NMO	**OIML** Certification System

OIML Member State United Kingdom of Great Britain and Northern Ireland	**OIML Certificate No.** **R21/2007-B-GB1-19.03**

OIML CERTIFICATE ISSUED UNDER SCHEME [B]

OIML Issuing Authority	**NMO** **Stanton Avenue** **Teddington** **TW11 0JZ** **United Kingdom**
Person responsible:	**Mannie Panesar – Head of Technical Services**
Applicant	**ITALTAX SRL** **Via dell'Industria, 16** **62017 Porto Recanati (MC)** **Italy**
Manufacturer	**The applicant**
Identification of the certified type	**M1 PLUS** *(the detailed characteristics are defined in the Descriptive Annex)*

This OIML Certificate attests the conformity of the above identified type (represented by the sample(s) identified in the OIML type evaluation report) with the requirements of the following Recommendation of the International Organization of Legal Metrology (OIML):

OIML R21 – Edition 2007(E)

Issue date: 19 March 2019

The OIML Issuing Authority

G Stones
Technical Manager
For and on behalf of the Head of Technical Services

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NMO is part of the Office for Product Safety and Standards within the Department for Business, Energy & Industrial Strategy

This OIML Certificate relates only to metrological and technical characteristics of the type of measuring instrument covered by the relevant OIML Recommendation identified above.

This OIML Certificate does not bestow any form of legal international approval.

The conformity was established by the results of tests and examinations provided in the associated OIML type evaluation report:

No. P02584-2 dated 19 March 2019 that includes 16 pages.

The technical documentation relating to the identified type is contained in documentation file:

No. P02584-D2 dated 19 March 2019.

OIML Certificate History

Revision No.	Date	Description of the modification
0	19 March 2019	OIML Certificate first issued.
-	-	-

No revisions have been issued.

Important note:
Apart from the mention of the Certificate's reference number and the name of the OIML Member State in which the Certificate is issued, partial quotation of the Certificate and of the associated OIML type evaluation report(s) is not permitted, although either may be reproduced in full.

DESCRIPTIVE ANNEX

Characteristics of the instrument:

The pattern is a taximeter designated the M1 PLUS, designed to be installed in a road vehicle for the calculation of fares. The fares are calculated based on measurement of distance and time; the instrument operates in calculation modes S (single application of tariff) or D (double application of tariff). The instrument is powered via the vehicle battery.

The distance measuring device (transducer) is not covered by this certificate.

Model variants and designation:

Construction:

The instrument is incorporated in a vehicle rear-view mirror and comprises a PCB housed within a plastic enclosure, five push buttons, two LED displays, a mirror, a tariff LED and a status LED behind the mirror.

The plastic enclosure consists of front and rear parts held together with screws, with removable parts preventing access to the PCB, communication ports and test connector.

The sealing points are available as hardware security measure. The verification seal does not provide any mechanical sealing but may be used to identify periodic testing of the instrument when required by local or national regulations (e.g. London).

Devices:

- Display check
- Calculation modes S or D
- Fare calculation (initial fare, fare increments, extras)
- Display of rate, mode (For Hire, Hired, Stopped) and fare (actual fare and total fare with extras)
- Display of distance and time for the journey
- Loading of tariffs and software (via sealed interface)
- Remote download of tariff and Firmware ("Over The Air")
- Real time clock
- Long-term totalisers (non-resettable)
- Display of parameters and software information (read-only)
- Test connector

Interfaces:

- 2 X RS232
- Passenger Sensor
- External Lights Input
- External Lights Power Output
- Odometer Input
- Digitax Printers
- Optional CAN Bus input
- Optional Bluetooth serial port module (SPP)

- Test Connector
- Service Programming keys

Technical data:

Power supply	9 to 16 VDC (12 V nominal)
Taximeter constant k	500 to 65,535 pulses/km
Maximum speed	200 km/h
Pulse voltage amplitude (low/high)	0 - 0.3 VDC / 5 -12 V DC
Pulse frequency	≤ 1 kHz
Minimum pulse width	50 µs
Electromagnetic environment	E3
Mechanical environment	M3
Climatic environment	-25°C to +70 °C
	Non-condensing (closed)

Software:

The legally relevant software is held in the firmware and is unambiguously identified by its release name and CRC-16 checksum value.

The firmware release name and CRC versions programmed in the taximeter can be displayed as follows:

- From For Hire Position press at the same time K2+K3+K4
- Wait few seconds
- The left display will show the CRC Firmware number.
- The right display will show the Country identification with 3 letters and 2 numbers.

The software identification shall be as follows:

Software release name	CRC (checksum value)	Country / Language
M1C01	57580	Generic / Programmable

Software download is possible via the Service programming key, which is protected by the mechanical seal described in the Sections Construction and Sealing, or remote online Over The Air.

Tariff:

The instrument allows the remote download of tariff and Firmware ("Over The Air", OTA), without breaking the mechanical seal.

In order to be able to download the tariff and the firmware OTA, the taximeter has to be en-rolled to the OTA Server. This is a manual procedure that is started from the taximeter, using a dedicated ID memory key, and then confirmed from the OTA Server.

Taximeter communication with the OTA server is protected using SSL and uses both client and server certificates for authentication. Access to the OTA Server Web Interface is only allowed using HTTPS and registered security tokens for client and user identification and authentication.

Using the OTA Server Web Interface, it is possible to load a new tariff or firmware into the server, and then download them to all the registered taximeters or only to a group of them. Each taximeter periodically polls the OTA server, and if a new tariff or firmware is found then it is automatically downloaded, authenticated and programmed into the taximeter itself, without the need for breaking the mechanical seal.

The tariff is protected by a CRC-16 checksum, the checksum value can be displayed on the taximeter by pressing K1+K4 keys in For Hire status: the taximeter will start the display self-check procedure and at the end will show the tariff CRC in its main display and the firmware name in the secondary display.

Peripheral devices

The following peripheral devices may be connected to the instrument:

- Magnetic Card reader
- Dallas 1-Wire Net
- Optional T.I.M. Reader module (for German fiscal regulation)

Sealing:

The taximeter is fitted with a programming sealing point preventing access to the metrological components and parameters.

Alternatives:

Having an alternative software with improved Remote Download of Tariff and Firmware ("Over The Air", OTA). This alternative firmware M1C02 is mandatory for the OTA function outside UK.

Software release name	CRC (checksum value)	Country / Language
M1C02	9805	Generic / Programmable

The following changes have been implemented based on M1C01 firmware in Section Software:

- Failed attempts of Remote Download of Tariff and Firmware are recorded in device's E-Seal

- The taximeter is able to synchronize its time with the one received from the OTA Server at every status poll. This feature allows adjusting the time for a maximum of 2 minutes, maximum once every 7 days. Time synchronization with the server is recorded to the device E-Seal, the same as manual time synchronization.

- Pressing K1+K4 keys in For Hire status, the taximeter will start the display self- check procedure and at the end will show the tariff CRC in its main display and the firmware name in the secondary display. Subsequently it can be shown a secondary Maintenance Checksum (MT checksum) which comprise not only the current tariff but also non-legally relevant parameters for OTA management.