File specifications

Version 4.5

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Contents

1.MOVE3 File Structures

In this manual the structures of the MOVE3 input and output files are reviewed. The user can either create the input files himself using an ASCII text editor, or let MOVE3 create the files using the integrated intelligent editors. A project is defined as a group of files containing all data necessary for the processing of a network.

1.1.MOVE3 Input Files

All MOVE3 input files are standard ASCII-files. They may be created and modified using any ASCII text editor. However, it is safer and more convenient to use the intelligent built-in editors of the Windows user interface. Files, which have the file name in common, are part of the same project. A project is defined, as a group of files comprising all data needed to process a network. Files in a project share the same file name, but have different extensions:

Project.prj:	contains project dependent parameters, such as geometry, adjustment and testing parameters and print switches;
project.tco:	contains terrestrial coordinates, i.e. the coordinates of the terrestrial network in a map projection or in ellipsoidal coordinates;
project.gco:	contains GPS coordinates, either cartesian, or ellipsoidal, or in a map projection;
project.geo:	contains the geoid heights of the stations;
project.obs:	contains all observations.

In previous versions of MOVE3 the observations were stored in two files. A *.tob* for the terrestrial observations and a *.gob* file for the GPS observations. As from MOVE3 version 3.0 all observations will be stored in one observation file *.obs*.

MOVE3 versions 3.0 and later can read projects containing *.tob*- en *.gob*-files. MOVE3 version 3.0 and later projects cannot be used in older MOVE3 versions.

File types are identified by the file extensions ('prj', 'tco', 'gco', 'geo', 'obs' and also 'tob' and 'gob'). Other file extensions are not recognised by MOVE3.
The input files are subdivided into a number of blocks. The blocks are separated by a block separator: a record beginning with the $-symbol. This is also necessary in case the block is empty. The user is free to add comment to the record after the $-symbol. The first four records of all input files are reserved for the file header comprising two blocks:

- the first block contains information on the MOVE3 version and the file type;
- the second block contains the network name (maximum 30 characters).

For instance:

MOVE3 V4.5.0 PRJ file

$

Kamerik

$

This is the file header from the project file of Kamerik, created by MOVE3 version 4.5.0. Based on the network name, the name of this project file could e.g. be 'kamerik.prj'. Other files in the project would then be called: 'kamerik.tco', 'kamerik.obs' and so on.
In addition to the presence of a file header, the following additional conventions apply with respect to the contents of MOVE3 input files:

- Fields in a record are not bound to a specific position, provided they are separated by at least two spaces. The order of fields within a record is fixed. The maximum record length is 255 characters.
- There are 16 positions available for station names. Any ASCII symbol may be included in the station name. However, the station name may not include two successive spaces since spaces are regarded as field separators.
- MOVE3 will *not* supply default values for standard deviations, which are defined as 0.0 in the input files.
- Files must end with a block separator ($-record).

On the MOVE3 installation CD input files of the 'Kamerik' demonstration project are available.

1.1.1.Project file (PRJ)

All parameters of the *Options* menu are gathered in the project or PRJ file. The standard file header is followed by seven parameter blocks:

- Block 1 (Included File types) holds information on coordinate and observation file types included in the project.
- Block 1 (Included File types) holds information on coordinate and observation file types included in the project.
- Block 2 (Geometry Parameters) holds information on the dimension of the solution, the map projection and the reference ellipsoid.
- Block 3 (Adjustment Parameters) holds parameters with information on the adjustment, e.g. phase, maximum number of iterations and break-off criterion of the iteration process.
- Block 4 (Precision and Testing Parameters) holds the parameters for precision and statistical testing.
- Block 5 (Default Standard Deviations) holds the default absolute and relative standard deviations for observations and known stations.
- Block 6 (Additional Parameters) holds information on additional unknowns: scale factors, vertical refraction coefficients, azimuth offsets and GPS transformation parameters.
- Block 7 (Print Output Switches) holds information on which parts of the input, adjustment, precision and testing results are to be appended to the OUT file.

In the following tables a complete description is included of the parameters, their default values and ranges.

