

User Manual of Using Coordinates Transformation API (version 2)

(Manual revised on 24.08.2017)

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”.

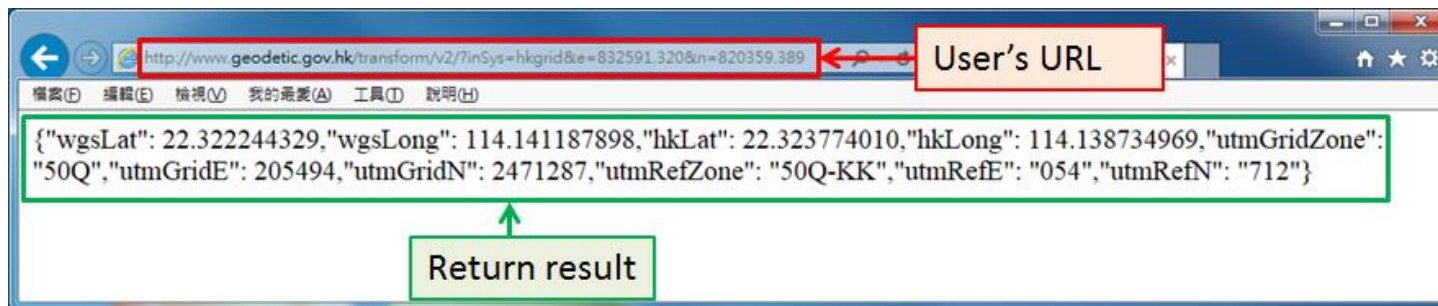


Figure 2.1 – Conduct Transformation with using Web Browser

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.

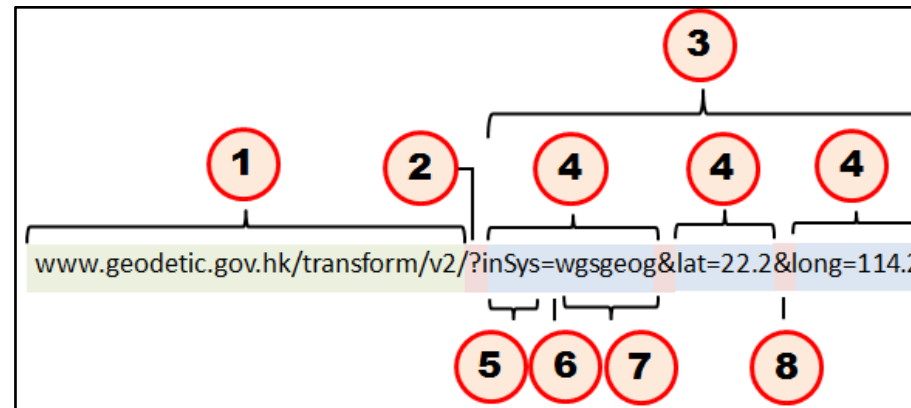


Figure 2.2 – Structure of URL

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 following Table 2.2 shows the required variables for different coordinate system of user input. 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
<i>inSys</i>	Coordinate system of user input	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
<i>outSys</i>	Coordinate system to be transformed to	Optional	Optional	Optional	Optional	Optional
<i>lat</i>	Latitude of Geographical Coordinates	Mandatory	Mandatory	Not required	Not required	Not required
<i>long</i>	Longitude of Geographical Coordinates	Mandatory	Mandatory	Not required	Not required	Not required
<i>n</i>	Northing Coordinates	Not required	Not required	Mandatory	Mandatory	Mandatory
<i>e</i>	Easting Coordinates	Not required	Not required	Mandatory	Mandatory	Mandatory
<i>h</i>	Height	Optional	Optional	Optional	Not required	Not required
<i>zone</i>	Zone value for UTM System	Not required	Not required	Not required	Mandatory	Mandatory
<i>inUnit</i>	Format of Geographical Coordinates for <i>inSys</i>	Optional	Optional	Not required	Not required	Not required
<i>outUnit</i>	Format of Geographical Coordinates for <i>outSys</i>	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
<i>inSys</i>	Coordinate system of user input	<i>wgsgeog</i> WGS84 Geographical Coordinates <i>hkgeog</i> HK80 Geographical Coordinates <i>hkgrid</i> HK80 Grid Coordinates <i>utmgrid</i> UTM Grid Coordinates <i>utmref</i> UTM Grid Reference Coordinates
<i>outSys</i>	Coordinate system to be transformed to	Default value: <i>all</i> <i>all</i> Transform to following five coordinates systems <i>wgsgeog</i> WGS84 Geographical Coordinates <i>hkgeog</i> HK80 Geographical Coordinates <i>hkgrid</i> HK80 Grid Coordinates <i>utmgrid</i> UTM Grid Coordinates <i>utmref</i> UTM Grid Reference Coordinates

