Altivar Machine ATV340

Variable Speed Drives
for Asynchronous and Synchronous Motors

Sercos III Manual

08/2018

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical character-istics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information ⓘ

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Qualification Of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used. All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

Intended Use

This product is a drive for three-phase synchronous, reluctance and asynchronous motors and intended for industrial use according to this manual. The product may only be used in compliance with all applicable safety standard and local regulations and directives, the specified requirements and the technical data. The product must be installed outside the hazardous ATEX zone. Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented. Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design). Any use other than the use explicitly permitted is prohibited and can result in hazards.

Product Related Information

Read and understand these instructions before performing any procedure with this drive.

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage.
- Only use properly rated, electrically insulated tools and measuring equipment.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.
- Before performing work on the drive system:
  - Disconnect all power, including external control power that may be present. Take into account that the circuit breaker or main switch does not de-energize all circuits.
  - Place a **Do Not Turn On** label on all power switches related to the drive system.
  - Lock all power switches in the open position.
  - Wait 15 minutes to allow the DC bus capacitors to discharge.
  - Follow the instructions given in the chapter "Verifying the Absence of Voltage" in the installation manual of the product.
- Before applying voltage to the drive system:
  - Verify that the work has been completed and that the entire installation cannot cause hazards.
  - If the mains input terminals and the motor output terminals have been grounded and short-circuited, remove the ground and the short circuits on the mains input terminals and the motor output terminals.
  - Verify proper grounding of all equipment.
  - Verify that all protective equipment such as covers, doors, grids is installed and/or closed.

Failure to follow these instructions will result in death or serious injury.

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

⚠ ⚠ DANGER
ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION
Do not use damaged products or accessories.
Failure to follow these instructions will result in death or serious injury.

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

⚠ WARNING
LOSS OF CONTROL
● The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart. ● Separate or redundant control paths must be provided for critical control functions. ● System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link. ● Observe all accident prevention regulations and local safety guidelines (1). ● Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.

NOTICE
DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE
Before switching on and configuring the product, verify that it is approved for the mains voltage.
Failure to follow these instructions can result in equipment damage.

The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

⚠ WARNING
HOT SURFACES
● Ensure that any contact with hot surfaces is avoided. ● Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces. ● Verify that the product has sufficiently cooled down before handling it. ● Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

⚠ DANGER
POTENTIAL FOR EXPLOSION
Install and use this equipment in non-hazardous locations only.
Failure to follow these instructions will result in death or serious injury.

Machines, controllers, and related equipment are usually integrated into networks. Unauthorized persons and malware may gain access to the machine as well as to other devices on the network/fieldbus of the machine and connected networks via insufficiently secure access to software and networks.

⚠ WARNING
UNAUTHORIZED ACCESS TO THE MACHINE VIA SOFTWARE AND NETWORKS
● In your hazard and risk analysis, consider all hazards that result from access to and operation on the network/fieldbus and develop an appropriate cyber security concept. ● Verify that the hardware infrastructure and the software infrastructure into which the machine is integrated as well as all organizational measures and rules covering access to this infrastructure consider the results of the hazard and risk analysis and are implemented according to best practices and standards covering IT security and cyber security (such as: ISO/IEC 27000 series, Common Criteria for Information Technology Security Evaluation, ISO/ IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - Standard of Good Practice for Information Security). ● Verify the effectiveness of your IT security and cyber security systems using appropriate, proven methods.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING
LOSS OF CONTROL
Perform a comprehensive commissioning test to verify that communication monitoring properly detects communication interruptions
Failure to follow these instructions can result in death, serious injury, or equipment damage.

About the Book

At a Glance

Document Scope

The purpose of this document is to show you how to set up the Sercos III fieldbus on your drive.

NOTE: Read and understand this document and all related documents (see below) before installing, operating, or maintaining your drive.

Validity Note

Original instructions and information given in this manual is written in English (before optional translation).

This documentation is valid for the Altivar Machine 340 Sercos drives.

The technical characteristics of the devices described in the present document also appear online. To access the information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Use your tablet or your PC to quickly access detailed and comprehensive information on all our products on www.schneider-electric.com.

The internet site provides the information you need for products and solutions:
- The whole catalog for detailed characteristics and selection guides,
- The CAD files to help design your installation, available in over 20 different file formats,
- All software and firmware to maintain your installation up to date,
- A large quantity of White Papers, Environment documents, Application solutions, Specifications... to gain a better understanding of our electrical systems and equipment or automation,
- And finally all the User Guides related to your drive, listed below:

You can download these technical publications and other technical information from our website at www.schneider-electric.com/en/download

(Other option manuals and Instruction sheets are available on www.schneider-electric.com)

Title of Documentation	Catalog Number
ATV340 Catalog	DIA2ED2160701EN (English), DIA2ED2160701FR (French)
ATV340 Getting Started	NVE37643 (English), NVE37642 (French), NVE37644 (German), NVE37646 (Spanish), NVE37647 (Italian), NVE37648 (Chinese)
ATV340 Getting Started Annex (SCCR)	NVE37641 (English)
Wiring Diagrams for Frame Sizes S1, S2, S3	NVE97896 (English)
ATV340 Installation Manual	NVE61069 (English), NVE61071 (French), NVE61074 (German), NVE61075 (Spanish), NVE61078 (Italian), NVE61079 (Chinese)
ATV340 Programming Manual	NVE61643 (English), NVE61644 (French), NVE61645 (German), NVE61647 (Spanish), NVE61648 (Italian), NVE61649 (Chinese)
ATV340 Modbus manual (Embedded)	NVE61654 (English)
ATV340 Ethernet manual (Embedded)	NVE61653 (English)
ATV340 PROFIBUS DP manual (VW3A3607)	NVE61656 (English)
ATV340 DeviceNet manual (VW3A3609)	NVE61683 (English)
ATV340 PROFINET manual (VW3A3627)	NVE61678 (English)
ATV340 CANopen manual (VW3A3608, 618, 628)	NVE61655 (English)
ATV340 EtherCAT manual - (VW3A3601)	NVE61686 (English)
ATV340 Sercos III manual (Embedded for ATV340•••••S)	PHA33735 (English)
ATV340 Communication Parameters	NVE61728 (English)
ATV340 ATEX manual	NVE61651 (English)
ATV340 Embedded Safety Function Manual	NVE64143 (English)
SoMove FDT	SoMove_FDT (English, French, German, Spanish, Italian, Chinese)
Altivar 340: DTM	ATV340_DTM_Library_EN (English), ATV340_DTM_Lang_FR (French), ATV340_DTM_Lang_DE (German), ATV340_DTM_Lang_SP (Spanish), ATV340_DTM_Lang_IT (Italian), ATV340_DTM_Lang_CN (Chinese)

Terminology

The technical terms, terminology, and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the area of drive systems this includes, but is not limited to, terms such as **error, error message, failure, fault, fault reset, protection, safe state, safety function, warning, warning message**, and so on.

Among others, these standards include:
● IEC 61800 series: Adjustable speed electrical power drive systems
● IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related
● EN 954-1 Safety of machinery - Safety related parts of control systems
● ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems
● IEC 61158 series: Industrial communication networks - Fieldbus specifications
● IEC 61784 series: Industrial communication networks - Profiles
● IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

In addition, the term **zone of operation** is used in conjunction with the description of specific hazards, and is defined as it is for a **hazard zone** or **danger zone** in the EC Machinery Directive (2006/42/EC) and in ISO 12100-1.

Also see the glossary at the end of this manual.

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Chapter 1
Presentation

Hardware Overview

General

The drive embeds a Sercos III dual port adapter that can be used in industrial Sercos III fieldbuses.

The following figure shows the location of the Sercos III dual port adapter:
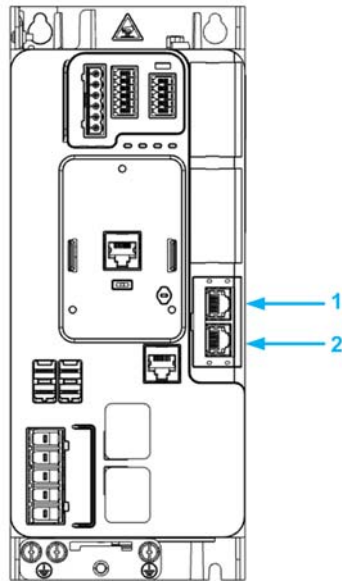
1 Sercos III port 1.
2 Sercos III port 2

Chapter 2
Hardware Setup

What Is in This Chapter?

This chapter contains the following topics:

Electrical Installation

Pin Layout

The drive is equipped with 2 RJ45 female sockets for Sercos III connection.
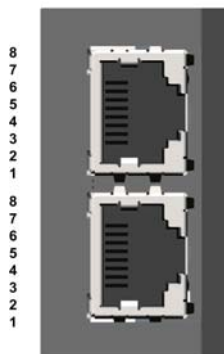
The table provides the pin out details of each RJ45 connector:

Pin	Signal	Meaning
1	Tx+	Ethernet transmit line +
2	Tx-	Ethernet transmit line –
3	Rx+	Ethernet receive line +
4...5	–	–
6	Rx-	Ethernet receive line -
7...8	–	–

Cable Specification

Cable specifications are as follows:
- Minimum Cat 5e,
- Use equipotential bonding conductors (100 BASE-TX, category 5e or industrial Ethernet fast connect)
- Connector RJ45, no crossover cable
- Shield: both ends grounded
- Twisted-pair cable
- Wiring, cables and connected interfaces must meet the PELV requirements.
- Maximum cable length per segment = 99.9 m (328 ft)

Cable Routing Practice

Installation Topology

The Sercos III adapter enables several wiring solutions:
- Line or Double-Line topology:
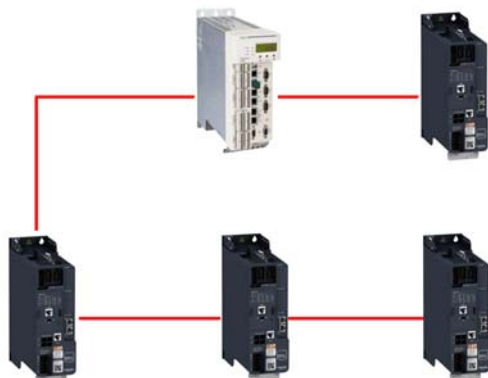
The Double-Line topology must be used with Sercos Address as Sercos Identification mode. If the Sercos Identification mode is done with Topology Addresses, the double-line cannot be used.

NOTE: In line or double line topology, if one drive is turned off, a **[Embd Eth Com Interrupt]** EtHF error is triggered in he other drives connected to the same topology.

