



LWL - Transmitter

Type: LWL-T, LWLS-T

光纤变送器

型号: *LWL-T, LWLS-T*

LWL - Decoder

Type: LWLS-D, LWLS-Di

光纤解码器

型号: *LWLS-D, LWLS-Di*



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- On-site consultation, service and measurements including installation support
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- Harbour and crane technology
- Mining industry
- Transport and marine technology
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- 超过80年的经验, 满足重工业的客户需求
- 全球范围内在钢铁厂, 起重机和露天采矿厂中有几千个应用

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- 港口和起重机技术
- 矿山工业
- 运输及海洋科技
- 能源技术, 石油及天然气生产
- 可再生能源



1. Incremental encoder with fiber optics option

1. 带有光纤输出的增量编码器

1.1 Signal transmission using fiber optics (LWL)

1.1 使用光纤 (LWL) 的信号变送器

As an alternative to conventional signal transmission using copper cables, the signals from the incremental encoders can also be transmitted through fiber optics.

作为替代传统的铜电缆的信号传输，来自增量编码器的信号也可以通过光缆传输。

The signals 0°, 90°, marker pulse, and LED check, which are available in parallel, are encoded in the transmitter and transmitted via just one fiber optics cable to the decoder in the control cabinet.

0°, 90°, 标记脉冲和 LED CHECK 信号可以并行输出, 并在变送器中被编码, 然后通过一根光缆把它们传输到控制柜中的解码器。

The decoder converts the coded signals back into the standard electrical signals with their complementary inverted signals.

