JOHANNES
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ideas and solutions

中文 | ENGLISH

通用型编码器系统 U-ONE
用于速度和位置的可靠监测

Universal encoder system U-ONE®
For reliable measurement and monitoring of speed and position

可选
SIL / PL
认证 /
certified

Johannes Hübner Giessen

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、定制的解决方案。为了支持我们的客户， 我们提供了强大的编码器系统、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。你有什么挑战?

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 robust 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
- 发电行业
- 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

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编码器技术革命：通用型编码器系统 U-ONE
Revolution in encoder technology: Universal encoder system U-ONE

用于速度和位置的可靠监测
这种开发是基于一种通用的基本单元，通过光缆连接到电控柜的电子功能模块，从而避免电磁干扰。电子功能模块采用内部总线结构连接，可根据需要自由串联（串联插件模块）。

大量的电子功能模块导致高度的设计灵活性，并且使得后期的扩展更加容易。

这种全新理念可以节省开支，得益于它自身简单的机械安装，标准的电子功能模块和极大地减少电缆的需求。

For reliable measurement and monitoring of speed and position
This development is based on an universal basic unit connected to electronic function modules in the switchboard via fiber optic cables that are immune to EMI. The electronic function modules are linked by an internal bus structure, and can be freely connected in series as required (series plug-in modules).

A large number of possible electronic function modules results in high planning flexibility and easy expandability for later additional requirements.

This concept offers considerable cost savings, thanks to its simple mechanical fitting, standardized electronic function modules and reduced wiring requirements.

模块化技术 /
Modular technology

通过光缆把基本装置和电子功能模块连接 在一起。/ *Basic unit with electronic function modules connected by fiber optic cable*

优点

- 紧凑型的设计
- 光缆信号传输，抗电磁干扰
- 电子模块安装在电气柜中
- 极大地降低了电缆成本
- 易扩展
- 高灵活性
- 节省了备件

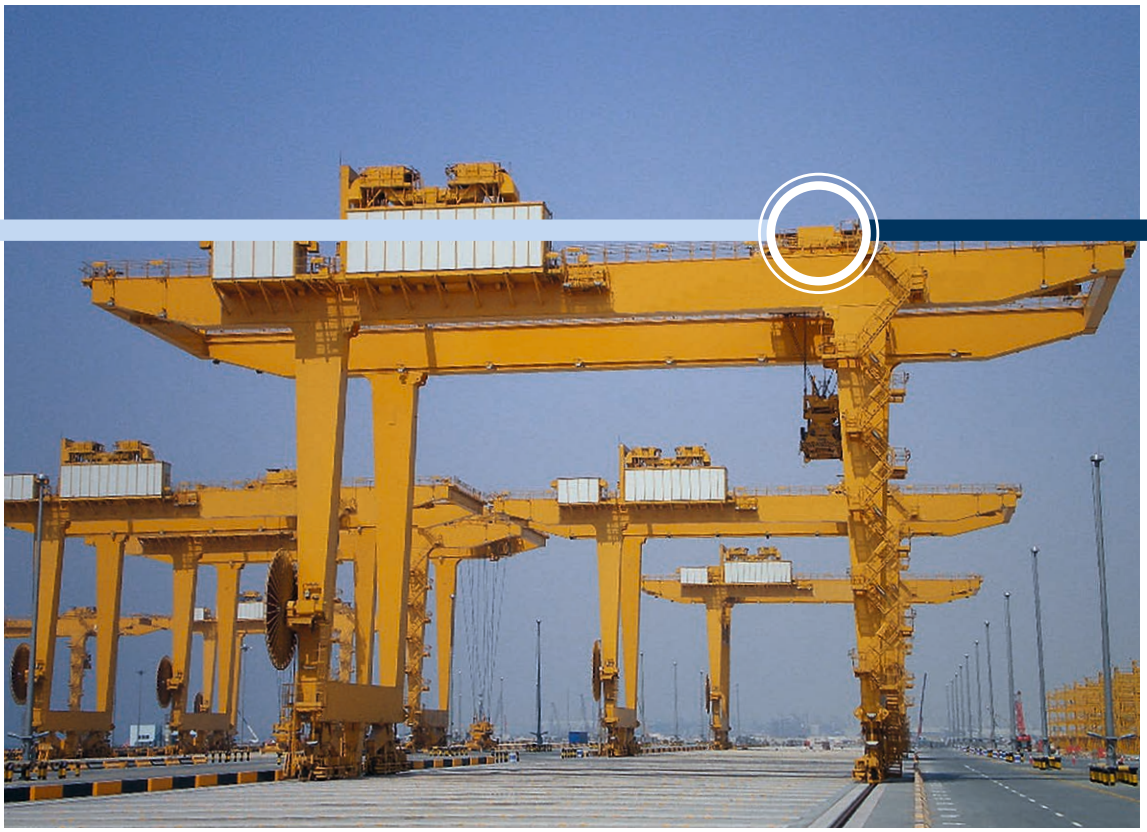
最多可在一个装置中实现 10 种功能
- 速度测量
- 位置测量
- 最小切断值为 0.63 rpm 的可编程电子超速开关
- 多样化的总线接口
- 电子位置开关
- 过程图形显示

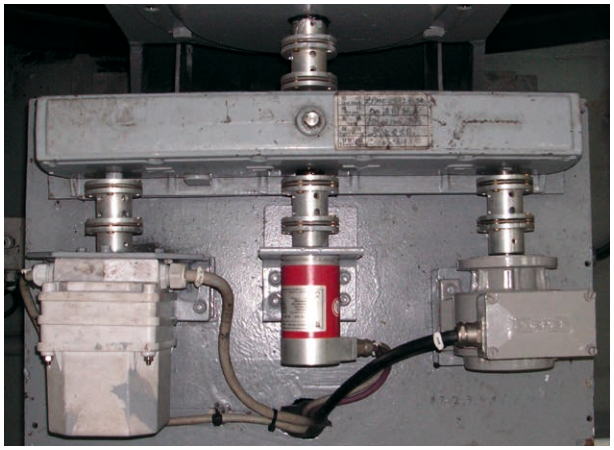
Advantages

- Compact design
- EMI immune fiber optic signal transmission
- Switchboard mounted electronics
- Extreme reduction of cabling costs
- Easy to extend
- High flexibility
- Saving spares

Up to 10 functions in one unit:
- Speed measurement
- Position measurement
- Electronic overspeed switch with a programmable switching speed from 0.63 rpm
- Wide variety of bus interfaces
- Electronic position switch
- Graphic display of processes