- The following conventions apply:
- 'float' represents floating point numbers;
- 'char' represents characters;
- 'int' represents integers;
- 'dms' represents degrees minutes seconds (separated by one space);
- curly brackets '{}' are used to indicate a range of values;
- the parameters and the attached values may both be in uppercase or lowercase.

```
MOVE3 V4.5.0  PRJ file
$
Project name
```

$ Block 1: INCLUDED FILE TYPES			
Parameter	**Type**	**Default**	**Values**
TerCoord (switch for TCO file)	char	YES	YES, NO
GPSCoord (switch for GCO file)	char	YES	YES, NO
TerObserv (switch for terrestrial observations in OBS file)	char	YES	YES, NO
GPSObserv (switch for GPS observations in OBS file)	char	YES	YES, NO
GeoidModel (switch for GEO file) YES = Automatic Using a specific geoid will create a project file that is not backward compatible with older versions of MOVE3	char	NO	YES, NO, GEOIDNLGEO2008BESSEL, GEOIDNLGEO2008GRS80, GEOIDNLGEO2004BESSEL, GEOIDNLGEO2004GRS80, GEOIDHBG03INTERNATIONAL, GEOIDHBG03GRS80, GEOID99, GEOID03, GEOID09, GEOID12, GEOIDCANADA, GEOIDCGG2013A, GEOIDGUM97, GEOIDEGM96, GEOIDAUSGEOID09 GEOIDAUSGEOID98, GEOIDNZGEOID09, GEOIDFIN2000, GEOIDFIN2005, GEOIDEGM2008, GEOIDLV98, GEOIDSGEOID09, GEOIDPT08
FeatureCode (type of feature code used)	char	NONE	NONE, LKI, USER
ProjectHeight	float	0	any value
ProjectType	char	DEFAULT	DEFAULT KADASTER AUSTRALIA_SP1

$ Block 2: GEOMETRY PARAMETERS			
Parameter	**Type**	**Default**	**Values**
Dimension (dimension solution)	int	3	1, 2, 3
Projection (map projection)	char	NONE	NONE RD RDNAPTRANS2018 RDNAPTRANS LAMBERT72 GAUSS_KRUGER UTM_NORTH UTM_SOUTH LOCAL TM STEREOGRAPHIC LAMBERT1 LAMBERT2 BRSO MRSO OBLIQUEMERCATOR IRISHGRID_OSTN15 OSGB36_OSTN02 OSGB36_OSTN15
LonOriginCM (longitude of origin/	dms	depends on	{0, 360 E}

$ Block 2: GEOMETRY PARAMETERS			
Parameter	**Type**	**Default**	**Values**
central meridian)		projection	
LatOrigin (latitude of origin)	dms	depends on projection	{-90 S, 90 N}
StandPar1 (first standard parallel, Lambert)	dms	depends on projection	{-90 S, 90 N}
StandPar2 (second standard parallel, Lambert)	dms	depends on projection	{-90 S, 90 N}
SkewAzimuth	dms	depends on projection	{-360, 360}
ProjScaleFac (scale factor of projection)	float	depends on projection	> 0
FalseEasting (false easting of projection in m)	float	depends on projection	any value
FalseNorthing (false northing of projection in m)	float	depends on projection	any value
Ellipsoid (reference ellipsoid)	char	to be specified	USER AIRY MODIFIED_AIRY AUSTRALIAN_NATIONAL BESSEL_1841 MODIFIED_BESSEL CLARKE_1866 CLARKE_1880 EVEREST MODIFIED_EVEREST FISHER_1960 MODIFIED_FISHER_1960 FISHER_1968 GRS_1967 GRS_1980 HELMERT_1906 HOUGH INTERNATIONAL KRASSOVSKY_1940 SOUTH_AMERICAN_1969 WGS72 WGS84 TIMBALAI_EVEREST
SemiMajAx (semi major axis reference ellipsoid in m)	float	to be specified	> 0
InvFlatt (inverse flattening reference ellipsoid)	float	to be specified	> 0
TransProj	char	NONE	NONE RDNAPTRANS
GPSCoordType (type of GPS coordinates)	char	XYZ	XYZ, ELL, ENH

