

The logo for AMC Instruments features the letters 'AMC' in a large, bold, blue font. The letter 'A' is stylized with diagonal lines on its left side. Below 'AMC', the word 'INSTRUMENTS' is written in a smaller, bold, blue, sans-serif font.

**AMC**  
**INSTRUMENTS**

The Lifting KnowHow 

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-INDUCTIVE  
DEVICES  
DEVELOPMENT

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**Custom**

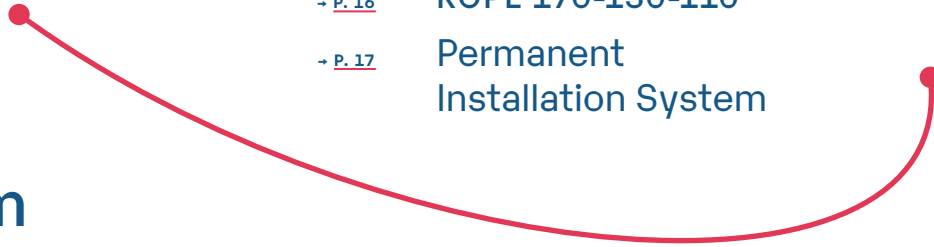
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1.

# AMC

AMC was born in 2007, as a start-up of the Polytechnic of Turin.

We started producing ropeway devices, that requires MRT inspection and an EN12927-compliant design. Our first challenge was the test to achieve the accuracy and the stability required by the ropeway market. After several phases of trials and errors, our equipment successfully passed the test with a signal-to-noise ratio bigger than 2.

In the following years, AMC made its entrance in the Heavy Lifting and Elevators Market with standard and customized solutions.

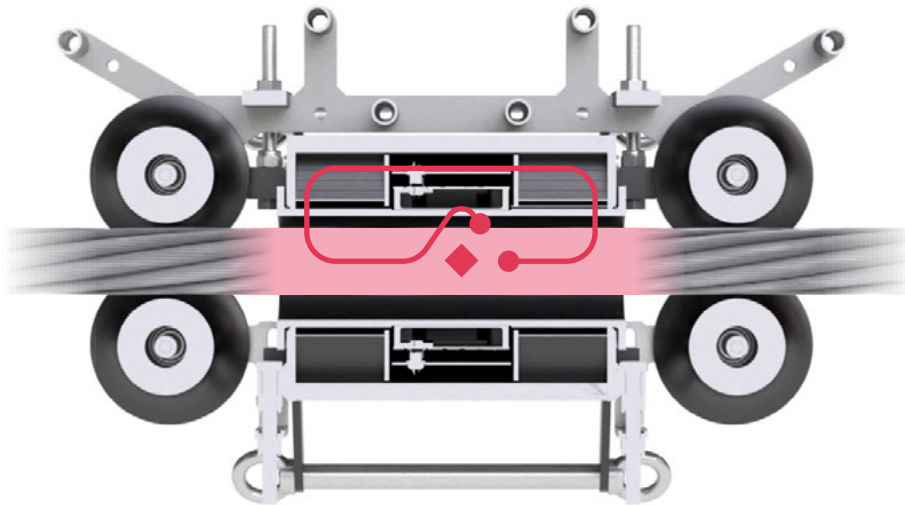
Thanks to our experience and knowledge, we became an examination center for ISO9712 training and certification. AMC Instruments is now a technical partner for the qualification of experienced personnel in Non-Destructive-Test, Level 1 and 2 of the IOS9712, for wire ropes used to lift and transport people and goods.

Last but not least, at the end of 2018 we were acquired by Axel Johnson, joining the Lifting Solution Group.



2.

# The MRT method



The MRT method is a non destructive, magnetic and contactless procedure that allows to detect broken wires, distortions and corrosion on steel wire ropes.

This magnetic method was introduced in the cableways sector to inspect the haulage and carriage and to identify external and internal defects. In the 80s this technique broadened the offshore heavy lifting market due to the increasing needs in terms of efficiency and safety. Most recent version of ISO4309 includes MRT as assessment method for the inspection of generic heavy lifting wire ropes.

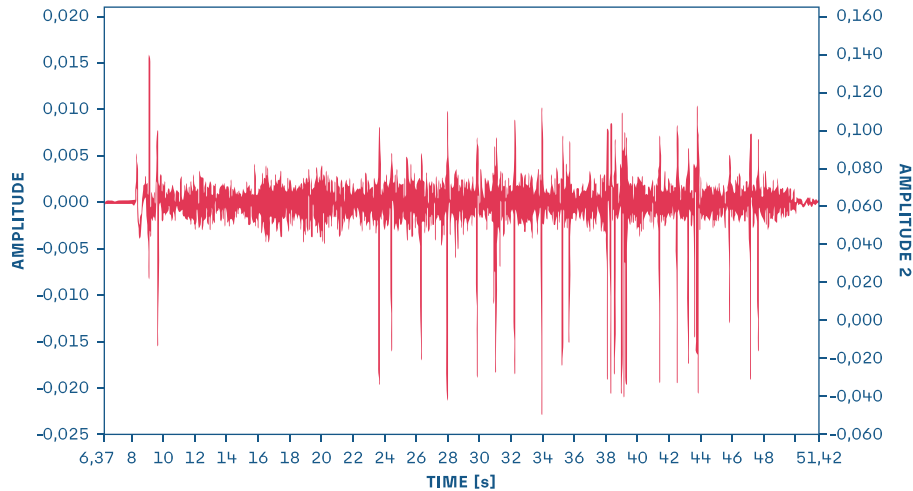
AMC introduced a lot of innovative concepts in the MRT, improving both magnetic development and user-interface facilitating a full wire rope inspection thanks to an automatic setting included in the software.

AMC devices are equipped with two different signals (on two separate electric circuits) that can be useful for the operator to identify and estimate damages such as internal and external broken wires, corrosion, wear, etc.

