



中文 | ENGLISH

增量型编码器 FG 2 / FGHJ 2
用于重工业标准传动

Incremental encoders FG 2 / FGHJ 2
For standard drives in heavy industry



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精确、优势、关注客户

我们专注于技术— 我们了解我们的客户。我们坚定的站在客户一边为其提供特殊的设想、定制的方案。为了支持我们的客户，我们提供了坚固的编码器系统、强大的传动技术和全球化的服务。我们将与我们的客户一起克服在重工业领域或其它极其恶劣条件领域的巨大的挑战，继而不断的增进客户的业务。

Precision. Strength. Customer focused.

We are fascinated by technology – and we understand our customers. We stand firmly at your side with exceptional ideas and tailor-made solutions; to support our customers we offer rugged encoder systems, powerful drive technology and a worldwide service. That is how we overcome together with our customers the huge challenges in heavy industry and other fields subject to harsh conditions to sustainably improve their business. What challenges do you have?

我们的应用领域：

- 金属及轧制技术
- 港口和起重机技术
- 矿山工业
- 石油和天然气工业
- 运输
- 海洋工程
- 发电
- 其它应用领域

Our fields of applications:

- Metal and rolling mill technology
- Port and crane technology
- Mining industry
- Oil and gas industry
- Transport
- Marine engineering
- Power generation
- ... and many other applications

任务和解决方案

Task and Solution

任务

重工业领域强烈的要求所使用部件的可靠性和使用寿命。来至于 Johannes Hübner Giessen 的编码器数十年基于应用在极端恶劣条件下已经证明了自己的价值 - 通常是被指定的解决方案。

此外，编码器还可用在正常条件如：标准传动、辅传动和二级传动。这些解决方案良好的性价比是与高可靠性和长寿命同等重要。此外，它们几乎没有需要定制的细节和广泛的变化范围。

Task

Heavy industry places tough demands on the reliability and service life of the used components. Encoders from Johannes Hübner Giessen have proven their worth for decades in applications subject to extreme conditions – and their use is often the specified solution.

Furthermore, there are also applications in which the encoders are operating in normal ambient conditions, such as on standard, auxiliary and secondary drives. For these solutions a good price-performance ratio is as important as reliability and a long service life. Moreover, they have little need for customized details and a broad spectrum of variations.



FG 2系列 / Series FG 2

解决方案

FG 2 系列重工业编码器定制解决方案的专家, Johannes Hübner Fabrik elektrischer Maschinen GmbH 提供用于标准传动的增量编码器。FG 2系列不仅具有Hübner惯常的优点，如：长寿命和高水平的可靠性，它也同样满足在标准环境下对机器操作的技术要求。

FG 2 系列：

- 可靠性
- 舒适性
- 灵活性
- 安全性

Solution

With the FG 2 series the specialist for customized encoder solutions in heavy industry, Johannes Hübner Fabrik elektrischer Maschinen GmbH, offers an incremental encoder for standard drives. The FG 2 series not only combines the customary benefits of Hübner devices such as a long service life and high levels of reliability, it also fulfils the technical requirements of machines operating in normal environments.

The FG 2 series is:

- reliable
- comfortable
- flexible
- safe

安全性 / **safe**

- 具有坚固外壳的最先进的电子设备
- 具有高动载额定值的大型轴承
- 空心轴设计带有绝缘轴承和扭矩支架
- 高质量EMC 电缆锁紧套
- UL/CSA证书

- State-of-the-art electronics in a robust, thick-walled housing
- Large bearings with high dynamic load rating
- Hollow shaft design with insulated hybrid bearings and robust torque bracket with ball joints
- High-quality EMC cable clamps
- UL/CSA certification



灵活性 / **flexible**

- 转速最高至 7000 rpm
- 可选电子超速开关(选项S)
- 可选第二增量输出(选项AKK)
- 可选集成光纤变送器(选项FOC)
带有光缆破损监控
- 多种空心轴尺寸

- Speed up to max. 7000 rpm
- Optional additional electronic overspeed switch (Option S)
- Optional second incremental output (Option AKK)
- Optional integrated FOC transmitter (Option FOC)
with FOC break detection
- Variety of hollow shaft diameters