- Ring topology
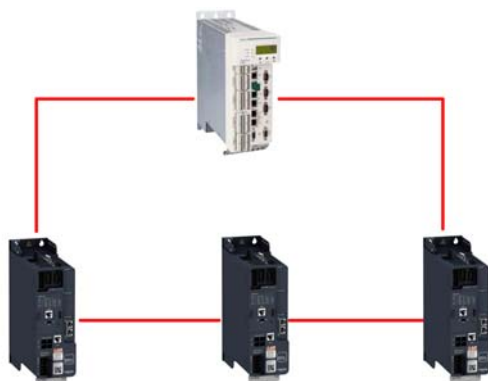
NOTE: In ring topology, the Sercos network communication is robust to one cable loss between two slaves or between a Master and a Slave.

NOTE: Irrespective of the topology, to keep the integrity of Sercos network when one or more drives are powered off, add an external permanent 24 Vdc supply to the control block of the drive.

Accessories

SERCOS III Cables with Connectors

Description	Catalog number
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 0.5 m	VW3E5001R005
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 1 m	VW3E5001R010
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 1.5 m	VW3E5001R015
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 2 m	VW3E5001R020
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 3 m	VW3E5001R030
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 5 m	VW3E5001R050
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 10 m	VW3E5001R100
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 15 m	VW3E5001R150
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 20 m	VW3E5001R200
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 25 m	VW3E5001R250
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 30 m	VW3E5001R300
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 40 m	VW3E5001R400
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 50 m	VW3E5001R500
SERCOS III cable, 2 x RJ45, shielded cable, Twisted Pair, 99.9 m	VW3E5001R999

Chapter 3
Software Setup

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
3.1	Basic Settings	20
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Section 3.1
Basic Settings

What Is in This Section?

This section contains the following topics:

[IP address] *ıC 0 1* *ıC 0 2* *ıC 0 3* *ıC 0 4*

About This Parameter

This parameter is used to set the default IP address.

Access

This parameter is accessible via **[Communication]** *C o M -* , **[Comm parameters]** *C M P -* menu and **[Embd Eth Config]** *E t E -* submenu.

This is a read/write parameter

The parameter number for IC01 is 64401

The parameter number for IC02 is 64402

The parameter number for IC03 is 64403

The parameter number for IC04 is 64404

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[0.0.0.0]	*0*	0...255	First byte of IP address.
	0	0...255	Second byte of IP address.
	0	0...255	Third byte of IP address.
	0	0...255	Fourth byte of IP address.
			Factory setting: 0.0.0.0

[Mask] *ıM 0 1* *ıM 0 2* *ıM 0 3* *ıM 0 4*

About This Parameter

This parameter is used to set the default IP subnet mask.

Access

This parameter is accessible via **[Communication]** *C o M -* , **[Comm parameters]** *C M P -* menu and **[Embd Eth Config]** *E t E -* submenu.

This is a read/write parameter

The parameter number for IM01 is 64405

The parameter number for IM02 is 64406

The parameter number for IM03 is 64407

The parameter number for IM04 is 64408

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[255.255.255.0]	*255*	0...255	First byte of IP Mask Eth Embd.
	255	0...255	Second byte of IP Mask Eth Embd.
	255	0...255	Third byte of IP Mask Eth Embd.
	0	0...255	Fourth byte of IP Mask Eth Embd
			Factory setting: 255.255.255.0

[Gateway] *IG01, IG02, IG03, IG04*

About This Parameter

This parameter is used to set the default gateway address.

Access

This parameter is accessible via **[Communication]** *CoM-* , **[Comm parameters]** *CMP-* menu and **[Embd Eth Config]** *EtE-* submenu.

This is a read/write parameter

The parameter number for IG01 is 64409

The parameter number for IG02 is 64410

The parameter number for IG03 is 64411

The parameter number for IG04 is 64412

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[0.0.0.0]	*0*	0...255	First byte of IP gateway.
	0	0...255	Second byte of IP gateway
	0	0...255	Third byte of IP gateway
	0	0...255	Fourth byte of IP gateway
			Factory setting: 0.0.0.0

[Sercos Address] *S3Ad*

About This Parameter

This parameter is used to set the Sercos III device address.

The modification of the setting value is effective when you restart the drive.

Access

This parameter is accessible via **[Communication]** *CoM-* , **[Comm parameters]** *CMP-* menu and **[Embd Eth Config]** *EtE-* submenu.

This is a read/write parameter

The parameter number for S3AD is 63300.

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[0]...[255]	*0...255*	0...255	Sercos III device address
			Factory setting: 0

[MAC @] _Π Ĥ Ľ E_

About This Parameter

This parameter displays the MAC address of the device.

Access

This parameter is accessible via **[Display]** _Π o n -_ , **[Communication map]** _Ľ Π Π -_ menu and **[Ethernet Emb Diag]** _Π P E -_ submenu.

This is a read-only parameter

This parameter can also be accessed with the standard Sercos parameter S-0-1019.

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[MM-MM-MM-XX-XX-XX]	_Π Π - Π Π - Π Π - X X - X X - X X_	MM-MM-MM-XX-XX-XX	MAC address

[Sercos Com Phase] _S Ʒ P Ĥ_

About This Parameter

This parameter displays the actual Sercos III communication phase.

Access

This parameter is accessible via **[Display]** _Π o n -_ , **[Communication map]** _Ľ Π Π -_ menu and **[Ethernet Embd Diag]** _Π P E -_ submenu.

This is a read only parameter

The parameter number for S3PH is 63301.

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[CP0]	_Ľ P Ũ_	0	Communication phase 0
[CP1]	_Ľ P I_	1	Communication phase 1
[CP2]	_Ľ P ɘ_	2	Communication phase 2
[CP3]	_Ľ P Ʒ_	3	Communication phase 3
[CP4]	_Ľ P Ч_	4	Communication phase 4
[HP0]	_Ĥ P Ũ_	5	Reserved
[HP1]	_Ĥ P I_	6	Reserved
[HP2]	_Ĥ P ɘ_	7	Reserved
[NRT]	_n r ţ_	255	Non real time mode

Section 3.2
Additional Parameters

What Is in This Section?

This section contains the following topics:

Standard Sercos Parameters

Introduction

The following pages describe the standard Sercos IDN parameters supported by the drive.

The parameters are classified by Profile areas and function groups.

Parameters are described as following example:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
ABCDE	Description of parameter	Unit 0.00 3.00 300.00	R/W	Parameter address

Sercos Communication Profile (SCP)

SCP Identification

The following table describes the parameter of `SCP Identification` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
`SCP Type & Version`	This parameter contains a list of the Sercos communication capabilities / communication classes and the appropriate version supported by the drive. Type: Hexadecimal - 2 bytes (variable length) Write access: Read only Class name: `SCP_VarCFG`	- - - -	R/-	S-0-1000.0.0

Timing

The following table describes the parameter of `Timing` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
`Communication Cycle time (tScyc)`	This parameter specifies the intervals at which the cyclic real-time data is transmitted. Possible values are 1000 µs, 2000 µs and 4000 µs. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: `SCP_VarCFG` In increment of 0.001 µs	µs 1000.000 1000.000 4000.000	R/W	S-0-1002
`Minimum feedback processing time (t5)`	This parameter specifies the time required by the drive for receiving and processing actual values (such as encoder data) and providing them in ATs. Type: Unsigned decimal - 4 bytes Write access: Read only Class name: `SCP_Sync` In increment of 0.001 µs	µs- - - -	R/-	S-0-1005
`AT0 transmission starting time (t1)`	This parameter specifies the nominal time interval between the end of MST and the beginning of AT0. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: `SCP_Sync` In increment of 0.001 µs	µs - - -	R/W	S-0-1006
`MDT Command value valid time (t3)`	This parameter determines the point in time at which the drive is permitted to access the new reference values, related to the synchronization time. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: `SCP_Sync` In increment of 0.001 µs	µs 0 - 4000.000	R/W	S-0-1008

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
SYNC jitter	This parameter contains the maximum synchronization jitter. The synchronization jitter is used by the drive to calculate the MST window (2 x synchronization jitter). This parameter is transmitted to all drives supporting SCP_Sync. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: SCP_Sync In increments of 0.001 µs	µs - - -	R/W	S-0-1023
AT Command value valid time (t9)	This parameter determines the point in time at which the drive is permitted to access the new reference values from the AT. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: SCP_Sync In increments of 0.001 µs	µs 0 - 4000.000	R/W	S-0-1041

Sync

The following table describes the parameters of `Sync` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Synchronisation Time (tSync)	This parameter specifies the point in time at which all producer cycle times (producing and consuming connections) in a drive are synchronized. This value is set by the master. It must be less than the value for the synchronization cycle time. The synchronization cycle time is the least common multiple of al producer cycle times (tPcyc) to be synchronized in the network. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: SCP_Sync In increment of 0.001 µs	µs 0 - 4294967.295	R/W	S-0-1007
Ring delay	This parameter contains the entire ring delay determined by the master. The master assigns this value to the drives. Type: Unsigned decimal - 4 bytes Write access: Always Class name: SCP_Sync In increment of 0.001 µs	µs 0 - 1048.575	R/W	S-0-1015

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Slave delay (P/S)	This parameter contains the slave delay. After the master has assigned the ring delay (S-0-1015) to the slaves, the slaves measure their own delay (SYNCCNT-P / SYNCCNT-S) when the procedure command S-0-1024 is executed. Type: Unsigned decimal - 4 bytes (variable length) Write access: Read only Class name: `SCP_Sync` In increment of 0.001 µs	µs - - -	R/-	S-0-1016
`SYNC delay measuring procedure command`	This procedure command causes the drive to determine its slave delay (S-0-1016) depending on the ring delay (S-0-1015). Type: Binary - 2 bytes Write access: Always Class name: `SCP_Sync`	- 0 0 3	R/W	S-0-1024

Telegram Setup

The following table describes the parameters of `Telegram Setup` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
`Device Control offset in MDT`	This parameter specifies the MDT number and the position within the specified MDT for device control. This parameter is transferred by the master to each drive. Type: Hexadecimal - 2 bytes Write access: CP2 Class name: `SCP_VarCFG`	- 0 - 1492	R/W	S-0-1009
`Length of MDTs`	This parameter contains the lengths of the four possible MDTs in octets. These values are required for the initialization of the Sercos hardware. Type: Unsigned decimal - 2 bytes (variable length) Write access: CP2 Class name: `SCP_VarCFG`	- 0 - 1494	R/W	S-0-1010
`Device Status offset in AT`	This parameter specifies the position of the status field of the drive in the AT in octets. This parameter is transferred by the master to each drive. Type: Hexadecimal - 2 bytes Write access: CP2 Class name: `SCP_VarCFG`	- 0 - 1492	R/W	S-0-1011

