User Manual of Using Coordinates Transformation API (version 2)

(Manual revised on 01.09.2017)

1. Introduction:

This is a service to conduct coordinates transformation using HTTP request. It provides coordinates transformation among the following five coordinate systems.

a) WGS84 Geographical Coordinates
b) HK1980 Grid Coordinates
c) HK1980 Geographical Coordinates
d) UTM Grid Coordinates
e) UTM Grid Reference Coordinates

2. How to use:

User can use a web browser to key-in URL (refer 2a), and then transformed coordinates will be returned in JSON format. Alternatively, user can conduct transformation programmatically with using the “HTTP request”.

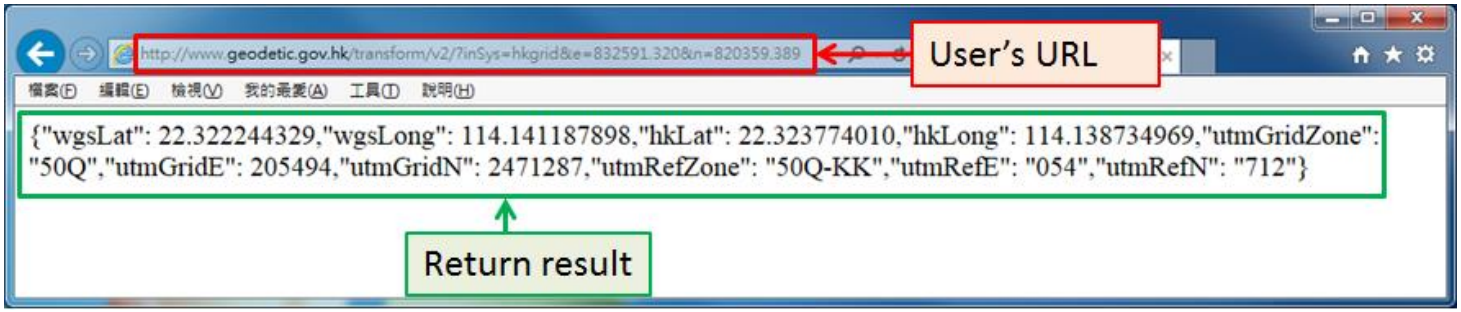


Figure 2.1 – Conduct Transformation with using Web Browser

2a. Structure of URL input

The query strings can be in any order. However, user should refer Table 2.2 to select a combination of parameters.

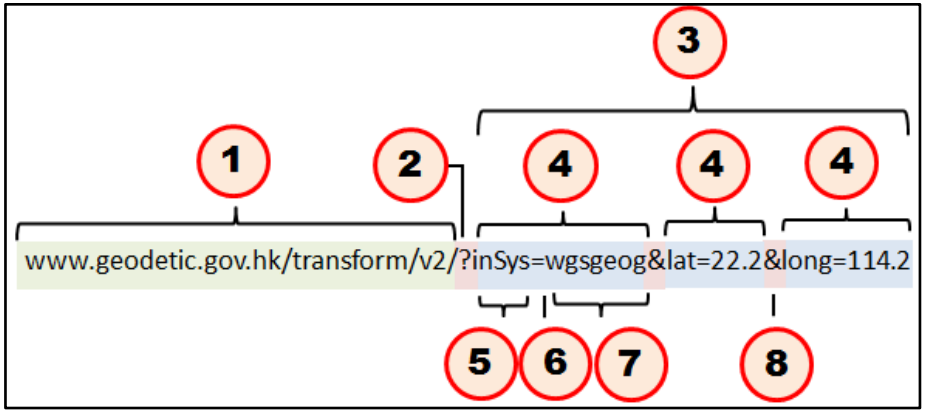


Figure 2.2 – Structure of URL

Section	Description
①	Geodetic Domain Name + Path
②	"?" character to separate Section ① and ③
③	Query string collection
④	Query strings (max. 7)
⑤	Name of query variable
⑥	"=" character to separate Section ⑤ and ⑦
⑦	Keyword or Value of variable
⑧	"&" character to separate query strings

Table 2.1 – Description of URL Components

2b. Required parameters for different coordinate systems

The required variables are different when using different input coordinate system. For the requirements of each variable, please refer to Section 2c. Examples are provided in Section 3.

