

CERTIFIKÁT EÚ SKÚŠKY TYPU

EU – type examination certificate

Číslo dokumentu: **SK 11-MI001-SMU023** **Revízia 1**
Document number: *Revízia 1 nahrádza certifikát zo dňa 2. decembra 2011* *Revision 1*
Revision 1 replaces the certificate issued by December 2, 2011

V súlade s: **nariadením vlády Slovenskej republiky č. 145/2016 Z. z. o sprístupňovaní meradiel na trhu, ktorým sa preberá smernica Európskeho parlamentu a Rady 2014/32/EU o harmonizácii právnych predpisov členských štátov týkajúcich sa sprístupnenia meradiel na trhu**
In accordance with: *Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments, which implemented the Directive 2014/32/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments*

Žiadateľ/Výrobca: **Hydromess s.r.o.**
Issued to (Manufacturer): **Holandská 872/2, Štýrice, 639 00 Brno, Czech Republic**

Druh meradla: **Vodomer (MI-001)**
Type of instrument: **Water meter (MI-001)**

Označenie typu: **F401 ACQUAMAG**
Type designation:

Základné požiadavky: **príloha č. 1 a príloha č. 3 Vodomery (MI-001) k nariadeniu vlády SR č. 145/2016 Z. z.**
Essential requirements: **Annex No. I and Annex No. III Water meters (MI-001) to Government Ordinance of SR No. 145/2016 Coll.**

Platnosť do: **1. december 2021**
Valid until: **December 1, 2021**

Notifikovaná osoba: **Slovenský metrologický ústav 1781**
Notified body: **Slovak Institute of Metrology 1781**

Dátum vydania: **2. mája 2018**
Date of issue: **May 2, 2018**

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu. Certifikát vrátane prílohy má spolu 11 strán.
Essential characteristics, instrument description and approval conditions are set out in the appendix hereto, which forms the part of the certificate. The certificate including the appendix contains 11 pages.




Emanuel Godál
zástupca notifikovanej osoby
representative of notified body

Poznámka: Tento certifikát EÚ skúšky typu môže byť rozmnožovaný len celý a nezmenený. Bez podpisu a odtlačku pečiatky je neplatný.

Note: This EU-type examination certificate shall not be reproduced except in full. Certificates without signature and stamp are not valid.

History of the Certificate

Issue of the Certificate	Date	Modification
SK 11-MI001-SMU023, Revision 0	December 2, 2011	Initial certificate
SK 11-MI001-SMU023, Revision 1	May 2, 2018	Applicant/manufacture name change, new Q_3 and R range, correct body length for DN100, software revision

1 Instructions and standards used within assessment
1.1 Generally binding instructions

Meter type was examined in terms of request for given type provisions Government Ordinance of the Slovak Republic No. 145/2016 Coll. relating to the making available on the market of measuring instruments, which implemented the Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments as later amended (next Government Ordinance).

Requirements are set out in Annex No. 1 and Annex No. 3 Water Meters (MI-001) to Government Ordinance of SR No. 145/2016 Coll.

1.2 Harmonised standards and normative documents used

OIML R 49-1:2006	Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements
OIML R 49-2:2004	Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
EN 14154-1:2005+A2:2011	Water meters - Part 1: General requirements
EN 14154-2:2005+A2:2011	Water meters - Part 2: Installation and conditions of use
EN 14154-3:2005+A2:2011	Water meters - Part 3: Test methods and equipment

1.3 Other instructions used:

OIML R 49-2:2013	Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods
OIML R 49-3:2013	Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format
ISO 4064-1: 2017	Water meters for cold potable water and hot water. Part 1: Metrological and technical requirements
ISO 4064-2: 2017	Water meters for cold potable water and hot water. Part 2: Test methods
ISO 4064-5: 2017	Water meters for cold potable water and hot water. Part 5: Installation requirements



2 Type marking

Inductive flow meter – **F401 ACQUAMAG**

Meter is made in following subgroups:

Type of meter	Temperature class	Classes	Nominal Diameter
F401 ACQUAMAG	T50	M1 ¹⁾ B ²⁾ E1 ¹⁾	DN15 - DN1000

3 Description of measuring instrument

Meter name: Inductive flow meter

Type marking: F401 ACQUAMAG

Description of operating principle instrument design:

Inductive flow meter is intended for measuring of flow and delivered water quantity with a conductivity at least 5 μ S/cm.