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Length of ATs	This parameter contains the lengths of the four possible ATs in octets. These values are required for the initialization of the Sercos hardware. Type: Unsigned decimal - 2 bytes (variable length) Write access: CP2 Class name: SCP_VarCFG	- 0- 1494	R/W	S-0-1012
SVC offset in MDT	This parameter specifies the position of the service channel in the MDT for the drive. This parameter is transferred by the master to each drive. Type: Hexadecimal - 2 bytes (variable length) Write access: CP2 Class name: SCP_VarCFG	- 0 - 1484	R/W	S-0-1013
SVC offset in AT	This parameter specifies the position of the service channel in the AT for the drive. This parameter is transferred by the master to each drive. Type: Hexadecimal - 2 bytes (variable length) Write access: CP2 Class name: SCP_VarCFG	- 0 - 1484	R/W	S-0-1014

Control

The following table describes the parameters of Control function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
IDN list of invalid operation data for CP2	This parameter contains an IDN list with IDNS which are considered invalid by the drive when it performs the CP3 transition check (S-0-0127). Type: IDN - 4 bytes (variable length) Write access: Read only Class name: SCP_VarCFG, SCP_Diag	- - - -	R/-	S-0-0021
IDN list of invalid operation data for CP3	This parameter contains an IDN list with IDNS which are considered invalid by the drive when it performs the CP4 transition check (S-0-0128). Type: IDN - 4 bytes (variable length) Write access: Read only Class name: SCP_VarCFG, SCP_Diag	- - - -	R/-	S-0-0022

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Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
CP3 transition check	This procedure command instructs the drive to verify that all parameters necessary for CP3 have been transferred. If an error is detected, parameter S-0-0021 contains the appropriate IDNs. After correct termination of the command by the master, the master can activate CP3. Type: Binary - 2 bytes Write access: Always Class name: SCP_VarCFG	- 0 - 3	R/W	S-0-0127
CP4 transition check	This procedure command instructs the drive to verify that all parameters necessary for CP4 have been transferred. If an error is detected, parameter S-0-0022 contains the appropriate IDNs. After correct termination of the command by the master, the master can activate CP4. Type: Binary - 2 bytes Write access: Always Class name: SCP_VarCFG	- 0 - 3	R/W	S-0-0128

Bus Diagnostics

The following table describes the parameters of `Bus Diagnostics` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Interface Status	This parameter contains the status of the Sercos interface. Type: Binary - 2 bytes Write access: Read only Class name: SCP_VarCFG	- 0 0 16383	R/-	S-0-0014
Allowed MST losses in CP3/CP4	This parameter specifies the maximum number of successive communication cycles during which a drive is permitted to not receive the MST in CP3 and CP4. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: SCP_VarCFG	- 0 2 65535	R/W	S-0-1003
Version of communication hardware	This parameter contains the Sercos III specific communication hardware identification. Type: Text - 1 byte (variable length) Write access: Read only Class name: SCP_VarCFG	- - - -	R/-	S-0-1026
Error counter MST P/S	This parameter is an error counter which is incremented if no valid MST is received at port 1 or port 2 during CP3 and CP4. Type: Unsigned decimal - 2 bytes Write access: Read only Class name: SCP_Diag	- 0 0 65535	R/-	S-0-1028

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Test pin assignment Port 1 & Port 2	This parameter is used to assign communication-related hardware signals to the test pins TS1 and TS2. Type: Binary - 2 bytes Write access: Always Class name: SCP_Diag	- 0 0 3855	R/W	S-0-1031
Error counter Port1 and Port2	This parameter is an error counter which counts the detected Ethernet errors. Type: Hexadecimal - 4 bytes Write access: Always Class name: SCP_VarCFG	- 0 0 65535	R/W	S-0-1035
SERCOS address (see page 22)	This parameter contains the Sercos device address assigned to the drive. Type: Unsigned decimal - 2 bytes Write access: CP2 Class name: SCP_VarCFG	- 0 0 511	R/W	S-0-1040
Device Control	This parameter contains the control information (for example, topology control, fast-forward, loopback, physical topology, ring, etc…) set by the master and evaluated by the drive. Type: Hexadecimal - 2 bytes Write access: Read only Class name: SCP_Diag	- - - -	R/-	S-0-1044
Device Status	This parameter contains the status information (for example, topology status, fast-forward, loopback, physical topology, ring, etc…) set by the drive and evaluated by the master. Type: Hexadecimal - 2 bytes Write access: Read only Class name: SCP_Diag	- - - -	R/-	S-0-1045
List of SERCOS addresses in device	If a device comprises multiple Sercos slaves, this parameter contains the Sercos addresses of the slaves that participate in the communication. Type: Unsigned decimal - 2 bytes (variable length) Write access: Read only Class name: SCP_VarCFG	- 1 1 1	R/-	S-0-1046
Topology address	This parameter contains the topology address of the drive (physical position in the network). This address is independent of the Sercos address. This parameter is a manufacturer-specific extension of the standard parameter. Type: IDN - 2 bytes Write access: Read only	- 0 0 511	R/-	S-0-1040.0.128

Connection

The following table describes the parameters of `Connection` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
IDN list of configurable data as producer	This parameter contains a list of all IDNs with operation data (feedback values) which can be cyclically processed by the drive. Type: IDN - 4 bytes (variable length) Write access: Read only Class name: `SCP_VarCFG`	- - - -	R/-	S-0-0187
IDN list of configurable data as consumer	This parameter contains a list of all IDNs with operation data (command values) which can be cyclically processed by the drive. Type: IDN - 4 bytes (variable length) Write access: Read only Class name: `SCP_VarCFG`	- - - -	R/-	S-0-0188
Connection setup	This parameter is used to configure connections. Type: Hexadecimal - 2 bytes Write access: CP2 Class name: `SCP_VarCFG`, `SCP_Sync`, `SCP_WDCon`	- 0 8218 65535	R/W	S-0-1050.x.01
Connection Number	The connection number is used to identify a connection. The producer and all consumers of the same connection have the same connection number. Type: Unsigned decimal - 2 bytes Write access: CP2 Class name: `SCP_VarCFG`	- 0 0 65535	R/W	S-0-1050.x.02
Telegram Assignment	This parameter contains the telegram type (MDT or AT), the telegram number and the telegram offset of connection control for this connection. Type: Hexadecimal - 2 bytes Write access: CP2 Class name: `SCP_VarCFG`	- 0 0 15828	R/W	S-0-1050.x.03
Max. Length Of Connection	This parameter specifies the maximum length of this connection. Type: Unsigned decimal - 2 bytes Write access: Read only Class name: `SCP_VarCFG`	- 2 2 200	R/-	S-0-1050.x.04
Current length of connection	This parameter specifies the current length of this connection. Type: Unsigned decimal - 2 bytes Write access: Read only Class name: `SCP_VarCFG`	- 2 2 200	R/-	S-0-1050.x.05

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Configuration List	If the connection data is configured via IDNs (type of connection, bit 5-4 = 00, in S-0-1050.x.01), this parameter contains the list of IDNs within this connection. Type: IDN - 4 bytes (variable length) Write access: CP2 Class name: SCP_VarCFG	- - - -	R/W	S-0-1050.x.06
Assigned connection capability	This parameter shows the configured connection capability of this connection. Type: Signed decimal - 2 bytes Write access: CP2	- -1 -1 255	R/W	S-0-1050.x.07
Connection Control (C-Con)	This parameter contains the image of the control word C-Con of this connection. Type: Unsigned decimal - 4 bytes Write access: Read only. Class name: SCP_Diag	- - - -	R/-	S-0-1050.x.08
Producer Cycle Time	This parameter contains the producer cycle time. The producer cycle time must be an integer multiple of the communication cycle time. Type: Unsigned decimal - 4 bytes Write access: CP2 Class name: SCP_Sync, SCP_WDCon In increment of 0.001 µs	µs 31.250 1000.000 4294967.296	R/W	S-0-1050.x.10
Allowed Data Losses	This parameter specifies the maximum amount of consecutive producer data that may be lost before a connection is closed. Type: Unsigned decimal - 2 bytes Write access: CP2 Class name: SCP_Sync, SCP_WDCon	- 1 1 65535	R/W	S-0-1050.x.11
Error Counter Data Losses	This parameter is a counter which counts the amount of producer data lost. Type: Unsigned decimal - 2 bytes (variable length) Write access: Read only Class name: SCP_Sync, SCP_Diag	- 0 0 65535	R/-	S-0-1050.x.12
Image of connection setups	This parameter contains the actual state of all the connections of the drive, corresponding to the parameter S-0-1050.x.1. Type: Hexadecimal - 2 bytes (variable length) Write access: Read only Class name: SCP_VarCFG	- - - -	R/-	S-0-1051.0.0

NRT

The following table describes the parameters of `NRT` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
UC transmission time	This parameter contains the UC transmission time. Type: Unsigned decimal - 4 bytes (variable length) Write access: Read only Class name: `SCP_VarCFG` In increment of 0.001 µs	µs - - -	R/-	S-0-1017
MAC Address	The drive writes its MAC address to this parameter. Type: Hexadecimal - 1 byte (variable length) Write access: Read only Class name: `SCP_NRT`	- - - -	R/-	S-0-1019
Current IP address	This parameter contains the IP address of the Sercos III interface of the drive. The master can modify the IP address by writing this parameter. Type: Unsigned decimal - 1 byte (variable length) Write access: Always Class name: `SCP_NRT`	- - 0.0.0.0 -	R/W	S-0-1020
Subnet Mask	This parameter contains the subnet mask. The master can modify the subnet mask for IP communication via the NRT channel. Type: Unsigned decimal - 1 byte (variable length) Write access: Always Class name: `SCP_NRT`	- - 255.255.255.0 -	R/W	S-0-1021
Gateway address	This parameter contains the gateway address. The master can modify the gateway address for IP communication via the NRT channel. Type: Unsigned decimal - 1 byte (variable length) Write access: Always Class name: `SCP_NRT`	- - 0.0.0.0 -	R/W	S-0-1022
Requested MTU	The requested MTU specifies the maximum number of octets that can be sent via the NRT channel by higher layers. Type: Unsigned decimal - 2 bytes Write access: CP2 Class name: `SCP_NRT`	- 46 - 1500	R/W	S-0-1027.0.1
Effective MTU	This parameter contains the current MTU. The current MTU is calculated using the parameters S-0-1017 and S-0-1027.0.1 Type: Unsigned decimal - 2 bytes Write access: CP2 Class name: `SCP_NRT`	- 46 - 1500	R/W	S-0-1027.0.2

Generic Device Profile

Administration

The following table describes the parameter of `Administration function` group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
IDN-list of all operation data	This parameter contains all procedure commands and parameters supported by the drive. Type: IDN - 4 bytes (variable length) Write access: Read only Class name: GDP_Basic	- - - -	R/-	S-0-0017