$ Block 3: ADJUSTMENT PARAMETERS			
Parameter	**Type**	**Default**	**Values**
AdjDesign (adjustment/design switch)	char	ADJUST	ADJUST, DESIGN
Phase (phase of adjustment or design)	int	1	1 Free network 2 Pseudo constrained 3 Weighted constrained 4 Absolute constrained
InnerConstraint	char	FALSE	FALSE, TRUE, TRUE_KNOWNS
AngleUnit (unit of angular measurements)	char	GON	GON, DEG, DMS
LinearUnit (unit of distances)	char float char	m 1.0 meters	maximum 3 characters > 0 METERS INTSURVEYFOOT USSURVEYFOOT
IterMax (maximum number of iteration)	int	3	> 0
Epsilon (break-off criterion iteration process in m)	float	0.0001	> 0.0
Delta (singularity criterion)	float	1.0e-06	> 0.0
CovMatrix (covariance matrix)	char	NONE	NONE, FULL, REDUCED, DEFXYZ,FULLCSV, DESIGNMATRIX, ONRONDHEID,STATION SUMMARYGRID, STATIONSUMMARY
ApostVarFac (a posteriori variance factor) Not available in user interface	char	DONOT	DONOT, ONFAIL, ALWAYS
VarComponent (variance component) Not available in user interface	char	NONE	NONE, TERGPS, OBSTYPE, INSTRUMENT
VarIterMax (maximum number of iteration of variance factor) Not available in user interface	int	5	≥ 0
VarEpsilon (break-off criterion iteration process of variance factor) Not available in user interface	float	0.0100	≥ 0.0
FilterFreeStations (filtering of uncontrolled observations)	char	FALSE	TRUE, FALSE
EstAddTrf (setting for the use of additional parameters)	char	FREENET	DONOT, FREENET, ALWAYS
COGO3Computation (setting to exclude special cases from approximate coordinate computation) Not available in user interface	char	ALL	ALL, NORESECTION, NOINTERSECTION NOREINTERSECTION
BaseStation1 BaseStation2 BaseStation3	char		station name

$ Block 4: PRECISION AND TESTING PARAMETERS			
Parameter	**Type**	**Default**	**Values**
Sigma0 (square root of variance of unit weight)	float	1.0	> 0.0
Alfa0 (significance level W-test)	float	0.001	0.001, 0.01, 0.05
AlfaShiftVector (significance level W-test Shift Vector)	float	0.001	0.001, 0.01, 0.05, 0.32, 0.50
Beta (power statistical testing)	float	0.80	0.70, 0.80, 0.90
ConfidenceLevel1D (confidence level for 1D standard deviations)	float	0.683 (standard)	0.683, 0.90, 0.95, 0.99
ConfidenceLevel2D (confidence level for 2D standard ellipses)	float	0.394 (standard)	0.394, 0.90, 0.95, 0.99
C0 (C0 parameter criterion matrix, in cm²)	float	0.000	≥ 0.0
C1 (C1 parameter criterion matrix, in cm²/km)	float	1.000	≥ 0.0
DataSnooping (datasnooping off or on)	char	NO	NO, YES
DataSnoopingFTestHigh (datasnooping stop criterion, upper F-test value)	float	2.0	≥ 0.0
DataSnoopingFTestLow (datasnooping stop criteria, lower F-test value)	float	0.5	≥ 0.0
DataSnoopingMaxRemovals (datasnooping stop criteria, maximum number of removed observations/known stations)	int	25	≥ 0
DataSnoopingMinRedundancy (datasnooping stop criteria, minimal redundancy of observation to be removed)	float	51.0	0-100%

$ Block 5: DEFAULT STANDARD DEVIATIONS			
Parameter	**Type**	**Default**	**Values**
SigmaAbsR (absolute standard deviation directions in AngleUnit)	float	0.00100 gon 0.00090 deg 0 0 03.2 dms	≥ 0.0
SigmaRelR (relative standard deviation directions in AngleUnit.km)	float	0.0	≥ 0.0
SigmaAbsS (absolute standard deviation distances in m)	float	0.0100	≥ 0.0
SigmaRelS (relative standard deviation distances in ppm)	float	0.0	≥ 0.0
SigmaAbsZ (absolute standard deviation zenith angles in AngleUnit)	float	0.00100 gon 0.00090 deg 0 0 03.2 dms	≥ 0.0
SigmaRelZ (relative standard deviation zenith angles in AngleUnit.km)	float	0.0	≥ 0.0
SigmaAbsA (absolute standard deviation azimuths in AngleUnit)	float	0.00100 gon 0.00090 deg 0 0 03.2 dms	≥ 0.0
SigmaRelA (relative standard deviation azimuths in AngleUnit.km)	float	0.0	≥ 0.0
SigmaDHA (standard deviation height differences in mm)	float	0.0	≥ 0.0
SigmaDHB (relative standard deviation height differences in mm/√km)	float	1.0	≥ 0.0
SigmaDHC (relative standard deviation height differences in mm/km)	float	0.0	≥ 0.0
SigmaAbsDX (absolute standard deviation GPS baselines in m)	float	0.0100	≥ 0.0
SigmaRelDX (relative standard deviation GPS baselines in ppm)	float	1.0	≥ 0.0
SigmaAbsX (standard deviation observed GPS coordinates in m)	float	10.0000	≥ 0.0

