

Rexroth SYNAX200 Version 10

290543
Edition 01

Firmware Version Notes



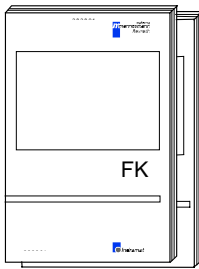
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Purpose of Documentation	The documentation gives an overview about the highlights of SYNTAX200 version 10VRS and the most important differences compared with the incompatible previous SYNTAX200 version 08VRS.

Record of Revisions

Description	Release Date	Notes
DOK-SYNAX*-SY*-10VRS**-FV01-EN-P	07.02	Version 10VRS

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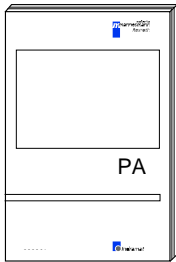
Summary of Documentation - Overview



Functional Description: Interfaces:

Help familiarize the user with SYNAX200 and the functions of SYNAX200

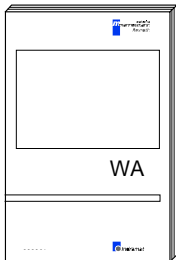
Order designation:
 DOK-SYNAX*-SY*-10V*1/2-FK01-EN-P
 DOK-SYNAX*-SY*-10V*2/2-FK01-EN-P



Parameter Description:

Description of the SYNAX200 system parameters

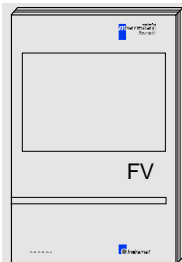
Order designation:
 DOK-SYNAX*-SY*-10VRS**-PA01-EN-P



Trouble Shooting Guide:

Explanation of the diagnostics states
 How to proceed when eliminating faults

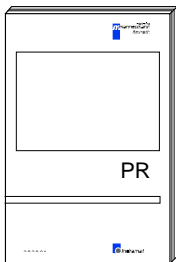
Order designation:
 DOK-SYNAX*-SY*-10VRS**-WA01-EN-P



Firmware Version Notes:

Overview of the highlights of SYNAX200 version 10VRS and the most important differences compared with the incompatible previous SYNAX200 version 08VRS

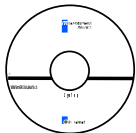
Order designation:
 DOK-SYNAX*-SY*-10VRS**-FV01-EN-P



Project Planning:

Selection of units and hardware components
 Basic control in cabinet construction

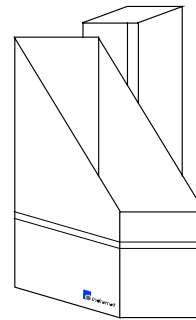
Order designation:
 DOK-SYNAX*-SY*-10VRS**-PR01-EN-P



CD: SynTop

Collection of Windows help systems
 SynTop, user interface for SYNAX200

Order designation:
 SWD-SYNTOP-INB-10VRS-MS-CD600



Order designation:
 DOK-SYNAX*-SY*-10VRS**-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*-10VRS-MS.

1.2 Referenced hardware

Permissible module carrier

- RMB02.2-02 (for installation of 2 modules)
- RMB02.2-04 (for installation of 4 modules)

Permissible controls

- PPC-R01.2 (small, 1 RECO-Slot, up to 1 expansion card)
- PPC-R02.2 (wide, 2 RECO-Slots, 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)
- CNS01 (ControlNet slave)
- ETH01 (Ethernet/IP, 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 fieldbus expansion cards at an integrated PLC (master interface) in addition

- DPM01 (Profibus master)
- IBM 2 (Interbus master)
- DNM03 (DeviceNet master)

Permissible fieldbus couplers and modules at an integrated PLC with RECO inline (slave interfaces)

- R-IBS IL 24 BK-T (INTERBUS-S bus clamp)
- R-IBS IL 24 RB-T (INTERBUS-S remote bus branch)
- R-IL PB BK (PROFIBUS-DP bus clamp)
- R-IB IL 24 DI 2 (clamp with 2 digital inputs)
- R-IB IL 24 DI 4 (clamp with 4 digital inputs)
- R-IB IL 24 DI 8 (clamp with 8 digital inputs)
- R-IB IL 24 DI 16 (clamp with 16 digital inputs)
- R-IB IL 24 EDI 2-DES (clamp with 2 digital and 2 diagnostic inputs)
- R-IB IL 24 DO 2-2A (clamp with 2 digital outputs 2A)
- R-IB IL 24 DO 4 (clamp with 4 digital outputs 500 mA)
- R-IB IL 24 DO 8 (clamp with 8 digital outputs 500 mA)
- R-IB IL 24 DO 16 (clamp with 16 digital outputs 500 mA)
- R-IB IL 24/230 DOR 1/W (clamp with relay output)
- R-IB IL DOR LV-SET (pair of clamp as accessory of the relay clamp)
- R-IB IL 24 AI 2/SF (clamp with 2 analog input channels)
- R-IB IL 24 TEMP 2 RTD (clamp with 2 input channels for connection of temperature resistor)
- R-IB IL 24 AO 1/SF (clamp with analog output channel)
- R-IB IL 24 AO 2 U/BP (clamp with 2 analog voltage outputs)
- R-IB IL 24 CNT (function clamp counter – timer)
- R-IB IL PWR IN (supply clamp)
- R-IB IL SEG/F (segment clamp)