Diagnostics

The following table describes the parameter of `Diagnostics` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Class 1 diagnostic (C1D)	This parameter provides information on detected errors. A class 1 diagnostics error leads to a Quick Stop (with transition to operating state Fault). Type: Binary - 2 bytes Write access: Read only	- 0 0 65535	R/-	S-0-0011
Class 2 diagnostic (C2D)	This parameter provides information on warnings. Type: Binary - 2 bytes Write access: Read only	- 0 0 65535	R/-	S-0-0012
Reset class 1 diagnostic	If this procedure command is received by the drive via the service channel, the detected errors, the error bits and the shut-down mechanism are cleared. In order to process the reset command, you must write the value 3 to this parameter. Type: Binary - 2 bytes Write access: Always Class name: GDP_Basic	- 0 0 3	R/W	S-0-0099
Diagnostic number	The operation data of this parameter contains detailed information on the diagnostics event with the highest priority which is currently active in the drive. Type: Hexadecimal - 4 bytes Write access: Read only Class name: GDP_Basic	- 0 0 4294967295	R/-	S-0-0390

Identification

The following table describes the parameter of `Identification` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Vendor Name	This parameter contains the vendor-specific name of the device. Type: Text - 1 byte (variable length) Write access: Read only Class name: GDP_Id	- - - -	R/-	S-0-1300.0.02
Vendor Code	This parameter contains the vendor code. The vendor code is a unique number assigned to each vendor and helps to identify a SERCOS device. Type: Unsigned decimal - 2 bytes Write access: Read only Class name: GDP_Basic	- 1 1 1	R/-	S-0-1300.0.03
Device Name	This parameter contains the device name published in vendor's price list. Type: Text - 1 byte (variable length) Write access: Read only Class name: GDP_Id	- 0 - 255	R/-	S-0-1300.0.04
Vendor Device ID	The parameter contains the vendor device ID. The vendor device ID is a unique device ID managed by the vendor; it identifies the component number. Type: Text - 1 byte (variable length) Write access: Read only Class name: GDP_Basic	- 0 - 255	R/-	S-0-1300.0.05
Hardware Revision	This parameter contains the hardware revision of the device. Type: Text - 1 byte (variable length) Write access: Read only	- 0 - 255	R/-	S-0-1300.0.08
Software Revision	This parameter contains the firmware version of the drive. Type: Text - 1 byte (variable length) Write access: Read only	- 0 - 255	R/-	S-0-1300.0.09
Order Number	This parameter contains the order number of the drive. Type: Text - 1 byte (variable length) Write access: Read only	- - - -	R/-	S-0-1300.0.11
Serial Number	This parameter contains the serial number of the drive. Type: Text - 1 byte (variable length) Write access: Read only Class name: GDP_Id	- 0 - 255	R/-	S-0-1300.0.12

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Software Revision	This parameter contains the software version of the SERCOS III Communication Option. Type: Text - 1 byte (variable length) Write access: Read only	- 0 - 255	R/-	S-0-1300.1.09
Firmware Loader Revision	This parameter contains the revision of the firmware loader or bootloader implemented in the drive. Type: Text - 1 byte (variable length) Write access: Read only	- 0 - 255	R/-	S-0-1300.1.10
Software Revision	This parameter contains the software version of the FPGA of the SERCOS communication option. Type: Text - 1 byte (variable length) Write access: Read only	- 0 - 255	R/-	S-0-1300.2.09
List of GDP classes & Version	This parameter contains a list of the generic profile capabilities and the versions supported by the drive. Type: Hexadecimal - 2 bytes (variable length) Write access: Read only Class name: GDP_Basic	- 257 - 5889	R/-	S-0-1301
FSP Type & Version	This parameter contains the function-specific type and the function-dependent version of the resource. Type: Hexadecimal - 4 bytes Write access: Read only Class name: GDP_Basic	- 0 - 4294967295	R/-	S-0-1302.0.01
Function groups	The operation data of this parameter contains a list of all instanced function groups. Type: IDN - 4 bytes (variable length) Write access: Read only Class name: GDP_Basic	- 0 - 4294967295	R/-	S-0-1302.0.02
Application Type	The operation data of this parameter contains the type of the sub-device application (for example, main spindle drive, round axis, X axis, etc.). Type: Text - 1 byte (variable length) Write access: Always Class name: GDP_Id	- 0 - 255	R/W	S-0-1302.0.03

Function Specific Profile

Drive State Machine

The following table describes the parameter of `Drive State Machine` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Drive Control	This parameter contains the control word. Type: Binary - 2 bytes Write access: Always	- 0 - 65535	R/W	S-0-0134
Drive Status	This parameter contains the status word of the AT. It can be used for diagnostics purposes. Type: Binary - 2 bytes Write access: Read only	- 0 - 65535	R/-	S-0-0135

The contain of these two parameters is described in the sercos profile part. `Drive Control` and `Drive Status` .

Operation Modes

The target position values are synchronously sent to the drive on a cyclic basis. From the received target position, the drive calculates the speed to be followed. The transmitted values are linearly interpolated (internally).

The possible applications for this operating mode are described in the manual of the master controller.

This operating mode corresponds to the following in the case of Sercos III:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Primary Operation Mode	This parameter sets the primary operating mode of the drive. The operating mode is started via bits 8, 9 and 10 in the parameter `Drive Control` (S-0-0134). The active operating mode is indicated by bits 8, 9 and 10 in the `Drive Status` (S-0-0135). Type: Binary - 2 bytes Write access: Read only	- 0 3 3	R/-	S-0-0032

Position Mode

The following table describes the parameters of `Position Mode` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Position Command Value	This parameter contains the target values for operating modes with position target values. Type: Signed decimal - 4 bytes Write access: Always	- -2147483648 - 2147483647	R/W	S-0-0047
Position Feedback Value 1 (motor feedback)	This parameter contains the position data of the motor encoder, if a motor encoder is available. Otherwise, it contains the position command value of the cycle -1. Type: Signed decimal - 4 bytes Write access: Read only	- -2147483648 - 2147483647	R/-	S-0-0051

SE Firmware Update

The following table describes the parameters of `SE Firmware Update` function group supported by the drive:

Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
Firmware Update Control Word	This parameter is used to control the firmware update state. Once the firmware is available in the Sercos slave drive, it must be applied using this Sercos object. Type: Binary - 2 bytes Write Access: CP2	- 0 0 255	R/W	P-0-3000.0.1
Firmware Update Status Word	This parameter is used to report the firmware update state. Possible values are: No firmware update available (0) New firmware available (2) Update done successfully (4) Update Error (5) Type: Binary - 2 bytes Write Access: Read only	- 0 0 255	R/-	P-0-3000.0.2

Manufacturer Sercos Profile

Description of manufacturer specific Sercos IDN

Manufacturer parameters can be accessed with the service channel during acyclic exchanges.

The IDN of these manufacturer parameter has the following form: P-0-Index.0.SubIndex

The calculation of the "Index" and "Subindex" fields are done by using the Modbus address of the parameters. The following formula used to calculate these two fields are:
- Index = (ModbusAddress div 100) - 30 + 2000 (with the integer division "div")
- Subindex = ModbusAddress mod 100 (with the modulus function "mod")

For example, the Modbus address of FRHD (speed reference before ramp) is 8605, the Sercos address associated is P-0-2056.0.5.

A parameter address list is available in the ATV340 communication parameters file *(NVE61728)*.

Real-Time Parameters

The following table list the parameters allowed to add with real-time channel (AT and MST). Additional information about these parameters are available in the communication parameters excel file.

Code	Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
ıL ır	Logic inputs real image	This parameter contains the real image of the digital inputs. The bit 0 gives the status of the Digital input DI1, the bit 1 gives the status of DI2, etc. Type: Binary - 2 bytes	- - - -	R/-	P-0-2022.0.2
oL ır	Logic outputs real image	This parameter contains the real image of the digital outputs and relay. The bit 0 gives the status of the relay R1 (bit0 = R1, bit1=R2, etc.). The bit 8 and 9 gives the status of the digital outputs DO1 and DO2. DO11 and DO12 status are on the bits 12 and 13. Type: Binary - 2 bytes	- - - -	R/W	P-0-2022.0.12
A ı1r	AI1 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog input AI1 depending on the configuration done on AI1 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/-	P-0-2022.0.32
A ı2r	AI2 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog input AI2 depending on the configuration done on AI2 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/-	P-0-2022.0.33
A ı3r	AI3 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog input AI3 depending on the configuration done on AI3 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/-	P-0-2022.0.34

Code	Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
A i4r	AI4 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog input AI4 depending on the configuration done on AI4 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/-	P-0-2022.0.35
A i5r	AI5 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog input AI5 depending on the configuration done on AI5 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/-	P-0-2022.0.36
Ao1r	AO1 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog output AQ1 depending on the configuration done on AQ1 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/W	P-0-2022.0.61
Ao2r	AO2 real application image (MAX = 8192)	This parameter is the corresponding application image of the analog output AQ2 depending on the configuration done on AQ2 (refer to the programming manual). Type: Signed decimal - 2 bytes	- -32767 - 32767	R/W	P-0-2022.0.62
rFr	Motor Frequency	Motor frequency. This parameter is the estimated rotor frequency without motor slip.This parameter is also available on the graphic display terminal. Type: Signed decimal - 2 bytes	Hz -3276.7 - 3276.7	R/-	P-0-2002.0.2
otr	Motor torque	Output torque value. 100% corresponds to the nominal motor torque. The value is always positive in motor mode and negative in generator mode whatever the direction. This parameter is also available on the graphic display terminal. Type: Signed decimal - 2 bytes	% -3276.7 - 3276.7	R/-	P-0-2002.0.5
LALr	Last Warning	This parameter contains the last warning which occured on the drive. This parameter is also available on the graphic display terminal. Refer to the communication excel file for the list of the possible last warning. Type: Decimal - 1 byte	- - - -	R/-	P-0-2098.0.90

Code	Parameter name	Description	Unit Minimum Value Factory setting Maximum Value	Access R/W	Parameters address via Sercos
L F t	Last Error	This parameter contains the last error which occured on the drive. This parameter is also available on the graphic display terminal. Refer to the communication excel file for the list of the possible last error. Type: Decimal - 1 byte	- - - -	R/-	P-0-2041.0.21
F n b	Fault number	This parameter is a counter which counts the amount of error. Type: Unsigned decimal - 2 bytes	- 0 0 65535	R/-	P-0-2043.0.93
S t o S	Safe Torque Off function Status	This parameter gives the STO function status. The possible values are: -0: [Not Active] IDLE -1: [Active] STO -2: [Error] FLT Type: Decimal - 1byte	- - - -	R/-	P-0-2123.0.22
S t o F	STOx Input State	This parameter contains the feedback status of STO_A and STO_B. The bit 0 gives STOA feedback status and the bit 1 gives STOB feedback status. Type: Binary - 2 bytes	- - - -	R/-	P-0-2123.0.23

Section 3.3
Profile

What Is in This Section?

This section contains the following topics:

Definition of a Profile

Types of Profiles

There are 3 types of profile:
- Communication profiles
- Functional profiles
- Application profiles

Communication Profile

A communication profile describes the characteristics of a bus or network:
- Cables
- Connectors
- Electrical characteristics
- Access protocol
- Addressing system
- Periodic exchange service
- Messaging service
- ...