$ Block 5: DEFAULT STANDARD DEVIATIONS			
Parameter	**Type**	**Default**	**Values**
SigmaLatLon (standard deviation latitudes,longitudes in m)	float	0.0100	≥ 0.0
SigmaHgt (standard deviation heights in m)	float	0.0100	≥ 0.0
SigmaXYZ (standard deviation cartesian coordinates in m)	float	0.0100	≥ 0.0
SigmaCentr (centring error in m)	float	0.0000	≥ 0.0
SigmaInstr (h.i. error in m)	float	0.0000	≥ 0.0
SigmaTape (standard deviation for eccentric measure in m)	float	0.0100	≥ 0.0
SigmaOrthogonal (standard deviations for determination of orthogonal projection in m)	float	0.0100	≥ 0.0
SigmaDistLine (standard deviation for geometrical relations with distances in m)	float	0.0150	≥ 0.0
SigmaAngle (standard deviation for geometric relations with angles in AngleUnit)	float	0.10000 gon 0.09000 deg 0 03 36 dms	≥ 0.0
SigmaIdealXY (idealisation precision horizontal position in m)	float	0.0000	≥ 0.0
SigmaIdealH (idealisation precision height in m)	float	0.0000	≥ 0.0
SigmaGeoidAbs (absolute precision Geoid model in m)	float	0.0000	≥ 0.0
SigmaGeoidRel (relative precision Geoid model in ppm)	float	0.0000	≥ 0.0

$ Block 6: ADDITIONAL PARAMETERS			
Parameter	**Type**	**Default**	**Values**
ScaleFacn (scale factor related to distance Sn)	char float	FREE 1.0	FREE, FIXED > 0.0
VertRefrn (vertical refraction coefficient related to vertical angle Zn)	char float	FIXED 0.13	FREE, FIXED any value
AzimOffsn (azimuth offset related to azimuth An in AngleUnit)	char float	FIXED 0.0	FREE, FIXED depends on AngleUnit
GPSTrfTX (GPS transformation parameter translation X)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfTY (GPS transformation parameter translation Y)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfTZ (GPS transformation parameter translation Z)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfRX (GPS transformation parameter rotation X)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfRY (GPS transformation parameter rotation Y)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfRZ (GPS transformation parameter rotation Z)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED any value ≥ 0.0
GPSTrfSc (GPS transformation parameter scale factor)	char float float	FREE 0.0 0.0	FREE, FIXED, WEIGHTED ≥ 0.0 ≥ 0.0
GPSCGX (X Rotation Center for Molodensky method)	float	0.0	any value
GPSCGY (Y Rotation Center for Molodensky method)	float	0.0	any value
GPSCGZ (Z Rotation Center for Molodensky method)	float	0.0	any value
LocalTrfType (type of similarity transformation for Local Coordinates	char	NONE	1D, 2D, 3D, 2D1D, 2DNOSCALE, 3DNOSCALE, 2D1DNOSCALE

$ Block 7: PRINT OUTPUT SWITCHES			
Parameter	**Type**	**Default**	**Values**
PrProjConst (print switch projection and ellipsoid constants)	char	YES	YES, NO
PrInpCoords (print switch input coordinates)	char	YES	YES, NO
PrAddParms (print switch input additional parameters)	char	YES	YES, NO
PrInpObsv (print switch input observations)	char	YES	YES, NO
PrAdjCoords (print switch adjusted coordinates)	char	YES	YES, NO
PrExtReliab (print/compute switch external reliability)	char	NO	YES, NO
PrAbsStandEll (print switch absolute standard ellipses)	char	YES	YES, NO
PrRelStandEll (print switch relative standard ellipses)	char	YES	YES, NO
PrTestCoords (print switch test results coordinates)	char	YES	YES, NO
PrErrCoords (print switch estimated errors coordinates)	char	YES	YES, NO
PrAdjParms (print switch adjusted additional parameters)	char	YES	YES, NO
PrAdjObsv (print switch adjusted observations)	char	YES	YES, NO
PrTestObsv (print switch test results observations)	char	YES	YES, NO
PrErrObsv (print switch estimated errors observations)	char	YES	YES, NO
LogFile	char	ASCII	ASCII, XML

$ End of file

The following parameters cannot be changed through the user interface (for future use):
- ApostVarFac
- VarComponent
- VarIterMax
- VarEpsilon
- EstAddTrf
- Delta
- **Sigma0**
- COGO3Computation

