

# LDD 1800 Field Cable Guide

Encoder, Power, and Hybrid Cables

108872-A

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## Overview

LiveDrive® LDD direct drive motor power and encoder cables are available to support faster prototyping and development testing. For additional ease of integration, drive-specific connectors are available on encoder and hybrid cables. This document provides cable configurations, part numbers, connector information, and pinouts.

## Field Cable Selection

1. Select an LDD motor model.
  - a. Models with HIPERFACE DSL® will require one M23 Hybrid cable.
  - b. All other models (HIPERFACE®, BiSS-C®, EnDat 2.2) will require one M23 Power cable and one M12 Encoder cable.
2. Select cables(s) based on the encoder protocol and drive match using the tables below.

Table 1: Encoder Cables (HIPERFACE, BiSS-C, EnDat 2.2 models)

Table 2: Power Cables (HIPERFACE, BiSS-C, EnDat 2.2 models)

Table 3: Hybrid Power and Encoder Cables (HIPERFACE DSL models)

3. Select desired cable length.

## Field Cable Part Numbering

**Table 1: Encoder Cables**

Drive Match	Drive Models	Encoder Protocol	Drive Connector	Motor Connector	Length	PN
Schneider Electric®	Lexium 32 Lexium 52 Lexium 62	HIPERFACE	RJ45	M12 A-code straight	5m	107726
					10m	107727
Beckhoff®	AX5000 with AX5721 or AX5722 option card AX8000	EnDat 2.2 BiSS-C	D-Sub 15		5m	107728
					10m	107729
B&R®	ACOPOS P1 ACOPOS Multi	EnDat 2.2 BiSS-C	D-Sub 9		5m	107730
					10m	107731
	ACOPOS P3	EnDat 2.2 BiSS-C	8-pin Mini I/O		5m	107734
					10m	107735
Keba®	KeDrive3	EnDat 2.2 BiSS-C	High Density D-Sub 15		5m	107736
					10m	107737
Drive Independent		EnDat 2.2 BiSS-C HIPERFACE	Blunt End	M12 A-code straight	3m	102744
					5m	102745
					10m	102746
		EnDat 2.2 BiSS-C HIPERFACE		M12 A-code 90 degree	3m	102747
					5m	102748
					10m	102749

**Table 2: Power Cables**

Drive Match	Motor Connector	Drive Connector	Length	PN
Drive Independent	M23 8-pole straight	Flying leads	3m	102750
			5m	102751
			10m	102752
	M23 8-pole 90 degree		3m	102753
			5m	102754
			10m	102755

Note: Power cables in Table 2 should be used for drive independent HIPERFACE DSL configurations.

**Table 3: Hybrid Power and Encoder Cables**

Drive Match	Drive Models	Encoder Type	Drive Connector	Motor Connector	Length	PN
Schneider Electric	Lexium 62	HIPERFACE DSL	Flying leads (power, brake), RJ45-8+2 connector (encoder)	M23 8-pole straight	5m	107738
					10m	107739
Beckhoff	AX5000		Beckhoff ZS4500-2013 (power)		5m	107740
			Beckhoff ZS4500-2014 (brake, encoder)		10m	107741
	AX8000		Beckhoff ZS4800-2013 (power, brake, encoder)		5m	107742
					10m	107743
B&R	ACOPOS P3		Flying leads (power, brake), 8-pin mini I/O (encoder)		5m	107744
					10m	107745
Keba	KeDrive3		Keba D3-XT 231/A (power, brake, encoder)		5m	107746
					10m	107747

# M12 Encoder Cables

HIPERFACE, BiSS-C, EnDat 2.2 models

## Cable Specifications

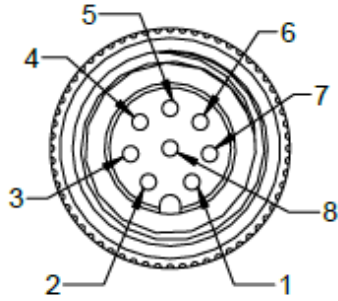
<b>Cable Type</b>	Shielded Cat5e, PUR Jacket
<b>Conductors</b>	8 cores, 24 AWG (0.25 mm <sup>2</sup> )
<b>Colour</b>	Teal
<b>Cable Diameter</b>	7.8 mm
<b>Minimum Bend Radius</b>	58.5 mm
<b>Current Rating (30°C)</b>	2 A
<b>Voltage Rating</b>	300 V
<b>Cable Lengths</b>	3 meters (Drive Independent only), 5 meters, 10 meters

