



WITTENSTEIN

motion control

TPM⁺

Control Techniques Unidrive SP

Quick Startup Guide



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2 General Information

2.1 Description, designations

The AC servo actuator **TPM⁺** (hereafter referred to as servo actuator) is a combination of a low-backlash planetary gearhead and an AC servo motor.

The following manual contains the following points:

- Safety Instructions
- Parameter lists for the **TPM⁺** series
- Connection schematic for **TPM⁺**

2.2 Whom does this manual concern?

This manual concerns all persons who install, operate, or maintain this servo actuator.

They may only carry out work on the servo actuator, 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

WITTENSTEIN motion control is not liable for damages or injury caused by:

- Improper utilization of the servo actuator and the servo amplifier or
- Incorrect setting of operating parameters.

2.5 EC low-voltage directive / EMC regulations

The servo actuator 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. You may only operate the equipment if you comply to the national EMC regulations (refer to the servo amplifier documentation for installation information pertaining to EMC) as they are defined for the given application.

2.6 Copyright

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All of the product brand names which appear in this manual are trademarks of the relevant companies. If the ® and/or TM symbols are omitted, this does imply that the name is a free brand name.

3 Safety

3.1 Intended use

The servo actuator 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 if your servo actuator is more than a year old. In this way you receive valid data.
- ➔ Please be sure to read the documentation provided by the manufacturer of the servo actuator.

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 servo actuator is prohibited if:

- It was not installed according to regulations (for example fastening bolts).
- The servo actuator is very dirty, damaged or blocked.
- It is operated without lubricant.
- The cables are damaged or improperly connected.
- The operating parameters have not been set properly.

3.3 Safety Instructions

The following symbols are used in this 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 servo actuator.



Environment

This symbol warns of environmental pollution risk.

3.3.1 General safety instructions

Working on the servo actuator



DANGER!

Improperly executed work can lead to injury and damage.

- ➔ Always ensure that the servo actuator 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 servo actuator into operation, check that there are no impurities or tools near it.

Maintenance**DANGER!**

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

- Ensure that 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.

- Check that all safety devices have been mounted and are activated.

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 servo actuator.
- Observe the prescribed voltage for the brakes (usually 24 V direct voltage) and the polarity.

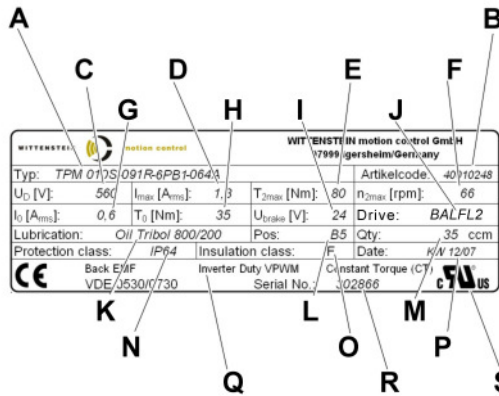


4 Type plate information – identification

- ➔ The technical specifications can be found on your servo actuator's type plate according to the following scheme.

