



SYNAX200 Decentralized System for the Synchronization of Machine Axes

Firmware Version FWA-PPCR0*-SY*-08VRS

DOK-SYNAX*-SY*-08VRS**-FV01-EN-P

Title	SYNTAX200 Decentralized System for the Synchronization of Machine Axes
Type of documentation	Firmware Versions Description
Document type code	DOK-SYNAX*-SY*-08VRS**-FV01-EN-P
Internal file reference	<ul style="list-style-type: none"> • Box 40-08V-EN • SY108E_V.doc • Document number 120-2200-B322-01/EN
The purpose of the documentation?	The documentation describes the difference between SYNTAX200 version 08VRS and the previous SYNTAX200 version 07VRS.

Editing sequence

Document designation of previous editions	Status	Comments
DOK-SYNAX*-SY*-08VRS**-FV01-EN-P	05.01	Version 08VRS

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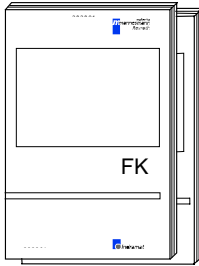
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Published by Rexroth Indramat GmbH
 Bgm.-Dr.-Nebel-Str. 2 • D-97816 Lohr a. Main
 Telephone 09352/40-0 • Tx 689421 • Fax 09352/40-4885
<http://www.rexroth.com/indramat>
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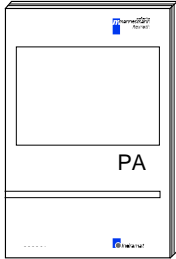
Summary of Documentation - Overview



Functional Description; Interfaces:

Help familiarize the user with SYNAX200 and the functions of SYNAX200

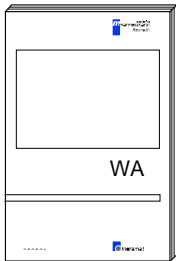
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Parameter Description:

Description of the SYNAX200 system parameters

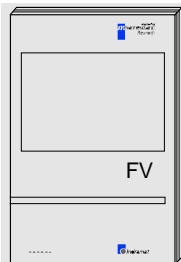
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Trouble Shooting Guide:

Explanation of the diagnostics states
 How to proceed when eliminating faults

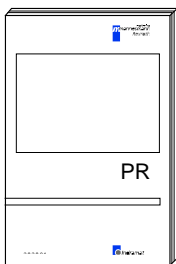
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Firmware Version Notes:

Description of the new and changed functions between SYNAX200 version 08VRS and previous SYNAX200 07VRS

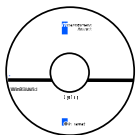
Order designation:
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Project Planning:

Selection of units and hardware components
 Basic control in cabinet construction

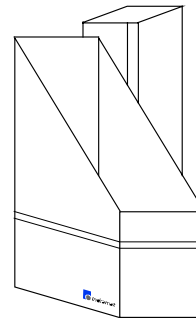
Order designation:
 DOK-SYNAX*-SY*-08VRS**-PR01-EN-P



CD: SynTop

Collection of Windows help systems
 SynTop, user interface for SYNAX200

Order designation:
 SWD-SYNTOP-INB-06VRS-MS-CD600



Order designation:
 DOK-SYNAX*-SY*-08VRS**-4001-EN-P

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1 References

1.1 Product family

The firmware version description references the product family:

SYNAX200 Decentralized System for the Synchronization of Machine Axes.

Current firmware version: FWA-PPCR0*-SY*-08VRS-MS.

1.2 Referenced hardware

Permissible controls

- PPC-R01.2 (1 RECO slot wide, 1 expansion card)
- PPC-R02.2 (2 RECO slots wide, up to 3 expansion cards)

Permissible PPC-R expansion cards

- DAQ03 (cross link and/or ARCNET)
- DPS01 (Profibus slave)
- IBS03 (Interbus slave)
- DNS03 (DeviceNet slave)
- ETH01 (Ethernet)

Permissible RECO local bus expansion modules

- RME02.2-16-DC024 (digital inputs)
- RME02.2-32-DC024 (digital inputs)
- RME02.2-16-AC115 (digital inputs)
- RMA02.2-16-DC024-200 (digital outputs)
- RMA02.2-32-DC024-050 (digital outputs)
- RMA02.2-16-AC230-200 (digital outputs)
- RMA02.2-16-RE230-200 (digital outputs)

Permissible SPS units

- MTS-R01.2 (1 RECO slot wide, 1 expansion card)
- MTS-R02.2 (2 RECO slots wide, up to 3 expansion cards)

Permissible drives

Drives belonging to the families DIAX03, DIAX04 and ECODRIVE03 may be used.

