

Servostar Setup with Profibus

Hints to the manual refer to "PROFIBUS S300/S400/S600/S700 Communication Profile" edition 12/2010. Addressing through Profibus is the same for all drives of the S300, S400, S600 and S700 series. In the following text "servo drive" does always mean these drives. Before the drive is run with the Profibus, it should be configured according to the application and tested with the PC setup software. To do that you may need to disable the watchdog by setting the parameter EXTWD = 0 (s. chap. 2.2.2). To start the Servostar via Profibus please follow these steps.

Null Telegram

At the beginning of the communication via the parameter channel and in case of a communication error a null telegram should be sent:

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8
PKE	IND	PWE	
0000	0000	0000	0000

The servo drive will answer by also setting the first 8 bytes of the telegram to zero.

Set Operation Mode

After power up the servo drive will always be in the so-called safe operation mode –126, no matter which operation mode has been set with the setup software. To operate the drive, the PNU 930 must be set to the required operation mode using the parameter channel. The example shows how to set operation mode 2, Positioning.

Task ID (AK) = 3; PNU 930 = 0x3A2, Parameter Value (PWE) = 2

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8
PKE	IND	PWE	
33A2	0000	0000	0002

In case of successful writing the servo drive will answer with Response ID (AK) 2 and show the parameter number as well as the parameter value:

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8
PKE	IND	PWE	
23A2	0000	0000	0002

In case of AK = 7 (PKE = 0x73A2) PWE will show an error number. The meaning of this number can be found in the manual (ch. 3.1.1.2). One reason for an error may be that no null telegram had been sent before.

Up to here the parameter channel has been used (bytes 1 – 8). The following steps will be done via the process data channel. The parameter channel can be set to zero to be ready for the next read or write access.

Enable Servo Drive

Now the internal state machine can be switched to "Operation Enabled" using the control word (STW). This will enable the drive.

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8	Byte 9, 10
PKE	IND	PWE		PZD 1
				STW
0000	0000	0000	0000	043F

If the hardware enable signal is switched on, the motor will get current now. Because bit 10 of the STW (PZD enable) is set, actual position and speed values should be sent from the Servostar. This can be seen looking onto the Profibus page of the set up software. HIW and PZD4 in the line Input should change.

Jog Mode

Before a reference move has been executed, the motor can only be moved in jog mode. To do this bit 8 of the STW must be set additionally and a speed setpoint must be written to PZD 2 (Main Setpoint HSW). In the example it is 10000 (2710hex).

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8	Byte 9, 10	Byte 11, 12
PKE	IND	PWE		PZD 1	PZD 2
				STW	HSW
0000	0000	0000	0000	053F	2710

The the motor speed results from this value multiplied with the adjustable multiplier PNU 1894 (ASCII parameter VMUL). The default value of this parameter is 1. The resolution set with the PC setup software is taken into account (ASCII parameters PGEARI, PGEARO). The sign of the speed determines the move direction.

Reference Move

The mode and the direction of the reference move can be set with the PC setup software or with the PNUs 1773 and 1644 (s. chap. 4.2.6). In the STW the reference (home) bit must be set in addition, and a speed setpoint must be written into the HSW (PZD 2). The speed at the motor results from this value multiplied with the adjustable multiplier PNU 1894. The default value of this parameter is 1. The resolution set with the PC setup software is taken into account (ASCII parameters PGEARI, PGEARO). For the reference move the sign of the speed does not matter.

Byte 1, 2	Byte 3, 4	Byte 5, 6	Byte 7, 8	Byte 9, 10	Byte 11, 12
PKE	IND	PWE		PZD 1	PZD 2
				STW	HSW
0000	0000	0000	0000	0C3F	2710

The drive will show the start of the reference move with the bit "Motion Task active", bit 0 of PZD 5. (Bits 16 – 31 of the manufacturer specific status are transferred here.) The answer may look as follows:

Byte 9, 10	Byte 11, 12	Byte 13, 14	Byte 15, 16	Byte 17, 18	Byte 19, 20
PZD1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6
ZSW	HIW			manufacturer specific status	
02A7	xxxx	xxxx	xxxx	4401	0000

When the reference move is finished, the bit „Motion Task active“ will be reset and – assumed the in position window has been set to a reasonable value – bit 3 of PZD5, "In Position", is set. Attention! The bit "Reference Point set" is active once the drive internally knows its reference position. At this time the motor may still be moving. After the reference move has been finished, you may e.g. see PZD5 = 5406h.

Start a Direct Motion Task

For a direct motion task bit 14 in the STW (PZD1) must be set. The motion task type is choosen according to the manual chapter 4.2.5.3 and the setpoints transferred as described in chap. 5.2.1. In this example the drive will go to the absolute position of 440000 µm with a speed of 50000 µm/s.

Byte 9, 10	Byte 11, 12	Byte 13, 14	Byte 15, 16	Byte 17, 18	Byte 19, 20
PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6
STW	Vsoll	position setpoint			motion task type
447F	0000	C350	0006	B6C0	2000

Every edge of bit 6 in the STW will start a motion task. Start and end of the motion task will be notified by the bits "Motion Task active" and "In Position" as described for the reference move.