IndraDrive drive control unit

Commissioning
Linear drive with IndraDrive control unit

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You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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Table of contents

1 About this manual

1.1 Purpose/validity

This manual is part of the drive control unit IndraDrive and describes the safe and proper use during all phases of operation.

This manual is valid only for the module specified on the front page.

1.2 Target groups

Target group	Task
Manufacturer, operator	➔ Keep this manual available for the personnel at all times. ➔ Require personnel to read and observe this manual and the applicable documents, especially the safety notes and warnings.
Skilled personnel, fitter	➔ Read, observe and follow this manual and the applicable documents, especially the safety notes and warnings.

Table 1

1.3 Applicable documents

You can find the following documents on our homepage:

Document	Purpose
Catalog	Technical data or application parameters of the module and information on accessories. The last version is always valid.
Assembly and operating manuals for linear motor drives	Detailed information about assembly, adjustment and commissioning of the linear motor drives.
Manual and references for drive control unit IndraDrive	Detailed information about assembly, adjustment and commissioning of the drive control unit IndraDrive.
General terms of business	Including notes on the warranty.

Table 2

1.4 Symbols in the manual

To give you quick access to information, the following symbols will be used in this manual:

Symbol	Meaning
⚠ **DANGER**	Dangers for persons. Nonobservance causes death or serious injuries.
⚠ **WARNING**	Dangers for persons. Nonobservance can cause death or serious injuries.
⚠ **CAUTION**	Dangers for persons. Nonobservance can cause slight injuries.
NOTICE	Information on avoiding material damage.
✓	Prerequisite for a handling instruction.
➔	Handling instruction, also measures in a warning or note.
1. 2. 3. ...	Step-by-step handling instruction. ➔ Observe the order.
(10)	Component/spare part represented in a graphic.
/10/	Part/detail shown in a graphic which is part of a spare part or which must be provided by the customer.
(10), (/10/)	Reference in the text or in a handling instruction to a part that is represented in a graphic.
< >	Menus and menu items

Table 3

2 Basic safety notes

2.1 Intended use

The module is intended for installation in a machine. The requirements of the applicable guidelines must be observed and complied with.

The module may be used only in the context of its defined application parameters.

Any other use or use exceeding that specified is an infringement of use for intended purpose. The manufacturer bears no liability for damage resulting from such use.

2.2 Environmental and operating conditions

➔ The module may be used only in the context of its defined application parameters (see catalog and applicable documents).

➔ Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Excepted are modules that are designed specially for contaminated environments.

2.3 Controlled production

The module represents the state of the art and the recognized safety rules at the time of delivery. However, it can present risks if, for example:

- The module is not used in accordance with its intended purpose.
- The module is not installed or maintained properly.
- The EC Machinery Directive, the VDE directives, the safety and accident-prevention regulations valid at the usage site, or the safety and installation notes are not observed.

2.3.1 Protective equipment

➔ Provide protective equipment per EC Machinery Directive.

2.3.2 Constructional changes, attachments, or modifications

Additional drill holes, threads, or attachments that are not offered as accessories by SCHUNK may be attached only with permission of SCHUNK.

2.4 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the drive control unit may be performed only by trained specialist personnel.

Every person called upon by the operator to work on the module must have read and understood the complete Assembly and Operating Manual, especially chapter 2 “Basic safety note”. This applies particularly to occasional personnel such as maintenance personnel.

2.5 Safety-conscious working

➔ Avoid any manner of working that may interfere with the function and operational safety of the drive control unit.

➔ Observe the safety and accident-prevention regulations valid at the usage site.

3 Commissioning

3.1 Required equipment

The following equipment/requirements are necessary for commissioning a drive with IndraDrive

- ✓ a fully installed drive with an IndraDrive CS drive control unit (for connection schematics, see chapter “Appendices” Figure 13 Connection schematic of IndraDrive, page 23)
- ✓ PC with network connection
- ✓ the IndraWorks operating software (from version 08Vxx) installed on the PC
- ✓ Ethernet (patch cable) PC connection cable – IndraDrive (order no. 336 432)
- ✓ Commissioning CD with the motor parameters and the files for parameter selection

3.2 Commissioning tasks

⚠ DANGER

Danger to life and limb from electric shock!

Touching energized parts can cause death.

➔ Only professional electricians may carry out work on electrical systems and equipment under compliance of the rules for working with electrical systems.

NOTICE

Damage to guide block and guide beam!

Activation of the “automatic control loop” command can cause the guide block to crash.

➔ Under no circumstances may the automatic control loop setting be activated for linear motors.

1. Wire drive control unit IndraDrive to motor and higher-order controller in accordance with the connection schematics. (see chapter 4, page 23)
2. Create connection between PC and controller.
   CAUTION: The control unit has the IP address 192.168.0.1(default setting)
   The PC interface must have a similar IP address, e.g. 192.168.0.11 and the subnet mask must also be identical: 255.255.255.0.
3. Set the controller to Sercos III communication. This is done using the front side panel.

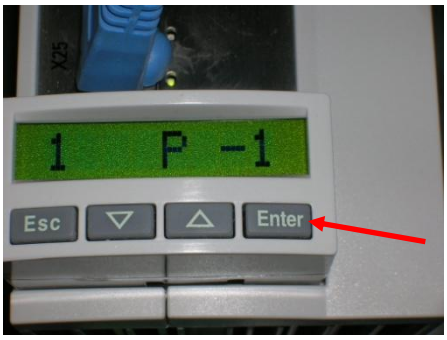


Figure 1 Front Side Panel

- Press the [Enter] key four times.
  The desired field bus option flashes on the display.
- Now use the arrow keys  to select Sercos III.
- Confirm your selection with the [Enter] key.
  The display now shows Sercos III and does **not** flash.
- Switch off the 24V supply and switch it back on again.
  The controller reboots and Sercos III is activated.
  To verify: After startup the display should show **P -1**. (See Figure 1, page 11)

4. Start IndraWorks DS on PC.

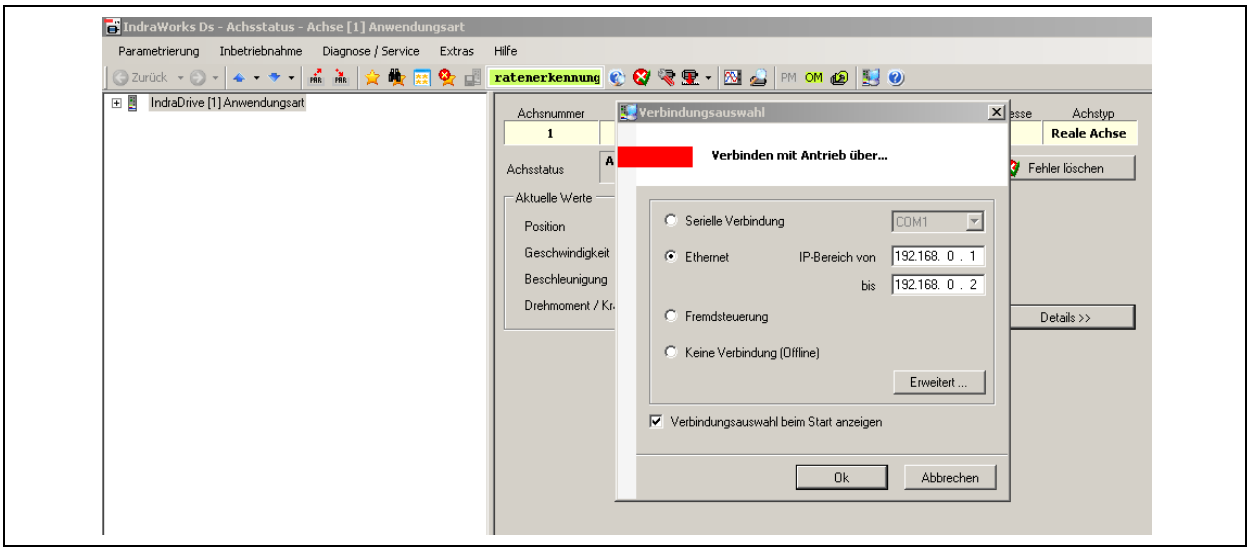


Figure 2

➔ Select Ethernet and set the IP search range.

Note

Operation of IndraWorks is explained in the help menu of the program.