A communication profile is unique to a type of fieldbus (such as Modbus, PROFIBUS DP, and so on) and is used by different types of devices.

Functional Profile

A functional profile describes the behavior of a type of device:
- Functions
- Parameters (such as name, format, unit, type, and so on.)
- Periodic I/O variables
- State chart
- ...

A functional profile is common to all members of a device family (such as variable speed drives, encoders, I/O modules, displays, and so on).

They can feature common or similar parts. The standardized (IEC 61800-7) functional profiles of variable speed drives are:
- CiA402
- PROFIDRIVE
- CIP AC Drive
- SERCOS III

Application Profile

Application profile defines the services to be provided by the devices on a machine. .

Interchangeability

The aim of communication and functional profiles is to achieve interchangeability of the devices connected via the fieldbus.

Functional Profiles Supported by the Drive

Sercos Profile

The drive only starts up following a command sequence.

The Sercos III profile is only supported by the Sercos III fieldbus.

The control word (S-0-0134) and the drive status word (S-0-0135) are specific and standardized.

The drive supports the positioning mode by using this fieldbus.

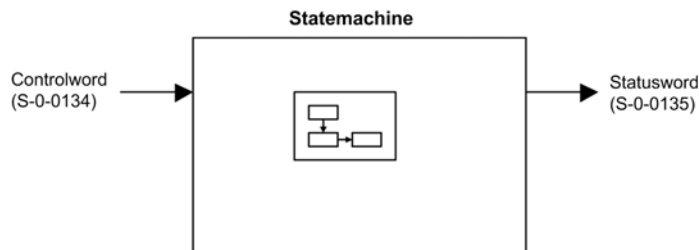The position commands are exchanged by Position Feedback Value (S-0-0051) and Position Command Value (S-0-0047).

Functional Description

Introduction

Drive operation involves two main functions, which are illustrated in the diagrams below.

Sercos III

The following figure shows the control diagram for drive operation:

Regarding the control mode, a reference position command (S-0-0047) is sent to the drive. In the drive, this reference position is converted in speed regarding the limitations. In the embedded Sercos III module, the reference position is copied into the actual position (S-0-0051). At the next cycle, the drive gives back this actual position (S-0-0051).
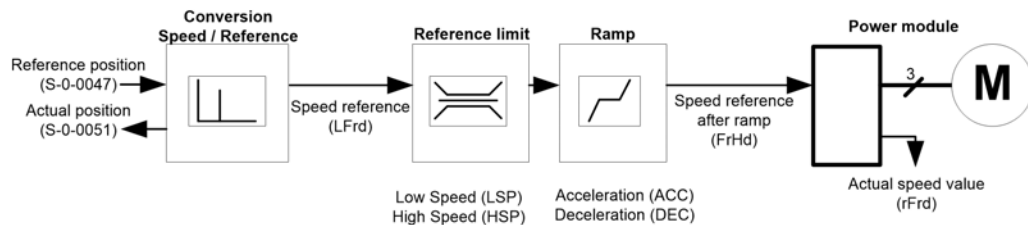
NOTE: The CIA402 operating state is used internally to the drive. Through Sercos III communication, only Sercos state diagram is available. In the drive a conversion is done between Sercos III and CIA402.
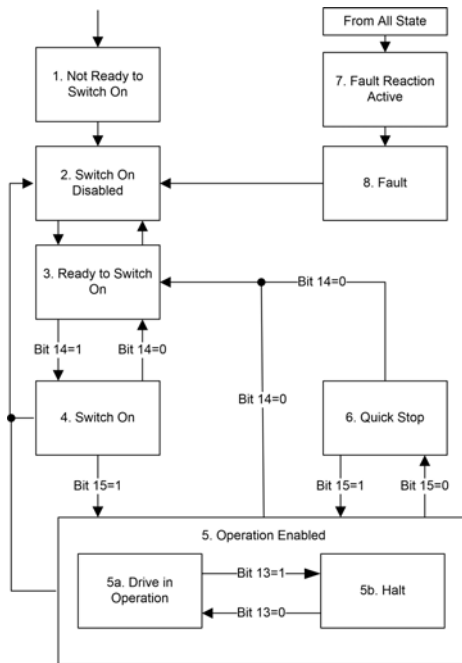
Sercos III Operating State Diagram

State Diagram

After switching on and when an operating mode is started, the product goes through a number of operating states.

The state diagram (state machine) shows the relationships between the operating states and the state transitions. The operating states are internally monitored and influenced by monitoring functions.

The following figure shows the Sercos III state diagram:

Description of Operating States

Operating State	Description
1 – Not ready to switch on	Initialization starts. This is a transient state invisible to the communication network.
2 – Switch on disabled	The power stage is not ready to switch on. The drive is locked, no power is supplied to the motor. The configuration and adjustment parameters can be modified.
3 – Ready to switch on	The power stage is ready to switch on and awaiting power stage supply mains. The drive is locked, no power is supplied to the motor. The configuration and adjustment parameters can be modified.
4 – Switched on	Power stage is switched on. The drive is locked, no power is supplied to the motor. The power stage of the drive is ready to operate, but voltage has not yet been applied to the output. The adjustment parameters can be modified. If a configuration parameter is modified, the drive returns to the state `2 – Switch on disable`.
5 – Operation enabled	Power stage is enabled. The drive is in running state In this operating state, two states can be dissociated: ● 5a - Drive in operation: The drive is running. ● 5b - Halt active: The drive is halted.
6 – Quick stop active	A quick stop of the drive is being executed.
7 – Fault reaction active	Transient state during which the drive performs an action corresponding to the selected error response.
8 – Fault	Error response terminated. Power stage is disabled. The drive is locked, no power is supplied to the motor.

Stop Commands

Halt Command

The `Halt` command enables movement to be interrupted without having to leave the `5 - Operation enabled` state. The `Halt` is performed in accordance with the **[Type of stop]** `Stt` parameter.

If the `Halt` command is active, no power is supplied to the motor and no torque is applied.

Regardless of the assignment of the **[Type of stop]** `Stt` parameter **[On Ramp]** `rΠP`, **[Freewheel Stop]** `nSt`, the drive remains in the `5 - Operation enabled` state.

Quick Stop Command

A `Quick Stop` command at the terminals causes a modification to the operating state `6 - Quick Stop Active`

Freewheel Command

A `Freewheel Stop` command using a digital input of the terminal causes a modification to the operating state operating state `2 - Switch on disabled`.

S-0-0134 Drive Control

Bit Mapping of the Control Word

The following table describes the control word of the Sercos III Profile:

Bit number	Description
15	Drive start (under the condition that the drive is enable, e.g. bit 14 is set to 1) 1 --> 0 = Stop. The drive stops and the power stage can remain in an activated state. 0 -> 1 = Start. The drive follows the command values.
14	Drive enable 1 --> 0 = drive disabled 0 -> 1 = drive enabled
13	Drive halt (under the condition that the bits 14 and 15 are set to 1) 1 --> 0 = halt 0 --> 1 = restart
12	Reserved
11	Reserved
10	0 = Primary operation mode
9	Reserved (=0)
8	Reserved (=0)
7-0	Reserved

State Transition

The following table describes the transition depending on the command word of Sercos III profile:

Command	From the operating state	Final operating state	Bit 15 Drive start	Bit 14 Drive enable	Bit 13 Drive halt
Shutdown	4 - 5a - 5b - 6	3 – Ready to switch on	X	0	x
Switch on	3	4 – Switched on	x	0-->1	x
Enable operation	4	5a – Drive in operation	0-->1	1	0
Enable operation (halt active)	4	5b – Halt	0-->1	1	1
Halt	5a	5b – Halt	1	1	1-->0
Run	5b	5a – Drive in operation	1	1	0-->1
Quick stop	5a - 5b	6 – Quick stop active	1-->0	1	x

From the operating state `8-Fault`, the transition to the state `2 – Switch on disabled` is done with the function Fault Reset.

From the operating state `5a-Drive in operation`, `5b-Halt`, `6-Quick Stop` and `4-Switch on`, the transition to the state `2-Switch on disabled` is done on the event on a request for disabling the power stage.

S-0-0135 Drive Status

Bit Mapping of the Status word

The following table describes the Drive Status of the Sercos Profile:

Bit number	Description
15-14	Ready to operate: 00 = Not ready to switch on 01 = Switch on disabled, main power disabled 10 = Switch on 11 = Drive enabled
13	Drive shut-down error 0 = No error 1 = Error
12	Warning: 0 = No warning 1 = Warning
11	Reserved
10	0 = Primary operation mode
9	Reserved (=0)
8	Reserved (=0)
7	Quick stop 0 = inactive 1 = active
6	Reserved
5	Position feedback value status (S-0-0403)
4	Drive halt 0 = inactive 1 = active
3	Status command value processing if 0 = ignored
2	Reserved
1	Reserved
0	Reserved

Operating state

The following table describes the drive status depending on the status word of the drive:

Operating State	Bit 15	Bit 14	Bit 13	Bit 7	Bit 4	Bit 3
1 – Not ready to switch on	0	0	-	-	-	-
2 – Switch on disabled	0	1	-	-	-	-
3 – Ready to switch on	1	0	-	-	-	-
4 – Switched on	1	1	-	-	-	-
5a – Drive in operation	1	1	-	-	0	1
5b – Halt active	1	1	-	-	1	0
6 – Quick stop active	1	1	-	1	1	0
7 – Fault reaction active	1	1	1	-	0	0
8 – Fault	1	0	1	-	0	0

Summary

Device Status Summary

Operating State	Power Stage Supply for Separate Control Stage	Power Supplied to Motor	Modification of Configuration Parameters
`1 - Not ready to switch on`	Not required	No	Yes
`2 - Switch on disabled`	Not required	No	Yes
`3 - Ready to switch on`	Not required	No	Yes
`4 - Switched on`	Required	No	Yes, return to `2 - Switch on disabled` operating state
`5 - Operation enabled`	Required	Yes	No
`6 - Quick stop active`	Required	Yes, during fast stop	No
`7 - Fault reaction active`	Depends on error response configuration	Depends on error response configuration	–
`8 - Fault`	Not required	No	Yes
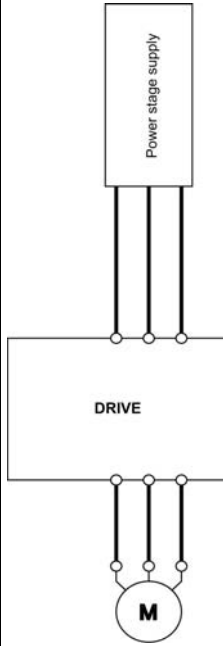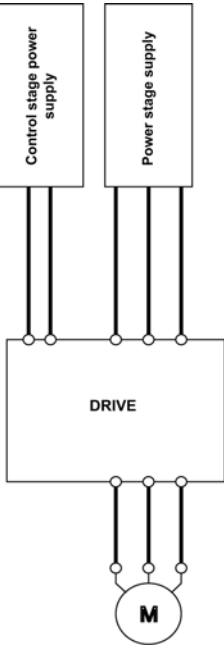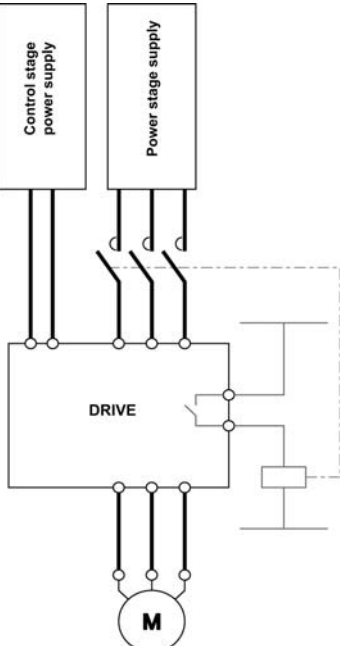
NOTE:
- Configuration parameters are described in communication parameter file as R/WS access type parameters. Other parameters can be accessed whatever the operating state.
- A Setting parameter can be accessed in all operating state of the drive.