1.3 Referenced firmware

Control firmware

Product:	Product firmware (order designation):	Printed board firmware (Flash module labeling):
PPC-R	FWA-PPCR0*-SY*-08VRS-MS-XXXXXX	FWB-PSM01*-SY*-08VRS-MS
PPC-R + Interbus-Slave	FWA-PPCR0*-SY*-08VRS-MS-B2XXXX	FWB-PSM01*-SY*-08VRS-MS FWC-IBS03*-PHB-01VRS-NN
PPC-R + Profibus-Slave	FWA-PPCR0*-SY*-08VRS-MS-P2XXXX	FWB-PSM01*-SY*-08VRS-MS FWC-DPS01*-PHP-02VRS-NN
PPC-R + DeviceNet-Slave	FWA-PPCR0*-SY*-08VRS-MS-V2XXXX	FWB-PSM01*-SY*-08VRS-MS FWC-DNS01*-PHV-01VRS-NN
PPC-R + Ethernet	FWA-PPCR0*-SY*-08VRS-MS-T2XXXX	FWB-PSM01*-SY*-08VRS-MS FWC-ETH01*-PHT-01VRS-NN
PPC-R + Interbus-Slave + Ethernet	FWA-PPCR0*-SY*-08VRS-MS-B2T2XX	FWB-PSM01*-SY*-08VRS-MS FWC-IBS03*-PHB-01VRS-NN FWC-ETH01*-PHT-01VRS-NN
PPC-R + Profibus-Slave + Ethernet	FWA-PPCR0*-SY*-08VRS-MS-P2T2XX	FWB-PSM01*-SY*-08VRS-MS FWC-DPS01*-PHP-02VRS-NN FWC-ETH01*-PHT-01VRS-NN
PPC-R + DeviceNet-Slave + Ethernet	FWA-PPCR0*-SY*-08VRS-MS-V2T2XX	FWB-PSM01*-SY*-08VRS-MS FWC-DNS01*-PHV-01VRS-NN FWC-ETH01*-PHT-01VRS-NN

Fig. 1-1: Control firmware

SPS firmware/software

Product:	Product firmware (order designation):	Printed board firmware (Flash-module-/CD- labeling):
ISP200-R	FWA-MTSR0*-P07-03VRS-NN-NNNNNN	FWC-PLC07*-005-21VRS-NN
WinPCL-Software	SWA-WINPCL-P0*-03VRS-MS-CD650-WIN*NT	SWD-WINPCL-P0*-03VRS-MS-FILE*

Fig. 1-2: SPS Firmware/software

Drive firmware

Product:	Product firmware (order designation):	Printed board firmware (EPROM-/Flash-module- labeling):
Drive family DIAX03	FWA-DIAX03-ELS-05VRS-MS	FWC-DSM2.3-ELS-05VRS-MS
Drive family DIAX04	FWA-DIAX04-ELS-05VRS-MS	FWC-HSM1.1-ELS-05VRS-MS
Drive family Ecodrive03	FWA-ECODR3-SGP-01VRS-MS	FWC-ESM2.1-SGP-01VRS-MS
	FWA-ECODR3-SGP-03VRS-MS	FWC-ESM2.1-SGP-03VRS-MS

Fig. 1-3: Drive firmware

Firmware download

Product:	Product software (order designation):	CD labeling
DOLFI tool for download of firmware	SWA-DOL*PC-INB-01VRS-MS-C1,44-COPY	SWD-DOL*PC-INB-01VRS-MS-C1,44

Fig. 1-4: Firmware download

Commissioning interface

Product:	Product software (order designation):	CD labeling
User interface SynTop	SWA-SYNTOP-INB-06VRS-MS-CD650-COPY	SWD-SYNTOP-INB-06VRS-MS-CD650

Fig. 1-5: User Software

Note: The software with suffix -COPY may be copied.

1.4 System documentation

Control components

Order designation	Title:
DOK-SYNAX*-SY*-08V*1/2-FK01-EN-P	SYNTAX200 - Functional Description
DOK-SYNAX*-SY*-08V*2/2-FK01-EN-P	SYNTAX200 - Interfaces
DOK-SYNAX*-SY*-08VRS**-PA01-EN-P	SYNTAX200 - Parameter Description
DOK-SYNAX*-SY*-08VRS**-PR01-EN-P	SYNTAX200 - Project Planning
DOK-SYNAX*-SY*-08VRS**-WA01-EN-P	SYNTAX200 - Trouble Shooting Guide
DOK-SYNAX*-SY*-08VRS**-FV01-EN-P	SYNTAX200 - Versions Description
DOK-SYNAX*-SY*-08VRS**-4001-EN-P	SYNTAX200 - Box 40-08V
SWD-SYNTOP-INB-06VRS-MS-CD650	General support for SYNTAX version 08VRS
DOK-SYNAX*-WINPCL*3VRS-AW01-EN-P	Integration of the ISP with the system solution SYNTAX - Application description
DOK-CONTRL-WINPCL*3VRS-AW01-EN-P	Programming Guide for WinPCL
DOK-CONTRL-PPC-R0*.2**-PR02-EN-P	PPC-R0*.2 - Project Planning Manual
DOK-CONTRL-MTS-R0*.2**-PR01-EN-P	RECO-SPS ISP200-R - Project Planning Manual
DOK-CONTRL-MTS-P0*.2**-PR01-EN-P	SPS-Modules MTS-P01.2 and MTS-P02.2 - Project Planning
DOK-CONTRL-RECO02.2***-PR01-EN-P	SERCOS I/O-Unit RECO02.2 - Configuration
DOK-CONTRL-RECO12.2***-PR02-EN-P	INTERBUS I/O-Unit RECO12.2 - Configuration
DOK-CONTRL-R-IL*INLINE-KB01-DE-P	RECO-Inline - Kurzbeschreibung
DOK-CONTRL-SM*12.1****-PRJ2-EN-P	Interbus Sensor-Actuator Boxes SM*12.1 in IP65 rating - Configuration

Fig. 1-6: Control components

Miniature control panels

Order designation	Title:
DOK-SUPPL*-BTV04.2****-FK01-EN-P	System 200 BTV04.2 - Description of functions
DOK-SUPPL*-BTV05.2****-FK02-EN-P	System 200 BTV05.2 - Functional Description
DOK-SUPPL*-BTV06.1****-PR01-EN-P	System 200 BTV06.1 - Project Planning Manual
DOK-SUPPL*-BTC06*****-PR02-EN-P	System 200 BTC06 - Project Planning Manual
DOK-SUPPL*-SCM*BEDIEN*-AW03-EN-P	SCREENMANAGER for Small HMIs - Application Description
DOK-SUPPL*-SCM*PROG*V3-FK01-EN-P	SCREENMANAGER 03VRS - Functional Description

