

HR Upute za montažu i uporabu

i Upotreba/funkcija

The battery-operated sononic 3 calculator is a component of a combination thermal energy meter in accordance with EN 1434. It receives signals from connected flow sensors and temperature sensors, and calculates the energy transferred from these.

It is authorised for measuring circuit water in accordance AGFW (FW 510) in heating systems. It is not authorised for use for billing purposes in systems with glycol admixtures.

Variants:

- T1: 1 pulse = 1 l
- T25: 1 pulse = 25 l
- T250: 1 pulse = 250 l
- TX: Pulse value of on-site flow sensor can only be selected once

Opseg isporuke

- 1 x sononic 3 calculator
- 1 x mounting plate
- 1 x mounting set (2 screws / 2 dowels)
- 3 x cable grommet (pre-assembled)
- 1 x manual including declarations of conformity

Upozorenja

UPOZORENJE!



Opasnost od eksplozije

Nestručno rukovanje litij-metalnom baterijom ugrađenom u uređaj može uzrokovati eksploziju baterije i izazvati požar ili ozljede.

Uređaj i LITIJ-METALNU BATERIJU

- ▶ nemojte zagrijavati na temperaturi veće od navedenih temperatura u ovom dokumentu za skladištenje i rad uređaja.
- ▶ Nemojte bacati u vatru.
- ▶ Nemojte izlagati vodi.
- ▶ nemojte kratko spajati.
- ▶ Nemojte otvarati ili oštećivati.
- ▶ Nemojte puniti.
- ▶ Nemojte zavarivati ili lemiti.



UPOZORENJE!

Opasnost od ozljeda zbog strujnog udara, požara i eksplozije

Spajanjem stranog napona (230 V) može doći do ozljeda uslijed strujnog udara kao i eksplozije baterije i posljedičnog požara.

- ▶ Na ovaj uređaj ne priključujte nikakve vanjske izvore napona.

i Napomene

Transport i otprema

- Transport sononic 3 calculator dopušten je samo u originalnom pakiranju.

UN3091 LITHIUM METAL BATTERIES IN EQUIPMENT

The certificates required for transport can be requested from ista SE, stating the article number.

Skladištenje / zbrinjavanje

- Uskladištite uređaj na suhom mjestu, zaštićeno od mraza.
- Na ovaj proizvod primjenjuje se Direktiva 2012/19/EU o otpadnoj električnoj i električnoj opremi (OEEO) i ne smije se zbrinjavati kao kućanski otpad. Zbrinite iskorišteni proizvod predviđenim kanalima ili ga vratite u lokalnu podružnicu tvrtke ista.

Upute za primjenu i postupanje s broji- lom

- Samo obučeno stručno osoblje smije montirati uređaj!
- Skidajte plombe korisnika samo ako ste za to ovlašteni. Neposredno nakon završenog posla plombe treba zamijeniti.
- To properly adhere to calibration error limits, the current state-of-the-art as well as notes and facts in this manual must be observed.
- Upotrebljavajte uređaj u okruženju koje odgovara navedenim radnim uvjetima.

Upute za ugradnju

- Check to see whether the installation site (flow/return) and the flow sensor pulse value is appropriate for the type sononic 3 calculator (see type plate and type plate loop).
- The flow sensor and temperature sensor of the energy meter must be located in the same partial circuit of the system (same circuit rule).
- Pri odabiru mjesta montaže pazite na duljine kabela.
- Duljina priključnog voda za senzor protoka smije iznositi maks. 10 m.

- If possible, when installing the calculator and cables, as recommended in EN 1434-6, Clause 4.2, maintain a minimum distance of 60 cm from strong electromagnetic fields (e.g. from frequency-controlled pumps and power cables) or their wiring.
- If used as a cold meter or combined heat/cold meter, the calculator must be attached so that condensation cannot penetrate the calculator via the connected cables.
- Stezni vijci priključaka računске jedinice moraju biti na vodu jer u protivnom nema kontakta.
- Priključujte isključivo parove temperaturnih osjetnika i senzora protoka s vlastitom oznakom CE.
- Dopušteni su parovi temperaturnih osjetnika duljine maks. 3 m (tehnika s 2 vodiča), odn. maks. 30 m (tehnika s 4 vodiča).
- The temperature sensors may only be installed symmetrically in the warm and cold lines.
- Litij-metalna baterija ugrađena je u ovaj uređaj i ne smije se mijenjati.



