Installation guide

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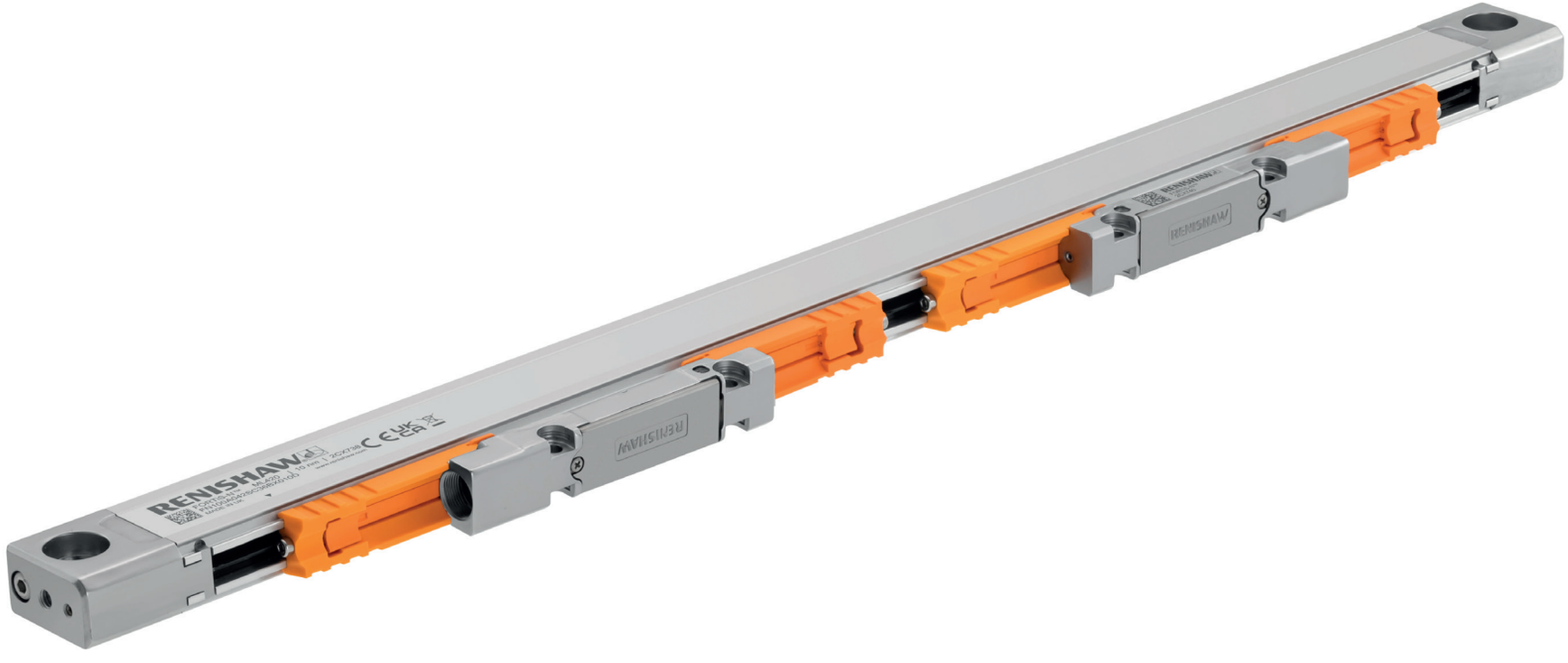
# FORTiS-N™ enclosed encoder system with multiple readheads

## Addendum to M-9768-9887

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# Contents

# 1 Introduction to this addendum

This installation guide addendum details the additional information for the installation and commissioning of a multiple readhead system.

It must be read in conjunction with the *FORTiS-N enclosed encoder system* installation guide (Renishaw part no. M-9768-9887) for single readhead systems, which provides the following contents:

- Legal notices
- Overview of the FORTiS-N encoder system
- Parts list
- Storage and handling
- Installation drawings
- Product specification
- Installation procedure – extrusion
- Installation procedure – readhead
- Cables and serial interfaces

This installation guide addendum for multiple readheads provides the following contents and revisions to the above:

- Overview of the FORTiS-N encoder system with multiple readheads
- Parts list
- Additional content for the installation of a multiple readhead system
- Installation drawings

# 2 Overview of the FORTiS-N encoder system with multiple readheads

This system is an enclosed linear optical encoder designed for use in harsh industrial environments where high-precision feedback and metrology are required. It is suitable for applications where various slideway mechanisms are common to a particular linear axis and require multiple readheads to provide feedback.

