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**HEIDENHAIN**



Product Overview

## **Connection Technology**

For Encoders with  
Purely Serial Interfaces

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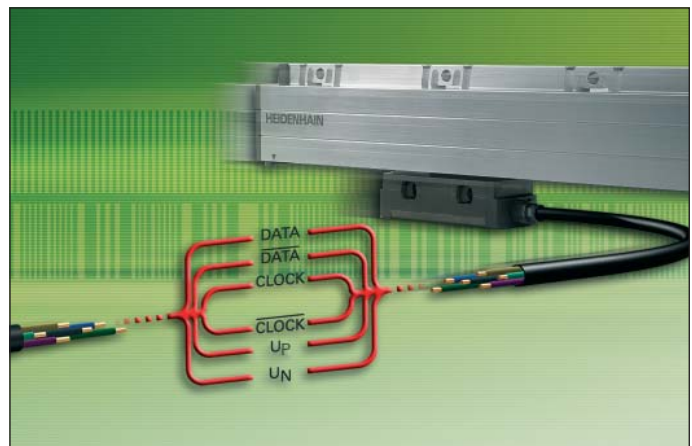
# M12 Connecting Elements

## Connection Technology for Purely Serial Interfaces

Modern machine designs and technological improvements require not only encoders and control components with ever higher performance in ever smaller spaces—new paths are needed in connection technology as well. As a result, a new, but industrially proven, connector technology was introduced for encoders with purely serial interfaces.

### M12, 8-pin connector technology

M12 connector technology is in wide use in industrial applications. This connector technology is used successfully in 4 or 5 pin versions with most of today's sensors. However, the technology had to be improved for use with absolute encoders. For example, at least six lines are needed to transfer the signal and the clock pulse according to RS-485 and to provide power. Eventually an 8-pin connector system was realized. In addition, the tough technical requirements for transmission technology up to 16 MHz had to be accounted for. All qualifications were performed for this purpose and special cable assemblies were developed.