## Motor-Side Encoder Connector

Motor-Side Connector

M12 8-Pole A-Code, Female

Straight OR 90-Degree Connector

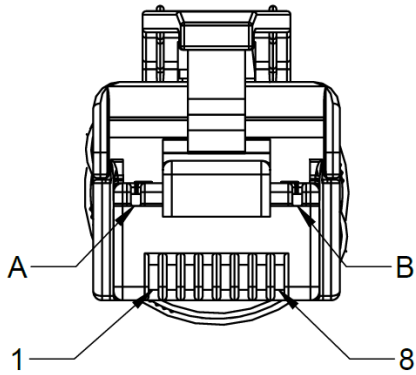


Pin	HIPERFACE	EnDat 2.2	BiSS-C
1	DATA-	N/C	N/C
2	DATA+	N/C	N/C
3	REFCOS	DATA+	DATA+
4	COS+	DATA-	DATA-
5	0V	0V	0V
6	REFSIN	CLK-	CLK-
7	SIN+	CLK+	CLK+
8	Us	Us	Us

## Drive-Side Encoder Connectors

### Schneider Electric

<b>Compatible Drive Model</b>	Lexium 32
	Lexium 52
	Lexium 62
<b>Drive-Side Connector</b>	RJ45



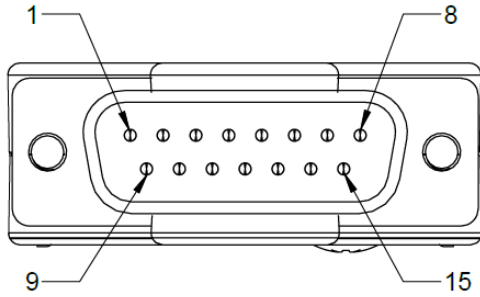
Pin	HIPERFACE
1	COS+
2	REFCOS
3	SIN+
4	DATA+
5	DATA-
6	REFSIN
7	N/C
8	N/C
A	Us
B	0V



**Beckhoff**

**Compatible Drive Model** AX5000 with AX5721 or AX5722 option card  
AX8000

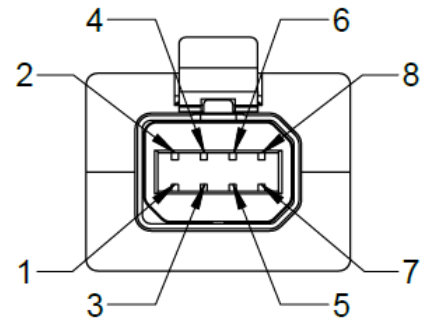
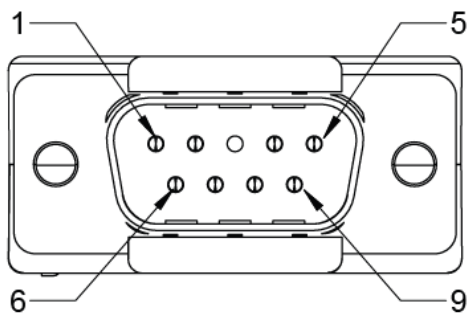
**Drive-Side Connector** D-Sub 15, Male, 45°



Pin	EnDat 2.2	BiSS-C
1		N/C
2		0V
3		N/C
4		Us
5		DATA+
6		N/C
7		N/C
8		CLK+
9		N/C
10		N/C
11		N/C
12		N/C
13		DATA-
14		N/C
15		CLK-