4.1 Identification plate, designation

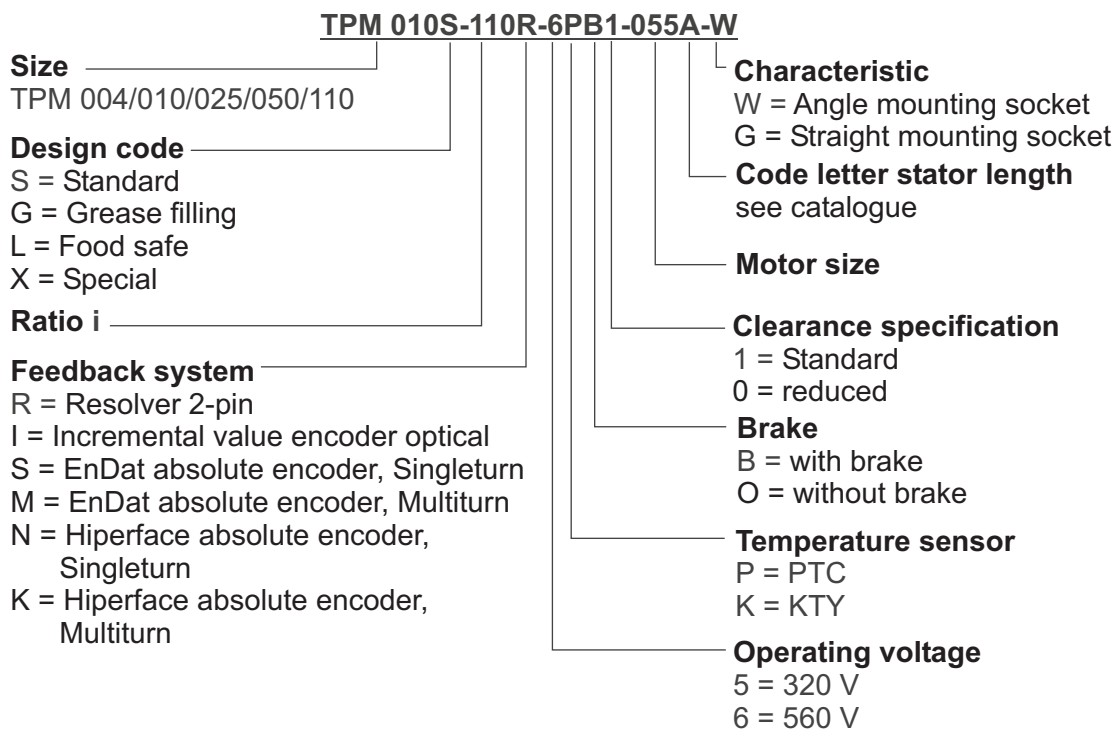
The following specifications can be found on the identification plate:



- A Ordering codes
- B Article code
- C Intermediate voltage
- D Maximum permitted current
- E Maximum moment of the gear output
- F Maximum gear output speed
- G Continuous stall current
- H Continuous stall moment at gear output
- I Brake voltage
- J For use with drive
- K Lubricant
- L Mounting position
- M Lubricant quantity
- N Type of protection
- O Insulation class
- P Date
- Q Specifications for UL approval
- R Series number
- S UL logo

Fig. 4.2

Designation:





5 Setting the parameters

The tables in chapter 5 contain all of the parameters that are required for the initial start-up of a TPM⁺ servo actuator from WITTENSTEIN motion control at a Control Techniques UniDrive SP. When the servo actuator and the servo drive are properly connected, these parameters guarantee that the servo actuator can be operated at idle with speed control. Based on these default settings, you can optimize the dynamics of the speed controller depending on the application.

Follow the details of the type plate.

Data for combinations not shown here are available on demand.

5.1 TPM⁺ motor feedback Resolver

The parameter of the motor feedback has to be entered before connecting the motor. Wrong parameters can damage the motor feedback or the drive.

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S	
03.26	Speed feedback selector		Slot 1, Slot 2 oder Slot 3 abhängig von Steckplatz SM-Resolver					
03.40	Drive encoder error detection level		0	0	0	0	0	
xx.10	Äquivalente Geberstriche pro Umdrehung		1024	1024	1024	1024	1024	
xx.13	Resolver excitation		1 (2:1)	1 (2:1)	1 (2:1)	1 (2:1)	1 (2:1)	
xx.15	Resolver poles		2Pole (0)	2Pole (0)	2Pole (0)	2Pole (0)	2Pole (0)	
00.43	Encoder phase angle	°	180	180	180	180	180	

5.2 TPM⁺ motor feedback Heidenhain EnDat

The parameter of the motor feedback has to be entered before connecting the motor. Wrong parameters can damage the motor feedback or the drive.

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S	
03.26	Speed feedback selector		drv (0)					
03.36	Drive encoder supply voltage		5V	5V	5V	5V	5V	
03.38	Drive encoder type		SC.EnDat	SC.EnDat	SC.EnDat	SC.EnDat	SC.EnDat	
03.41	Drive encoder auto-configuration		EIN (1)	EIN (1)	EIN (1)	EIN (1)	EIN (1)	
00.43	Encoder phase angle	°	180	180	180	180	180	



5.3 TPM⁺ motor feedback Sick-Stegmann Hiperface

The parameter of the motor feedback has to be entered before connecting the motor.
Wrong parameters can damage the motor feedback or the drive.