Montaža



UPOZORENJE!

Opasnost od ozljeda zbog udara struje i eksplozije

Bušanjem strujnih ili plinskih vodova može doći do udara struje odn. eksplozije.

- ▶ Prije zidne montaže elektronike provjerite ima li na mjestu montaže strujnih i plinskih vodova položenih ispod žbuke.



NAPOMENA

Opasnost od šteta uzrokovanih vodom

Bušanjem vodovodnih cijevi može doći do šteta uzrokovanih vodom.

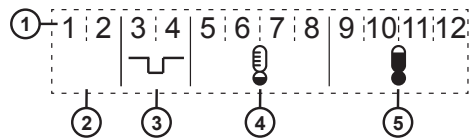
- ▶ Prije zidne montaže elektronike provjerite ima li na mjestu montaže vodovodnih cijevi položenih ispod žbuke.

1. Attach the mounting plate to the wall.
2. Engage calculator in mounting plate.
3. Open clamping cover.
4. Undo/remove strain relief.
5. Thread cables through sleeves.
 - Left sleeve: Pulse cable of flow sensor
 - Central sleeve: Cold line temperature sensor cable

- Right sleeve: Hot line temperature sensor cable
6. Connect the lines (see connection).
 7. Attach strain relief.
 8. Close clamping cover
 9. Installation of the temperature sensor as per its installation instructions.

Priključak

Terminal labelling



1. Numbering of the terminals
2. Terminals 1 + 2: Not used.
3. Terminal 3: Connection of flow sensor pulse cable – earth
- Terminal 4: Connection of flow sensor pulse cable – pulse
4. Terminals 5 – 8: Cold line temperature sensor cable connection
5. Terminals 9 – 12: Hot line temperature sensor cable connection

Priključivanje senzora protoka

	Cable to terminal no.				
	whi te	gre en	brow n	blu e	red
sonosic II flow sensor	-	4	-	-	3
US flow sensor (Diehl variant)	4	-	-	3	-
US flow sensor (Zenner variant)	-	4	-	3	-
US flow sensor (variant L&G)	reverse polarity protected				
KTZ* / ultego III flow sensor	reverse polarity protected				

* Do not connect cable shielding

NAPOMENA

- ▶ Calculator and flow sensors must have the same pulse value: T1 = 1 l/pulse, T25 = 25 l/pulse, T250 = 250 l/pulse.

Priključak temperaturnog osjetnika ista

- hladan odvojak = plava oznaka osjetnika
- topao odvojak = crvena oznaka osjetnika

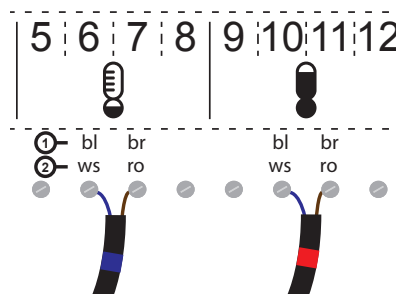
Variant	hot line / red sensor marking	cold line / blue sensor marking
Heat meter	Flow	Return
combined heat/cold meter	Flow	Return
Cold meter	Return	Flow

Abbreviations used on the terminals:

bl = blue gn = green ws = white
br = brown ge = yellow ro = red

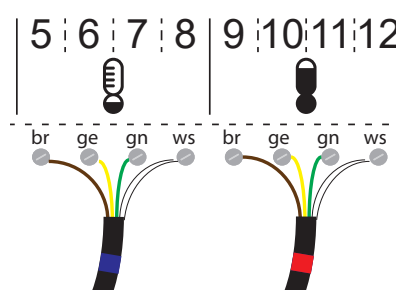
In case of calculators without permanently connected temperature sensors, connector sensor cables as follows:

2 wire technology



1. ista temperature sensor, Ø 5.0 mm
2. ista / Jumo temperature sensor, Ø 5.2 and 6.0 mm

4 wire technology



Korisničko sučelje

Funkcija tipke

Uz pomoć ove tipke mogu se izvoditi sljedeće aktivnosti:

Funkcija tipke	Trajanje/ interval	Funkcija u petlji prikaza
kratak pritisak tipke	< 2 s	Prebacivanje na sljedeći prikaz unutar iste petlje prikaza (odnosno od posljednje do prve točke izbornika)
dugačak pritisak tipke	> 2 s	Kontinuirano prebacivanje na sljedeću petlju prikaza sve dok je tipka pritisnuta (< 1 minute)

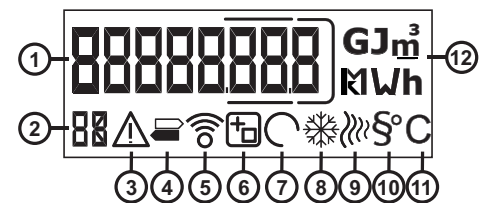
Funkcija tipke	Trajanje/ interval	Funkcija u petlji prikaza
Dvostruki klik	2 puta u 0,5 s	Aktivacija određene funkcije (npr. editora)

Zaslon

In measuring mode, the display is generally deactivated as long as

- no button has been pressed within the past 60 s and
- no error exists in the device.

The display is activated by pressing a button. First, a display test is shown, where all display elements are shown. The display switches over to display 1A automatically.



1. Measured values with optional three, one or without a full stop (visualised by full stop and frame)
2. Number of the currently shown display
3. Error detected
4. Wrong flow direction (not relevant for sensoric 3 calculator)
5. Radio status
 - off: Device not accessible with ista service tools
 - on: Device accessible with ista service tools
 - flashing: Device is accessible with ista service tools, installation or service mode
6. Module detected
7. Flow detected
8. Cold value
9. Heat value
10. calibrated value
11. in °C:
 - Temperature
 - Temperature difference
12. Units for
 - Energy in kWh, MWh, GJ
 - Volume in m³
 - Power in kW
 - Time in h

If the value currently shown on the display changes, it is updated automatically. This mainly affects current consumption values, but also device parameters such as radio status, M-bus primary addresses etc., which can be written via external interfaces (radio, M-bus).

Petlje prikaza

U sljedećoj se tablici nalaze simboli koji u opisu petlje prikaza pojašnjavaju ponašanje prikaza ili potrebne radnje korisnika.

Simbol	Opis
	Prikazi se automatski mijenjaju svake 2 s
	Alternativni prikazi, ovisno o statusu uređaja
	Prikaz se može pozvati jednostavnim, kratkim klikom
	Prikaz/petlja mogu se pozvati dugačkim klikom
	Prikaz se može pozvati dvostrukim klikom

Loop 1: Measuring loop

In the measuring loop you can read out the current measured values, the last and second-to-last reference date values for energy and volumes and the next reference date.

Number	Display	Meaning
1A		Current meter reading for thermal energy ¹
		Current meter reading for cold energy ²
1B		Last reference date value for thermal energy ¹
		Last reference date value for cold energy ²
		Last reference date value for total volume ³
		Last reference date value, cold volume ^{3,4}
		Date of last reference date
1C		Second-to-last reference date value for thermal energy ¹
		Second-to-last reference date value for cold energy ²
		Second-to-last reference date value for total volume ³

Number	Display	Meaning
		Second-to-last reference date value, cold energy ^{3,4}
		Date of second-to-last reference date
1D		Date of next reference date
1E		Current meter reading for total volume
		Current meter reading for cold volume ^{3,4}
		Current meter reading, error volume ^{5,6}

- 1.For heat meters and combined heat/cold meters only
- 2.For cold meters and combined heat/cold meters only
- 3.For combined heat/cold meters, if necessary, calculate the “heat volume” as the difference between the “total volume” and the sum of the “cold volume” and “error volume”.
- 4.For combined heat/cold meters only
- 5.The “error volume” is volume for which, for various reasons, no energy could be calculated.
- 6.If necessary, calculate the “heat volume” for heat meters or “cold volume” for cold meters as the difference between the “total volume” and the “error volume”.

Loop 2: Wireless service loop

You can initiate wireless commissioning and activate fast service beacons via the wireless service loop.

	NAPOMENA
	Wireless M-bus telegrams can only be activated via ista radio after the activation of the bidirectional ista radio system via display 2A or 2B.
	NAPOMENA
	After activation of the radio, manual parameterisation via the parameterising loop is no longer possible.