3.2.1 Loading motor parameters

1. In the main window of IndraWorks, select <View> ➔ <Project Explorer>.
   The Project Explorer appears.
   (see Figure 3, page 13)

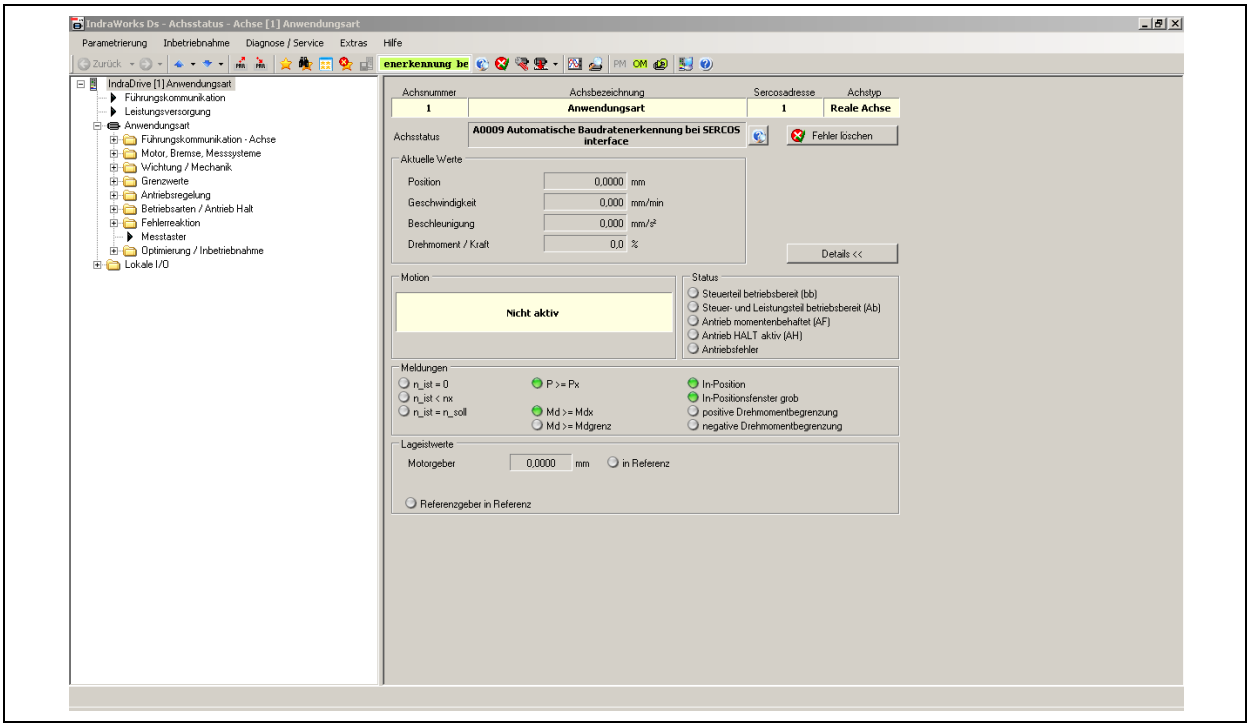


Figure 3 Project Explorer

2. Right click <IndraDrive > and then select <Parameters> ➔ <Load> from the menu which appears:

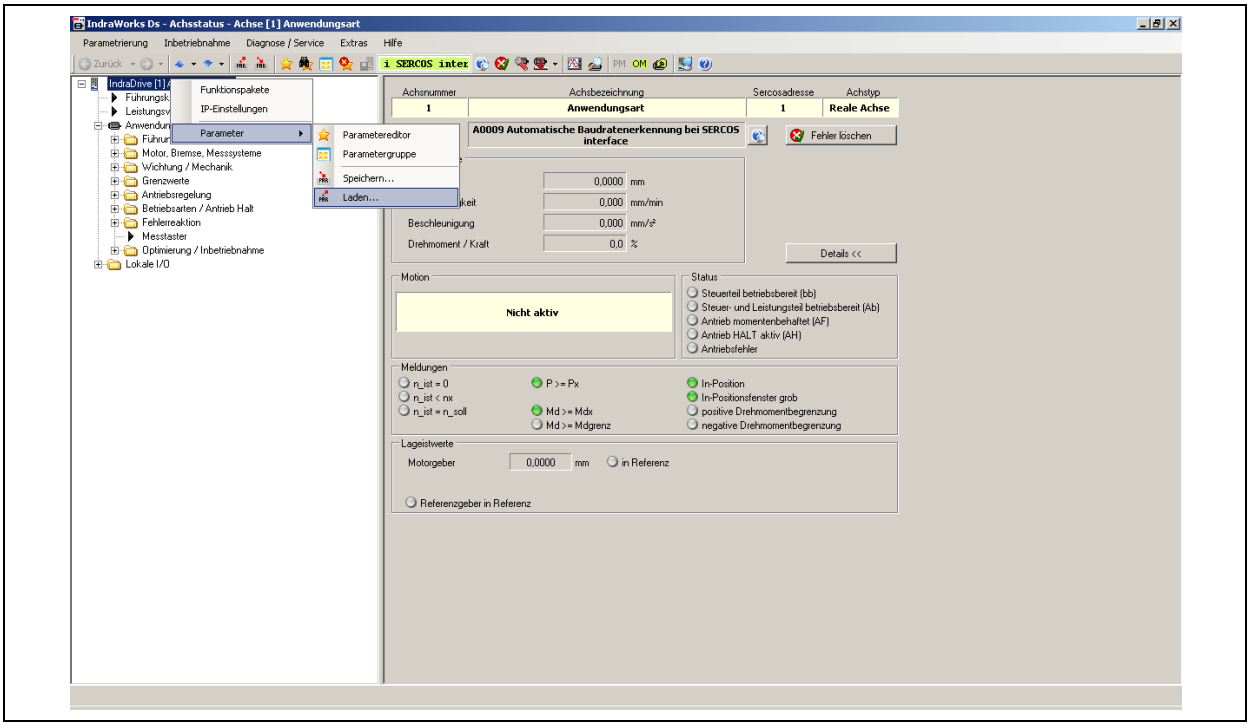


Figure 4 Selecting linear motor type

The dialog box appears:

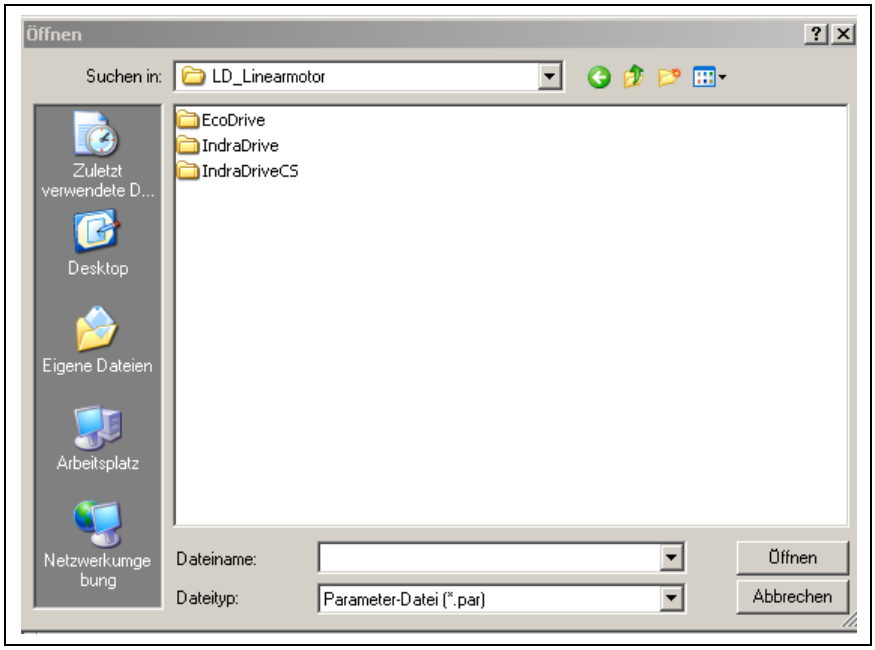


Figure 5 Importing Motor parameters

3. Select the <Motor parameters> folder on the IndraDrive commissioning CD.
4. Select relevant motor parameter file from the description key (see figure in the chapter 4.2, page 24) and select drive/linear motor assignment file (see figures in the chapter 4.3, at page 25).
5. Select the folder of the desired linear motor type in the dialog box.
6. Select desired motor parameter file in the next dialog box and open it.
   The motor parameters are loaded:

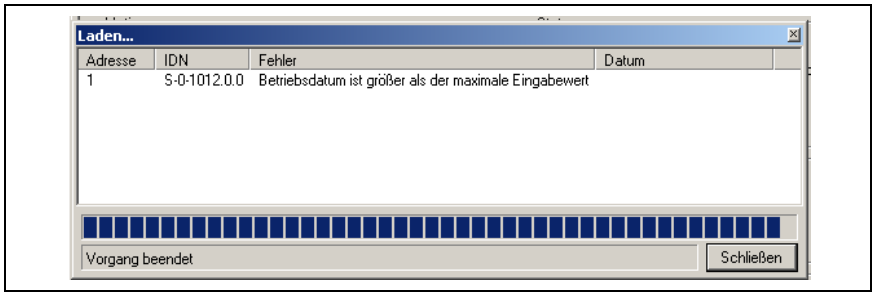


Figure 6 Loading motor parameters

3.2.2 Starting field bus

1. Configure field bus interface in accordance with IndraDrive manufacturer documentation and switch cabinet documentation.
2. Connect and start field bus.
3. Implement and check the wiring for controller enable, stop, reference switch and limit switch, depending on the field bus interface.