Permissible RECO local bus module at an integrated PLC in addition

- RMC02.2-2E-1A (analog module 2 x input, 1 x output)

Permissible drives

- DIAX03
- DIAX04
- ECODRIVE03

1.3 Reference list firmware/software

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

Motion control firmware

Product:	Product firmware (order designation):	Printed board firmware (flash module labeling):
PPC-R	FWA-PPCR0*-SY*-10VRS-MS-XXXXXX	FWB-PSM01*-SY*-10VRS-MS
PPC-R + Profibus slave	FWA-PPCR0*-SY*-10VRS-MS-P2XXXX	FWB-PSM01*-SY*-10VRS-MS FWC-DPS01*-PHP-02VRS-NN
PPC-R + Interbus slave	FWA-PPCR0*-SY*-10VRS-MS-B2XXXX	FWB-PSM01*-SY*-10VRS-MS FWC-IBS03*-PHB-01VRS-NN
PPC-R + DeviceNet slave	FWA-PPCR0*-SY*-10VRS-MS-V2XXXX	FWB-PSM01*-SY*-10VRS-MS FWC-DNS01*-PHV-01VRS-NN
PPC-R + Ethernet/IP slave or Ethernet	FWA-PPCR0*-SY*-10VRS-MS-T2XXXX	FWB-PSM01*-SY*-10VRS-MS FWC-ETH01*-PHT-02VRS-NN
PPC-R + ControlNet slave	FWA-PPCR0*-SY*-10VRS-MS-L2XXXX	FWB-PSM01*-SY*-10VRS-MS FWC-CNS01*-PHL-01VRS-NN
PPC-R + Profibus slave + Ethernet (HMI)	FWA-PPCR0*-SY*-10VRS-MS-P2T2XX	FWB-PSM01*-SY*-10VRS-MS FWC-DPS01*-PHP-02VRS-NN FWC-ETH01*-PHT-02VRS-NN
PPC-R + DeviceNet slave + Ethernet (HMI)	FWA-PPCR0*-SY*-10VRS-MS-V2T2XX	FWB-PSM01*-SY*-10VRS-MS FWC-DNS01*-PHV-01VRS-NN FWC-ETH01*-PHT-02VRS-NN

Fig. 1-1: SYNAX200 MC-R

Product:	Product firmware (order designation):	Printed board firmware (flash module labeling):
PPC-P	FWA-PPCP11-SY*-10VRS-MS-XXXXXX	FWC-PFM01*-SY*-10VRS-MS
PPC-P + Profibus slave	FWA-PPCP11-SY*-10VRS-MS-P2XXXX	FWC-PFM01*-SY*-10VRS-MS FWC-DPS01*-PHP-02VRS-NN
PPC-P + DeviceNet slave	FWA-PPCP11-SY*-10VRS-MS-V2XXXX	FWC-PFM01*-SY*-10VRS-MS FWC-DNS01*-PHV-01VRS-NN
PPC-P + Ethernet/IP slave or Ethernet	FWA-PPCP11-SY*-10VRS-MS-T2XXXX	FWC-PFM01*-SY*-10VRS-MS FWC-ETH01*-PHT-02VRS-NN