Number	Display	Meaning
2A		Activation of installation beacons by double-clicking (maximum 14 times); if no parametrisation takes place via ista service tools, then the radio is deactivated
		Activation of 30 fast service beacons by double-clicking (maximum 20 times a day)
		No further activation of installation beacons (at all) or service beacons (until daily change) possible
2B		One-off activation of installation beacons by double-clicking; if no parametrisation takes place via ista service tools, then the radio is activated with default parameters, parameters set via the parameterising loop are overwritten
2C		Activation of wireless M-bus telegrams by double-clicking ¹

- 1.Protected by password 2

Loop 2: Wireless service loop

	NAPOMENA
	Wireless M-bus telegrams can only be activated via ista radio after the activation of the bidirectional ista radio system via display 2A or 2B.

NAPOMENA

- ▶ After activation of the radio, manual parameterisation via the parameterising loop is no longer possible.

2A: — Activation of installation beacons by double-clicking (maximum 14 times); if no parameterisation takes place via ista service tools, then the radio is deactivated ('SETUP') # Activation of 30 fast service beacons by double-clicking (maximum 20 times a day)('READ') # No further activation of installation beacons (at all) or service beacons (until daily change) possible ('no READ')

2B: | One-off activation of installation beacons by double-clicking; if no parameterisation takes place via ista service tools, the radio is activated with default parameters ('A SETUP')

2C: | Activation of wireless M-bus telegrams by double-clicking ('C1 SETUP')¹

1.Protected by password 2

Loop 3: Diagnostics loop

In the diagnostics loop, you will find extensive information on the device's current status.

Number	Display	Meaning
3A		No existing device errors
		Existing device error ¹
		Number of days in operation since production
		Number of error days since production
3B		Current flow
3C		Current heat output ²
		Current cold output ²
3D		Current flow temperature
3E		Current return temperature
3F		Current temperature difference Δt ³
3G		Maximum flow since production
		Maximum temperature of the current billing period

Number	Display	Meaning
		Maximum temperature difference Δt of the current billing period ³

- 1.Description of the device errors in the 'error status' section
- 2.Depending on current count mode (heat/cold)
- 3.Becomes negative, if $T_{\text{flow}} < T_{\text{return}}$ (cold measurement or sensor mixed up)

Loop 4: Type plate loop

You can find information on the current configuration of the device in the type plate loop.

- 4A: — M-bus ID number (part of secondary address)
- 4B: | Flow sensor pulse value (litres per pulse) ("LP X.X") / (Flow sensor installation site for hot line ("LoC hot")¹ # Flow sensor installation site for cold line ("LoC cold")¹)
- 4C: | Device can no longer be read out via the module until the day changes ("no CrEdt")² # M-bus module detected with bus address (primary) ("Bus XXX")² # Pulse output module detected ("PULSEOut")²
- 4D: | Glycol type³ / Glycol concentration ("ConC XX")³
- 4E: | Radio off ("rF OFF") # WalkBy ("rF PdA") # ista radio ("rF nEt") # OMS C1 + WalkBy ("rF C1")
- 4F: | Radio network number (first 8 digits) # Radio network number (last 8 digits)
- 4G: | Measuring interval in seconds ("SEC X")
- 4H: | Sensor type Pt500 ("Pt 500")/ Detected sensor connection technology: 2-wire ("PtLinE 2") # Detected sensor connection technology: 4-wire ("PtLinE 4") # Sensor connection technology not detected ("PtLinE 0")
- 4I: | Software version
- 4J: | Hash code

- 1.Display shows the planned (programmed) installation site of the flow sensor, not the actual site.
- 2.Display only if a module was detected
- 3.Display only for glycol meters

Loop 5: Statistics loop

In the statistics loop, you can read the values at the end of the month for energy and volumes, and the respective reference date of the last 14 months.

Number	Display	Meaning
5A		Reference date from last month
		Thermal energy value from end of last month ¹
		Cold energy value from end of last month ²
		End of month value total volume last month ³
		Cold volume last month ^{3,4}
5B		Same as 5A for the previous 13 months
5N		

- 1.For heat meters and combined heat/cold meters only
- 2.For cold meters and combined heat/cold meters only
- 3.For combined heat/cold meters, if necessary, calculate the "heat volume" as the difference between the "total volume" and the "cold volume".
- 4.For combined heat/cold meters only

Loop 5: Statistics loop

In the statistics loop, you can read the values at the end of the month for energy and volumes, and the respective reference date of the last 14 months.

