

安装说明书

增量型编码器型号 RI41/RI50

前言

这个安装说明书提供编码器连接和开始使用的步骤说明。你可以从我们的编码器样本中得到更多的信息。

安全和操作说明

- RI41/RI50 系列增量型编码器是按照电气工程标准生产的有质量保证的产品。装置按照安全守则的要求从工厂发货。  
为维持这个条件和确保无故障运行，请遵守这个文件的技术规格。
- 必须由有资质的电工进行安装操作！
- 装置一定要在技术数据规定的范围内使用。
- 一定不能超过最高工作电压！  
这个装置被设计符合 VDE 0160，防护等级 III。  
为避免设备结构携带电流的危险，设备必须在安全额定电压 (SELV) 下使用，并且必须在等电位联接区域。
- 应用领域：工业过程 and 控制系统。  
连接端子的过电压必须被限定在过电压种类 II 范围内。

连接图

功能描述	线径 $\varnothing$ mm	颜色
5VDC/5–12VDC/5–24VDC/10–30VDC	0.14	红色
A	0.14	白色
B	0.14	绿色
Z	0.14	黄色
GND	0.14	黑色
$\overline{A}$	0.14	粉色
$\overline{B}$	0.14	兰色
$\overline{Z}$	0.14	橙色

<sup>1)</sup> 标准配置编码器屏蔽层不与外壳连接

**警告！接线请注意极性 —— 错误接线可能烧坏编码器。**

机械参数

安装法兰	圆型法兰 <sup>1)</sup> ，标准法兰 <sup>1)</sup> ，顶丝夹紧带弹簧片，抱环夹紧带弹簧片
轴径	RI41：实心轴 6 和 8mm, 空心轴 6, 8, 10mm RI50：实心轴 6, 8, 10mm, 空心轴 8, 10, 12mm
绝对最大轴载	RI41：径向 30N (6.5lbs), 轴向 15N (3.3lbs) RI50 实心轴：径向 80N(17.3lbs), 轴向 50N(10.8lbs); RI50 空心轴：径向 40N(8.7lbs), 轴向 20N(4.3lbs)。
最高转速	6,000 RPM
启动转矩	RI41: IP 50 $\leq$ 0.2Ncm, IP 65 $\leq$ 1Ncm; RI50: IP 50 $\leq$ 0.2Ncm, IP 65 $\leq$ 5Ncm.
防护等级	IP50 或 IP65
工作温度	RI41: $\leq$ 1000PPR: –10...+70°C; >1000PPR: –20...+85°C RI50: $\leq$ 1024PPR: –10...+70°C; >1024PPR: –20...+85°C
存储温度	–25 ... +85°C
抗振动 (IEC 68–2–6)	100 m/s <sup>2</sup> (10 ... 2000 Hz)
抗冲击 (IEC 68–2–27)	1000 m/s <sup>2</sup> (6 ms)
连接类型	1.5m 标准电缆
外壳	铝
重量	RI41: 60g; RI50: 220g

<sup>1)</sup> 使用 M3 螺钉固定

电气参数







设计标准	符合 DIN 0160，防护等级 III，污染等级 2，过压等级 II
电源电压 (SELV)	驱动器型 (R)：5VDC 驱动器型 (M)：10...30VDC 电源输入，5VDC 输出 推挽型 (K)：10...30VDC <sup>1</sup> 推挽型 (KL)：5...24VDC RS422A 型 (I)：10...30VDC RS422A 型 (IL)：5...24VDC 电压型 (V)：10...30VDC 电压型 (VL)：5...12VDC 集电极开路型 (C)：10...30VDC 集电极开路型 (CL)：5...12VDC 集电极开路型 (CM)：5...24VDC
电源消耗	40mA (5VDC), 60mA (10VDC), 30mA (24VDC)
标准输出通道	驱动器型 (R, M), RS422A 型 (I, IL): A, B, Z, $\overline{A}$ , $\overline{B}$ , $\overline{Z}$ 推挽型 (K, KL)，电压型 (V, VL)， 集电极开路型 (C, CL, CM)：A, B, Z