产品功效/Product benefits

可靠性 / **reliable**

- 长使用寿命和高可靠性
 - 高冲击性和抗振荡性
 - 高防护等级 IP66
 - 不锈钢轴
 - 温度范围 -25 °C 到 +85 °C
- Long service life and high levels of availability
 - High shock and vibration resistance
 - High degree of protection IP66
 - Shaft made of stainless steel
 - Temperature range from -25 °C to +85 °C

舒适性 / **comfortable**

- 舒适化的操作源于一个带有LED显示电源状态的超大尺寸的端子箱。
 - 抗振的弹性连接端子和用于光纤选项的ST接头，便于连接。(见第9页图片)
 - 或选择 ITT-Cannon 连接器。
 - 个性化解决方案的服务和咨询
- User-friendly start-up thanks to a generously sized axial terminal box with status LED to indicate power is „on“
 - Easy cable connection due to vibration-proof, spring-loaded terminals or ST connectors for option FOC (see image on page 9)
 - Alternatively with ITT-Cannon connector
 - Service and consultation for individual solutions

选项和版本 / Options and versions

组合选项 / Combination options

输出1 Output 1	增量信号通过铜电缆输出 Incremental output via copper cable		增量信号通过光纤输出(选项FOC) Incremental output via FOC (Option FOC)
输出2 Output 2	不带第二组输出 without 2 nd output	选项 / option S ¹⁾ (超速开关) (Overspeed switch)	选项 / option AKK ²⁾ (第二增量输出) (Second incremental output)
		不带第二组输出 without 2 nd output	选项 / option S ¹⁾ (超速开关) (Overspeed switch)



编码器带有简单电缆锁紧套
Encoder with simple cable gland



第二电缆锁紧套用于选项S或AKK
Second cable gland for options S or AKK

选项S或AKK

¹⁾选项 S (超速开关)

带有选项S的增量编码器FG 2通过铜电缆连接，并具有电隔离开关输出。切断功能通过一个半导体开关实现。切断速度在出厂时设置(0.5至最大6300 rpm，开关迟滞10%)。当速度超过设定值，开关断开。

²⁾选项AKK (第二组增量输出)

带有冗余设计的光电式增量编码器。输出1和输出2(见上面列表)均提供可选600，1024或2048脉冲每转。

Option S and AKK

¹⁾ Option S (overspeed switch)

The incremental encoder FG 2 with option S is connected by means of copper cable and has an electrically isolated switching output. The switching function is implemented with a semiconductor switch. The speed is set ex works (0.5 to max. 6300 rpm, switching hysteresis 10%). The switch opens when the speed exceeds the set value.

²⁾ Option AKK (second incremental output)

Incremental encoder featuring optical scanning with designed-in redundancy. Both outputs 1 and 2 (see table at the top) offer optionally 600, 1024 or 2048 pulses per revolution each.

选项和版本 / Options and versions

选项 FOC: 通过光缆信号传输

- 抗干扰信号传输
- 传输距离可至 1000 m
- 所有通道只用一根光缆
- 解码器带有两路输出
- 光缆破损监控

操作方式

在通过光缆传输前，编码器信号0°，90°和标志脉冲被编码。它们在交换机中解码并作为反向信号发出。

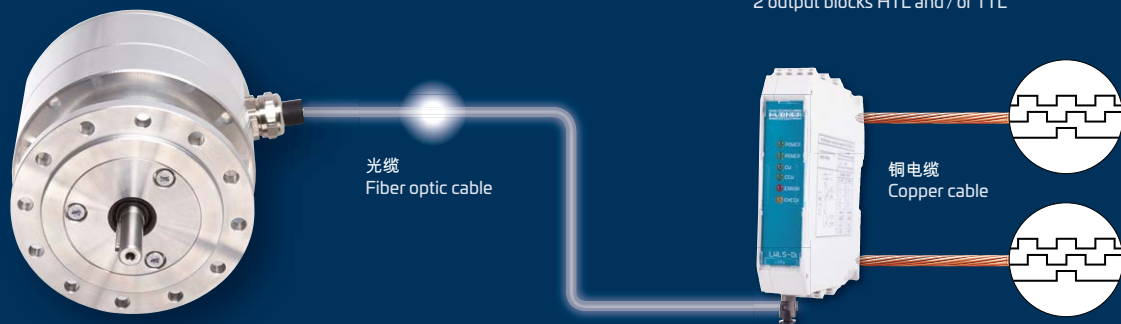
Option FOC: Signal transmission via fiber optic cable

