metronix
servo drives

Product Manual

HIPERFACE® DSL

HIPERFACE DSL (HDSL)

for the ARS 2000 FS series servo drives

Metronix Meßgeräte und Elektronik GmbH
Kocherstraße 3
38120 Braunschweig
Germany

Tel.: +49 (0)531 8668 0
Fax: +49 (0)531 8668 555
E-mail: vertrieb@metronix.de
http://www.metronix.de

Translation of the original instructions

Copyrights

The information and data in this document have been composed to the best of our knowledge. However, deviations between the document and the product cannot be excluded entirely. For the devices and the corresponding software in the version handed out to the customer, Metronix guarantees the contractual use in accordance with the user documentation. In the case of serious deviations from the user documentation, Metronix has the right and the obligation to repair, unless it would involve an unreasonable effort. A possible liability does not include deficiencies caused by deviations from the operating conditions intended for the device and described in the user documentation.

Metronix does not guarantee that the products meet the buyer's demands and purposes or that they work together with other products selected by the buyer. Metronix does not assume any liability for damages resulting from the combined use of its products with other products or resulting from improper handling of machines or systems.

Metronix reserves the right to modify, amend, or improve the document or the product without prior notification.

Trademarks

Any product names in this document may be registered trademarks. The sole purpose of any trademarks in this document is the identification of the corresponding products.

Metronix ServoCommander® is a registered trademark of Metronix Meßgeräte und Elektronik GmbH.

Revision Information	
Author:	Metronix Meßgeräte und Elektronik GmbH
Manual title:	Product Manual "HIPERFACE DSL (HDSL)"
File name:	P-HB_ARS2000_FS_HDSL_1p0_EN.docx
Version 1.0	August 2016

Table of Contents

Table of Figures

Table of Tables

1 General

1.1 Documentation

1.1.1 This product manual

The purpose of this product manual is to ensure the safe use of the ARS 2000 FS servo drives with the HIPERFACE DSL extension (HDSL). It is a supplementary document to the manuals and mounting instructions for the servo drives of the ARS 2000 FS series and it includes details about the installation of the devices with HIPERFACE DSL (HDSL).

1.1.2 Other applicable documents

Basic information about the servo drives of the ARS 2000 FS series can be found in the documents in Table 1. They include a general description of the technical data, device functionality and software functions as well as notes concerning the installation and operation of the devices.

Depending on the device type, the following documents apply:

Table 1: Overview of other applicable documents

Device type	Documents
ARS 2102 FS HDSL	▪ Product Manual „Servo Positioning Controller ARS 2100 FS“ ▪ Software Manual „Servo Positioning Controller ARS 2000“ ▪ Mounting Instructions “Servo Positioning Controller ARS 2102 FS, 2105 FS and 2108 FS”
ARS 2105 FS HDSL	
ARS 2108 FS HDSL	
ARS 2302 FS HDSL	▪ Product Manual „ Servo Positioning Controller ARS 2300 FS“ ▪ Software Manual „Servo Positioning Controller ARS 2000“ ▪ Mounting Instructions “Servo Positioning Controller ARS 2302 FS, 2305 FS and 2310 FS”
ARS 2305 FS HDSL	
ARS 2310 FS HDSL	

1.1.3 Important notes and instructions

Please observe the mandatory "Safety notes for electrical drives and controllers" as well as the applicable standards and directives concerning the servo drives of the ARS 2000 FS series. They can be found in the documents that are listed in Table 1.

You can find all of these documents on our website for download http://www.metronix.de.

The certificates and declarations of conformity for the products described in this manual can be found at http://www.metronix.de.

1.2 Order numbers

Table 2: Order numbers

Servo drive ARS 2000 FS with HIPERFACE DSL extension (HDSL)		
Type	**Metronix order number**	**Note**
HIPERFACE DSL® adapter	9200-0170-00	Necessary accessory for HIPERFACE DSL
Suitable for the following devices:		
ARS 2102 FS HDSL	9200-2102-40	Including the hardware extension for supporting HIPERFACE DSL
ARS 2105 FS HDSL	9200-2105-40	
ARS 2108 FS HDSL	9200-2108-40	
ARS 2302 FS HDSL	9200-2302-40	
ARS 2305 FS HDSL	9200-2305-40	
ARS 2310 FS HDSL	9200-2310-40	

2 Product description

The improvement and simplification of the cable connection between the servo drive and motor is becoming increasingly important. The company Sick offers a new encoder system that requires only 2 lines that are integrated together with the motor lines in the same cable.

