

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING (NOTES omitted)

TRANSPORTING

B64 AIRCRAFT; AVIATION; COSMONAUTICS

B64G COSMONAUTICS; VEHICLES OR EQUIPMENT THEREFOR (apparatus for, or methods of, winning materials from extraterrestrial sources [E21C 51/00](#))

NOTES

1. This subclass covers only vehicles, equipment or the like, which are specially adapted for cosmonautics.
2. This subclass does not cover vehicles and equipment applicable to both cosmonautics and aeronautics, which are covered by the appropriate aeronautical subclasses of class [B64](#).
3. In this subclass, the following term is used with the meaning indicated:
 - "cosmonautics" includes all transport outside the earth's atmosphere, and thus includes artificial earth satellites, and interplanetary and interstellar travel.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00	Cosmonautic vehicles	1/1014	. . {Navigation satellites (navigation systems G01S 5/145)}
1/002	. {Launch systems}	1/1021	. . {Earth observation satellites}
	<u>WARNING</u>	1/1028	. . . {using optical means for mapping, surveying or detection, e.g. of intelligence}
	Group B64G 1/002 is impacted by reclassification into groups B64G 1/006 and B64G 1/008 .	1/1035	. . . {using radar for mapping, surveying or detection, e.g. of intelligence}
	Groups B64G 1/002 , B64G 1/006 and B64G 1/008 should be considered in order to perform a complete search.	1/1042	. . . {specifically adapted for meteorology}
1/005	. . {Air launch}	1/105	. . {Space science}
1/006	. . {Reusable launch rockets or boosters}	1/1057	. . . {specifically adapted for astronomy}
	<u>WARNING</u>	1/1064	. . . {specifically adapted for interplanetary, solar or interstellar exploration}
	Group B64G 1/006 is incomplete pending reclassification of documents from group B64G 1/002 .	1/1071 {Planetary landers intended for the exploration of the surface of planets, moons or comets}
	Groups B64G 1/002 and B64G 1/006 should be considered in order to perform a complete search.	1/1078	. . {Maintenance satellites (refueling in space B64G 1/4024)}
1/008	. . {Arrangement of launch rockets or boosters}		<u>WARNING</u>
	<u>WARNING</u>		Group B64G 1/1078 is impacted by reclassification into group B64G 1/1081 .
	Group B64G 1/008 is incomplete pending reclassification of documents from group B64G 1/002 .		Groups B64G 1/1078 and B64G 1/1081 should be considered in order to perform a complete search.
	Groups B64G 1/002 and B64G 1/008 should be considered in order to perform a complete search.	1/1081	. . . {for debris removal}
1/10	. Artificial satellites; Systems of such satellites; Interplanetary vehicles (space shuttles B64G 1/14 ; radio transmission systems using satellites H04B 7/185)		<u>WARNING</u>
1/1007	. . {Communications satellites (communications aspects H04B 7/185)}		Group B64G 1/1081 is incomplete pending reclassification of documents from group B64G 1/1078 .
		1/1085	. . {Swarms and constellations}
		1/12	. . manned
			Groups B64G 1/1078 and B64G 1/1081 should be considered in order to perform a complete search.

- 1/14 . Space shuttles ([\(reusable launch rockets B64G 1/006\)](#))
- 1/16 . Extraterrestrial cars ([land vehicle aspects B60 - B62](#))
- 1/22 . Parts of, or equipment specially adapted for fitting in or to, cosmonautic vehicles
- 1/222 . . {for deploying structures between a stowed and deployed state}

WARNING

Group [B64G 1/222](#) is impacted by reclassification into groups [B64G 1/2221](#), [B64G 1/2222](#), [B64G 1/2223](#), [B64G 1/2224](#), [B64G 1/2225](#), [B64G 1/2226](#), [B64G 1/2227](#), [B64G 1/2228](#) and [B64G 1/2229](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/2221 . . . {characterised by the manner of deployment}

WARNING

Groups [B64G 1/2221](#) - [B64G 1/2227](#) are incomplete pending reclassification of documents from group [B64G 1/222](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/2222 {Folding}
- 1/2223 {via scissor linkage}
- 1/2224 {about multiple axes}
- 1/2225 {Rolling or unfurling ([B64G 1/2227](#) takes precedence)}
- 1/2226 {Telescoping}
- 1/2227 {Inflating}
- 1/2228 . . . {characterised by the hold-down or release mechanisms}

WARNING

Group [B64G 1/2228](#) is incomplete pending reclassification of documents from group [B64G 1/222](#).