<sup>1)</sup> 极性保护

HENGSTLER

- 请避免对外壳的冲击（特别是对编码器的轴）和编码器轴的轴向与径向过载！
- 只有使用合适的联轴器，轴编码器的精度和耐用性才能得到保证。
- 只有和标准类型的电缆和插头一起使用才能达到高质量的 EMC 指标。当使用屏蔽电缆时，屏蔽层必须被连接到地。同样电源电缆也应该被完全屏蔽。如果不可能作到这些，你必须采取适当的滤波措施。
- 安装环境和接线都会影响编码器的 EMC 性能，因此安装者必须确保整个设备（装置）的 EMC。
- 电源线上的瞬时峰值电压必须小于 1000V。
- 在安装操作期间, 请注意在静电危险区域的插头和电缆的 ESD 保护。
- 指定最大轴负载被赋予以下的限制：
  - 在 35% 的负载下可以转动  $1 \times 10^{10}$  转（典型）。
  - 在 100% 的负载下可以转动  $1 \times 10^8$  转（典型）。
- 只能使用在种类 II 的电路中。








订购信息







型号	脉冲数	电源电压 <sup>1</sup>	法兰 <sup>2</sup>	防护等级	轴 <sup>5</sup>
					
RI41–O 实心轴 RI41–H 盲孔轴 RI41–TH 通孔轴	5...6,000	A 直流 5V E 直流 10V ~ 30V 直流 5V ~ 24V 直流 5V ~ 12V	R 圆形法兰 S 标准法兰 Q 7孔标准法兰 <sup>3</sup> E 顶丝夹紧，带弹簧片 F 抱环夹紧，带弹簧片	1 IP50 2 IP65 <sup>4</sup>	1 6mm 2 8mm 3 10mm

输出	连接	电缆长度选项	轴长选项	屏蔽选项	定制代码
					
K 推挽输出 (10~30VDC) KL 推挽输出 (5~24VDC) R 驱动器输出 (5VDC) M 驱动器输出 (10~30VDC 输入，5V 输出) V 电压输出 (10~30VDC) VL 电压输出 (5~12VDC) <sup>6</sup> I RS422A 输出 (10~30VDC) IL RS422A 输出 (5~24VDC) C 集电极开路输出 (10~30VDC) CL 集电极开路输出 (5~12VDC) CM 集电极开路输出 (5~24VDC)	A 轴向电缆 B 径向电缆	X 电缆长度 x 米 <sup>7</sup>	15S–5 实心轴长度 10+5mm	缺省屏蔽不接壳 G 屏蔽接壳 CG 屏蔽接壳，壳与 0V 之间接 630V 0.01u 电容	S  字母 S+ 两位数字 或字母

- <sup>1</sup> 电源电压范围与输出类型有关，参见“输出”列中括号内的电压。
- <sup>2</sup> 其它法兰类型及安装孔位置可按客户要求定制。另有不锈钢外壳产品可满足防腐蚀及食品饮料行业的要求。
- <sup>3</sup> 7 个螺纹安装孔分布在 4PCD30+3PCD28。
- <sup>4</sup> IP65 仅适用于实心轴和盲孔轴类型。
- <sup>5</sup> 实心轴：6mm, 8mm；盲孔轴：6mm, 8mm, 10mm；  
通孔轴：6mm, 8mm, 10mm。
- <sup>6</sup> 脉冲数>1000PPR,无论何种输出方式，标准输出电压5–24V变为8–24V，5–12V变为8–12V输出。
- <sup>7</sup> 缺省电缆长度为 1.5m。