The LF signal is the main technique in this field and it is completely regulated by international standards. It consists in the measurement of the leakage flux that appears when a defective portion of rope is introduced into the device.

[→ WATCH THE VIDEO](#)

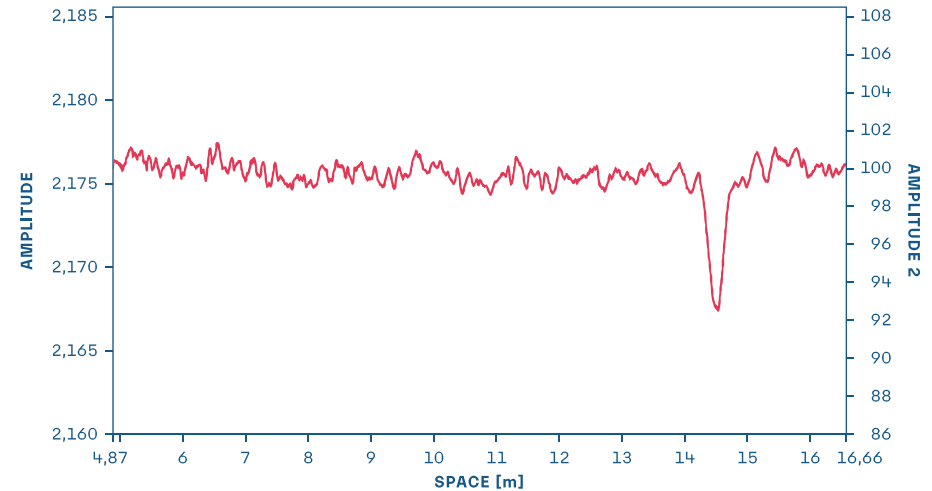
## 2. The MRT method



If the rope is magnetically saturated, when a local flaw appears, a part of the magnetic flux lines move from the inner part of the rope to the surrounding air. The quantity of this flux and its path depend on the characteristics of the damage. Inside the device, some probes acquire the flux distortions and traduce them in a measurable quantity (i.e. voltage or current). A diagram in the user-interface will then show the effects of the flaw.

Each peak in the graph corresponds to one or more broken wires in the inspected wire rope.

The LF signal is fully regulated by the EN12927 standard, which has to be accomplished.



The LMA signal is based on the measurement of the main flux that moves inside the rope. Under certain hypothesis, this flux is proportional to the wire rope cross section and this signal can give useful indications of phenomena such extended corrosion, wear and so on. It should be said that the LMA aimed to 'long' flaws and it is not suitable for localized damages such as broken wires.

In the picture it is possible to see a distinctive signal corresponding to a corroded zone in which the cross section decreases by 10% approx.

In AMC devices the LMA signal is optional because it may provide wrong result in case certain conditions are not fulfilled.

3.

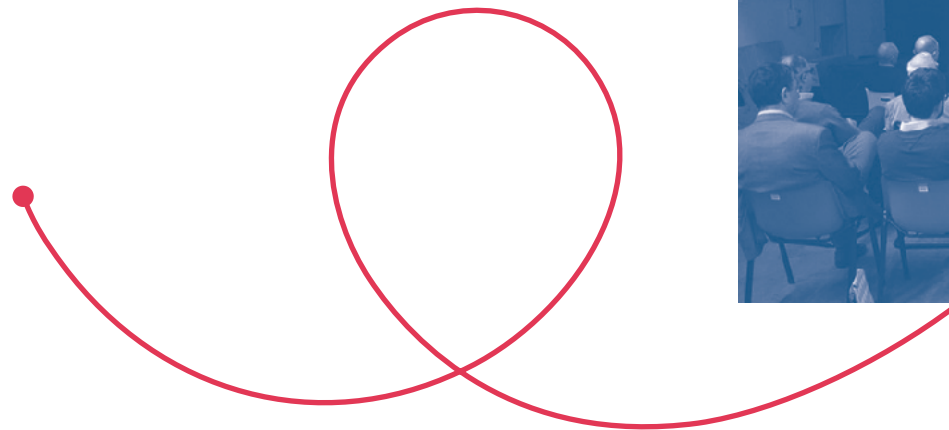
# Training

A perfect MRT inspection is the combination of good acquisition and good interpretation.

A fully automatic interpretation is rarely possible, especially for mobile application.

The user must know how the equipment works and look for all the causes that could affect its performance. For this reason, the signal interpretation is fundamental in order to define the rope status.

Thanks to our training, our customers will complete the journey to become MRT experts. Two different trainings and constant practice are the most important steps of this process.