实例 起重机 起升装置
Example crane hoist

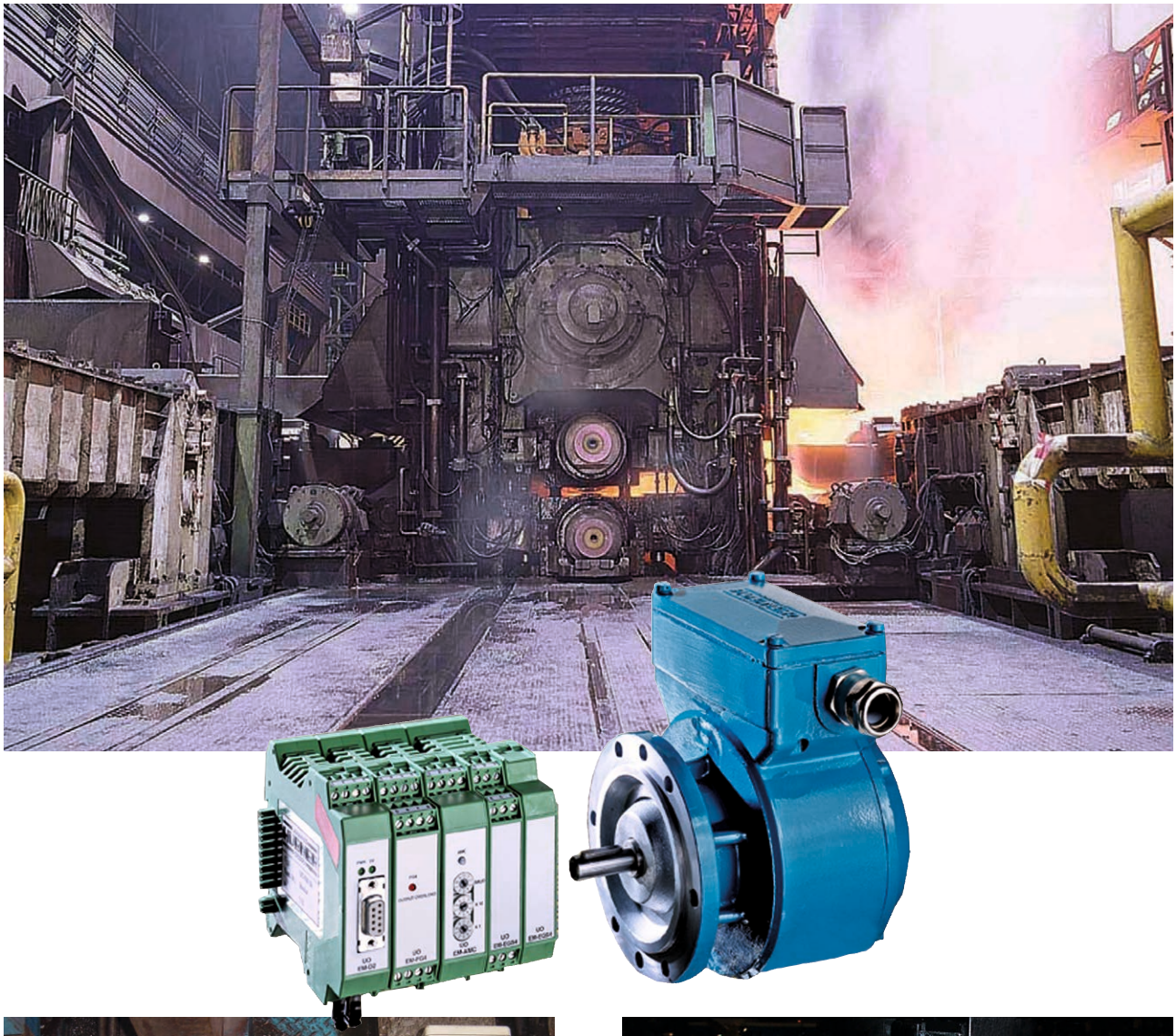


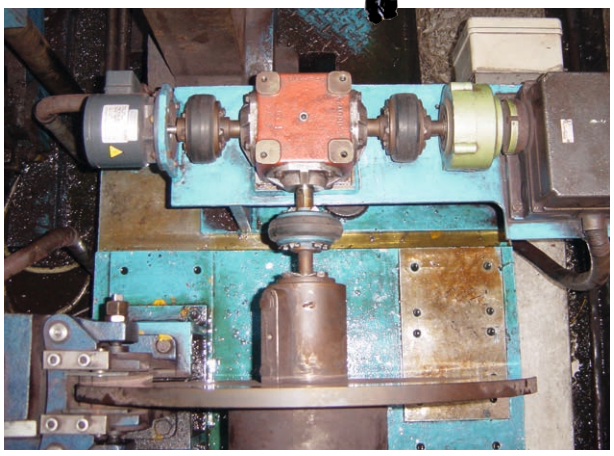


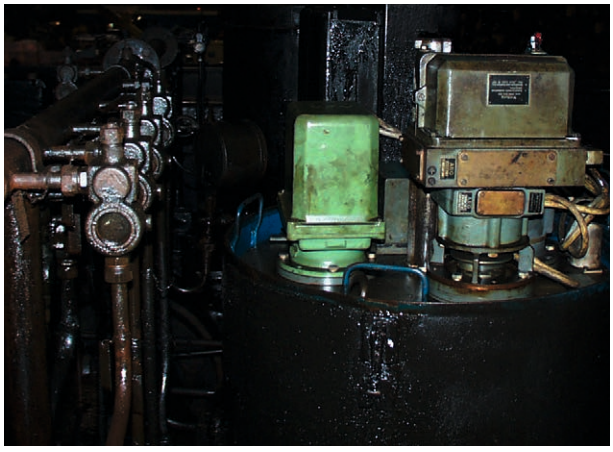
旧方案 / *Previous solution*

新方案 / *New solution*

实例 压下 / 侧导板
Example screw downs / side guides







旧方案 / *Previous solution*

基本单元技术参数
Technical data basic units

UOM(H) 4L 和 / and UOM(H) 41L (SIL 2 / PL d)

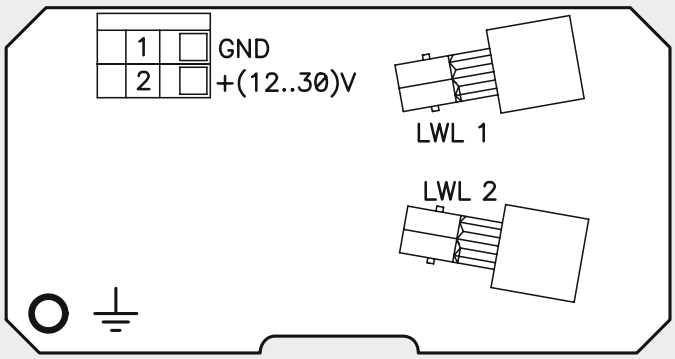
电气参数 / Electrical data

供电电压 / Supply voltage	12 – 30 VDC
分辨率：增量 Resolution: Incremental	1024 方波脉冲 / 1024 square pulses
绝对值单圈 / Absolute singleturn	12 bit (4096 每圈步数 / steps per revolution)
绝对值多圈 / Absolute multiturn	12 bit (4096 圈数 / revolutions)
信号传输 / Signal transmission	光缆传输 / optical via fiber optic cable
电子部分温度范围 Temperature range electronics	-25 °C ... +85 °C