订购信息

型号	脉冲数	电源电压 <sup>1</sup>	法兰 <sup>2</sup>	防护等级	轴 <sup>4</sup>	输出
						
RI50–O 实心轴 RI50–TH 通孔轴	5...10,000	A 直流 5V E 直流 10V~30V 直流 5V~24V 直流 5V~12V	R 圆形法兰 S 标准法兰 M 夹紧同步 E 弹簧片带前夹紧环	1 IP50 2 IP65 <sup>3</sup>	1 6mm 2 8mm 3 10mm 4 12mm	K 推挽输出 (10 ~ 30VDC) KL 推挽输出 (5 ~ 24VDC) R 驱动器输出 (5VDC) M 驱动器输出 (10 ~ 30VDC 输入，5V 输出) V 电压输出 (10 ~ 30VDC) VL 电压输出 (5 ~ 12VDC) <sup>6</sup> I RS422A 输出 (10 ~ 30VDC) IL RS422A 输出 (5 ~ 24VDC) C 集电极开路输出 (10 ~ 30VDC) CL 集电极开路输出 (5 ~ 12VDC) CM 集电极开路输出 (5 ~ 24VDC)

连接方式	特殊选项 1	特殊选项 2	特殊选项 3	客户代码
				
A 轴向电缆 B 径向电缆	X 电缆长度 x 米 <sup>6</sup>	15S–5 实心轴长度 10+5mm	缺省屏蔽不接壳 G 屏蔽接壳 CG 屏蔽接壳，壳与 0V 之间接 630V 0.01u 电容	S  字母 S+ 两位数字 或字母

- <sup>1</sup> 电源电压范围与输出类型有关，参见“输出”列中括号内的电压。
- <sup>2</sup> 其它法兰类型及安装孔位置可按客户要求定制。另有不锈钢外壳产品可满足防腐蚀及食品饮料行业的要求。
- <sup>3</sup> IP65 仅适用于实心轴 6mm,8mm 和 10mm。
- <sup>4</sup> 实心轴：6mm, 8mm,10mm；通孔轴：8mm,10mm,12mm。
- <sup>5</sup> 脉冲数>1024PPR,无论何种输出方式，标准输出电压5–24V变为8–24V，5–12V变为8–12V输出。
- <sup>6</sup> 缺省电缆长度为 1.5m。

**\* 技术数据发生变更恕不通知。**



Incremental Encoders Type RI41/RI50

Introduction

These installation instructions are provided for the connection and starting procedure of your shaft encoders. You can get further informations from our Shaft Encoders Catalogue.

Safety and Operating Instructions

- The incremental encoders of the type RI41/ RI50 model series are quality products manufactured in accordance with established electrical engineering standards. The units have been delivered from the factory in perfect conformance to safety regulations.  
To maintain this condition and to ensure trouble–free operation, please observe the technical specifications of this document.
- Installation and mounting may only be performed by an electrotechnical expert!
- The units may only be operated within the limits specified by the technical data.
- Maximum operating voltages must not be exceeded!  
The units are designed complying with VDE 0160, protection class III.  
To prevent dangerous structure–borne currents, the equipment has to be run on safety extra–low voltage (SELV) and must be in an area of equipotential bonding.
- Application: Industrial processes and control systems.  
Overvoltage at the connecting terminals must be limited to the values within overvoltage category II.

Connection diagram

Function	wire ømm	Color
5VDC/5–12VDC/5–24VDC/10–30VDC	0.14	Red
A	0.14	White
B	0.14	Green
Z	0.14	Yellow
GND	0.14	Black
$\overline{A}$	0.14	Pink
$\overline{B}$	0.14	Blue
$\overline{Z}$	0.14	Orange

<sup>1)</sup> Screen don't been connected to encoder housing (standard).

