

Torino, 11th December 2017

Tangram Technical Note 7

DMIS Characterization Files

Rev.	Date	Change Reason
1	11-12-2017	Update with new supported features

The characterization file lists the DMIS statements and functions Tangram supports.
Refer to Chapter 5.5 of DMIS 04.0 ANSI/CAM-I 104.0-2001, Part 1 for a description on how to interpret the characterization file format.

DMIS Characterization File

```
CHFILE/INPUT
CHFIL1
/*-----*/
/* DMIS INPUT Grammar Version: 04.0 Release 1 */
```

```
/*-----*/
/*-----*/
/*-----*/
/* <input_file> is the start symbol */
/*-----*/
<input_file>::=
    <dmis_first_stm>
    <dmis_body>
<dmis_first_stm>::=
    DMISMN'/'<string_val>', '<version> #
/*    |DMISMD'/'<string_val>', '<version> # */
<dmis_body>::=
    ENDFIL #
    |<dmis_seq>
    ENDFIL #

/*-----*/
/* DMIS Sequence */
/*-----*/
<dmis_seq>::=
    <dmis_def>
    |<dmis_seq> <dmis_def>
    |<dmis_stm>
    |<dmis_seq> <dmis_stm>

/*-----*/
/* DMIS Definition STATEMENTS*/
/*-----*/
<dmis_def>::=
/* <algdef_def> not supported */
    |<assign_def> /* FULL */
/* |<clmpid_def> not supported */
/* |<clmpsn_def> not supported */
/* |<cmpntgrp_def> not supported */
/* |<crgdef_def> not supported */
/* |<cutcom_def> not supported */
/* |<czone_def> not supported */
    |<datset_def> /* PART */
    |<device_def> /* PART */
/* |<dmeid_def> not supported */
/* |<dmeswi_def> not supported */
/* |<dmeswv_def> not supported */
/* |<extens_def> not supported */
    |<feat_def> /* PART */
/* |<fildef_def> not supported */
/* |<fixtid_def> not supported */
/* |<fixtsn_def> not supported */
/* |<geom_def> not supported */
/* |<group_def> not supported */
/* |<litdef_def> not supported */
/* |<locate_def> not supported */
/* |<lotid_def> not supported */
/* |<matdef_def> not supported */
```

```
/* |<mfgdev_def> not supported */
  |<obtain_def> /* PART */
/* |<operid_def> not supported */
/* |<partid_def> not supported */
/* |<partrv_def> not supported */
/* |<partsn_def> not supported */
/* |<planid_def> not supported */
/* |<prevop_def> not supported */
/* |<procid_def> not supported */
/* |<prompt_def> not supported */
/* |<qisdef_def> not supported */
/* |<refmnt_def> not supported */
/* |<report_def> not supported */
  |<rotate_def> /* FULL */
/* |<rotdef_def> not supported */
/* |<sensor_def> not supported */
  |<snsdef_def> /* PART */
/* |<snsgrp_def> not supported */
/* |<thldef_def> not supported */
  |<tol_def> /* PART */
/* |<tooldf_def> not supported */
  |<trans_def> /* FULL */
/* |<value_def> not supported */
  |<vform_def> /* PART */
/* |<windef_def> not supported */
/* |<wrist_def> not supported */
/*-----*/
/* DMIS Statements */
/*-----*/
<dmis_stm>::=
/* <calib_seq> not supported */
  |<comment> /* FULL */
  |<do_seq> /* FULL */
  |<if_seq> /* FULL */
/* |<macro_seq> not supported */
  |<meas_seq> /* FULL */
  |<motion_seq> /* FULL */
/* |<rmeas_seq> not supported */
/* |<select_seq> not supported */
/* |<xtern_seq> not supported */
  |<aclrat> /* PART */
/* |<badtst> not supported */
  |<bound> /* PART */
/* |<call> not supported */
  |<close> /* FULL */
  |<const> /* PART */
/* |<crmode> not supported */
/* |<croscl> not supported */
/* |<crslct> not supported */
/* |<czslct> not supported */
  |<datdef> /* PART */
```

```
|<decl> /* PART */
|<decpl> /* PART */
/* |<delete> not supported */
/* |<disply> not supported */
/* |<dmehw> not supported */
/* |<dmesw> not supported */
/* |<dmis> not supported */
/* |<equate> not supported */
/* |<error> not supported */
/* |<eval> not supported */
/* |<extfil> not supported */
|<fedrat> /* PART */
/* |<filnam> not supported */
