

## Application Note AN137

### New MR361-1 Series Fiber Optic Extender System for Incremental Encoders Replace Legacy MR361 series

#### Objective

This application note introduces the 2<sup>nd</sup> Generation MR361-1 series Fiber Optic Extender Link for Incremental Encoders and its relationship and replacement of the legacy MR361 series.

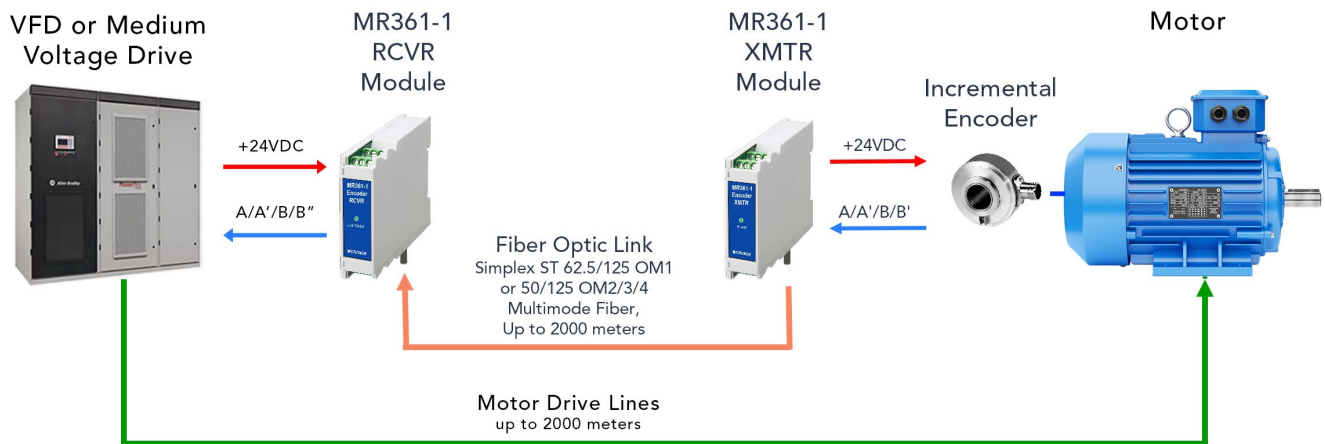
**Effective October 2022, the 1<sup>st</sup> Generation MR361 series was discontinued and no longer available.**

#### Background

The MR361-1 series Fiber Optic Extenders allow conventional electronic-based incremental encoders (optical or magnetic) to reach longer distances by converting the encoder's A/B/Z quadrature pulses to optical signals which can then be transmitted interference-free up to 2000 meters.



As shown in the following diagram of a typical VFD application, the encoder optical link system is comprised of a MR361-1 fiber optic transmitter and a MR361-1 fiber optic receiver. The transmitter converts the electrical signals of an incremental encoder to optical signals - typically the A, B and Index quadrature signals. The receiver module converts the optical signals back into electrical signals which are connected to the encoder input of the user's motor drive or motion control system. Able to transmit up to 4 channels, any unused channels can be used for other system signaling purposes, e.g. e-stop status, limit switch status, etc. The diagram below illustrates a common use of the MR361-1 series for extending the reach of the encoder signals to the remote motor drive interface.



## IMPORTANT NOTE

MR361-1 XMTR and RCVR modules can be different encoder types if required to match different encoders or drive interfaces, i.e. a +5V/RS422 XMTR module can transmit to a +10-30V HTL RCVR module.

## Features

- Simple means of extending encoder reach via one 50/125 or 62.5/125 multimode fiber
- Provides interference-free transmission up to 2000m
- Allows encoder signals to pass safely through hazardous areas and explosive atmospheres
- Input frequency up to 400 kHz
- Supports RS422 or HTL/Push-Pull encoder signals
- Optical system can transmit 4 channels, unused channels can transmit other signals
- Temperature range -10°C to +60°C
- Compact DIN rail mount modules

## Applications

- Applications sensitive to interference
- Passing signals safely through explosive areas
- Variable frequency drive systems (VFD)
- Mining, conveyors, and similar process control and plant automation applications that must extend longer distances than the capability of the encoder interfaces
- High voltage plants
- Remote robotic systems

If you are using the 1<sup>st</sup> Generation MR361 series (9770.30.XXX) ...

The corresponding MR361-1 Encoder Link Extender encoders are *physically interchangeable but not compatible with the older 1<sup>st</sup> Generation MR361 series*. This is because the internal multiplexing system is not compatible between the two series. However, the existing ST fiber optic link can be used without modification.