1.1.2.Terrestrial coordinates file (TCO)

The TCO file is the input file containing the coordinates of the terrestrial network, either in a map projection (X East, Y North, height), or ellipsoidal (latitude, longitude, height). The file may comprise both known and approximate coordinates. A coordinate is marked as a known coordinate by an asterisk * directly behind the pertaining coordinate. Alternatively an asterisk * on the first position of the record indicates that all three coordinates are known. A record is deselected by a number sign # on the first position of the record.
If a number sign # is placed directly behind a coordinate, the coordinate is known, but it will not be used as a known station in the computations. These deselected known coordinates will not be updated after a COGO3 computation.
The file must contain the PROJECTION parameter identifying the map projection. In case the file contains ellipsoidal coordinates the PROJECTION parameter must be set to NONE. The value of this parameter must be equal to the value of the associated parameter in Block 2 of the PRJ file.

Parameter : PROJECTION
Values : see paragraph 1.1, MOVE3 Input Files, under

Project file (PRJ)

For future use:

If the coordinates are not specified in meters the file must contain the LINEARUNIT parameter. The LINEARUNIT parameter is the conversion factor to meters.

Parameter : *LINEARUNIT*
Values : > 0.0

In case the international survey foot is used the LINEARUNIT parameter reads:

LINEARUNIT 0.3048

In case RD coordinates are used the PROJECTION parameter reads:

PROJECTION RD

In the general case where a projection is defined, coordinate records contain the following successive fields:

[#] :	optional deselection flag
[*] :	optional fix flag
station name :	maximum 16 characters
X East[*] or [#]:	in LINEARUNIT
Y North[*] or [#]:	in LINEARUNIT
height[*] or [#]:	in LINEARUNIT
standard deviation X East :	in LINEARUNIT
standard deviation Y North :	in LINEARUNIT
standard deviation height :	in LINEARUNIT
ID idealisation precision :	'IP'
idealisation precision XY:	in LINEARUNIT
idealisation precision H :	in LINEARUNIT

In case the TCO file contains ellipsoidal coordinates the PROJECTION parameter reads:

PROJECTION NONE

Coordinate records then contain the following successive fields:

[#] :	optional deselection flag
[*] :	optional fix flag
station name :	maximum 16 characters
latitude[*] or [#]:	in degrees minutes seconds
longitude[*] or [#]:	in degrees minutes seconds
height[*] or [#]:	in LINEARUNIT
standard deviation latitude :	in LINEARUNIT
standard deviation longitude :	in LINEARUNIT
standard deviation height :	in LINEARUNIT
ID idealisation precision :	'IP'
idealisation precision XY:	in LINEARUNIT
idealisation precision H :	in LINEARUNIT

The flags, # and *, are optional as indicated by the square brackets [ ]. Standard deviations need only be specified for known stations.

Latitudes and longitudes are in degrees, minutes and seconds, and must be separated by *one* (and only one) space.

Latitudes range from -90 S to +90 N degrees, longitudes range from 0 to +360 E degrees.

1.1.3.GPS coordinates file (GCO)

The GCO file is the input file containing the coordinates of the GPS stations, either as cartesian WGS'84 coordinates (X, Y, Z), as ellipsoidal WGS'84 coordinates (latitude, longitude, height), or in a map projection (X East, Y North, height). The file may contain both known and approximate coordinates. A coordinate is marked as a known coordinate by an asterisk *, directly behind the pertaining coordinate. Alternatively an asterisk * on the first position of the record indicates that the complete coordinate triplet is known. A record is deselected by a number sign # on the first position of the record.
If a number sign # is placed directly behind a coordinate, the coordinate is known, but it will not be used as a known station in the computations. These deselected known coordinates will not be updated after a COGO3 computation.
The file must contain the COORDINATES parameter which identifies the coordinate type (cartesian, ellipsoidal, map projection). The value of this parameter must be equal to the value of the parameter GPSCoordType in Block 2 of the PRJ file.

Parameter : *COORDINATES*
Values : *XYZ, ELL, ENH*

If the coordinates are not specified in meters the file also must contain the LINEARUNIT parameter. The LINEARUNIT parameter is the conversion factor to meters.