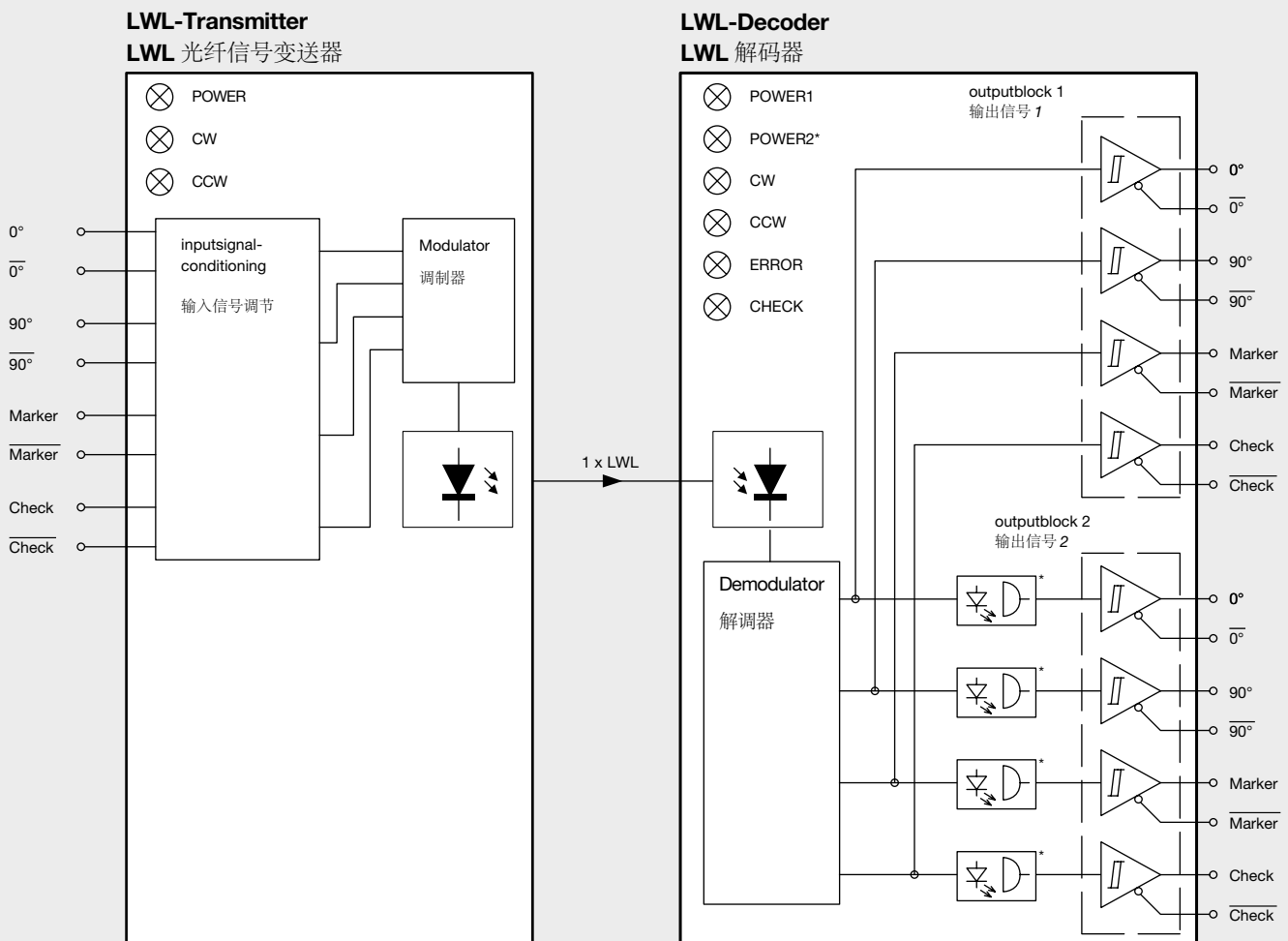
解码器把编码的信号连同互补的反相信号一起转换成标准的电信号。

1.2 Advantages of fiber optics transmission

1.2 光纤传输的优点

- High transmission capacity for long cables
- EMC insensitivity
- High transmission reliability
- Low cable costs through transmission via a single fiber optics cable
- Electrical isolation (encoder-decoder)
- LWL decoder with two output blocks
- Electrically isolated output blocks (option)

- 长电缆的高传输容量
- 抗 EMC 电磁干扰
- 高可靠性传输
- 通过单根光纤电缆传输的低电缆成本
- 电气隔离 (编码器-解码器)
- 带两个输出端子的 LWL 解码器
- 电气隔离输出 (选项)



2. LWL-Transmitter LWL-T

2.1 LWL-T for installation in exposed situations

The LWL transmitter is mounted in a cast aluminium housing that provides degree of protection to IP65.

The electrical signals from the encoder can be connected to a spring-loaded terminal strip

Sealing of the cable is achieved by 2 cable glands M20 x 1,5 for cable diameters from 7,5 – 9 mm and 9 mm – 11 mm. The cable gland for cables 9 – 11 mm can be changed into 7,5 – 9 mm.

2. 光纤变送器LWL-T

2.1 可以在露天使用的LWL-T光纤变送器

LWL变送器安装在铸铝外壳中，提供IP65防护等级。来自编码器的电信号可以连接到弹簧端子排。

电缆的密封是通过2个电缆密封套M20 x 1.5实现的，电缆直径为7,5 – 9 mm和9 – 11 mm。

用于电缆9 – 11 mm的电缆密封接头可更换为7,5 – 9 mm。

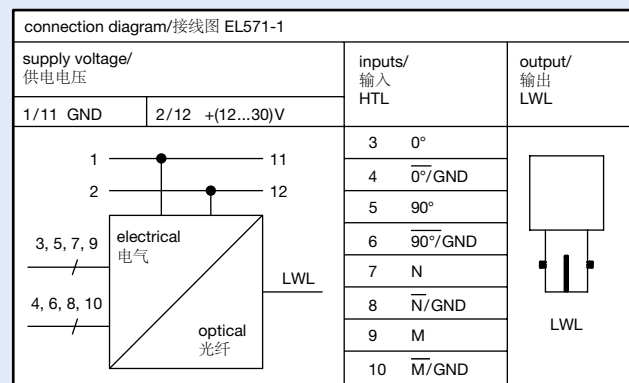
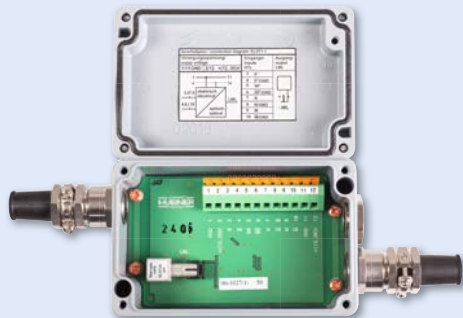
2.2 Technical data