Groups [B64G 1/222](#) and [B64G 1/2228](#) should be considered in order to perform a complete search.

- 1/2229 . . . {characterised by the deployment actuating mechanism ([inflating B64G 1/2227](#))}

WARNING

Group [B64G 1/2229](#) is incomplete pending reclassification of documents from group [B64G 1/222](#).

Groups [B64G 1/222](#) and [B64G 1/2229](#) should be considered in order to perform a complete search.

- 1/223 . . {Modular spacecraft systems}
- 1/226 . . {Special coatings for spacecraft}
- 1/228 . . {Damping of high-frequency vibration effects on spacecraft elements, e.g. by using acoustic vibration dampers}

- 1/24 . . Guiding or controlling apparatus, e.g. for attitude control ([jet-propulsion plants F02K](#); navigation or navigational instruments, see the relevant subclasses, e.g. [G01C](#); automatic pilots [G05D 1/00](#))
- 1/242 . . . {Orbits and trajectories}

WARNING

Group [B64G 1/242](#) is impacted by reclassification into groups [B64G 1/2421](#), [B64G 1/2422](#), [B64G 1/2423](#), [B64G 1/2425](#), [B64G 1/2427](#), [B64G 1/2429](#) and [B64G 1/244](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/2421 {Aerobraking}

WARNING

Group [B64G 1/2421](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2421](#) should be considered in order to perform a complete search.

- 1/2422 {using Lagrange points, e.g. halo orbits}

WARNING

Group [B64G 1/2422](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2422](#) should be considered in order to perform a complete search.

- 1/2423 {Sun-synchronous orbits}

WARNING

Group [B64G 1/2423](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2423](#) should be considered in order to perform a complete search.

- 1/2425 {Geosynchronous orbits}

WARNING

Group [B64G 1/2425](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2425](#) should be considered in order to perform a complete search.

- 1/2427 {Transfer orbits}

WARNING

Group [B64G 1/2427](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2427](#) should be considered in order to perform a complete search.

1/2429 {Station keeping}

WARNING

Group [B64G 1/2429](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/2429](#) should be considered in order to perform a complete search.

1/244 {Spacecraft control systems}

WARNING

Group [B64G 1/244](#) is incomplete pending reclassification of documents from group [B64G 1/242](#).

Groups [B64G 1/242](#) and [B64G 1/244](#) should be considered in order to perform a complete search.

1/245 {Attitude control algorithms for spacecraft attitude control}

1/247 {Advanced control concepts for autonomous, robotic spacecraft, e.g. by using artificial intelligence, neural networks or autonomous agents}

1/26 using jets

WARNING

Group [B64G 1/26](#) is impacted by reclassification into groups [B64G 1/262](#) and [B64G 1/264](#).

Groups [B64G 1/26](#), [B64G 1/262](#) and [B64G 1/264](#) should be considered in order to perform a complete search.

1/262 {having adjustable angles, e.g. gimbaled thrusters}

WARNING

Groups [B64G 1/262](#) and [B64G 1/264](#) are incomplete pending reclassification of documents from group [B64G 1/26](#).

Groups [B64G 1/26](#), [B64G 1/262](#) and [B64G 1/264](#) should be considered in order to perform a complete search.

1/264 {mounted on adjustable booms or the like}

1/28 using inertia or gyro effect

1/281 {Spin-stabilised spacecraft}

1/283 {using reaction wheels}

1/285 {using momentum wheels}

1/286 {using control momentum gyroscopes (CMGs)}

1/32 using earth's magnetic field

1/34 using gravity gradient

1/36 using sensors, e.g. sun-sensors, horizon sensors

1/361 {using star sensors}

1/363 {using sun sensors}

1/365 {using horizon or Earth sensors}

1/366 {using magnetometers}

1/368 {using gravimeters}

1/369 {using gyroscopes as attitude sensors}

1/38 damping of oscillations, e.g. nutation dampers

1/40 Arrangements or adaptations of propulsion systems ([propulsion plants per se](#), [see the relevant subclasses](#), e.g. [F02K](#), [F03H](#))

WARNING

Group [B64G 1/40](#) is impacted by reclassification into group [B64G 1/4005](#).