Fig. 1-7: Miniature control panels

Drive components

Order designation	Title:
DOK-DIAX03-DKR*****-PR02-EN-P	DKR02, DKR03 and DKR04 Drive Controllers - Project Planning Manual
DOK-DIAX04-HDD+HDS**G2-PR03-EN-P	DIAX04 HDD and HDS Controllers 2 nd Generation - Project Planning Manual
DOK-ECODR3-DKC**.3****-PR04-EN-P	ECODRIVE03 Drive controllers -Project Planning Manual
DOK-DIAX03-ELS-05VRS**-5001-EN-P	DIAX03 - Box 50-05V
DOK-DIAX04-ELS-05VRS**-6002-EN-P	DIAX04 - Box 60-05V
DOK-ECODR3-SGP-01VRS**-7201-EN-P	ECODRIVE03 - Box 72-01V
DOK-GENERL-DRIVEHELP**-GN07-MS-D0600	Drive Help

Fig. 1-8: Drive components

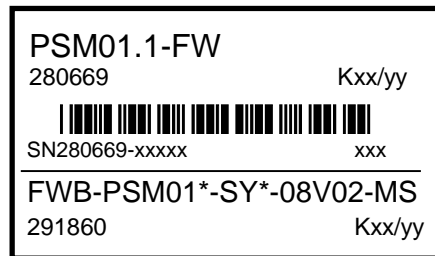
2 Firmware version FWC-PSM01*-SY*-08VRS

2.1 Release notes on FWC-PSM01*-SY*-08V02

The SYNAX200 firmware version FWC-PSM01*-SY*-08V02 was released May 30th, 2001.

2.2 Flash module labeling FWC-PSM01*-SY*-08V02

Flash module PSM01.1:



2.3 New functions

Ethernet interface

The connection of SYNAX to Ethernet uses the plug-in card (PC-104) BGR RECO-CONTROL T2 LK ETH01.

Functional features of the Ethernet interface

- The interface is a 10 MBaud Ethernet participant in conformity with IEEE803.2. It's implemented as an Ethernet server.
- The process data channel is supported for up to four clients via UDP.
- For both directions the process data channel may be configured with up to 128 input and output words.
- Indramat specific protocol for acyclic communication channel is supported via TCP (Indramat SIS-protocol) with up to 11 clients.

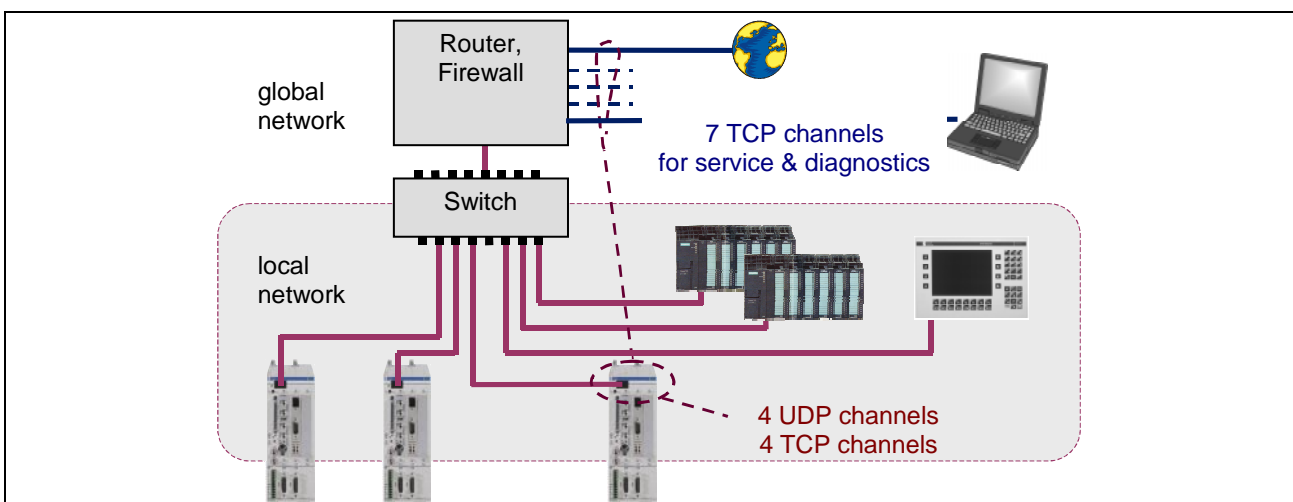


Fig. 2-1: Overview Ethernet

Profiles of the Ethernet interface

The Ethernet interface supports two different server profiles, which may be active in parallel.

Ethernet as a fieldbus	<p>Within the local network the Ethernet-SPS server permits a communication profile similar to a fieldbus interface. It applies:</p> <ul style="list-style-type: none"> • The process data channel is supported for up to four clients via UDP. • An acyclic communication channel is supported via TCP for up to four clients.
Ethernet for service and diagnostics	<p>Within a global network with up to 64 gateways the Ethernet-HMI server is used just like SynTop as a setup and diagnostic tool. It applies:</p> <ul style="list-style-type: none"> • An acyclic communication channel is supported via a separate TCP port for up to seven clients. • The service and diagnostics channels are automatically activated if an Ethernet board ETH01 is available.

Supporting the INDRAMAT SPS (ISP 200-R)

The communication between the motion control (PPC-R) and the Indramat SPS (ISP 200-R) takes place via Dual-Port-RAM. The SPS is able to access any drive and motion control parameter via different communication channels.