机械参数 / Mechanical data

结构形式 / Construction types	见21页尺寸图 See dimension drawings on page 21 f.
保护等级 / Protection types	IP55 或 / or IP66 según (EN60529)
最大允许速度 / max. perm. speed	3000 rpm (空心轴 / hollow shaft: 2000 rpm)
接线技术 / Connection technology	端子箱，端子排（供电电压） 2 x ST 接头连接光纤, 50 / 125 µm 或 62.5 / 125 µm Terminal box, terminal strip (supply voltage) 2 x ST-plug connections for fiber optic cable, 50 / 125 µm or 62.5 / 125 µm

供电电源 / Power supply



SIL 2 Functional Safety PL d

屏蔽连接
Screen Connection

LWL 1, LWL 2: 光纤传输
Fiber optic transmitter

UOM(H) 4L / UOM(H) 41L

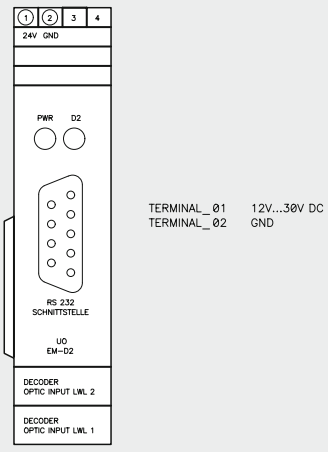
接线图 EL667
Connection diagram EL667

解码器模块技术参数
Technical data decoder modules

UO-EM-D2 和 / and UO-EM-D41 (SIL 2 / PL d)

功能 / Function	用于解码基本单元的 FOC 信号并且提供电子功能模块的电源 / For decoding the optical FOC signals of the basic unit and supply of electronic function modules
接线技术 Connection technology	ST-接头连接 FOC,端子排接电源 ST-plug connection for FOC, terminal strip for supply voltage
供电电压 / Supply voltage	12 – 30 VDC
输出 / Outputs	内部总线连接到下一个模块 internal bus connection to next modules
温度范围 / Temperature range	-25 °C ... +70 °C
集中编程接口 Central programming interface	RS 232 (见18页 / see p. 18)

SIL 2 Functional Safety PL d



TERMINAL_ 01 12V...30V DC
TERMINAL_ 02 GND

UO-EM-D2 / UO-EM-D41

接线图 EL668
Connection diagram EL668

速度开关模块技术参数
Technical data speed switch modules

UO-EM-EGS4

切断速度范围（订货时指定）/ Switching speed ranges (specify on order)

最小 / Min.	最大 / Max.
0.63 rpm	300 rpm
2.5 rpm	1200 rpm
5 rpm	2400 rpm
10 rpm	3000 rpm

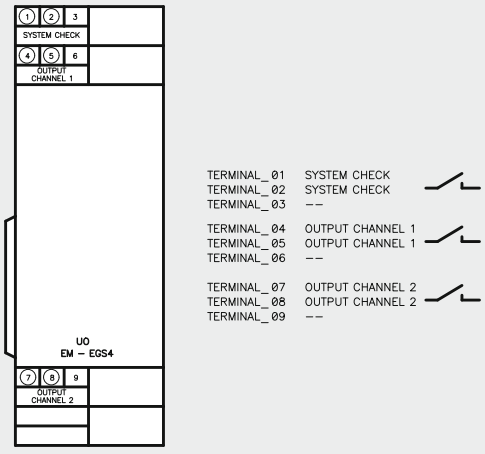
接线技术 / Connection technology	内部总线连接 / internal bus connection
输出 / Outputs	端子排 / Terminal strip
切断速度 / Switching speed	2个可编程切断点（NO），1个系统检测点（NO） 2 programmable switching points (NO), 1 system check (NO)
切断电压 / Switching voltage	2 – 250 V AC/DC, 最大 / max. 0.5 A
温度范围 / Temperature range	-25 °C ... +70 °C

可编程功能：
- 密码保护
- 逆旋转评估
- 超速和欠速
- 切断延时
- 旋转方向切换
- 开关测试
- 监测

通过解码器接口编程 (RS 232)

Programmable functions:
- Password protection
- Inverse rotation evaluation
- Overspeed and underspeed
- Switching delay
- Rotation-dependent switching
- Switch test
- Monitoring

Programming via decoder interface (RS 232)



UO-EM-EGS4

接线图 EL669A
Connection diagram EL669A

速度开关模块技术参数
Technical data speed switch modules

UO-EM-EGS41 (SIL 2 / PL d)

供电电压 / Supply voltage	通过总线供电 / Supply via bus connection
接线技术 / Connection technology	端子排 / Terminal strip
开关输出 S1 和 S2 Switching outputs S1 and S2	最大 / max. 230 V AC/DC, 5 – 500 mA (带有强制导向触点的继电器 / Relays with forcibly guided contacts)
切断输出诊断 Switching output diagnostics	230 V AC/DC, 5 – 500 mA (继电器触点 / Relay contact)
复位输入 / Reset input	潜在自由复位电压，12 – 30 VDC，约 7mA potential-free, reset voltage, 12 – 30 VDC, approx. 7 mA
可编程切断速度范围 / Programmable switching speed range	0.5 – 2700 rpm
可编程接口 Programming interface	USB
温度范围 Temperature range	-25 °C ... +70 °C

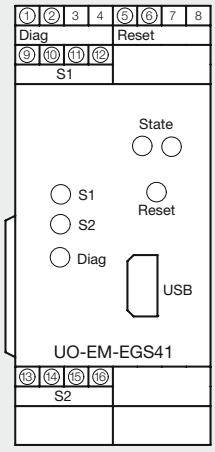
可编程功能:
- 密码保护
- 逆旋转评估
- 超速和欠速
- 旋转方向切换
- 切断延迟
- 旋转角度（用于静止监测）
- 断线检测
- 延时过载关断
- 开关测试
- 监测

通过模块接口编程 (USB)

Programmable functions:
- Password protection
- Inverse rotation evaluation
- Overspeed and underspeed
- Rotation-dependent switching
- Switching delay
- Rotational angle (for standstill monitoring)
- Broken wire detection
- Delayed overcurrent switch-off
- Switch test
- Monitoring

Programming via module interface (USB)

SIL 2 Functional Safety PL d



接线图 Connection diagram PN169-400	输出 / Output
切断输出 S1 Switching output S1	9 – 10, 11 – 12
切断输出 S2 Switching output S2	13 – 14, 15 – 16
诊断 / DIAG	1 – 2