Groups [B64G 1/40](#) and [B64G 1/4005](#) should be considered in order to perform a complete search.

1/4005 {Air-breathing propulsion}

WARNING

Group [B64G 1/4005](#) is incomplete pending reclassification of documents from groups [B64G 1/40](#) and [B64G 1/401](#).

Groups [B64G 1/40](#), [B64G 1/401](#) and [B64G 1/4005](#) should be considered in order to perform a complete search.

1/401 {Liquid propellant rocket engines (Ion or plasma engines [B64G 1/413](#); Arcjets and other resistojets [B64G 1/415](#))}

WARNING

Group [B64G 1/401](#) is impacted by reclassification into group [B64G 1/4005](#).

Groups [B64G 1/401](#) and [B64G 1/4005](#) should be considered in order to perform a complete search.

1/402 {Propellant tanks; Feeding propellants}

WARNING

Group [B64G 1/402](#) is impacted by reclassification into groups [B64G 1/4021](#), [B64G 1/4022](#), [B64G 1/4024](#) and [B64G 1/4026](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/4021 {Tank construction; Details thereof}

WARNING

Group [B64G 1/4021](#) is incomplete pending reclassification of documents from group [B64G 1/402](#).

Groups [B64G 1/402](#) and [B64G 1/4021](#) should be considered in order to perform a complete search.

1/4022 {Arrangements of tanks in or on spacecraft}

WARNING

Group [B64G 1/4022](#) is incomplete pending reclassification of documents from group [B64G 1/402](#).

Groups [B64G 1/402](#) and [B64G 1/4022](#) should be considered in order to perform a complete search.

1/4024 {Refueling in space}

WARNING

Group [B64G 1/4024](#) is incomplete pending reclassification of documents from group [B64G 1/402](#).

Groups [B64G 1/402](#) and [B64G 1/4024](#) should be considered in order to perform a complete search.

1/4026 {providing propellant to propulsion systems of differing type}

WARNING

Group [B64G 1/4026](#) is incomplete pending reclassification of documents from group [B64G 1/402](#).

Groups [B64G 1/402](#) and [B64G 1/4026](#) should be considered in order to perform a complete search.

1/403 {Solid propellant rocket engines}

1/404 {Hybrid rocket engines}

1/405 {Ion or plasma engines (per se F03H 1/00)}

(Frozen)

WARNING

Group [B64G 1/405](#) is no longer used for the classification of documents as of August 1, 2023.

The content of this group is being reclassified into groups [B64G 1/411](#) and [B64G 1/413](#).

Groups [B64G 1/405](#), [B64G 1/411](#) and [B64G 1/413](#) should be considered in order to perform a complete search.

1/407 {Solar sailing}

1/408 {Nuclear spacecraft propulsion}

1/409 {Unconventional spacecraft propulsion systems}

WARNING

Group [B64G 1/409](#) is impacted by reclassification into groups [B64G 1/411](#) and [B64G 1/417](#).

Groups [B64G 1/409](#), [B64G 1/411](#) and [B64G 1/417](#) should be considered in order to perform a complete search.

1/411 {Electric propulsion}

WARNING

Group [B64G 1/411](#) is incomplete pending reclassification of documents from groups [B64G 1/405](#) and [B64G 1/409](#).

Groups [B64G 1/405](#), [B64G 1/409](#) and [B64G 1/411](#) should be considered in order to perform a complete search.

1/413 {Ion or plasma engines}

WARNING

Group [B64G 1/413](#) is incomplete pending reclassification of documents from group [B64G 1/405](#).

Groups [B64G 1/405](#) and [B64G 1/413](#) should be considered in order to perform a complete search.

1/415 {Arcjets or resistojets}

1/417 {Electromagnetic fields or flux without mass expulsion}

WARNING

Group [B64G 1/417](#) is incomplete pending reclassification of documents from group [B64G 1/409](#).