- 5A: — Reference date of last month / End of month value for thermal energy for last month¹ / End of month value for cold energy for last month² / End of month value for total volume for last month³ / Cold volume for last month^{3,4}
- 5B – 5N: | As 5A for the previous 13 months

- 1.For heat meters and combined heat/cold meters only
- 2.For cold meters and combined heat/cold meters only
- 3.For combined heat/cold meters, if necessary, calculate the "heat volume" as the difference between the "total volume" and the "cold volume".
- 4.For combined heat/cold meters only

Loop 6: Tariff loop

In the tariff loop, you can read the values at the end of the month for the maximum performance and flow, and each reference date from the last 14 months.

Number	Display	Meaning
6A		Reference date from last month
		Maximum heat performance value from end of last month ¹
		Maximum cold performance value from end of last month ²
		Maximum flow value from end of last month
6B	●	Same as 6A for the previous 13 months
6N		

1. Only for heat meter and combined heat meter/cold meters
2. Only for cold meters and combined heat/cold meters

Editor

Uz pomoć ove tipke mogu se u editoru izvoditi sljedeće aktivnosti:

Funkcija tipke	Trajanje/interval	Funkcija u editoru
kratak pritisak tipke	< 2 s	- Prebacivanje na sljedeće mjesto za unos (odnosno s posljednjeg na prvo) - Prebacivanje na sljedeći unos u popisu za odabir
dugačak pritisak tipke	> 2 s	Izmjena mjesta u koje trenutačno unosite
Dvostruki klik	2 puta u 0,5 s	Izlazite iz editora uz spremanje izmijenjenih vrijednosti

Mjesto u koje trenutačno unosite prikazano je treptanjem.

Unos zaporka

Da biste izbjegli neželjene promjene parametara uređaja, petlja parametara zaštićena je zaporkom 1, a aktivacija telegrama bežične M-sabirnice zaporkom 2.

- Zaporka 1 ima četiri znamenke i sastoji se od aktualnog mjeseca i godine u formatu „MMGG“ (primjer: siječanj 2019. prikazuje se kao „0119“). Morate zaporku jednokratno unižeti pri prvom postupku parametrizacije. Nakon toga ona vrijedi sve do sljedeće deaktivacije zaslona.
- Zaporka 2 ima tri znamenke i sastoji se od prve tri znamenke serijskog broja (Primjer:

serijski broj uređaja „914000069“ daje u zaporki 2 „914“).

Unosu zaporka pristupate iz petlje za parametriziranje ili prikaza 2C dvostrukim klikom.

Broj	Prikaz	Značenje
PA		Unos zaporka 1
–PI		Zaporka ispravna
V		Zaporka neispravna

Parameter entry

You access the entry to be edited automatically from the corresponding entry in the parametrising loop after successfully entering the password if required. After entering the required value, exit the editor with a double-click.

- PA: || Reference date
- PC: Pulse value: || Flow sensor undefined ("undEF") | 1.0 | 2.5 | 10.0 | 25.0 | 100.0 | 250.0 | 500.0 | 1000.0 | 2500.0 | 10000.0 | 25000.0 litres per pulse (LPP)¹
- PD: || M-Bus primary address ("BUS XXX")
- PE: Pulse output type || heat energy ("En hot")² | cold energy ("En cold")³ | volume ("Fluid")
- PF: Pulse output value || 1 pulse per increase of last digit in display ("Auto")
 - 1 pulse per | 0.1 | 1.0 | 10.0 | 100.0 | 1000.0 kWh⁴
 - 1 pulse per | 0.001 | 0.010 | 0.100 | 1.000 m³₅
- PI: || Discard entry from PC ("d/ScArd") | save entry from PC ("SEt") || entry is being saved ("SEtting") / (save successful ("SEt dOnE") # save failed ("SEt FAIL"))

