



S701x2...S724x2 (STO dual channel)

## Quickstart Guide

Version 12.2014



Keep all manuals as a product component during the life span of the product. Pass all manuals to future users/owners of the product.

**KOLLMORGEN**

## Preparation

The CD-ROM delivered with the servo amplifier contains all the manuals in PDF format and the setup software. Insert the CD-ROM into your PC.

**Autostart function activated:** A window with the start screen opens.

**Autostart function deactivated:** Click START (task bar), then on Run. Enter x:\index.htm or x:\autorun.exe (x = CD drive letter). Click OK. The start screen opens.

## Documents

You need Acrobat Reader to read the PDFs, an installation link is on every screen of the product CD-ROM.

European CD-ROM: Select the language version on the start screen of the CD-ROM. Click "Servo Amplifiers" in the column "Technical Manuals". A table with links to all manuals appears.

North American CD-ROM: Click on any manual title automatically brings up the document.

You need access to these documents (located on the product CD-ROM, you can download the latest editions from our website):

- Instructions manual (Assembly, Installation, Setup)
- CANopen communication profile manual
- EtherCAT communication profile manual
- Accessories manual

Depending on the installed expansion card, you need one of these documents:

- Operating Manual Safety Expansion Card Sx
- PROFIBUS DP communication profile manual
- DeviceNet communication profile manual
- SERCOS communication profile manual

## Install Setup Software

European CD-ROM: On the start screen you find a link to the setup software:

***Install Setup Software S300/S700 Release \_\_. \_\_ Build \_\_***

Click it and follow the instructions from here.

North American CD-ROM: Click the product name, then select ***Install Software*** from the next screen. Follow the instructions from here.

## Mechanical and Electrical Installation of the Servo Amplifier

1. Unpack servo amplifier and accessories
2. Keep the instructions manual ready (print if necessary), check HW-Revision
3. **Observe safety instructions in the manuals**
4. Mount the servo amplifier as described in the instructions manual
5. Wire the servo amplifier as described in the instructions manual or apply the minimum wiring for drive test (see page 5)

The servo amplifiers must **only** be operated in a closed control cabinet, taking into account the ambient conditions defined in the Instructions Manual. Ventilation or cooling may be necessary to keep the temperature within the cabinet below 40°C.

- Servo amplifiers in the S7xx6 series (overvoltage category III acc. to EN 61800-5-1) can be supplied from 1-phase or 3-phase grounded (earthed) industrial supply networks (TN-system, TT-system with grounded neutral point, no more than 42kA symmetrical rated current at 110V<sub>-10%</sub> to 230V<sup>+10%</sup>).
- Servo amplifiers in the S7xx0 series (overvoltage category III acc. to EN 61800-5-1) can be supplied from 3-phase grounded (earthed) industrial supply networks (TN-system, TT-system with grounded neutral point, no more than 42kA symmetrical rated current at 208V<sub>-10%</sub>, 230V, 240V, 400V or 480V<sup>+10%</sup>).
- Periodic overvoltage between phases (L1, L2, L3) and the housing of the servo amplifier must not exceed 1000V crest. In accordance with IEC 61800, voltage spikes (< 50µs) between phases must not exceed 1000V. Voltage spikes (< 50µs) between a phase and the housing must not exceed 2000V.

## UL Markings

This servo amplifiers S7xx0 are listed under UL file number **E217428**.

This servo amplifiers S7xx6 are **not** listed under UL.

