

SYSDA02.1
Commissioning Aid for digital, intelligent
AC Drives with SERCOS interface
Applications

DOK-SUPPL*-SYSDA02.1**-AW01-EN-P • 07.99



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1 General Informations

1.1 Introduction

The commissioning aid for certified drives with SERCOS interface is used in particular with initial startups and when servicing.

The comfortable user interface, SercTop, offers parameter administration, diagnoses and a simple test operation mode independent of a control unit.

The equipment is suited for such tasks as single drives or complete drive packages, whereby the number of drives in the SERCOS ring is limited to 8 participants. The drives in the ring are individually set into operation; only one axis can be run.

Operating with SYSDA requires no special settings in the drive. For example, the same address settings are acceptable as used when operating with one control.

In addition to the general functions for parameter administration and service, the user interface also offers extensive commissioning. The user is guided step by step through parametrization up to a simple test run of the drives.

Parameter administration offers several possibilities for filling and the documentation of drive parameters. Thus, for example, all the parameters of all the drives in one ring can be compiled into one backup copy. The data secured in this fashion can now easily be transferred to a different drive package.

Back-up copies are stored as ASCII files. This data format permits processing any time thereafter with any editors and a simple output (monitor, printer) without having to call up the menu program.

Parameter files put together by the user (e.g., correction tables) can be imported without any additional work.

1.2 Components

Included in the delivery of the commissioning aid for certified drives with SERCOS interface are:

- 1 SercBox (SERCOS interface master) 200x110x45mm
- 1 plug-in power supply unit 100 - 240 V / 47 - 63 Hz
- 1 serial cable (l = 5m) to connect the SercBox to a PC
- 2 fibre-optics cable (l = 5m)
- 1 SercTop software
- this document

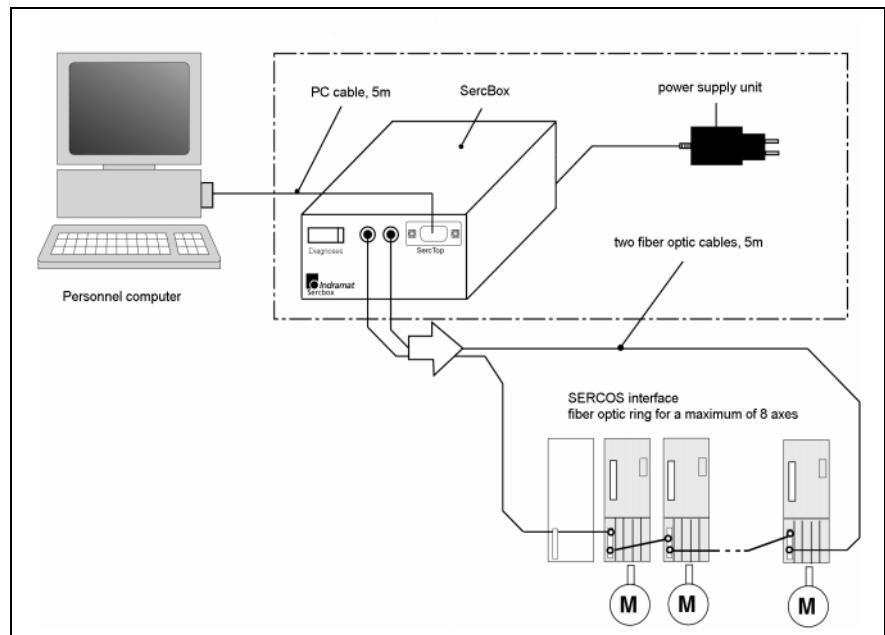


Fig. 1-1: Overview: commissioning aid for digital intelligent drives

The components are connected as illustrated.

The user of SYSDA02.1 does not need extensive knowledge of SERCOS interface specifications.

The SERCOS interface conform connection means that the modules works in all SERCOS interface applications.

2 Commissioning

2.1 Backing up parameters

To enable operations with all certified drives, the SercBox automatically initiates specific settings in the units. It is recommended, that the following parameters of all drives are secured or backed up, so that they can be loaded back into the drives once operation with the SercBox has been successfully completed.

S-0-0001	NC cycle time (Tncyc)
S-0-0002	SERCOS cycle time (Tscyc)
S-0-0006	AT transmission starting time (T1)
S-0-0089	MDT transmission starting time (T2)
S-0-0008	Command valid time (T3)
S-0-0007	Feedback acquisition starting time (T4)
S-0-0009	Beginning address in master data telegram
S-0-0010	Length of master data telegram
S-0-0015	Telegram type
S-0-0032	Main operating mode
S-0-0024	Configuration list of master data telegram
S-0-0016	Configuration list of drive telegram

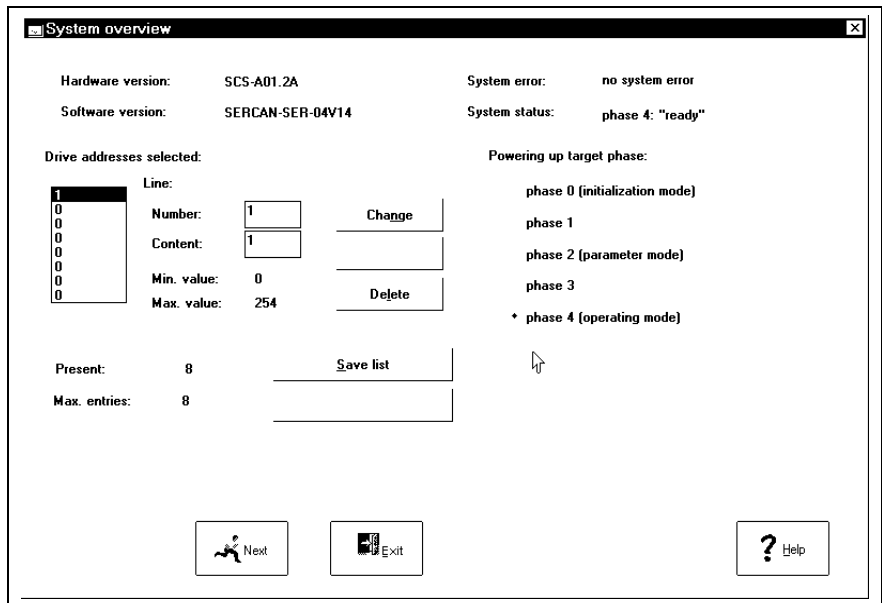
2.2 First Steps

The goal of this commissioning is to bring the SercBox with a SERCOS drive into SERCOS phase 4.