/* |<finpos> not supported */
|<fly> /* FULL */
/* |<from> not supported */
/* |<gecomp> not supported */
|<geoalg> /* PART */
/* |<gohome> not supported */
/* |<goto> not supported */
/* |<includ> not supported */
/* |<iterat> not supported */
/* |<jumptarget> not supported */
/* |<jumpto> not supported */
|<mode> /* PART */
|<open> /* PART */
/* |<output> not supported */
/* |<pop> not supported */
|<prcomp> /* FULL */
/* |<psthru> not supported */
/* |<ptbuff> not supported */
|<ptmeas> /* FULL */
/* |<push> not supported */
/* |<rapid> not supported */
/* |<read> not supported */
/* |<recall> not supported */
/* |<resume> not supported */
/* |<rotab> not supported */
/* |<rotset> not supported */
|<save> /* FULL */
/* |<scan> not supported */
|<scnmod> /* FULL */
/* |<scnpln> not supported */
|<scnset> /* PART */
|<snset> /* PART */
|<snslct> /* PART */
/* |<snsmnt> not supported */
|<tecomp> /* FULL */
/* |<text> not supported */
|<units> /* FULL */
/* |<wkplan> not supported */
```

```
/* |<write> not supported */
/* |<xtract> not supported */
/*-----*/
/* Expressions */
/*-----*/
<expr>::=
    <bool_expr>
    |<real_expr>
    |<string_expr>
    |<vector_expr>
/*-----*/
/* Define expression returning boolean */
/*-----*/
<bool_expr>::=
    <basic_bool_expr>
    |<bool_not_expr>
    |<bool_expr>'. 'AND'.'. ' <bool_expr>
    |<bool_expr>'. 'OR'.'. ' <bool_expr>
    |' (' <bool_expr> ') '
<basic_bool_expr>::=
    <bool_val>
    |<compare_bool_expr>
    |<intrinsic_bool_func>
<bool_not_expr>::=
    '. 'NOT'.'. ' <basic_bool_expr>
    |'. 'NOT'.'. ' (' <bool_expr> ') '
    |'. 'NOT'.'. ' <bool_not_expr>
<compare_bool_expr>::=
    <real_compare_bool_expr>
    |<string_compare_bool_expr>
/* |<vector_compare_bool_expr> */
<real_compare_bool_expr>::=
    <real_expr><compare_sym><real_expr>
<string_compare_bool_expr>::=
    <string_expr><compare_sym><string_expr>
/* <vector_compare_bool_expr>::= */
/* <vector_expr>'. 'EQ'.'. ' <vector_expr> */
/* |<vector_expr>'. 'NE'.'. ' <vector_expr> */
<compare_sym>::=
    '. 'EQ'.'. '
    |'. 'NE'.'. '
    |'. 'LT'.'. '
    |'. 'LE'.'. '
    |'. 'GT'.'. '
    |'. 'GE'.'. '
/*-----*/
/* Define expression returning number */
/*-----*/
<real_expr>::=
    <real_val>
    |<real_expr><math_sym><real_expr>
```

```

    |<intrinsic_real_func>
    |'('<real_expr>')'
/* A non_negative_real_expr is guaranteed to be non_negative only if it */
/* is a literal non_negative number. Other types of non_negative_real_expr */
/* must be checked for being non-negative after they are evaluated. */
<non_negative_real_expr>::=
    <non_negative_real_val>
    |<real_expr><math_sym><real_expr>
    |<intrinsic_real_func>
    |'('<non_negative_real_expr>')'
/* A positive_real_expr is guaranteed to be positive only if it is */
/* a literal positive number. Other types of positive_real_expr must */
/* be checked for being positive after they are evaluated. */
<positive_real_expr>::=
    <positive_real_val>
    |<real_expr><math_sym><real_expr>
    |<intrinsic_real_func>
    |'('<positive_real_expr>')'
<math_sym>::=
    '+'
    | '-'
    | '*'
    | '/'
    | '****'
/*-----*/
/* Define expression returning string */
/*-----*/
<string_expr>::=
    <string_val>
    |<intrinsic_string_func>
    |'('<string_expr>')'
/*-----*/
/* Define expression returning vector */
/*-----*/
/* <vector_expr>::= */
/* <varname> */
/* |<intrinsic_vector_func> */
/* |'('<vector_expr>')' */
/*-----*/
/* Numbers */
/*-----*/
<digit>::=
    '0'
    |<non_zero_digit>
<digit_list>::=
    <non_zero_digit>[<digit>...]
<integer>::=
    <non_negative_integer>
    |<negative_integer>
<negative_decimal>::=

