



Pursuant to section 12 of the Weights and Measures Act 1985 Certificate No 3116 Revision 1

Issued by:

NMO

In accordance with the provisions of section 12 of the Weights and Measures Act 1985, the Secretary of State for Business, Energy & Industrial Strategy has issued this UK national type-approval certificate to:

**Motus Weighing AB
Viktoriagatan 22
SE-411 25 Göteborg
Sweden**

And hereby certifies as suitable for use for trade the following pattern of an automatic road weighbridge for measuring the weight of road vehicles in motion, and designated MHS.

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

Under the provisions of section 12(5) of the said Act, this certificate is subject to the conditions described in the descriptive annex.

Note: This certificate relates to the suitability of the equipment for use for trade only in respect of its metrological characteristics. It does not constitute or imply any guarantee as to the safety of the equipment in use for trade or otherwise.

Issue Date: 11 December 2019

Valid Until: 30 May 2029

**Marek Bokota
Technical Manager**

For and on behalf of the Head of Technical Services

CONTENTS

CERTIFICATION NO 3116

| | |
|-----------|--|
| 1 | CHARACTERISTICS OF THE INSTRUMENT |
| 2 | CONSTRUCTION |
| 3 | COMPATIBLE STATIC WEIGHBRIDGE |
| 4 | DEVICES |
| 5 | RATED OPERATING CONDITIONS |
| 6 | SOFTWARE |
| 7 | INTERFACES |
| 8 | LEGENDS AND MARKINGS |
| 9 | SEALING |
| 10 | AUTHORISED ALTERNATIVES |
| 11 | CERTIFICATE HISTORY |

ILLUSTRATIONS

| | |
|-----------------|----------------------------|
| Figure 1 | MHS electronics box |
| Figure 2 | Example printout |
| Figure 3 | Sealing measures |

CERTIFICATION NO 3116

Descriptive Annex

1 CHARACTERISTICS OF THE INSTRUMENT

The Motus Weighing AB MHS comprises the MHS electronics box with integral display and printer connected to a compatible static weighbridge to form an automatic instrument for weighing road vehicles in motion and measuring axle loads.

The instrument shall only be used for the determination of gross vehicle weight.

An interlock prevents weights being stored or transmitted if the maximum operating speed is exceeded; if Max is exceeded; or if partial weighing is below Min.

The measurement data is printed automatically when the weighing operation is complete. The data storage device shall not be used for legal purposes.

The weighing system shall be permanently installed according to manufacturer's guidelines in a controlled weighing area, and shall adhere to the installation requirements of OIML R134:2006(E).

The system is not suitable for determining the mass of vehicles carrying liquid products.

2 CONSTRUCTION

2.1 Electrical

The MHS electronics box (Figure 1) comprises a 2 x 16 dot matrix display, 12 x buttons, (optional) printer, and internal electronics. Measurement data may be stored on the internal PCB. The MHS electronics box must be connected to a compatible static weighbridge via its junction box and indicator.

2.2 Mechanical

The weigh zone comprises one load receptor with aprons on both sides. The load receptor is situated in a pit with sufficient drainage and provision for heating if appropriate. The aprons must be sufficiently rigid and durable, and long enough to provide the road surface characteristics needed to achieve the required level of accuracy. A lateral guide is not mandatory provided the relevant installation requirements are complied with.

Adequate surge/lightning protection must be part of the installation.

3 COMPATIBLE STATIC WEIGHBRIDGE

3.1 The MHS electronics box may be connected to any compatible static weighbridge, with an OIML R76:2006(E) certificate or EU Type-examination certificate, that meets the following requirements.

- Weighing platform minimum length 5 metres
- Weighing platform is a single or multiple rigid cuboid supported by a load cell at each of

- the corners of the cuboids. Multiple cuboids must be linked to form a single rigid platform
- The indicator can export live weighing data via an approved interface listed in this certificate, at a refresh rate ≥ 20 Hz
- $e \leq d$ of complete MHS system
- $n \geq$ number of scale intervals of complete MHS system
- $\text{Max} \geq$ Max of complete MHS system

Note: For the purposes of this certificate covering dynamic weighing only, the attached static weighbridge need not be initially verified.