Parameter : *LINEARUNIT*
Values : > 0.0

If the coordinate type is XYZ, records contain the following successive fields:

[#] :	optional deselection flag
[*] :	optional fix flag
station name :	Maximum 16 characters
X[*] or [#]:	in LINEARUNIT
Y[*] or [#]:	in LINEARUNIT
Z[*] or [#]:	in LINEARUNIT
standard deviation X :	in LINEARUNIT
standard deviation Y :	in LINEARUNIT
standard deviation Z :	in LINEARUNIT
ID idealisation precision :	'IP'
idealisation precision XY:	in LINEARUNIT
idealisation precision H :	in LINEARUNIT

If the coordinate type is ELL, records contain the following successive fields:

[#] :	optional deselection flag
[*] :	optional fix flag
station name :	maximum 16 characters
latitude[*] or [#]:	in degrees minutes seconds
longitude[*] or [#]:	in degrees minutes seconds
height[*] or [#]:	in LINEARUNIT
standard deviation latitude :	in LINEARUNIT
standard deviation longitude :	in LINEARUNIT
standard deviation height :	in LINEARUNIT
ID idealisation precision :	'IP'
idealisation precision XY:	in LINEARUNIT
idealisation precision H :	in LINEARUNIT

If the coordinate type is ENH, records contain the following successive fields:

[#] :	optional deselection flag
[*] :	optional fix flag
station name :	maximum 16 characters
X East[*] or [#]:	in LINEARUNIT
Y North[*] or [#]:	in LINEARUNIT
height[*] or [#]:	in LINEARUNIT
standard deviation X East :	in LINEARUNIT
standard deviation Y North :	in LINEARUNIT
standard deviation height :	in LINEARUNIT
ID idealisation precision :	'IP'
idealisation precision XY:	in LINEARUNIT
idealisation precision H :	in LINEARUNIT

The flags, * and #, are optional as indicated by the square brackets [ ]. Standard deviations need only be specified for known stations.

Latitudes and longitudes are in degrees, minutes and seconds, and must be separated by *one* (and only one) space.

Latitudes range from -90 S to +90 N degrees, longitudes range from 0 to +360 E degrees.

1.1.4.Observation file (OBS)

The OBS file is the input file containing all observations (both terrestrial and GPS). The file begins with the standard 4-record file header, followed by the ANGLEUNIT parameter identifying the unit of directions, zenith angles and azimuths. The value must be equal to the value of the associated parameter in Block 3 of the PRJ-file.

Parameter : *ANGLEUNIT*
Values : *GON, DEG, DMS*

If the observations are not specified in meters the file also must contain the LINEARUNIT parameter. The LINEARUNIT parameter is the conversion factor to meters.

Parameter : *LINEARUNIT*
Values : > 0.0

A record may include the following observation types:

Total station record
A total station record contains a direction, distance and zenith angle or a combination of these three observation types. A total station record always starts with following fields:

total station ID :	TS
station name :	maximum 16 characters
target name :	maximum 16 characters
station instrument height :	in LINEARUNIT
target instrument height :	in LINEARUNIT

Station and target instrument heights must *always* be included in the record. If no instrument heights are used (e.g. in a 2D network), specify 0.0.

After these mandatory fields the individual observation types are included:

Direction R:

observation type :	Rn
reading[#] :	in gon/deg/dms depending on ANGLEUNIT
absolute standard deviation :	in gon/deg/dms
relative standard deviation :	in gon.km/deg.km/dms.km

Rn : n = 0 to 9 is related to series n.

Distance S:

observation type :	Sn
reading[#] :	in LINEARUNIT
absolute standard deviation :	in LINEARUNIT
relative standard deviation :	in ppm

Sn : n = 0 to 9 is related to scale factor n.

Zenith angle Z:

observation type :	Zn
reading[#] :	in gon/deg/dms depending on ANGLEUNIT
absolute standard deviation :	in gon/deg/dms
relative standard deviation :	in gon.km/deg.km/dms.km

Zn : n = 0 to 9 is related to refraction coefficient n.

A total station record may also contain following fields:

dimension ID:	1D / 2D / 3D
eccentricity ID	FB
Forward / Backward:	
reading Forward(-) / Backward (+):	in LINEARUNIT
eccentricity ID	LR
Left / Right:	
reading Left (-) / Right (+):	in LINEARUNIT
height to be solved for the instrument	IHGT0 to IHGT9

The direction series (R0...R9) have no **relationship with scale factors (S0...S9) and refraction coefficients (Z0...Z9). For example: a total station record can consist of R1, S0 and Z0.**

Azimuth record AZ:

azimuth ID :	AZ
station name :	maximum 16 characters
target name :	maximum 16 characters
station instrument height:	in LINEARUNIT
target instrument height :	in LINEARUNIT
observation type :	An
reading[#] :	in gon/deg/dms depending on ANGLEUNIT
absolute standard deviation :	in gon/deg/dms
relative standard deviation :	in gon.km/deg.km/dms.km

An : n = 0 to 9 is related to azimuth offset n.