Groups [B64G 1/409](#) and [B64G 1/417](#) should be considered in order to perform a complete search.

1/42 . . . Arrangements or adaptations of power supply systems (power supply systems per se, see the relevant subclasses)

1/421 {Non-solar power generation}

1/422 {Nuclear power generation}

1/423 {Fuel cells}

1/425 {Power storage}

1/426 {Flywheels}

1/427 {Thermal power storage}

1/428 {Power distribution and management}

WARNING

Group [B64G 1/428](#) is impacted by reclassification into group [B64G 1/4282](#).

Groups [B64G 1/428](#) and [B64G 1/4282](#) should be considered in order to perform a complete search.

1/4282 {for transmitting power to earth or other spacecraft}

WARNING

Group [B64G 1/4282](#) is incomplete pending reclassification of documents from group [B64G 1/428](#).

Groups [B64G 1/428](#) and [B64G 1/4282](#) should be considered in order to perform a complete search.

1/44 using radiation, e.g. deployable solar arrays (solar cells per se H01L 31/00)

1/443 {Photovoltaic cell arrays}

1/446 {Thermal solar power generation}

1/46 . . . Arrangements or adaptations of devices for control of environment or living conditions (space suits [B64G 6/00](#))

WARNING

Group [B64G 1/46](#) is impacted by reclassification into group [B64G 1/465](#).

Groups [B64G 1/46](#) and [B64G 1/465](#) should be considered in order to perform a complete search.

1/465 . . . {for controlling gravity}

WARNING

Group [B64G 1/465](#) is incomplete pending reclassification of documents from groups [B64G 1/46](#) and [B64G 1/60](#).

Groups [B64G 1/46](#), [B64G 1/465](#) and [B64G 1/60](#) should be considered in order to perform a complete search.

- 1/48 . . . for treatment of the atmosphere ([B64G 1/50 takes precedence; air conditioning in general F24F](#))
- 1/50 . . . for temperature control ([temperature control in general G05D 23/00](#))
- 1/503 {Radiator panels}
- 1/506 {Heat pipes}
- 1/52 . . Protection, safety or emergency devices; Survival aids ([life-saving in general A62](#))
- 1/525 . . . {Survival aids}
- 1/54 . . . Protection against radiation ([against radiation in general G21F](#))
- 1/543 {protecting the crew in manned spacecraft}
- 1/546 {shielding electronic equipment}
- 1/56 . . . Protection against meteoroids or space debris ([meteoroid or space debris detectors B64G 1/68](#))
- 1/58 . . . Thermal protection, e.g. heat shields ([thermal insulation in general F16L 59/00](#); chemical aspects, [see the relevant classes](#))
- 1/60 . . Crew or passenger accommodations

WARNING

Group [B64G 1/60](#) is impacted by reclassification into group [B64G 1/465](#).

Groups [B64G 1/465](#) and [B64G 1/60](#) should be considered in order to perform a complete search.

- 1/62 . . Systems for re-entry into the earth's atmosphere; Retarding or landing devices

WARNING

Group [B64G 1/62](#) is impacted by reclassification into groups [B64G 1/623](#) and [B64G 1/625](#).

Groups [B64G 1/62](#), [B64G 1/623](#) and [B64G 1/625](#) should be considered in order to perform a complete search.

- 1/623 . . . {Retarding devices, e.g. retrorockets}

WARNING

Group [B64G 1/623](#) is incomplete pending reclassification of documents from group [B64G 1/62](#).

Groups [B64G 1/62](#) and [B64G 1/623](#) should be considered in order to perform a complete search.

1/625 . . . {Landing devices; Undercarriages}

WARNING

Group [B64G 1/625](#) is incomplete pending reclassification of documents from group [B64G 1/62](#).

Groups [B64G 1/62](#) and [B64G 1/625](#) should be considered in order to perform a complete search.