```

```

/* '-'>.' [<zero_list>]<digit_list> */
    '-'>.<zero_list>.' [<zero_list>]<digit_list>
    | '-'> [<zero_list>]<digit_list>.' [<zero_list>]<digit_list>
    | '-'> [<zero_list>]<digit_list>.' <zero_list>
/* | '-'> [<zero_list>]<digit_list>.' */
<negative_integer> ::=
    '-'> [<zero_list>]<digit_list>
<negative_real> ::=
    <negative_decimal>
    | <negative_integer>
<non_negative_decimal> ::=
    <positive_decimal>
    | <zero_decimal>
<non_negative_integer> ::=
    <positive_integer>
    | <zero_integer>
<non_negative_real> ::=
    <non_negative_decimal>
    | <non_negative_integer>
<non_zero_digit> ::=
    '1'|'2'|'3'|'4'|'5'|'6'|'7'|'8'|'9'
<positive_decimal> ::=
/* ['+'>].' [<zero_list>]<digit_list> */
    ['+'>]<zero_list>.' [<zero_list>]<digit_list>
    | ['+'>] [<zero_list>]<digit_list>.' [<zero_list>]<digit_list>
    | ['+'>] [<zero_list>]<digit_list>.' <zero_list>
/* | ['+'>] [<zero_list>]<digit_list>.' */
<positive_integer> ::=
    ['+'>] [<zero_list>]<digit_list>
<positive_real> ::=
    <positive_decimal>
    | <positive_integer>
<real> ::=
    <non_negative_real>
    | <negative_real>
<sign> ::=
    '+'
    | '-'
<zero_decimal> ::=
/* [<sign>].' <zero_list> */
    [<sign>]<zero_list>.' <zero_list>
/* | [<sign>]<zero_list>.' */
<zero_integer> ::=
    [<sign>]<zero_list>
<zero_list> ::=
    '0' ['0'...]
<pct_real> ::=
    '0''.' <zero_list>
    | '0''.' [<zero_list>]<digit_list>
    | '1''.' <zero_list>
    | <varname>

```

```

<integer_val> ::=
    <integer>
    | <varname>
<non_negative_real_val> ::=
    <non_negative_real>
    | <varname>
<positive_integer_val> ::=
    <positive_integer>
    | <varname>
<positive_real_val> ::=
    <positive_real>
    | <varname>
<real_val> ::=
    <real>
    | <varname>
<zero_val> ::=
    <zero_decimal>
    | <zero_integer>
    | <varname>
<string_val> ::=
    <text_string>
    | <varname>
<bool_val> ::=
    <bool_constant>
    | <varname>
/*-----*/
/* Define the text and character non-terminal symbols */
/*-----*/
<comment> ::=
    '$'$' <comment_char_list>#
<text_string> ::=
    ''' <string_char_list> '''
<string_char_list> ::=
    <string_char>[<string_char>...]
<comment_char_list> ::=
    <comment_char>[<comment_char>...]
<comment_char> ::=
    <var_char>
    | <other_char>
    | '''
<string_char> ::=
    <var_char>
    | <other_char>
    | <apostrophe_char>
<lower_char> ::=
    'a'|'b'|'c'|'d'|'e'|'f'|'g'|'h'|'i'|'j'|'k'|'l'|'m'|'n'|'o'|'p'|'q'|'r'
    '| 's'
    | 't'|'u'|'v'|'w'|'x'|'y'|'z'
<upper_char> ::=
    'A'|'B'|'C'|'D'|'E'|'F'|'G'|'H'|'I'|'J'|'K'|'L'|'M'|'N'|'O'|'P'|'Q'|'R'
    '| 'S'