- Interference-free signal transmission
- For long transmission paths up to 1000 m
- A single fiber optic cable for all channels
- Decoder with 2 output blocks
- FOC cable break monitoring

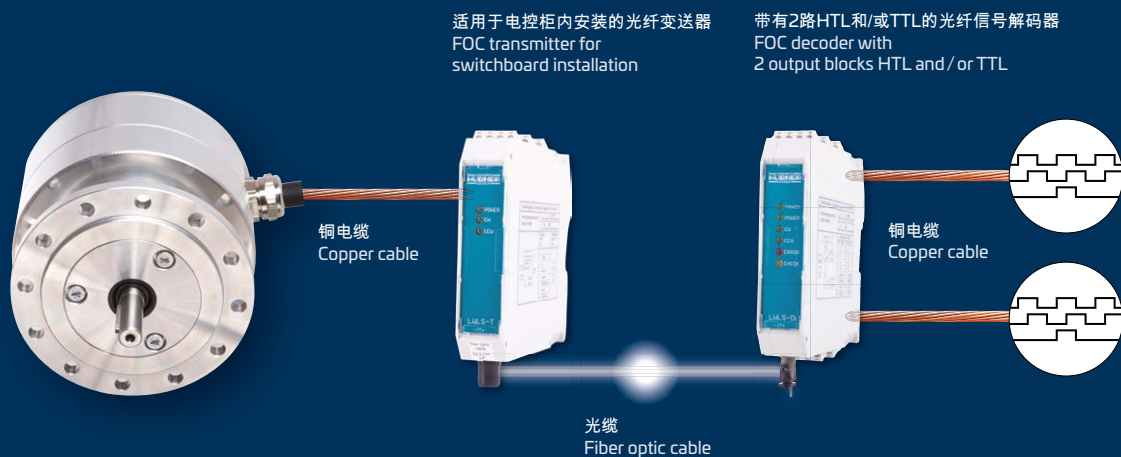
Mode of operation

The encoder signals 0°, 90° and reference pulse are coded before being transmitted via a fiber optic cable. They are decoded in the switchboard and issued as inverted signals.

集成光纤信号变送器的编码器 Encoder with integrated FOC transmitter



带有独立光纤信号变送器的编码器 Encoder with separate FOC transmitter




电气参数 / Electrical data

基本信息 / Basic device							
脉冲数 / Pulse rate	600/1024/2048 对称方形脉冲 600/1024/2048 symmetrical square pulses						
电源电压 / Supply voltage	12 – 30 V DC						
空载电流 / No-load current	24 V 时，大约 50 mA / approx. 50 mA at 24 V						
负载电流 / On-load current	≤ 150 mA 峰值 / peak						
脉冲高度 / Pulse height	HTL、大约等于供电电压 (可选 : TTL信号输出) HTL, approx. as supply voltage (Alternatively: TTL signal output)						
最大频率 / Max. frequency	200 kHz						
设备温度范围 Device temperature range	-25 ... +85 °C 其它温度范围可指定 / Other temperature ranges on request						
电子超速开关 (选项 S) / Electronic overspeed switch (Option S)							
切断电压/电流 Switching voltage / current	最大 30 V DC / 最大 0,5 A DC max. 30 V DC / max. 0,5 A DC						
切断点数 Number of switches	1 (当速度超过设定值时，开关断开。) 1 (Switch opens when the speed exceeds the set value)						
切断速度 (出厂设置) Switching speed (set ex works)	0.5 – 6300 rpm						
切断迟滞 / Switching hysteresis	10 %						
集成光纤变送器 (选项 FOC) / Integrated FOC transmitter (Option FOC)							
光纤参数 / Fiber geometry	50 / 125 μm 或 / or 62.5 / 125 μm						
第二组增量输出 (选项 AKK) / Second incremental output (Option AKK)							
基本原理 / Fundamental principle	通过冗余/额外电子元件实现第二组扫描功能 Second scanning function via redundant/additional electronics						
信号输出 / Signal outputs	 						
基本通道 0° / Basic channel 0°	<table border="1"> <tr> <td>0°</td> <td></td> <td>增量输出 0° incr. output 0°</td> </tr> <tr> <td>0°</td> <td></td> <td>增量反向输出 0° incr. output 0° inverse</td> </tr> </table>	0°		增量输出 0° incr. output 0°	0°		增量反向输出 0° incr. output 0° inverse
0°		增量输出 0° incr. output 0°					
0°		增量反向输出 0° incr. output 0° inverse					
脉冲通道 90° / Pulse channel 90°	<table border="1"> <tr> <td>90°</td> <td></td> <td>增量输出 90° incr. output 90°</td> </tr> <tr> <td>90°</td> <td></td> <td>增量反向输出 90° incr. output 90° inverse</td> </tr> </table>	90°		增量输出 90° incr. output 90°	90°		增量反向输出 90° incr. output 90° inverse
90°		增量输出 90° incr. output 90°					
90°		增量反向输出 90° incr. output 90° inverse					
机械定位的标志脉冲 N ; 每圈一个方波脉冲 Reference pulse N mechanically defined; one square pulse per revolution	<table border="1"> <tr> <td>N</td> <td></td> <td>标志脉冲 Reference pulse</td> </tr> <tr> <td>N</td> <td></td> <td>反向标志脉冲 Reference pulse inverse</td> </tr> </table>	N		标志脉冲 Reference pulse	N		反向标志脉冲 Reference pulse inverse
N		标志脉冲 Reference pulse					
N		反向标志脉冲 Reference pulse inverse					
超速开关 (选型 S) Overspeed switch (Option S)	<table border="1"> <tr> <td>Option S</td> <td></td> <td>开关 / Switch</td> </tr> </table>	Option S		开关 / Switch			
Option S		开关 / Switch					