1. Only for TX variant
2. Only for heat and combined heat/cold meters
3. Only for cold meters and combined heat/cold meters
4. Only for heat or cold energy pulse output types
5. Only for volume pulse output type

Status greške

Number	Display	Meaning
3A		Calculation unit error – check temperature sensor and replace temperature sensor and / or device if necessary ¹

Number	Display	Meaning
		Temperature measurement error – check temperature sensor and replace temperature sensor and / or device if necessary ¹
		Flow measurement error – replace device ¹
		Internal error – replace device ¹
		End of life – replace device ¹
		System error – replace device ²

1. Combinations of the stated errors are possible.
 2. Permanent display. Access to display loops no longer possible.
- 3A "ERR C": Computing unit error – check temperature sensor; replace temperature sensor and / or device if necessary¹
 - 3A "Err t": Temperature measurement error – check temperature sensor; replace temperature sensor and / or device if necessary¹
 - 3A "Err U": Internal error – replace device¹
 - 3A "Err L": End of life – replace device¹
 - "SysError": System error – replace device²

1. Combinations of the stated errors are possible.
2. Permanent display. Access to display loops no longer possible.



Puštanje u rad

NAPOMENA

- ▶ When commissioning a heat meter, a commissioning record must be prepared in accordance with PTB K6.

1. Parametrise the device manually or via wireless connection, using the above parametrising loop.
2. Check function.
3. Clean the device exterior with a soft damp cloth. Do not use cleaning products.
4. Seal meter.



Zamjena

1. Zabilježite stanje brojila.
2. Otvorite stezni poklopac.
3. Otpustite/uklonite vlačno rasterećenje.
4. Odspojite vodove.
5. Skinite/uklonite natpise na stezaljkama.
6. Skinite računsku jedinicu (odvijačem izravajte stezni nosić).
7. Za dalje vidi montažu od točke 2.



Tehnički podatci

- *Ambient conditions to EN 1434:* Classes M1 / E1
- *Ambient temperature:* Storage: -25 °C to +55 °C, Operation: +5 °C to +55 °C
- *Relative humidity:* 5 % to 95 %, non-condensing
- *Vrsta zaštite:* IP 65 u skladu s EN 60529
- *Temperaturni osjetnik:* Tip Pt500 u skladu s EN 60751
- *Temperature measurement range limits (Θ) / Temperature difference limits ($\Delta\Theta$):*

	$\Theta_{\min}$	$\Theta_{\max}$	$\Delta\Theta_{\min}$	$\Delta\Theta_{\max}$
Heat meter	5 °C	150 °C	3 K	100 K
Combined heat/cold meter	1 °C	150 °C	3 K	100 K
Cold meter	1 °C	25 °C	3 K	20 K

- *Combined heat / cold meter changeover criteria:* $\Delta\Theta_{\text{grenz}} = 0.19 \text{ K}$, $\Theta_{\text{in_umsch}} = 20 \text{ °C}$
- *Pulse value:* 1 / 25 / 250 l/pulse set by the factory in accordance with type plate (T1, T25, T250 versions), 1 / 2.5 / 10 / 25 / 100 / 250 / 500 / 1000 / 2500 / 10000 / 25000 l/impulse can be adjusted oncer (TX version)
- *Ulaz impulsa:* Razred IB u skladu s EN 1434
- *Glavne dimenzije:* Širina: 93 mm, Visina (bez kablskih tuljaca): 134,5 mm, Visina (s kablskim tuljcima): 149 mm, Dubina: 35 mm
- *Power supply:* 1 x 3.6 V AA lithium metal battery
- *Vijek trajanja:* 10 godina rada + 1 godina rezerve rada + 1 godina skladištenja
- *Wireless interfaces:* Frequency range: 868 MHz, Maximum transmission power: < 10 mW, Wireless M-Bus: Operating mode C1 as per EN 13757-4; transmission interval: 4 minutes



Odobrenje

- Heat (MID): DE-19-MI004-PTB029
- Cold (national approval for Germany): DE-21-M-PTB-0025
- Cold (national approval for Switzerland): CH-T2-21779-00

Copyright

Original BSD-style license

Copyright (c) 2004-2005, Swedish Institute of Computer Science.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- 1.Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- 3.Neither the name of the Institute nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

This software is provided by the Institute and contributors "as is" and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall the Institute or contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