```



```

    |'T'|'U'|'V'|'W'|'X'|'Y'|'Z'
<other_char>::=
    `|'~'|'!'|'@'|'#'|'$'|'%'|^'|'&'|'*'|'('|')'|'-
    '|='|'+'|'\'|'|'|']'
    '|}'|'|'['|'|'{'|'|'"}|';'|':'|'|'/'|'|'?'|'|.'|'|'>'|'|','|'|'<'|'|' '
<apostrophe_char>::=
''' '''
/* The above six apostrophes mean two apostrophes, one after the other. The
*/
/* space between the two groups of three apostrophes is for clarity. Within
*/
/* a text string a single apostrophe is not allowed; there must be two */
/* apostrophes, one after the other. */
/*-----*/
/* Define the allowable characters in a label name or jumptarget, */
/* maximum of 64 characters */
/* Define the allowable characters in a variable name, */
/* maximum of 16 characters */
/*-----*/
<label_name>::=
    '('<Label_char_list>')'
    |'('@'<varname>)'
/* <jumptarget>::= */
/* '('<Label_char_list>')' # */
/* <jumpto_label>::= */
/* '('<Label_char_list>')' */
<Label_char_list>::=
    <Label_char>[<Label_char>...63]
<var_char>::=
    <lower_char>
    |<upper_char>
    |<digit>
    | '_'
<Label_char>::=
    <var_char>
    | '-'
    | '.'
<varname>::=
    <lower_char>[<var_char>...15]
    |<upper_char>[<var_char>...15]
/*-----*/
/* Define some constants */
/*-----*/
<on_off_constant>::=
    ON
    |OFF
<bool_constant>::=
    '.'TRUE'.'
    |'.'FALSE'.'
/*-----*/
/* Define the formats Cartesian coordinates and polar coordinates */

```

```

/*-----*/
<cart_coord>::=
    <real_val>', '<real_val>', '<real_val>
    |<varname>
<pol_coord>::=
    <positive_real_val>', '<angle>', '<real_val>
    |<varname>
/* Note that the EBNF term "vector" defined here is just */
/* a syntactic construct and is not a vector in the sense of the */
/* DMIS VECTOR data type. */
*/
/* <vector>::= */
/* <real_val>', '<real_val>', '<real_val> */
/* |<varname> */
/*-----*/
/* Define the formats for time, date, positive decimal degrees and */
/* positive degrees:minutes:seconds */
/* Also define the version format */
/* Also a transformation matrix */
/*-----*/
/* <full_time>::= */
/* <integer_val>':'<integer_val>':'<integer_val> */
/* <full_date>::= */
/* <integer_val>':'<integer_val>':'<integer_val> */
<angle>::=
    <real_val>
/* |<deg_dms> */
<angle_expr>::=
    <real_expr>
/* |<deg_dms> */
/* <deg_digit>::= */
/* '0'|'1'|'2'|'3'|'4'|'5'|'6'|'7'|'8'|'9' */
/* <sec_deg_digit>::= */
/* '0'|'1'|'2'|'3'|'4'|'5' */
/* <min_sec>::= */
/* ':'<sec_deg_digit><deg_digit> */
/* <deg_dms>::= */
/* <integer_val>[<min_sec>] */
/* |<integer_val><min_sec><min_sec>['.<digit_list>] */
/* |<integer_val><min_sec><min_sec>'.<zero_list>[<digit_list>] */
/* <version>::= */
/* <digit><digit>'.<digit> */
/* |<varname> */
/* |<varname>'.<varname> */
<trans_matrix>::=
<real_val>', '<real_val>', '<real_val>', '
<real_val>', '<real_val>', '<real_val>', '
<real_val>', '<real_val>', '<real_val>', '
<real_val>', '<real_val>', '<real_val>'
/* |<varname>', ' */