The I/O logic of the PPC, in connection with the ISP in SYNTAX 08VRS, is completely substituted on the ISP with program code according to IEC 61131-3 (IL, LD). The program code can be distributed on different program organization units (function blocks, functions,...).

I/O logic source codes of existing projects can be translated by a converting software tool into program code according to IEC 61131-3. The converting tool is delivered with SynTop.

Cyclic communication

- Binary inputs/outputs
- Cyclic channel (number of parameters in each direction: 128)
- Fieldbus channel (number of 32 bit container in each direction: 64)

Acyclic communication

- Acyclic channel (with Indramat SIS-protocol)

For the acyclic communication prepared SPS function blocks are available.

Communication in parallel

It is possible to communicate in parallel with the ISP via Dual-Port-RAM and other participants (e.g., external SPS) via Ethernet and fieldbus (e.g., Interbus, Profibus).

An overview of all possible communications in parallel together with the number of the related channels is given in the following table:

PPC communication with						
ISP via	External-SPS via					
Backplane	Ethernet	Profibus	Interbus)	DeviceNet	ARCNET	3964R
process data ¹⁾	process data ²⁾ service & diagnostics ³⁾	--	--	--	--	--
process data ¹⁾	service & diagnostics ³⁾	process data ¹⁾	--	--	--	--
process data ¹⁾	service & diagnostics ³⁾	--	process data ¹⁾	--	--	--
process data ¹⁾	service & diagnostics ³⁾	--	--	process data ¹⁾	--	--
process data ¹⁾	service & diagnostics ³⁾	--	--	--	process data ⁴⁾	--
process data ¹⁾	service & diagnostics ³⁾	--	--	--	--	process data ⁴⁾
--	process data ²⁾ service & diagnostics ³⁾	--	--	--	--	--
--	service & diagnostics ³⁾	process data ¹⁾	--	--	--	--
--	service & diagnostics ³⁾	--	process data ¹⁾	--	--	--
--	service & diagnostics ³⁾	--	--	process data ¹⁾	--	--
--	service & diagnostics ³⁾	--	--	--	process data ⁴⁾	--
--	service & diagnostics ³⁾	--	--	--	--	process data ⁴⁾

Fig. 2-2: Possible communications in parallel

- 1) 1 channel cyclic/acyclic data
- 2) Ethernet as fieldbus: 4 channels cyclic/acyclic data
- 3) Ethernet for service & diagnostics: 7 acyclic channels
- 4) acyclic transmission with data blocks

Serial firmware updates with DOLFI

Using the windows program DOLFI a serial firmware update is also possible now. That means, the firmware update can be loaded directly to the PSM module via serial interface of the PPC-R.

Diagnosis

Commands to clear diagnosis data

SYNTAX offers two new commands for more effective diagnosis of the system state:

- Command clear error recorder (C-0-0051):
With the help of this command it is possible to clear all inputs in the error recorder (C-0-0156).
- Command clear all SYNAX errors (C-0-0045):
With the help of this command it is possible to clear all present errors (PPC, external communication, PPC link, drives) after evaluating diagnosis data.

Diagnosis and commissioning with S1 button and H1 display

For diagnosis and configuration of the SynTop interface, a menu with display and setting possibilities was implemented via S1 button and the H1 display.

With the help of this menu it is possible to set mode and baudrate of the SynTop interface X10 or X16.

User-defined application data

There are new parameters to store user-defined application data:

A "User defined text" (C-0-0249 and A-0-0176) and/or a "user defined decimal number" (C-0-0248 and A-0-0175) can be stored here.

Application example

For an application using electronic cam mode, up to now the cam table (parameter P-0-0072) must have been read out completely at production change to check the actual cam. As of SYNAX 08VRS, a cam can be loaded together with the describing text (A-0-0176). Now the actual cam can be identified with parameter A-0-0176.

2.4 New parameters, I/Os and diagnoses

New C parameters

List of new C parameters

ID no.	Name of parameter
C-0-0045	Command clear all SYNAX-errors
C-0-0051	Command clear error recorder
C-0-0126	Operation time counter
C-0-0131	DPRAM - Configuration list of process input data
C-0-0132	DPRAM - Configuration list of process output data
C-0-0181	Internal I/O: PPC outputs 3
C-0-0182	Internal I/O: PPC outputs 4
C-0-0183	Internal I/O: PPC outputs 5
C-0-0184	Internal I/O: PPC outputs 6
C-0-0185	Ethernet 2 Configuration list of process output data
C-0-0186	Ethernet 3 Configuration list of process output data
C-0-0187	Ethernet 4 Configuration list of process output data
C-0-0188	Ethernet 2 Configuration list of process input data
C-0-0189	Ethernet 3 Configuration list of process input data
C-0-0190	Ethernet 4 Configuration list of process input data
C-0-0191	PPC - IP address
C-0-0192	PPC - Subnet mask
C-0-0193	PPC - Standard gateway
C-0-0194	PPC - UDP ports
C-0-0195	PPC - TCP port for acyclic SPS channels
C-0-0196	PPC - TCP port for HMI channels
C-0-0197	Configuration element process data channel - End of static
C-0-0198	Configuration element process data channel - End of multiplex
C-0-0199	Configuration element process data channel - Filler
C-0-0200 - C-0-0231	Fieldbus - External I/O, PPC input word 1 - 32
C-0-0248	User defined decimal number
C-0-0249	User defined string
C-0-0250 - C-0-0281	Fieldbus - External I/O, PPC output word 1 - 32
C-0-0299	Ethernet-HMI - firmware version
C-0-0300 - C-0-0363	DPRAM - Inputvariable data container 1 - 64
C-0-0400 - C-0-0463	DPRAM - Outputvariable data container 1 - 64
C-0-0500 - C-0-0503	PPC-Visualization: actual value 1 - 4
C-0-0504 - C-0-0507	PPC-Visualization: signal selection 1 - 4
C-0-0508 - C-0-0511	PPC-Visualization: target selection 1 - 4
C-0-0512 - C-0-0515	PPC-Visualization: expanded signal selection 1 - 4
C-0-0516 - C-0-0519	PPC-Visualization: scaling 1 - 4 per 10V full scale