Variables (Case insensitive)	Keyword of inSys	Description	Remarks
lat	wgsgeog	Latitude of WGS84 Geographical Coordinates	Range between 22.13° and 22.57° (<i>Decimal degree</i>)
	hkgeog	Latitude of HK1980 Geographical Coordinates	
long	wgsgeog	Longitude of WGS84 Geographical Coordinates	Range between 113.82° and 114.48° (<i>Decimal degree</i>)
	hkgeog	Longitude of 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 HK80 Datum: 49Q-GQ, 49Q-HQ, 50Q-JV, 50Q-KV
n	hkgrid	Northing of HK1980 Grid Coordinates	Range between 799 000 and 848 000 (<i>metres</i>)
	utmgrid	Northing of UTM Grid Coordinates	Range between 2 450 600 and 2 498 000 (<i>metres</i>)
	utmref	Northing of UTM Grid Reference Coordinates	a. The no. of digits of must be between 3 and 5 (e.g. 607, 6073, 60739) b. No. of digits between Northing and Easting coordinates must be identical Range between 2450600 and 2498000 (<i>metres</i>) (<i>3 digits case</i>) (<i>For 4 digits and 5 digits case, range of value is greater than 10 times and 100 times respectively</i>)

Variables (Case insensitive)	Keyword of inSys	Description	Remarks
e	hkgrid	Easting of HK1980 Grid Coordinates	Range between 799 500 and 867 500 (metres)
	utmgrid	Easting of 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 of UTM Grid Reference Coordinates	a. The no. of digits of must be between 3 and 5 (e.g. 607 , 6073 , 60739) b. No. of digits between Northing and Easting coordinates must be identical 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)
h	wgsgeog	Ellipsoidal height for 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 for HK1980 Geographical Coordinate System	Ellipsoidal height for HK1980 Coordinate System can be provided Range between -1000 and 10000 (metres)
	hkgrid	Hong Kong Principal Datum (HKPD)	Ellipsoidal height for HK1980 Coordinate System can be provided Range between -1000 and 10000 (metres)

Variables (Case insensitive)	Keyword of inSys	Description	Remarks
<i>inUnit</i>	wgsgeog / hkgeog	Format of Geographical Coordinates for input system	Default value: <i>decDeg</i> <i>dms</i> Degree minute second (e.g. 22°30'40.5" = 22.30405)
<i>outUnit</i>		Format of Geographical Coordinates for output system	<i>decDeg</i> Decimal Degree (e.g. 22.51125° = 22.51125) <i>decMin</i> Decimal Minute (e.g. 22°30.675' = 22.30675)

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 on WGS84 Datum
wgsLong	Numbers	Longitude on WGS84 Datum
wgsEllHgt*	Numbers	Ellipsoidal Height on WGS84 Datum
hkLat	Numbers	Latitude on HK1980 Datum
hkLong	Numbers	Longitude on HK1980 Datum
hkEllHgt*	Numbers	Ellipsoidal Height on HK1980 Datum
hkN	Numbers	Northing on HK1980 Grid System
hkE	Numbers	Easting on HK1980 Grid System
hkpd*	Numbers	Hong Kong Principal Datum (HKPD)
utmGridZone	Strings	Zone on UTM Grid System
utmGridE	Numbers	Easting on UTM Grid System
utmGridN	Numbers	Northing on UTM Grid System
utmRefZone	Strings	Zone on UTM Grid Reference System
utmRefE	Strings	Easting on UTM Grid Reference System
utmRefN	Strings	Northing on UTM Grid Reference System
ErrorCode	Numbers	1: Missing mandatory variable 2: Unrecognized inSys / outSys value 3: Invalid Input Value 4: Coordinates out of range 5: Identical of inSys and outSys value 6: Cannot fulfill the requirement(s) of Northing and Easting coordinates of UTM 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: <i>HK1980 Grid Coordinates → All five coordinate systems</i>	
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: <i>HK1980 Grid Coordinates → WGS84 Geographical Coordinates</i>	
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: <i>WGS84 Geographical Coordinates → HK1980 Grid Coordinates</i>	
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: <i>UTM Grid Reference → HK1980 Grid Coordinates</i>	
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.