whether the motor protection setting is correct.
Wrong direction of rotation	Wrong set value specification for the servo controller	Check servo controller/converter. Check the set value specifications and the polarities.
Motor is droning and has a high power consumption	Drive is blocked	Check the drive
	Error in the encoder line	Check the encoder line
	Incorrect controller parameters	Check that the motor parameters are suitable for the implemented gear drive.
	Brake does not release	(see error "Brake does not release")
Brake does not release	Voltage drop along the supply line > 10%	Ensure that the connected voltage is correct. Check the cable cross-section
	Incorrect brake connection	Check the connection for correct polarity and voltage
	Short circuit in the coil or at body of brake coil	Please consult our technical service department.
Holding brake slips	Stopping torque of the brake exceeded	Check the construction plan.
Acceleration times are not met	Load is too high	Check the construction plan.
	Power limiting is active	Check the controller parameters

Table 8.2

9 **Supplementary Information**

- ☺ If you should need supplementary information (e.g. disassembly, or disposal), please contact our service department (chapter [1.1](#))

10 **Appendix**

10.1 **Tightening torques**

property class	Tightening torque [Nm] for threads...													
	M 3	M 3.5	M 4	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24
4.8	0.56	0.86	1.28	2.5	4.3	10.5	21	36	58	88	121	171	230	295
8.8	1.28	1.96	2.9	5.75	9.9	24	48	83	132	200	275	390	530	675
10.9	1.8	2.75	4.1	8.1	14	34	67	117	185	285	390	550	745	950
12.9	2.15	3.3	4.95	9.7	16.5	40	81	140	220	340	470	660	890	1140

Table 10.1

10.2 **Conversion table**

Conversion		
Length	1 mm	0.03937 in
	1 m	1.094 yd
Space / Capacity	1 ccm	0.061 cu.in.
Weight	1 kg	2.205 lb
Torque	1 Nm	0.738 ft-lb
		8.85 in.lb.

Table 10.2

10.3 Declaration of conformity

WITTENSTEIN



motion control

EG-Konformitätserklärung EC-Declaration of Conformity

Wir / We, **WITTENSTEIN motion control GmbH**
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 Fax: +49(0)7931 - 493-200
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erklären hiermit in alleiniger Verantwortung, daß die Erzeugnisse
hereby declare under our sole responsibility, that the products

Bezeichnung: **AC-Servoactuator mit Leistungs- und Signalstecker**
Designation: AC-Servo actuator with power and signal plug

Typ / Type: **TPM004, TPM010, TPM(A)025, TPM(A)050, TPM(A)110**

mit den wesentlichen Anforderungen der folgenden EG-Richtlinien und EN-Normen
comply with the principle demands of the following EC directives and EN standards

89/336/EWG Elektromagnetische Verträglichkeit (EMV)
89/336/EEC Electromagnetic Compatibility (EMC)

EN 61000-6-4:2001 EMV Störaussendung - Industriebereich
EN 61000-6-4:2001 EMC Emission – industrial environments

EN 61000-6-2:2001 EMV Störfestigkeit - Industriebereich
EN 61000-6-2:2001 EMC Immunity for industrial environments

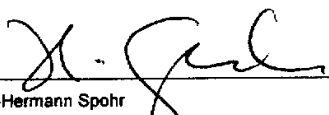
73/23/EWG Elektrische Betriebsmittel Niederspannungsrichtlinie
geändert durch RL 93/68/EWG
73/23/EEC Electrical Equipment Low voltage directive, amended by 93/68/EEC

EN 60034-1:1998 Drehende elektrische Maschinen,
Bemessung und Betriebsverhalten (VDE 0530 Teil 1)
EN 60034-1:1998 Rotating electrical machines, rating and operating behaviour

und den Prüfberichten übereinstimmt und somit den Bestimmungen entspricht. Die AC-Servoactuatoren TPM und TPM(A) tragen das CE-Zeichen.
and agree with the test reports and thus comply with the rules. The TPM and TPM(A) actuator-systems carry the CE sign.

Igersheim, 05.04.2005

Ort und Datum der Ausstellung
Place and Date of Issue


 Hans-Hermann Spohr
 Geschäftsführer / General Manager
 WITTENSTEIN motion control GmbH

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10.4 Form for complaints

In the event of product errors or wrong deliveries, we will do our best to quickly remedy the situation.
You can assist us by using the following form for your feedback.

Contact:

Date

Name (& Initials)

Company

Department

Street or postal address

City

Telephone

Fax

E-mail

Preferred method of contact:
Telephone Fax E-mail Post

Product:

Please copy down from type plate

Type

Serial no.

Comment:

Description of the problem