Variables	Description	Coordinate System				
		WGS84 Geographical	**HK1980 Geographical**	**HK1980 Grid**	**UTM Grid**	**UTM Grid Reference**
inSys	Input Coordinate system	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
outSys	Output Coordinate system	Optional	Optional	Optional	Optional	Optional
lat	Latitude	Mandatory	Mandatory	Not required	Not required	Not required
long	Longitude	Mandatory	Mandatory	Not required	Not required	Not required
n	Northing	Not required	Not required	Mandatory	Mandatory	Mandatory
e	Easting	Not required	Not required	Mandatory	Mandatory	Mandatory
h	Height	Optional	Optional	Optional	Not required	Not required
zone	UTM Zone value	Not required	Not required	Not required	Mandatory	Mandatory
inUnit	Format of Geographical Coordinates for **inSys**	Optional	Optional	Not required	Not required	Not required
outUnit	Format of Geographical Coordinates for **outSys**	Optional	Optional	Optional	Optional	Optional

Table 2.2 – Parameters Requirement for Different Coordinate Systems

2c. Description and requirements of variables

Variables (Case insensitive)	Description	Remarks
inSys	Input Coordinate system	***wgsgeog*** World Geodetic System 1984 (WGS84) Geographical Coordinates ***hkgeog*** Hong Kong 1980 (HK1980) Geographical Coordinates ***hkgrid*** Hong Kong 1980 (HK1980) Grid Coordinates ***utmgrid*** Universal Traverse Mercator (UTM) Grid Coordinates ***utmref*** Universal Traverse Mercator (UTM) Grid Reference Coordinates
outSys	Output Coordinate system	Default value: ***all*** ***all*** All of the following five coordinates systems ***wgsgeog*** WGS84 Geographical Coordinates ***hkgeog*** HK1980 Geographical Coordinates ***hkgrid*** HK1980 Grid Coordinates ***utmgrid*** UTM Grid Coordinates ***utmref*** UTM Grid Reference Coordinates

Variables (Case insensitive)	Keyword of inSys	Description	Remarks
lat	wgsgeog	Latitude in WGS84 Geographical Coordinates	Range between ***22.13°*** and ***22.57°*** *(Decimal degree)*
	hkgeog	Latitude in HK1980 Geographical Coordinates	
long	wgsgeog	Longitude in WGS84 Geographical Coordinates	Range between ***113.82°*** and ***114.48°*** *(Decimal degree)*
	hkgeog	Longitude in HK1980 Geographical Coordinates	
zone	utmgrid	UTM Grid Zone	Value: ***49Q*** or ***50Q***
	utmref	UTM Grid Reference Zone	In WGS84 Datum: ***49Q-GE***, ***49Q-HE***, ***50Q-JK***, ***50Q-KK*** In HK1980 Datum: ***49Q-GQ***, ***49Q-HQ***, ***50Q-JV***, ***50Q-KV***
n	hkgrid	Northing in HK1980 Grid Coordinates	Range between ***799 000*** and ***848 000*** *(metres)*
	utmgrid	Northing in UTM Grid Coordinates	Range between ***2 450 600*** and ***2 498 000*** *(metres)*
	utmref	Northing in UTM Grid Reference Coordinates	The no. of digits of Northing and Easting coordinates must be between 3 and 5 (e.g. ***607***, ***6073***, ***60739***) Range between ***24506*00*** and ***24980*00*** *(metres) (3 digits case)* Range between ***24506*0*** and ***24980*0*** *(metres) (4 digits case)* Range between ***24506*00*** and ***24980*00*** *(metres) (5 digits case)*