S1 / S2 / 诊断 / DIAG:
最大 / max. 230 V AC / DC / 500 mA

重置 / Reset	+U: 12 ... 30 VDC	5 +U	6 GND

UO-EM-EGS41 接线图 PN169-400
Connection diagram PN169-400

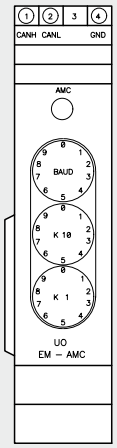
CAN bus 模块技数参数
Technical data CAN bus modules

UO-EM-AMC

接线技术 Connection technology	内部总线连接 / Internal bus connections
输出 / Outputs	端子排 / Terminal strip
绝对值单圈 Absolute singleturn	12 bit (4096 每圈步数 / Steps per revolution)
绝对值多圈 Absolute multiturn	12 bit (4096 圈数 / Revolutions)
温度范围 / Temperature range	-25 °C ... +70 °C

CAN-Bus-接口 / CAN-Bus-interface

数据接口 / Data interface	CAN-H, CAN-L, CAN-GND
波特率 / Baud rates	(20-50-100-125-250-500-800-1000) kBaud
节点号 / Node number	0 – 96 (可调节 / adjustable)
CAN –操作模式 CAN-operation mode	Polled Mode, Cyclic Mode, Sync Mode
可编程参数 Programmable parameter	计数方向，预设值，下限开关，上限开关 counting direction, preset value, lower end switch, upper end switch



TERMINAL_ 01 CAN HIGH
TERMINAL_ 02 CAN LOW
TERMINAL_ 03 NC
TERMINAL_ 04 CAN GND

UO-EM-AMC

接线图 EL670
Connection diagram EL670

PROFIBUS 模块技术参数
Technical data PROFIBUS modules

UO-EM-AMP

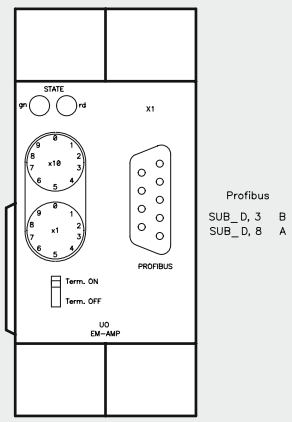
接线技术 Connection technology	内部总线连接 / Internal bus connection
输出 / Outputs	D-SUB 母接头 / D-Sub terminal female
绝对值单圈 Absolute singleturn	12 bit (4096 每圈步数 / Steps per revolution)
绝对值多圈 Absolute multiturn	12 bit (4096 圈数 / Revolutions)
温度范围 / Temperature range	-25 °C ... +70 °C

PROFIBUS-DP接口 / PROFIBUS-DP interface

设备地址 / Device address	0 – 99 (可调节 / adjustable)
总线终端 / Bus termination	可切换 / Switchable

可编程功能 / Programmable Functions

多圈或单圈 Multiturn or Singleturn	Class 1 模式 / Class 1 mode: 计数方向 / Counting direction Class 2 模式 / Class 2 mode: 计数方向/ Counting direction 分辨率/圈. / Resolution/rev. 总分辨率 / Total resolution 标尺 / Scaling Mode 2.1: Class 2 模式功能基础上增加终端开关功能 Class 2 mode with additional end switch function Mode 2.2: Class 2 模式功能基础上增加终端开关功能和 速度输出 / Class 2 mode with additional end switch function and velocity output



UO-EM-AMP 接线图 EL722B
Connection diagram EL722B

SSI 模块技术参数
Technical data SSI modules

UO-EM-AMS

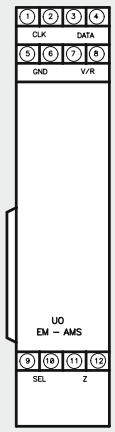
接线技术 Connection technology	内部总线连接 / Internal bus connection
输出 / Outputs	端子排 / Terminal strip
绝对值单圈 Absolute singleturn	12 bit (4096 每圈步数 / Steps per revolution)
绝对值多圈 Absolute multiturn	12 bit (4096 圈数 / Revolutions)
温度范围 / Temperature range	-25 °C ... +70 °C

SSI 接口 / SSI interface

数据接口 / Data interface	SSI-时钟, SSI-数据 / SSI clock, SSI data
时钟频率 / Clock frequency	最大 / max. 1 MHz
超时 / Timeout	28 µs
硬件输入 / Hardware inputs	计数方向；预设选择；预设值设定 Counting direction; Preset selection; Preset set

U-ONE 编程接口 / U-ONE programming interface

可编程参数 Programmable parameter	预设值 1；预设值2；输出格式 preset value 1; preset value 2; output format



TERMINAL_01 CLOCK +
TERMINAL_02 CLOCK –
TERMINAL_03 DATA +
TERMINAL_04 DATA –
TERMINAL_05 GND_SSI
TERMINAL_06 GND_SSI
TERMINAL_07 V/R +
TERMINAL_08 V/R –
TERMINAL_09 SEL +
TERMINAL_10 SEL –
TERMINAL_11 Z +
TERMINAL_12 Z –

UO-EM-AMS

接线图 EL702A
Connection diagram EL702A

Ethernet / Modbus 模块技术参数
Technical data Ethernet / Modbus modules

UO-EM-AME/M

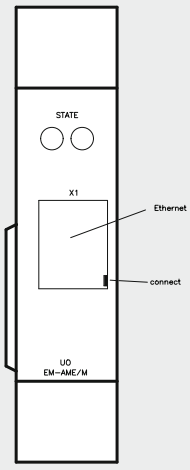
接线技术 Connection technology	内部总线连接 / Internal bus connection
输出 / Outputs	RJ-45 接头 / RJ-45 connector
绝对值单圈 Absolute singleturn	12 bit (4096 每圈步数 / Steps per revolution)
绝对值多圈 Absolute multiturn	12 bit (4096 圈数 / Revolutions)
温度范围 / Temperature range	-25 °C ... +70 °C

Ethernet 接口 / Ethernet interface

数据接口 / Data interface	RJ-45 接头 / RJ-45 connector
波特率 / Baud rates	10 / 100 Mbit 自检测 / 10/100 Mbit autodetect
协议 / Protocol	Modbus TCP / IP / Modbus over TCP/IP
可编程参数 Programmable parameter	计数方向；预设值；下限开关；上限开关； Counting direction; Preset value; Lower end switch; Upper end switch

U-ONE 编程接口 / U-ONE programming interface

可编程参数 Programmable parameter	ERC功能；IP地址；子网掩码；默认网关 ERC functions; IP address; Subnet mask; Default gateway



UO-EM-AME/M 接线图 PN110-400
Connection diagram PN110-400

位置开关模块技术参数
Technical data position switch modules

UO-EM-ERC (电子位置开关 / Electronic position switch)

接线技术 Connection technology	内部总线连接 / Internal bus connection
输出 / Outputs	端子排 / Terminal strip
开关位置 Switching position	6个可编程开关点，继电器触点（可翻转）；一个故障信号，继电器触点(NC) 6 programmable switching points, relais contacts (change-over), 1 error signal, relais contact (NC)
触点电压 / Switching voltage	250 V AC/DC, max. 0.5 A
温度范围 Temperature range	-25 °C ... +70 °C