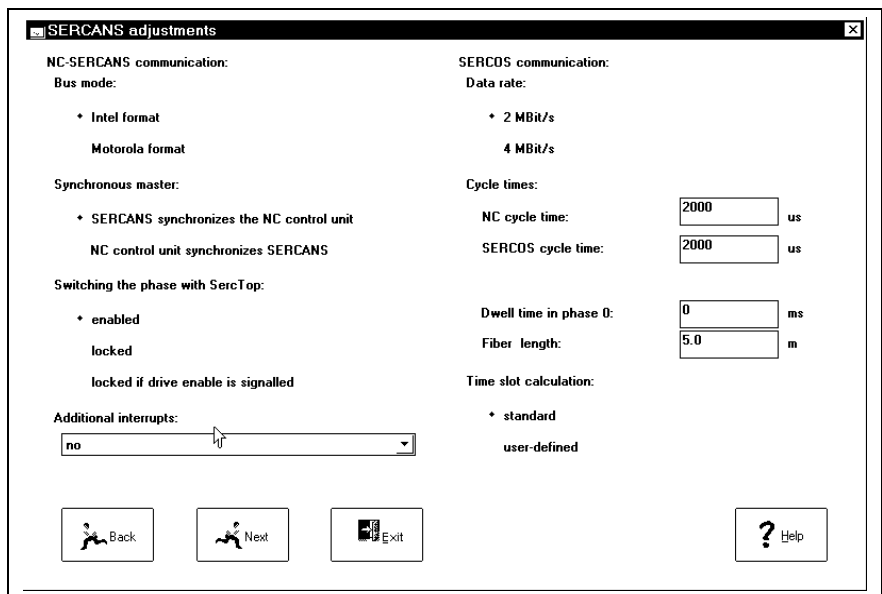
The following steps must be completed to startup:

- Install SercTop as described in section 3.3 "Installing SercTop".
- Establish connection with serial cable between SercBox (connector code: SercTop) and your PC (connector COM1/2).
- The two fibre-optics cables must be connected from the SercBox connection RxD/TxD to the drive connection RxD/TxD.
- Prepare the drive for the operation with a data rate of 2MBit. Switch the SERCOS participant address of the drive to one.
- Switch drive on.
- Switch SercBox on (the supplied plug-in power supply unit has a voltage range of 100 - 240 V).
- Start SercTop.

Call up "system overview" under "Parameter -> System basic configuration" and make the following settings:



With "next" move into the next window.



With "next" move into the next window.

Axis structure 1 - drive address 1, Achse 1

Telegram type

• Priority telegram 0

Configured telegram

Configured data in Master-Data-1 telegram:

IDN	Name
-----	------

Command value configuration:

IDN	Name
-----	------

Back Next Exit Help

Under "Parameter" select "individual parameter".

The following parameters must be set to zero:

"Lifecounter difference", Y-0-0018

"Command value generator enable", Y-0-0044

Select "Extras" under "operating mode".

SercBox commissioning is now completed.

3 SercTop: User Interface for SYSDA02.1

3.1 General Information about SercTop

SercTop is the comfortable user interface on SYSDA and SERCOS drives which can be run with MS-Windows. SercTop offers the following functions from version 04VRS:

- Parametrization and commissioning of any machine that meets the international standard IEC 61491 of SERCOS interface.
- A highly directed commissioning of the settings on the SercBox.
- The SERCOS functions are easy to hand, e.g., phase changeovers, cyclical configurations and initial program loading.
- Function specific commissioning of drives belonging to drive firmware FWA-DIAX03-ELS-04VRS-MS, FWA-DIAX03-ELS-05VRS-MS, FWA-DIAX04-ELS-05VRS-MS, FWA-DIAX03-SSE-01VRS-MS, FWA-DIAX03-SSE-02VRS-MS, FWA-DIAX04-SSE-02VRS-MS, FWA-DIAX03-SHS-02VRS-MS, FWA-DIAX04-SHS-02VRS-MS, and FWA-ECODRV-SSE-02VRS-MS, FWA-ECODRV-SSE-03VRS-MS, FWA-ECODR2-SSE-03VRS-MS,
- Selected parameter blocks can be loaded and stored.
- There are various diagnostics.
- A context sensitive help system (Ctrl-F1) in connection with the help system drive firmware of INDRAMAT and the help system SercBox.
- Dialogues for oscilloscope functions with time and frequency diagram.
- Dialogues for command value generator.

3.2 System Prerequisites

SercTop can be run with Windows 3.1, Windows 95 and Windows NT but requires the following hardware:

- at least 80486 processor
- a main memory of at least 8MB
- at least 7MB of available hard drive memory
- one available RS232 interface

3.3 Installing SercTop

Software Installation of SercTop

SercTop is supplied on 3,5" disks. (DOS format; 1,44MB)

Note: Prior to installation, please make a backup copy of the SercTop disc. Install the software using this backup copy of the SercTop disc. Install the software using this backup copy. Keep the original disk in a safe place! To install the program on your PC, it is necessary to use the installation program on the disk.

Please follow the steps below to install SercTop:

- Read this documentation in its entirety.
- Switch PC on and start Windows.
- Insert SercTop disk 1 in disk drive.
- In menu "file" select command "execute...".

Note: If SercTop is to be installed on a PC which already has an older version of it, then this version will be retained. The directory suggested by the installation program will be list the version number as well as the icon of the program group. If an older version is to be removed from the hard drive, then simply erase the directy in which the relevant "SercTop.exe" is located as well as the icon in the program group.

- In input field "command line enter:" A:\ SETUP (if SercTop disk is in drive A:).
- Now follow the instruction of the installation program.

Once installation is complete, the new SERCANS program group should be on your PC. The SercTop program symbol should be in this group.

Connecting the PC to the SercBox

A connecting cable, SYSDA02.1, is needed for the data exchange between the SercBox and the PC (included in delivery).

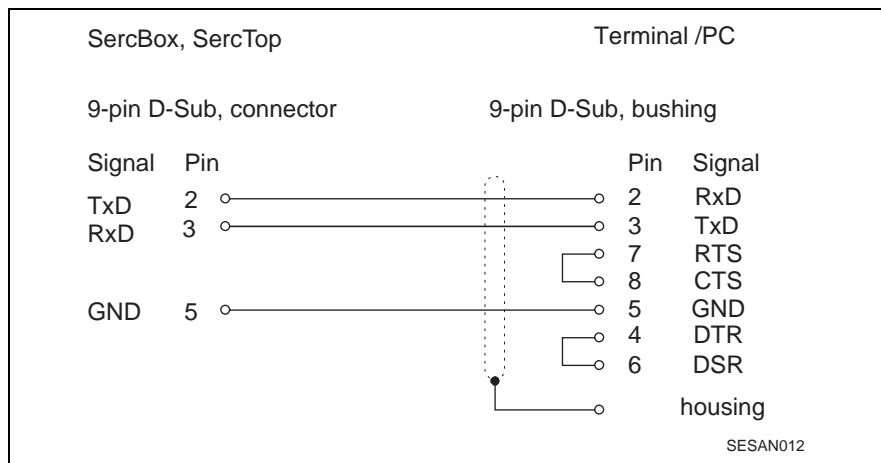


Fig. 3-1: Allocation of the connectors

Start SercTop

Prerequisites:

SercTop has been installed successfully, SercBox is on and connected to the PC via a serial cable.

Start SercTop in the SERCANS group in the program manager.

SercTop is started and attempts to establish a connecting structure with the SercBox.

3.4 Functions

Menu File

The submenus "load" and "store" are listed in the menu "file".

Submenu Load

Parameters can be loaded out of a file into the drives of the SercBox.

Submenu Save

The S/P parameters in the drives and the Y parameters of the SercBox are stored in a file.

Menu Parameter

The dialog windows, run through during commissioning, are in the menu parameters as well as the dialog windows for individual parameters and the list of all S, P and Y parameters.

List of all S, P and Y Parameters

The S/P parameters of the selected drive are listed by name, operating data and unit. The user can sort per ident number or alphabetically, can search per ident number or text and change parameters.