C-0-0520 - C-0-0523	PPC-Visualization: configuration 1 - 4
C-0-0524	PPC-Visualization: activate
C-0-0525	PPC-Visualization: diagnostics number
C-0-0526	PPC-Visualization: diagnostics text
C-0-0527 - C-0-0530	PPC-Visualization: expanded signal selection 1 - 4, axis address

Fig. 2-3: New C parameters

New A parameters

List of new A parameters

ID no.	Name of parameter
A-0-0173	Following axis - Jogging speed
A-0-0174	Following axis - Reduced jogging speed
A-0-0175	User defined decimal number
A-0-0176	User defined string

Fig. 2-4: New A parameters

New inputs/outputs

New inputs

Designation	Function
_E:C01.06	Link-SYNC1
_E:C01.07	Link-SYNC2
_E:C01.08	Link-SYNC3
_E:C01.09	Link-SYNC4
_E:C01.10	DPRAM - process output data invalid

Fig. 2-5: New inputs

New outputs

Designation	Function
_A:C03.m ¹	Link participant m, input Link-SYNC1 active
_A:C04.m	Link participant m, input Link-SYNC2 active
_A:C05.m	Link participant m, input Link-SYNC3 active
_A:C06.m	Link participant m, input Link-SYNC4 active
_A:C01.10	DPRAM - process input data invalid

Fig. 2-6: New outputs

¹ m = 1..32

New diagnostic messages

C-0-0048 Error number	Dis- play	C-0-0047 Diagnostic text PPC system	C-0-0046 Diagnostic info	Binary Output	Clear with
263	F15	"Parameter C-0-0131 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
264	F15	"Parameter C-0-0132 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
280	F15	"Parameter C-0-0127 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
281	F15	"Parameter C-0-0188 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
282	F15	"Parameter C-0-0189 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
283	F15	"Parameter C-0-0190 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
284	F15	"Parameter C-0-0128 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
285	F15	"Parameter C-0-0185 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
286	F15	"Parameter C-0-0186 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--
287	F15	"Parameter C-0-0187 not correct. Line nbr.: xxx"	10000h	OK A:C01.01	--

Fig. 2-7: New diagnostic messages

2.5 Changed and extended functions

Jogging function

The jogging speed for the jogging function has been extended. In the existing SYNAX versions parameter "jogging speed" (C-0-0043) and "reduced jogging speed" (C-0-0044) were available for the jogging function of the master axis and the following axis.

As before, parameters C-0-0043 and C-0-0044 are still effective for the jogging function of the master axis.

The jogging speeds for the jogging function of the following axis for each axis however are individually adjustable with parameters "following axis - jogging speed" (A-0-0173) and "following axis - reduced jogging speed" (A-0-0174).

Jogging speed of the following axes

Internal input:	effective jogging speed:
"manual operation speed set" (_E:F#.11) = 0	"following axis - jogging speed" (A-0-0173)
"manual operation speed set" (_E:F#.11) = 1	"following axis - reduced jogging speed" (A-0-0174)

Fig. 2-8: Jogging speed of the following axes

Jogging speed of the virtual master axis

Internal input:	effective jogging speed:
"VM jogging speed reduced" (_E:L01.14) = 0	"ELS master - jogging speed" (C-0-0043)
"VM jogging speed reduced" (_E:L01.14) = 1	"ELS master - reduced jogging speed" (C-0-0044)

Fig. 2-9: Jogging speed of the virtual master axis

Register control - teach mode "automatic locking"

Beside teaching at standstill the register control can also lock "automatically" to a register mark. If bit 18 is set in parameter "process control - control word 1" (A-0-0025) and the input "process controller - setpoint lock" (_E:F#.35) is set, the controller waits for the next measuring. With the first recognized register mark, the actual position value is accepted as the new command value.

Register control direct and indirect - common preset input

When setting the binary input "process controller preset 1" (_E:F#.19), the manipulated variable of the direct and indirect register control is cleared now. So far, only the manipulated variable of the indirect register control was cleared with this binary input.

Winding control with dancer - changed structure

The internal structure of the winding control with dancer has been changed. The new PI controller is effective on the speed offset "additive velocity command value" (S-0-0037) and fine adjustment "gain adjust" (P-0-0083). The existing diameter calculation has been dropped. The diameter of the reel is derived from the actual fine adjustment.

PPC link - synchronous inputs and outputs

The PPC link in SYNTAX exists of one link master and a maximum of 31 link slaves. Each participant of a maximum of 32 link participant has four binary inputs `_E:C01.06` to `_E:C01.09`. These inputs can be set or cleared with the I/O logic for example.

With active link participants, the synchronous link inputs "Link-SYNCn" are used to set and clear the binary outputs "link participant m, input Link-SYNCn active" (m = 1...32, n = 1...4) synchronously.

With the help of the synchronous inputs and outputs it is possible to synchronize binary signals in the link from one PPC to another.