机械参数 / Mechanical data

主要 / General

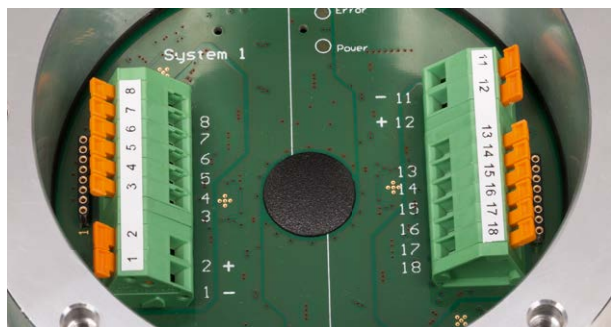
保护等级 / Degree of protection	IP66
抗振荡性 Vibration resistance	20 g ($\leq 200 \text{ m/s}^2$)
抗冲击性 / Shock resistance	200 g ($\leq 2000 \text{ m/s}^2$)
温度范围 Device temperature range	-25 ... +85 °C
重量 / Weight	大约 / approx 2 kg
认证标志 / Certification	UL / CSA 

实心轴和空心轴版本设计 / Design of solid shaft and hollow shaft versions

	实心轴 Solid shaft	空心轴 ^{*)} / Hollow shaft ^{*)}		
		ø 12 mm 圆柱形 ø 12 mm cylindrical	ø 16 mm 圆柱形 ø 16 mm cylindrical	ø 17 mm 圆锥形 1:10 ø 17 mm tapered 1:10
定制轴长度 (最大) Customer shaft length (max.)	-	52 mm	52 mm	20 mm
编码器抗振荡性 Vibration resistance of encoder	20 g ($\leq 200 \text{ m/s}^2$ Sinus)	20 g ($\leq 200 \text{ m/s}^2$, Sinus)	20 g ($\leq 200 \text{ m/s}^2$, Sinus)	20 g ($\leq 200 \text{ m/s}^2$, Sinus)
编码器抗冲击性 Shock resistance of encoder	200 g ($\leq 2000 \text{ m/s}^2$ half sine)	200 g ($\leq 2000 \text{ m/s}^2$ half sine)	200 g ($\leq 2000 \text{ m/s}^2$ half sine)	200 g ($\leq 2000 \text{ m/s}^2$ half sine)
最大速率 Max. speed	7000 rpm	6000 rpm	6000 rpm	6000 rpm

^{*)} 空心轴设计, 带绝缘轴承 (介电强度约 100 V), 使用寿命长, 可屏蔽轴电流。

^{*)} Hollow shaft design with insulated bearings (dielectric strength approx. 100 V), suitable for long service life and shield against shaft currents.