**B&R**

	ACOPOS P1
<b>Compatible Drive Model</b>	ACOPOS Multi ACOPOS P3
<b>Drive-Side Connector</b>	ACOPOS P1: D-Sub 9, Male, 45° ACOPOS Multi: D-Sub 9, Male, 45° ACOPOS P3: 8-Pin Mini I/O, Female

**ACOPOS P1 / ACOPOS Multi**

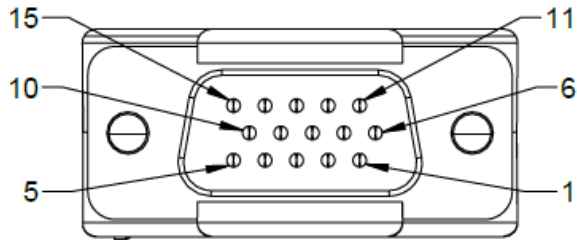
Pin	EnDat 2.2	BiSS-C
1	Us	
2	N/C	
3	N/C	
4	DATA+	
5	CLK+	
6	0V	
7	N/C	
8	DATA-	
9	CLK-	

**ACOPOS P3**

Pin	EnDat 2.2	BiSS-C
1	Us	
2	CLK+	
3	N/C	
4	CLK-	
5	N/C	
6	DATA+	
7	0V	
8	DATA-	

## Keba

<b>Compatible Drive Model</b>	KeDrive D3
<b>Drive-Side Connector</b>	D-Sub 15 High Density, Male, 45°



Pin	EnDat 2.2	BiSS-C
1		N/C
2		N/C
3		Us
4		DATA+
5		DATA-
6		N/C
7		N/C
8		0V
9		N/C
10		N/C
11		N/C
12		N/C
13		N/C
14		CLK+
15		CLK-

## Drive-Independent

<b>Drive-Side Connector</b>	Blunt End
<b>Conductors</b>	24 AWG

Refer to LDD User Manual for encoder connector pinouts.

## M23 Power and Hybrid Cables

Note that M23 power cables are also used as hybrid cables HIPERFACE DSL configurations. Cable and motor-side connector specifications are identical.

Power and drive-independent hybrid cables have flying leads on the drive side of the cable.

### Cable Specifications

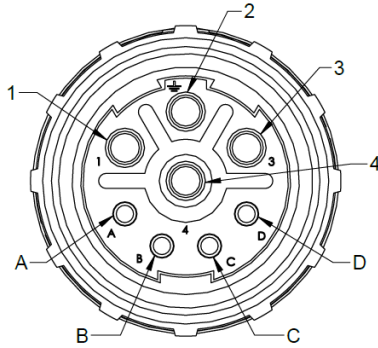
<b>Cable Type</b>	Shielded Servo Cable, PVC Jacket
<b>Conductors</b>	Power, 16 AWG (1.5 mm <sup>2</sup> ) Control Pairs 1 and 2, 18 AWG (0.75 mm <sup>2</sup> )
<b>Conductors (Schneider and B&amp;R Hybrid cables only)</b>	Power, 16 AWG (1.5 mm <sup>2</sup> ) Control Pair 1, 18 AWG (0.75 mm <sup>2</sup> ) Control Pairs 2 and 3, 26 AWG (0.14 mm <sup>2</sup> ) Control Pair 4, 24 AWG (0.25 mm <sup>2</sup> )
<b>Colour</b>	Orange
<b>Cable Diameter</b>	13.5 mm
<b>Minimum Bend Radius</b>	67.5 mm (fixed installations)
<b>Current Rating (30°C)</b>	19 A
<b>Voltage Rating</b>	1000 V
<b>Cable Lengths</b>	3 meters, 5 meters, 10 meters

## Motor-Side Power and Hybrid Connector

### Motor-Side Connector

M23 8-Pole, Power and Control

Straight or 90-degree Connector



Pin	Power with Brake	Power without Brake	Hybrid with Brake	Hybrid without Brake
1	L1	L1	L1	L1
2	PE	PE	PE	PE
3	L2	L2	L2	L2
4	L3	L3	L3	L3
A	BR+	N/C	BR+	N/C
B	BR-	N/C	BR-	N/C
C	TH-	TH-	DSL+*	DSL+*
D	TH+	TH+	DSL-	DSL-

\*Temperature information is transmitted through DSL signal.