The fact that the motor feedback signal can be transmitted via the motor cable offers a clear advantage for the users of servomotors and servo drives in terms of the investment and installation costs.

This new encoder system is called "HIPERFACE DSL®".

In order to connect the purely digital motor feedback evaluation system HIPERFACE DSL® to the servo drives of the ARS 2000 FS HDSL series, an adapter is required (see Table 2: Order numbers).

2.1 Mode of operation

The data of the motor feedback evaluation is modulated relative to the supply voltage of the motor feedback system. In the servo drive, the serial encoder data is picked up from the supply lines with the aid of a transducer and then processed to provide fast position data for controlling the motor.

2.2 Hardware requirements

This basic device (see chapter 1.2) is fully compatible with the devices of the ARS 2000 FS series and additionally enables the connection of a HIPERFACE DSL encoder.

This means that standard encoders such as EnDat®, resolvers, etc. are still supported as before.

In addition, this configuration requires an adapter in the form of a DSUB connector in order to adjust the data signals and levels of the HIPERFACE DSL interface to the RS485 interface (X2B) of the ARS 2000 FS HDSL (see Table 2: Order numbers).

3 Installation

3.1 Motor cable including the motor feedback evaluation system

The servomotor is connected to the servo drive via a single cable. It includes the motor phases with PE, the optional holding brake and the HIPERFACE DSL motor feedback signals together with the motor feedback supply voltage.

Cable set-up overview:

- 3 x motor phase
- 1 x PE (motor)
- 2 x holding brake (optional)
- 2 x HIPERFACE DSL (serial data and encoder supply)
- 1 x shield for HIPERFACE DSL

3.1.1 Shield design and cable type and configuration

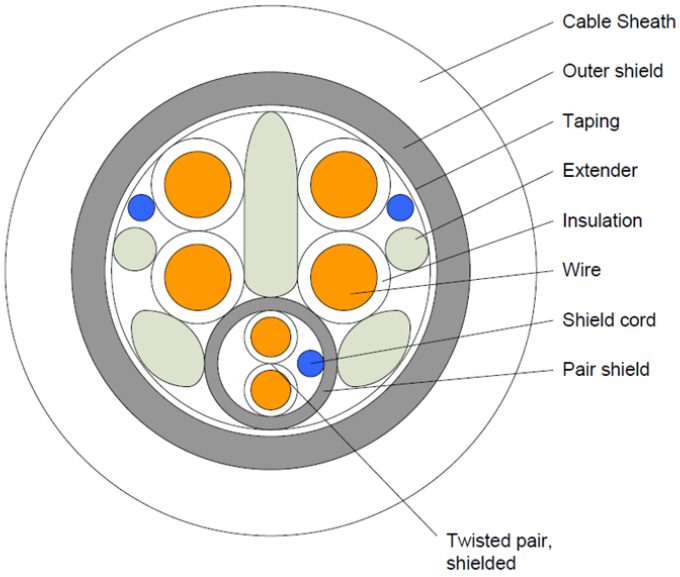

Figure 1: Recommended shield design of the cable (in accordance with the HIPERFACE DSL specification)

The HIPERFACE DSL cables must have a separate shield (see above) that must be connected to the PE conductor of the servo drive. In addition, the signal lines must be twisted in pairs.

The following cables are recommended:

- Helukabel WT940060U
- Leoni 95040129A
- TecniKabel 35492

The cables listed above as examples were taken from the HIPERFACE DSL specification.

It is also possible to use comparable cables from other manufacturers (e.g. Lapp, Lütze).

Caution!

Please comply with the prescribed minimum copper cross-section for cables as per EN 60204-1!

In the case of long cables, the cable capacitance between UVW and the shield should be as low as possible.

3.2 Electrical installation

The encoder must be connected to the servo drive via the HIPERFACE DSL adapter as shown in Figure 2.