2.2 技术参数

Technical data/ 技术参数			
Supply voltage/ 供电电压	+12 ... 30 VDC	+12 ... 30 VDC	
No load current (24 V)/ 空载电流 (24 V)	approx. 35 mA	约35 mA	
Frequency range/ 频率范围	0 ... 100 kHz	0 ... 100 kHz	
Temperature range/ 温度范围	-20°C ... 85°C	-20°C ... 85°C	
Output signal/ 输出信号	optical, 850 nm ST plug connector	光纤, 850 nm ST接头	
Dimensions (LxWxH)/ 外形尺寸	125 mm x 80 mm x 57 mm	125 mm x 80 mm x 57 mm	
Cable gland/ 电缆接头	M20 x 1,5 for cable dia. 7,5 – 9 mm M20 x 1,5 for cable dia. 9 – 11 mm	M20 x 1,5用于电缆直径7,5 – 9 mm M20 x 1,5用于电缆直径9 – 11 mm	
Degree of protection/ 保护等级	IP65	IP65	
LWL recommendation/ LWL推荐	glass fiber 62.5/125 µm or 50/125 µm	光纤 或	62.5/125 µm 50/125 µm

2.3 Connection diagram for type LWL-T-1

2.3 LWL-T-1 接线图




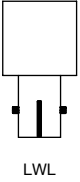
GND +12 ... 30 V

Connection diagram EL571-1
接线图 EL571-1

2.4 Connection diagram for type LWL-T-2

2.4 LWL-T-2 接线图



supply voltage/ 供电电压		inputs/ 输入 TTL	output/ 输出 LWL
1/11 GND	2/12 +(12...30)V	3 0°	
11	12	4 0°/GND	
3, 5, 7, 9	electrical 电气	5 90°	
4, 6, 8, 10	optical 光纤	6 90°/GND	
	LWL	7 N	
		8 N̄/GND	
		9 M	
		10 M̄/GND	

GND +12 ... 30 V

Connection diagram EL571-2
接线图EL571-2

2.5 Order code LWL-T Transmitter

2.5 LWL-T 变送器订货码

Cast aluminium housing/ 铸铝外壳	Input/ 输入	Connection diagram/ 接线图	Order code/ 指令码	Cable type/ 电缆型号s
LWL-T-1-50/125	HTL	EL 571-1	ID 17606	50/125 µm
LWL-T-1-62,5/125	HTL	EL 571-1	ID 17607	62,5/125 µm
LWL-T-2-50/125	TTL	EL 571-2	ID 17608	50/125 µm
LWL-T-2-62,5/125	TTL	EL 571-2	ID 17609	62,5/125 µm

3. LWL-Transmitter LWLS-T

The fiber optics transmitter is used to convert electrical encoder signals into fiber optics signals. The encoder signals 0°, 90°, marker pulse and LED check are coded, and transmitted via one optical fiber cable.

Transmission distances of 1000 m can be achieved. The time required for signal conversion is 2 µs (measured from transmitter input to decoder output). The inputs can be set to HTL or TTL. The settings are made at the factory.

3.1 LWLS-T for cabinet mounting

The module, size 23 mm x 120 mm x 115 mm (W x H x D), can be snapped onto a standard rail to EN 50022.

The degree of protection is IP20.

The electrical signals from the encoder can be connected to the terminal strip. The LWL decoder is connected via a ST-compatible plug

LEDs on the front show the operating status:

POWER Supply voltage
CW clockwise
CCW counter-clockwise

3. 光纤变送器 LWLS-T

光纤变送器被用于把编码器的电信号转换成光纤信号。编码器的信号0°, 90°, 标记脉冲和LED CHECK 被编码, 通过一根光缆传输, 传输距离最远可达到1000米。信号转换的时间为2 µs (从变送器输入到解码器输出的测量) 输入可设定为HTL或者TTL, 只能在工厂设定。