**Warning! The wiring please note the polarity, otherwise the false wiring possibly burns out the encoder.**

Mechanical data

Mounting	round flange <sup>1)</sup> , standard flange <sup>1)</sup> , set screw with tether, front clamping ring with tether
Shaft diameter	RI41: solid 6 and 8mm, hollow 6, 8, 10mm RI50: solid 6, 8, 10mm, hollow 8, 10, 12mm
Absolute max. shaft load	RI41: radial 30N(6.5lbs), axial 15N(3.3lbs) RI50 solid: radial 80N(17.3lbs), axial 50N(10.8lbs); RI50 hollow: radial 40N(8.7lbs), axial 20N(4.3lbs).
Max. speed	6,000 RPM
Torque	RI41:IP 50≤0.2Ncm, IP 65≤1Ncm; RI50:IP 50≤0.2Ncm, IP 65≤5Ncm.
Protection class	IP50 or IP65
Operating temperature	RI41: ≤1000PPR: –10...+70°C; >1000PPR: –20...+85°C RI50: ≤1024PPR: –10...+70°C; >1024PPR: –20...+85°C
Storage temperature	–25 ... +85°C
Vibration performance (IEC 68–2–6)	100 m/s <sup>2</sup> (10 ... 2000 Hz)
Shock resistance (IEC 68–2–27)	1000 m/s <sup>2</sup> (6 ms)
Connection	1.5m standard cable
Housing	Aluminum
Weight	RI41: 60g; RI50: 220g

<sup>1)</sup> use threads M3 for fastening

Electrical data

General design	as per DIN VDE 0160, protection class II, contamination level 2, overvoltage class II
Supply voltage (SELV)	Line driver (R): 5VDC Line driver (M): 10...30VDC power supply, 5VDC output. Push–pull (K): 10...30VDC <sup>1</sup> Push–pull (KL): 5...24VDC RS422A (I): 10...30VDC RS422A (IL): 5...24VDC Voltage (V): 10...30VDC Voltage (VL): 5...12VDC Open collector (C): 10...30VDC Open collector (CL): 5...12VDC Open collector (CM): 5...24VDC
Power consumption	40mA (5VDC), 60mA (10VDC), 30mA (24VDC)
Standard output channel	Line driver (R, M), RS422A (I, IL): A, B, Z, $\overline{A}$ , $\overline{B}$ , $\overline{Z}$ Push–pull (K, KL), Voltage (V, VL), Open collector (C, CL, CM): A, B, Z

<sup>1)</sup> Pole protection

- Please avoid shocks to the housing–especially to the encoder shaft–and axial or radial overload to the encoder shaft.
- Maximum accuracy and durability of our shaft encoders is only granted when using suitable couplings.
- The high–quality EMC–specifications are only valid together with standard–type cables and plugs. When using screened cables, the screen must broadly be connected with ground. Likewise, the voltage–supply cables should entirely be screened. If this is not possible you will have to take appropriate filtering measures.
- Installation environment and wiring are influential on the encoder's EMC: Thus the installer must secure EMC of the whole facility (device).
- Transient peaks on the power supply leads are to be limited by the preconnected power unit to a maximum of 1000 V.
- In electrostaticly threatened areas please take care for neat ESD–protection of plug and connecting cable during installation work.
- Specified maximum shaft loads are only given under restrictions:
  - Full bearing life of 1 x 10<sup>10</sup> revolutions (typ.) will be reached at 35% of full rated shaft load
  - a bearing life of 1 x 10<sup>8</sup> revolutions (typ.) will be reached at 100% of full rated shaft load.
- For use class II circuits only.

ORDERING INFORMATION

Type	PPR	Supply voltage <sup>1</sup>	Flange <sup>2</sup>	Protection	Shaft/Hole <sup>3</sup>
	/			•	
<b>RI41–O</b> Solid shaft <b>RI41–H</b> Hubshaft <b>RI41–TH</b> Hollow shaft	<b>5...6,000</b>	<b>A</b> DC 5V <b>E</b> DC 10V~30V DC 5V~24V DC 5V~12V	<b>R</b> Round flange <b>S</b> Standard flange <b>Q</b> Standard flange(7 hole) <sup>3</sup> <b>E</b> Set screw with tether <b>F</b> Front clamping ring with tether	<b>1</b> IP50 <b>2</b> IP65 <sup>4</sup>	<b>1</b> 6mm <b>2</b> 8mm <b>3</b> 10mm