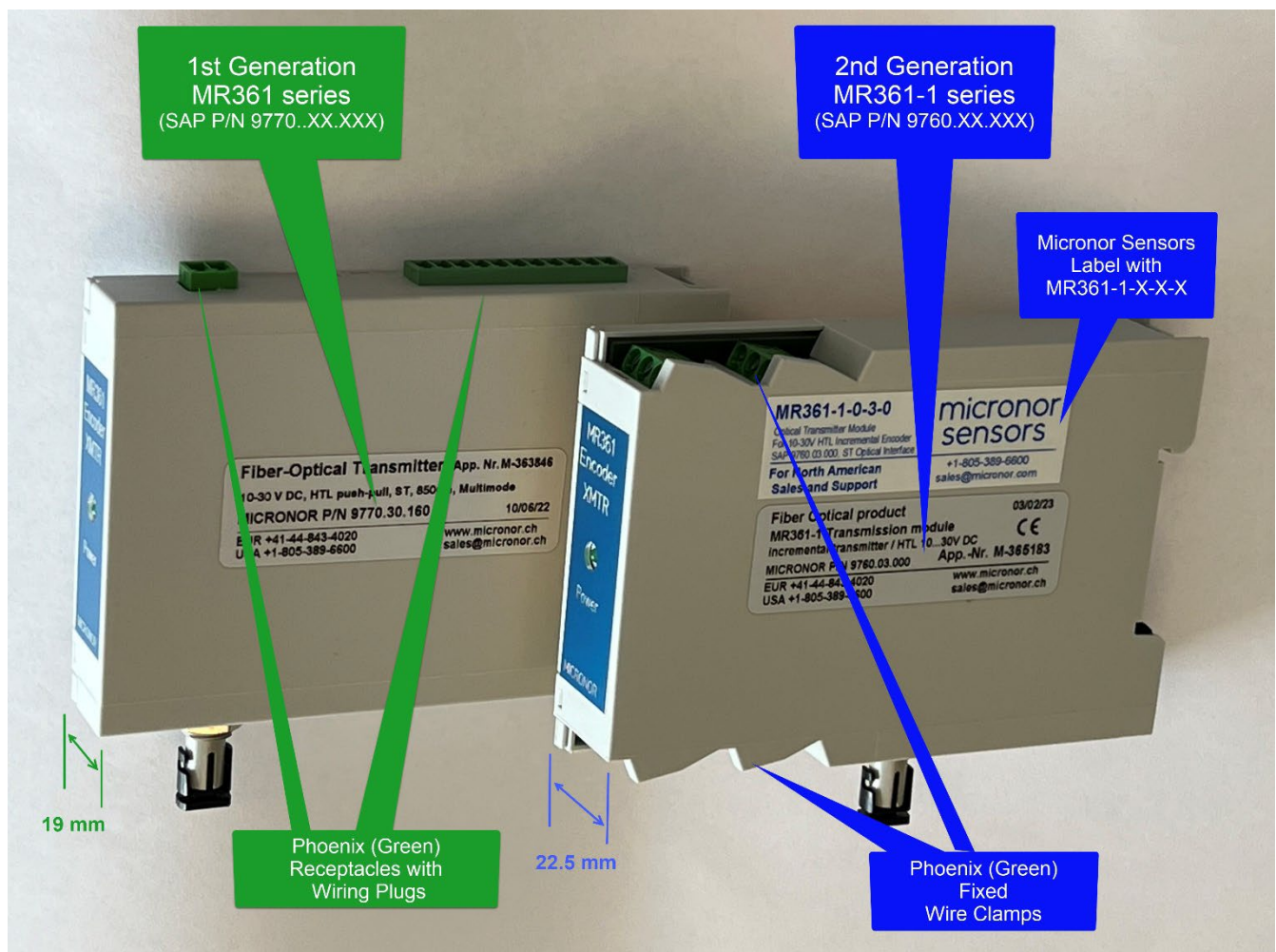
- The MR361 series is no longer available. For new applications, use the MR361-1 series.
- From a fiber optic link perspective, the MR361-1 series the same OM1 62.5/125 and OM2 50/125 multimode fiber cabling, and same simplex ST-PC connections. Only the XMTR and RCVR modules need to be changed.

Encoder Type	MR361 Series XMTR Module	Replace With MR361-1 Series XMTR Module	MR361 Series RCVR Module	Replace With MR361-1 Series RCVR Module	Notes
<b>Type 0</b> +10-30VDC with RS422 Differential Line Driver Outputs	9770.30.140	<b>MR361-1-0-0-0</b> (SAP P/N 9760.00.000)	9770.30.210	<b>MR361-1-1-0-0</b> (SAP P/N 9760.10.000)	In all cases, both MR361 XMTR and RCVR modules must be replaced at the same time.
<b>Type 2</b> +5VDC with RS422 Differential Line Driver Outputs	9770.30.100	<b>MR361-1-0-2-0</b> (SAP P/N 9760.02.000)	9770.30.200	<b>MR361-1-1-2-0</b> (SAP P/N 9760.12.000)	
<b>Type 3</b> +10-30VDC with HTL or Push-Pull Differential Line Driver Outputs	9770.30.160	<b>MR361-1-0-3-0</b> (SAP P/N 9760.03.000)	9770.30.220	<b>MR361-1-1-3-0</b> (SAP P/N 9760.13.000)	

## How to identify 1<sup>st</sup> Gen MR361 series versus 2<sup>nd</sup> Gen MR361-1 series...

They both appear to have the same front panel label, but the similarities end there. Per photo below, here is how to physically verify which series you have:

- MR361-1 series modules are thicker (22.5mm versus 19mm)
- MR361-1 series modules have fixed Phoenix (green) wire clamps; original MR361 series have interconnectable Phoenix (green) wiring plugs
- MR361-1 series has Swiss CE labels with SAP 9760.XX.XXX part numbers; original MR361 series use SAP 9770.XX.XXX part numbers
- MR361-1 series also feature MICRONOR SENSORS product labels with MR361-1-X-X-X part numbers (early shipments did not have this label)



If any questions, please contact Micronor Sensors technical support at [support@micronor.com](mailto:support@micronor.com)