## Drive-Side Power and Hybrid Flying Leads

Specifications below apply to:

- Power cables for LDD configurations with EnDat 2.2, BiSS-C, or HIPERFACE encoder protocols
- Drive-independent hybrid cables for LDD configurations with HIPERFACE DSL encoder protocol

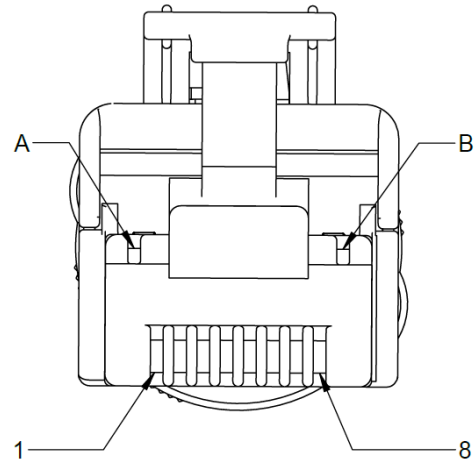
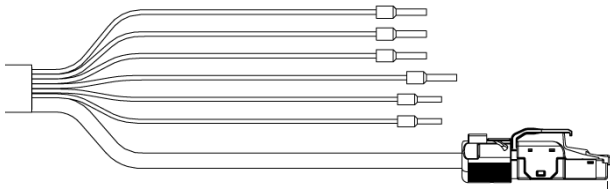
<b>Drive-Side Connector</b>	Flying leads
<b>Conductors</b>	Power – 16 AWG (1.5 mm <sup>2</sup> )
	Control – 18 AWG (0.75 mm <sup>2</sup> )

Refer to labels on flying leads for pin designation.

## Drive-Side Hybrid Connectors

### Schneider Electric

<b>Compatible Drive Model</b>	Lexium 62
<b>Drive-Side Connector</b>	Flying Leads (Power, Brake) RJ45 (Encoder)

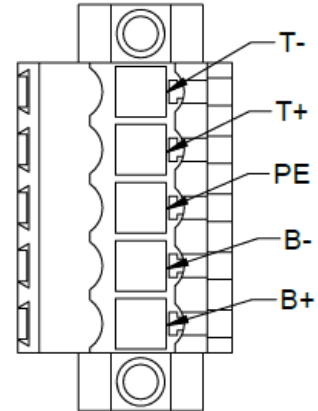
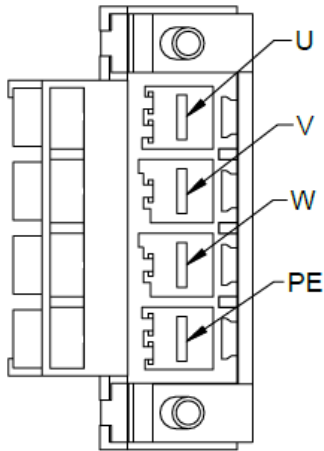


Power/Brake		
Lead Color	Hybrid with Brake	Hybrid without Brake
Black	L1	L1
Brown	L2	L2
Blue	L3	L3
Green & Yellow	PE	PE
White & Blue	BR+	N/C
White & Green	BR-	N/C

Signal	
Pin	Hybrid
1	N/C
2	N/C
3	N/C
4	DSL+
5	DSL-
6	N/C
7	N/C
8	N/C
A	N/C
B	N/C

**Beckhoff AX5000**

<b>Compatible Drive Model</b>	AX5000
<b>Drive-Side Connector</b>	Plug, Female ZS4500-2013 (Power) ZS4500-2014 (Signal)