List of all invalid Parameters

The invalid parameters of the SercBox or the selected drive are listed by name, operating data and unit. The user can sort alphabetically or numerically or search for texts and change parameters.

Individual Parameters

A parameter of a selected drive address is listed by name, operating data, minimum and maximum value and unit. The user can sort per ident number or alphabetically, search per ident number or text and change ident number.

Menu Commissioning

The menu items SercBox basic configuration or parameter fixing are located in the menu commissioning. If these are called up, then the user must run through a series of dialog windows for the parametrization of axis overlapping Y parameters or axis parameters (Y, S or P parameters).

Menu View

In menu view the diagnostic screen displayed in the background is switched from installation status, drive status of a drive within a selected installation status and a parameter group that the user can configure.

Menu Extras

This entails menu items on phase changeovers, viz., parametrization mode, operating mode, phase changeovers and menu item diagnosis with the submenus of the internal inputs and outputs as well as dialog windows for additional diagnosis and startup tools, for e.g., "analog outputs", "command value box", "oscilloscope".

Menu Options

Such menu items as connections, for switching online to offline, language, for switching between German, English and Japanese and for switching to Japanese codes, are located here.

Menu Help

When bringing down the submenus, all drive firmware helps and SercBox installed are displayed. The user can reconfigure, using submenu "settings", the allocation of the helps to the drive firmwares as needed.

Menu Right Mouse Key

The right mouse key (Shift-F10) can open a local menu at any point in SercTop making some help functions available (phase transitions, drive help, dialog (single parameter). If the current cursor position is on a display element of a parameter (e.g., input field), then additional info on the parameter can be accessed and it can be accepted into a list in menu "parameter group accepted".

4 SercBox

4.1 SERCOS interface

SercBox is a SERCOS interface master that can support up to a **maximum of eight drives**. Both the communication cycle times and the data rates can be set via the system parameter "SERCOS cycle time" and "data rate".

The SERCON410B assembly assumes the processing of SERCOS interface communications.

As the assembly can only support the standard functions of SERCOS interface functions it is possible to connect SERCOS compatible slaves (I/O stations and drives).

4.2 Cycle Times

SercBox makes SERCOS cycle times of 0,5 ms, 0,75 ms, 1 ms, through 32 ms in increments of 0,25 ms. The following table supplies data about SERCOS cycle times, data rates and the number of drives in a ring.

Data rate in ring	4 drives in ring	8 drives in ring
2 Mbit/s	1 ms	2 ms
4 Mbit/s	0,5 ms	1 ms

Tab. 4-1: Cycle times

4.3 Diagnoses and Error Display

A display module (M1) is on the SercBox. It is made up of a 7-segment display and a red LED.

The definition of the errors displayed is defined in section 6.

4.4 Communication Phases SercBox

Communication Phase 0

Close fiber optic ring: "system status" = 0x0000

SercBox attempts to close the fiber optic ring.

- "system status" = 0xE008: fiber optic ring not closed.
- "system status" = 0xE001: fiber optic ring closed.

If the fiber optic ring is closed, then the SercBox switches into communication phase 1.

Communication Phase 1

Drive identification: "system status" = 0xE002

All drives with addresses in the system parameter "list of drive addresses" (Y-0-0012) are queried.

If all programmed drive addresses in the ring are present, then "system status" is set to 0xE003 and SercBox switches into communications phase 2.

If SercBox detects a difference between the programmed drive addresses and those addresses on the ring, then the relevant axis structure of the diagnostic status is set to 0x8005 (see display "A", Definition of Error Messages, Section 6.3).

Communication Phase 2

Parameterization mode: "system status" = 0xE003

In phase 2 SercBox permits the transmission of parameters via the user interface. If the control or the user interface generates the transition of phases 2 and 3, then SercBox conducts the following operations:

- In addition, during phase 2, the operating mode and the scaling parameters must be set in the drives for the relevant application by the user interface.

This involves the following ident numbers:

operating modes:	S-0-0032, S-0-0033, S-0-0034, S-0-0035
position scaling:	S-0-0076, S-0-0077, S-0-0078, S-0-0079
velocity scaling:	S-0-0044, S-0-0045, S-0-0046
torque scaling:	S-0-0086, S-0-0093, S-0-0094
accel scaling:	S-0-0160, S-0-0161, S-0-0162
polarity parameters:	S-0-0055, S-0-0043, S-0-0085

Note: See drive handbook for instructions on programming these parameters!

- All necessary data (identification numbers) are copied from all drives to calculate the time slot:

S-0-0003	t1min
S-0-0004	tATMT
S-0-0005	t5
S-0-0087	tATAT
S-0-0088	tMTSY
S-0-0090	tMTSG
S-0-0096	SLKN

- Both command value and actual value configuration lists are checked.
- SercBox calculates the time slot.

- The calculated communication parameters are transmitted to the drive.
S-0-0006 t1
S-0-0089 t2
S-0-0008 t3
S-0-0007 t4
S-0-0001 tNcyc
S-0-0002 tScyc
- SercBox transmits the parameters for the telegram structure to the drives (S-0-0009, S-0-0010, S-0-0015, S-0-0016, S-0-0024).
- The command "reset class 1 diagnostics" (S-0-0099) is transmitted to the drives.
- The changeover command (S-0-0127) is transmitted to the drives.

If SercBox was able to switch into communication phase 3, then system status is set to 0xE004.

If changeover phase 2 -> 3 was not possible, then the diagnostics status is set to 0xD002 (see display "E", Definition of Error Messages, Section 6.3).

Communication Phase 3

Parameterization mode: "system status" = 0xE004

In phase 3 SercBox permits the transmission of parameters via the NC-/MMI service channel or user interface. If the control or user interface generates the transition of phase 3 to phase 4, then SercBox conducts the following operations:

- Changeover command (S-0-0128) is transmitted to the drives.

If SercBox was able to switch into communication phase 4, then the system status is set to 0xE005.

If the changeover phase 3 -> 4 was not possible, then the diagnostics status is set to 0xD003 (see display "F", Definition of Error Messages Section 6.3).

Communication Phase 4

Operating mode: "system status" = 0xE005

In communication phase 4 command and actual values are valid.

5 Command Value Generator Functions

5.1 Introduction

The command value generator is an independent function in the SercBox. SercTop is needed as a user interface.

General

The command value generator is a general tool to initiate operation of the drive without the control unit but using the SERCOS interface.

The drive receives defined command values during the drive check with command value generator with the help of which the electrical and mechanical features of the system can be checked.

In addition, an optimum matching of the drive to a specific application is possible. With the help of the available command value it is, for example, possible to optimize the behavior of the drive by changing the loop parameters.

The command value generator is a test and optimization tool and should, therefore, only be used by trained personnel.



WARNING

Error in the drive control

can injury personnel and destroy mechanical parts.

⇒ It is forbidden to remain within the motional range of the machine.

Overview

In operating modes "velocity loop" and "position loop" the command value generator supports functions

- jogging,
- reversing,
- step mode.

In mode "torque loop" in drives with external measuring systems it is additionally possible to check

- the setting of encoder polarity.

The next section outlines the automatic encoder polarity check in mode "torque loop".