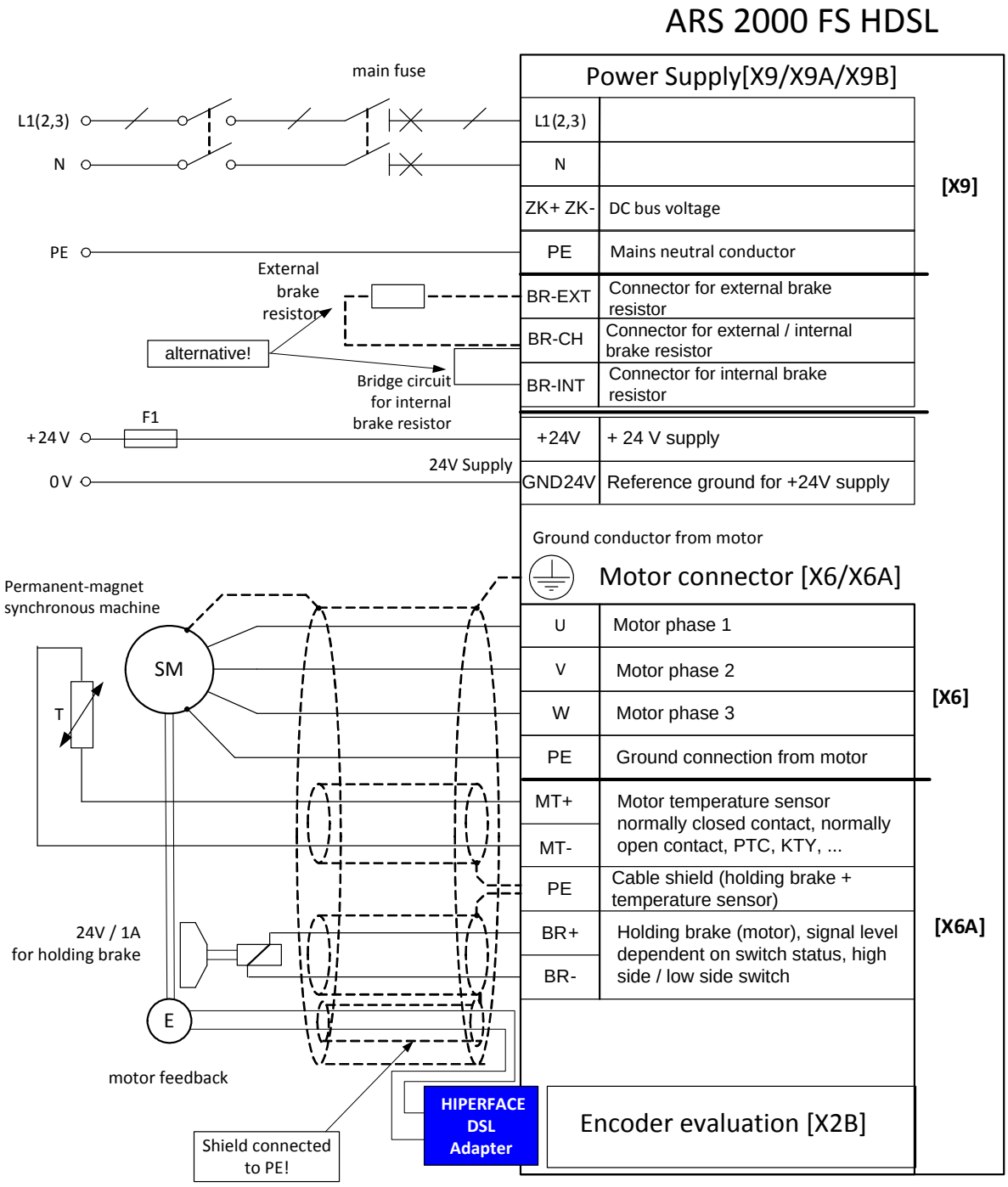

Figure 2: Connection of a motor with a HIPERFACE DSL encoder to the ARS 2000 FS HDSL

The cable must be fanned out at the encoder and fed to the interface motor connector [X6] and encoder input [X2B].

The connection is then realised directly on the circuit board of the adapter (order number: 9200-0170-00).

The connector housing must be opened for wiring.