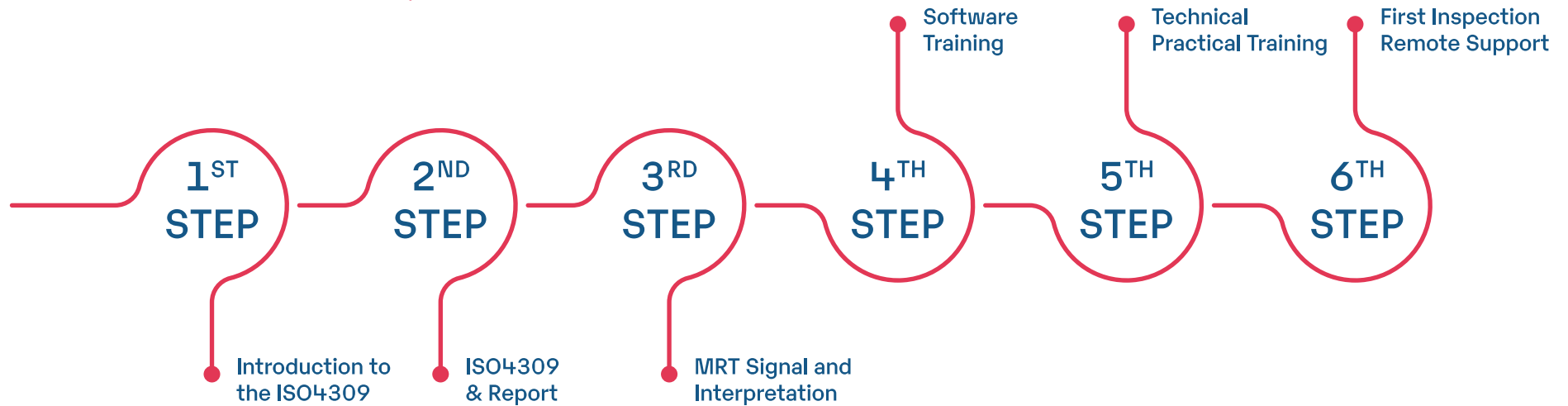
### 3. Training

A. Operative training: it teaches the correct use of the inspection system and the interpretation of the signal.

The inspector will be guided through a 6 steps training. Each step will last approximately 1-2 hours.

All the step can be done online. If it is possible, we suggest doing the technical-practical part on-field.

After at least 6 months of practice, the inspector can attend the ISO9712 course.



### 3. Training

**B. II level training (ISO 9712):** it is a strong technical course that allows the customer to work in full compliance of ISO9712 norm.

#### **COURSE GENERAL CHARACTERISTICS**

The ISO 9712 course (on-field) lasts 3 days, 8 hours per day. There will be both a theoretical and practical part, and the end of the course all participants must take a final examination.

The exam duration is 8 hours.

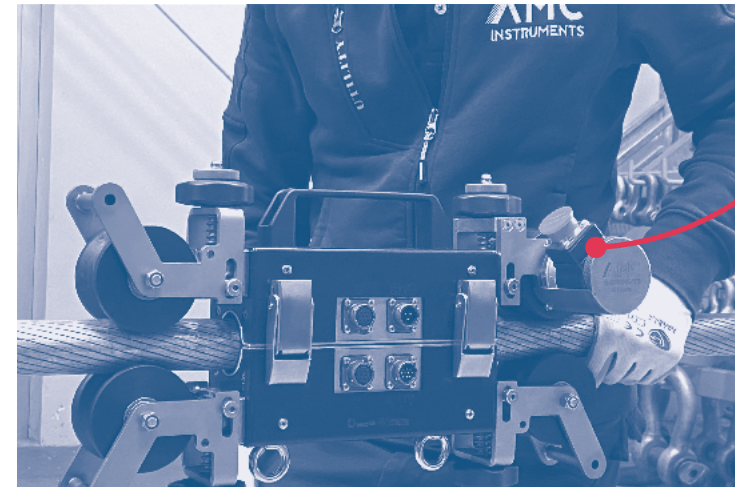
The course ISO9712 can be attended online, the scheduling will be decided with the students.

#### **MINIMUM SUBSCRIPTION REQUIRED**

The course required min. 6 participants.

#### **DURATION OF THE CERTIFICATE**

The ISO 9712 certificate is valid for 5 years.



4.

# Sectors

MRT devices apply in all wire ropes sectors, which are:



## Heavy Lifting

→ [SEE P. 10](#)



## Cableways

→ [SEE P. 18](#)



## Elevator Market

→ [SEE P. 28](#)

These areas use wire ropes in different ways, but the general aspects about safety and service continuity are very similar. Cableways carry people from one place to another and the condition of wire ropes is really important to avoid accidents. This applies also for elevators and heavy lifting, in which a failure of the rope could cause huge issues in terms of responsibility, human life and finance.

# Heavy Lifting



MRT made its first appearance in this sector in the '80s, especially for some specific applications. Although heavy lifting ropes don't lift humans but loads, safety is really important because a failure can cause a disaster (imagine a steel mill, or a mine).

A strong progress in technology in the early 2000 led to the availability of heavy lifting devices, compliant with cableways standards, in order to improve the final user experience and simplify the use of MRT systems in this environment.

The updated version of ISO4309 (2017) indicates MRT as state-of-the-art method for internal damages.

Non rotational wire ropes are actually used in many applications. Non rotational wire ropes behave differently according to each layer ropes. The degradation often starts from the inner part of the rope, and a standard visual inspection cannot be enough to ensure a correct evaluation. In these cases an MRT inspection is strongly suggested to avoid failures and damages.

# ROPE 22



Device able to perform Non-Destructive-Test on wire ropes with diameter ranging from 6 to 22 mm.

The device works only on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

|  |  |
|--|--|
| WEIGHT                                   | 8 kg   |
| DIMENSIONS                               | 30 x 30 x 20 cm                                  |
| IP                                       | 66   |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1  |
| ENCODER & CENTERING SYSTEM               | On request (suggested for cableways and zipline) |
| CERTIFIABLE UNDER THE EN12927            | Yes  |

## SENSORS KIT

|  |            |
|--|------------|
| STANDARD RANGE                           | 22 – 14 mm |
| MIN ROPE DIAMETER (WITH A REDUCTION KIT) | 6 mm       |
| NUMBER OF REDUCTION KIT                  | 1          |

## INSTRUMENT CHARACTERISTICS

|                              |  |
|------------------------------|--|
| FIELD SOURCE                 | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                  | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                  | LF; LMA (on request)                               |
| SIGNAL ACCURACY              | In accordance with EN12927                         |
| TEST SPEED MAX 0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 28



Device able to perform Non-Destructive-Test on wire ropes with diameter ranging from 6 to 28 mm.