- 1/64 . . Systems for coupling or separating cosmonautic vehicles or parts thereof, e.g. docking arrangements

- 1/641 . . . {Interstage or payload connectors ([docking systems B64G 1/646](#))}

WARNING

Group [B64G 1/641](#) is impacted by reclassification into groups [B64G 1/642](#), [B64G 1/6425](#) and [B64G 1/643](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 1/642 {Clamps, e.g. Marman clamps}

WARNING

Group [B64G 1/642](#) is incomplete pending reclassification of documents from group [B64G 1/641](#).

Groups [B64G 1/641](#) and [B64G 1/642](#) should be considered in order to perform a complete search.

- 1/6425 {arrangements for damping vibrations}

WARNING

Group [B64G 1/6425](#) is incomplete pending reclassification of documents from group [B64G 1/641](#).

Groups [B64G 1/641](#) and [B64G 1/6425](#) should be considered in order to perform a complete search.

- 1/643 {for arranging multiple satellites in a single launcher}

WARNING

Group [B64G 1/643](#) is incomplete pending reclassification of documents from group [B64G 1/641](#).

Group [B64G 1/643](#) is also impacted by reclassification into group [B64G 1/644](#).

Groups [B64G 1/641](#), [B64G 1/643](#) and [B64G 1/644](#) should be considered in order to perform a complete search.

- 1/644 {arranged for independent deployment}

WARNING

Group [B64G 1/644](#) is incomplete pending reclassification of documents from group [B64G 1/643](#).

Groups [B64G 1/643](#) and [B64G 1/644](#) should be considered in order to perform a complete search.

1/645 . . . {Separators}

WARNING

Group [B64G 1/645](#) is impacted by reclassification into groups [B64G 1/6455](#), [B64G 1/6457](#) and [B64G 1/6459](#).

All groups listed in this Warning should be considered in order to perform a complete search.

1/6455 {Pyrotechnics; Using heat}

WARNING

Group [B64G 1/6455](#) is incomplete pending reclassification of documents from group [B64G 1/645](#).

Groups [B64G 1/645](#) and [B64G 1/6455](#) should be considered in order to perform a complete search.

1/6457 {Springs; Shape memory actuators}

WARNING

Group [B64G 1/6457](#) is incomplete pending reclassification of documents from group [B64G 1/645](#).

Groups [B64G 1/645](#) and [B64G 1/6457](#) should be considered in order to perform a complete search.

1/6459 {Fluid-actuated}

WARNING

Group [B64G 1/6459](#) is incomplete pending reclassification of documents from group [B64G 1/645](#).

Groups [B64G 1/645](#) and [B64G 1/6459](#) should be considered in order to perform a complete search.

1/646 . . . {Docking or rendezvous systems (refueling in space [B64G 1/4024](#))}

WARNING

Group [B64G 1/646](#) is impacted by reclassification into groups [B64G 1/6462](#) and [B64G 1/6464](#).

Groups [B64G 1/646](#), [B64G 1/6462](#) and [B64G 1/6464](#) should be considered in order to perform a complete search.

1/6462 {characterised by the means for engaging other vehicles}

WARNING

Groups [B64G 1/6462](#) and [B64G 1/6464](#) are incomplete pending reclassification of documents from group [B64G 1/646](#).

Groups [B64G 1/646](#), [B64G 1/6462](#) and [B64G 1/6464](#) should be considered in order to perform a complete search.

1/6464 {Docking probes and receivers}

1/648 . . . {Tethers}

1/66 . . Arrangements or adaptations of apparatus or instruments, not otherwise provided for (instruments [per se](#), see the relevant classes, e.g. antennas for use in satellites [H01Q 1/28](#))

1/68 . . . of meteoroid or space debris detectors

3/00 Observing or tracking cosmonautic vehicles (radio or other waves systems for navigation or tracking [G01S](#))

4/00 Tools specially adapted for use in space

2004/005 . {Robotic manipulator systems for use in space}

5/00 Ground equipment for vehicles, e.g. starting towers, fuelling arrangements ([B64G 3/00](#) takes precedence)

2005/005 . {Systems for launching spacecraft from a platform at sea}

6/00 Space suits

7/00 Simulating cosmonautic conditions, e.g. for conditioning crews (simulators for teaching or training purposes [G09B 9/00](#))

2007/005 . {Space simulation vacuum chambers}

99/00 Subject matter not provided for in other groups of this subclass