可编程功能:
- 多圈操作位数
- 选择单圈/多圈
- 开关范围输入 / 可转换
- 迟滞值
- 计数方向
- 测量单位
- 标识
- 最后编程 (自动设定)
- 转换系数

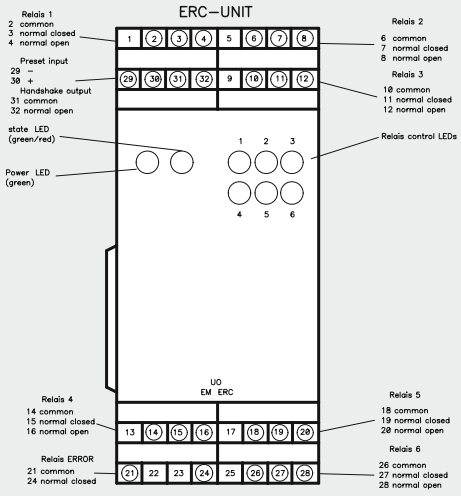
解码器接口编程

硬件输入:
更换系统上的机械部件后，使用预设输入功能在同步点位置进行调整。

Programmable functions:
- Bit number in multiturn operation
- Selection Singleturn / Multiturn
- Switching range input / can be converted
- Value of hysteresis
- Counting direction
- Dimensional unity
- Identification
- Last edit (automatic setting)
- Conversion factor

Programming by decoder interface

Hardware input:
Preset-input to make adjustments at reference position after replacing mechanical parts on the system.



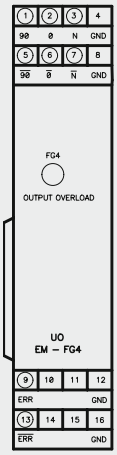
UO-EM-ERC

接线图 EL777
Connection diagram EL777

增量编码器模块技术参数
Technical data Incremental encoder modules

UO-EM-FG4

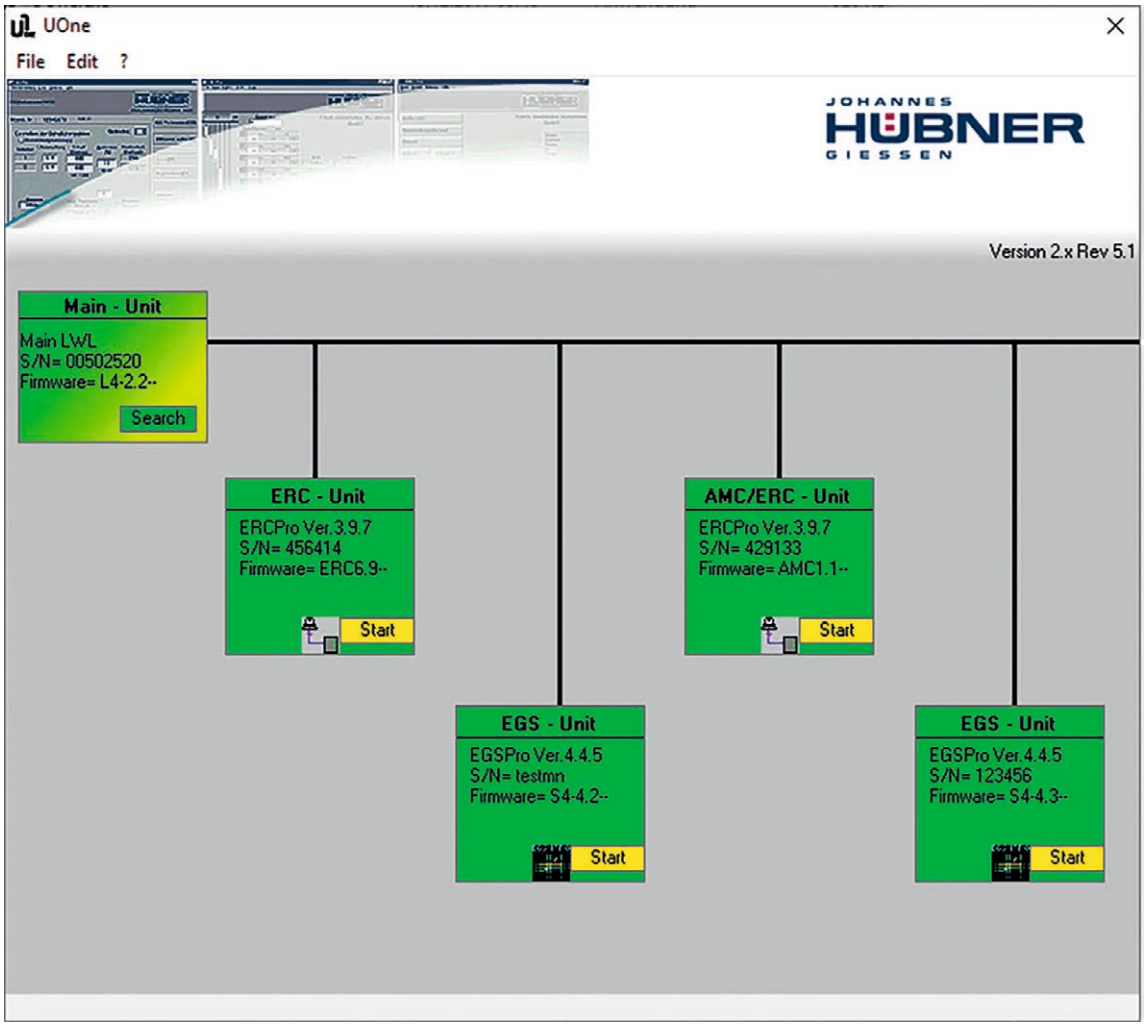
接线技术 Connection technology	内部总线连接 / Internal bus connection
输出 / Outputs	端子排 / Terminal strip
脉冲率 / Pulse rate	1024 方波脉冲 / 1024 square pulses
信号幅度 / Signal amplitude	HTL (12 – 30 V) 或者 / or 5 V 到 / to RS 422
每路输出额定负载 Rated load each output	50 mA (Ri = 50 Ohm)
最大频率 / max. frequency	100 kHz
温度范围 / Temperature range	-25 °C ... +70 °C
带有下列可选项 **Equipped with the following options**	1. 选项 (90): 相对于基础脉冲的 90° 移位脉冲 1. Option (90): 90° phase displacement to basic pulse 2. 选项 (N): 标志脉冲，机械定位 2. Option (N): Reference pulse, mechanically fixed 3. 选项 (G): 反向脉冲 3. Option (G): Inverted signals