The device works only on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

|  |  |
|--|--|
| WEIGHT                                   | 10 kg  |
| DIMENSIONS                               | 40 x 40 x 20 cm                                  |
| IP                                       | 66   |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1  |
| ENCODER & CENTERING SYSTEM               | On request (suggested for cableways and zipline) |
| CERTIFIABLE UNDER THE EN12927            | Yes  |

## SENSORS KIT

|  |            |
|--|------------|
| STANDARD RANGE                           | 28 – 18 mm |
| MIN ROPE DIAMETER (WITH A REDUCTION KIT) | 6 mm       |
| NUMBER OF REDUCTION KIT                  | 2          |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 40



AMC\_ROPE 40 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 22 to 40 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 20 kg           |
| DIMENSIONS                               | 46 x 28 x 12 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

## SENSORS KIT

|                       |       |
|-----------------------|-------|
| STANDARD RANGE        | 40 mm |
| MIN ROPE DIAMETER     | 20 mm |
| NUMBER OF BUSHING KIT | 2     |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 65



AMC\_ROPE 65 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 20 to 65 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 32 kg           |
| DIMENSIONS                               | 75 x 55 x 45 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

## SENSORS KIT

|                       |            |
|-----------------------|------------|
| STANDARD RANGE        | 65 – 40 mm |
| MIN ROPE DIAMETER     | 20 mm      |
| NUMBER OF BUSHING KIT | 2          |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 10 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 80



AMC\_ROPE 80 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 60 to 80 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- digitally acquired LF & LMA Signal;
- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 55 kg           |
| DIMENSIONS                               | 60 x 32 x 40 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

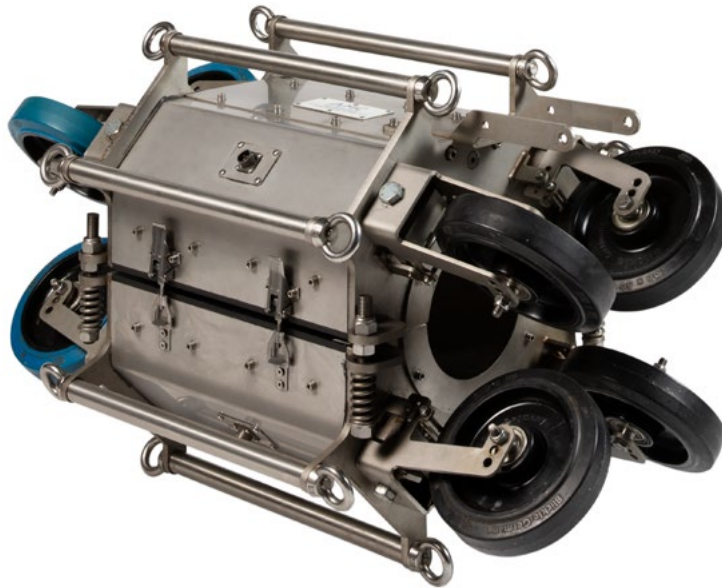
## SENSORS KIT

|                       |       |
|-----------------------|-------|
| STANDARD RANGE        | 80 mm |
| MIN ROPE DIAMETER     | 40 mm |
| NUMBER OF BUSHING KIT | 2     |

## INSTRUMENT CHARACTERISTICS

|                                |  |
|--------------------------------|--|
| FIELD SOURCE                   | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                    | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                    | LF; LMA (on request)                               |
| SIGNAL ACCURACY                | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 8 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 170-130-110



AMC\_ROPE 170-130-110 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 90 to 170 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- digitally acquired LF & LMA Signal;
- Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |  |
|--|--|
| WEIGHT                                   | 200 kg   |
| DIMENSIONS                               | 985 x 550 x 520 cm                               |
| IP                                       | 66   |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1  |
| ENCODER & CENTERING SYSTEM               | Included   |
| CERTIFIABLE UNDER THE EN12927            | Yes, up to 120 mm (maximum diameter certifiable) |

## SENSORS KIT

|                       |                                 |
|-----------------------|---------------------------------|
| STANDARD RANGE        | 170 – 130 – 110 mm              |
| MIN ROPE DIAMETER     | 90 mm                           |
| NUMBER OF BUSHING KIT | Depending on the upper diameter |

## INSTRUMENT CHARACTERISTICS

|                             |  |
|-----------------------------|--|
| FIELD SOURCE                | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                 | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                 | LF; LMA (on request)                               |
| SIGNAL ACCURACY             | In accordance with EN12927 & ASTM E1571            |
| TEST SPEED MAX 0,05 – 8 m/s | Standard range, speed higher than 8 m/s on request |

# Permanent Installation System

A permanent installation ensures a 24/7 monitoring. The device will be placed in the most stable position of the lifting/transporting machine. A continuous monitoring will prevent interruptions in the productive process, saving both time and money.

Different options available for the customer:

- the remote control (IOT) will provide the final customer a constant rope monitoring with a threshold alarm;
- an alert based on pre-set thresholds (defined with the customer) will report rope status.

**Example:**

1<sup>st</sup> threshold: Rope is ok = green

2<sup>nd</sup> threshold: Call maintenance for a deeper inspection = yellow

3<sup>rd</sup> threshold: Stop the plant, dangerous situation = red



# Cableways

In this sector MRT is usually requested and, in some Countries, mandatory. Safety is the main concern and being aware of the actual conditions of the ropes is really important.

The MRT application is not limited to internal damages, but also for external wires. Furthermore, the cableway sector is the first environment in which specific standards for the MRT inspection have been developed.

These standards, such as the EN12927, now applies to different fields.