3.2.3 Selecting operating mode

⚠ WARNING

Danger of injury!

An improperly set operating mode can lead to undesired drive movement.

➔ Under no circumstances should the “Torque control” or “Speed control” operating mode be set.

➔ Activate contouring error monitoring and configure it sensibly.

➔ Switch the controller to the operating mode (Phase 4).

`bb` appears on the display of the standard operating field of the IndraDrive drive control unit.

3.2.4 Testing measuring system

1. In the tree view of the project Explorer, select <IndraDrive> ➔ <Application type>.
2. Right click <Application type> and then select <Diagnosis> ➔ <Status> from the menu which appears.
   (See Figure 7,page 16)
   The dialog box for the <Status> folder appears.

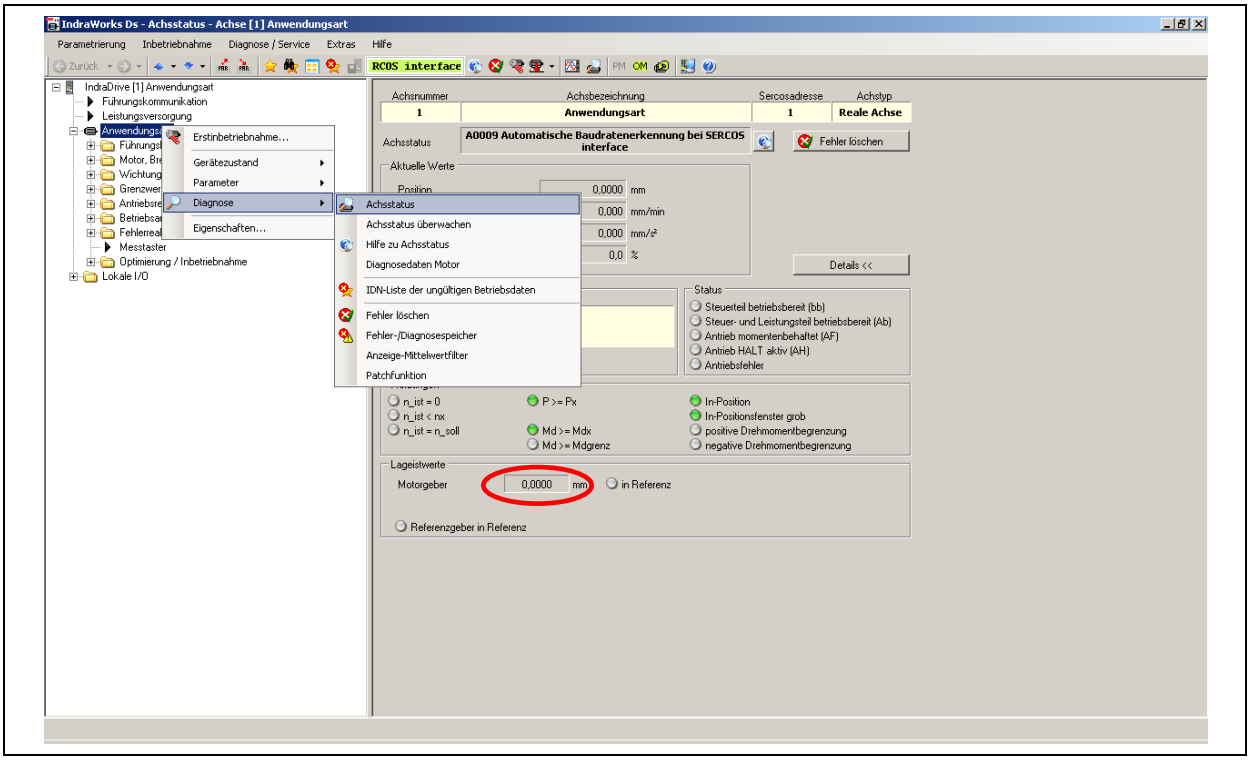


Figure 7 checking status

Checking and enabling functioning of the pneumatic holding brake (optional)

NOTICE

Possible damage to the linear motor axis!

The guide beam and pneumatic holding brake can be damaged by violent movement of the guide block.

➔ Do not try to forcefully move the guide beam or guide block with the brake applied.

➔ Ensure that only minimal force is applied to the guide block when you are checking the functioning of the pneumatic holding brakes.

1. Carefully try to move the guided slide with the holding brake on.
   The guided slide should not move.
2. Apply 24 V connection to the brake valve.
   The pneumatic holding brake (optional) is enabled.

Checking display and scale of the measuring system

1. Move guide block by hand.
   The “Position” indicator (see red marking in Figure 7 page 16) may not jump.
2. Place measuring stick (approx. 10cm) on the guide beam and slide the guide block along the measuring stick.
3. Compare the measured traversal path to the display of the actual position.

3.2.5 Control loop monitoring

1. In the tree view of the project Explorer, select <IndraDrive> ➔ <Motion> ➔ <Axis> ➔ <Control> ➔ <Axis control> ➔ <control loop monitoring>.
   The dialog box <Control loop monitoring> appears:

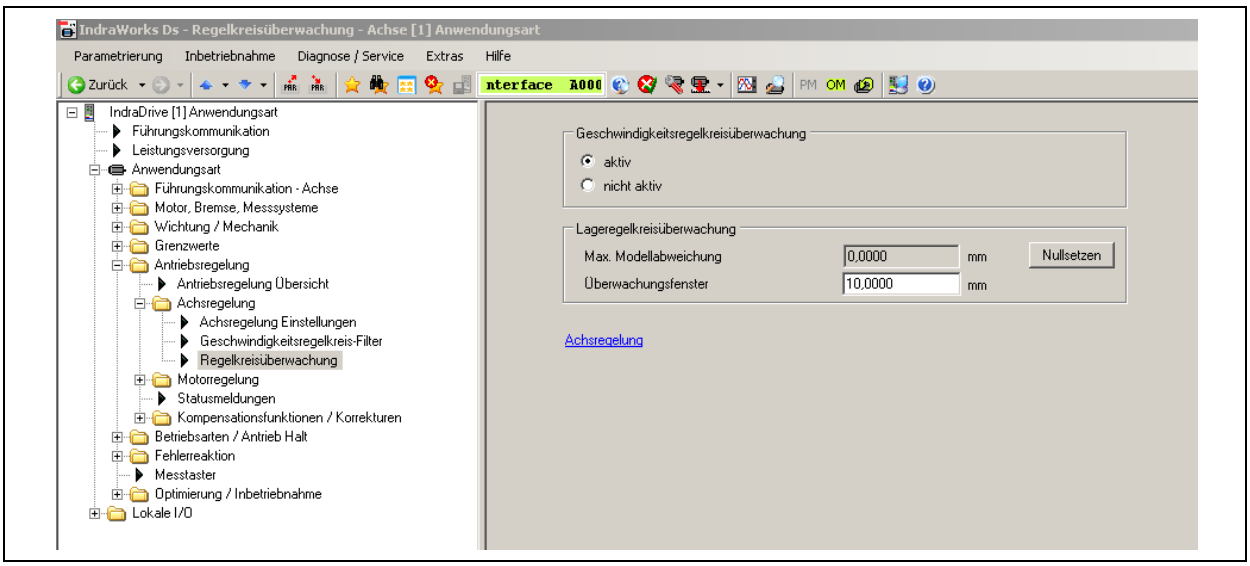


Figure 8 Control loop monitoring

NOTICE

Damage to guide block and guide beam!

If the Control Loop Monitoring dialog box is deactivated or set too large, the guide block could crash.

➔ Configure control loop monitoring **sensibly**.

2. Activate the <Velocity Loop Monitoring> option field.
3. Configure position loop monitoring.

3.2.6 Connecting IndraDrive drive control unit to the power supply

➔ Switch on power at the control switch cabinet (power supply connection: 380 V).

`Ab` appears on the display of the standard operating field of the IndraDrive drive control unit, which indicates that the IndraDrive drive control unit is connected to the power supply.

3.2.7 Controller enable (AF)

Note
The controller enable can be activated with either hardware or software, depending on the field bus system.

1. Activate controller enable (AF).
2. Activate „stop“.

`AF` appears on the display of the standard operating field of the IndraDrive drive control unit.