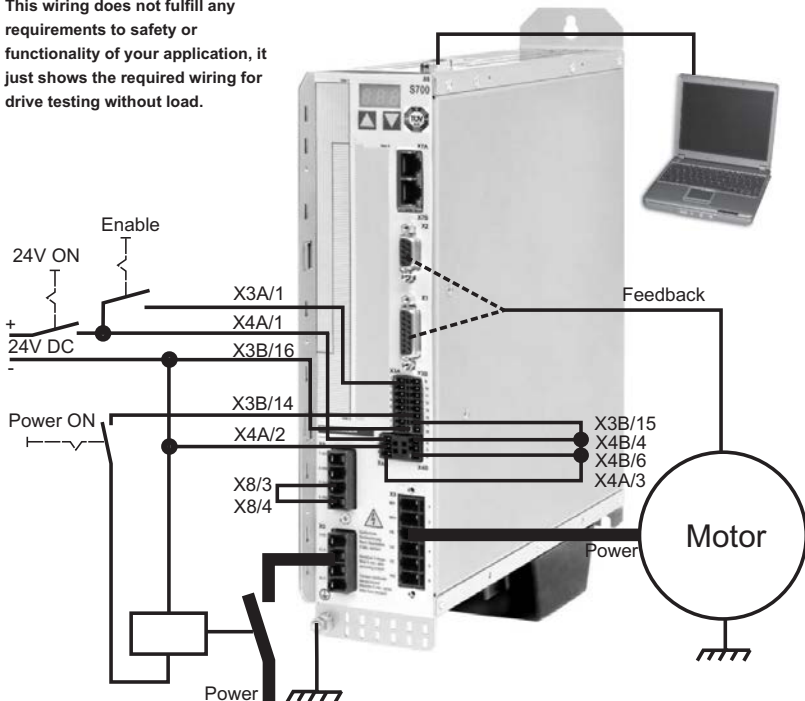
- Use 60°C or 75°C copper wire only for every model of this section.
- Use Class 1 wire only or equivalent.
- Tightening torque for field wiring terminals.  
X0, X8, X9: 0.7 - 0.8Nm
- Use in a pollution degree 2 environment.
- These devices provide solid state motor overload protection at 130% of full load current.
- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.
- These devices are not provided with motor over-temperature sensing.
- Suitable for use on a circuit capable of delivering not more than 42kA rms symmetrical amperes for a max. voltage of 480 Vac.
- For circuit protection see table below.

Model	Fuse class	Rating	Max. Fuse Rating
S7010	RK5, CC, J, T	600VAC 200kA	6A (Time-Delay)
S7030	RK5, CC, J, T	600VAC 200kA	6A (Time-Delay)
S7060	RK5, CC, J, T	600VAC 200kA	10A (Time-Delay)
S7120	RK5, CC, J, T	600VAC 200kA	15A (Time-Delay)
S7240	RK5, CC, J, T	600VAC 200kA	30A (Time-Delay)



- The drives may be connected together via the “common bus” (DC bus link) based on the instructions in the Instructions Manual. The devices may also be grouped from the AC input side based on the max. input fuse.



## Minimum Wiring for Drive Operation

This wiring does not fulfill any requirements to safety or functionality of your application, it just shows the required wiring for drive testing without load.



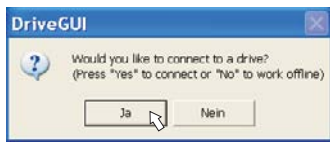
## Connect

- Connect the interface cable to a serial interface on your PC and to the serial interface X6 of the servo amplifier. USB to serial converter can be used optionally.
- Switch on the 24 V logic power supply for the servo amplifier.
- Wait about 30 seconds, until the front display of the servo amplifier displays the current rating (e.g.  for 3 amps). If the mains power supply voltage is switched on, too, a leading P is displayed (e.g.  for Power, 3 amps).

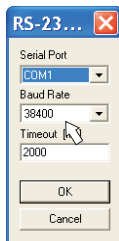
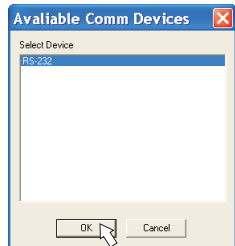
**If a fault code (  ) or a warning (  ) or a status message ( "." or "\_ " or "E" or "S" ) appears in the display, you will find the description and hints for trouble shooting in the instructions manual. If there is fault, fix the problem.**



Double-Click the DriveGUI.exe icon on your Windows desktop to start the software.



You can work offline or online with DriveGUI.exe.  
Work ONLINE now.



If the communication is started for the first time, you have to setup the communication parameters. Choose the communication system and the interface, where the servo amplifier is connected to. Click OK.

The software tries to communicate with the drive and to upload the parameters. If it's not successful, you receive this error message:



Frequent causes:

- wrong interface chosen
- wrong connector chosen at the servo amplifier
- interface is used by another software
- 24 V auxiliary voltage for the servo amplifier not working
- interface cable broken or wrong wiring

Click OK to remove the error message. The software starts in the offline mode now, that requires the manual selection of the amplifier's type. Quit this selection by closing the window.

Fix the communication problem. Restart the software in Online mode. If communication works, you see the start screen.




**Make sure, that the amplifier is disabled (Input Enable connector X3A pin 1 must be 0 V or open)!**

Select **"Setup Wizard"** in the navigation frame.

# Important Screen Elements


## Help Function


The Online-Help gives detailed information to all parameters the servo amplifier can work with.

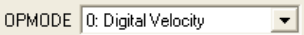
Key F1	Starts Online Help for the actual screen page.
Menu bar Help	Starts Online Help with the first page.
	Context Help. Click the help symbol first. Then click the function for which you need help.

