Compliance sheet — star-kepler

Everything a supplier qualification, a legal review or an export check usually asks about star-kepler 0.1.1, in one document.

1. Identity

Document	STAR-PKG-STAR-KEPLER-EN · v2.3 · 2026-11-14
Package	star-kepler
Version	0.1.1
Capability	star.orbit.kepler
Maturity	Released & Verified (RELEASED)
Python	>=3.9
Source commit	dc09f61d
Source	https://github.com/Andrea07072000/S.T.A.R.-/tree/main/packages/star_kepler

2. Licence and obligations

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3. What it needs at run time

Nothing beyond the Python standard library: it works offline.

4. Integrity

SHA-256 fingerprints of the files published on this website. Check a downloaded file with:

```
python -c "import
hashlib,sys;print(hashlib.sha256(open(sys.argv[1],'rb').read()).hexdigest())" star_kepler-
0.1.1-py3-none-any.whl
```

FILE	SHA-256
star_kepler-0.1.1-py3-none-any.whl	f55c30ab1c90f9802542ea566207c713ee57234cffbd931a9f37990009a4c5b0
star_kepler.py	e28bacf7f0d3e09a31d6e01fc45472f4421c78bf76f9e30c8587d72a504cb7fa
star_kepler-0.1.1-source.zip	6409709ebc41289bd16d2ba69e988b051153ed63412f16381fa14c488f2311a0

5. What it does, and its limits

Kepler propagation with universal variables and Stumpff functions: no orbit-geometry singularity (circular, equatorial, elliptic, hyperbolic), whole periods removed, bracketed root with bounded iterations, explicit refusals.

Two-body motion only (no perturbations). Parabolic orbits use the same series but are not separately validated. Rectilinear orbits are refused. No flight heritage.

- `propagate` returns position and velocity for elliptic and hyperbolic orbits, any consistent units; it reproduces Vallado Example 2-4 within the printed precision (1e-3 km, 1e-5 km/s).
- No orbit-geometry singularity: circular and equatorial orbits are propagated like any other; whole periods are removed on closed orbits, so a thousand revolutions return the initial state to 1e-4 km.
- Accuracy: on 450 known orbits (eccentricity 0 to 0.95, 0 and 10 revolutions) the error is below 1e-6 km (1 mm) and 1e-8 km/s; energy and angular momentum are conserved to 1e-9 relative.
- Failure behaviour: non-finite input, zero position, `mu <= 0`, wrong vector length and rectilinear motion raise `ValueError` before any iteration; an exhausted iteration budget raises `RuntimeError`; the call cannot loop forever (bracketed root, bounded bisection).

6. Export, use and certification

The package is published and freely available. That usually takes software out of export-control lists, but not every use of it: read the page on space activities and export control before using it in a

controlled programme. It is not certified or qualified for flight; the evidence describes what was tested and how.

7. Citation and bill of materials

```
@software{cavazzini_star_kepler_0_1_1,
  author  = {Cavazzini, Andrea},
  title   = {{star-kepler}: Two-body propagation with universal variables},
  version = {0.1.1},
  year    = {2026},
  url     = {https://andrea07072000.github.io/S.T.A.R.-/software/star_kepler/},
  note    = {Apache-2.0. Source: https://github.com/Andrea07072000/S.T.A.R.-, commit dc09f61d}
}
```

CITATION.cff · BibTeX · SBOM CycloneDX 1.5 · SBOM SPDX 2.3

8. Warranty and liability

Provided "as is", without warranties or conditions of any kind (Apache License 2.0, sections 7 and 8), to the extent the law allows. This never excludes liability that the law does not allow to exclude.

Related: space activities and export control · acceptable use · evidence and limits · licence texts