3.2.8 Setting reference switch

1. In the tree view of the project Explorer, select <IndraDrive> ➔ <Motion> ➔ <Axis> ➔ <Create position data reference> ➔ <Data reference motor encoder>.
   The dialog box <Data reference motor encoder> appears:

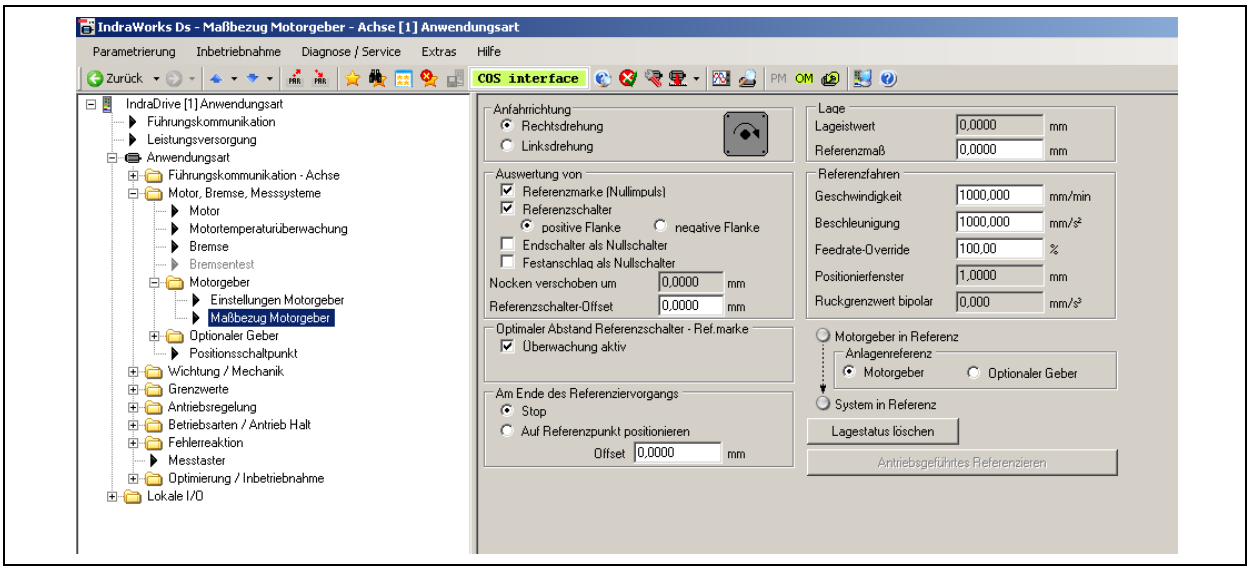


Figure 9 Data reference motor encoder

2. Slowly traverse guide block in both directions via the field bus.
3. Reference, configure and test the direction, velocity and acceleration.

Note
Perform configuration in accordance with the functional description in the documentation of the Rexroth IndraDrive drive control unit.

3.2.9 Mounting drive

1. Mount all moving modules (moving mass).
2. Set limit switch.
3. Move drive to the intended position.

3.2.10 Configuring software limit position

1. In the tree view of the Project Explorer, select <IndraDrive> ➔ <Motion> ➔ <Axis> ➔ <Limit values>.
   The dialog box <Motion Limit Values> appears:

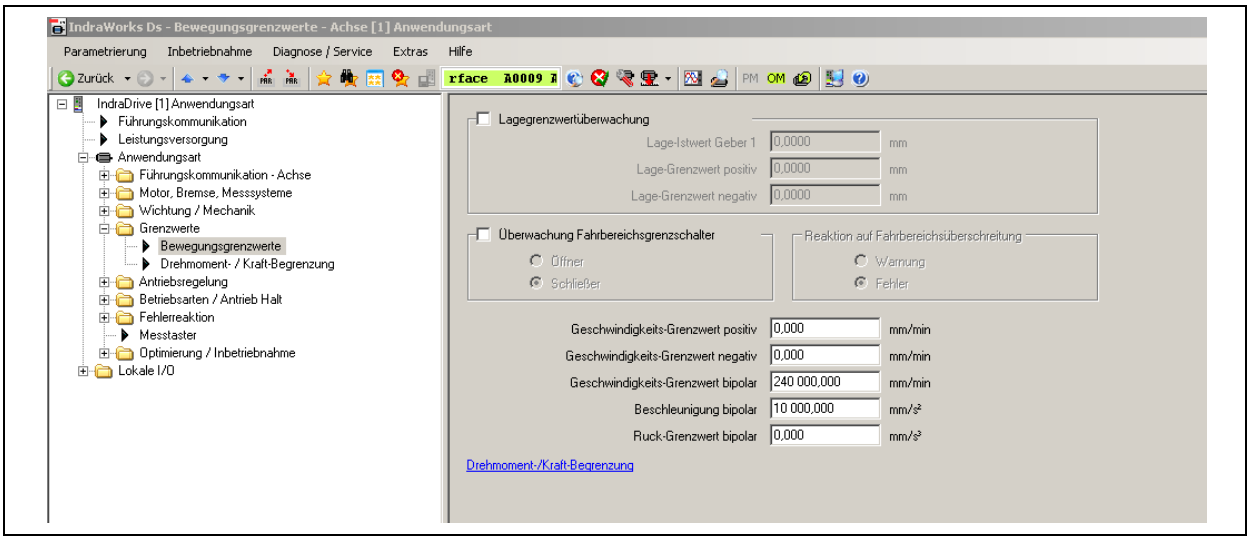


Figure 10 Motion Limit Values

2. Activate the <Position limit value monitoring> option field.
3. Activate the <Velocity Loop Monitoring> option field.
4. Set motion limit values in the dialog box.

3.2.11 Configuring position and speed controller

1. In the tree view of the Project Explorer, select <IndraDrive> ➔ <Motion> ➔ <Axis> ➔ <Control> ➔ <Axis control settings>.
   The dialog box <Axis Control> appears:

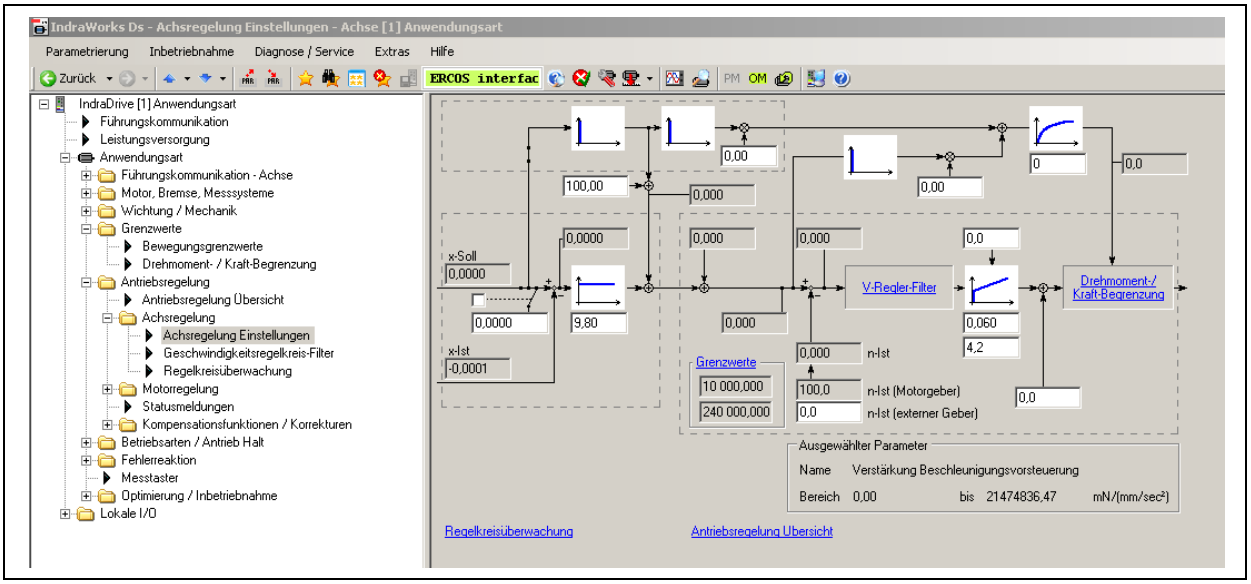


Figure 11 Axis control settings

2. Make fine settings for position controller and speed controller.

Note

Perform configuration in accordance with the functional description in the documentation of the Rexroth IndraDrive drive control unit (chapter <Drive control>, section <Axis control (closed-loop operation)>.