Fig. 1-2: SYNAX200 MC-P

Product:	Product firmware (order designation):	Printed board firmware (flash module labeling):
PPC-R with ML	FWA-PPCR0*-SL*-10VRS-MS-XXXXXX	FWB-PSM02*-SL*-10VRS-MS
PPC-R with ML + Profibus slave	FWA-PPCR0*-SL*-10VRS-MS-P2XXXX	FWB-PSM02*-SL*-10VRS-MS FWC-DPS01*-PHP-02VRS-NN
PPC-R with ML + DeviceNet slave	FWA-PPCR0*-SL*-10VRS-MS-V2XXXX	FWB-PSM02*-SL*-10VRS-MS FWC-DNS01*-PHV-01VRS-NN
PPC-R + Ethernet/IP slave or Ethernet	FWA-PPCR0*-SL*-10VRS-MS-T2XXXX	FWB-PSM02*-SL*-10VRS-MS FWC-ETH01*-PHT-02VRS-NN
PPC-R + Profibus slave + Ethernet (HMI)	FWA-PPCR0*-SL*-10VRS-MS-P2T2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DPS01*-PHP-02VRS-NN FWC-ETH01*-PHT-02VRS-NN
PPC-R + DeviceNet slave + Ethernet (HMI)	FWA-PPCR0*-SL*-10VRS-MS-V2T2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DNS01*-PHV-01VRS-NN FWC-ETH01*-PHT-02VRS-NN
PPC-R with ML + Profibus master	FWA-PPCR0*-SL*-10VRS-MS-P1XXXX	FWB-PSM02*-SL*-10VRS-MS FWC-DPM01*-PHP-02VRS-NN
PPC-R with ML + DeviceNet master	FWA-PPCR0*-SL*-10VRS-MS-V1XXXX	FWB-PSM02*-SL*-10VRS-MS FWC-DNM03*-PHV-01VRS-NN
PPC-R with ML + Profibus master + Profibus slave	FWA-PPCR0*-SL*-10VRS-MS-P1P2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DPM01*-PHP-02VRS-NN FWC-DPS01*-PHP-02VRS-NN
PPC-R with ML + DeviceNet master + DeviceNet slave	FWA-PPCR0*-SL*-10VRS-MS-V1V2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DNM03*-PHV-01VRS-NN FWC-DNS01*-PHV-01VRS-NN
PPC-R with ML + Profibus master + Ethernet/IP slave or Ethernet	FWA-PPCR0*-SL*-10VRS-MS-P1T2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DPM01*-PHP-02VRS-NN FWC-ETH01*-PHT-02VRS-NN
PPC-R with ML + DeviceNet master + Ethernet/IP slave or Ethernet	FWA-PPCR0*-SL*-10VRS-MS-V1T2XX	FWB-PSM02*-SL*-10VRS-MS FWC-DNM03*-PHV-01VRS-NN FWC-ETH01*-PHT-02VRS-NN

Fig. 1-3: SYNAX200 ML-R

Product:	Product firmware (order designation):	Printed board firmware (flash module labeling):
PPC-P with ML	FWA-PPCP11-SL*-10VRS-MS-XXXXXX	FWC-PFM01*-SY*-10VRS-MS
PPC-P with ML + Profibus master	FWA-PPCP11-SL*-10VRS-MS-P1XXXX	FWC-PFM01*-SL*-10VRS-MS FWC-DPM01*-PHP-02VRS-NN
PPC-P + DeviceNet master	FWA-PPCP11-SL*-10VRS-MS-V1XXXX	FWC-PFM01*-SL*-10VRS-MS FWC-DNM03*-PHV-01VRS-NN

Fig. 1-4: SYNAX200 ML-P

PLC/HMI software

Product:	Product software (order designation):	Product software (CD labeling):
SPS f. SYNTAX200 (without HMI)	SWA-SYNAX*-PO*-10VRS-MS-CD650	SWD-SYNAX*-PO*-10VRS-MS-CD650
license for WinPCL programming interface	SWL-SYNAX*-PO*-10VRS-MS	
SPS + HMI f. SYNTAX200	SWA-SYNAX*-HMI-10VRS-MS-CD650	SWD-SYNAX*-HMI-10VRS-MS-CD650
license for WinPCL-programming interface and WinHMI	SWL-SYNAX*-HMI-10VRS-MS	

Fig. 1-5: PLC/HMI firmware/software

Product:	Product software (order designation):	Product software (CD labeling):
OPC-Server	SWS-CONTRL-OPC-02VRS-MS	
WinLock	SWS-CONTRL-WLO-01VRS-MS	
email integration	SWS-CONTRL-E*M-01VRS-MS	
remote diagnosis	SWS-CONTRL-TSE-02VRS-MS	

Fig. 1-6: HMI addon software options

Drive firmware

Drive firmware for synchronization mode, positioning mode and idle mode

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labeling):
drive family DIAX03	FWA-DIAX03-ELS-06VRS-MS	FWC-DSM2.3-ELS-06VRS-MS
drive family DIAX04	FWA-DIAX04-ELS-06VRS-MS	FWC-HSM1.1-ELS-06VRS-MS
drive family Ecodrive03	FWA-DRIVE*-SGP-20VRS-MS	FWC-ESM2.2-SGP-20VRS-MS

Fig. 1-7: Drive firmware (synchronization mode, positioning mode, idle mode)