3.1 用于电气柜安装的LWLS-T

模块尺寸为23 mm x 120 mm x 115 mm (宽 x 高 x 厚), 可以卡入EN 50022的标准导轨上。

保护等级 是IP20

编码器的电信号被连接到端子排
LWL解码器用ST接头连接

前面板的LED灯显示工作状态。

电源电压
顺时针方向
逆时针方向

3.2 Technical data

2.2 技术参数

Technical data / 技术参数			
Supply voltage / 供电电压	+12 ... 30 VDC	+12 ... 30 VDC	
No load current (24 V) / 空载电流(24 V)	approx. 35 mA	约35 mA	
Frequency range / 频率范围	0 ... 100 kHz	0 ... 100 kHz	
Temperature range / 温度范围	-20 °C ... 70 °C	-20 °C ... 70 °C	
Output signal / 输出信号	optical, 850 nm ST-plug	光纤, 850 nm ST接头	
Dimensions (LxWxH) / 外形尺寸	23 mm x 120 mm x 115 mm	23 mm x 120 mm x 115 mm	
Degree of protection / 保护等级	IP20	IP20	
LWL recommendation / LWL推荐	glass fiber 62.5/125 µm or 50/125 µm	光纤 或	62.5/125 µm 50/125 µm

3.3 Connection diagram for type LWLS-T

3.3 LWLS-T 接线图



connection diagram/接线图 PN114-401-H	
supply voltage/ 供电电压	1/11 +12...30 VDC internally connected/内部连接
	2/12 GND internally connected/内部连接
	inputs/ 输入 HTL
	3 0°
	4 0°/GND
	5 90°
	6 90°/GND
	7 Marker
	8 Marker/GND
	9 Check
	10 Check/GND
	output/ 输出 LWL

connection diagram/接线图 PN114-403-T	
supply voltage/ 供电电压	1/11 +12...30 VDC internally connected/内部连接
	2/12 GND internally connected/内部连接
	inputs/ 输入 TTL
	3 0°
	4 0°/GND
	5 90°
	6 90°/GND
	7 Marker
	8 Marker/GND
	9 Check
	10 Check/GND
	output/ 输出 LWL

GND +12 ... 30 VDC

Connection diagram PN114-401-H and PN114-403-T
接线图 PN114-401-H 和 PN114-403-T

3.4 Order code LWLS transmitter

3.4 LWLS 变送器订货码

Cast aluminium housing/ 铸铝外壳	Input/ 输入	Connection diagram/ 接线图	Order code/ 订货码	Cable type/ 电缆类型
LWL-T-1-50/125	HTL	PN 114-401-H	ID 18461	50/125 µm
LWL-T-1-62,5/125	HTL	PN 114-401-H	ID 18462	62,5/125 µm
LWL-T-2-50/125	TTL	PN 114-403-T	ID 18463	50/125 µm
LWL-T-2-62,5/125	TTL	PN 114-403-T	ID 18464	62,5/125 µm

4. LWL-Decoder LWLS-D / LWLS-Di

The LWL decoder can convert the fiber optics signals received from an incremental encoder. After the optical-electrical conversion, the data are decoded and passed on to two electrically isolated output systems.

With version LWLS-Di the 2nd output system can be isolated from the 1st output system connecting two electrically isolated supply voltages.

Both output systems can be separately set to produce HTL or TTL signals. The settings are made at the factory.

The fiber optics cable is connected via a ST-compatible plug.

4.1 LEDs on the front show the operating status:

POWER1	green	Supply voltage 1
CW	green	clockwise
CCW	green	counter-clockwise
ERROR	red	error in the output stages (overload) or: fiber optics cable breakage (Option M)
CHECK	yellow	LED display to check ageing of the encoder sensor diode.

The module, size 23 mm x 120 mm x 115 mm (W x H x D), can be snapped onto a standard rail to EN 50022.

4. 光纤解码器 LWLS-D / LWLS-Di

LWL解码器可以转换从增量编码器接收的光纤信号。在光电转换之后，数据被解码并传送到两个电气隔离的输出系统。

使用版本LWLS-Di, 使用各自电源电压的第一个和二个输出系统是电

气隔离的，两个输出系统可以分别设置为HTL或TTL信号。设置只能在工厂进行。

光纤电缆通过ST插头连接。

4.1 前面板的LED显示工作状态

电源1	绿色	供电电压1
CW 绿:		顺时针
CCW 绿:		反时针
ERROR 红色,		输出错误 (过载) 或: 光纤电缆破损 (选项M)