The subsequent section describes the functions in mode "velocity loop". This is followed by an explanation of the functionalities of the command value generator in mode "position loop". The drive-internal position command value interpolation is used for mode "position loop".

Note: Mode position loop can only be used in drives with internal position command value interpolation.

The movement of the drives are not only effected by the command value generator functions but also the marginal conditions and drive-internal functions.

Limit values The limit values set in the drive for the operating variables

- current
- torque or force
- velocity

are always monitored (see application description of the drives).

Monitoring position limit values The monitor of the position limit values which have been set drives with an absolute position measurement must be separately activated (see S-0-0055, bit 4, position polarity). If these limit values are exceeded, then the drive is braked.

Drive firmware If special drive firmware is used, then additional variables can play a role. These are explained, however, at the relevant point in the text.

The command value generator is set by the SercBox using parameters relevant to its function. It is activated in the SercBox user interface "SercTop" in the window of the command value box.

5.2 Command Value Generator Torque Control

Checking Encoder Polarity

General The first startup of drives with external measuring systems (e.g., linear drives) necessitates a checking of the polarity of the measuring system and eventually inverting it. The polarity can be inverted for the following reasons:

- encoder system is mounted side-inverted
- stator is mounted inverted
- bit 3 of parameter "position feedback 1 type parameter" (S-0-0277) has been incorrectly programmed.

Function Encoder polarity can only be checked in mode "torque loop".
To do so, the drive force is increased ramp-like to the value set in parameter "bipolar torque/force limit value" (S-0-0092). The sign of the drive's force is set via bit 4 in parameter "command value generator control word" (Y-0-0053).

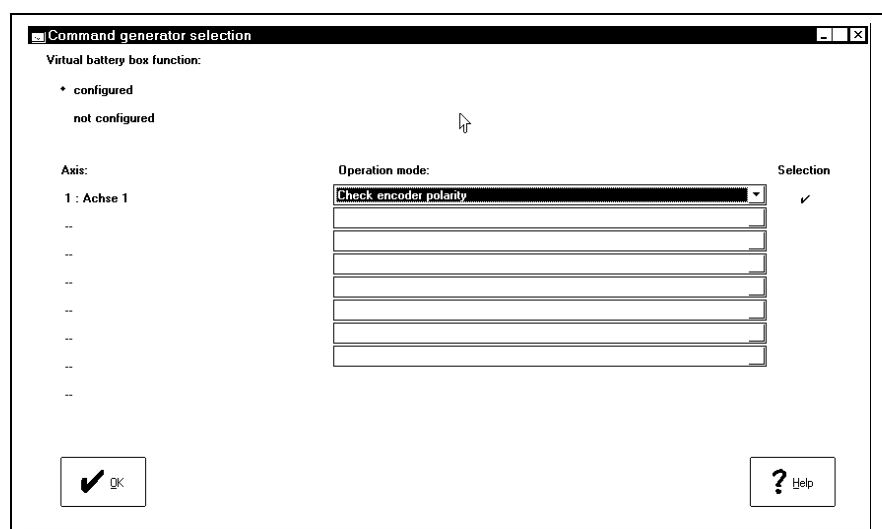
The command value generator sets the polarity of the external measuring system if the actual velocity value leaves the velocity window. Drive force is simultaneously set to zero. The velocity window is automatically determined by the command value generator.

If the velocity of positive (negative) force command exceeds positive (negative) limit of the velocity window, then the polarity has been correctly set. In the opposite case the polarity has been incorrectly set.

If maximum drive force is reached and the actual velocity value is still in the window, then the error message "max. torque reached" is generated. The drive is then brought to a standstill.

Activation To start the function, it is necessary to execute the following:

- Call up menu item "virtual battery box selection" under "Extras → virtual battery box" and make the following settings.



- Then select menu item "virtual battery box adjustments" under "Extras → virtual battery box". To start the check it is necessary to set the drive enable and the command value generator must also be started.

5.3 Command Value Generator Velocity Control

Jogging

Function Jogging an axis is only possible in "velocity control".

The drive, in this case, is given the jog velocity in steps ("command value generator jogging velocity translatory", Y-0-0058 or "command value generator jogging velocity rotary", Y-0-0063) as a command value. The motional direction is set in parameter "command value generator control word" (Y-0-0053).

The following illustrates the resulting velocity command in terms of the activation of the jogging key.

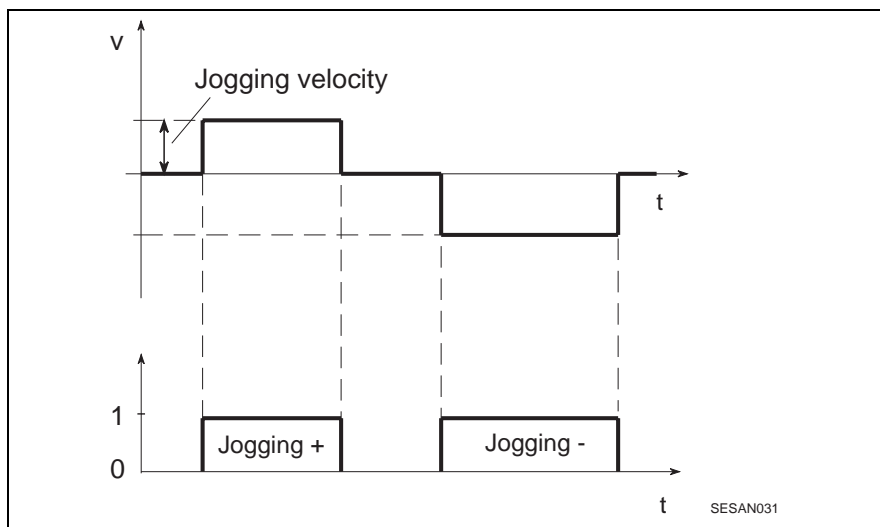
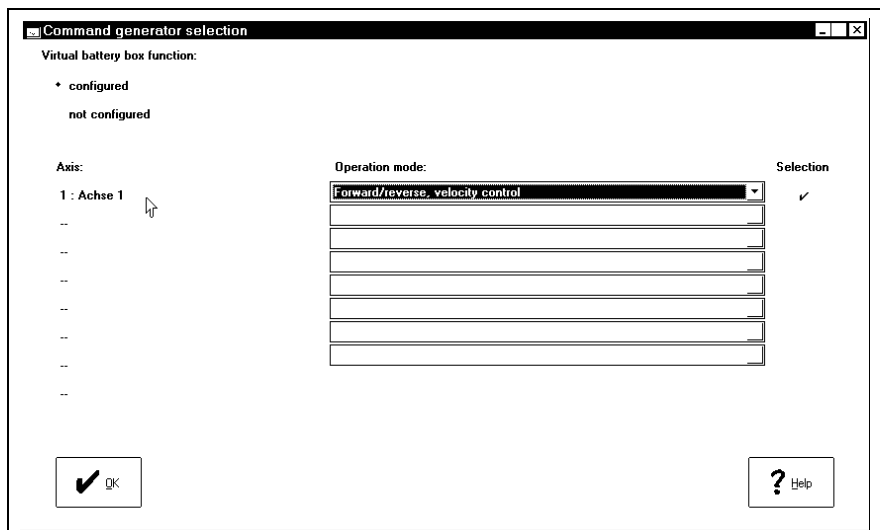


Fig. 5-1: Jogging in velocity control

- Activation**
- Call up menu item "virtual battery box selection" under "Extras → virtual battery box" and make the following settings.