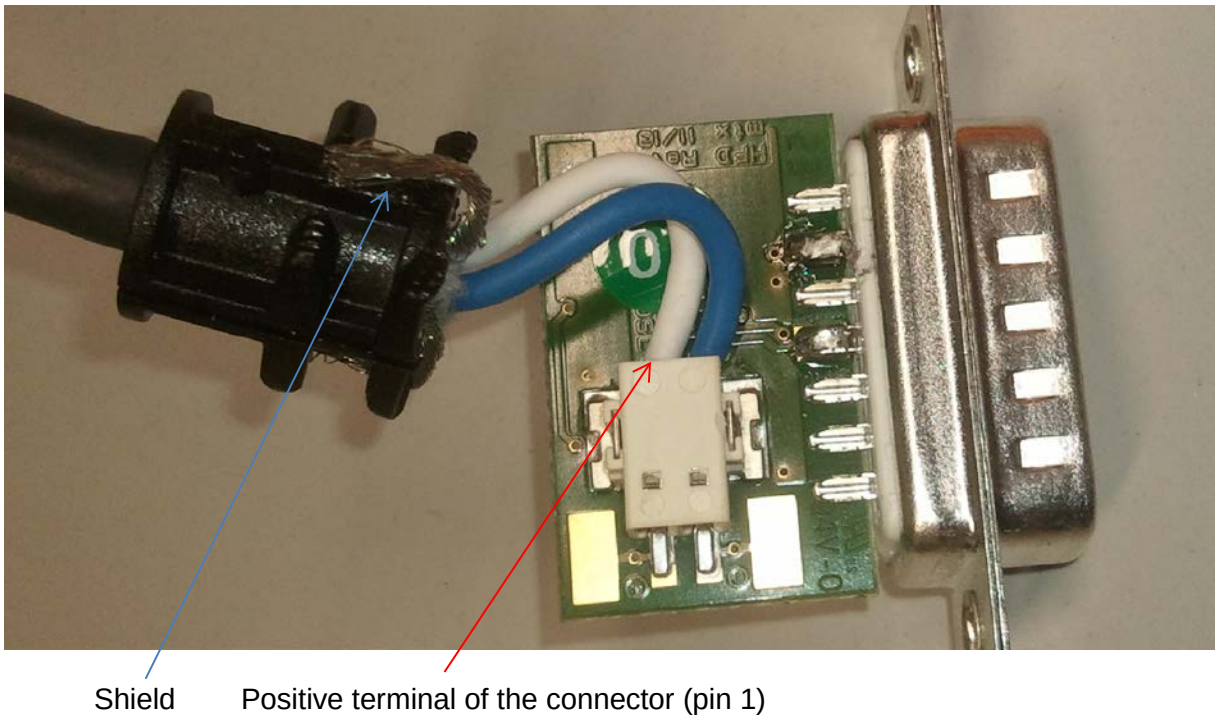

Figure 3: Connection of the lines to the HIPERFACE DSL adapter (plus)

Push-in terminals ensure the easy and quick connection of the motor feedback signals in the connector.
The shield is connected to the connector housing via the strain relief device.

Caution!

Ensure the correct polarity of the signals. Since the two lines are also used for the supply of the encoder, the encoder may be destroyed if the polarity is not correct.

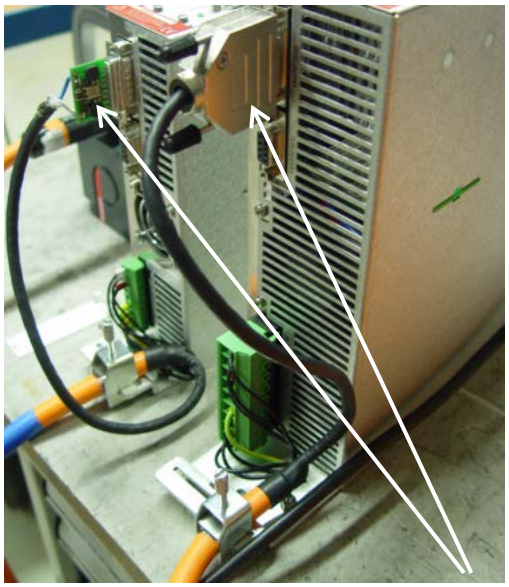

Figure 4: Connection of the motor cables to the HIPERFACE DSL adapter

Table 3: Pin assignment of the "HIPERFACE DSL Adapter"

Pin no.	Name	Value	Specification
Housing	PE	PE	Connection for the inner shield (holding brake + temperature sensor + HIPERFACE DSL)
1 (+)	DSL+	7 ... 12 V	Positive supply for the HIPERFACE DSL encoder (modulated DSL signal)
2 (-)	DSL-	-1 ... 1 V (typical)	Negative supply (DGND) for the HIPERFACE DSL encoder (modulated DSL signal) DC coupled with DGND

4 Technical data

4.1 General technical data

Table 4: Technical data: HIPERFACE DSL

Parameter	Value
Level	In accordance with the HIPERFACE DSL specification RS485
Baud rate	9.37 MHz
Frame rate	12.1 to 27 µs
Supply voltage	12 V (250 mA)
Supported transfer modes	Transfer of short and long messages with storage of the set of parameters in the encoder
Wave impedance of the cable and line termination	110 Ω
Maximum cable length	25 m

4.2 Supported angle encoders

4.2.1 HIPERFACE DSL®

The system supports Sick angle encoder with a HIPERFACE DSL interface in line with the current implementation (July 2016) and design. The proof of operability has been performed with an EKM36 encoder (18-bit version). At present, the following variants are not supported:

- 17-bit or 20-bit encoders
- Single-turn encoders (EKS...)
- Capacitive encoder systems (EEy37)
- Customised encoders (EFx50 encoders)

The adjustments and the test have been performed with sample encoders.