→ [WATCH THE VIDEO](#)

# OPEN



AMC\_OPEN special device, able to perform Non-Destructive-Tests on hauling ropes with diameter ranging from 30 to 80 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                       |
|--|-----------------------|
| WEIGHT                                   | Depending on the size |
| DIMENSIONS                               | Depending on the size |
| IP                                       | 66                    |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1                     |
| ENCODER & CENTERING SYSTEM               | Included              |
| CERTIFIABLE UNDER THE EN12927            | Yes                   |

## SENSORS KIT

|  |                       |
|--|-----------------------|
| STANDARD RANGE                           | TBD with the customer |
| MIN ROPE DIAMETER (WITH A REDUCTION KIT) | TBD with the customer |
| NUMBER OF REDUCTION KIT                  | TBD with the customer |

## INSTRUMENT CHARACTERISTICS

|                             |  |
|-----------------------------|--|
| FIELD SOURCE                | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                 | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                 | LF   |
| SIGNAL ACCURACY             | In accordance with EN12927                         |
| TEST SPEED MAX 0,02 – 6 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 22



Device able to perform Non-Destructive-Test on wire ropes with diameter ranging from 6 to 22 mm.

The device works only on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

|  |  |
|--|--|
| WEIGHT                                   | 8 kg   |
| DIMENSIONS                               | 30 x 30 x 20 cm                                  |
| IP                                       | 66   |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1  |
| ENCODER & CENTERING SYSTEM               | On request (suggested for cableways and zipline) |
| CERTIFIABLE UNDER THE EN12927            | Yes  |

## SENSORS KIT

|  |            |
|--|------------|
| STANDARD RANGE                           | 22 – 14 mm |
| MIN ROPE DIAMETER (WITH A REDUCTION KIT) | 6 mm       |
| NUMBER OF REDUCTION KIT                  | 1          |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 28



Device able to perform Non-Destructive-Test on wire ropes with diameter ranging from 6 to 28 mm.

The device works only on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

|  |  |
|--|--|
| WEIGHT                                   | 10 kg  |
| DIMENSIONS                               | 40 x 40 x 20 cm                                  |
| IP                                       | 66   |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1  |
| ENCODER & CENTERING SYSTEM               | On request (suggested for cableways and zipline) |
| CERTIFIABLE UNDER THE EN12927            | Yes  |

## SENSORS KIT

|  |            |
|--|------------|
| STANDARD RANGE                           | 28 – 18 mm |
| MIN ROPE DIAMETER (WITH A REDUCTION KIT) | 6 mm       |
| NUMBER OF REDUCTION KIT                  | 2          |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 40



AMC\_ROPE 40 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 22 to 40 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 20 kg           |
| DIMENSIONS                               | 46 x 28 x 12 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

## SENSORS KIT

|                       |       |
|-----------------------|-------|
| STANDARD RANGE        | 40 mm |
| MIN ROPE DIAMETER     | 20 mm |
| NUMBER OF BUSHING KIT | 2     |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 30 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 65



AMC\_ROPE 65 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 20 to 65 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 32 kg           |
| DIMENSIONS                               | 75 x 55 x 45 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

## SENSORS KIT

|                       |            |
|-----------------------|------------|
| STANDARD RANGE        | 65 – 40 mm |
| MIN ROPE DIAMETER     | 20 mm      |
| NUMBER OF BUSHING KIT | 2          |

## INSTRUMENT CHARACTERISTICS

|                                 |  |
|---------------------------------|--|
| FIELD SOURCE                    | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                     | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                     | LF; LMA (on request)                               |
| SIGNAL ACCURACY                 | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 10 m/s | Standard range, speed higher than 8 m/s on request |

# ROPE 80



AMC\_ROPE 80 device, able to perform Non-Destructive-Tests on wire ropes with diameter ranging from 60 to 80 mm. The device works on ferromagnetic ropes.

The system allows to measure the LF & LMA Signal, detecting internal and external flaws, such as broken wires, corrosions, wear and fretting fatigue.

Main characteristics of our device are:

- digitally acquired LF & LMA Signal;
- device internal Rope Centering System (mechanically guided by wheels) that improves signal quality and friction reduction in the bushings;
- presence of a fully integrated Encoder system that localizes the flaw.

|  |                 |
|--|-----------------|
| WEIGHT                                   | 55 kg           |
| DIMENSIONS                               | 60 x 32 x 40 cm |
| IP                                       | 66              |
| NUMBER OF ROPES CHECKED AT THE SAME TIME | 1               |
| ENCODER & CENTERING SYSTEM               | Included        |
| CERTIFIABLE UNDER THE EN12927            | Yes             |

## SENSORS KIT

|                       |       |
|-----------------------|-------|
| STANDARD RANGE        | 80 mm |
| MIN ROPE DIAMETER     | 40 mm |
| NUMBER OF BUSHING KIT | 2     |

## INSTRUMENT CHARACTERISTICS

|                                |  |
|--------------------------------|--|
| FIELD SOURCE                   | Permanent magnets (NdFeB)                          |
| SENSOR TYPE                    | Coils; Hall Effect Sensors                         |
| SIGNAL TYPE                    | LF; LMA (on request)                               |
| SIGNAL ACCURACY                | In accordance with EN12927                         |
| TEST SPEED MAX<br>0,02 – 8 m/s | Standard range, speed higher than 8 m/s on request |

# Custom



Design customization is increasingly demanded in order to avoid standard and interface issues.

The technical maturity of the magneto-inductive methodology (60 years) and its inspection adaptability to any ferromagnetic materials create the best conditions for customization. The magneto-inductive method has been used in different sectors and applications, cableways, cranes, belt conveyors, elevators and pipes, granting the technicians an exhaustive vision of the object. The magnetoinductive method, thanks to its accuracy and reliability, it is claimed by: EN12927 (Cableway); ISO4309 (Heavy Lifting); UNI 1607593 (Elevator Technical Project).