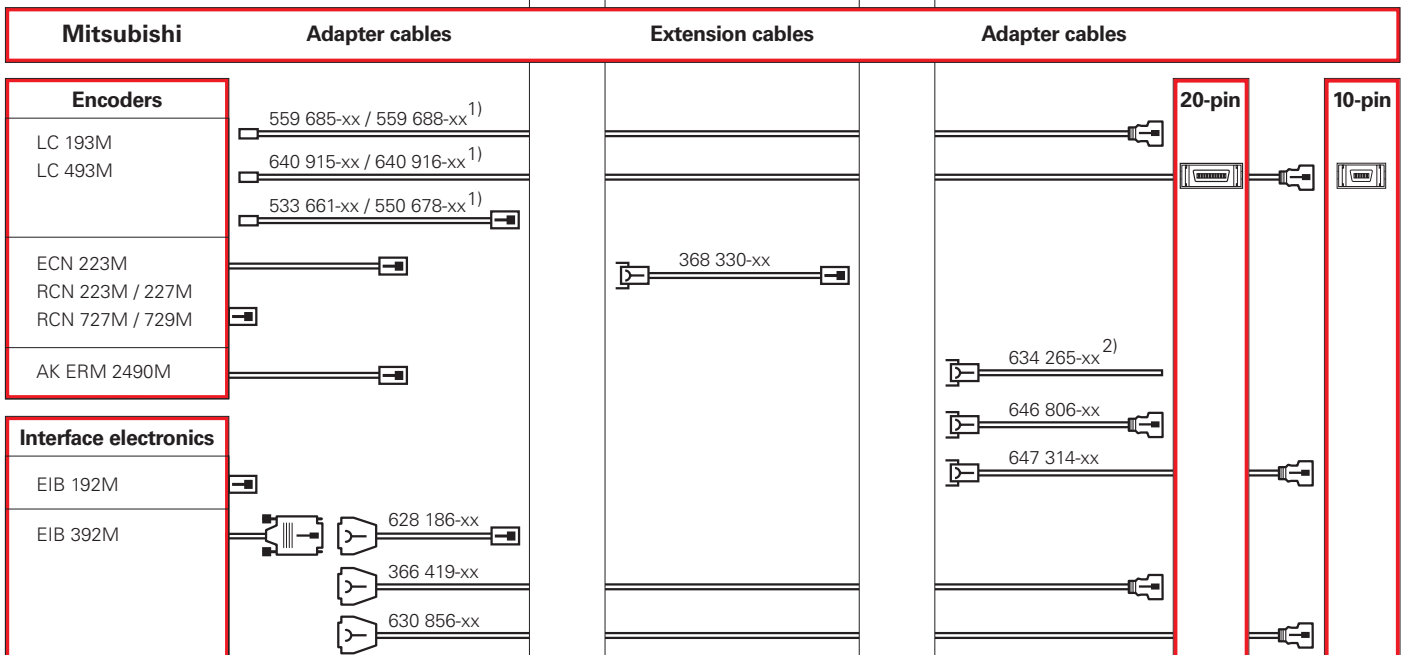
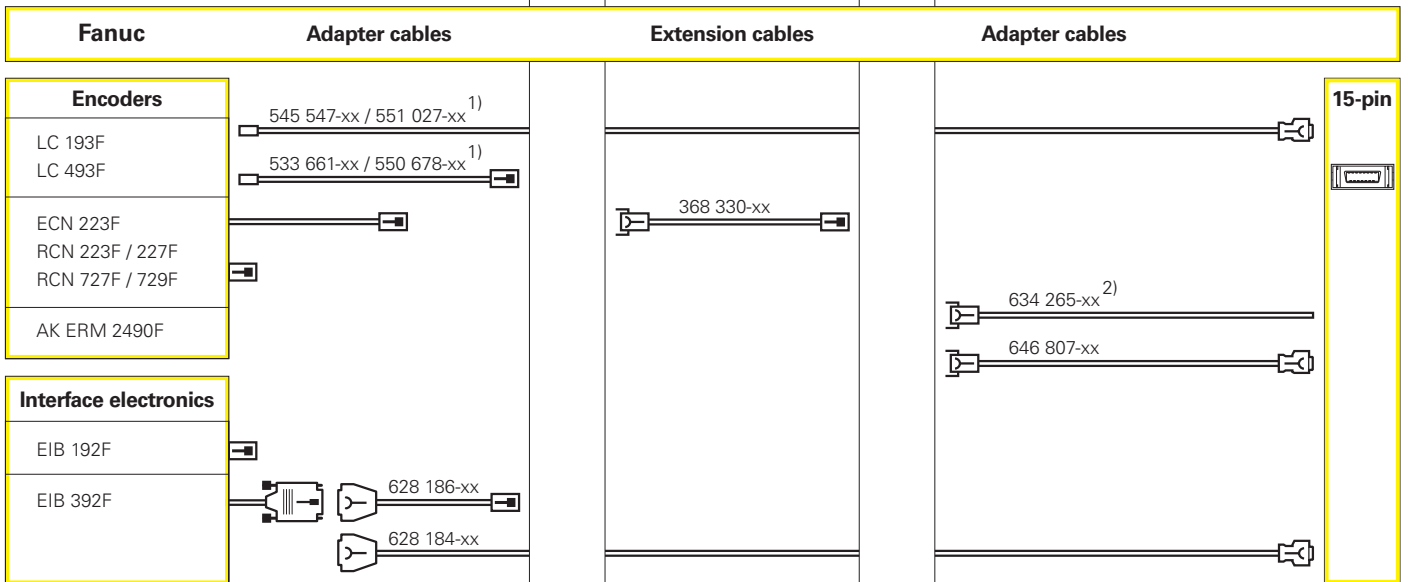
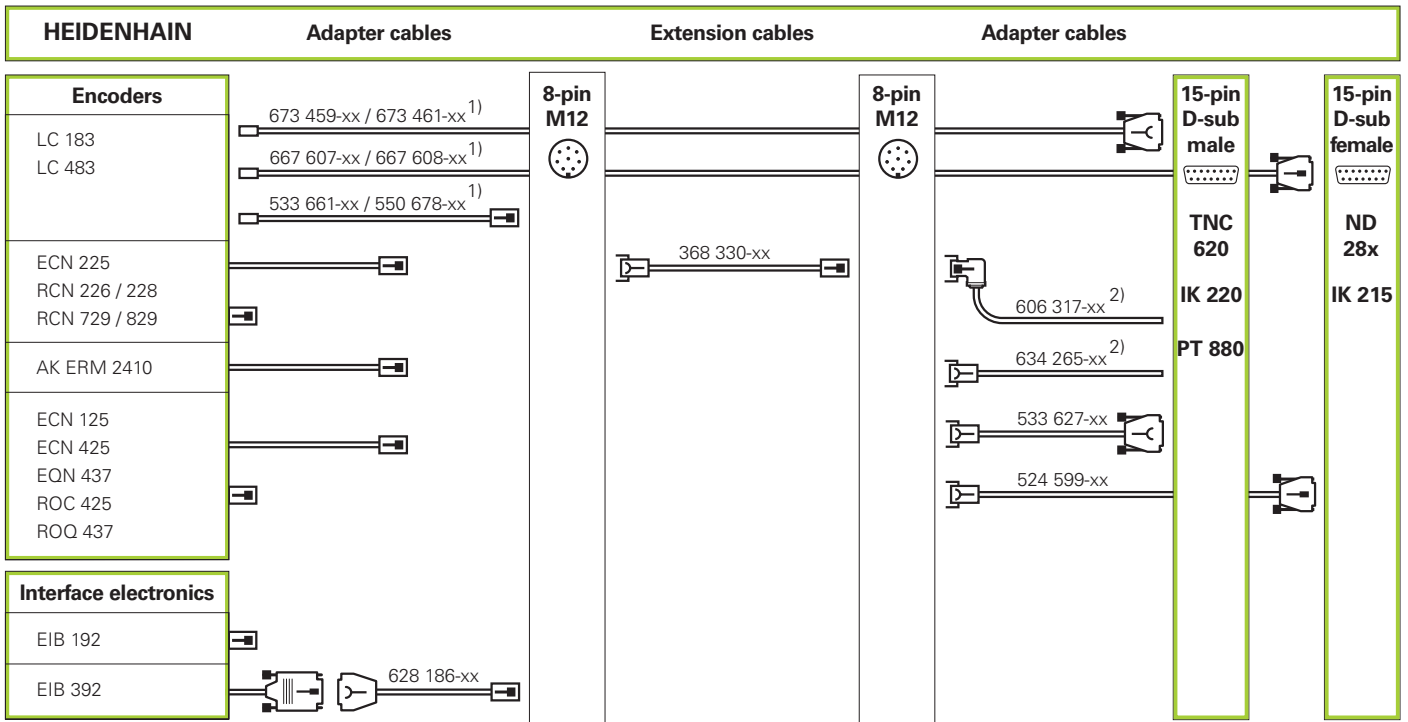
### Benefits of M12 connector technology