Based upon Renishaw's award-winning absolute technology, the rugged non-contact design has no internal moving parts, such as bearings or wheeled readhead carriages, thus improving the overall reliability. Additionally, hysteresis and backlash errors associated with mechanical contact system designs are reduced.

In addition to enhanced breakage resistance, the robust steel scale has a coefficient of thermal expansion similar to the base material used in the majority of machines, reducing errors due to thermal effects whilst increasing measurement certainty.

Renishaw's patented set-up LED provides instant verification of the encoder's signal strength and therefore its accurate alignment. This intuitive procedure significantly reduces the need for additional peripheral diagnostics equipment during installation. When combined with Renishaw's carefully designed installation accessories, these unique tools make installation easier and faster compared to traditional methods, whilst building confidence in a right-first-time installation.

## 2.1 Fault exclusions

The following will invalidate the warranty of the FORTiS-N encoder system:

- Faults caused by cutting and reconnecting the cable or the use of a non-Renishaw cable that is not approved
- Incorrect installation
- Dismantling
- Operating the system outside the limits specified in this installation guide

## 2.2 Commissioning test

The following test MUST be performed when commissioning the FORTiS-N encoder system and after any repair or maintenance of the system.

**Resolution check** Move each readhead by a known distance and confirm that the position changes as expected. The tolerance for raising a fault condition is relative to the safe position determined by the system manufacturer.

## 2.3 Maintenance

The maintenance check intervals will be defined by the system manufacturer according to their risk assessment. There are no user-serviceable parts within the FORTiS-N encoder system.

The following maintenance actions are advised:

- Check the extrusion screws and readhead retaining screws are correctly tightened.
- Check for worn or damaged cables and connectors.
- Check the cable connectors are correctly tightened/located.
- Check the air supply fitting is correctly tightened and the air hose is correctly fitted.
- When the DRIVE-CLiQ interface is used check the retaining screws are correctly tightened.

## 2.4 Repair

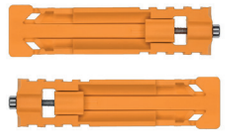
- Repair of the FORTiS-N encoder system is only by replacement of parts.
- The replacement parts must have the same part number as the original parts.
- The repaired encoder system must be installed and commissioned in accordance with 'Commissioning test'.
- In the event of failure the affected parts should be returned to Renishaw for further analysis.
- Using damaged parts invalidates the warranty.

## 2.5 Further information

For information regarding FORTiS-N encoder systems with single readheads and for information regarding compatible serial interfaces please refer to the *FORTiS-N enclosed encoder system* installation guide (Renishaw part no. M-9768-9887).

# 3 Parts list

## 3.1 Included in the box

| Item | | Description |
|---|---|---|
|  | **FORTiS-N encoder unit** | The FORTiS-N enclosed encoder unit |
|  | **18 mm readhead setting shim** | Plastic shim to be used as an installation aid |
|  | **Air connection fitting** | To enable connection to one of the encoder air purge inlets |
|  | **Cable connection wrench** | Used for securely connecting the encoder cable to the readhead |
|  | **Alignment brackets** | Two brackets to secure each readhead during transit and set the correct readhead alignment during installation<br>**IMPORTANT:** Retain until installation is complete |
|  | **Serrated washers** | 2 × M8 serrated washers for mounting an extrusion with standard end caps |
|  | **Serrated washers** | 2 × M4 serrated washers for mounting the readhead to the machine slideway |
| | **FORTiS quality inspection certificate** | Certifies specific encoder performance and provides traceability |

| | | |
|---|---|---|
|  | **Siemens DRIVE-CLiQ interface** | Included with Siemens-only versions of FORTiS-N |