- Then select menu item "virtual battery box adjustments" under "Extras → virtual battery box". To start the check it is necessary to set the drive enable and the command value generator must also be started.

Jogging the axis is only possible as long as the drive enable is activated. If it is cleared, then the drive is shut down.

Reversing (Velocity Control)

Function When reversing in mode "velocity control" the drive moves, for example, with the velocity profile depicted below. The velocity command value is entered in steps. The command value generator brakes the drive once the actual position value has reached positions x_1 or x_2 . After dwell time (Y-0-0057) the motional direction is reversed.

The resulting position deviation depends on the velocity set.

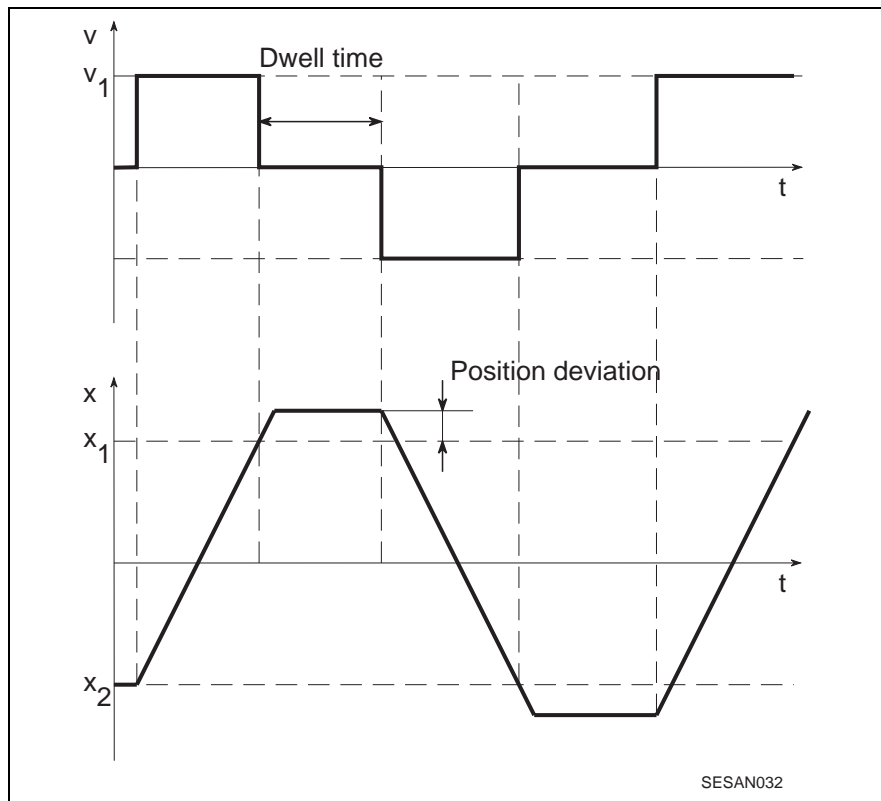


Fig. 5-2: Reversing with velocity control

Activation Run activation as described in "jogging".

Reversing the axis is only possible as long the drive enable is activated. If it is removed, then the drive brakes.

Step Mode (Velocity Control)

Note: This function is only possible with axes with modulo format. The axes move approximately around the specified travel path Δx !

Relative motion The present position conducts a relative motion around the travel path Δx . The direction is set by the sign of Δx .

Function During step mode, "velocity control" moves the drive, for example, as illustrated below. The velocity command value is set in steps. The command value generator brakes the drive after reaching the relative position Δx . After dwell time (Y-0-0057), the motion is continued in the same direction.

The resulting position deviation depends on the velocity set.

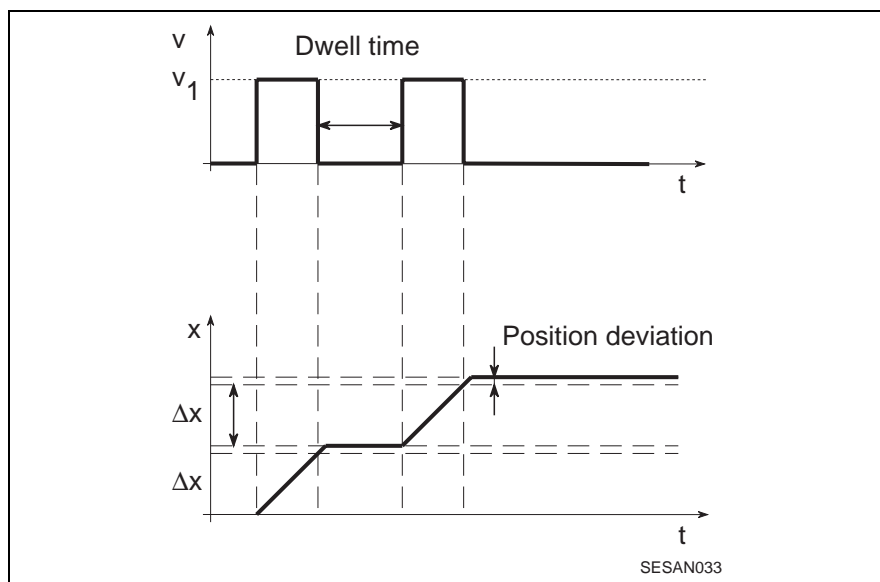


Fig. 5-3: Step mode with velocity control

Activation Execute activation with relevant operating mode as described in "jogging".

Step mode is only possible if the drive enable is activated. If it is removed, then the drive is braked.

5.4 Command Value Generator Position Control

Reversing (Position Control)

Note: Reverse mode can only be used with drives with internal position command interpolation.

Function When reversing in "position control" mode the drive moves as illustrated below.

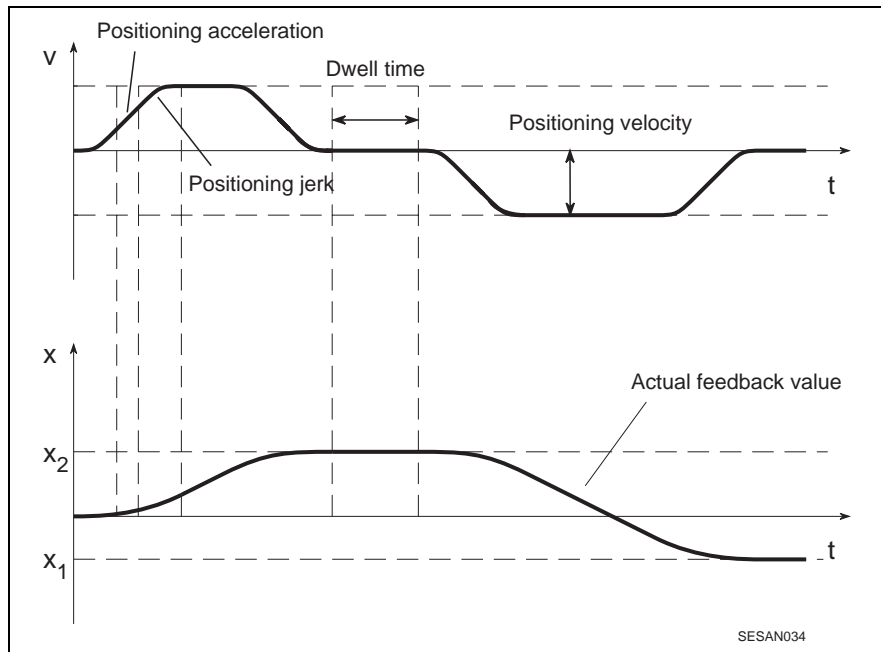


Fig. 5-4: Reversing with position control

The drive reverses between positions x_1 and x_2 .