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S	
03.26	Speed feedback selector		drv (0)					
03.36	Drive encoder supply voltage		8V	8V	8V	8V	8V	
03.38	Drive encoder type		SC.Hiper	SC.Hiper	SC.Hiper	SC.Hiper	SC.Hiper	
03.41	Drive encoder auto-configuration		EIN (1)	EIN (1)	EIN (1)	EIN (1)	EIN (1)	
00.43	Encoder phase angle	°	120	120	120	120	120	



5.4 TPM⁺ 560 V Ratio 16

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,00	1,20	5,60	13,40	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	311	424	304	298	429
04.06	Regen current limit	%	311	424	304	298	429
04.07	Symmetrical current limit	%	311	424	304	298	429
04.15	Thermal time constant		76	105	159	400	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	28,18	21,30	2,20	0,45	0,32
05.24	Transient inductance (Ls)	mH	33,28	22,80	5,95	3,01	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,69	0,96	0,98	1,00	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.5 TPM⁺ 560 V Ratio 21

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,00	1,20	5,60	12,20	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	256	424	304	282	429
04.06	Regen current limit	%	256	424	304	282	429
04.07	Symmetrical current limit	%	256	424	304	282	429
04.15	Thermal time constant		74	105	159	400	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	28,18	21,30	2,20	0,45	0,32
05.24	Transient inductance (Ls)	mH	33,28	22,80	5,95	3,01	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,69	0,96	0,98	1,00	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.6 TPM⁺ 560 V Ratio 31

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,00	1,20	5,60	13,40	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	216	380	256	222	429
04.06	Regen current limit	%	216	380	256	222	429
04.07	Symmetrical current limit	%	216	380	256	222	429
04.15	Thermal time constant		72	105	155	400	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	28,18	21,30	2,20	0,45	0,32
05.24	Transient inductance (Ls)	mH	33,28	22,80	5,95	3,01	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,69	0,96	0,98	1,00	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th

5.7 TPM⁺ 560 V Ratio 61

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	0,70	0,90	1,80	3,70	12,90
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	187	247	322	322	236
04.06	Regen current limit	%	187	247	322	322	236
04.07	Symmetrical current limit	%	187	247	322	322	236
04.15	Thermal time constant		75	0	147	351	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5800	5500	4500	3500	3900
05.17	Stator resistance	Ohm	37,44	40,00	13,46	4,00	0,45
05.24	Transient inductance (Ls)	mH	30,01	30,00	18,92	11,10	3,01
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,46	0,78	1,01	0,96	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.8 TPM⁺ 560 V Ratio 64

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	0,80	0,90	1,80	3,70	12,80
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	169	234	305	322	223
04.06	Regen current limit	%	169	234	305	322	223
04.07	Symmetrical current limit	%	169	234	305	322	223
04.15	Thermal time constant		52	0	146	351	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5500	4800	3800	3100	3200
05.17	Stator resistance	Ohm	37,44	40,00	13,46	4,00	0,45
05.24	Transient inductance (Ls)	mH	30,01	30,00	18,92	11,10	3,01
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,46	0,78	1,01	0,96	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.9 TPM⁺ 560 V Ratio 91

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	0,50	0,70	1,50	3,20	9,00
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	170	193	250	269	208
04.06	Regen current limit	%	170	193	250	269	208
04.07	Symmetrical current limit	%	170	193	250	269	208
04.15	Thermal time constant		143	0	203	400	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5800	5500	4500	3500	3900
05.17	Stator resistance	Ohm	37,44	40,00	13,46	4,00	0,45
05.24	Transient inductance (Ls)	mH	30,01	30,00	18,92	11,10	3,01
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,46	0,78	1,01	0,96	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.10 TPM⁺ 320 V Ratio 16

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,80	2,10	9,70	23,40	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	3700
04.05	Motoring current limit	%	308	426	303	298	429
04.06	Regen current limit	%	308	426	303	298	429
04.07	Symmetrical current limit	%	308	426	303	298	429
04.15	Thermal time constant		23	34	53	146	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	9,40	7,33	0,73	0,13	0,32
05.24	Transient inductance (Ls)	mH	11,10	7,10	1,98	1,00	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,40	0,56	0,56	0,57	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.11 TPM⁺ 320 V Ratio 21

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,80	2,10	9,70	21,30	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	3700
04.05	Motoring current limit	%	255	426	303	282	429
04.06	Regen current limit	%	255	426	303	282	429
04.07	Symmetrical current limit	%	255	426	303	282	429
04.15	Thermal time constant		23	34	53	175	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	9,40	7,33	0,73	0,13	0,32
05.24	Transient inductance (Ls)	mH	11,10	7,10	1,98	1,00	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,40	0,56	0,56	0,57	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.12 TPM⁺ 320 V Ratio 31