HEIDENHAIN has succeeded in developing a uniform connector and cable technology for all encoders with purely serial interfaces. Even where device-specific connection technologies are required on the encoders and the manufacturers of the higher-level electronics have special wishes: All peripheral, connecting, and adapter cables are based on the same cable and the same connector technology.

Other advantages:

- Cost-effective connection technology
- Smaller dimensions
- Simpler cable feed through in machines
- Thinner connecting cables (Ø 6 mm instead of the previous 8 mm)
- Higher reliability thanks to injection-coated connection technology
- Integrated lock mechanism as vibration protection
- Higher availability through standardization





<sup>1)</sup> With metal armor

<sup>2)</sup> Note connector for 8-MHz signal transmission

# General Information

## Cable

HEIDENHAIN cables are mandatory for **safety-related applications**.

The **cable lengths** listed in the *Specifications* of the respective encoders apply only to HEIDENHAIN cables and the recommended input circuitry of the subsequent electronics.

### Durability

All encoders have polyurethane (PUR) cables. PUR cables are resistant to oil, hydrolysis and microbes in accordance with **VDE 0472**. They are free of PVC and silicone and comply with UL safety directives. The **UL certification** AWM STYLE 20963 80 °C 30 V E63216 is documented on the cable.

### Temperature range

HEIDENHAIN cables can be used for

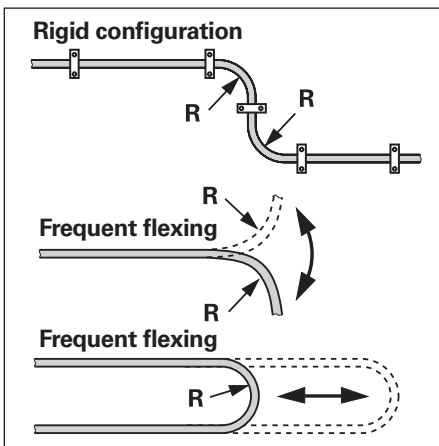
- rigid configuration -40 °C to 85 °C
- frequent flexing -10 °C to 85 °C

Cables with limited resistance to hydrolysis and microbes are rated for up to 100 °C.

If required, please ask for assistance from HEIDENHAIN Traunreut.

### Bend radius

The permissible bend radii R depend on the cable diameter and the configuration:



Cable	Cross section of power supply lines $A_p$ EnDat/Fanuc/Mitsubishi 8-pin	Bend radius R	
		Rigid configuration	Frequent flexing
Ø 4.5 mm	0.14 mm <sup>2</sup>	≥ 10 mm	≥ 50 mm
Ø 6 mm Ø 10 mm <sup>1)</sup>	0.34 mm <sup>2</sup>	≥ 20 mm ≥ 35 mm	≥ 75 mm ≥ 75 mm
Ø 8 mm	1 mm <sup>2</sup>	≥ 40 mm	≥ 100 mm

<sup>1)</sup> Metal armor

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### For more information

- *EnDat* Technical Information