## 3.2 Not included / required tools

| Item | | Description |
|---|---|---|
|  | **6 mm torque wrench** | To tighten the extrusion mounting screws |
| | **3 mm torque wrench** | To tighten the readhead mounting screws |
|  | **1.5 mm hex key** | Air bung removal (only if air purge is required) |
|  | **2 mm hex key** | To fit the mounting spar when tightening the extrusion mounting screws from the underside, if required (non-preferred method)<br><br>Alignment bracket removal |
|  | **3 mm hex key** | For locking the mounting aid |
|  | **M8 screws** | 2 × M8 × 1.25 screws length ≥ 20 mm for mounting the extrusion |
|  | **M4 screws** | 2 × M4 × 0.7 screws length ≥ 20 mm for mounting each readhead |

# 4 Additional installation content for a multiple readhead system

## 4.1 Mounting the encoder

For mounting surface preparation and mounting orientations refer to the *FORTiS-N enclosed encoder system* installation guide (Renishaw part no. M-9768-9887).

For minimum distances between readheads and permissible cable orientations refer to the system installation drawings; see sections 4.3 and 4.4 in this addendum.

1. It is the responsibility of the installer to ensure that readheads and their connected cable assemblies do not meet with each other or collide with end caps.
2. Typically, for applications that require multiple readheads traversing a single extrusion, the extrusion is fixed with only the readheads moving. Please contact your local Renishaw representative if your requirements are different.
3. Some of the shorter measuring lengths will not support multiple readheads, depending on number of readheads, cable configuration and cable type. Please discuss with your local Renishaw representative.
4. A persistent fault condition may indicate a hardware failure of the FORTiS-N encoder system or an installation problem.
5. The individual readheads must be treated as separate encoder sub-systems.
6. The system manufacturer and/or system installer are responsible for ensuring the safe operation of these sub-systems: for example, ensuring the readheads do not collide with each other.

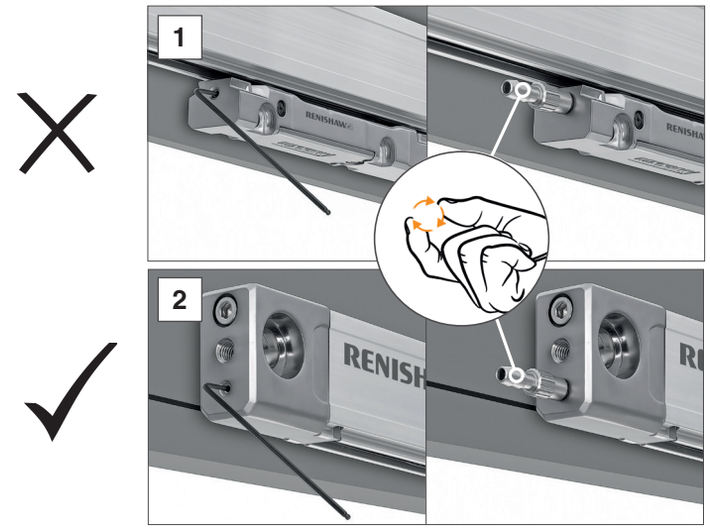
## 4.2 Connecting the air supply

For fixed extrusion installations (see section 4.1) the air purge supply must be connected to the extrusion only.

Air inlets are included in each end cap, at both ends of the extrusion. Use a suitable air supply hose with a 4 mm bore.

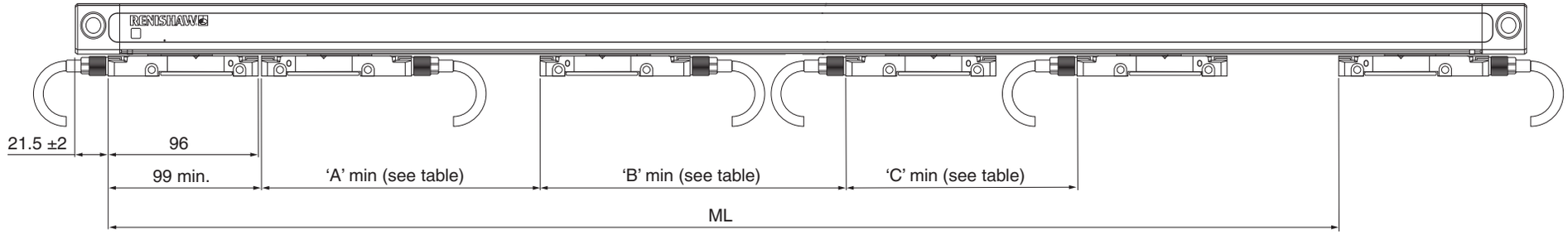
For compatible air supply components refer to the data sheet *Air filtration systems for use with FORTiS encoders* (Renishaw part number L-9517-9982).