Inductive flow meter (Picture No. 1) consists of:

- flow sensor and
- control unit

Inductive flow meter is intended for measuring reverse flow.



Picture No.1 Inductive flow meter F401 ACQUAMAG

¹ according to Government Ordinance of the Slovak Republic, Annex No. 1

² according to EN 14154-3:2005+A2 and OIML R 49-2:2004

3.1 Description of subgroups

Marking: F401 ACQUAMAG

DN: DN15-DN1000

It is manufactured in two versions in compact construction and in the so-called separated version where the electronic unit is interconnected with the sensor by a special cable.

3.2 Flow sensor

The structure of flow sensor is shown in the drawings according to item 3.5 of this Annex.

Flow sensor consists of measuring tube with an inner dielectric liner is hardened rubber or PTFE. Excitation coils are placed on measuring tube. Wires of excitation coils are routed together with electrodes into box placed on the flow sensor housing or routed through grommet by cable. Ending of flow sensor body is flanged according to figures in item 3.5 of this Annex.

3.3 Control unit

The control unit is shown in the drawings under item 3.5 of this Annex. It is electronic part of inductive flow meter, which generates excitation of flow sensor and processes its signal voltage. Central unit of measuring instrument is a microprocessor which processes the signals corresponding to flow. The signal is taken from 24-bit AD converter, it is mathematically evaluated and displayed on display and provided on data buses RS232, on current loop 4-20 mA and on frequency output. Following data are available: immediate flow rate, overall indicated volume and other parameters (current output, pulse output, change the user password, set the display units and volume flow). Calibration constants of flow are the result of calibration of each flow meter and they are located in indelible and unchangeable memory, which is protected with a seal.

The maximum permissible cable length between electronic part and flow sensor of an electromagnetic flow meter AcquaMAG, as defined in ISO 6817:1992 [8], shall be not more than 100 metres or not more than the value L expressed in metres according to the following formula, whichever is smaller:

$$L = (k \times c) / (f \times C)$$

where:

$k = 2 \times 10^{-5}$ m;

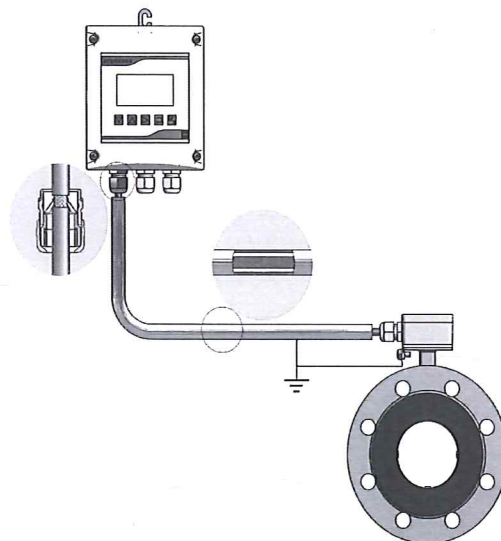
c is the conductivity of the water, in S/m;

f is the field frequency during the measuring cycle, in Hz; and

C is the effective cable capacitance per metre, in F/m.

The shielding of the connecting cable is to be connected to the protective conductor of the electronic unit case. It is secured by a metal entry intended for the environment of high demands to EMC. To provide higher resistance to electromagnetic disturbances, it is suitable to protect the link cable between the sensor and the electronic unit by a metal protective hose or tube connected to the earth potential.





Picture No.2 The shielding connecting cable

3.4 Principle of operation

Faraday law is used during flow measuring by inductive flow meter.. Electrically conductive fluid as a conductor in a magnetic field flows through the flow metering perpendicular direction to field lines of external magnets. Conductor length is given by distances of electrodes, which are located on opposite sides of the pipe. Induced voltage is scanned on the electrodes, and it is directly proportional to fluid velocity.

3.5 Technical documentation

A number of drawing of technical documentations is listed in the following list:

Drawing Number	Title
Z10-007-01	Indukční průtokoměr DN15-150-kompakt
Z10-007-01-01	Svařenec s výstelkou DN15-150
Z10-007-01-01-01	Svařenec DN15-150
Z10-007-01-04	Cívka
Z10-007-01-10	Krabička elektroniky úplná
Z10-007-01-10-01	Skříň elektroniky
Z10-007-01-10-02	Plastový kryt
Z10-007-01-10-04	Osazovací plán F401
Z10-007-02	Indukční průtokoměr DN15-150-oddelený
Z10-007-03	Indukční průtokoměr DN200-1000-kompakt
Z10-007-03-01	Svařenec s výstelkou DN200-1000
Z10-007-03-01-01	Svařenec DN200-1000
Z10-007-04	Indukční průtokoměr DN200-1000-oddelený



All drawings, schemes and technical documentations used during the conformity assessment are saved in document No. NO-122/10 and NO-374/18.