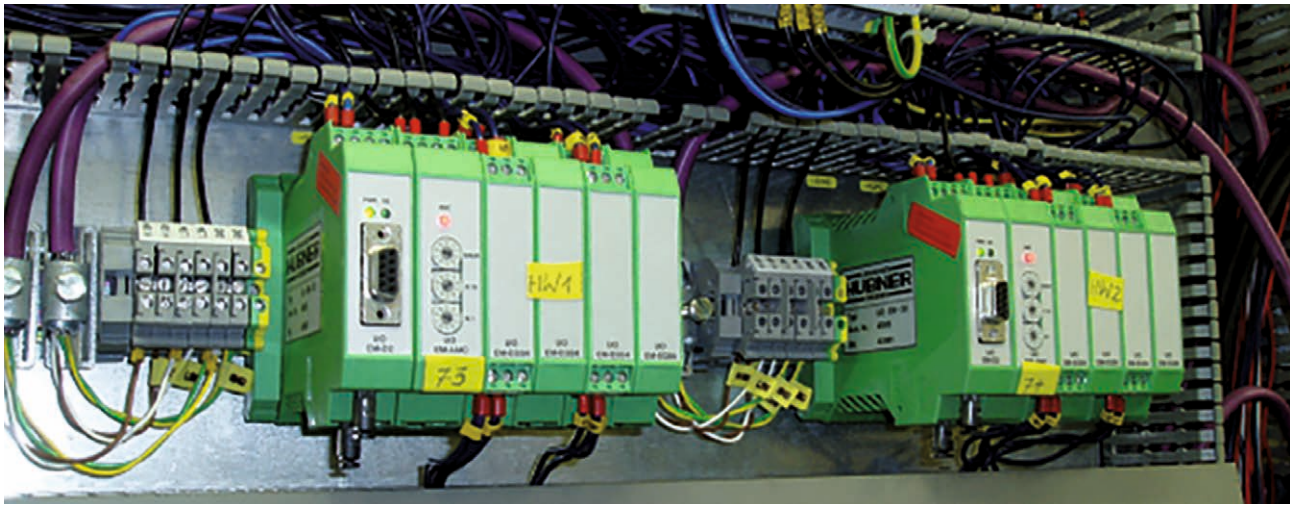
TERMINAL_ 01 incr. output 90°
TERMINAL_ 02 incr. output 0°
TERMINAL_ 03 reference pulse
TERMINAL_ 04 GND
TERMINAL_ 05 incr. output 90° inverse
TERMINAL_ 06 incr. output 0° inverse
TERMINAL_ 07 reverence pulse inverse
TERMINAL_ 08 GND
TERMINAL_ 09 ERR
TERMINAL_ 10 – –
TERMINAL_ 11 – –
TERMINAL_ 12 GND
TERMINAL_ 13 ERR inverse
TERMINAL_ 14 – –
TERMINAL_ 15 – –
TERMINAL_ 16 GND

UO-EM-FG4

接线图 EL671A
Connection diagram EL671A

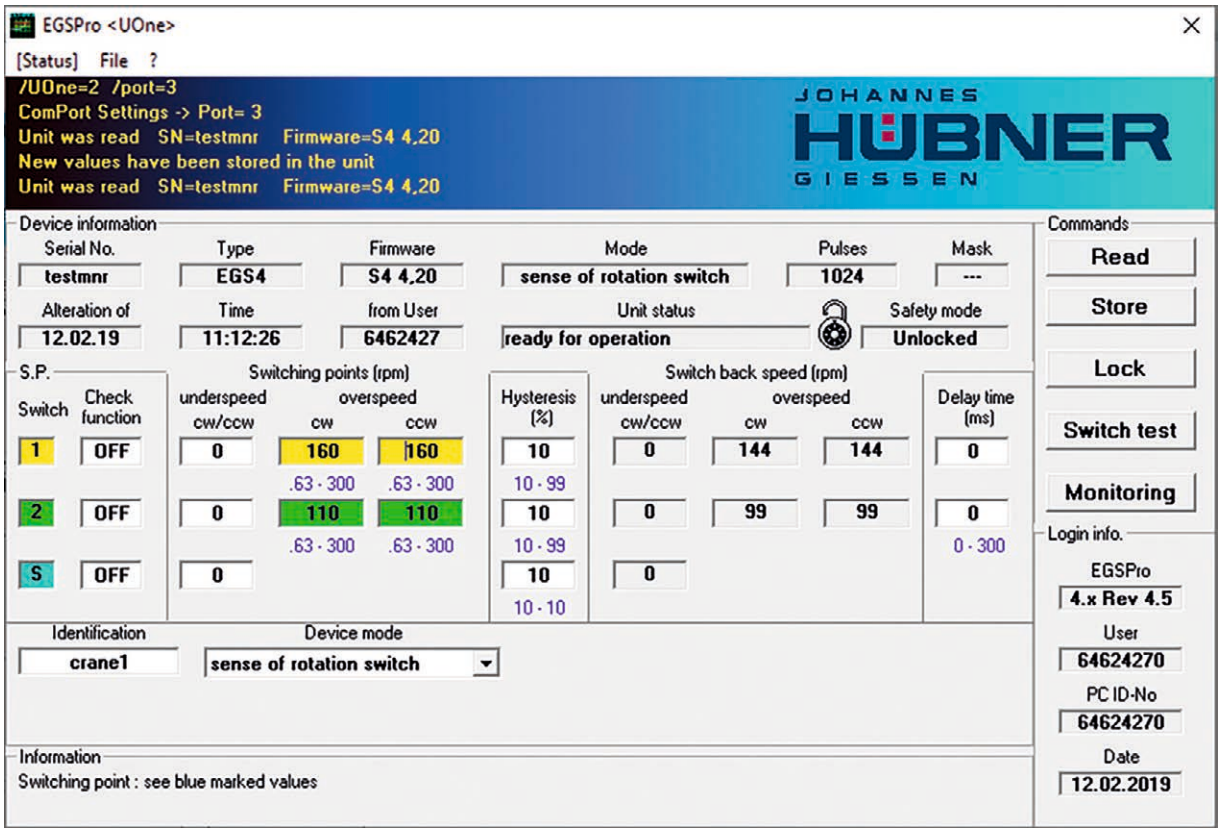


通过解码器模块 *UO-EM-D2 / UO-EM-D41* 集中编程 / *Central programming via decoder modules UO-EM-D2 / UO-EM-D41*