CHECK黄色: LED显示应检查编码器传感器二极管的老化情况。

模块外形尺寸23 mm x 120 mm x 115 mm (宽 x 高 x 厚), 安装在符合EN50022的标准的导轨上

4.2 Technical data

4.2 技术参数

Technical data / 技术参数		
Supply voltage 1 / 供电电压 1	+12 ... 30 VDC	+12 ... 30 VDC
Supply voltage 2 / 供电电压 2	+12 ... 30 VDC*	+12 ... 30 VDC*
No load current (24 V) / 空载电流 (24 V)	30 mA	30 mA
Output current (HTL) / 输出电流 (HTL)	60 mA 120 mA (temporary)	60 mA 120 mA (瞬时)
Output current (TTL) / 输出电流 (TTL)	RS422A	RS422A
Frequency range / 频率范围	0 ... 100 kHz	0 ... 100 kHz
Temperature range / 温度范围	-20 °C ... 70 °C	-20 °C ... 70 °C
Degree of protection / 保护等级	IP20	IP20

* only with type LWLS-Di / 只有LWLS-Di型

4.3 Connection diagrams decoder LWLS-D 4.3 解码器 LWLS-D 接线图



connection diagram/接线图 PN115-401D-H																		
supply voltage/ 供电电压	1/11 +12...30 VDC internally connected/内部连接																	
	2/12 GND internally connected/内部连接																	
	output/输出																	
	<table border="1"> <tr> <td>HTL 60mA</td> <td>HTL 60mA</td> </tr> <tr> <td>3 0°</td> <td>13 0°</td> </tr> <tr> <td>4 0°</td> <td>14 0°</td> </tr> <tr> <td>5 90°</td> <td>15 90°</td> </tr> <tr> <td>6 90°</td> <td>16 90°</td> </tr> <tr> <td>7 Marker</td> <td>17 Marker</td> </tr> <tr> <td>8 Marker</td> <td>18 Marker</td> </tr> <tr> <td>9 Check</td> <td>19 Check</td> </tr> <tr> <td>10 Check</td> <td>20 Check</td> </tr> </table>	HTL 60mA	HTL 60mA	3 0°	13 0°	4 0°	14 0°	5 90°	15 90°	6 90°	16 90°	7 Marker	17 Marker	8 Marker	18 Marker	9 Check	19 Check	10 Check
HTL 60mA	HTL 60mA																	
3 0°	13 0°																	
4 0°	14 0°																	
5 90°	15 90°																	
6 90°	16 90°																	
7 Marker	17 Marker																	
8 Marker	18 Marker																	
9 Check	19 Check																	
10 Check	20 Check																	

connection diagram/接线图 PN115-402D-HT																		
supply voltage/ 供电电压	1/11 +12...30 VDC internally connected/内部连接																	
	2/12 GND internally connected/内部连接																	
	output/输出																	
	<table border="1"> <tr> <td>HTL 60mA</td> <td>TTL RS422</td> </tr> <tr> <td>3 0°</td> <td>13 0°</td> </tr> <tr> <td>4 0°</td> <td>14 0°</td> </tr> <tr> <td>5 90°</td> <td>15 90°</td> </tr> <tr> <td>6 90°</td> <td>16 90°</td> </tr> <tr> <td>7 Marker</td> <td>17 Marker</td> </tr> <tr> <td>8 Marker</td> <td>18 Marker</td> </tr> <tr> <td>9 Check</td> <td>19 Check</td> </tr> <tr> <td>10 Check</td> <td>20 Check</td> </tr> </table>	HTL 60mA	TTL RS422	3 0°	13 0°	4 0°	14 0°	5 90°	15 90°	6 90°	16 90°	7 Marker	17 Marker	8 Marker	18 Marker	9 Check	19 Check	10 Check
HTL 60mA	TTL RS422																	
3 0°	13 0°																	
4 0°	14 0°																	
5 90°	15 90°																	
6 90°	16 90°																	
7 Marker	17 Marker																	
8 Marker	18 Marker																	
9 Check	19 Check																	
10 Check	20 Check																	