## Tool Bar



	Save to EEPROM, required if you changed parameters.
--	--

	Reset, required if you changed important configuration parameters.
--	---

	Operation Mode, use Digital Velocity mode for drive testing.
--	--

## Status Bar



The status bar shows a green Online symbol, indicating that the communication works.



# Setup Wizard

The Setup Wizard leads you through the necessary steps for configuring your servo amplifier. Depending on the selected application, only the active screen pages are necessary.

## Welcome to the Drive Setup Wizard

This Setup Wizard will help you configure your drive. Start by choosing the type of set up from the list below: "Quick Motor/Drive Setup", "Analog Application Setup", "Gearing Application Setup", "Motion Task Application Setup" or "Complete Setup".

Click "Next" and "Previous" to move between screens, or move directly to any screen by clicking in the tree on the left. Click the "Refresh" toolbar button to bring back the original data for the screen currently showing.

When a new wizard page is opened, the current parameter values related to that page are reloaded from the drive.

Select Type of Setup Wizard

<p>Standard Servo Setups</p> <ul style="list-style-type: none"><li><input type="radio"/> Quick Motor/Drive Setup</li><li><input type="radio"/> Analog Application Setup</li><li><input type="radio"/> Gearing Application Setup</li><li><input type="radio"/> Motion Task Application Setup</li><li><input checked="" type="radio"/> Complete Setup</li></ul>	<p>Sensorless Setups</p> <ul style="list-style-type: none"><li><input type="radio"/> Induction Motor Setup (U/f Control)</li></ul>
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For a quick setup select the setup type "Quick Motor/Drive Setup".

**Start the Wizard.**

## Basic Setup

Power Supply

Regen Resistor

Internal    Value    0    Ohms

External    max. Regen Power    50    W

Mains Voltage

400    V

Response to Loss of Input Phase

Three-Phase (Current Limit), Warning n05

Amplifier

Hardware

Drive 12A

Firmware

V3.65 DRIVE Rev create.d Apr 07 16:01:56 2009

Serial Number    Run Time    Name

0    xxxx:xx    h    DRIVE0

Set Software-Enable on Bootup

Next

**Mains voltage:** Select the nominal mains AC voltage

**Response to Loss of Input Phase:** You can select either warning "n05" or error "F19" in case of phase loss. The setting "F19" disables the output stage, "n05" is just a message.

**Name:** You can enter a name for the servo amplifier (up to 8 characters). This simplifies the drive identification in the system.

**Set Software Enable on Bootup:** Don't select this option for the quick test.

Click **NEXT**.

# Units/Mechanical

User Units

Position  
µm

Velocity  
rpm

Acceleration  
ms->Speed Limit

Mechanical Conversion

Resolution = 10000 µm

1 Motor Revs

Calculate PGEARI / PGEARO for misc. application examples

< Previous    Next >

Calc. conversion factors for specific mechanics

Select Position Unit: µm

Load: 1 gm

Steering:  
 None  
 Tape  
 Teeth

Motor: Load

Calculate conversion factors and return    Cancel

The user units for all input fields in the setup software can be preselected here.

## Position, Velocity, Acceleration

Select usable units for your application referring to the moved load.

## Mechanical Conversion

The relationship between motor shaft revolution (pole pair pitch with linear motors) and motion distance of the load is specified here. Gear ratio can be calculated here as well. Detailed information can be found in the online help. Use the calculation tool based on sample applications for calculating the resolution value (press "**Calculate PGEARI/PGEARO...**" button). Select the application and enter the required values. Click "Calculate Conversion Factors..." button. Resolution is calculated now.

Click **NEXT**.

## Motor (rotary) / Feedback - linear motor see next page

Feedback			
Type			
0 Resolver - connector X2			
Motor			
Select from Database...	No.	Name	Continuous Current
	276	DBL3H00065	1.08 A
Type	Brake	Peak Current	
1: PM Rotary Motor	without	5 A	
		Maximum Speed	
		6000 rpm	
Calculated Quick Tuning			
Load-to-Motor Inertia Ratio	Desired Servo Performance		
0	<input type="radio"/> Gentle <input checked="" type="radio"/> Medium <input type="radio"/> Stiff <input type="radio"/> Do not tune		
< Previous		Next >	

Simplified setting of the motor related parameters.

**Feedback:** Select the feedback type used in the motor.

**Attention: Resolver is fixed to 2 pole in the Quick Motor/Drive Setup.**

Change "pole n" on feedback screen in Complete Setup later, if required.

**Motor type:** Click the button "**Select from Database...**". Open the database file (mdb\_...\_csv) and select the used motor. Special motors must be defined in the "Complete Setup".