Starting with the present position, the drive accelerates to "positioning velocity translatory" (Y-0-0069) or "positioning velocity rotary" (Y-0-0070). The rise in velocity depends on "positioning acceleration" (S-0-0260) and "positioning jerk" (S-0-0193).

The drive assumes positions x_1 or x_2 precisely.

Motional direction is reversed after dwell time (Y-0-0057).

Activation Execute activation with relevant operating mode as described in "jogging".

Reversing is only possible as long as drive enable is activated. If removed, the drive is braked.

Step Mode (Position Control)

Note: Step mode can only be used with drives with internal position command value interpolation.

Relative Motion Starting with the present position, a relative motion is being conducted around travel path Δx . The direction is specified by the sign of Δx .

Function Step mode in "position control" mode results, for example, in the following motion:

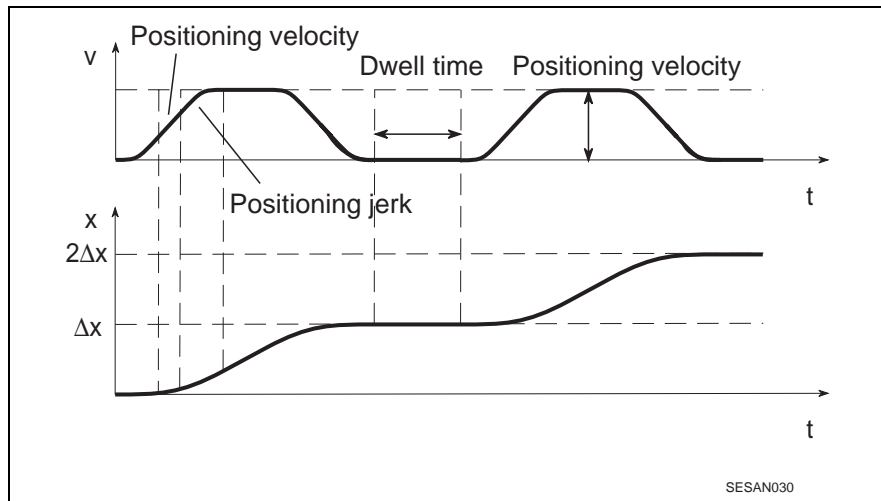


Fig. 5-5: Step mode with position control

First, there is acceleration starting from the present position whilst taking into account "positioning acceleration" (S-0-0260) and "positioning jerk" (S-0-0193) to "positioning velocity translatory" (Y-0-0069) or "positioning velocity rotary" (Y-0-0070).

The drive runs precisely to position Δx .

The procedure is repeated after dwell time (Y-0-0057).

Activation Execute activation with relevant operating mode as described in "jogging".

Step mode is only possible if the drive enable is activated. If it is removed, then the drive is braked.

5.5 Noise Generator

General When starting up a machine axis it is not always possible to use the jump response of the velocity or position control loop to determine the system's frequency. In such cases, a noise generator can be used. It makes available a test signal without average available.

Function The noise generator makes a pseudostatistic binary signal available. Its amplitude accepts positive and negative values. The drive receives a new command value during each SERCOS cycle.

The amplitude of the output signal can be scaled for translatory axes via parameter "output amplitude noise generator translatory" (Y-0-0067) or for rotary axes via "output amplitude noise generator rotary" (Y-0-0068).

The output signal is generated repeatedly about every 0,5 minutes given a SERCOS cycle time of 2 ms. The repetition time t_W of the noise generator depends on "SERCOS cycle time" (Y-0-0004) and is computed as follows:

$$t_W = 2^8 \cdot t_{Syc}$$

The noise signal can be switches on in any command value generator mode and is added to the relevant command value. This takes place by activation in menu "virtual battery box".

Activation The noise generator can be activated as long as the command value generator has been started and the drive enable is set. If the drive enable is removed, then the noise generator is stopped.

6 Diagnostics and Error Messages

6.1 List of Diagnostics and Error Messages

Diagnoses on the 7 Segment Display

The following lists the diagnostics and fault messages of the 7 segment display:

M1	Error in phase	Reaction	Diagn. register	Description
7-Seg.				
			System status	Status message in system parameter "system status" (Y-0-0015)
0	0	none	0xE001	phase 0
0	0	none	0xE011	phase 0, phase changeover active
1	1	none	0xE002	phase 1
1	1	none	0xE012	phase 1, phase changeover active
2	2	none	0xE003	phase 2
2	2	none	0xE013	phase 2, phase changeover active
3	3	none	0xE004	phase 3
3	3	none	0xE014	phase 3, phase changeover active
b	4	none	0xE005	phase 4: "ready"
5.	0-4	phase 0	0xE006	test mode: zero bit stream
6.	0-4	phase 0	0xE007	test mode: continuous light
7	0	none	0xE008	fiber optic ring not closed
8.	-	-	0x0000	reset
			Diagn. Status	Error messages in diagnostics of the drives
C	3-4	phase 0	0x8007	double AT failure
d	2-4	phase 0	0x8006	NC/MMI service channel HS timeout
E	2	phase 2	0xD002	changeover: phase 2 -> 3 not possible
F	3	phase 3	0xD003	changeover: phase 3 -> 4 not possible
h	2-4	phase 2-4	0xD001	drive error (class 1 diagnostics, S-0-0011)
			System error	Error messages in system parameter "system error" (Y-0-0011)
A	1	phase 0	0x8005	drive address not correct
C	3-4	phase 0	0x8007	double AT failure
L	1-4	phase 0	0x8009	fiber optic ring disrupted
n	2	phase 0	0xF001	configuration error (command/actual value channel)
o	2	phase 0	0xF002	error in time slot calculation
r	0-4	phase 0	0xF004	SercBox: internal error
U	4	phase 0	0xF005	lifecounter error
u	2	phase 0	0xF006	copy times too long
y	0	phase 0	0xF007	check sum error (Y parameter)
c	2-4	phase 0	0xF008	input signal SYNCIN failed

Tab. 6-1: Diagnoses on the 7 segment display

6.2 Status Message Definitions

Display "0" : Phase 0 or phase 0, phase changeover active

SercBox sets communication phase 0.

Display "1" : Phase 1 or phase 1, phase changeover active

SercBox sets communication phase 1.

Display "2" : Phase 2 or phase 2, phase changeover active

SercBox sets communication phase 2.

Display "3" : Phase 3 or phase 3, phase changeover active

SercBox sets communication phase 3.

Display "b" : Phase 4 "ready to operate"

SercBox sets communication phase 4. Power can be switched on and the drives run.

Display "5." : Test mode: Zero bit stream

The test mode "zero bit stream" was selected.

Reaction from the SercBox

SercBox sends a zero bit stream and prevents phase runup.