connection diagram/接线图 PN115-403D-T																		
supply voltage/ 供电电压	1/11 +12...30 VDC internally connected/内部连接																	
	2/12 GND internally connected/内部连接																	
	output/输出																	
	<table border="1"> <tr> <td>TTL RS422</td> <td>TTL RS422</td> </tr> <tr> <td>3 0°</td> <td>13 0°</td> </tr> <tr> <td>4 0°</td> <td>14 0°</td> </tr> <tr> <td>5 90°</td> <td>15 90°</td> </tr> <tr> <td>6 90°</td> <td>16 90°</td> </tr> <tr> <td>7 Marker</td> <td>17 Marker</td> </tr> <tr> <td>8 Marker</td> <td>18 Marker</td> </tr> <tr> <td>9 Check</td> <td>19 Check</td> </tr> <tr> <td>10 Check</td> <td>20 Check</td> </tr> </table>	TTL RS422	TTL RS422	3 0°	13 0°	4 0°	14 0°	5 90°	15 90°	6 90°	16 90°	7 Marker	17 Marker	8 Marker	18 Marker	9 Check	19 Check	10 Check
TTL RS422	TTL RS422																	
3 0°	13 0°																	
4 0°	14 0°																	
5 90°	15 90°																	
6 90°	16 90°																	
7 Marker	17 Marker																	
8 Marker	18 Marker																	
9 Check	19 Check																	
10 Check	20 Check																	

GND +12 ... 30 VDC

Connection diagram PN115-401-H, PN115-402D-HT and PN115-403D-T
接线图 PN115-401-H, PN115-402D-HT 和 PN115-403D-T

4.4 Connection diagrams decoder LWLS-Di 4.4 解码器LWLS-Di 接线图



connection diagram/接线图 PN115-404Di-H		
supply voltage 1/ 供电电压 1	1 +12...30 VDC	
	2 GND	
supply voltage 2/ 供电电压 2	11 +12...30 VDC	
	12 GND	
	output/输出	
	HTL 60mA	HTL 60mA
	3 0°	13 0°
	4 0°	14 0°
	5 90°	15 90°
	6 90°	16 90°
	7 Marker	17 Marker
	8 Marker	18 Marker
	9 Check	19 Check
	10 Check	20 Check

connection diagram/接线图 PN115-405Di-HT		
supply voltage 1/ 供电电压 1	1 +12...30 VDC	
	2 GND	
supply voltage 2/ 供电电压 2	11 +12...30 VDC	
	12 GND	
	output/输出	
	HTL 60mA	TTL RS422
	3 0°	13 0°
	4 0°	14 0°
	5 90°	15 90°
	6 90°	16 90°
	7 Marker	17 Marker
	8 Marker	18 Marker
	9 Check	19 Check
	10 Check	20 Check

connection diagram/接线图 PN115-406Di-T		
supply voltage 1/ 供电电压 1	1 +12...30 VDC	
	2 GND	
supply voltage 2/ 供电电压 2	11 +12...30 VDC	
	12 GND	
	output/输出	
	TTL RS422	TTL RS422
	3 0°	13 0°
	4 0°	14 0°
	5 90°	15 90°
	6 90°	16 90°
	7 Marker	17 Marker
	8 Marker	18 Marker
	9 Check	19 Check
	10 Check	20 Check

GND +12 ... 30 VDC

Connection diagram PN115-404Di-H, PN115-405Di-HT and PN115-406Di-T
接线图 PN115-404Di-H, PN115-405Di-HT 和 PN115-406Di-T

4.5 Order code LWLS-D decoder

4.5 LWLS-D 解码器订货码

Cabinet housing/ 机箱外壳	Output/ 输出	Connection diagram/ 接线图	Order code/ 订货码
LWLS-D-1	HTL/HTL	PN 115-401D-H	ID 18465
LWLS-D-2	HTL/TTL	PN 115-402D-HT	ID 18466
LWLS-D-3	TTL/TTL	PN 115-403D-T	ID 18467

4.6 Order code LWLS-Di decoder galvanically isolated

4.6 LWLS-Di 解码器订货码电气隔离

Cabinet housing/ 机箱外壳	Output/ 输出	Connection diagram/ 接线图	Order code/ 订货码
LWLS-Di-1	HTL/HTL	PN 115-404Di-H	ID 18471
LWLS-Di-2	HTL/TTL	PN 115-405Di-HT	ID 18472
LWLS-Di-3	TTL/TTL	PN 115-406Di-T	ID 18473

5. Error handling / Option M Monitoring of fiber optics cable breakage

Standard:

LWL transmitter is equipped with an error input.
LWL decoder is equipped with an error output.

The transmitter is capable of transmitting an early warning signal (LED Check) from the incremental encoder to the decoder.

Option M:

As an option transmitter and decoder can be equipped with a monitoring of fiber optics cable breakage.
A breakage of the fiber optics cable or an incorrect cable installation will be detected by the decoder.