**Brake:** If the amplifier shall control a brake, change the Brake parameter to "With"

**Calculated quick tuning:** If you know the load-to-motor inertia ratio (0 is for no load), enter this number here and select the desired servo performance. If you don't know the inertia ratio, select "Do not tune". **Click FINISH.**

## Motor (linear) / Feedback - rotary motor see previous page

Feedback

Type: 4 Sine Enc EnDAT - connector X1 Encoder Lines: 1000 Calculate

Motor

No.	Name	Continuous Current
21006	IL12-050A2	4.3 A

Type: 2 PM Linear Motor Brake: without

Peak Current: 14 A

Maximum Speed: 5330 rpm

Calculated Quick Tuning

Load to Motor Inertia Ratio: 0

Desired Servo Performance:  Gentle  Medium  Stiff  Do not tune

< Previous Finish >

Calculate ENCLINES for line...

Motor pole-pair pitch: 32000 µm

Encoder signal period: 0.1 µm/cycle

Cancel Calculate ENCLINES and Return

Simplified setting of the motor related parameters.

**Feedback:** Select the feedback system used.

**Motor type:** Click the button "**Select from Database...**". Open the database file (mdb\_...\_.csv) and select the used motor out of the list. Special motors must be defined in the "Complete Setup".

**Encoder Lines** (appears with Feedback Type Sine Encoder):

Click "Calculate" and fill in the Encoder signal period.

**Brake:** If the motor has a built-in brake, change the Brake parameter to "With"

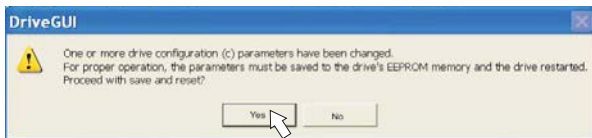
**Calculated quick tuning:** If you know the load-to-motor inertia ratio (0 is for no load), enter this number here and select the desired servo performance. If you don't know the inertia ratio, select "Do not tune". **Click FINISH.**

## Save Parameters and Restart

You are going to finish the Setup Wizard and you have changed several basic parameters. Depending on the parameters you changed, two possible reactions will occur now:


### Configuration parameters changed

A warning appears, that you have to restart the amplifier, this is called "coldstart".



Click "YES". The parameters are saved to the amplifier's EEPROM automatically and a reset command restarts the amplifier (takes a few seconds).





### Other parameters changed

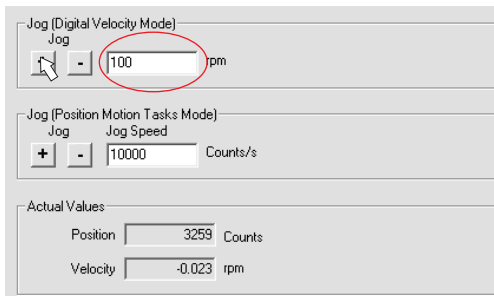
No warning appears. Save the parameters to the EEPROM of the servo amplifier manually by clicking the symbol  in the tool bar. A coldstart of the amplifier is not necessary.

Select the screen "**Motion Service**" in the navigation frame.

## Motion Service (Jog Mode)

Be aware that the actual position of the load permits the subsequent moving operations. The axis could move to the hardware limit-switch or the mechanical stop. Make sure that a jerk or a fast acceleration of the load cannot cause any damage.

- Switch on the power supply for the drive.
- **STO1/2-Enable:** Apply +24 V to the inputs STO1/2-Enable [X4B/6 & X4A/3]
- **Hardware-Enable:** Apply +24 V to the input Enable [X3A/1]. If one STO-Enable is missed or the sequence was wrong, the front display shows  .
- **Software-Enable:** Click the symbol  in the tool bar. Now, the front display shows an E and the current rating (e.g.  for Enable, 3amps). Click the symbol  to switch off the output stage (disable).



Jog (Digital Velocity Mode)  
Jog   rpm

Jog (Position Motion Tasks Mode)  
Jog Jog Speed  
   Counts/s

Actual Values  
Position  Counts  
Velocity  rpm

### Jog (Digital Velocity Mode):

You can move the drive with constant speed. Enter a safe speed.

**Observe the "safe reduced speed" requirements for your application!**

The drive moves with the preset speed when the + or – button is pressed. It stops when the button is released.

Actual errors and warnings are listed on the screen **Status**. A description of errors/warnings can be found in the online help.

Now you have setup and tested the basic functions of the drive successfully.

**Technical changes which improve the performance of the equipment may be made without prior notice!**

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