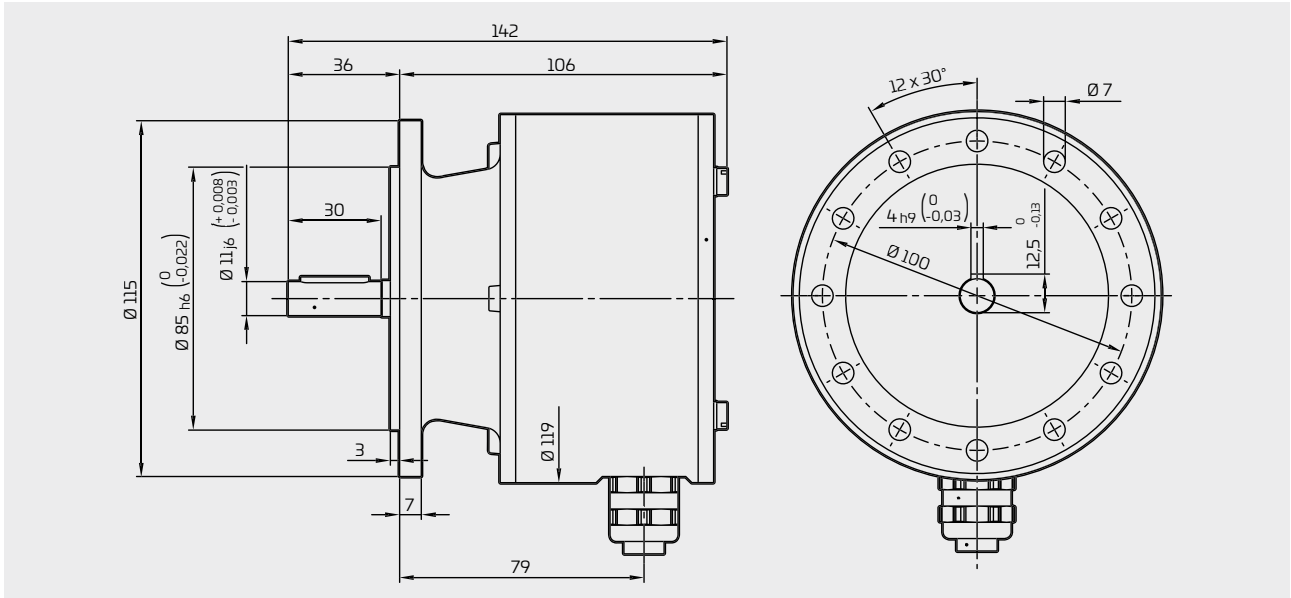


端子箱选项 AKK (第二组增量输出)
Terminal box option AKK (second incremental output)