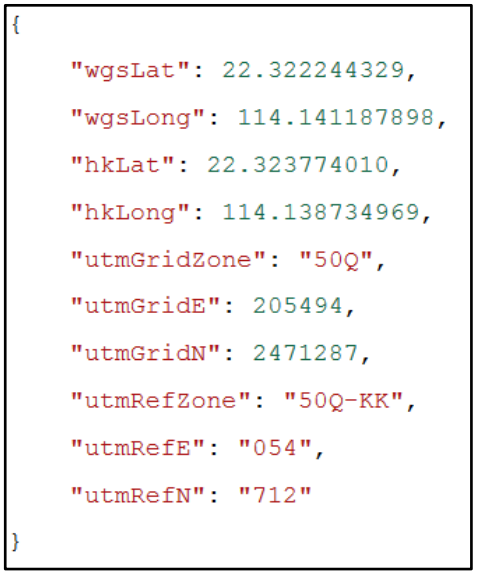
Variables (Case insensitive)	Keyword of inSys	Description	Remarks
e	hkgrid	Easting in HK1980 Grid Coordinates	Range between ***799 500*** and ***867 500*** *(metres)*
	utmgrid	Easting in UTM Grid Coordinates	For **zone** = ***49Q*** , Range between ***791 200*** and ***810 000*** *(metres)* For **zone** = ***50Q*** , Range between ***190 000*** and ***243 000*** *(metres)*
	utmref	Easting in UTM Grid Reference Coordinates	The no. of digits of Northing and Easting coordinates must be between 3 and 5 (e.g. ***607***, ***6073***, ***60739***) For **zone**= ***49Q-GE*** / ***49Q-GQ*** , range between ***791200*** and ***800000*** *(metres) (3 digits case)* For **zone**= ***49Q-HE*** / ***49Q-HQ*** , range between ***800000*** and ***810000*** *(metres) (3 digits case)* For **zone**= ***50Q-JK*** / ***50Q-JV*** , range between ***190000*** and ***200000*** *(metres) (3 digits case)* For **zone**= ***50Q-KK*** / ***50Q-KV*** , range between ***200000*** and ***243000*** *(metres) (3 digits case)* *For 4 digits and 5 digits case, range of value is greater than 10 times and 100 times respectively* e.g. For **zone**= ***49Q-GE*** / ***49Q-GQ*** , Range between ***7912000*** and ***8000000*** *(metres) (4 digits case)* Range between ***791200*** and ***800000*** *(metres) (5 digits case)*

Variables (Case insensitive)	Keyword of inSys	Description	Remarks
h	wgsgeog	Ellipsoidal height in WGS84 Geographical Coordinate System	**Ellipsoidal height for HK1980 Coordinate System** and **height above HKPD** can be provided Range between ***-1000*** and ***10000*** *(metres)*
	hkgeog	Ellipsoidal height in HK1980 Geographical Coordinate System	**Ellipsoidal height for HK1980 Coordinate System** can be provided Range between ***-1000*** and ***10000*** *(metres)*
	hkgrid	Height above the Hong Kong Principal Datum (HKPD)	**Ellipsoidal height for HK1980 Coordinate System** can be provided Range between ***-1000*** and ***10000*** *(metres)*
inUnit	wgsgeog / hkgeog	Format of input WGS84 / HK1980 Geographical Coordinates	Default value: ***decDeg*** ***dms*** Degree minute second (e.g. **22°30'40.5"** ⇔ ***22.30405***) For minute, Range between **0** and **59** For second, Range **<60** ***decDeg*** Decimal Degree (e.g. **22.51125°**⇔ ***22.51125***) ***decMin*** Decimal Minute (e.g. **22°30.675'** ⇔ ***22.30675***) For minute, Range ***<60***
outUnit		Format of output WGS84 / HK1980 Geographical Coordinates	