Output	Connection	Option1: Cable length	Option2 Shaft length	Option3: Screen	Special code
		–	–	–	–
<b>K</b> Push–pull (10~30VDC) <b>KL</b> Push–pull (5~24VDC) <b>R</b> Line driver (5VDC) <b>M</b> Line driver (10~30VDC In, 5V Out) <b>V</b> Output (10~30VDC) <b>VL</b> Output (5~12VDC) <sup>5</sup> <b>I</b> RS422A (10~30VDC) <b>IL</b> RS422A (5~24VDC) <b>C</b> Open collector (10~30VDC) <b>CL</b> Open collector (5~12VDC) <b>CM</b> Open collector (5~24VDC)	<b>A</b> Cable, Axial <b>B</b> Cable, Radial	<b>X</b> Cable length X m <sup>7</sup>	<b>15S–5</b> Solid shaft length 10+5mm	Default screen don't connect with encoder housing <b>G</b> Connect with housing <b>CG</b> Connect with encoder housing and a 630V 0.01 μ F capacitor between housing and GND	<b>S</b> S+ two numbers or letters

<sup>1</sup> The supply voltage is associated with the output type, refer to voltage in brackets of column "Output".

<sup>2</sup> Other flange type and mounting hole is on request. In addition, stainless steel encoder can meet high corrosion resistance and food&beverage application.

<sup>3</sup> 7 mounting thread located in 4PCD30+3PCD28.

<sup>4</sup> Protection IP65 is available for solid shaft and hubshaft type.

<sup>5</sup> Solid shaft: 6mm, 8mm; Hubshaft: 6mm, 8mm, 10mm; Hollow shaft: 6mm, 8mm, 10mm.

<sup>6</sup> >1000PPR, for any output type, standard output voltage 5–24V change to 8–24V, 5–12V change to 8–12V.

<sup>7</sup> Default cable length is 1.5m.

ORDERING INFORMATION

Type	PPR	Supply voltage <sup>1</sup>	Flange <sup>2</sup>	Protection	Shaft/Hole <sup>4</sup>
	/			•	
<b>RI50–O</b> Solid shaft <b>RI50–TH</b> Hollow shaft	<b>5...10,000</b>	<b>A</b> DC 5V <b>E</b> DC 10V~30V DC 5V~24V DC 5V~12V	<b>R</b> Round flange <b>S</b> Standard flange <b>M</b> Syn. Clamping <b>E</b> Front clamping ring with tether	<b>1</b> IP50 <b>2</b> IP65 <sup>3</sup>	<b>1</b> 6mm <b>2</b> 8mm <b>3</b> 10mm <b>4</b> 12mm

Output	Connection	Option1: Cable length	Option2 Shaft length	Option3: Screen	Special code
		–	–	–	–
<b>K</b> Push–pull (10~30VDC) <b>KL</b> Push–pull (5~24VDC) <b>R</b> Line driver (5VDC) <b>M</b> Line driver (10~30VDC In, 5V Out) <b>V</b> Output (10~30VDC) <b>VL</b> Output (5~12VDC) <sup>5</sup> <b>I</b> RS422A (10~30VDC) <b>IL</b> RS422A (5~24VDC) <b>C</b> Open collector (10~30VDC) <b>CL</b> Open collector (5~12VDC) <b>CM</b> Open collector (5~24VDC)	<b>A</b> Cable, Axial <b>B</b> Cable, Radial	<b>X</b> Cable length X m <sup>6</sup>	<b>15S–5</b> Solid shaft length 10+5mm	Default screen don't connect with encoder housing <b>G</b> Connect with housing <b>CG</b> Connect with encoder housing and a 630V 0.01 μ F capacitor between housing and GND	<b>S</b> S+ two numbers or letters

<sup>1</sup> The supply voltage is associated with the output type, refer to voltage in brackets of column "Output".

<sup>2</sup> Other flange type and mounting hole is on request. In addition, stainless steel encoder can meet high corrosion resistance and food&beverage application.

<sup>3</sup> Protection IP65 is available for solid shaft.

<sup>4</sup> Solid shaft: 6mm, 8mm, 10mmmm; Hubshaft: 8mm, 10mmmm, 12mm.

<sup>5</sup> >1024PPR, for any output type, standard output voltage 5–24V change to 8–24V, 5–12V change to 8–12V.

<sup>6</sup> Default cable length is 1.5m.

**\* Technical specifications subject to change without notice.**