This is why the actual encoder should always be tested in the intended application prior to actually using it.

Please contact Metronix for the support of further variants.

The activation must be performed in the window **Angle encoder settings**:

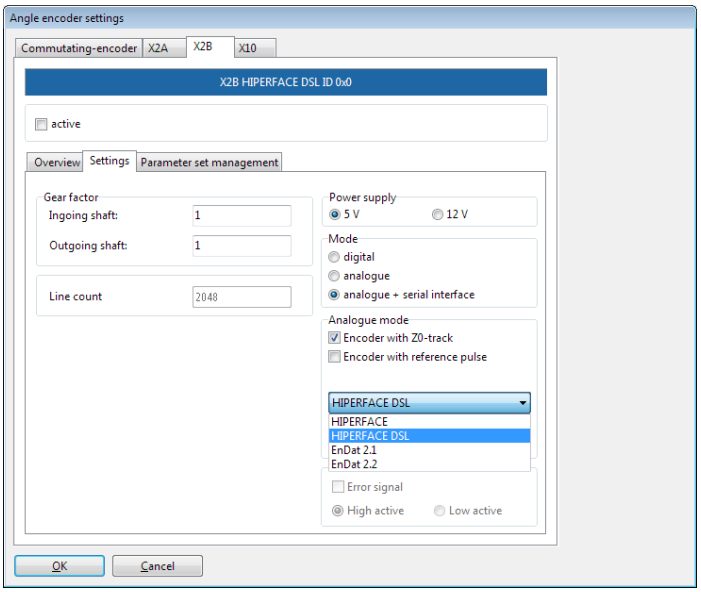

Figure 5: Angle encoder settings

4.3 Special functions

4.3.1 Motor temperature measurement

The measurement of the motor temperature via HIPERFACE DSL is not supported.

Metronix recommends a suitable set up of the I^2T time and the adjustment of the nominal current and maximum current in the motor data menu (**Parameters→Device parameters→Motor data**).

4.3.2 Storage of parameters in the encoder

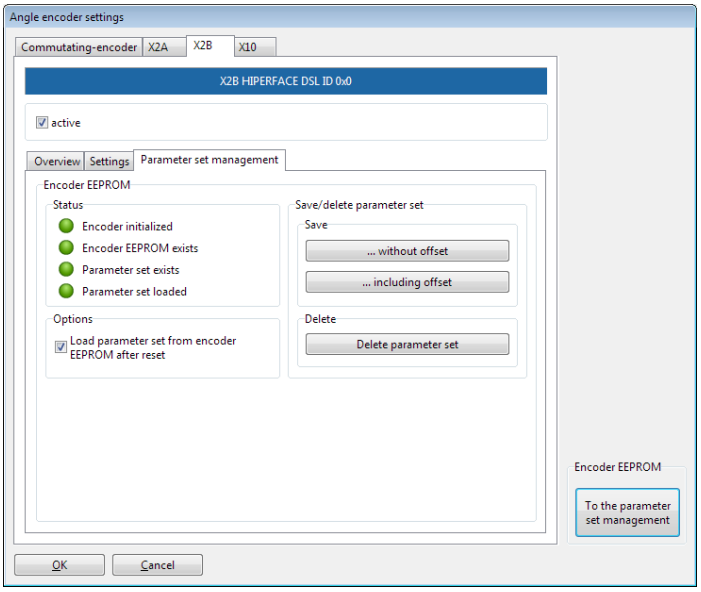

Figure 6: Angle encoder parameter set

In the menu **Angle encoder settings**, the state of the data in the angle encoder can be analysed or updated on the tab "Parameter set management".

The following parameters are stored in the encoder:

- Pole pair number, phase sequence and commutation offset
- Nominal and maximum current and the settings for the current controller
- Lateral displacement parameter concerning the actual position (e.g. after homing)
- Gear ratio for the angle encoder

DANGER!

In the case of angle encoders with an internal EEPROM and a valid parameter set in the angle encoder, the parameters that are stored in the flash memory of the servo drive will be overwritten.

This may result in an unwanted operating state, for example if the motors of a machine are replaced, the direction of movement is changed or if a changed lateral displacement parameter indicates a different actual position.