4 Basic technical characteristics

Type marking		F401 ACQUAMAG
Nominal diameter DN	mm	10, 15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000
Indicating range	m ³	999 999 999
Resolution of the reading	m ³	0,01
Maximum admissible pressure	-	MAP16 (DN10 - DN400), MAP10 (DN300- DN1000)
Working pressure range	bar	from 0,3 to 16/from 0,3 to 10
Pressure loss	-	Δp 10
Temperature class	-	T50
Flow profile sensitivity classes	-	U5 / D3
Position	-	H, V
Climatic and mechanical environments	-	Closed spaces /from 5°C to 40°C/mech. class M1
Electromagnetic environments	-	E1

4.1 Additional technical characteristics

Weight	from 2 kg to 510 kg
Sensor	rustless non-magnetic austenitic steel
IP Code	IP67 (transducer IP67)
Measuring tube lining	Rubber, PTFE
Sensing electrodes	AISI 316L stainless steel
Conductivity	Minimum of 5 μ S/cm
Humidity	Maximum 90%
Power supply	100 – 240 V AC (optionally 12 - 24V AC/DC)
Outputs	2x passive, pulse, separated, programmable outputs, 50 ms/imp (NPN transistor, loading 30 V/50 mA max.) 1x active, current, programmable output (4-20 mA up to loading \leq 500 Ω) 1x RS232
Frequency output	0 – 15 kHz
Communication	RS232, keyboard, graphical, permanently illuminated display
Input	10 VA max.
Display	8 rows, 20-character LCD
Weight of control unit	0,8 kg
Weight of sensor	from 1,2 kg to 509,2 kg
Software	Type P (Welmec 7.2, 2015: Software Guide)
Software version and checksum	F401.34 SIMPLE (checksum – CRC16: 3392)



5 Basic metrological characteristics

The maximum permissible error (accuracy class):

$$\pm 5 \% (Q_1 \leq Q < Q_2)$$

$$\pm 2 \% (Q_2 \leq Q \leq Q_4) \text{ for water temperature (from 0,1 to 30) } ^\circ\text{C}$$

$$\pm 3 \% (Q_2 \leq Q \leq Q_4) \text{ for water temperature greater than 30 } ^\circ\text{C}$$

DN	R	Q_1	Q_2	Q_3^3	Q_4
mm	Q_3/Q_1^4	m ³ /h			
15	≤ 250	≥ 0,0252	≥ 0,04	≤ 6,3	≤ 7,875
20	≤ 250	≥ 0,04	≥ 0,064	≤ 10	≤ 12,5
25	≤ 250	≥ 0,064	≥ 0,1	≤ 16	≤ 20
32	≤ 250	≥ 0,1	≥ 0,16	≤ 25	≤ 31,25
40	≤ 250	≥ 0,16	≥ 0,256	≤ 40	≤ 50
50	≤ 250	≥ 0,252	≥ 0,4	≤ 63	≤ 78,75
65	≤ 250	≥ 0,4	≥ 0,64	≤ 100	≤ 125
80	≤ 250	≥ 0,64	≥ 1,024	≤ 160	≤ 200
100	≤ 250	≥ 1	≥ 1,6	≤ 250	≤ 312,5
125	≤ 250	≥ 1,6	≥ 2,56	≤ 400	≤ 500
150	≤ 250	≥ 2,52	≥ 4,032	≤ 630	≤ 787,5
200	≤ 250	≥ 4	≥ 6,4	≤ 1000	≤ 1250
250	≤ 160	≥ 10	≥ 16	≤ 1600	≤ 2000
300	≤ 160	≥ 15,625	≥ 25	≤ 2500	≤ 3125
350	≤ 160	≥ 15,625	≥ 25	≤ 2500	≤ 3125
400	≤ 160	≥ 25	≥ 40	≤ 4000	≤ 5000
500	≤ 160	≥ 39,375	≥ 63	≤ 6300	≤ 7875
600	≤ 160	≥ 62,5	≥ 100	≤ 10000	≤ 12500
700	≤ 160	≥ 62,5	≥ 100	≤ 10000	≤ 12500
800	≤ 100	≥ 160	≥ 256	≤ 16000	≤ 20000
900	≤ 100	≥ 160	≥ 256	≤ 16000	≤ 20000
1000	≤ 100	≥ 250	≥ 400	≤ 25000	≤ 31250