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	stator length	mm	30	30	45	60	75
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,80	2,10	9,70	23,40	16,30
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	3700
04.05	Motoring current limit	%	216	382	255	222	429
04.06	Regen current limit	%	216	382	255	222	429
04.07	Symmetrical current limit	%	216	382	255	222	429
04.15	Thermal time constant		22	34	52	138	400
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	4400	4000	3500	2800	2900
05.17	Stator resistance	Ohm	9,40	7,33	0,73	0,13	0,32
05.24	Transient inductance (Ls)	mH	11,10	7,10	1,98	1,00	2,41
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,40	0,56	0,56	0,57	1,00
07.15	T8 analogue input 3 mode		th	th	th	th	th

5.13 TPM⁺ 320 V Ratio 61

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,20	1,50	3,20	6,40	22,50
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	190	245	322	322	235
04.06	Regen current limit	%	190	245	322	322	235
04.07	Symmetrical current limit	%	190	245	322	322	235
04.15	Thermal time constant		26	0	46	117	151
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5800	5500	4500	3500	3900
05.17	Stator resistance	Ohm	12,50	13,30	4,49	1,33	0,13
05.24	Transient inductance (Ls)	mH	10,00	10,00	6,31	3,70	1,00
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,26	0,45	0,58	0,55	0,57
07.15	T8 analogue input 3 mode		th	th	th	th	th



5.14 TPM⁺ 320 V Ratio 64

Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s ⁻¹	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	1,30	1,50	3,20	6,40	22,50
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	171	232	305	322	223
04.06	Regen current limit	%	171	232	305	322	223
04.07	Symmetrical current limit	%	171	232	305	322	223
04.15	Thermal time constant		21	0	46	117	149
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5500	4800	3800	3100	3200
05.17	Stator resistance	Ohm	12,50	13,30	4,49	1,33	0,13
05.24	Transient inductance (Ls)	mH	10,00	10,00	6,31	3,70	1,00
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,26	0,45	0,58	0,55	0,57
07.15	T8 analogue input 3 mode		th	th	th	th	th