Drive firmware only for positioning mode and idle mode

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labeling):
drive family DIAX	FWA-DIAX03-SSE-02VRS-MS FWA-DIAX04-SSE-02VRS-MS	FWC-DSM2.3-SSE-02VRS-MS FWC-HSM1.1-SSE-02VRS-MS
drive family ECODRIVE03	FWA-ECODR3-SMT-02VRS-MS	FWC-ESM2.1-SMT-02VRS-MS

Fig. 1-8: Drive firmware (only positioning mode and idle mode)

Firmware download

Product:	Product firmware (order designation):	Disk 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. 1-9: Firmware download

Commissioning interface

Product:	Product software (order designation):	CD labeling
User interface SynTop	SWA-SYNTOP-INB-10VRS-MS-CD650-COPY	SWD-SYNTOP-INB-10VRS-MS-CD650

Fig. 1-10: User software

Miniature control panels (Screenmanager)

Product:	Product software/firmware (order designation):	disk labeling/ printed board firmware (EPROM/flash module labeling)
BTV programming interface Screenmanger	SWA-SCM*PC-INB-04VRS-MS-C1,44	SWD-SCM*PC-INB-04VRS-MS-C1,44
BTV firmware (runtime):		
BTV04	SWA-BTV04*-SCM-04VRS-MS-C1,44	SWD-BTV04*-SCM-04VRS-MS-C1,44
BTV05	SWA-BTV05*-SCM-04VRS-MS-C1,44	SWD-BTV05*-SCM-04VRS-MS-C1,44
BTV06	SWA-BTV06*-SCM-04VRS-MS-C1,44	SWD-BTV06*-SCM-04VRS-MS-C1,44
BTC06	SWA-BTC06*-SCM-04VRS-MS-C1,44	SWD-BTC06*-SCM-04VRS-MS-C1,44
BTV firmware (loader):		
BTV04	FWA-BTV04*-DOL-01VRS-EN	FWC-BTV04*-DOL-01VRS-EN
BTV05	FWA-BTV05*-DOL-01VRS-EN	FWC-BTV05*-DOL-01VRS-EN
BTV06	FWA-BTV06*-DOL-01VRS-EN	FWC-BTV06*-DOL-01VRS-EN
BTC06	FWA-BTC06*-DOL-01VRS-EN	FWC-BTC06*-DOL-01VRS-EN

Fig. 1-11: Miniature control panels (Screenmanager)

1.4 System documentation

Additional information of the components described can be found in the following documents.

Motion control components

Order designation	Title
DOK-SYNAX*-SY*-10V*1/2-FK01-EN-P	SYNTAX200 - Functional Description
DOK-SYNAX*-SY*-10V*2/2-FK01-EN-P	SYNTAX200 - Interfaces Description
DOK-SYNAX*-SY*-10VRS**-PA01-EN-P	SYNTAX200 - Parameter Description
DOK-SYNAX*-SY*-10VRS**-PR01-EN-P	SYNTAX200 - Project Planning
DOK-SYNAX*-SY*-10VRS**-WA01-EN-P	SYNTAX200 - Trouble Shooting Guide
DOK-SYNAX*-SY*-10VRS**-FV01-EN-P	SYNTAX200 - Versionsnotes
DOK-SYNAX*-SY*-10VRS**-4001-EN-P	SYNTAX200 - Box 40-10V
SWD-SYNTOP-INB-10VRS-MS-CD650	General help for SYNTAX version 10VRS
DOK-SYNAX*-WINPCL05VRS-AW01-EN-P	Expansion of the System Solution SYNTAX200 - MotionControl by the Integrated PLC LogicControl to the System Solution SYNTAX200 - MotionLogic - Application Manual
DOK-CONTRL-WINPCL*5VRS-AW01-EN-P	Programming Guide for WinPCL
DOK-CONTRL-PPC-R0*.2**-PR03-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	PLC-Modules MTS-P01.2 and MTS-P02.2 - Project Planning
DOK-CONTRL-RECO02.2***-PRJ1-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-KB02-EN-P	RECO-Inline Brief Description

Fig. 1-12: Motion control components

Miniature control panels/Screenmanager

Order designation	Title
DOK-SUPPL*-BTV04.2****-FK02-EN-P	System 200 BTV04.2 - Description of Functions
DOK-SUPPL*-BTV05.2****-FK03-EN-P	System 200 BTV05.2 - Functional Description
DOK-SUPPL*-BTV06.1****-PR02-EN-P	System 200 BTV06.1 - Project Planning Manual
DOK-SUPPL*-BTC06*****-PR03-EN-P	System 200 BTC06 – Project Planning Manual
DOK-SUPPL*-SCM*BEDIEN*-AW04-EN-P	SCREENMANAGER for Small HMIs – Application Description
DOK-SUPPL*-SCM*PROG*V4-AW01-EN-P	SCREENMANAGER 04VRS - Functional Description