How it works:

Action	Effect
link participant 5 sets input <code>_E:C01.06</code>	all link participants synchronously set output <code>_A:C03.05</code>
link participant 12 sets inputs <code>_E:C01.06</code> , <code>_E:C01.07</code> and <code>_E:C01.08</code>	all link participants synchronously set outputs <code>_A:C03.12</code> , <code>_A:C04.12</code> and <code>_A:C05.12</code> (output <code>_A:C03.05</code> , see above, remain set at all link participants)
link participant 7 sets input <code>_E:C01.09</code>	all link participants synchronously set output <code>_A:C06.07</code>
link participant 5 clears input <code>_E:C01.06</code>	all link participants synchronously clear output <code>_A:C03.05</code>

Fig. 2-10: Example for synchronous inputs and outputs

Also see "New inputs/outputs", page 2-6.

Optimizing the processing of binary inputs

The processing of the following axis inputs for selecting

- operating modes (synchronization, setup, idle, special operation modes)
- setup positions
- idle speeds

as well as the processing of the input signals

- drive HALT
- select cam table 2

was optimized as follows: From now all inputs set between one cycle of the I/O logic arrive at the same time in all drives after internal processing. This feature is supported by the DIAX04 family only and not by the ECODRIVE03 drive family.

This functionality is already available in SYNTAX version 07V06.

Fieldbus interfaces

The fieldbus interfaces are completely revised concerning parameterization and configuration of the multiplex channel. The essential expansions and changes are:

- Different data structures and lengths in the different multiplex levels.
- Supporting I/O data in the multiplex channel.
- Direct configuration of the process data channel (without fieldbus objects and data blocks).
- Direct acyclic access via communication channel to all SYNAX single parameters (no lists).
- Reducing the number of fieldbus parameters.

Because of the simplified fieldbus configuration, parameter backups of previous SYNAX versions are not completely compatible to version 08VRS.

To convert to version 08VRS the following procedure is recommended:

- load base parameters
- load parameter file from 07VRS
- reconfigure fieldbus interface via SynTop dialogs
- check fieldbus control bits (C-0-0129): bit 0 = 0, bit 13 = 1

Direct object mapping

With the expansion of the object numbers 0x2000 to 0x4FFF of the fieldbus objects and the establishment of subindexes, it is now possible to map each SYNAX parameter (from the motion control and the drive) directly to fieldbus objects.

In the communication channel of the fieldbusses therefore all individual parameters can be accessed directly without protocol expansion.

Note: Further on, the access to list parameters (e.g., cam, P-0-0072) is only possible via data exchange objects 0x5E70 - 0x5E73 with SIS telegramm.

Allocation of fieldbus objects and SYNAX parameters for direct acyclic access

The following table contains the allocation of fieldbus objects and parameters.

(fieldbus object, subindex)	SYNTAX ident number	Remark
(0x2000 + yyyy, xx)	Axx:S-0-yyyy	0 < yyyy < 4096, 0 < xx < 41
(0x3000 + yyyy, xx)	Axx:P-0-yyyy	0 < yyyy < 4096, 0 < xx < 41
(0x4000 + yyyy, xx)	Axx:A-0-yyyy	0 < yyyy < 2048, 0 < xx < 41
(0x4800 + yyyy, 1)	C00:C-0-yyyy	0 < yyyy < 4096

Fig. 2-11: Allocation of fieldbus objects and SYNAX parameters

Variable configuration of the multiplex channel

The multiplex channel be be configured more flexible. The following expansions are implemented:

- Binary inputs/outputs can be transmitted in the multiplex channel.
- 16 and 32 bit data can be mixed.
- The length of the multiplex channel for input and output data can be different.

Reducing the number of fieldbus parameters

Further on, the parameterization of the process data channel occurs with parameters C-0-0127 or C-0-0128:

"Fieldbus/Ethernet 1 configuration list of process input data" or

"Fieldbus/Ethernet 1 configuration list of process output data"

(see documentation "SYNAX200 - Parameter description", DOK-SYNAX*-SY*-08VRS**-PA01-EN-P).

The length of the process data channel, the multiplex depth and the startoffset are automatically calculated concerning the fieldbus configuration. The parameters "fieldbus: length of process data channel" (C-0-0126), "fieldbus - multiplex size" (C-0-0131) and "fieldbus - start address of multiplex channel" (C-0-0132) have been dropped.

Configuration list for data blocks

The "configuration lists data block" (C-0-0058 - C-0-0065 and C-0-0078 - C-0-0085) are only relevant for serial interface ARCNET and 3964R.

2.6 Changed and extended parameters, I/Os and diagnoses

Changed C parameters

List of changed
C parameters

ID no.	Name of parameters
C-0-0033	Host communication - control word
C-0-0043	ELS master - Jogging speed
C-0-0044	ELS master - Reduced jogging speed
C-0-0101	SYNTAX - power up target mode
C-0-0118	External I/O: X-Inputs – number
C-0-0120	External I/O: X-outputs – number
C-0-0124	Serial communication - time out
C-0-0126	<i>Fieldbus: length of process data channel (see section "New C parameters")</i>
C-0-0127	Fieldbus/Ethernet 1 configuration list of process input data
C-0-0128	Fieldbus/Ethernet 1 configuration list of process output data
C-0-0129	Fieldbus - control bits
C-0-0131	<i>Fieldbus - multiplex size (see section "New C parameters")</i>
C-0-0132	<i>Fieldbus - start address of multiplex channel (see section "New C parameters")</i>
C-0-0142	SynTop - PPC address for RS485 bus
C-0-0153	Error recorder - index
C-0-0156	Error recorder
C-0-0177	I/O-Assignment - source file

Fig. 2-12: Changed C parameters

Individual C parameter changes

C-0-0033 Host communication - control word

Changed items of parameter C-0-0033:

- Phasing out the Polling mode, bit 2 must always be set to 1 in order to support the ARCNET interface.
- Using the Ethernet interface, the bits 3 – 5 must be set to 1 in order to support the profile Ethernet-SPS (i.e. Ethernet as a fieldbus).