**WARNING:** Remove the blanking plug only from the position at which the purge air supply is to be connected, or the sealing integrity may be compromised.



## 4.3 FORTiS-N system with multiple readheads installation drawing – standard end caps

Dimensions and tolerances in mm



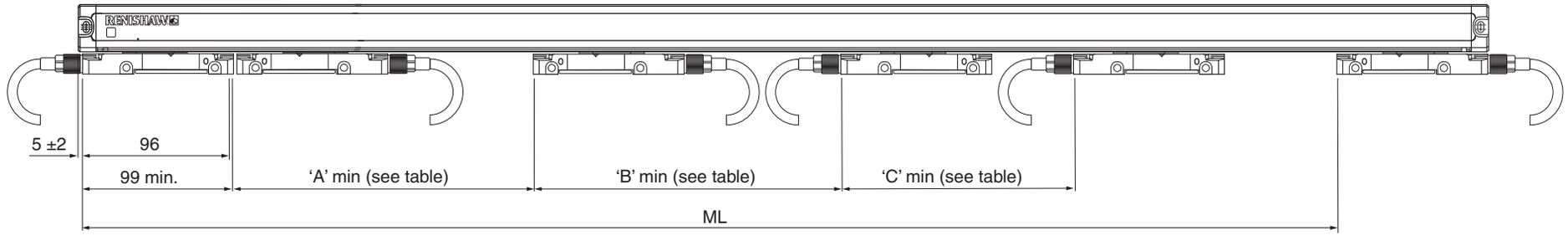

| Cable type | A | B | C | Minimum static bend radius |
|---|---|---|---|---|
| **Black** | 143 | 187 | 143 | 15 |
| **Green** | 160 | 222 | 160 | 31.5 |
| **Armoured** | 176 | 253 | 176 | 45 |

**NOTES:**

1. For required installation information see 'FORTiS-N system installation drawings' in the *FORTiS-N enclosed encoder system* installation guide (Renishaw part no. M-9768-9887).
2. The arrangement of readheads shown is arbitrary and does not represent a defined sequence. It depicts the range of possible readhead and cable orientations.

## 4.4 FORTiS-N system with multiple readheads installation drawing – short end caps

Dimensions and tolerances in mm




| Cable type | A | B | C | Minimum static bend radius |
|---|---|---|---|---|
| **Black** | 143 | 187 | 143 | 15 |
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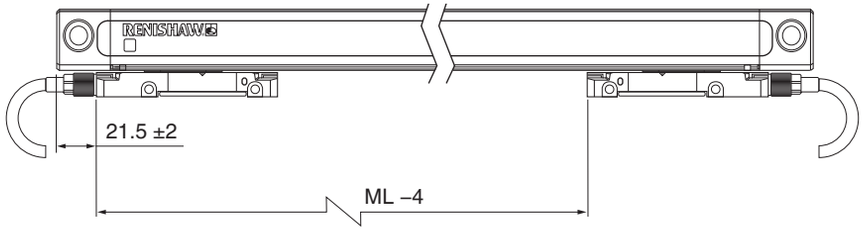
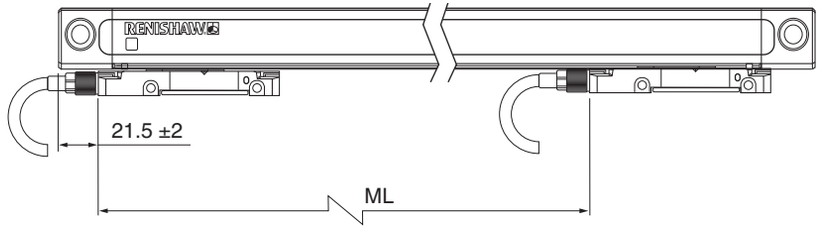
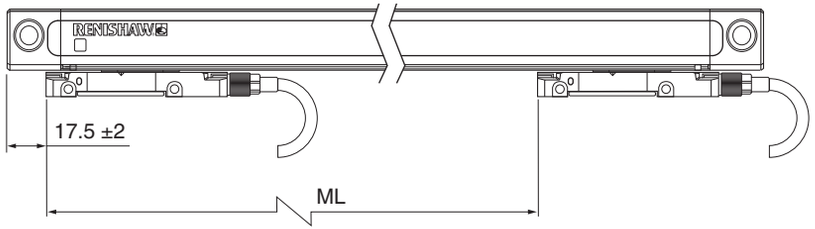
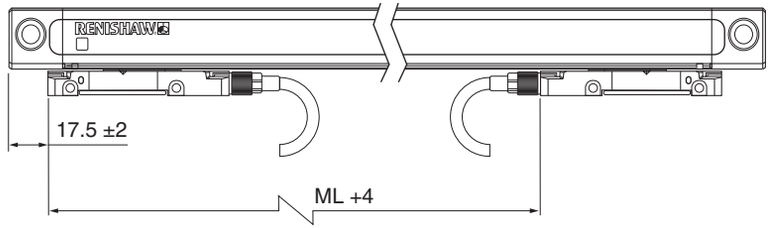
## 4.5 Standard end caps – first and last readhead orientation