Fig. 1-13: Miniature control panels/Screenmanager

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-DIAX04-PLUG*IN*MOD-PR03-EN-P	DIAX04 Plug-in Module for Digital Intelligent Drive Controllers - Project Planning Manual
DOK-ECODR3-DKC**.3****-PR05-EN-P	ECODRIVE03 Drive Controllers -Project Planning Manual
DOK-DIAX03-ELS-06VRS**-IF01-EN-P	DIAX03 - Brief Description
DOK-DIAX04-ELS-06VRS**-6001-EN-P	DIAX04 - Box 60-06V
DOK-DRIVE*-SGP-20VRS**-7201-EN-P	ECODRIVE03 - Box 72-01V
DOK-GENERL-DRIVEHELP**-GN07-MS-D0600	Drive Help

Fig. 1-14: Drive components

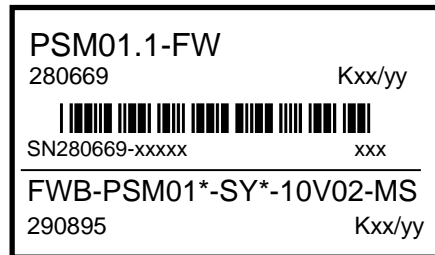
2 Firmware version FWC-PSM01*-SY*-10VRS

2.1 Release notes on FWC-PSM01*-SY*-10V02

The SYNAX200 firmware version FWC-PSM01*-SY*-10V02 was released July 18th, 2002.

2.2 Flash module labelling FWC-PSM01*-SY*-10V02

Flash module PSM01.1:



2.3 Functions

Product cycles

For production procedures that covers several master axes, absolute positioning and synchronization over several master axis revolutions is guaranteed with the specification of the product cycles.

After a product cycle of n master axis revolutions the following axes are in the same starting position to each other.

The product cycles are relevant for:

- the master axis
- the following axis

The default values of the corresponding parameters in the drive and on the PPC are set the way that one master axis revolution corresponds one product. So the default values are compatible to previous SYNAX versions.

Master axis

Position format of the master axis

The position format of the master axis can be parameterized with parameter "Product cycle" (C-0-0076). The product cycle specifies the number of master axis revolutions the product or processing cycle is repeated.

New master axis structure

The new master axis principle supports two master axes.

For the user there are several operating modes for both master axes available:

- virtual master axis,
- real master axis,
- secondary master (master axis cascading),
- positioning mode,
- E-stop (emergency stop).

Operating mode "Switching to virtual master axis (master toggle)" has been dropped.

There are further functions for both master axis available depending on the operating mode:

- synchronization when changing the operating mode, absolute or relative, synchronization ranges 0...360 degree and product cycle,
- jerk limitation,
- gear functions: phase offset (offset 1 and 2), master axis gear (32 bit), fine adjustment (32 bit), preset with selectable adjusting speed,
- speed limit.

This master axis structure makes it possible, e.g., to connect the printing units to the first and the infeed unit and the drag roller downstream to the second master axis. Then the master axis gear between the master axis is changed at format change.

Speed operating thresholds

Eight speed operating thresholds are supported for both master axis.

The outputs that display the reaching of the speed operating thresholds were renamed to `_A:G#.0n`.

Example: When reaching the speed operating threshold 5 of master axis 2 then output bit `_A:G02.05` is set.

Cams witch groups 1 and 2

The position of the cams of both cam switch groups can be limited with:

- modulo value (0 ... 360 degree)
- product cycle (0 ... n*360 degree)

The signals of the cam switch group 2 can be directly output via:

- DEA04, DEA08
- RECO I/Os

Process controller/ jogging

The changes of the process controllers and the jogging mode of the master axis are described in following sections.

PPC link

To support two master axis and the product cycles, it was necessary to redefine the data to transmit in the PPC link:

- all master axis positions (AT and MDT)
- all product cycles (AT and MDT)
- control and synchronization bits (AT and MDT)
- validity bits (MDT)
- system time (MDT)

Note: Product cycles of more than one master axis revolution in the PPC link are only possible if the link master also supports the product cycles.

Following axis

For the following axis there are changes in SYNTAX200 version 10 concerning supported drive firmware and functionality.

Supported drive firmware

SYNTAX200 version 10VRS supports for all operating modes only drives with the following firmware versions:

- DRIVE*-SGP-20VRS-MS
- DIAX03-ELS-06VRS-MS
- DIAX04-ELS-06VRS-MS

Only these firmware versions support the new gear conception with product cycles of more than one master axis revolution.