5.15 TPM⁺ 320 V Ratio 91

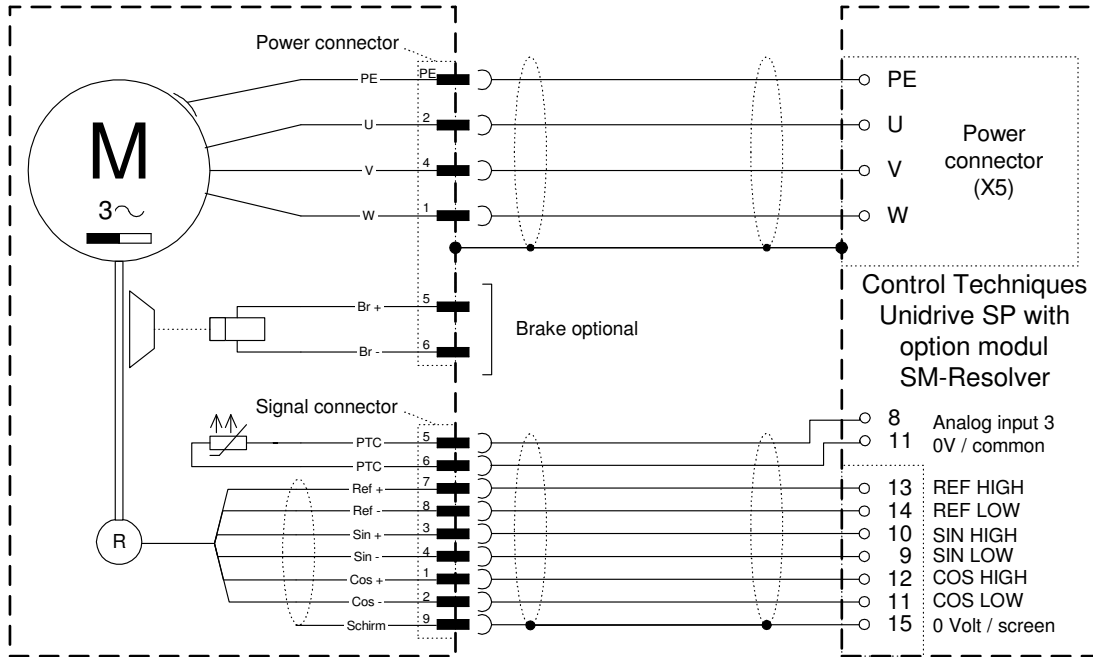
Parameter	Function	Unit	TPM 004S	TPM 010S	TPM 025S	TPM 050S	TPM 110S
	Stator length	mm	15	15	15	15	60
00.07	Speed controller proportional gain (Kp1)	1/rad s-1	0,0050	0,0050	0,0100	0,0100	0,0200
00.08	Speed controller integral gain (Ki1)	1/rad	1,00	1,00	1,00	1,00	1,00
00.09	Speed controller differential feedback gain (Kd1)	s	0	0	0	0	0
00.38	Current controller Kp gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.39	Current controller Ki gain		Automatic calculation by setting #0.40 to 6 after input of R, L in #5.17 and #5.24				
00.41	Maximum switching frequency	kHz	16	16	16	16	16
00.42	Number of motor poles		8	8	12	12	12
00.46	Motor rated current	A	0,90	1,30	2,60	5,60	15,80
00.48	Operating mode selector		SERVO	SERVO	SERVO	SERVO	SERVO
01.06	Maximum reference clamp	RPM	6000	6000	6000	5000	5000
04.05	Motoring current limit	%	173	189	250	268	208
04.06	Regen current limit	%	173	189	250	268	208
04.07	Symmetrical current limit	%	173	189	250	268	208
04.15	Thermal time constant		44	0	67	149	296
04.16	Thermal protection mode		1 or 0 depending on application				
05.08	Rated speed	RPM	5800	5500	4500	3500	3900
05.17	Stator resistance	Ohm	12,50	13,30	4,49	1,33	0,13
05.24	Transient inductance (Ls)	mH	10,00	10,00	6,31	3,70	1,00
05.32	Motor torque per amp, Kt	Nm/A _{rms}	0,26	0,45	0,58	0,55	0,57
07.15	T8 analogue input 3 mode		th	th	th	th	th

6 Connection schematic TPM+

- ➔ Detailed information on cable design and the type of shielding can be found in the documentation from the servo drive manufacturer.

6.1 TPM+ with resolver

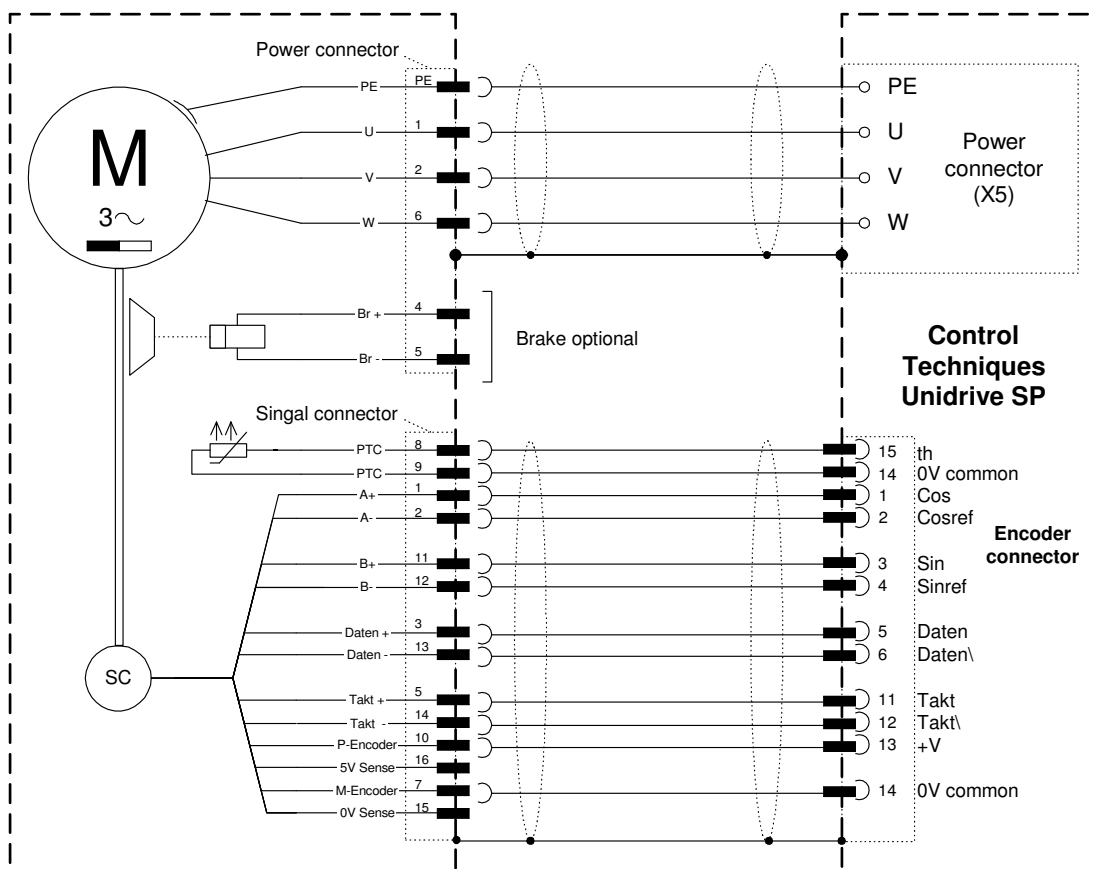
WITTENSTEIN motion control offers pre-manufactured and drag chain compatible cablesets for this servo drive. Please take the required order informations from the TPM+ catalogue.