Both, early warning signal and breakage of the fiber optics cable will be transmitted to one output (CHECK and CHECK inverted).

In case of an error CHECK output will switch from high level to low level and the CHECK inverted vice versa.

5.1 LEDs on the front show the operating status:

Additionally these errors will be shown on LEDs.

Yellow indicates early warning signal (LED Check), red indicates breakage of the fiber optics cable (see also 4.1).

5.2 Order code LWL transmitter (Option M)

Cabinet housing/ 机箱外壳	Input/ 输入	Connection diagram/ 接线图	Order code/ 订货码	Cable type/ 电缆型号
LWLS-T-1-M-50/125	HTL	PN 114-401-H	ID 19233	50/125 µm
LWLS-T-1-M-62,5/125	HTL	PN 114-401-H	ID 19214	62,5/125 µm
LWLS-T-2-M-50/125	TTL	PN 114-403-T	ID 20302	50/125 µm
LWLS-T-2-M-62,5/125	TTL	PN 114-403-T	ID 20389	62,5/125 µm

5.3 Order code LWL decoder (Option M)

Cabinet housing/ 机箱外壳	Output/ 输出	Connection diagram/ 接线图	Order code/ 订货码
LWLS-D-1-M	HTL/HTL	PN 115-401D-H	ID 19215
LWLS-D-2-M	HTL/TTL	PN 115-402D-HT	ID 21447
LWLS-D-3-M	TTL/TTL	PN 115-403D-T	ID 20390

5. 错误处理/选项M, 光纤电缆破损监视

标准

LWL 变送器配有错误输入。
LWL 解码器配有错误输出。

变送器能够从增量编码器向解码器发送预警信号 (LED 检查)。

选项M

作为选项, 变送器和解码器可以配置监视光纤电缆破损的功能。
光缆的破损或不正确的安装将由解码器检测。

预警信号和光缆的破损都将传输到一个输出 (CHECK 和 CHECK Inverted)。

在出错时, CHECK 输出将从高电平变到低电平, CHECK Inverted 反之亦然

5.1 前面板的LED灯显示工作状态

此外, 这些错误将显示在 LED 上。

黄色表示预警信号 (LED Check), 红色表示光缆破损 (参见4.1)

5.2 LWL 订货码 (M选项)

5.3 LWL 解码器 (M选项) 订货码

5.4 Order code LWL-Decoder galvanically isolated (Option M)

5.4 电气绝缘 (M选项) 的 LWL 解码器的订货码

Cabinet housing / 机箱外壳	Output / 输出	Connection diagram / 接线图	Order code / 订货码
LWLS-Di-1-M	HTL/HTL	PN 115-404Di-H	ID 20824
LWLS-Di-2-M	HTL/TTL	PN 115-405Di-HT	ID 21232
LWLS-Di-3-M	TTL/TTL	PN 115-407Di-TT	ID 21817



Fiber optic option

Signal transmission using fiber optic cable

- Interference-free signal transmission
- Transmission path up to 1000 m
- Single fiber optic cable for all channels
- Decoder with 2 output blocks
- Optionally available with fiber optic cable break monitoring

光纤选项

使用光缆的信号传输

- 无干扰信号传输
- 传输路径长达1000米
- 使用一根光缆传输所有通道的信号
- 带有2个输出端口的解码器
- 可选配光缆破损监视功能

Mode of operation

The encoder signals 0°, 90°, reference pulse and error output are coded before being transmitted via a fiber optic cable. They are decoded in the switch board and issued incl. inverted signals. See separate data sheet for further information.

操作方式

编码器信号0°, 90°, 标志脉冲和误差输出在通过光纤电缆传输之前进行编码。它们在开关板中解码并发出，包括反相信号。对于进一步的信息，请参见单行手册。

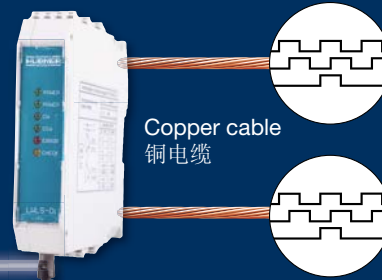
Encoder with integrated fiber optic transmitter