To provide you a customized magneto-inductive device we need to know:

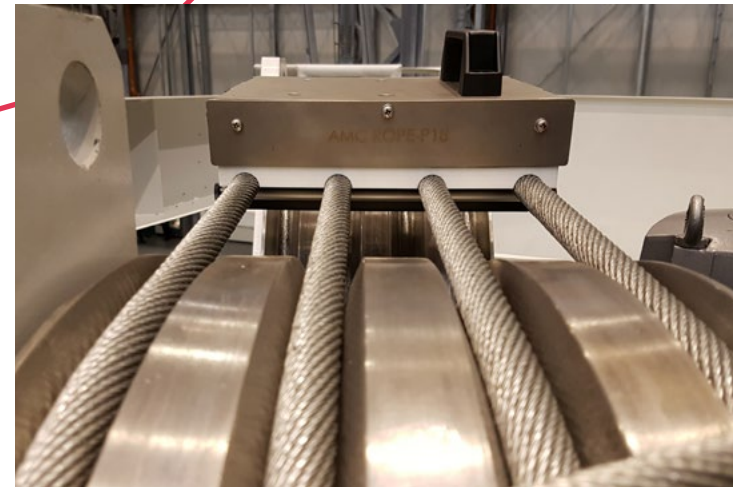
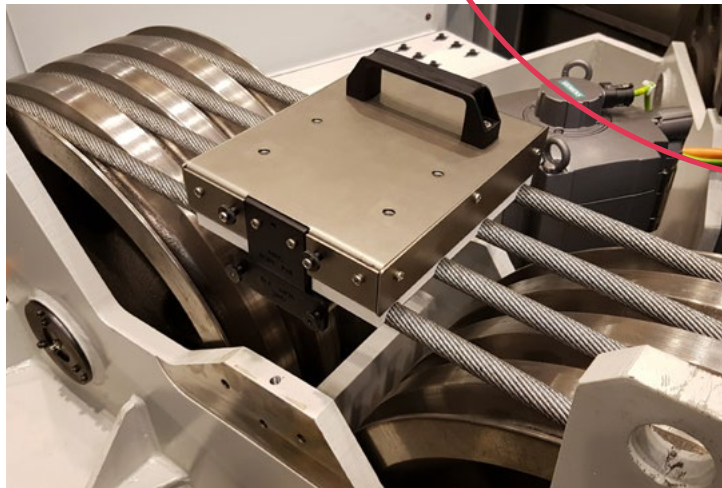
- application/inspection Environment;
- permanent/mobile configuration;
- numbers of ropes to inspect at the same time;
- rope speed;
- rope diameters;
- IP desired.

# Example of Permanent Industrial Equipment

The ropes of an automatic plant required continuous control to avoid system failure resulting in service interruptions and risks for personnel.

We developed a device suitable to monitor 4 ropes with a diameter of 18 mm and to intervene directly on the electronics of the machine in case of exceeding pre-set limits (following an accurate characterization of the ropes).

The device operates 24/7 and guarantees full compliance with safety conditions, promoting system efficiency.



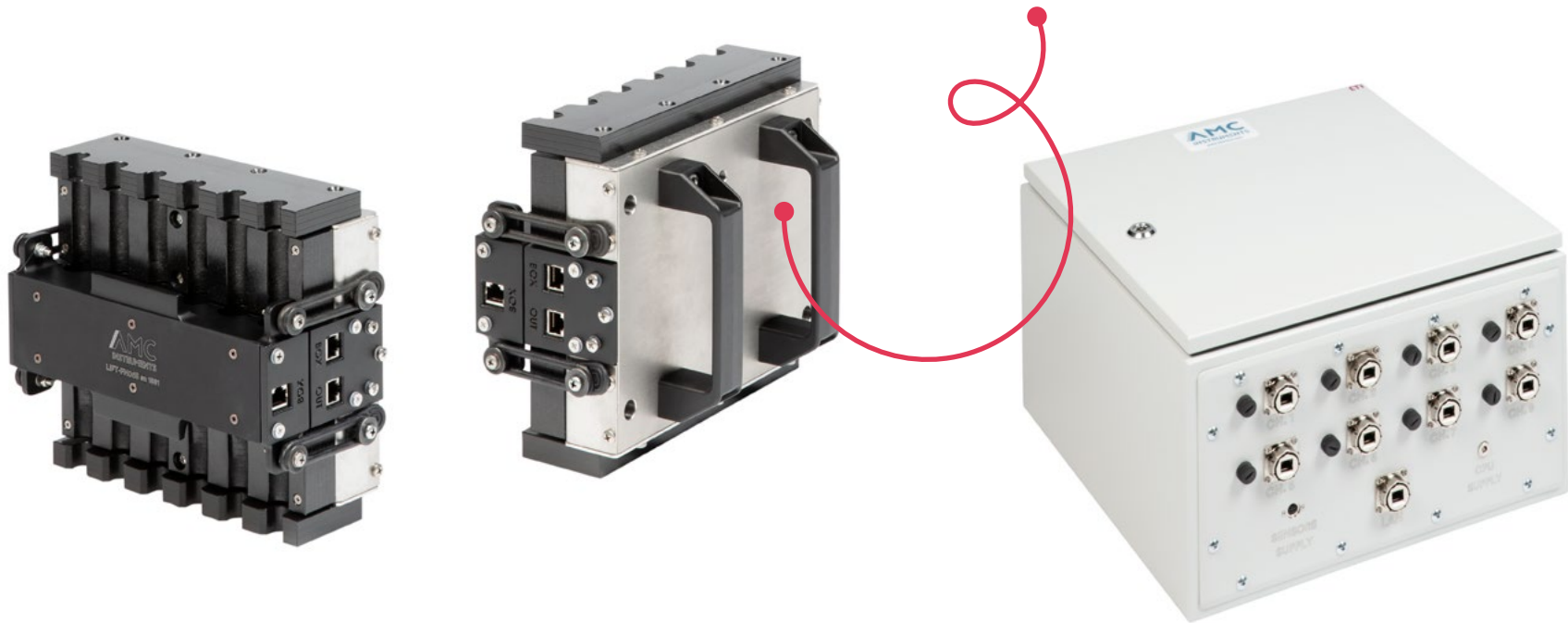
# Example of Permanent Elevator Installation

A complex system for the continuous monitoring of the ropes of 8 lifts was developed for an important multinational corporation.