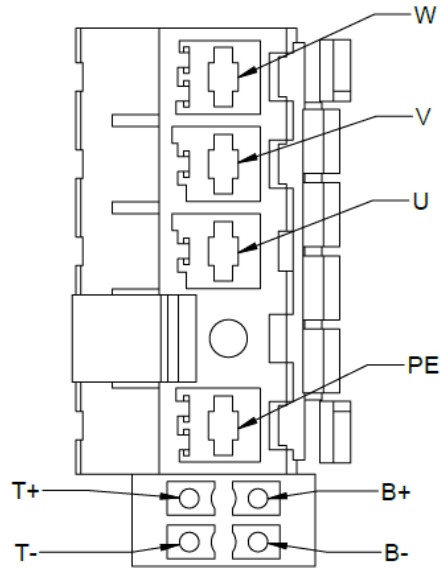
Power	
Pin	Hybrid
U	L1
V	L2
W	L3
PE	PE

Signal		
Pin	Hybrid with Brake	Hybrid without Brake
T-	DSL-	DSL-
T+	DSL+	DSL+
PE	Shield	Shield
B-	BR-	N/C
B+	BR+	N/C



**Beckhoff AX8000**

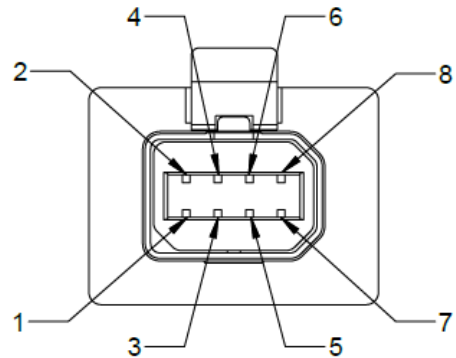
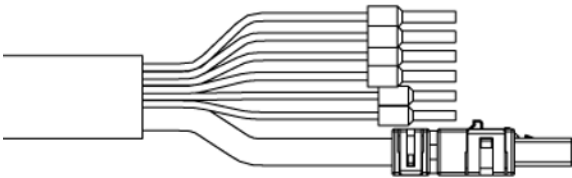
<b>Compatible Drive Model</b>	AX8000
<b>Drive-Side Connector</b>	Plug, Female ZS4800-2013



Pin	Hybrid with Brake	Hybrid without Brake
W	L3	L3
V	L2	L2
U	L1	L1
PE	PE	PE
B+	BR+	N/C
B-	BR-	N/C
T-	DSL-	DSL-
T+	DSL+	DSL+

**B&R**

<b>Compatible Drive Model</b>	ACOPOS P3
<b>Drive-Side Connector</b>	Flying Leads (Power, Brake) Mini I/O (Encoder)

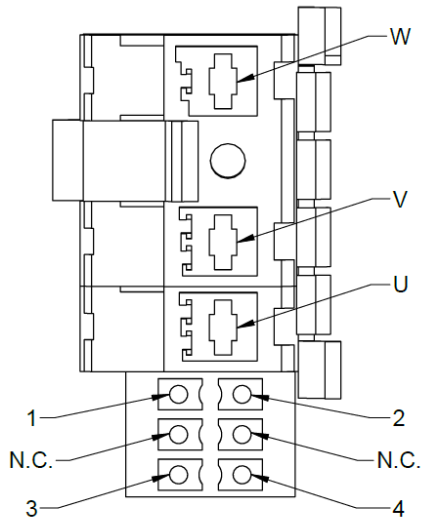


Power/Brake		
Lead Color	Hybrid with Brake	Hybrid without Brake
Black	L1	L1
Brown	L2	L2
Blue	L3	L3
Green & Yellow	PE	PE
White & Blue	BR+	N/C
White & Green	BR-	N/C

Signal	
Pin	Hybrid
1	N/C
2	N/C
3	DSL+
4	N/C
5	DSL-
6	N/C
7	N/C
8	N/C

## Keba

<b>Compatible Drive Model</b>	KeDrive 3
<b>Drive-Side Connector</b>	Plug, Female D3-XT 231/A



Pin	Hybrid with Brake	Hybrid without Brake
PE	Ring Terminal	Ring Terminal
W	L3	L3
V	L2	L2
U	L1	L1
1	DSL-	DSL-
2	DSL+	DSL+
N.C.	N/C	N/C
N.C.	N/C	N/C
3	BR+	N/C
4	BR-	N/C