3.2.12 Commutation setting (only up to firmware 16V10)

1. In the tree view of the project Explorer, select <IndraDrive> ➔ <Application type> ➔ <Drive control> ➔ <Motor control> ➔ <Commutation setting>.
   The <Commutation setting> dialog window appears:

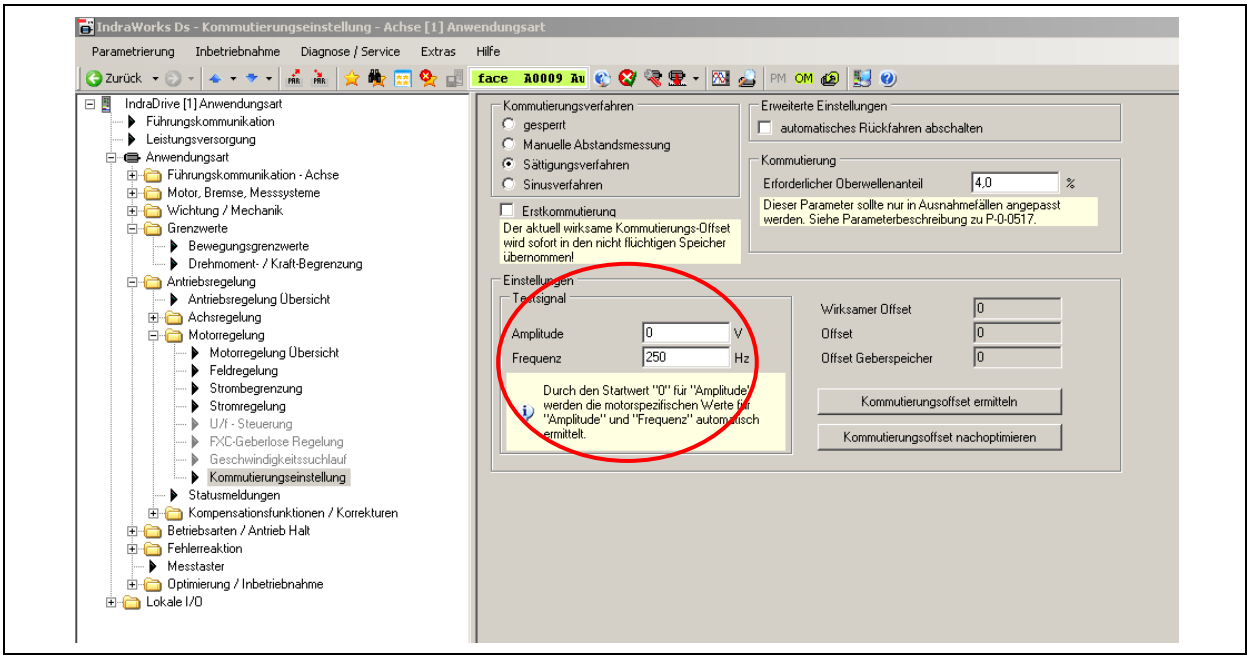


Figure 12 Commutation settings

Up to firmware 16V10, a manual modification needs to be made upon initial commutation of the drive. During its initial commutation, the drive searches independently for a voltage vector (amplitude in the test signal (see Figure 12)). In certain cases, this value is not enough to drive the motor to saturation. Therefore the value needs to be increased manually. For example, if the automatically calculated value is 68V, simply increase it by **40** to 108V. Every value that the controller calculates should be increased by **40**.

Note

With firmware version 16V12 and higher, manual intervention in the parameter settings is no longer necessary. The process of commutation finding was improved in these versions.