Starting Sequence

Description

The command sequence in the state diagram depends on how power is being supplied to the drive.

There are 3 possible scenarios:

|			
Power stage supply	Direct	Direct	Mains contactor controlled by the drive
Control stage supply	Not separate [1]	Separate	Separate
[1] The power stage supplies the control stage.			

Starting Sequence for a Drive Powered by the Power Stage Supply

Description

Both the power and control stages are powered by the power stage supply.

If power is supplied to the control stage, it has to be supplied to the power stage as well.

The following sequence must be applied:

Step 1

Apply the `2 - Shut down` command
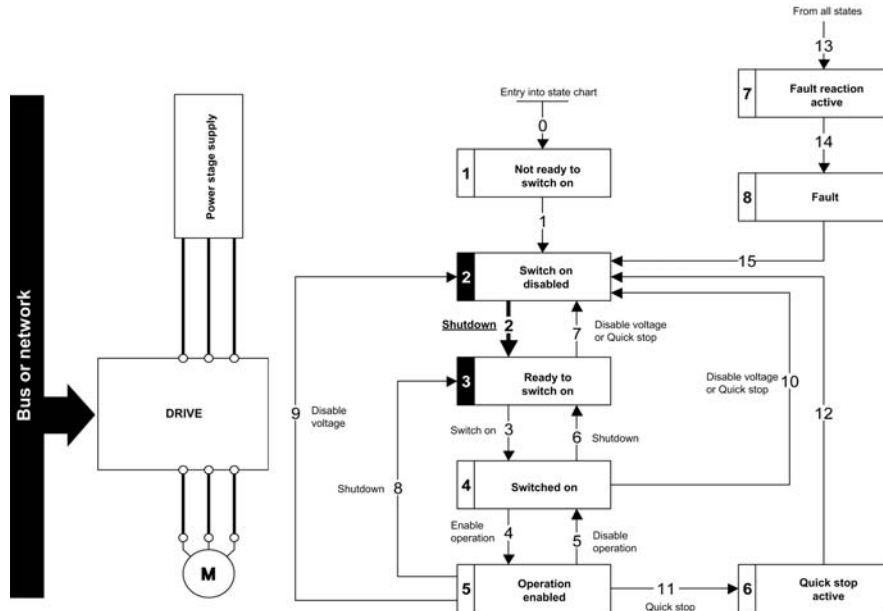
Step 2

- Check that the drive is in the operating state `3 - Ready to switch on`.
- Then apply the `4 - Enable operation` command.
- The motor can be controlled (send a reference value not equal to zero).
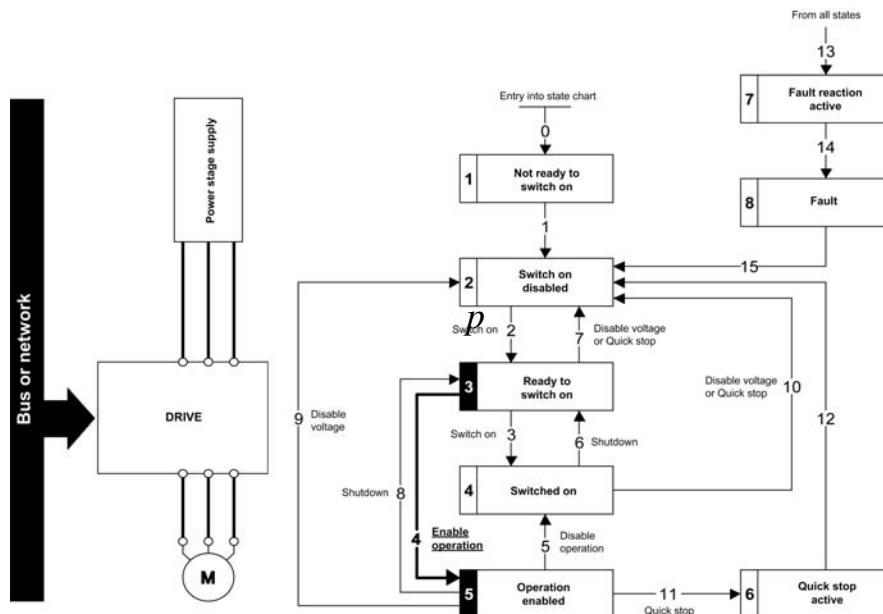
NOTE: It is possible, but not necessary to apply the `3 - Switch on` command followed by the `4 - Enable Operation` command to switch successively into the operating states `3 - Ready to Switch on`, `4 - Switched on` and then `5 - Operation Enabled`. The `4 - Enable operation` command is sufficient.

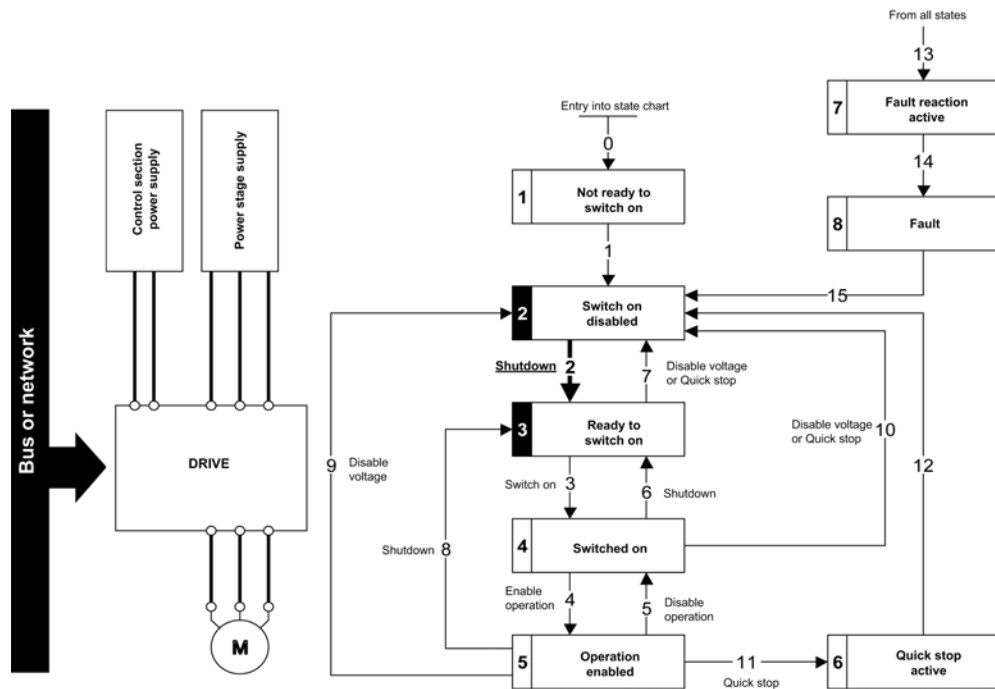## Starting Sequence for a Drive with Separate Control Stage

Description

Power is supplied separately to the power and control stages.

If power is supplied to the control stage, it does not have to be supplied to the power stage as well.

The following sequence must be applied:

Step 1

- The power stage supply is not necessarily present.
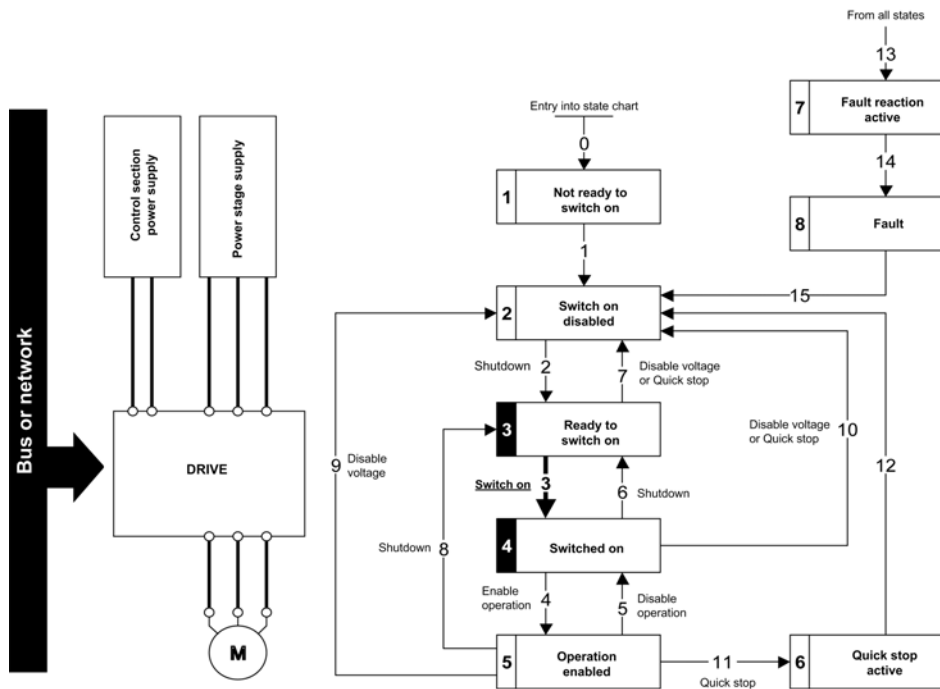- Apply the `2 - Shut down` command

Step 2

- Check that the drive is in the operating state `3 - Ready to switch on`.
- Check that the power stage supply is present (`Voltage enabled` of the status word).