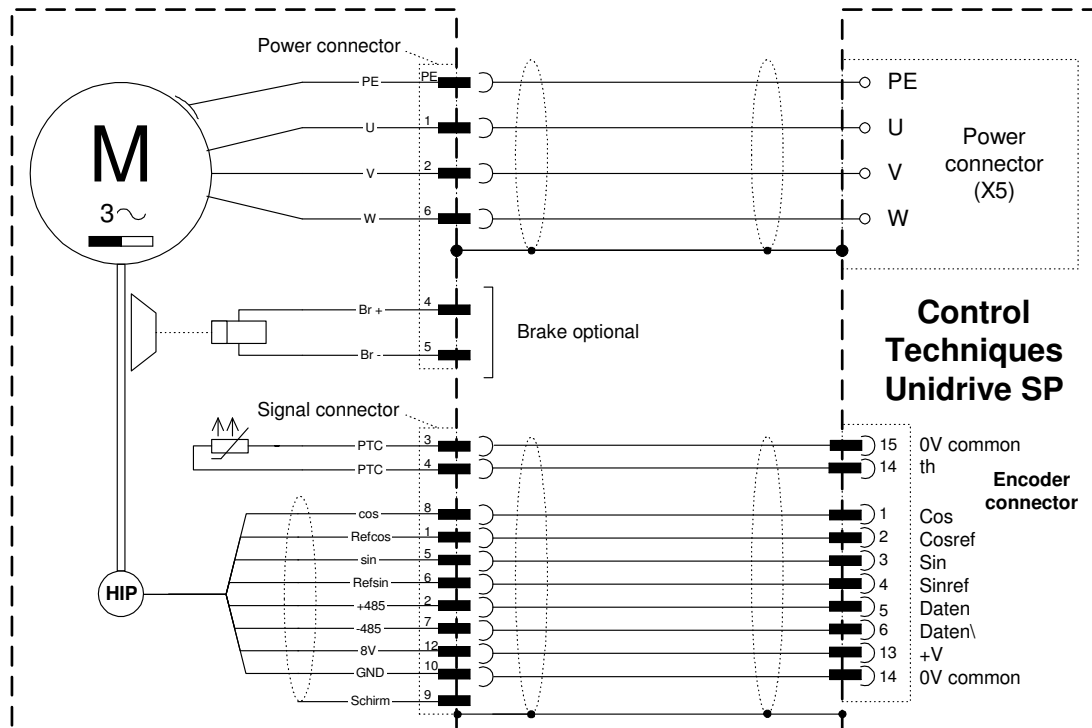
6.2 TPM+ with absolute encoder Heidenhain EnDat ECN1113 / EQN 1125

WITTENSTEIN motion control offers pre-manufactured and drag chain compatible cablesets for this servo drive. Please take the required order informations from the TPM+ catalogue.



6.3 TPM+ with absolute encoder Stegmann SKS 36 / SKM 36

WITTENSTEIN motion control offers pre-manufactured and drag chain compatible cables for this servo drive. Please take the required order informations from the TPM+ catalogue.





motion control

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