3.2 The complete MHS system may exceed the specifications (lower scale interval, higher number of scale intervals, higher maximum capacity) of the static weighbridge OIML R76 certificate or EU Type-examination certificate provided that:

- the indicator with an R76:2006(E) certificate or a Parts (Test) certificate* + digital or analogue load cells with an R60:2017(E) certificate or a Parts (Test) certificate*; or
- the indicator with an R76:2006(E) certificate or a Parts (Test) certificate* + analogue load cells with an R60:2000(E) certificate or a Parts (Test) certificate*

meet the compatibility of modules in R76:2006(E) for the specifications of the complete MHS system.

*Parts (Test) certificate (EN45501) issued by a Notified Body responsible for type examination under Directive 2014/31/EU.

- The certificate must contain the necessary data required for the manufacturer's declaration of compatibility of modules.
- The compatibility must be established by the manufacturer by means of compatibility of modules calculation at the time of verification.

4 DEVICES

- Determination of total vehicle mass
- Determination of single-axle loads
- Determination of axle-group loads
- Determination of average vehicle speed
- Determination of average acceleration
- Single or bi-directional direction of travel
- Vehicle recognition device (automatic capture, no operator required)
- Integral data storage device (not for legal purposes)
- Printing
- Secure data transmission to external devices

5 RATED OPERATING CONDITIONS

| | | | |
|--|----------------|---------------|---------------|
| Accuracy class – Vehicle mass | ≥ 0.2 | ≥ 1 | ≥ 0.2 |
| Accuracy class – Single axle | - | $\geq D$ | - |
| Accuracy class – Axle groups | - | - | $\geq B$ |
| Maximum operating speed $v_{\text{max}} =$ | ≤ 13 km/h | ≤ 8 km/h | ≤ 8 km/h |

| | | |
|-------------------------------------|-------------|----------------------------------|
| Minimum operating speed | $V_{min} =$ | ≥ 3 km/h |
| Maximum capacity | Max = | dependent on configuration |
| Minimum capacity | Min = | dependent on configuration |
| Scale interval | d = | ≥ 5 kg |
| Maximum number of axles per vehicle | $A_{max} =$ | 120 |
| Maximum transit speed | | 30 km/h |
| Direction of weighing | | Either, or both directions |
| Power supply | | 110 – 240 VAC, 50/60 Hz |
| Temperature range | | dependent on NAWI specifications |

Max, Min, V_{max} , V_{min} , and direction of weighing achieved at initial verification must be protected parameters.

6 SOFTWARE

The MHS software is provided as compiled executable code and runs on the motherboard within the MHS electronics box. The software cannot be modified via the user interface.

Any changes to the software will cause the software identification to change. The software identification is shown below for verification purposes:

Software identification: Motus HS 1.0.XY

Where X and Y may be any alphanumeric value and denote legally non-relevant changes.

The current software identification is inscribed on the MHS electronics box near to the rating plate and is displayed at boot-up.

Any changes to legally relevant parameters require password access and will cause a non-resettable event counter to increment. The current value of the event counter is shown by pressing “M” (menu) repeatedly until “Event Counter” is displayed, then pressing “OK”.

7 PERIPHERALS AND INTERFACES

7.1 Peripherals

The instrument may be connected to any peripheral device that has been issued with Parts Certificate by a Notified Body responsible for Module B under Directive 2014/32/EU and bears the CE marking of conformity to the relevant directives; or

A peripheral device without a Parts certificate may be connected under the following conditions:

- it bears the CE marking for conformity to the EMC Directive;
- it is not capable of transmitting any data or instruction into the measuring instrument, other than to release a printout, checking for correct data transmission or validation;
- it prints measurement results and other data as received from the measuring instrument without any modification or further processing; and
- it complies with the applicable requirements of Paragraph 8.1 of Annex I.

7.2 Interfaces

The instrument may be fitted with the following protected interfaces:

- RS232/485
- Ethernet
- USB

7.3 Printing

The instrument shall produce a printout automatically without operator intervention. the printout shall include at least the following information:

- Total vehicle mass with unit
- Single axle and axle groups weights with unit
- Date and time
- Operating speed or warning message if applicable
- Direction of weighing

Note: Printing of single axle weights is only permitted when not part of axle groups, axle group weights must also be printed when applicable (Figure 2a). Printing of weights of single axle - where part of axle groups - is only permitted if the weights are clearly designated as "Not verified" or similar (Figure 2b).