带有内部集成有光纤信号变送器的编码器



1 Fiber optic cable
1 根光缆

Fiber optic decoder with
2 output blocks HTL and/or TTL
光纤解码器，带有2个输出块HTL和/或TTL



Copper cable
铜电缆

Encoder with separate fiber optic transmitter

带有独立光纤变送器的编码器



Copper cable
铜电缆

LWL-Transmitter for
switch board installation
用于开关箱安装
LWL 变送器



1 Fiber optic cable
1 根光缆

Fiber optic decoder with
2 output blocks HTL and/or TTL
具有2个输出端子HTL和/或TTL的LWL解码器



Copper cable
铜电缆

Program overview

程序概要



Speed control and positioning equipment

- **Incremental encoder FG(H)**
for rolling mill application, shock tested hollow shaft bore up to \varnothing 200 mm, redundant version
- **Magnetic encoder MAG**
hollow shaft bore up to 1000 mm
- **Absolute encoder Singleturn Type AS... Multiturn Type AM...**
PROFIBUS, DeviceNet, CAN open, Ethernet, EtherCAT, SSI interface
- **Universal encoder U-ONE**
for speed, position and overspeed control as well as further functions
- **Fiber optic signal transmission**
LWL transmitter/decoder
- **Digital/Analog Electronics**
- **Electronic position switch**
Output multiplier
- **Electronic overspeed switch**
programmable switching speed from 0,63 rpm
- **Mechanical Overspeed switch**
- **Combined units**
on one common shaft
 - DC tachometer/incremental encoders
 - Overspeed switch
- **Tachometer generators DC/AC**
robust versions for heavy duty applications
- **Couplings, adapter shafts**
Mounting devices, customized

DC/AC Drive technology

- **Motors – Generators – Controllers** customer specific versions
- **Regenerative Energy**
high-pole synchronous generators with permanent excitation
- **Mobile Fahrzeugtechnik**
DC motors for battery operation, currents up to 400 A
- **Test stands**
AC high-speed motors
- **Railway applications**
AC synchronous servomotors

Special ideas and solutions

- **For tough environments**
such as steelworks and rolling mills, opencast mines, cranes, marine engineering, railways
- **Drive engineering**
DC servomotors – also for battery operation
- **Hollow-shaft pulse encoder**
- **With large bore up to \varnothing 200 mm or \varnothing 1000 mm**
- **With replaceable electronics and scanning system**
- **Fiber optic signal transmission**
- **Rolling mill approved / shock tested**
- **Customized**
- **Protection against bearing currents by using hybrid bearings**

For all interfaces the customized mounting solution!

速度控制和定位设备

- **增量编码器FG (H)**
用于轧机应用, 冲击试验
空心轴孔径可达 \varnothing 200 mm, 冗余制式
- **磁编码器MAG**
空心轴孔径 \varnothing 1000 mm
- **绝对编码器**
单圈 型号: AS ...
多圈 型号: AM ...
PROFIBUS, DeviceNet, CAN open, Ethernet, EtherCAT, SSI接
- **通用型编码器U-ONE**
用于速度、位置和超速控制以及其它功能
- **光纤信号传输**
LWL 变送器/解码器
- **数字/模拟电子**
电子位置开关
输出放大器
- **电子超速开关**
从0,63 rpm开始的可编程的切断速度
- **机械超速开关**
- **组合装置**
在一个共同的轴
 - 直流测速/增量式编码器
 - 超速开关
- **DC/AC测速发电机**
坚固的外壳适用于重载应用
- **联轴器, 适配轴**
安装装置, 定制

DC/AC传动技术

- **电机 – 发电机 – 控制器**
客户特定版本
- **再生能源**
具有永磁励磁的高磁极同步发电机
- **行走Fahrzeugtechnik**
电池操作的直流电机, 电流高达400A
- **测试台**
交流高速电机
- **铁路应用**
交流同步伺服电机

特殊想法和解决方案

- **对于恶劣环境**
如: 炼钢和轧机, 露天矿山, 起重机械, 海洋工程, 铁路
- **传动工程**
直流伺服电机 – 也用于电池操作
- **空心轴脉冲编码器**
- **孔径最大可达 \varnothing 200 mm或 \varnothing 1000 mm**
- **具有可更换电子头和扫描系统**
- **光纤信号传输**
- **轧机认可的/抗冲击测试的**
- **定制**
- **使用混合轴承防止轴电流**

对于所有接口定制安装解决方案!

WORLDWIDE | 全球



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