```

```
/* <varname>', ' */
/* <varname>', ' */
/* <varname> */
/* The above case is where these are vector variables */
/*-----*/
/* Define the axis, origins, directions, and planes */
/*-----*/
<axis>::=
    XAXIS
    | YAXIS
    | ZAXIS
<orig>::=
    XORIG
    | YORIG
    | ZORIG
<dir>::=
    <pos_dir>
    <neg_dir>
<pos_dir>::=
    XDIR
    | YDIR
    | ZDIR
<neg_dir>::=
    '-XDIR
    | '-YDIR
    | '-ZDIR
<plan>::=
    XYPLAN
    | YZPLAN
    | ZXPLAN
/*-----*/
/* Define the widely used label types and label names */
/*-----*/
<dat_label>::=
    <single_dat>
/* |<comp_dat> */
<single_dat>::=
    <single_dat_var> ')'
    | DAT '(' '@' <varname> ')'
<single_dat_var>::=
    DAT '(' <upper_char> [<upper_char>]
/* <comp_dat>::= */
/* <single_dat_var> '-' <upper_char> [<upper_char>] ')' */
/* |DAT '(' '@' <varname> ')' */
<datum_label>::=
    D<label_name>
    | DA<label_name>
<feature_label>::=
    F<label_name>
    | FA<label_name>
```

```

<tolerance_label>::=
    T<label_name>
    |TA<label_name>
<sensor_label>::=
    S<label_name>
    |SA<label_name>
<actuals_label>::=
    FA<label_name>
    |TA<label_name>
<nominals_label>::=
    F<label_name>
    |T<label_name>
/*=====*/
/*==== Productions of all of the DMIS major words grouped by type =====*/
/*=====*/
/*-----*/
/* Branching and Looping STATEMENTS */
/*-----*/
/* BADTST */
/*-----*/
/* <badtst>::= */
/*   BADTST'/'<on_off_constant> # */
/*-----*/
/* SELECT...CASE...ENDCAS...DFTCAS...ENDCAS...ENDSEL sequence */
/*-----*/
/* <select_seq>::= */
/* SELECT'/'<varname> # */
/* [<var_select_case>...] */
/* [<var_select_dftcase>] */
/* ENDSEL # */
/* <var_select_case>::= */
/* CASE'/'<varname> # */
/* |CASE'/'<string_val> # */
/* |CASE'/'<integer_val> # */
/* [<dmis_seq>] */
/* ENDCAS # */
/* <var_select_dftcase>::= */
/* DFTCAS # */
/* [<dmis_seq>] */
/* ENDCAS # */
/*-----*/
/* DO...ENDDO sequence */
/*-----*/
<do_seq>::=
    DO'/'<varname>', '<positive_integer_val>', '<positive_integer_val>
    ['', '<positive_integer_val>] #
    [<dmis_seq>]
    ENDDO #
/*-----*/
/* IF...ELSE...ENDIF sequence */