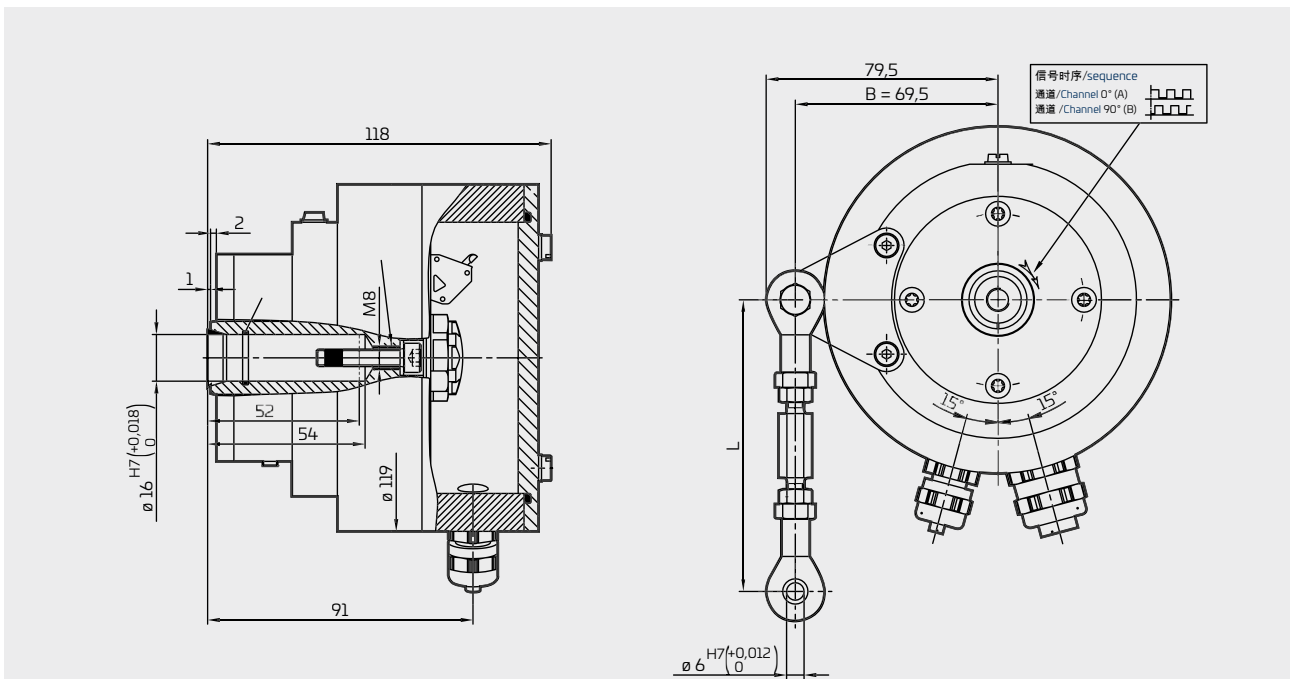
端子箱选项 FOC (通过光缆信号传输)
Terminal box option FOC (signal transmission via fiber optic cable)

增量编码器 FG 2 / Incremental encoder FG 2



FG 2 B5 结构 / Construction type B5

增量空心轴编码器 FGJH 2 / Incremental hollow shaft encoder FGJH 2



FGJH 2

具有圆柱形空心轴 $\varnothing 16\text{mm}$ 同样具有圆柱形 $\varnothing 12\text{mm}$ 和圆锥形 $\varnothing 17\text{mm}$ 。
with cylindrical hollow shaft $\varnothing 16\text{ mm}$; also available with $\varnothing 12\text{ mm}$ cylindrical and $\varnothing 17\text{ mm}$ tapered

选型表 / Type code

		2		-		G-90G -NG	-		/	
类型 / Type										
FG = 实心轴 / Solid shaft										
FGHJ = 空心轴 / Hollow shaft										
系列 / Series										
接线技术 / Connection technology										
AK = 单输出带端子排 / One system with terminal strip										
AL = 单输出带光纤接口 / One system with FOC connector										
AI = 单输出带ITT-Cannon接口 One system with ITT-Cannon connector										
AKK = 双输出带端子排 Two systems with terminal strip										
脉冲数 / Pulse rates										
600										
1024										
2048										
其它可指定 / others on request										
双输出系统时，注明两组输出的脉冲率，如：1024/1024或1024/2048 with two systems, state pulse rates for both., e.g. 1024/1024 or 1024/2048										
信号输出 / Signal outputs										
基本通道0° / Basic channel 0°										
脉冲通道90° / Pulse channel 90°										
标志脉冲N / Reference pulse N										
反向信号G / Inverted signals each G										
超速开关 (除AKK以外的) / Overspeed switch (not possible with AKK)										
S = 带开关 (出厂预设) / with switch (preset ex works)										
- = 不带开关 / without switch										
FGHJ2空心轴内径 / Hollow shaft bore of FGHJ 2										
12 K = \varnothing 12 mm 圆柱形 / \varnothing 12 mm cylindrical										
16 K = \varnothing 16 mm 圆柱形 / \varnothing 16 mm cylindrical										
17 C = \varnothing 17 mm 圆锥形 / \varnothing 17 mm tapered										
订购时请另外说明 / Please specify additionally when ordering										
选项S的切断速度 / Switching speed of option S										
选项5 V TTL (信号输出) / Option 5 V TTL (signal output)										
选项 FOC 光纤50 / 125 μ m 或 62.5 / 125 μ m / Fiber geometry for option FOC 50 / 125 μ m or 62.5 / 125 μ m										

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