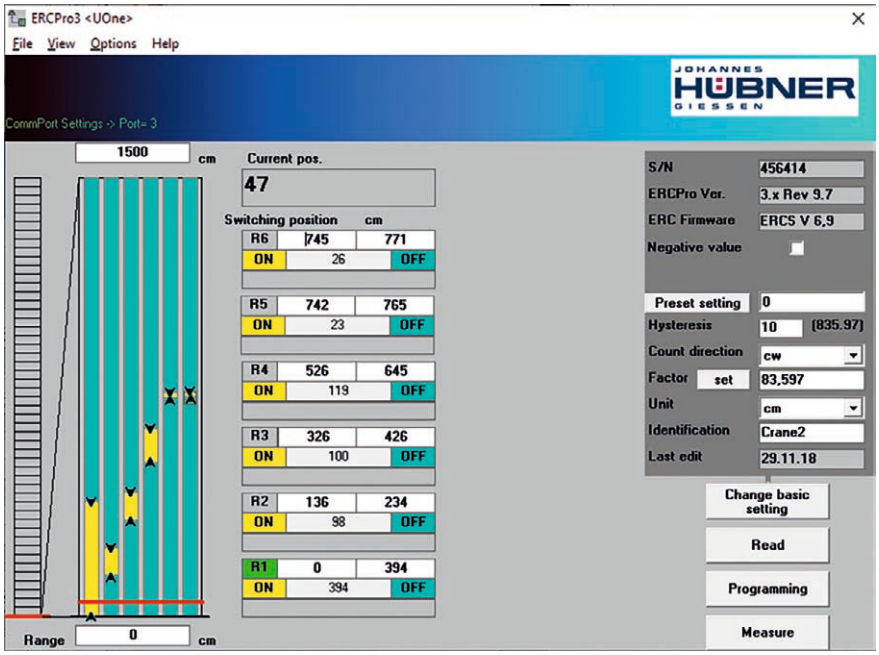


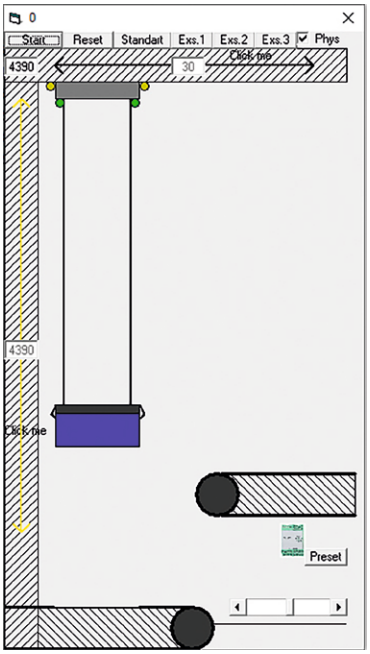
功能模块置于柜内 / *Function modules in a switchboard*

编程
Programming



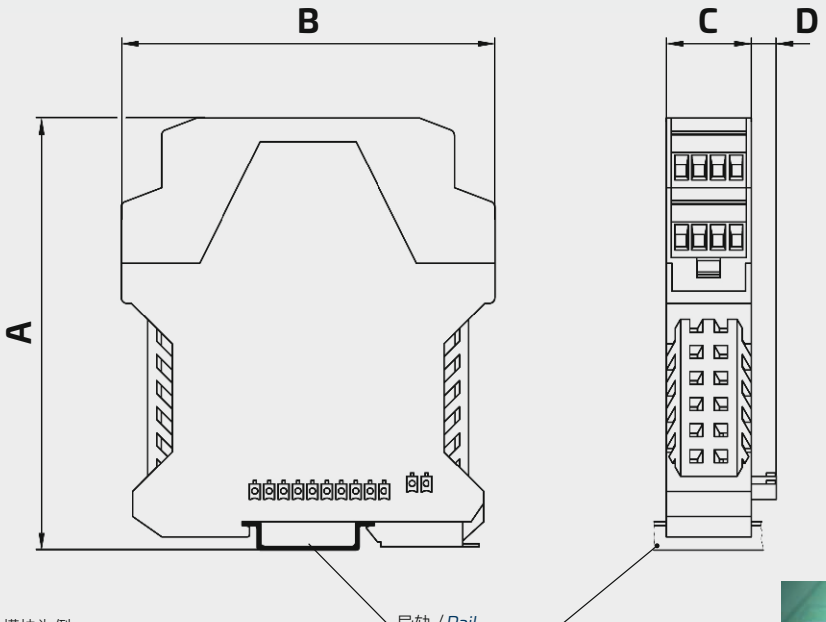
可编程速度开关模块*UO-EM-EGS4*。/ *Programming speed switch modules UO-EM-EGS4*



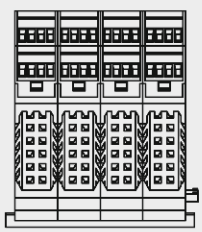


可编程位置开关模块*UO-EM-ERC*。/ *Programming position switch modules UO-EM-ERC*

功能模块尺寸图
Dimension drawing function modules

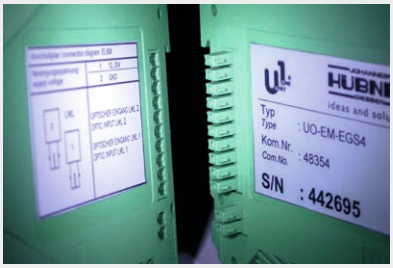


4个模块为例：
Example with 4 modules:



导轨 / *Rail*
EN 50022 – 35 x 7,5
不在供货范围内！
Not part of our scope of supply!

电路板置于带有总线连接的模块化外壳内 *(Phoenix)*
Printed board mounted in a modular casing ME with bus connector (Phoenix)