For positioning and idle mode also the following firmware is permissible:

- ECODR3-SMT-02VRS-MS
- DIAX03-SSE-02VRS-MS
- DIAX04-SSE-02VRS-MS

Electronic gear

The electronic gear was revised:

- Drive parameters "Lead drive 1 rotation" (S-0-0236) and "Slave drive rotation I" (S-0-0237) have been dropped.
- Drive parameters "Electronic gear input revolutions" (P-0-0156) or "Electronic gear output revolutions" (P-0-0157) can only be changed with motion control parameter "Electronical gear - input revolutions" (A-0-0170) or "Electronical gear - output revolutions" (A-0-0126).

Modulo value/ actual value cycle

The modulo value of the following axis is independent of the electronic gear. At rotary axes the value is fixed to 360°, at translatory axes parameter "Slave drive feed travel" (P-0-0159) is valid.

The position actual value of the following axis in the actual value cycle ("Position actual value in actual value cycle", P-0-0753) specifies the actual position value within one product cycle of the master axis.

Synchronization mode

In addition to the functional expansions in SYNTAX200 version 10 also new modes for the synchronization were introduced. The following modes can be selected:

- relative, absolute (the selection is not done with a bit in "Synchronization mode", A-0-0003, but it is directly done in the drive with a bit in "Synchronization mode", P-0-0155);
- actual value cycle, modulo range, subrange;
- positive and negative direction, shortest way ("Synchronization direction", P-0-0154).

Fine adjustment

The data length of the "Fine adjustment" (A-0-0060) was increased from 2 bytes to 4 bytes. The same applies for the parameters of the minimum/maximum limit ("Fine adjustment - positive limit", A-0-0019 and "Fine adjustment - negative limit", A-0-0020) and the correlating drive parameters ("Gear ratio fine adjust", P-0-0083). With this change

- the parameters A-0-0019, A-0-0020 and A-0-0060 of earlier SYNTAX backups can not be loaded correctly via SynTop,
- in speed synchronization mode of ECODRIVE03 parameter P-0-0083 is shift to the multiplex channel of the MDT.

The fine adjustment is also effective in operating modes phase synchronization and electronic cam.

Group parameters 1 and 2

The additive group command values ("Group command value additive 1", A-0-0132, "Group command value additive 2", A-0-0155) are no longer effective as additive offsets on the "Position command value additional" (S-0-0048) of the following axis, but they are now effective as phase offset on the master axis position.

A new value is added from the PPC directly to the "Master drive position" (P-0-0053) and is limited with a parameterized modulo value. The modulo range for both additive group command values can be specified separately.

It is always traveled the shortest way within the specified modulo range (example: modulo range group command value 720 degree, actual position 50 degree, command value 700 degree ⇒ travel distance 70 degree negative direction).

The termination of the movement is displayed with outputs "Group command value 1 achieved" (_A:F#.51) or "Group command value 2 achieved" (_A:F#.52).

Operating mode electronic pattern control

The operating mode electronic pattern control has been dropped.

Process controller / jogging

The changes of the process controllers and the jogging mode of the master axis are described in following sections.

Process controller - manipulated variables

The manipulated variables of the different process controllers were revised.

Register controller (direct, indirect)

- fine adjustment (of the master axis, of the following axis; 32 bit each)
- position offset (of the master axis after gear, of the following axis)
- cam phase offset begin of profile

Tension controller

- fine adjustment (of the master axis, of the following axis; 32 bit each, tension controller with load cell)
- speed offset (tension controller with dancer)

Winding controller (without sensor, with dancer)

- fine adjustment (of the following axis; 32 bit)
- speed offset (only for winding controller with dancer)

Process controller / jogging

The changes of the process controllers and the jogging mode of the master axis are described in following sections.

Jogging

Different target parameters of the master axis or the following axis can be jogged.

The jogged variable is selected with a selection parameter or with 4 binary inputs and can be changed in operation.

Jogging mode of the master axis

With parameter "Selection method: adjustable parameter" (C-0-0011) is set, if the selection of the process variable to jog is done with

- binary combination at the inputs `_E:L#.45...48` or
- binary combination in parameter "Adjustable parameter selection" (C-0-0012).

The acknowledge of the selection in both cases is done with outputs `_A:L#.45...48`.

The target parameters of the master axis in jogging mode are:

- Master axis speed (C-0-0006)
or effective command value of the command list (C-0-0054)
- Gear ratio - fine adjust (C-0-0045)
- Phase offset command, gear input (C-0-0080)
- Phase offset command, gear output (C-0-0096)

Jogging mode of the following axis

With parameter "Selection method: adjustable parameter" (A-0-0177) is set, if the selection of the process variable to jog is done with

- binary combination at the inputs E:F#.45...48 or
- binary combination in parameter "Adjustable parameter selection" (A-0-0013).