Cause

Test mode activated via DIP switch SD1 switch 1.

Remedy

Switch DIP switch SD1 switch 1 off.

Display "6." : Test mode: Continuous light

Test mode "Continuous light" was selected.

Reaction from the SercBox

The SercBox sends continuous light and prevents phase runup.

Cause

Test mode activated via DIP switch SD1 switch 2.

Remedy

Switch DIP switch SD1 switch 2 off.

Display "7" : Fiber optic ring not closed

After a hardware reset from the SercBox the SERCOS ring was not closed. The SercBox cannot receive ten sequential MST telegrams of phase 0.

Reaction from the SercBox

The SercBox remains in state "fiber optic ring not closed" until the fiber optic ring is closed. It then conducts a runup itself into target phase (see parameter "phase initiation" Y-0-0014).

Cause

- Fiber optic cable transposed or not correctly screwed on.
- Fiber optic cable ring defective.
- Data rate of drives and the SercBox have different settings.
- The optical transmission power (for the SercBox see parameter Y-0-0016) of a participant on the SERCOS ring is set too low.
- Drive defective.

Remedy

- Check all fibre-optics cables.
- Check data rates,
SercBox: see parameter Y-0-0003,
Drive: see applications of drive manufacturer
- Optical transmission power of all participants on SERCOS ring must be adjusted to the actual length.

Display "8." : Reset

SercBox is in reset. Communications with SercTop not possible.

Reaction from the SercBox

-

Cause

- SercBox assembly defective.

Remedy

- Contact customer service.

6.3 Definition of Error Messages

Display "C" : Double AT failure

The SercBox did not receive two sequential drive telegrams (AT) from a drive.

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

- Fiber optic cable not correctly screwed on.
- Fiber optic cable defective.
- Drive defective.
- The optical transmission power (for the SercBox see parameter Y-0-0016) of a participant on the SERCOS ring is set too low.

Remedy

- Check all fibre-optics cables.
- Optical transmission power of all participants on SERCOS ring must be adjusted to the actual length.

Display "d" : NC/MMI service channel HS timeout

A drive has not toggled bit 0 in drive status (service transport handshake) with ten SERCOS cycles as a result of a query via the service channel.

Reaction from the SercBox

Phase regression in communications phase 0.

Cause

- Drive defective.

Remedy

- Replace drive.
- Contact Customer Service of the drive manufacturer.

Display "E" : Changeover: Phase2 ⇒3 not possible

The SercBox cannot progress from phase 2 to phase 3.

Reaction from the SercBox

The SercBox retains set changeover command and ends phase runup. The diagnosis of the relevant drive is written into the diagnostics channel.

Cause

At least one drive refuses to move into phase 3.

Remedy

Clear error in drive affected (see help guidelines from drive manufacturer).

Display "F" : Changeover: Phase 3⇒4 not possible

The SercBox cannot conduct phase changeover from phase 3 to phase 4.

Reaction from the SercBox

The SercBox retains the changeover command and ends phase runup. The diagnosis of the relevant drive is written into the diagnostics channel.

Cause

At least one drive refuses to move into phase 4.

Remedy

Clear error in drive affected (see help guidelines from drive manufacturer).

Display "h" : Drive error

A drive signals a drive error by setting the drive error bit in drive status for class 1 diagnostics.

Reaction from the SercBox

The diagnosis of the relevant drive is written into the diagnostics channel.

Cause

An error occurred in the drive.

Remedy

Evaluate parameter "class 1 diagnostics" (S-0-0011), "diagnostic message" S-0-0095 and "diagnostic message number" (S-0-0390) and then eliminate the cause of the problem.

Clear error.

Display "A" : Drive addresses not correct

The phase progression out of phase 0 cannot be executed because the drive addresses entered in parameter "drive address list" (Y-0-0012) could not be found in the ring.

Reaction from the SercBox

Phase regression into communications phase 0.

Cause

- At least one drive address has been entered in Y-0-0012 which could not be found in the ring.
- After the SercBox detected that the fiber optic ring was closed, it was interrupted in phase 1 again.

Remedy

- Check drive addresses. It is allowed to have drive addresses in the ring that are not entered in parameter "drive address list" (Y-0-0012).
- Check the fiber optic ring.
- Check data rates,
SercBox: see parameter Y-0-0003,
Drive: see application description of the drive manufacturer.

Display "L" : Fiber optic ring interrupted

The fiber optic ring was interrupted after it was recognized that it was closed.

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

- Fiber optic ring defective.
- Data rate of drive and the SercBox have been set differently.
- The optical transmission power (for the SercBox see parameter Y-0-0016) of a user on the SERCOS ring is set too low.
- Drive defective.

Remedy

- Check all fiber optic cables.
- Check data rates,
SercBox: see parameter Y-0-0003,
Drives: see application description of drive manufacturer.
- Optical transmission power of all users on SERCOS ring must be adjusted to the actual length.

Display "n" : Configuration error (command/actual value channel)

An error occurred while configuring the cyclical telegram data with the entries from command/actual value channel.

Reaction from the SercBox

Phase regression to communications phase 0.

Cause

- Too many command or actual values have been configured.
- Bit 15 has been set in Y-0-0039 or Y-0-0040 and the length entered in low byte is too big.

Remedy

- Reduce the amount of cyclical data (see parameter S-0-0016, S-0-0024 in the drives).
- Clear bit 15 in Y-0-0039 or Y-0-0040 or change the length of command or actual value channel.

Display "o" : Error in time slot computation

While computing times for SERCOS transmission phase 4, an error occurred.

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

- The configured command or actual values are not supported by at least one drive (see parameter Y-0-0021 - Y-0-0036) because the parameter number is not present or cannot be cyclically configured (see parameter S-0-0187, S-0-0188).
- The command value generator has been activated in the SercBox and a mode set for which the SercBox wants to automatically cyclically configure parameters that are not in the drive or cannot be cyclically configured (see parameter S-0-0187, S-0-0188). For example, some drives do not support "drive-internal interpolation".

Remedy

- Check whether the parameters entered in relevant command and actual value channels are allowed by the drive for cyclical transmission (see parameter Y-0-0021 - Y-0-0036 and parameter S-0-0187, S-0-0188).
- Command value generator must be switched off and a different mode selected.

Display "r" : SercBox: Internal error

An internal error has occurred on the SercBox.

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

Internal hardware test routines have not been properly completed.

Remedy

- Contact Customer Service.

Display "U" : Error in lifecounter

NC and the SercBox monitor the transmission of new command and actual values in each NC cycle. The SercBox increments the "lifecounter SERCANS" (Y-0-0019) for this purpose and the NC does the same for "lifecounter NC" (Y-0-0020). The difference between the two is greater than allowable lifecounter difference (Y-0-0018).

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

The NC is not using the "lifecounter NC" (Y-0-0020) properly.

Remedy

- Check NC program.
- If NC not connected: switch lifecounter monitoring off, to do so write 0 into Y-0-0018.

Display "u" : Copy time too long

The copying of the actual values of the drive into the DPR is not yet completed at the time when copying of the command values from the DPR into the MDT is to start ($S-0-0006 + \text{transmission time of last AT} + Y-0-0037 > S-0-0089 - Y-0-0010$).