Each lift was equipped with a special measuring head capable to detect the presence of flaws on six ropes simultaneously.

The relative acquisition system is able to acquire up to a 48 channels and can be interrogated remotely. A customer-friendly dashboard allows clear and simple indication of the state of the ropes.

In this way, the safety of passengers on the lifts is guaranteed and maintenance management of the systems is considerably improved.



# Elevator Market



The application of MRT to elevators is quite new. AMC started in early 2000s to develop such devices and the technology is no longer just a 'testing application', but a recognized inspection system.

In this industry the safety is really important because an elevator machine moves people from one floor to another and millions of runs are performed every day.

A failure in one or more ropes can cause injuries and other issues (stop of the plant, damages, etc.).

Visual inspection is extremely difficult due to the tight spaces and to the time required.

Maintenance process can benefit a lot from MRT in terms of time saving.

The elevator market is characterized by different types of suspension elements, such as steel wire ropes, coated ropes and belts. An elevator plant is not always the appropriate place to perform a visual inspection, it is usually too dark and tight.

AMC INSTRUMENTS developed special tools to perform an accurate magnetoinductive inspection on all the mentioned suspension elements, also on belts and coated ropes where visual inspection is practically impossible.

These solutions allow to save time as well. Wire ropes on a fifth floors elevator can be inspected in less than 2 minutes (test setting included) increasing tenfold the accuracy of a visual inspection performed in a dark and small environment.

# LIFT LC04+



Device able to perform non destructive test on multiple ropes, up to 4 in the same inspection.

The device works only on ferromagnetic ropes and the standard range diameter goes from 6 mm to 13 mm.

The system allows to measure only the LF Signal, detecting internal and external defects, such as broken wires, corrosions, wear and fatigue breaks.

|                                 |  |
|---------------------------------|--|
| NUMBER OF ROPES TO BE INSPECTED | 2 – 8  |
| ROPES TYPOLOGY                  | Steel Wire Ropes;<br>Coated Ropes                |
| RANGE DIAMETER                  | 8 – 13 mm<br>Range<br>customizable<br>on request |
| WEIGHT                          | 2,8 kg   |
| DIMENSIONS                      | 13 x 17 x 12 cm                                  |
| TYPE OF SIGNAL                  | LF   |
| TYPE OF DEVICE                  | Portable device                                  |
| ACCESSORIES                     | Professional case                                |
| OPERATING TEMPERATURE           | -20°C – +50°C                                    |

# BELT LC



Device able to perform non destructive tests on a single belt with a maximum width of 30 mm.

The device works only on belts with ferromagnetic ropes in their cores.

The system allows to measure only the LF Signal, detecting internal and external defects, such as broken wires, corrosions, wear and fatigue breaks.

|                                 |   |
|---------------------------------|---|
| NUMBER OF BELTS TO BE INSPECTED | 1   |
| BELT WIDTH RANGE                | up to 50 mm<br>Belt width customizable on request |
| WEIGHT                          | 2,5 kg  |
| DIMENSIONS                      | 13 × 17 × 10 cm                                   |
| TYPE OF SIGNAL                  | LF  |
| TYPE OF DEVICE                  | Portable device                                   |
| ACCESSORIES                     | Professional case                                 |
| OPERATING TEMPERATURE           | -20°C – +50°C                                     |

# Acquisition System

This part of the MRT equipment is composed of a data processor and a software for the interpretation.

The acquisition system transforms the sensor's inputs in a signal on a graph, allowing the user to acquire, save and perform interpretation.



# IAS-H



The IAS-H is an acquisition system equipped with a solid suitcase and a PC for high operations even in complex environments.

|  |                 |
|--|-----------------|
| SAMPLING FREQUENCY FOR CHANNEL   | Up to 5 kS/s    |
| INDICATIVE IAS-H BATTERY LIFE IN CONTINUOUS OPERATION                            | > 6 hours       |
| BATTERY CHARGING   | 230 Vac – 50 Hz |
| WEIGHT   | 6 kg            |
| DIMENSIONS   | 50 x 40 x 20 cm |
| DIRECT CONNECTION WITH PROBE, COMPACT SIZE, PORTABLE; USE RECHARGEABLE BATTERIES | Yes             |
| REAL TIME  | Yes             |
| AVAILABLE STORAGE  | Up to 1 TB      |
| CONNECTING CABLE WITH THE DETECTOR   | 20 m            |

## OTHER CHARACTERISTICS

|                       |               |
|-----------------------|---------------|
| OPERATING TEMPERATURE | -20°C – +50°C |
| OPERATING SYSTEM      | Windows       |

# IAS-T

A highly portable acquisition system, specifically designed for operation in height.

|  |  |
|--|--|
| SAMPLING FREQUENCY FOR CHANNEL   | 5 kS/s<br>(up to 20 kS/s customizable) |
| INDICATIVE IAS-T BATTERY LIFE IN CONTINUOUS OPERATION                            | > 6 hours                              |
| BATTERY CHARGING   | 230 Vac – 50 Hz                        |
| WEIGHT   | 3 kg                                   |
| DIMENSIONS   | 33 x 22 x 10 cm                        |
| DIRECT CONNECTION WITH PROBE, COMPACT SIZE, PORTABLE; USE RECHARGEABLE BATTERIES | Yes                                    |
| REAL TIME  | Yes                                    |
| AVAILABLE STORAGE  | 128 Gb                                 |
| CONNECTING CABLE WITH THE DETECTOR   | 20 m                                   |

## OTHER CHARACTERISTICS

|                       |               |
|-----------------------|---------------|
| OPERATING TEMPERATURE | -20°C – +50°C |
| OPERATING SYSTEM      | Windows       |