4 Appendices

4.1 Connection schematic of IndraDrive CS (Drawing No. 357861)

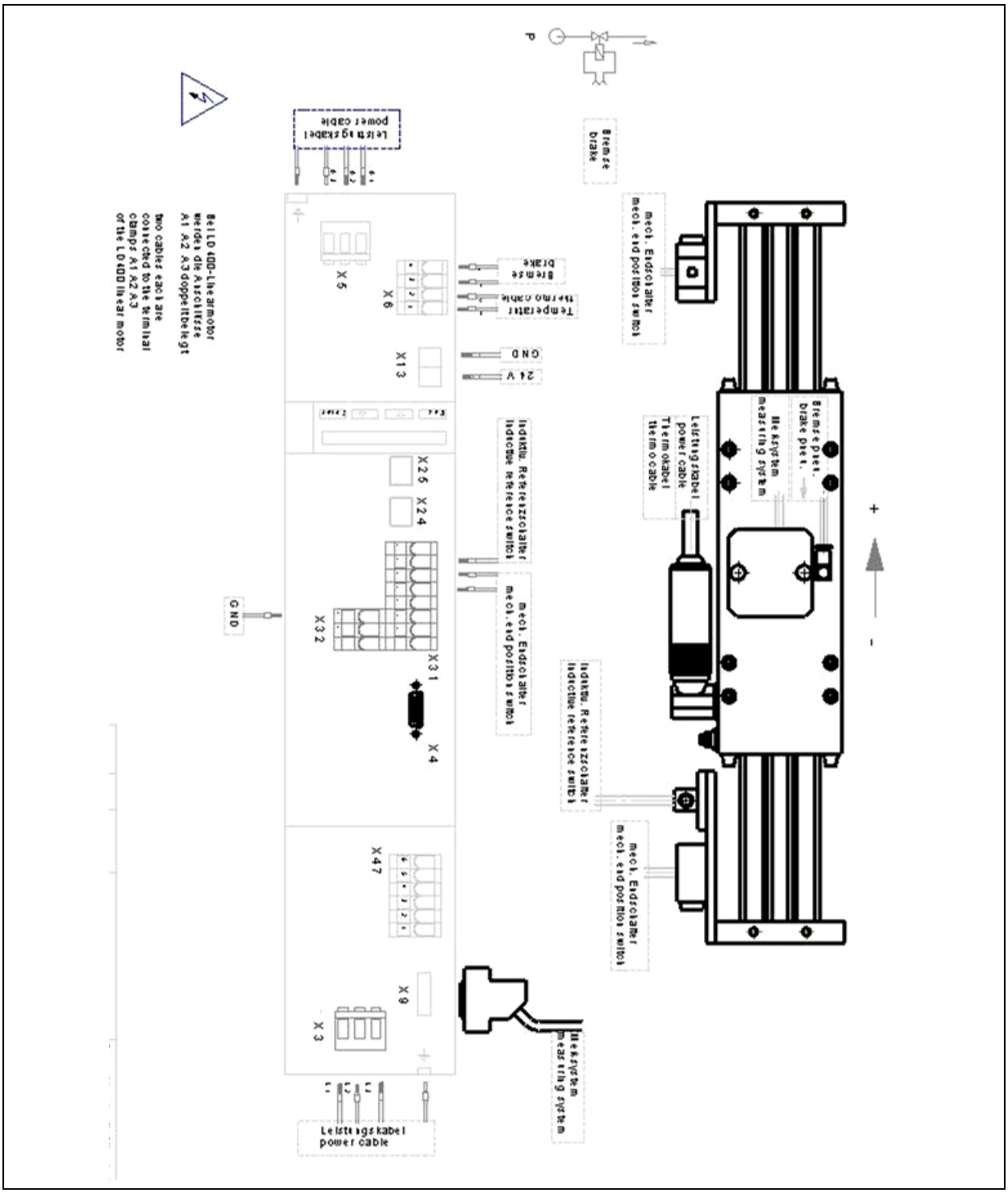


Figure 13 Connection schematic of IndraDrive

4.2 Designation key of files for linear motors

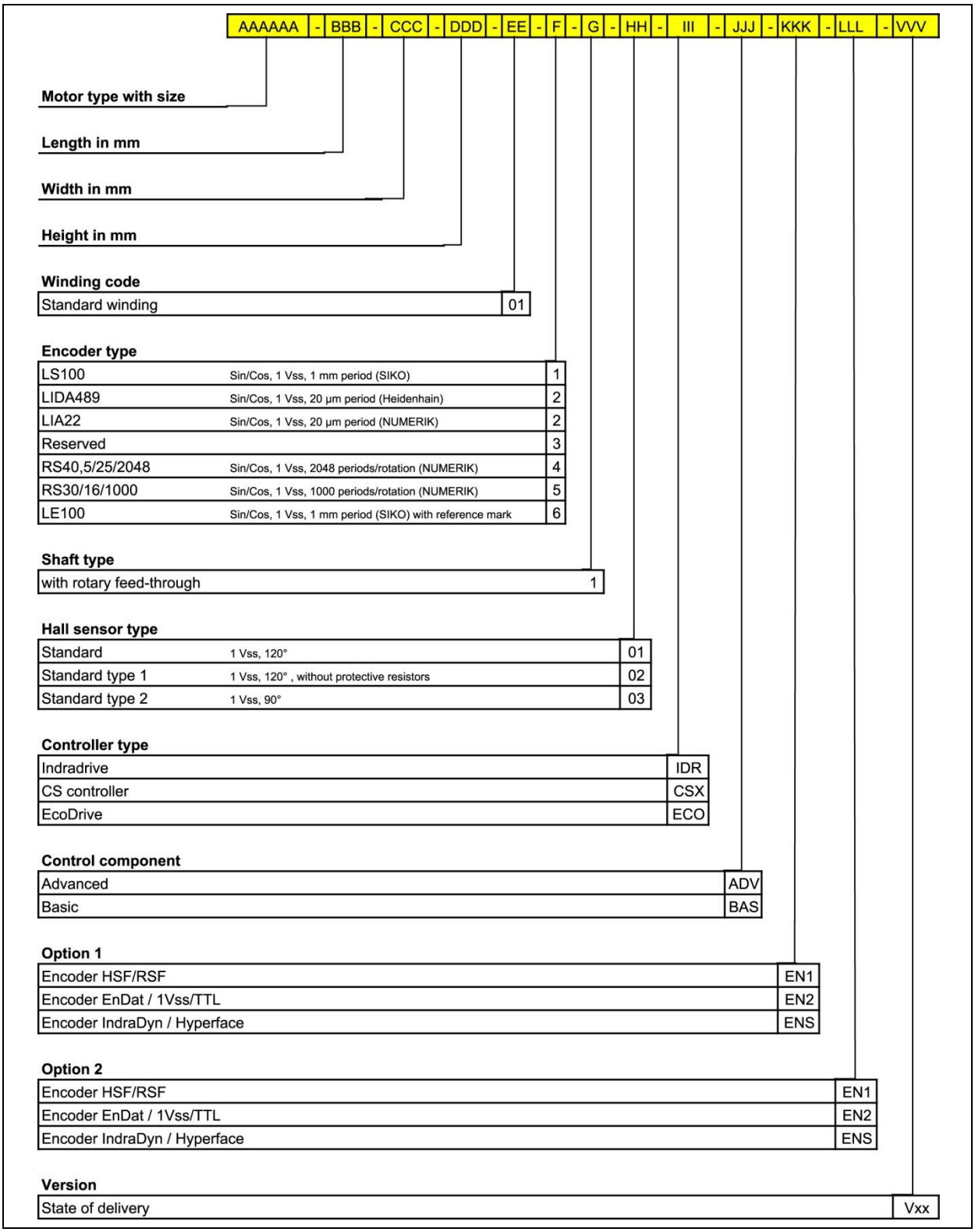


Figure 14 Designation key of files for linear motors

4.3 Assignment of the motors to the drives and files

Param.	Motorbezeichnung			Bez.	Dim.	MLS 05-58-15	MLS 10-85-15	MLS 10-100-15	MLD 20-85-15	MLS 20-85-25	MLS 20-100-25	MLS 30-85-35
	Achsbezeichnungen					MLD50K, MLD50KT	MLD100N, MLD100NL, MLD100NU, MLD100K	MLD100FU	MLD200N zwei Sekundärteile 1 Führung	MLD200NL, MLD200NUL, MLD200K	MLD200FU	MLD300NG, MLD300NUG
S-0-0111	spez. Stillstandsdauerstrom	I_0	Aeff			1,1 ; 1,1	2,2 ; 2,0 ; 1,8	2,2	3,2	3,8 ; 3,6 ; 3,4	3,9	5,6 ; 5,2
S-0-0112	max. Stillstandsdauerstrom	I_0	Aeff			1,1	2,2	2,2	3,2	3,8	3,9	5,6
S-0-0109	Maximalstrom	I_{max}	Aeff			4,1	8,1	8,1	16,2	16,2	16,2	24,3
	Nennkraft	F_{nenn}	N			46	88	91	127	154	163	224
P-0-4046	Wicklungswiderstand bei 25 °C	R_{ULL}	Ohm			16,4	7,1	12,7	3,5	3,5	5,7	2,3
P-0-0095	Kraftkonstante	k_f	N/A			40	40	40	40	40	40	40
	Maximalkraft	F_{max}	N			125	250	250	500	500	500	750
	Thermischer Widerstand	R_{th}	°K/W			2,01	1,39 ; 1,53 ; 1,79	1,14	1,23	0,84 ; 0,97 ; 1,07	0,76	0,6 ; 0,71
P-0-4044	Induktivität	L_{q-q}	mH			80	40,4	36,1	20,5	20,5	16,2	13,8
	Masse Primärteil mit Schritten		kg			1,8	3,1 ; 3,3 ; 2,5	3,1 ; 3,3 ; 2,6	7,6	5,3 ; 5,2 ; 4,7	5,3 ; 5,2 ; 4,8	8 ; 7,9
	Masse Sekundärteil		kg/m			2,8	6,2 ; 10,5 ; 3,5	6,2 ; 10,5 ; 3,6	8,86	6,2 ; 10,5 ; 3,5	6,2 ; 10,5 ; 3,6	6,2 ; 10,5
S-0-0200	Motorwerktemperatur	ϑ_k	°C			85	85	85	85	85	85	85
S-0-0200	Motorabschaltemperatur	ϑ_k	°C			90	90	90	90	90	90	90
S-0-0109	Strom-Regler Verstärkung	V_i	V/A			112	57	57	29	29	19	
S-0-0110	Strom-Regler Nachstellzeit	t_{ni}	ms			4,9	6	6	6	6	6	6
S-0-0106	Lageregelverstärkung	k_v				1	1	1	0,5	0,5	0,5	0,5
P-0-0000	Abtastzeit	t_s	ms			900	900	900	900	900	900	900
S-0-0319	Geschwindigkeitsverstärkung	k_p				0,012	0,012	0,012	0,031	0,031	0,031	0,031
S-0-0110	Nachstellzeit	T_N				5	5	5	5	5	5	5

Stromreserven des Reglers gegenüber dem Motorbedarf

Reglerauswahl:

Der Dauerstrom des Reglers muß größer als der Nennstrom des Motors sein.
Der Spitzenstrom des Reglers muß größer als der Spitzenstrom des Motors sein.
In den Zeilen sind die Stromreserven der Leistungsteile angegeben.

Leistungsteil		Dim	Wert	Motortyp	MLS 05-58-15	MLS 10-85-15	MLS 10-100-15	MLD 20-85-15	MLS 20-85-25	MLS 20-100-25	MLS 30-85-35
HCS01.1EW0003-_-02											
	Dauerstrom 4kHz	A_{eff}	**1,1**		0,0	-1,1	-1,1	-2,1	-2,7	-2,8	-4,5
	Spitzenstrom (max. 8 s)	A_{eff}	**3,3**		-0,8	-4,8	-4,8	-12,9	-12,9	-12,9	-21,0
HCS01.1EW0006-_-02											
	Dauerstrom 4kHz	A_{eff}	**2**			0,9	-0,2	-1,2	-1,8	-1,9	-3,6
	Spitzenstrom (max. 8 s)	A_{eff}	**6**			1,9	-2,1	-10,2	-10,2	-10,2	-18,3
HCS01.1EW0009-_-02											
	Dauerstrom 4kHz	A_{eff}	**3**			1,9	0,8	0,8	-0,2	-0,8	-2,6
	Spitzenstrom (max. 8 s)	A_{eff}	**9**			4,9	0,9	0,9	-7,2	-7,2	-15,3
HCS01.1EW0013-_-02											
	Dauerstrom 4kHz	A_{eff}	**4,4**			3,3	2,2	2,2	1,2	0,6	0,5	-1,2
	Spitzenstrom (max. 8 s)	A_{eff}	**13**			8,9	4,9	4,9	-3,2	-3,2	-3,2	-11,3
HCS01.1EW0005-_-03											
	Dauerstrom 4kHz	A_{eff}	**1,7**			0,6	-0,5	-0,5	-1,5	-2,1	-2,2	-3,9
	Spitzenstrom (max. 8 s)	A_{eff}	**5**			0,9	-3,1	-3,1	-11,2	-11,2	-11,2	-19,3
HCS01.1EW0008-_-03											
	Dauerstrom 4kHz	A_{eff}	**2,7**			1,6	0,5	0,5	-0,5	-1,1	-1,2	-2,9
	Dauerstrom 8kHz	A_{eff}	**2,7**			1,6	0,5	0,5	-0,5	-1,1	-1,2	-2,9
	Spitzenstrom (max. 8 s)	A_{eff}	**8**			3,9	-0,1	-0,1	-8,2	-8,2	-8,2	-16,3
HCS01.1EW0018-_-03												
	Dauerstrom 4kHz	A_{eff}	**7,6**			6,5	5,4	5,4	4,4	3,8	3,7	2,0
	Dauerstrom 8kHz	A_{eff}	**7**			5,9	4,8	4,8	3,8	3,2	3,1	1,4
	Spitzenstrom (max. 8 s)	A_{eff}	**18**			13,9	9,9	9,9	1,8	1,8	1,8	-6,3
HCS01.1EW0028-_-03			94,23								HCS01.1EW0028-_-03	HCS01.1EW0028-_-03
	Dauerstrom 4kHz	A_{eff}	**11,5**			10,4	9,3	9,3	8,3	7,7	7,6	5,9
	Dauerstrom 8kHz	A_{eff}	**9**			7,9	6,8	6,8	5,8	5,2	5,1	3,4
	Spitzenstrom (max. 8 s)	A_{eff}	**28**			23,9	19,9	19,9	11,8	11,8	11,8	3,7