Station and target instrument heights must *always* be included in the record. If no instrument heights are used (e.g. in a 2D network), specify 0.0.

Height difference DH:

height difference ID :	DH
station name :	maximum 16 characters
target name :	maximum 16 characters
reading[#] :	in LINEARUNIT
length levelling line :	in LINEARUNIT
absolute standard deviation A:	in mm
relative standard deviation B:	in mm/√km
relative standard deviation C:	in mm/km

The length of the levelling line followed during the measurement of a height difference must be included. If this length is specified as 0.0, MOVE3 will compute this length using the approximate coordinates.

GPS baseline DX:

GPS baseline ID :	DX
station name :	maximum 16 characters
target name :	maximum 16 characters
DX[#]:	in LINEARUNIT
DY[#] :	in LINEARUNIT
DZ[#] :	in LINEARUNIT

The precision is given by:

standard deviation DX :	in LINEARUNIT
Correlation DXDY :	correlation coefficient
standard deviation DY :	in LINEARUNIT
Correlation DXDZ :	correlation coefficient
Correlation DYDZ :	correlation coefficient
standard deviation DZ :	in LINEARUNIT
multiplication factor ID	M0
multiplication factor	any positive value

and/or by:
standard deviation absolute : in LINEARUNIT
standard deviation relative : in ppm
dimension ID: 2D / 3D (default 3D)

Components of a GPS baseline cannot be deselected individually. All components can be deselected by placing a number sign behind the DX, DY and DZ readings.

Observed GPS coordinate X:
GPS coordinate ID : X
station name : maximum 16 characters
X[#] : in LINEARUNIT
Y[#] : in LINEARUNIT
Z[#] : in LINEARUNIT
standard deviation X : in LINEARUNIT
standard deviation Y : in LINEARUNIT
standard deviation Z : in LINEARUNIT

Components of a GPS coordinate cannot be deselected individually. All components can be deselected by placing a number sign behind the X, Y and Z readings.

Local coordinate X:
Local coordinate ID : LC
station name : maximum 16 characters
E[#] : in LINEARUNIT
N[#] : in LINEARUNIT
H[#] : in LINEARUNIT
standard deviation East : in LINEARUNIT
standard deviation North : in LINEARUNIT
standard deviation Height : in LINEARUNIT

Shift vector X:
Shift vector ID : SV
station name : maximum 16 characters
target name : maximum 16 characters
DE[#] : in LINEARUNIT
DN[#] : in LINEARUNIT
DH[#] : in LINEARUNIT
standard deviation DEast : in LINEARUNIT
standard deviation DNorth : in LINEARUNIT
standard deviation DHeight : in LINEARUNIT

Geometrical relations
All geometrical relations always start with:

geometrical relation : GR

The observation types contain following field:

Angle
name At station : maximum 16 characters
name From station : maximum 16 characters
name To station : maximum 16 characters
observation type[#] : AN
reading : in gon/deg/dms depending on ANGLEUNIT
standard deviation : in gon/deg/dms

Perpendicular
name At station : maximum 16 characters
name From station : maximum 16 characters
name To station : maximum 16 characters
observation type[#] : PD
standard deviation: in gon/deg/dms depending on ANGLEUNIT

Collinearity

name At station :	maximum 16 characters
name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type [#] :	CL
standard deviation :	in LINEARUNIT

Diatance point - line

name At station :	maximum 16 characters
name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type[#] :	PL
reading:	in LINEARUNIT
standard deviation:	in LINEARUNIT

Parallelism (with distance)

name station 1 (line 1):	maximum 16 characters
name station 2 (line 1):	maximum 16 characters
name station 3 (line 2):	maximum 16 characters
name station 4 (line 2):	maximum 16 characters
observation type[#] :	PA
standard deviation:	in gon/deg/dms depending on ANGLEUNIT

If a the mutual distance between the lines has been measured, the record may also contain following fields:

observation type[#]:	LL
reading:	in LINEARUNIT
standard deviation:	in LINEARUNIT

Perpendicular lines

name station 1 (line 1):	maximum 16 characters
name station 2 (line 1):	maximum 16 characters
name station 3 (line 2):	maximum 16 characters
name station 4 (line 2):	maximum 16 characters
observation type[#] :	AL
standard deviation:	in gon/deg/dms depending on ANGLEUNIT