# DLH



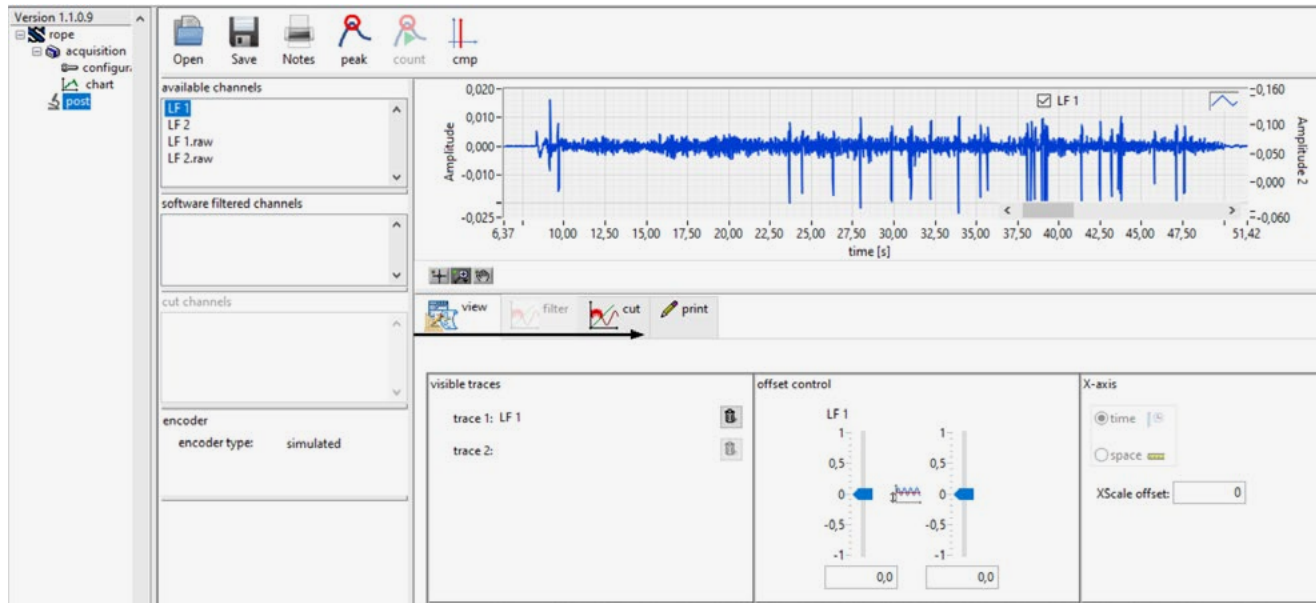
A practical data logger capable of acquiring up to 8 channels at the same time. Specifically designed for the elevator sector.

|  |  |
|--|--|
| SAMPLING FREQUENCY FOR CHANNEL   | 5 kS/s<br>(up to 20 kS/s customizable) |
| INDICATIVE DLH BATTERY LIFE IN CONTINUOUS OPERATION                              | > 2.5 hours                            |
| BATTERY TYPE   | 4x 1.5 V<br>(AA alkaline)              |
| WEIGHT   | < 1 kg                                 |
| DIMENSIONS   | 23 x 12 x 4 cm                         |
| DIRECT CONNECTION WITH PROBE, COMPACT SIZE, PORTABLE; USE RECHARGEABLE BATTERIES | Yes                                    |
| REAL TIME  | No                                     |
| AVAILABLE STORAGE  | 16 GB on SD card                       |
| CONNECTING CABLE WITH THE DETECTOR   | 10 m                                   |

## OTHER CHARACTERISTICS

|                       |               |
|-----------------------|---------------|
| OPERATING TEMPERATURE | -20°C – +50°C |
|-----------------------|---------------|

# SOFTWARE



- Real Time.
- Collecting and viewing data on the computer while testing on the cable (data can be viewed directly on the device or computer).
- Adjusting the distance measuring range and the amplitude range to suit different test requirements.
- Ability to choose the channel while entering data and adjust its settings.
- Connecting and downloading data from the display controller to the computer for analysis.
- Reviewing chart, LMA (on request), LF, distance signals for cable fault analysis and assessment.
- Zooming and stretching the signal graphs for analysis.
- Comparing signal charts from different tests.
- Post analysis: combine two signal charts into one common chart.
- Set of evaluation, acceptance or rejection criteria.
- Printing final chart.
- Exporting data.

# Find out more about Magneto-Inductive technology

## IOT IN THE HEAVY LIFTING SECTOR

→ [WATCH THE VIDEO](#)

## THE IMPORTANCE OF INTERPRETATION

→ [WATCH THE VIDEO](#)

## 3 STEPS TO DEVELOP CUSTOMIZED MAGNETO-INDUCTIVE EQUIPMENT

→ [WATCH THE VIDEO](#)

## HIGH MAGNETIZATION AND LOW MAGNETIZATION

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## HOW IS AN MRT EQUIPMENT MADE?

→ [WATCH THE VIDEO](#)

## 7 FUNDAMENTAL POINTS TO CORRECTLY CHOOSE AN MRT DEVICE

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## THE EN12927

→ [WATCH THE VIDEO](#)

## TO LF OR TO LMA THAT IS THE QUESTION!

→ [WATCH THE VIDEO](#)

## ROPE, INSPECTION AND ISO4309

→ [WATCH THE VIDEO](#)

## VISUAL INSPECTION AND MRT

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**We trust in technology.  
We trust in safety.**



**Operational headquarters:**

Via Pietro Nenni, 79/E  
10036 Settimo Torinese (TO), Italy

**Registered office:**

Corso Giacomo Matteotti, 36  
10121 Torino (TO), Italy

T. +39 011 037 8820 – +39 011 037 8821

F. +39 011 1983 5584

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