Zuordnung der Leistungsteile IndraDrive zu den Motoren

Motortypen	MLS 05-58-15	MLS 10-85-15	MLS 10-100-15	MLD 20-85-15	MLS 20-85-25	MLS 20-100-25	MLS 30-85-35
2 phasiger Anschluss	HCS01.1EW0006-_-02	HCS01.1EW0009-_-02	HCS01.1EW0009-_-02	HCS01.1EW0009-_-02			
3 phasiger Anschluss	HCS01.1EW0005-_-03	HCS01.1EW0018-_-03	HCS01.1EW0018-_-03	HCS01.1EW0018-_-03	HCS01.1EW0018-_-03	HCS01.1EW0018-_-03	HCS01.1EW0028-_-03

Figure 15 Assignment of the motors to the drives and files (page 1 of 2)

2* MLS 20-85-25	MLS10-250-15	MLS20-250-15	MLS30-250-15	MLS20-250-25	MLS40-250-25	MLS10-170-15	MLS20-170-15	MLS20-170-25	MLS40-170-25
MLD400NL	MLD 100T; MLD100TU	MLD200T ; MLD200TU	MLD300T ; MLD300TU	MLD200TL ; MLD200TUL	MLD400TL ; MLD400TUL	MLD100M	MLD200M, MLD200MU	MLD200ML	MLD400ML, MLD400MUL
5,6	3,1;2,6	4,2;3,6	5,6;4,7	5,2;4,5	7,2;6,2	2,2	3,8 ; 3,6	3,9	6,9;6,7
5,6	3,1	4,2	5,6	5,2	7,2	2,2	3,8	3,9	6,9
32,4	8,1	16,2	24,3	16,2	32,4	8,1	16,2	16,2	32,4
206	123 ; 104	170 ; 143	225 ; 189	208 ; 182	288 ; 247	88	152 ; 144	156	276 ; 268
2,2	7	3,7	2,1	3,5	1,9	7,0	3,4	3,5	1,581
40	40	40	40	40	40	40	40	40	40
1000	250	500	750	500	1000	250	500	500	1000
0,74	0,65 ; 0,92	0,65 ; 0,92	0,65 ; 0,92	0,46 ; 0,60	0,46 ; 0,60	1,39	1,13 ; 1,37	1,16	0,86
9,9	37,3	19,5	12,1	20,5	9,9	40,2	28	20,5	9,554
6,9	5,8	6,9	7,2	8,7	10,5	5,5	6,190 ; 5,650	8,92	10,07 ; 8,870
8,86	5,9+1,53/100mm ; 8,0+2,38/100mm	6,4+1,74/100mm ; 8,5+2,60/100mm	6,8+1,95/100mm ; 9,0+2,81/100mm	7,1+1,53/100mm ; 10,4+2,38/100mm	7+1,74/100mm ; 11,1+2,6/100m	1,5+0,97/100mm	,5+1,162/100mm ; 1,5+1,842/100mm	1,5+0,965/100mm	5+1,162/100mm ; 1,5+1,842/100m
85	85	85	85	85	85	85	85	85	85
90	90	90	90	90	90	90	90	90	90
15	52	29	17	29	14	62	29	35	14
6	5,3	5,9	5,8	5,9	5,2	5,3	5,9	6	5,2
0,8	1	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
900	900	900	900	900	900	500	500	500	500
0,031	0,031	0,031	0,031	0,031	0,031	0,031	0,031	0,031	0,031
5	5	5	5	5	5	5	5	5	5

2* MLS 20-85-25	MLS10-250-15	MLS20-250-15	MLS30-250-15	MLS20-250-25	MLS40-250-25	MLS10-170-15	MLS20-170-15	MLS20-170-25	MLS40-170-25
-4,5	-2,0	-3,1	-4,5	-4,1	-6,1	-1,1	-2,7	-2,8	-5,8
-29,1	-4,8	-12,9	-21,0	-12,9	-29,1	-4,8	-12,9	-12,9	-29,1
-3,6	-1,1	-2,2	-3,6	-3,2	-5,2	-0,2	-1,8	-1,9	-4,9
-26,4	-2,1	-10,2	-18,3	-10,2	-26,4	-2,1	-10,2	-10,2	-26,4
						HCS01.1EW0009-_02			
-2,6	-0,1	-1,2	-2,6	-2,2	-4,2	0,8	-0,8	-0,9	-3,9
-23,4	0,9	-7,2	-15,3	-7,2	-23,4	0,9	-7,2	-7,2	-23,4
	HCS01.1EW0013-_02					HCS01.1EW0013-_02			
-1,2	1,3	0,2	-1,2	-0,8	-2,8	2,2	0,6	0,5	-2,5
-19,4	4,9	-3,2	-11,3	-3,2	-19,4	4,9	-3,2	-3,2	-19,4
-3,9	-1,4	-2,5	-3,9	-3,5	-5,5	-0,5	-2,1	-2,2	-5,2
-27,4	-3,1	-11,2	-19,3	-11,2	-27,4	-3,1	-11,2	-11,2	-27,4
-2,9	-0,4	-1,5	-2,9	-2,5	-4,5	0,5	-1,1	-1,2	-4,2
-2,9	-0,4	-1,5	-2,9	-2,5	-4,5	0,5	-1,1	-1,2	-4,2
-24,4	-0,1	-8,2	-16,3	-8,2	-24,4	-0,1	-8,2	-8,2	-24,4
	HCS01.1EW00018-_03	HCS01.1EW00018-_03		HCS01.1EW00018-_03		HCS01.1EW00018-_03	HCS01.1EW00018-_03	HCS01.1EW00018-_03	
2,0	4,5	3,4	2,0	2,4	0,4	5,4	3,8	3,7	0,7
1,4	3,9	2,8	1,4	1,8	-0,2	4,8	3,2	3,1	0,1
-14,4	9,9	1,8	-6,3	1,8	-14,4	9,9	1,8	1,8	-14,4
		HCS01.1EW0028-_03	HCS01.1EW0028-_03	HCS01.1EW0028-_03				HCS01.1EW0028-_03	
5,9	8,4	7,3	5,9	6,3	4,3	9,3	7,7	7,6	4,6
3,4	5,9	4,8	3,4	3,8	1,8	6,8	5,2	5,1	2,1
-4,4	19,9	11,8	3,7	11,8	-4,4	19,9	11,8	11,8	-4,4

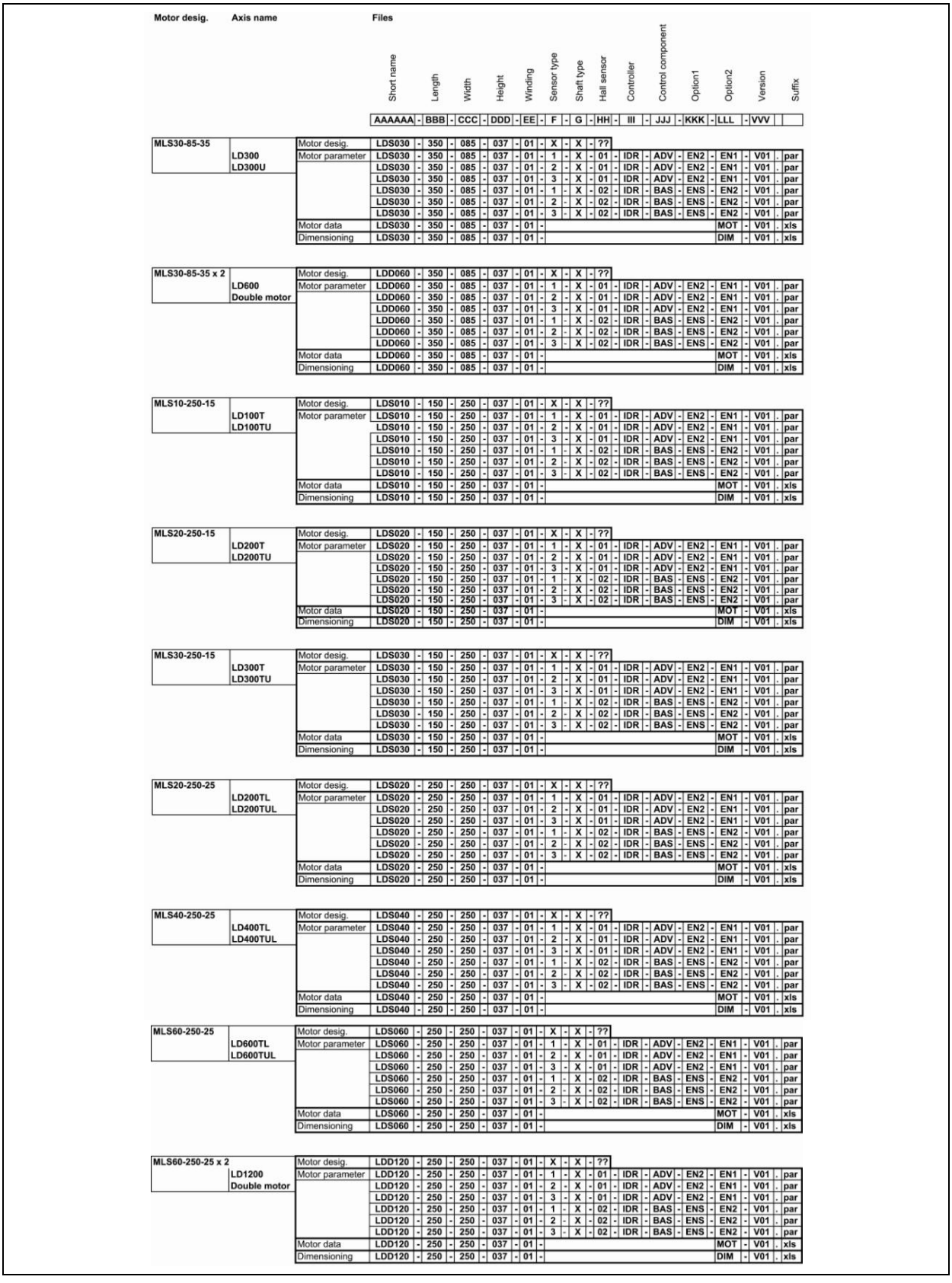
2* MLS 20-85-25	MLS10-250-15	MLS20-250-15	MLS30-250-15	MLS20-250-25	MLS40-250-25	MLS10-170-15	MLS20-170-15	MLS20-170-25	MLS40-170-25
	HCS01.1EW0013-_-02					HCS01.1EW0009-_-02			
	HCS01.1EW00018-_-03	HCS01.1EW00018-_-03	HCS01.1EW0028-_-03	HCS01.1EW00018-_-03		HCS01.1EW00018-_-03	HCS01.1EW00018-_-03	HCS01.1EW00018-_-03	