Chainage Offset

name At station :	maximum 16 characters
name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type[#] :	CH
reading chainage:	in LINEARUNIT
standard deviation:	in LINEARUNIT
observation type[#]	PL
reading offset:	in LINEARUNIT
standard deviation:	in LINEARUNIT

Double distance

name At station :	maximum 16 characters
name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type[#] :	DD
reading distance:	in LINEARUNIT
standard deviation:	in LINEARUNIT
observation type[#]	DD
reading distance:	in LINEARUNIT
standard deviation:	in LINEARUNIT
left right ID:	LR
left right information:	0 = left, 1 = right

Tape distance

name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type[#] :	TD

reading distance:	In LINEARUNIT
standard deviation:	In LINEARUNIT

Identical stations

name From station :	maximum 16 characters
name To station :	maximum 16 characters
observation type[#] :	EQ
dimension	3D, 2D or 1D

Contrary to other observation types the deselection symbol (#) for geometrical relation is placed directly behind the observation type. The reason for this is that some of the observation types (e.g. co linearity) do not contain a reading.

In case of a design computation the observation readings are read but disregarded in the actual computation. A (dummy) value, e.g. 0.0 must be included.

1.1.5.Geoid heights file (GEO)

The GEO file is the input file containing the geoid heights of the stations. The file begins with the standard 4-record header, followed by the ELLIPSOID parameter. The value of this parameter must be equal to the associated parameter in Block 2 of the PRJ file.

Parameter: *ELLIPSOID*
Values: see paragraph 1.1, MOVE3 Input Files, under
Project file (PRJ)

In the geoid height are not specified in meters the file also must contain the LINEARUNIT parameter. The LINEARUNIT parameter is the conversion factor to meters.

Parameter: *LINEARUNIT*
Values: > 0.0

A record contains the following successive fields:

Station name:	maximum 16 characters
geoid height:	in LINEARUNIT
Deflection of the vertical East	in arc seconds
Deflection of the vertical North	in arc seconds
Deflection of the vertical fixed	FIXED or FREE

The geoid height is the difference between the ellipsoidal height and the orthometric height.

1.2.MOVE3 Output Files

The MOVE3 design and adjustment module produces the following output files:

project.cor :	contains adjusted coordinates in case of a constrained adjustment;
project.out1, project.out2 :	contains an echo of the input, and the results of the design or adjustment and testing;
project.out1.xml, project.out2.xml	XML output file with design and adjustment results;
project.err :	contains warnings and error messages;

1.2.1.Computed coordinates file (COR)

In case of a constrained adjustment (pseudo, weighted or absolutely constrained), adjusted coordinates and computed standard deviations are directed to a separate coordinate file: the COR file. By convention, the coordinate type of the adjusted coordinates in this file is equal to the coordinate type of the known stations. The COR file begins with the standard 4-record header, immediately followed by three parameters identifying the projection, ellipsoid, coordinate type and phase.

Parameter: *PROJECTION*
Values: see paragraph 1.1, MOVE3 Input Files, under
Project file (PRJ)

Parameter: *ELLIPSOID*
Values: see paragraph 1.1, MOVE3 Input Files, under
Project file (PRJ)

Parameter: *COORDINATES*
Values: *XYZ, ELL, ENH*

Parameter: *PHASE*
Values: *2, 3, 4*

If the coordinates are not specified in meters the file also must contain the LINEARUNIT parameter. The LINEARUNIT parameter is the conversion factor to meters.

Parameter: *LINEARUNIT*
Values: > 0.0

The individual coordinates of a station are marked by an asterisk * in case the coordinate was entered as a known coordinate. A caret ^ is used for adjusted coordinates. A coordinate is not marked when it was not computed in the adjustment, e.g. heights in a 2D adjustment.

1.2.2.MOVE3 output file (OUT1 or OUT2)

The results of the design or adjustment and testing of a project are written to the OUT file. Depending on the print switch settings in the PRJ file, specific items are appended to this file. (version 3.4.3 and earlier)

1.2.3.MOVE3 XML output file (XML)

The results of the design or adjustment and testing of a project are written to the OUT.XML file. The XML will be transformed into HTML via a XSL style sheet.

1.2.4.Error file (ERR)

The warning and error messages of COGO3, GEOID3, PRERUN3, LOOPS3 and MOVE3 are written to the ERR file.