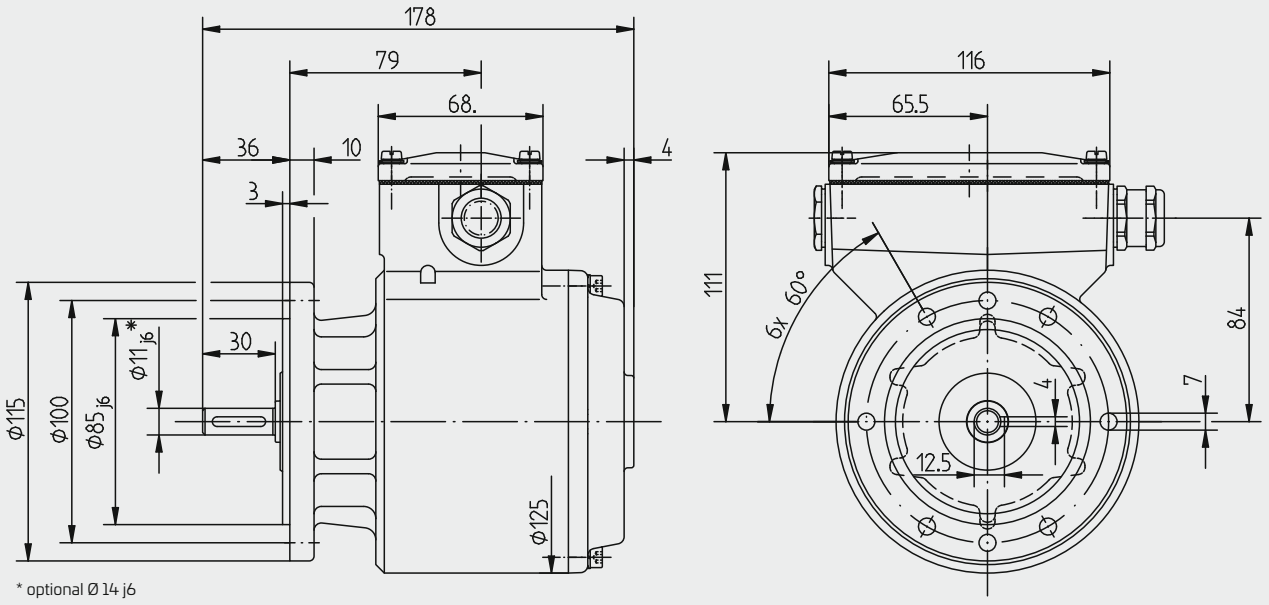


集成总线接头
Integrated bus connector

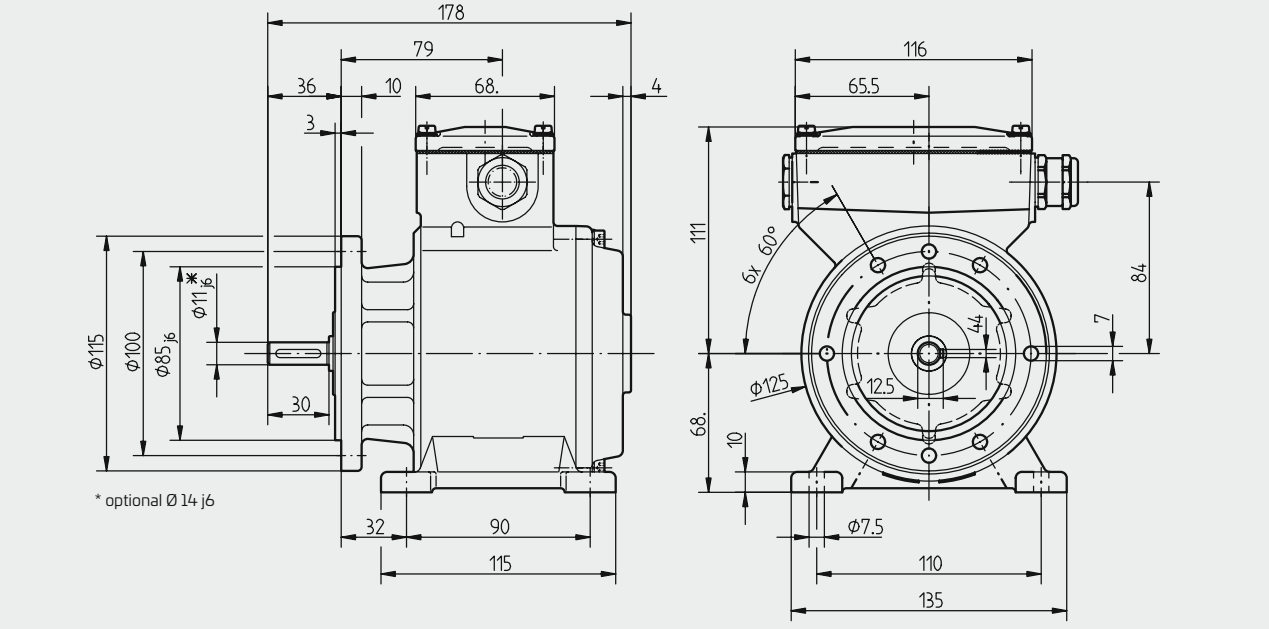
最大线规：*2.5 mm² / AWG 12 / max. wire gauge: 2,5 mm² / AWG 12*

	A (mm)	B (mm)	C (mm)	D (mm)	接线图 Connection diagram
UO-EM-D2	114,5	99,5	22,5	8	EL668
UO-EM-D41	114,5	99,5	22,5	8	EL668
UO-EM-FG4	114,5	99,5	22,5	8	EL671A
UO-EM-EGS4	114,5	99,5	35	8	EL669A
UO-EM-EGS41	114,5	99,5	45	8	PN169-400
UO-EM-AMC	114,5	99,5	22,5	8	EL670
UO-EM-AMP	114,5	99,5	45	8	EL722B
UO-EM-AMS	114,5	99,5	22,5	8	EL702A
UO-EM-AME/M	114,5	99,5	22,5	8	PN110-400
UO-EM-ERC	114,5	99,5	45	8	EL723A

基本单元尺寸图
Dimension drawings basic units

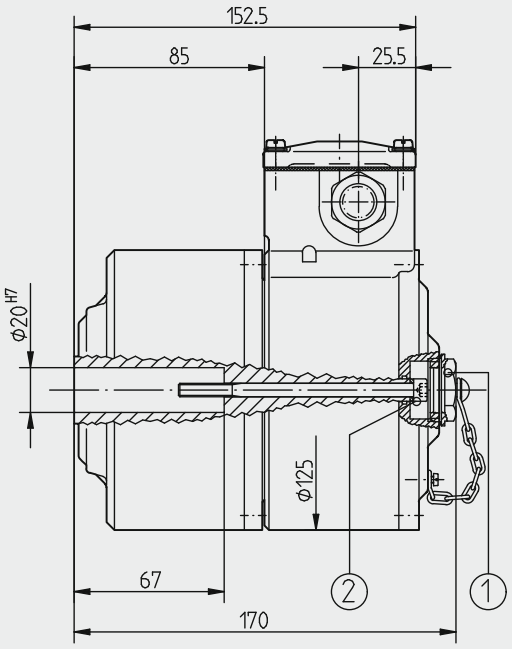


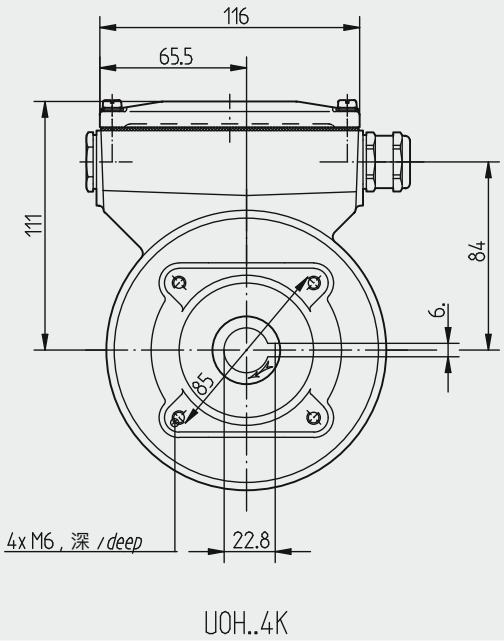
UOM 4L / UOM 41L 结构形式B5(法兰)
Construction type B5 (Flange)



UOM 4L / UOM 41L 结构形式B35(法兰和底座)
Construction type B35 (Flange and foot)

基本单元尺寸图
Dimension drawings basic units





UOMH 4L / UOMH 41L 空心轴设计 Hollow shaft design

可按要求提供 CAD 尺寸图

CAD dimension drawings available on request!

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