Power Stage Supply		Status Word
Not present	`n L P`	21 hex
Present	`r d Y`	31 hex

- Apply the `3 - Switch on` command

Step 3

- Check that the drive is in the operating state `4 - Switched on`.
- Then apply the `4 - Enable operation` command.
- The motor can be controlled (send a reference value not equal to zero).
- If the power stage supply is still not present in the operating state `4 - Switched on` after a time delay **[Mains V. time out]** $L \, C \, t$, the drive triggers an error **[Input Contactor]** $L \, C \, F$.
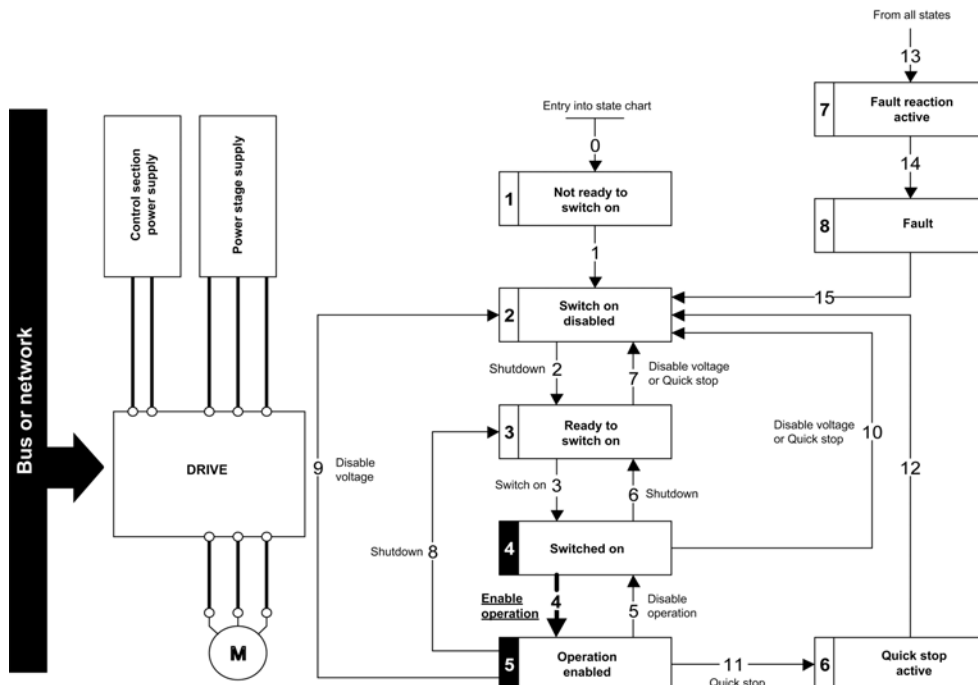
## Starting Sequence for a Drive with Mains Contactor Control

Description

Power is supplied separately to the power and control stages.

If power is supplied to the control stage, it does not have to be supplied to the power stage as well. The drive controls the mains contactor.

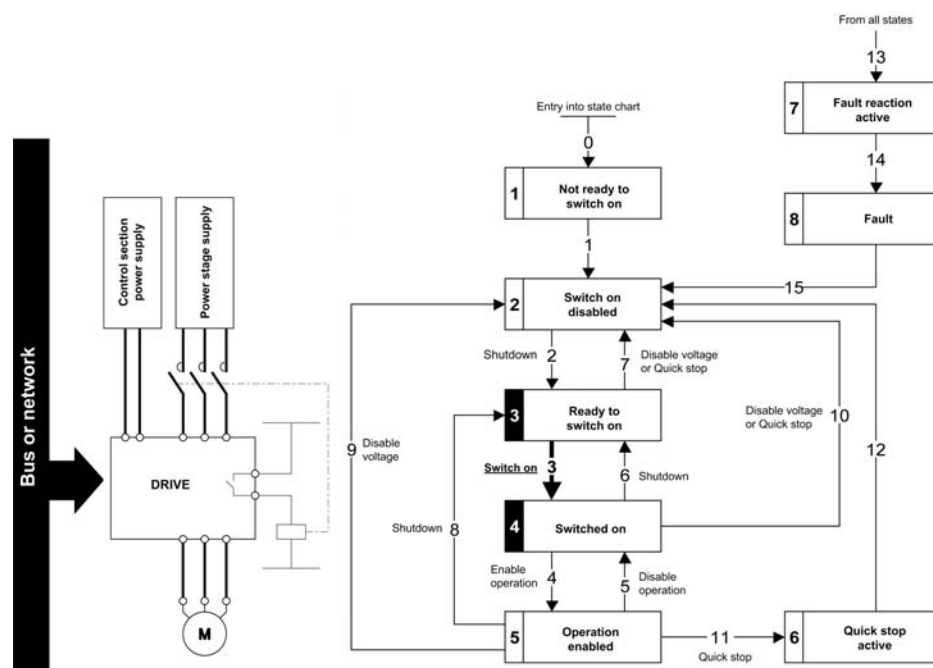The following sequence must be applied:

Step 1

- The power stage supply is not present as the mains contactor is not being controlled.
- Apply the `2 - Shutdown` command.
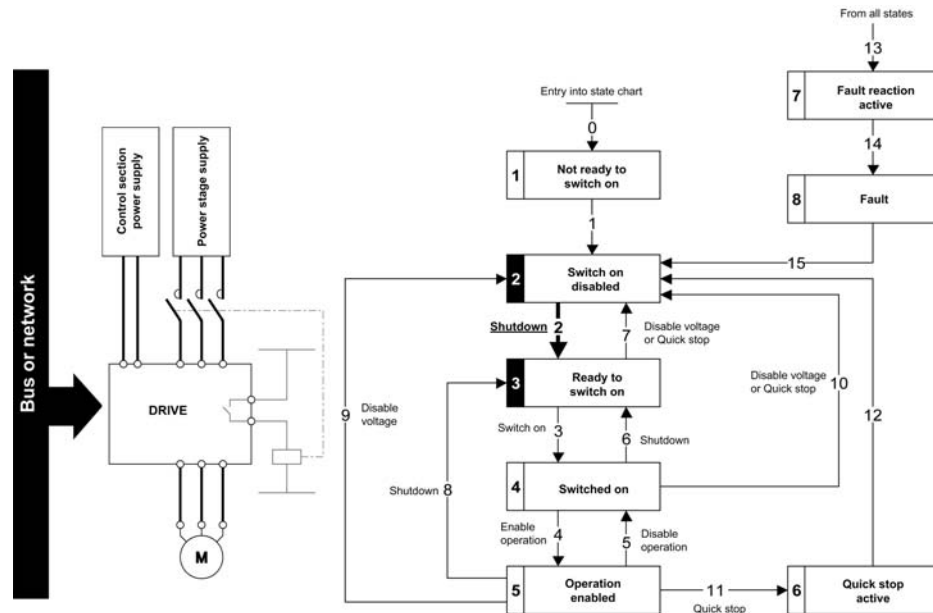
Step 2

- Check that the drive is in the operating state `3 - Ready to switch on`.
- Apply the `3 - Switch on` command, which closes the mains contactor and switch on the power stage supply.

Section 3.4
Integration with EcoStruxure™ Machine Expert

EcoStruxure™ Machine Expert

Overview

EcoStruxure™ Machine Expert (formerly known as SoMachine) is used to integrate the ATV340 drive with a Sercos III Fieldbus. For further information on EcoStruxure™ Machine Expert refer to the following link: *https://www.schneider-electric.com/en/product-range/2226-ecostruxure*.

EcoStruxure Machine Expert saves engineering time through intuitive machine programming with one of the most modern and powerful tool-based software concepts on the market.

The following figure shows the basic architecture to control the ATV340 Sercos III drive with the controller PacDrive LMC402.

Chapter 4
Operations

What Is in This Chapter?

This chapter contains the following sections:

Section 4.1
Operating States

Configuring Communication Error Response

Description

The response of the drive in the event of a Sercos III communication interruption can be configured.

Configuration can be performed using the display terminal from the **[Complete settings]** CSt -, **[Error/Warning handling]** $CSWN$ - menu, **[Communication Module]** $CoNo$ - submenu via the **[Eth Error Response]** $EtHL$ parameter.

The values of the **[Eth Error Response]** $EtHL$ parameter, which triggers a transition to the operating state fault are:

Value	Meaning
[Freewheel Stop] YES	Freewheel stop (factory setting)
[Ramp stop] NP	Stop on ramp

The values of the **[Eth Error Response]** $EtHL$ parameter, which does not trigger a transition to the operating state fault are:

Value	Meaning
[Ignore] no	Detected error ignored
[Per STT] Stt	Stop according to configuration of **[Type of stop]** Stt
[Fallback Speed] LFF	Reference frequency modified to fallback speed, maintained as long as the detected error persists and the run command has not been removed
[Speed maintained] rLS	The drive maintains the speed at the time the detected error occurred, as long as the detected error persists, and the run command has not been removed

The fallback speed can be configured in the **[Complete settings]** CSt -, **[Error/Warning handling]** $CSWN$ - menu, **[Fallback speed]** LFF - submenu, using the **[FallbackSpeed]** LFF parameter.

⚠ WARNING
LOSS OF CONTROL
If this parameter is set to no, Sercos III communication monitoring is disabled. ● Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application. ● Only use this setting for tests during commissioning. ● Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Error Code

Parameter	Description	Possible Values	Terminal Display
[Embd Eth Com Interrupt] $E\,t\,H\,F$ Written to the device	This parameter is used to indicate that fieldbus error has been detected. When the detected error is active, the value corresponds to the cause of the error. When the cause of the error is no longer active, the value is reset to 0.	0003 hex: Data loss 4001 hex: Sync timeout - no MST telegram within 65ms 4003 hex: invalid communication phase requested 4004 hex: Phase Shift 4005 hex: Phase Shift 4006 hex: Phase Shift without CPS flag 4007 hex: Phase Shift while RUN state 4017 hex: Watchdog timeout - no sercos telegram within 500ms	[3] $\exists$ [16385] $16\,3\,8\,5$ [16387] $16\,3\,8\,7$ [16388] $16\,3\,8\,8$ [16389] $16\,3\,8\,9$ [16390] $16\,3\,9\,0$ [16391] $16\,3\,9\,1$ [16407] $16\,4\,0\,7$

Error Code

Section 4.2
Operating Modes

What Is in This Section?

This section contains the following topics:

Topic	Page
Configuring the Control Channel	61
Configuration of the Drive for Operation with Sercos III Profile in Combined Mode	61

Configuring the Control Channel

Overview

This chapter explains how to configure the drive for operation from the communication network through the following example.
● Combined mode (with Sercos Profile) - Both reference value and command word come from the communication network.

NOTE: Separate mode (reference value and command word come from separate sources) must not be used with Sercos III.

Configuration of the Drive for Operation with Sercos III Profile in Combined Mode

Description

This section describes how to configure the settings of the drive if it is controlled in Sercos III mode.