Table 2.3 – Description and requirement for input parameters

2d. Structure of return result

The return result is in JSON format (refer to Figure 2.3). The description and data type of parameters for return data is listed in Table 2.4.



```
{
    "wgsLat": 22.322244329,
    "wgsLong": 114.141187898,
    "hkLat": 22.323774010,
    "hkLong": 114.138734969,
    "utmGridZone": "50Q",
    "utmGridE": 205494,
    "utmGridN": 2471287,
    "utmRefZone": "50Q-KK",
    "utmRefE": "054",
    "utmRefN": "712"
}
```

Figure 2.3 – Sample of return result

Name of JSON data	Data Type	Description
wgsLat	Numbers	Latitude in WGS84 Geographical Coordinates
wgsLong	Numbers	Longitude in WGS84 Geographical Coordinates
wgsEllHgt*	Numbers	Ellipsoidal Height in WGS84 Geographical System
hkLat	Numbers	Latitude in HK1980 Geographical Coordinates
hkLong	Numbers	Longitude in HK1980 Geographical Coordinates
hkEllHgt*	Numbers	Ellipsoidal Height in HK1980 Geographical Coordinates
hkN	Numbers	Northing in HK1980 Grid Coordinates
hkE	Numbers	Easting in HK1980 Grid Coordinates
hkpd*	Numbers	Height above the Hong Kong Principal Datum (HKPD)
utmGridZone	Strings	Zone value in UTM Grid System
utmGridE	Numbers	Easting in UTM Grid System
utmGridN	Numbers	Northing in UTM Grid System
utmRefZone	Strings	Zone value in UTM Grid Reference System
utmRefE	Strings	Easting in UTM Grid Reference System
utmRefN	Strings	Northing in UTM Grid Reference System
ErrorCode	Numbers	**1**: Missing mandatory variable **2**: Unrecognized **inSys** / **outSys** value **3**: Invalid Input value(s) **4**: Coordinates out of range **5**: Identical of **inSys** and **outSys** value **6**: Unrecognized Northing and Easting coordinates of UTM Grid System / Grid Reference System. **7**: Unrecognized **inUnit** / **outUnit** value

** If no input Height value is provided by user, the return result will not contain Height value.*

Table 2.4 – Data Type and description of output parameters

3. Examples:

Example 1: *HK1980 Grid Coordinates → All five coordinate systems*	
URL	**http://www.geodetic.gov.hk/transform/v2/?inSys=hkgrid&e=832591.320&n=820359.389**
Result	{"wgsLat": 22.322244329,"wgsLong": 114.141187898,"hkLat": 22.323774010,"hkLong": 114.138734969,"utmGridZone": "50Q","utmGridE": 205494,"utmGridN": 2471287,"utmRefZone": "50Q-KK","utmRefE": "054","utmRefN": "712"}

Example 2: *HK1980 Grid Coordinates → WGS84 Geographical Coordinates*	
URL	**http://www.geodetic.gov.hk/transform/v2/?inSys=hkgrid&outSys=wgsgeog&e=832591.320&n=820359.389**
Result	{"wgsLat": 22.322244329,"wgsLong": 114.141187898}

Example 3: *WGS84 Geographical Coordinates → HK1980 Grid Coordinates*	
URL	**http://www.geodetic.gov.hk/transform/v2/?inSys=wgsgeog&outSys=hkgrid&lat=22.32224&long=114.14118&h=23.128**
Result	{"hkN": 820358.910,"hkE": 832590.508,"hkpd": 26.009}

Example 4: *UTM Grid Reference → HK1980 Grid Coordinates*	
URL	**http://www.geodetic.gov.hk/transform/v2/?inSys=utmref&outSys=hkgrid&e=054&n=712&zone=50Q-KK**
Result	{"hkN": 820200,"hkE": 832400}

4. Contact:

If you have any comment or suggestion of this service, please send email to geodetic@landsd.gov.hk.