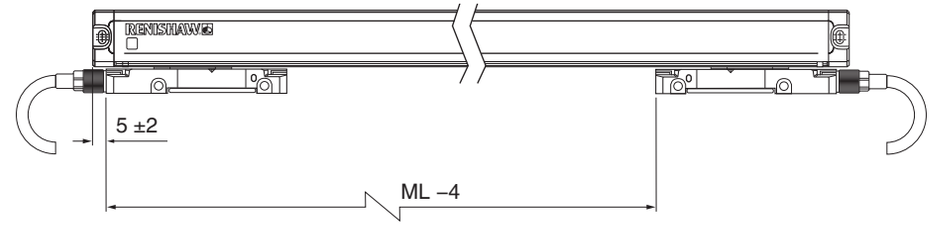


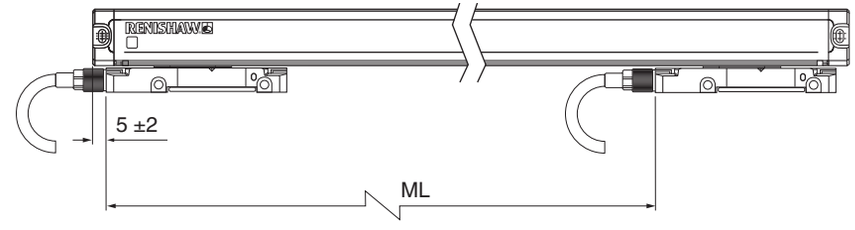



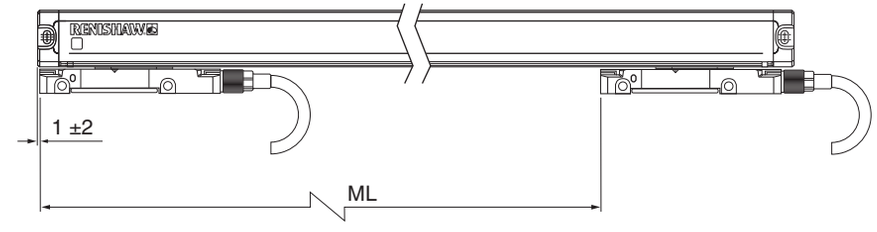



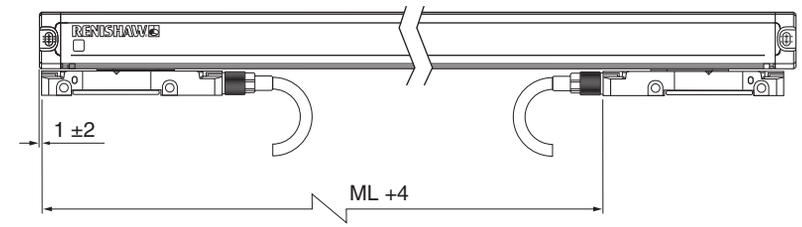




## 4.6 Short end caps – first and last readhead orientation



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