In the **[Complete settings]** $C 5 t -$ menu, **[Command and reference]** $C r P -$ submenu
● **[Ref Freq Channel 1]** $F r I$: is set on according to the communication source you can choose in the following table:

Origin of the Control	Ref1 Channel Setting
Sercos III	**[Embedded Ethernet]** $E t H$

● **[Freq Switch Assign]** $r F C$ is set to default value (**[Ref Freq Channel 1]** $F r I$).
● **[Control Mode]** $C H C F$: defines if the drive operates in combined mode (reference and command from the same channel).

For the current example, **[Control Mode]** $C H C F$ is adjusted to **[Not separ.]** $S I m$ as reference and control are originated from the communication network.

Chapter 5
Diagnostic and Troubleshooting

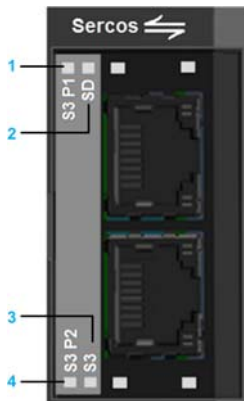**What Is in This Chapter?**

This chapter contains the following topics:

Fieldbus Status LEDs

LED Indicators

LED Description

Item	LED	Description
1	S3 P1	Indicates port 1 activity.
2	SD	Indicates sub-devices status.
3	S3	Indicates network status.
4	S3 P2	Indicates port 2 activity.

S3 P1 and S3 P2

These LEDs indicate the status of the Sercos adapter ports:

Color & status	Description
OFF	No link
Green ON	Link established at 100 Mbit/s
Yellow ON	Link established at 10 Mbit/s
Blinking Green	Fieldbus activity at 100 Mbit/s
Blinking Yellow	Fieldbus activity at 10 Mbit/s

S3: Network Status

This LED indicates the status of the Sercos fieldbus:

| Color & status	Description
OFF	No communication
Yellow ON	Communication phase 0 active
Yellow single flash	Communication phase 1 active
Yellow double flash	Communication phase 2 active
Yellow triple flash	Communication phase 3 active
Green ON	Communication phase 4 active
Blinking Green	Real-time state is " loopback "
Blinking Yellow/Red	Application error
Blinking Green/Red	MST transmission error "S-0-1003/2"
Red ON	Communication error
Blinking Yellow	Identification function ("IdentifyDevice")

SD: Sub-Device Status

This LED indicates the status of the adapter

Color & status	Description
OFF	Sub-device is not active
Yellow ON	Sub-device is in state " parametrization level (PL) "
Green ON	Sub-device is in state " operating level (OL) "
Red ON	Sub-device is in state " application error (C1D) "

LED Behavior
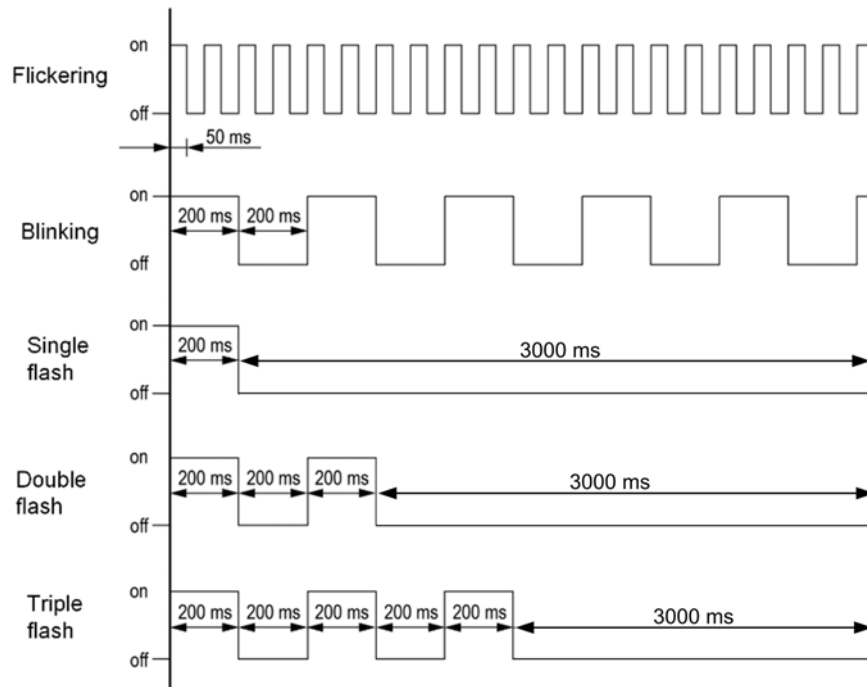
Connection for Fieldbus Mode

Description

If the product cannot be addressed via the fieldbus, first check the connections. The product manuals contains the technical data of the device and information on fieldbus and device installation.

Verify the following:
- Power connections to the device
- Fieldbus cable and fieldbus wiring
- Fieldbus connection to the device

Fieldbus Functions Test

Fieldbus Monitoring Criteria

The fieldbus is monitored according to the protocol-specific criteria.

Protocol	Criteria	Related Detected Error
Sercos III	Fieldbus overload	[External Error] $E P F \ I$ [Embd Eth Com Interrupt] $E E H F$

Monitoring of Communication Channels

⚠ WARNING
LOSS OF CONTROL
Perform a comprehensive commissioning test to verify that communication monitoring properly detects communication interruptions
Failure to follow these instructions can result in death, serious injury, or equipment damage.

If the drive is in remote mode and the **[Sercos Com Phase]** $S \ J P H$ has reached the communication phase **[CP4]** $C P \ 4$, the communication channels are monitored.

NOTE: Separate mode (reference value and command word come from separate sources) must not be used with Sercos III.

If a communication warning is sent (in accordance with the protocol criteria) by a monitored port or fieldbus module, the drive triggers a communication interruption.

The drive reacts according to the communication interruption configuration (operating state Fault, maintenance, fallback, and so on)

If a communication warning occurs on a channel that is not being monitored, the drive does not trigger a communication interruption.

NOTE: In local mode the sercos III communication channel is monitored. In the event of a communication interruption in local mode the error is not displayed however in remote mode a fault reset command must be send by the sercos III communication before sending a command to the drive

Control-Signal Diagnostics

Introduction

On the , the [Display] *ⴖoⴖ-* , [Communication map] *Cⴖⴖ-* submenu can be used to display control-signal diagnostic information between the drive and the controller:

- Active command channel [Command Channel] *CⴖdC* it must be equal to [Embedded Ethernet] *EtH*)
- Value of the control word [Cmd Register] *Cⴖd*
- Active reference frequency channel [Ref Freq Channel] *rFCC* it must be equal to [Embedded Ethernet] *EtH*)
- Value of the reference frequency [Pre-Ramp Ref Freq] *FrH*
- Value of the operating state word internal to the drive [CIA402 State Reg] *EtA*
- In the [Ethernet Emb Diag] *ⴖPE-* submenu: [Sercos Com Phase] *S3PH*
- In the [Command word image] *CWi-* submenu: Control word from Embedded Ethernet channel ([Ethernet Embd cmd.] *CⴖdS*)
- In the [Freq. ref. word map] *rWi-* submenu: reference frequency value word from Embedded Ethernet channel ([Ethernet Embd Ref Freq] *LFrS*)

Control Word Display

The [Command Channel] *CⴖdC* parameter indicates the active command channel. For sercos III, it must be equal to [Embedded Ethernet] *EtH*.

The [Cmd Register] *Cⴖd* parameter indicates the hexadecimal value of the control word (CMD) used to control the drive. It is derived from the drive control word S-0-0134 used to control the drive.

Reference Frequency Display

The [Ref Freq Channel] *rFCC* parameter indicates the active channel for reference frequency. For sercos III, it must be equal to [Embedded Ethernet] *EtH*.

The [Ref Frequency] *LFr* parameter indicates the value (in 0.1 Hz units) of the reference frequency used to control the drive.

Operating State Word Display

The [CIA402 State Reg] *EtA* parameter gives the value of the operating state word (ETA).

This parameter is the internal state of the drive. A correspondance exists with the drive status S-0-0135.

The following table provides the conversion between the [CIA204 State Reg] *EtA* and the bits of the drive status S-0-0135

[CiA402 State Reg] *EtA*	Drive status S-0-0135					
	bit 15	bit 14	bit 13	bit 7	bit 4	bit 3
0x0250	0	1	0	0	0	0
0x0231	1	0	0	X	0	0
0x0233	1	0	0	0	0	X
0x0237	1	1	0	0	0	0
0x0337	1	1	0	0	1	0
0x0217	1	1	0	X	0	0
0x021F	1	1	1	X	0	0
0x0218	1	0	1	X	0	0

Glossary

A

Abbreviations

Req. = Required

Opt. = Optional

AT

Acknowledge Telegram. This is a telegram sent by the salves to the master.

C

CPx

CP0 up to CP4: Sercos III Communication phases

E

Error

Discrepancy between a detected (computed, measured, or signaled) value or condition and the specified or theoretically correct value or condition.

F

Factory setting

Default configuration of the product.

Fault

Fault is an operating state. If the monitoring functions detect an error, a transition to this operating state is triggered, depending on the error class. A "Fault reset" is required to exit this operating state after the cause of the detected error has been removed. Further information can be found in the pertinent standards such as IEC 61800-7, ODVA Common Industrial Protocol (CIP).

Fault Reset

A function used to restore the drive to an operational state after a detected error is cleared by removing the cause of the error so that the error is no longer active.

I

IDN

Identification number

L

LSB

Least Significant Byte

M

MDT

Master Data Telegram. This is a telegram sent by the master to transmit data to the salves.

Monitoring function

Monitoring functions acquire a value continuously or cyclically (for example, by measuring) in order to check whether it is within permissible limits. Monitoring functions are used for error detection.

MSB

Most Significant Byte

MST

Master Synchronization Telegram. This is a telegram broadcast by the master to synchronize the timing cycle.

P

Parameter

Device data and values that can be read and set (to a certain extent) by the user.

PELV

Protective Extra Low Voltage, low voltage with isolation. For more information: IEC 60364-4-41

PLC

Programmable logic controller

Power stage

The power stage controls the motor. The power stage generates current for controlling the motor.

Q

Quick Stop

The quick Stop function can be used for fast deceleration of a movement as a response to a detected error or via a command.

R

R/WS

Read and write (write only possible when the drive is not in RUN mode). It is not possible to write these parameters in "5-Operation enabled" or "6-Quick stop active" states. If the parameter is written in the "4-Switched on" state, transition to "2-Switch on disabled" is activated.

V

VSD

Variable Speed Drive

W

Warning

If the term is used outside the context of safety instructions, a warning alerts to a potential problem that was detected by a monitoring function. A warning does not cause a transition of the operating state.

Z

Zone of operation

This term is used in conjunction with the description of specific hazards, and is defined as it is for a **hazard zone** or **danger zone** in the EC Machinery Directive (2006/42/EC) and in ISO 12100-1.