 Ratio $Q_2/Q_1 = 1,6$
6 Results of conformity assessment

The results of tests, assessments and evaluations given in the evaluation report NO-374/18/B/ER dated April 27, 2018 give sufficient evidence, that the technical design of the measuring instrument – Inductive flow meter type F401 ACQUAMAG is in compliance with the technical requirements of the Slovak Republic Governmental Ordinance No. 145/2016 Coll. relating to the making available on the market of measuring instruments, Annex No. 1 and Annex No. 3 Water Meters (MI-001) and the STN EN 14154-1:2005+A2 and OIML R 49-1:2006 standards (harmonised standards and normative documents).

³ The value of Q_3 shall be chosen from the line R5 of ISO 3:1973

⁴ The ratio of Q_3/Q_1 shall be chosen from the line R10 from ISO 3:1973 and this value shall be higher than 40



7 Data placed on the measuring instrument

On the shroud, the dial of the indicating device or on an identification plate of every water meter or in the product documentation minimum the following data should be marked:

- a) producer's name, registered trade name or registered trade mark and contact postal address
- b) type of the Inductive flow meter
- c) measuring unit m^3
- d) numerical value of Q_3 and ratio Q_3/Q_1
- e) production number and the year of production
- f) number of EU-type examination certificate and conformity mark
- g) the highest admissible pressure if it differs from 1 MPa
- h) flow direction
- i) the temperature class where it differs from T30
- j) class of pressure loss if it differs from Δp_{63}
- k) class of climatic and mechanical environment
- l) flow profile sensitivity classes
- m) class of electromagnetic environment
- n) For an external power supply: the voltage and frequency



8 Conditions of conformity assessment of measuring instruments produced with type approval

Inductive flow meter meter put onto the market in line with the procedure of conformity assessment according to the Annex No.2 (Module D or F) of the Governmental ordinance should be in compliance with the technical description by the item 3 of this report and at test should be in compliance with the requirements determined in OIML R 49-1:2006. Metrological test is performed by testing equipment which should be in compliance with the requirements determined in STN EN 14154-3:2005+A2 and water at temperature $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ in following point of flowrate:

- a) Minimum flowrate $Q_1 \leq Q \leq 1,1Q_1$
- b) Transitional flowrate $Q_2 \leq Q \leq 1,1Q_2$
- c) Permanent flowrate $0,9Q_3 \leq Q \leq Q_3$

A metrological test may only be performed by a producer, or a notified body respectively in line with the conformity assessment procedure according to the D or F Annexes of the Governmental ordinance respectively.

Remark: It is necessary to metrological test be performed at the operating (constant) temperature. It is recommended to metrological test be performed soon after 30 minutes of power on.

9 Measures asked for providing measuring instrument integrity

9.1 Identification

Inductive flow meter should be in compliance with the description provided on item 3 of this Annex and should be in compliance with the marking specified the item 7 of this Annex. The number given to the EU-type examination certificate is put at each piece of the measuring instrument.

Emplacement of the conformity mark is determined by § 15 of the Governmental ordinance.

9.2 Sealing of the measuring instrument

Inductive flow meter shall be before the conformity assessment according to the Annex No.2 (Module D or F) of the Governmental ordinance sealed by following sealing marks (Picture No. 3):

Memory housing of calibration constants and jumper, which is located under rear lid of control unit is secured by security mark (seal on the cover mounting screw to circuit board PCB and label on the top of the cover). Configuration of parameters under the SENSOR SETUP and DAMPING function is disabled in instruments by the so-called software seal.

The software is sealed by a password. The legal parameters are stored on a read-only memory. The software is identified by a CRC-16.

Additional securing mark insures measuring instrument label with serial number located on the side of control unit housing.

On flow meters with a separate flow sensor securing mark fixes the label with the serial number of flow sensor. The label is placed on the sensor housing or on inseparable part of terminal.