The acknowledge of the selection in both cases is done with outputs A:F#.45...48.

The selection of the jogging variable at the active register controller in parameter "Process control - control word 1" (A-0-0025), bit 21 is no longer necessary.

The target parameters of the following axis in jogging mode are:

- Fine adjustment (A-0-0060)
- Speed offset (A-0-0031)
- Process command value 1 (A-0-0026)
- Position command offset (A-0-0004)
- Register control - position command (A-0-0084)
- Phase offset begin of cam shaft profile (A-0-0096)
- Group command value additive 1 (A-0-0132)
- Group command value additive 2 (A-0-0155)

2.4 Interfaces

Ethernet/IP slave interface

An Ethernet/IP communication is possible with the assembly BGR RECO-CONTROL T2 LK ETH01.

Functional features

The ETH01 assembly is provided with the following functional features in Ethernet/IP mode:

- 10-Mbaud Ethernet users in accordance to IEEE802.3,
- Half and full duplex operation possible,
- Ethernet interface with completely DC-decoupled interface; connection via RJ45 connector,
- Diagnosis LEDs incorporated in the front panel,
- Ethernet/IP level 2 server,
- Cyclic data exchange via Ethernet/IP I/O Messaging,
- freely configurable cyclic process image with up to 128 words (16 bits) input and output data each,
- acyclic data exchange via Ethernet/IP Explicit Messaging (UCMM),
- acyclic data exchange with up to 7 HMI clients at the same time (via HMI port), by means of Indramat SIS protocol via TCP,
- acyclic access to all available SYNTAX parameters,

- monitoring of the process data channel and the SIS channel,
- data exchange with the PPC control assembly via the dual-port memory,
- hardware and software synchronization with the PPC control assembly,

Setting the IP addresses

The IP addresses for the slave interface, the subnet mask and the standard gateway can be set via

- SynTop serial
- button S1 and display H1

ControlNet slave interface

A ControlNet communication is possible with the assembly BGR RECO-CONTROL T2 LK CNS01.

Functional features

The CNS01 assembly has the following functional features:

- ControlNet adapter with completely galvanically isolated interface,
- LEDs for diagnosis on the front panel,
- freely configurable process data channel (Scheduled Messaging) with 1 to 32 words data width at the BUS,
- unscheduled Messaging via UCMM for acyclic parameter access,
- monitoring the process data channel,
- data exchange to control module PPC via dual-port memory,
- hardware and software synchronization with control module PPC,
- implementation of an object structure for simple accessing of variables and parameters of the control module and drive,
- upload / download function via four array of 16 to 128 bytes implemented (Unscheduled Messaging).

Data blocks 101 - 116

The configurable data blocks 101 - 116 can be transmitted via all interfaces except Ethernet/HMI with the following maximum user data length (read / write):

- parameter channel (Profibus): 116 / 114 bytes (r / w)
- PCP channel (Interbus): 116 / 114 bytes (r / w)
- Unscheduled Message (ControlNet): 116 / 114 bytes (r / w)
- Explicit Message (DeviceNet, Ethernet/IP): 116 / 114 bytes (r / w)
- 3964R: 128 / 128 bytes (r / w)
- ARCNET: 240 / 494 bytes (r / w)

Serial ports X10, X16

Both serial ports can be set to different device types, baudrates and modes with parameters "Serial Port A Baudrate" (Y-0-0003), "Serial Port A Mode" (Y-0-0004), "Serial Port A device type" (Y-0-0005) (X10) or "Serial Port B Baudrate" (Y-0-0008), "Serial Port B Mode" (Y-0-0009), "Serial Port B device type" (Y-0-0010) (X16).

The following devices are supported:

- SynTop (standard),
 - SIS interface (e.g., WinPCL),
 - SPS (not available for MotionControl, is used by WinPCL),
- and also
- the baudrates 9600, 19200, 38400, 57600 and 115200,
 - the modes RS232, RS422 and RS485.

SynTop version 10VRS

The commissioning of the SYNTAX application can only be done with SynTop as of version 10VRS.

The connection of the PPC to SynTop is possible with different interfaces:

- serial interfaces (Port X10 or X16)
- Ethernet for service and diagnosis (ETH01 card, TCP-HMI port)

2.5 Integrated MotionLogic (Onboard PLC)

The MotionLogic runs as a stand-alone task now beside the MotionControl on the PPC instead of a hardware component MTS-R.

2.6 Parameters

Y parameters

All parameters of the MotionControl that serve for configuration and diagnosis of the total system independent of the following axis or master axis are managed as Y parameters.

The ident numbers of all C parameters of the previous SYNAX200 versions that are not concerning the master axis, are assumed to the Y parameters without changes.