C-0-0043 ELS master - jogging speed

The name has been changed.

C-0-0044 ELS master - reduced jogging speed

The name has been changed.

C-0-0101 SYNTAX - power up target mode

The parameter has no write protection any more.

C-0-0118 External I/O: X-Inputs - number

The maximum input value has been changed to 32.

C-0-0120 External I/O: X-outputs - number

The maximum input value has been changed to 32.

C-0-0124 Serial communication - time out

The default value has been changed to 20.0 seconds.

C-0-0126 Fieldbus: length of process data channel

This parameter has been dropped for fieldbus interfaces. C-0-0126 was introduced as a new C parameter relating to other functionality.

C-0-0127 Fieldbus/Ethernet 1 configuration list of process input data

Changed items of parameter C-0-0127:

- The name has been changed.
- The maximum length of the configuration list has been increased to 2048 bytes
- The display format has been changed to SYNAX-ID number.

C-0-0128 Fieldbus/Ethernet 1 configuration list of process output data

Changed items of parameter C-0-0128:

- The name has been changed.
- The maximum length of the configuration list has been increased to 2048 bytes
- The display format has been changed to SYNAX-ID number.

C-0-0129 Fieldbus - control bits

Changed items of parameter C-0-0129:

- The name has been changed.
- The data length has been increased from 16 to 32 bits.
- The default value has been changed to 0x00002000.

Parameter C-0-0129 has been expanded to 32 bits and bits 0, 3 - 5 and 13 have been changed incompatibly to former firmware versions because of the new Ethernet interface:

- With bits 20 and 21 it is possible to configure up to 3 additional SPS master (Ethernet 2 - Ethernet 4) at Ethernet.
- Bit 13 is always set to 1, so the different multiplex levels can have different structures.
- Bits 8 and 9 can be used to convert the format (Intel -> Motorola) at Ethernet.
- With bit 6 and 7 up to 4 words PCP can be configured at Interbus interface.
Further on SYNAX08 only supports 2 words PCP channel, if bit 6 is set.
- With bits 3 - 5 up to 6 words can be configured in the parameter channel at Profibus interface.
Further on SYNAX08 only supports 6 words in the parameter channel, bit 4 and 5 must be set to 1.
- The control function of bit 0 has been dropped, because the fieldbus configuration only occurs via fieldbus parameters (not via fieldbus objects). Bit 0 may not be set to 1 any more.

C-0-0131 Fieldbus - multiplex size

This parameter has been dropped for fieldbus interfaces. C-0-0131 was introduced as a new C parameter relating to other functionality.

C-0-0132 Fieldbus - start address of multiplex channel

This parameter has been dropped for fieldbus interfaces. C-0-0132 was introduced as a new C parameter relating to other functionality.

C-0-0142 SynTop - PPC address for RS485 bus

The maximum input value and the default value have been changed to 127.

C-0-0153 Error recorder - index

The maximum input value has been changed to 63.

C-0-0156 Error recorder

The maximum list length has been changed to 5634 bytes.

C-0-0177 I/O-Assignment - source file

The maximum list length has been changed to 32.768 bytes.

Changed A parameters

List of changed A parameters

ID no.	Name of parameters
A-0-0025	Process control - control word 1
A-0-0146	Process control - control word 2
A-0-0147	<i>This parameter has been dropped.</i>
A-0-0148	<i>This parameter has been dropped.</i>

Fig. 2-13: Changed A parameters

Individual A parameter changes

A-0-0025 Process control - control word 1

The selection of the functionality "setpoint lock by _E:F#.35" is made by setting bit 18.

A-0-0146 Process control - control word 2

With the help of bit 14 it is possible to determine the polarity of the integral action time.

Changed diagnostic messages

C-0-0048 Error number	Display	C-0-0047 Diagnostic text PPC system	C-0-0046 Diagnostic info	Binary output	Clear with
152	F15	Interbus: Process data length is not supported (C-0127/128)	10000h	OK A:C01.01	--
153	F15	"Parameter channel: Is supported by Profibus only (C-33/129)"	10000h	OK A:C01.01	--
154	F15	"PCP channel: Is supported by Interbus only (C-33/129)"	10000h	OK A:C01.01	--

Fig. 2-14: Changed diagnostic messages

2.7 Phase out of functions / hardware

Electronic pattern control

The online mode of the electronic pattern control via the DPRAM isn't supported any longer.

In SYNAX-Version 08VRS only the serial mode via the serial interfaces X10 (PROG) or X16 (COM) is allowed.

ARCNET Polling mode

The polling mode isn't supported by the ARCNET interface any longer.

In SYNAX-Version 08VRS only the interrupt mode (bit 2 = 1 in "host communication – control word" (C-0-0033)) is allowed.

Fieldbus configuration by fieldbus objects

The fieldbus configuration by fieldbus objects using the object lists 6000 and 6001 isn't possible on the PPC any longer.

In SYNAX-Version 08VRS only the fieldbus configuration is possible by changing the fieldbus parameters in parameterization mode.

3 Glossary

1MB

AC kit motor with water cooling for integration in spindles (inductance principles).

2AD

AC motors in power range of approx. 3.5 - 93 KW (inductance principle).

Absolute encoder

Encoders that supply an absolute position over several rotations (e.g., 4096).