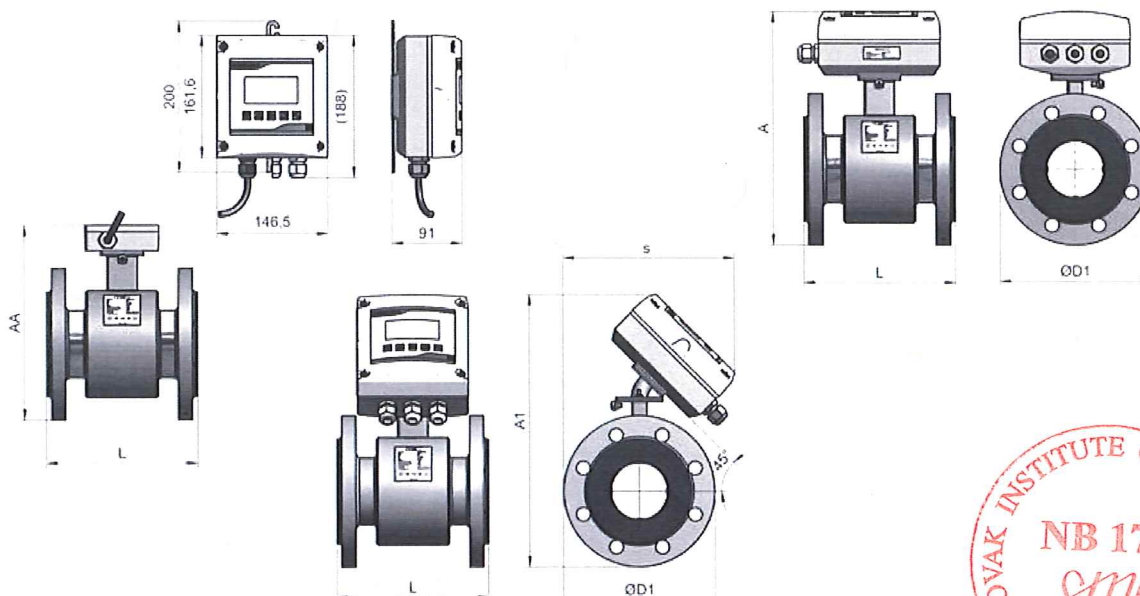
Picture No.3 Emplacement of seal used for security measures



10 Requirements for installation, especially conditions of usage
10.1 Installation data

Nominal diameter	15	20	25	32	40	50	65	80	100	125	150
L [mm]	165	165	200	200	200	200	200	200	250	250	300
D1[mm]	95	105	115	140	150	165	185	200	220	250	285
A [mm]	216	221	231	249	259	274	394	309	319	359	389
A1[mm]	267	272	282	300	310	325	345	360	370	410	440
AA [mm]	163	168	178	196	206	221	241	256	266	306	336
s [mm]	174	179	184	196	201	209	219	226	236	251	269
Weight [kg]	2	2	2	3	5	6	9	11	13	20	24

Nominal diameter	200	250	300	350	400	500	600	700	800	900	1000
L [mm]	350	450	500	500	600	600	800	800	1000	1000	1000
D1[mm]	340	405	460	520	580	715	840	910	1025	1125	1225
A [mm]	445	525	578	638	693	815	938	1033	1130	1220	1335
A1[mm]	496	576	629	689	744	866	989	1084	1181	1271	1386
AA [mm]	392	472	525	585	640	762	885	980	1077	1167	1335
s [mm]	296	329	356	386	416	484	546	581	639	689	739
Weight [kg]	34	41	55	65	110	120	155	230	325	420	510



Picture No.4 Installation dimensions



10.2 Installation requirements

The Inductive flow meter is introduced into the operation by a worker having a certificate for this activity performance. The Inductive flow meter F401 Acquamag is possible to be put into use after a construction in line with this report and in line with a producer instructions after sealing the pipes, the connecting electric circuits and flooding the interior of sensor throughout profile. The measuring instrument must be installed in the direction of water flow. Front lid of control unit and lid of connecting box on body by separate flow sensor is secured after installation by assembler's mark. Fixation of sensor in the pipe is secured by assembler's mark. Flow meter installation is carried out in accordance with STN EN 14154-2:2005 + A2, in the Slovak Republic is possible to execute installation in line with STN 25 782.

10.3 Conditions of use

The measuring instrument should be used within the recommendations of a producer.

Assessment done by:  Ing. Viliam Mazúr