8 LEGENDS AND MARKINGS

The following inscriptions are on a data plate affixed to the MHS electronics box. The data plate cannot be removed without being destroyed.

Manufacturer's mark or name and address
Designation
Serial number
Direction of weighing
Power supply
Temperature range
Accuracy class (total vehicle mass)
Maximum capacity (Max)
Minimum capacity (Min)
Scale interval (d)
Maximum operating speed (V_{max})
Minimum operating speed (V_{min})
Maximum number of axles (A_{max})
Software version

9 SEALING

9.1 The static weighbridge load cells, junction box and indicator must be physically sealed to the MHS electronics via tamper evident stickers or lead and wire type seals. The motherboard within the MHS electronics box must be physically secured within the box via tamper evident stickers or lead and wire type seals (Figure 3).

9.2 The value of the event counter described under Software must be written on a tamper evident label on or near the rating plate at verification.

10 AUTHORIZED ALTERNATIVES

There are currently no authorised alternatives.

11 CERTIFICATE HISTORY

| ISSUE NO. | DATE | DESCRIPTION |
|-----------------------------------|------------------|--|
| Certificate No 3116 | 31 May 2019 | Certificate first issued. |
| Certificate No 3116 Revision 1 | 11 December 2019 | <p>Certificate number corrected from 3030 to 3116 in CERTIFICATE HISTORY, line 2 above.</p> <p>Section 2.2: wording modified to specify that lateral guides are not mandatory.</p> <p>Section 3.1: "Platform length 5 to 7 m" changed to "minimum length 5 m". Multiple cuboid platform added.</p> <p>Section 4: "not for legal purposes" deleted for axle weights and axle groups weights.</p> <p>Section 5: Vmax changed to 13 km/h for vehicle mass, accuracy classes for single axle and axle groups added. Temperature range dependent on NAWI specifications.</p> <p>Section 7.3: "axle weights are not verified" replaced with "single axle and axle groups weights with unit". Note added, with inclusion of Figure 2a (Figure 2 becomes 2b).</p> |



Figure 1 MHS electronics box

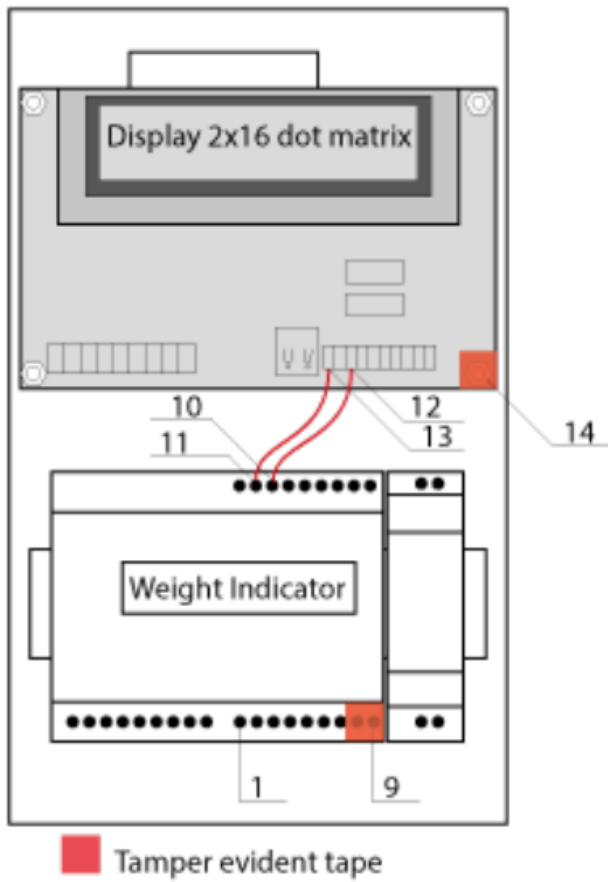


Fig 2a



Fig 2b

Figure 2 Example printout



| | |
|----|---|
| 1 | I OUT+ |
| 2 | V OUT+ |
| 3 | OUT- |
| 4 | EXC- |
| 5 | EXC+ |
| 6 | SENSE+ |
| 7 | SENSE- |
| 8 | SIG- |
| 9 | SIG+ |
| 10 | GND |
| 11 | TX |
| 12 | GND |
| 13 | RX |
| 14 | 4 x screw-nuts securing the Motherboard |

Figure 3 Sealing measures