ARCNET

Serial communication system (coaxial line).
Is used with printing machines, for example.

DAG

SSI- EnDat encoder interface

DAQ

PPC link and/or ARCNET connection - PPC-R daughter board.

DEA

Digital 24V I/Os- CLC D daughter board or plug-in module for digital drives.

DFF

High resolution master axis encoder interface - plug-in module for digital drives.

DIAX03

Controller family with an output width of 1 ... 100kW. (DDS02.2 / DDS03.2 / DKR02.1 / DKR03.1 / DKR04.1)

DIAX03 controller

Controller with uniform functions and a output band width of 1... 100kW. (DDS02.2 / DDS03.2 / DKR02.1 / DKR03.1 / DKR04.1)

DIAX04

Controller family with an output width of 1 ... 100kW. (HDS02.1 / HDS03.1 / HDS04.1 / HDD02.1)

DIAX04 controller

Controller with uniform functions and a output band width of 1... 100kW. (HDS02.1 / HDS03.1 / HDS04.1 / HDD02.1)

DLF

High resolution sinusoidal encoder interface - plug-in module for digital drives.

DPS

Profibus slave interface - PPC daughter board

DNS

DeviceNet slave interface - PPC daughter board

DRF

Analog input interface - plug-in module for digital drives.

DSA

Master axis position with SSI signals - plug-in module for digital drives.

DSS

SERCOS interface - plug-in module for digital drives.

DZF

High resolution gear/tooth interface - plug-in module for digital drives.

ECODRIVE03

Control unit (DKC 2.3) available 40 A and 100 A version

ETH

Ethernet interface - PPC daughter board

GDS

Master axis encoder

I/O logic

Simply logic with e.g. AND, OR, NOT allocations with which simply I/O allocations are executed.

The I/O logic is generated as a text file and translated. The results of this translation procedure are loaded into the PPC-R. A return to the original is possible with SynTop.

IBS

INTERBUS-S slave interface - PPC-R daughter board

ISP200

SPS - Programming system of the Rexroth Indramat GmbH

LAF

AC linear motor - flat construction (inductance principle).

LAR

AC linear motor - round construction (inductance principle).

LSF

AC linear motor - flat construction (synchronous principle)

LWL

Fiber optic cable, e.g., for SERCOS interface

Master axis encoder

The master axis encoder is a high resolution digital path scale system with 1048580 (=2²⁰) increments. This encoder is absolute over one revolution.

MBW

AC mounting motor with hollow shaft for printing cylinders (inductance principle).

MDD

AC motor with digital servo feedback (synchronous principle)

MKD

AC motor with resolver feedback (synchronous principle)

MTS-R01.2

SPS type as a RECO02 module. Assigns one RECO slot. A maximum of one expansion card can be inserted.

MTS-R02.2

SPS type as a RECO02 module. Assigns two RECO slots. A maximum of three expansion cards can be inserted.

Multi-Turn

Encoder, that supplies an absolute position over several revolutions (e.g. 4096).

PPC

Control module with SERCOS interface. PPC-R01.2 and PPC-R02.2 are available. There are different software packages available (in this case SYNAX200)

PPC-R01.2

Control type as a RECO02 module. Assigns one RECO slot. A maximum of one expansion card can be inserted.

PPC-R02.2

Control type as a RECO02 module. Assigns two RECO slots. A maximum of three expansion cards can be inserted.

PPC link

With the help of a SERCOS interface ring, up to 32 PPC-R controls can be connected. Master axis positions are synchronously distributed to all PPC-Rs for this purpose.

RECO02

Slot oriented assembly system with twofold and fourfold module carrier, control modules and I/O modules. Up to 16 modules can be switched together.

Select lists

Documentation used to determine, for a specific application, a specific motor/controller combination.

SERCOS interface

Internationally standardized digital interface (IEC 61491 or EN 61491) for communications between control and drives in numerically controlled drives.

Single-Turn

Encoder, that supplies an absolute position over a single revolution.

SSI

Synchronous serial interface. Interface for encoder systems with serial transmissions of digital actual values.

SYNAX200

Decentralized system for the synchronization of machine axes, made up of SYNAX200 firmware, SynTop software, PPC control, DIAX03-/DIAX04 and ECODRIVE03 drives.

SynTop

Commissioning interface for parameterization of the SYNAX200 system.

4 Service & Support

4.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

- telefonisch: **+49 (0) 9352 40 50 60**
über Service Call Entry Center Mo-Fr 07:00-18:00
- per Fax: **+49 (0) 9352 40 49 41**
- per e-Mail: **service@indramat.de**

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- by phone: **+49 (0) 9352 40 50 60**
via Service Call Entry Center Mo-Fr 7:00 am - 6:00 pm
- by fax: **+49 (0) 9352 40 49 41**
- by e-mail: **service@indramat.de**

4.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

oder **+49 (0) 171 333 88 26**
+49 (0) 172 660 04 06

After helpdesk hours, contact our service department directly at

or **+49 (0) 171 333 88 26**
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4.3 Internet

Weitere Hinweise zu Service, Reparatur und Training finden Sie im Internet unter

www.indramat.de

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit Ihrem lokalen Ansprechpartner auf. Die Adressen sind im Anhang aufgeführt.

- Verkaufsniederlassungen
- Niederlassungen mit Kundendienst

Additional notes about service, repairs and training are available on the Internet at

www.indramat.de

Please contact the sales & service offices in your area first. Refer to the addresses on the following pages.

- sales agencies
- offices providing service

4.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

detaillierte Beschreibung der Störung und der Umstände.

Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.

Tel./Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

4.5 Kundenbetreuungsstellen - Sales & Service Facilities

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