Figure 16 Assignment of the motors to the drives and files (page 2 of 2)

4.4 Overview of motor types

Motor desig.	Axis name	Files	Short name	Length	Width	Height	Winding	Sensor type	Shaft type	Hall sensor	Controller	Control component	Option1	Option2	Version	Suffix
			AAAAAA	BBB	CCC	DDD	EE	F	G	HH	III	JJJ	KKK	LLL	VVV	
MLS05-58-15	LD50K LD50KT	Motor desig.	LDS005	150	058	037	01	X	X	??						
		Motor parameter	LDS005	150	058	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS005	150	058	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS005	150	058	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS005	150	058	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS005	150	058	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS005	150	058	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS005	150	058	037	01							MOT	V01	xls
		Dimensioning	LDS005	150	058	037	01							DIM	V01	xls
MLS10-58-25	LD100KL	Motor desig.	LDS010	250	058	037	01	X	X	??						
		Motor parameter	LDS010	250	058	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	250	058	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	250	058	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	250	058	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	250	058	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	250	058	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS010	250	058	037	01							MOT	V01	xls
		Dimensioning	LDS010	250	058	037	01							DIM	V01	xls
MLS10-85-15	LD100 LD100U LD100K	Motor desig.	LDS010	150	085	037	01	X	X	??						
		Motor parameter	LDS010	150	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	150	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	150	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS010	150	085	037	01							MOT	V01	xls
		Dimensioning	LDS010	150	085	037	01							DIM	V01	xls
MLD20-85-15	LD200 Double motor	Motor desig.	LDD020	150	085	037	01	X	X	??						
		Motor parameter	LDD020	150	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD020	150	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD020	150	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD020	150	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD020	150	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD020	150	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDD020	150	085	037	01							MOT	V01	xls
		Dimensioning	LDD020	150	085	037	01							DIM	V01	xls
MLS20-85-25	LD200L LD200UL LD200K	Motor desig.	LDS020	250	085	037	01	X	X	??						
		Motor parameter	LDS020	250	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	250	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	250	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS020	250	085	037	01							MOT	V01	xls
		Dimensioning	LDS020	250	085	037	01							DIM	V01	xls
MLD40-85-25	LD400L Double motor	Motor desig.	LDD040	250	085	037	01	X	X	??						
		Motor parameter	LDD040	250	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD040	250	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD040	250	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD040	250	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD040	250	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD040	250	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDD040	250	085	037	01							MOT	V01	xls
		Dimensioning	LDD040	250	085	037	01							DIM	V01	xls

Figure 17 Overview of motor types (page 1 of 2)



Motor desig.	Axis name	Files	Short name	Length	Width	Height	Winding	Sensor type	Shaft type	Hall sensor	Controller	Control component	Option1	Option2	Version	Suffix
			AAAAAA	BBB	CCC	DDD	EE	F	G	HH	III	JJJ	KKK	LLL	VVV	
MLS30-85-35	LD300 LD300U	Motor desig.	LDS030	350	085	037	01	X	X	??						
		Motor parameter	LDS030	350	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	350	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	350	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	350	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS030	350	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS030	350	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS030	350	085	037	01							MOT	V01	xls
		Dimensioning	LDS030	350	085	037	01							DIM	V01	xls
MLS30-85-35 x 2	LD600 Double motor	Motor desig.	LDD060	350	085	037	01	X	X	??						
		Motor parameter	LDD060	350	085	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD060	350	085	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD060	350	085	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD060	350	085	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD060	350	085	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD060	350	085	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDD060	350	085	037	01							MOT	V01	xls
		Dimensioning	LDD060	350	085	037	01							DIM	V01	xls
MLS10-250-15	LD100T LD100TU	Motor desig.	LDS010	150	250	037	01	X	X	??						
		Motor parameter	LDS010	150	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS010	150	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	150	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS010	150	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS010	150	250	037	01							MOT	V01	xls
		Dimensioning	LDS010	150	250	037	01							DIM	V01	xls
MLS20-250-15	LD200T LD200TU	Motor desig.	LDS020	150	250	037	01	X	X	??						
		Motor parameter	LDS020	150	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	150	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	150	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	150	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	150	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	150	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS020	150	250	037	01							MOT	V01	xls
		Dimensioning	LDS020	150	250	037	01							DIM	V01	xls
MLS30-250-15	LD300T LD300TU	Motor desig.	LDS030	150	250	037	01	X	X	??						
		Motor parameter	LDS030	150	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	150	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	150	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS030	150	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS030	150	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS030	150	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS030	150	250	037	01							MOT	V01	xls
		Dimensioning	LDS030	150	250	037	01							DIM	V01	xls
MLS20-250-25	LD200TL LD200TUL	Motor desig.	LDS020	250	250	037	01	X	X	??						
		Motor parameter	LDS020	250	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS020	250	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	250	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS020	250	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS020	250	250	037	01							MOT	V01	xls
		Dimensioning	LDS020	250	250	037	01							DIM	V01	xls
MLS40-250-25	LD400TL LD400TUL	Motor desig.	LDS040	250	250	037	01	X	X	??						
		Motor parameter	LDS040	250	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS040	250	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS040	250	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS040	250	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS040	250	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS040	250	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS040	250	250	037	01							MOT	V01	xls
		Dimensioning	LDS040	250	250	037	01							DIM	V01	xls
MLS60-250-25	LD600TL LD600TUL	Motor desig.	LDS060	250	250	037	01	X	X	??						
		Motor parameter	LDS060	250	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS060	250	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS060	250	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDS060	250	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS060	250	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDS060	250	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDS060	250	250	037	01							MOT	V01	xls
		Dimensioning	LDS060	250	250	037	01							DIM	V01	xls
MLS60-250-25 x 2	LD1200 Double motor	Motor desig.	LDD120	250	250	037	01	X	X	??						
		Motor parameter	LDD120	250	250	037	01	1	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD120	250	250	037	01	2	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD120	250	250	037	01	3	X	01	IDR	ADV	EN2	EN1	V01	par
			LDD120	250	250	037	01	1	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD120	250	250	037	01	2	X	02	IDR	BAS	ENS	EN2	V01	par
			LDD120	250	250	037	01	3	X	02	IDR	BAS	ENS	EN2	V01	par
		Motor data	LDD120	250	250	037	01							MOT	V01	xls
		Dimensioning	LDD120	250	250	037	01							DIM	V01	xls

Figure 18 Overview of motor types (page 2 of 2)

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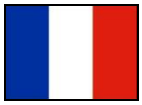

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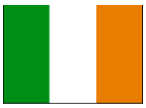

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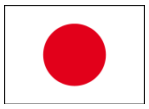

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