C parameters

All parameters that concern the master axis are specified as C parameters. With the support of two master axis all C parameters are managed depending on the master axis. If parameters are parameterized in data blocks or in the fieldbus assignment, they have to be entered, e.g., for the master axis 1 in form of "C01:C-0-XXXX".

Drive parameters

In SYNAX200 version 10VRS there are drive parameters where's no directly write access via serial interfaces or fieldbusses allowed. They can only be written via correlating motion control parameters. Such parameter pairs are:

- A-0-0170 ---> P-0-0156
- A-0-0126 ---> P-0-0157
- A-0-0124 ---> P-0-0093

2.7 SERCOS interface

SYNAX200-Version 10VRS also supports in the SERCOS interface of the SYNAX ring:

- transmission speed: 4 Mbit/s
- error codes: according to update 1999
- data format: floating point according to IEEE (754 - 1995)

3 Further important changes to previous versions

3.1 I/O logic

The inputs and the outputs of the master axis and the following axis were reorganized in parts.

Inputs and outputs were dropped, displaced to other numbers or the designation has changed. The speed operating thresholds were renamed: `_A:L#.1m` ---> `_A:G#.0m`.

All other internal I/Os are not concerned.

Note: So it is not possible to assume an existing I/O logic from older versions to SYNTAX10 without changes.

3.2 Synchronization absolute <-> relative

The selection between absolute and relative synchronization is displaced from the motion control to the drive:

A-0-0003, bit 3 ---> P-0-0155, bit 1

3.3 Cam shaft distance at operating mode electronic cam

Parameter "Cam shaft distance" (P-0-0093) is no manipulated variable of the register controller. So it is no longer possible to configure these parameters between motion control and drive and to change them in real time.

3.4 Process controller

The selection bits for tension controller, dancer controller and winding controller in parameter "Process control - control word 2" (A-0-0146) have changed as follows:

- polarity: bit 14 ---> bit 11
- preset: bit 9 ---> bit 12
- winding function: bit 10 ---> bit 13
- new: bit 14

3.5 Group parameters 1 and 2

The following applies for both additive group command values as opposed to previous SYNTAX200 versions:

- The additive group command value effects directly the "Master drive position" (P-0-0053).
- Limitation of the travel distance with an adjustable modulo range.
- It is always traveled the shortest way within the specified modulo range (example: modulo range group command value 720 degree, actual position 50 degree, command value 700 degree ⇒ travel distance 70 degree negative direction).
- The termination of the movement is displayed with outputs "Group command value 1 achieved" (_A:F#.51) or "Group command value 2 achieved" (_A:F#.52).

3.6 Fieldbus process data and data blocks

The process data of the fieldbuses and also the data blocks for the serial interface and the acyclic fieldbus channel are configured with list parameters in SYNTAX ident number format. These are the following parameters:

- Process input data: Y-0-0127, Y-0-0188, Y-0-0189, Y-0-0190
- Process output data: Y-0-0128, Y-0-0185, Y-0-0186, Y-0-0187
- Data blocks 101 ... 108: Y-0-0058 ... Y-0-0065
- Data blocks 109 ... 116: Y-0-0078 ... Y-0-0085

All master axis parameters in this lists must be provided with a master axis address ("C0x:C-0-yyyy"). All other parameters that are not drive dependent must be configured in form of "Y00:Y-0-xxxx".

3.7 Load parameter file of previous SYNTAX200 versions

When loading parameter backup files of previous SYNTAX200 versions all system parameters must be renamed from "C-0-XXXX" to "Y-0-XXXX" and the master axis parameters must be provided with a master axis address ("C00:C-0-xxxx" ---> "C01:C-0-xxxx").

This converting procedure can be automated, e.g., with an visual basic macro in word. Such a example macro (SYNTAX10MacrosCnachY_V02.zip) is available on request in dept. BRC/BMP2.

The following procedure is recommended:

- Dividing the old backup files to a file with all C parameters and a file with the remaining parameters
- Converting the new C parameter files with the word macro
- Loading the converted file
- Loading the file with the remaining parameters
- Checking the complete parameterization
- Adjustment of the I/O logic to SYNTAX10

4 Glossar

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.

CNS

ControlNet slave interface - PPC daughter board

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 ($=2^{20}$) 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)

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 MC (Motion Control)

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

SYNAX200 ML (Motion Logic)

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

SynTop

Commissioning interface for parameterization of the SYNAX200 system.

5 Service & Support

5.1 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**

5.2 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**
+49 (0) 172 660 04 06

5.3 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

5.4 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.

5.5 Kundenbetreuungsstellen - Sales & Service Facilities

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vom Ausland: (0) nach Landeskennziffer weglassen!
from abroad: don't dial (0) after country code!

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