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

- Too many command values configured.
- Too many actual values configured.
- SERCOS cycle time too small for the number of real-time data to be transmitted.
- "Data rate" (Y-0-0003) too small to transmit the amount of data in the cycle time.

Remedy

- Configure fewer command values
- Configure fewer actual values.
- Increase "SERCOS cycle time" (Y-0-0004).
- Increase "data rate" (Y-0-0003).

Display "y" : Checksum error (Y parameter)

The SercBox checks all Y parameters for validity by means of a checksum. Each parameter that passes this check, is entered in the "list of invalid Y parameters" (Y-0-0042).

Reaction from the SercBox

Communication phase 0 is set.

Cause

- New SercBox firmware has been installed.
- E²PROM defective.

Remedy

- Write sensible values into the parameters in "list of invalid Y parameter" (Y-0-0042).
- Contact Customer Service.

Display "c" : Input signal SYNCIN failed

The exchange of real time data via the DPR between the SercBox and the NC is synchronized by the synchronous master. If the NC is the "synchronous master" (Y-0-0002), then the SercBox supervises the SYNCIN signal with watchdog.

Reaction from the SercBox

Phase regression to communication phase 0.

Cause

Parameter Y-0-0002 is not zero.

Remedy

Parameter Y-0-0002 must be set to zero.

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<p>Canada <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Basic Technologies Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8</p> <p>Telefon: +1 905/335 55 11 Telefax: +1 905/335-41 84</p>	<p>China <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Mannesmann Rexroth (China) Ltd. Shanghai Office - Room 206 Shanghai Internat. Trade Centre 2200 Yanan Xi Lu PRC - Shanghai 200335</p> <p>Telefon: +86 21/62 75 53 33 Telefax: +86 21/62 75 56 66</p>	<p>China <input type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth (China) Ltd. Shanghai Parts & Service Center 199 Wu Cao Road, Hua Cao Minhang District PRC - Shanghai 201 103</p> <p>Telefon: +86 21/62 20 00 58 Telefax: +86 21/62 20 00 68</p>	<p>China <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Mannesmann Rexroth (China) Ltd. 15/F China World Trade Center 1, Jianguomenwai Avenue PRC - Beijing 100004</p> <p>Telefon: +86 10/65 05 03 80 Telefax: +86 10/65 05 03 79</p>
<p>China <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Mannesmann Rexroth (China) Ltd. A-5F., 123 Lian Shan Street Sha He Kou District PRC - Dalian 116 023</p> <p>Telefon: +86 411/46 78 930 Telefax: +86 411/46 78 932</p>	<p>Hongkong <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Rexroth (China) Ltd. 19 Cheung Shun Street 1st Floor, Cheung Sha Wan, Kowloon, Hongkong</p> <p>Telefon: +852 27/41 13 51/-54 oder/or +852 27/41 14 30 Telefax: +852 27/86 07 33</p>	<p>India <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth (India) Ltd. INDRAMAT Division Plot. 96, Phase III Peenya Industrial Area IND - Bangalore - 560058</p> <p>Telefon: +91 (0)80/8 39 21 01 Telefax: +91 (0)80/8 39 43 45</p>	<p>India <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth (India) Ltd. INDRAMAT Division Plot. A-58, TTC Industrial Area Thane Turbhe Midc Road Mahape Village IND - Navi Mumbai - 400 701</p> <p>Telefon: +91 (0)22/7 61 46 22 Telefax: +91 (0)22/7 68 15 31</p>
<p>Indonesia <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>PT. Rexroth Wijayakusuma Jl. Raya Bekasi Km 21 Pulogadung RI - Jakarta Timur 13920</p> <p>Telefon: +62 21/4 61 04 87 +62 21/4 61 04 88 Telefax: +62 21/4 60 01 52</p>	<p>Japan <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Rexroth Automation Co., Ltd. INDRAMAT Division 1F, I.R. Building Nakamachidai 4-26-44 Tsuzuki-ku, Yokohama-shi J - Kanagawa-ken 224-004</p> <p>Telefon: +81 459/42-72 10 Telefax: +81 459/42-03 41</p>	<p>Korea <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth-Seki Co Ltd. 1500-12 Da-Dae-Dong ROK - Saha-Ku, Pusan, 604-050</p> <p>Telefon: +82 (0)51/2 60 06 18 Telefax: +82 (0)51/2 60 06 19</p>	<p>Korea <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Seo Chang Corporation Ltd. Room 903, Jail Building 44-35 Yeouido-Dong Yeoungdeungpo-Ku C.P.O.Box 97 56 ROK - Seoul</p> <p>Telefon: +82 (0)2/7 80 82 08 +82 (0)2/7 80 82 09 Telefax: +82 (0)2/7 84 54 08</p>
<p>Mexico <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Rexroth Mexico S.A. de C.V. Calle Neptuno 72 Unidad Ind. Vallejo MEX - 07700 Mexico, D.F.</p> <p>Telefon: +52 5 754 17 11 +52 5 754 36 84 +52 5 754 12 60 Telefax: +52 5 754 50 73 +52 5 752 59 43</p>	<p>New Zealand <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Engineering Computer Services Ltd. P. O. box 20 204 Te Rapa NZ - Hamilton</p> <p>Telefon: +64 (0)7/8 49 22 11 Telefax: +64 (0)7/8 49 22 20</p>	<p>South Africa <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>HYTEC Automation (Pty) Ltd. 28 Banfield Road, Industria North RSA - Maraisburg 1700</p> <p>Telefon: +27 (0)11/673 20 80 Telefax: +27 (0)11/673 72 69</p>	<p>Taiwan <input checked="" type="checkbox"/> V/S <input type="checkbox"/> Service</p> <p>Rexroth Uchida Co., Ltd. No.1, Tsu Chiang Street Tu Cheng Ind. Estate Taipei Hsien, Taiwan, R.O.C.</p> <p>Telefon: +886 2/2 68 13 47 Telefax: +886 2/2 68 53 88</p>

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Außerhalb Europa / USA - outside Europe / USA

<p>USA <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Corporation INDRAMAT Division 5150 Prairie Stone Parkway USA - Hoffman Estates, IL 60192-3707</p> <p>Telefon: +1 847/6 45 36 00 Telefax: +1 857/6 45 62 01</p>	<p>USA <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Corporation INDRAMAT Division Central Region Technical Center USA - Auburn Hills, MI 48326</p> <p>Telefon: +1 248/3 93 33 30 Telefax: +1 248/3 93 29 06</p>	<p>USA <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Corporation INDRAMAT Division Southeastern Technical Center 3625 Swiftwater Park Drive USA - Suwanee Georgia 30174</p> <p>Telefon: +1 770/9 32 32 00 +1 770/9 32 19 03</p>	<p>USA <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Corporation INDRAMAT Division Northeastern Technical Center 99 Rainbow Road USA - East Granby, Connecticut 06026</p> <p>Telefon: +1 860/8 44 83 77 +1 860/8 44 85 95</p>
<p>USA <input checked="" type="checkbox"/> V/S <input checked="" type="checkbox"/> Service</p> <p>Mannesmann Rexroth Corporation INDRAMAT Division Charlotte Regional Sales Office 14001 South Lakes Drive USA - Charlotte, North Carolina 28273</p> <p>Telefon: +1 704/5 83 97 62 +1 704/5 83 14 86</p>			

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