```

```
/*-----*/
<if_seq> ::=
  IF '/' <bool_expr> #
  [<dmis_seq>]
  [ELSE #]
  [<dmis_seq>]
  ENDIF #
/*-----*/
/* JUMPTO */
/*-----*/
/* <jumpto> ::= */
/* JUMPTO '/' <jumpto_label> # */
/*-----*/
/* Carriage STATEMENTS */
/*-----*/
/* CRGDEF */
/*-----*/
/* <crgdef_def> ::= */
/* CR<label_name> = 'CRGDEF' / '<cart_coord>', '<cart_coord>', '<vector>', ' */
/* <vector>', '<vector>', '<vector>' # */
/*-----*/
/* CRMODE */
/*-----*/
/* <crmode> ::= */
/* CRMODE '/' <var_crmode> # */
/* <var_crmode> ::= */
/* SEQNTL */
/* |SIMUL */
/* |SYNC */
/*-----*/
/* CRSLCT */
/*-----*/
/* <crslct> ::= */
/* CRSLCT '/' <var_crslct> # */
/* <var_crslct> ::= */
/* CR<label_name> */
/* |ALL */
/*-----*/
/* CZONE */
/*-----*/
/* <czone_def> ::= */
/* CZ<label_name> = 'CZONE # */
/*-----*/
/* CZSLCT */
/*-----*/
/* <czslct> ::= */
/* CZSLCT '/' CZ<label_name>', '<on_off_constant> # */
/*-----*/
/* Datum STATEMENTS */
/*-----*/
```

```

/* PART COORDINATE SYSTEMS */
/*-----*/
/* DATDEF */
/*-----*/
<datdef>::=
    DATDEF '/' <var_datdef> #
<var_datdef>::=
    FA<label_name>', '<dat_label>
    | F<label_name>', '<single_dat>
/*-----*/
/* DATSET */
/*-----*/
<datset_def>::=
    D<label_name>'='DATSET'/'<var_datset_1>
<var_datset_1>::=
    MCS #
    | <var_datset_2>
    | TRMATX', '<trans_matrix> # /*EXTENSION*/
<var_datset_2>::=
    DA<label_name> # /* EXTENSION */
    | <single_dat>', '<dir>['', '<orig>...]<var_datset_3>['', '<single_dat>', '
    <orig>['', '<orig>...]] #
    | <single_dat>', '<dir>['', '<orig>...][', '<single_dat>', '<orig>['', '
    <orig>...]]<var_datset_3> #
    | <single_dat>', '<orig>['', '<orig>...]<var_datset_3>', '<single_dat>', '
    <dir>['', '<orig>...]] #
    | <single_dat>', '<orig>['', '<orig>...]', '<single_dat>', '<dir>['', '
    <orig>...]<var_datset_3> #
<var_datset_3>::=
    ['', '<single_dat>', '<dir>['', '<orig>...]]
    | ['', '<single_dat>', '<orig>['', '<orig>...]]
/*-----*/
/* DELETE */
/*-----*/
/* <delete>::= */
/* DELETE'/'<var_delete> ['', 'DID<label_name>] # */
/* |DELETE/ALLSA['', 'EXCEPT', 'SA<label_name> ['', 'SA<label_name>...]] # */
/* <var_delete>::= */
/* <datum_label> */
/* |<sensor_label> */
/* |FA<label_name> */
/* |RT<label_name> */
/*-----*/
/* EQUATE */
/*-----*/
/* <equate>::= */
/* EQUATE'/'<var_equate_1> # */
/* <var_equate_1>::= */
/* DA<label_name>', 'DA<label_name> */
/* |DA<label_name>', 'CADCS', 'DID<label_name>', '<var_equate_2> */

```

```

/* <var_equate_2>::= */
/* <trans_matrix> */
/* |<string_val> */
/*-----*/
/* ITERAT */
/*-----*/
/* <iterat>::= */
/* <varname>='ITERAT'/'<jumpto_label>','<jumpto_label>',' */
/* <real_val>','<var_iterat_1>','<positive_integer_val> */
/* <var_iterat_2><var_iterat_3> # */
/* <var_iterat_1>::= */
/* ABSL */
/* |INCR */
/* <var_iterat_2>::= */
/* ','<axis> */
/* |','<vector> */
/* <var_iterat_3>::= */
/* ','FA<label_name>[<var_iterat_4>] */
/* |','FA<label_name><var_iterat_2>[<var_iterat_4>] */
/* <var_iterat_4>::= */
/* <var_iterat_3> */
/*-----*/
/* LOCATE */
/*-----*/
/* <locate_def>::= */
/* D<label_name>='LOCATE'/' [<var_locate_1>] [<var_locate_2>] */
/* <var_locate_3> ['','<var_locate_3>...] # */
/* <var_locate_1>::= */
/* <pos_dir>',' */
/* |XYDIR',' */
/* |YZDIR',' */
/* |ZXDIR',' */
/* |XYZDIR',' */
/* |NOTRAN',' */
/* <var_locate_2>::= */
/* <axis>',' */
/* |XYAXIS',' */
/* |YZAXIS',' */
/* |ZXAXIS',' */
/* |XYZAXI',' */
/* |NOROT',' */
/* <var_locate_3>::= */
/* FA<label_name> */
/* |MA<label_name> */
/* |<dat_label> */
/*-----*/
/* RECALL */
/*-----*/
<recall>::=
RECALL/'<var_delete_1> /* ['','DID<label_name>] */ #

```

```

/*-----*/
/* ROTATE */
/*-----*/
<rotate_def>::=
    D<label_name>='ROTATE'/'<axis>','<var_rotate> #
<var_rotate>::=
    <angle>
    |F<label_name>','<dir>
    |FA<label_name>','<dir>
    |<single_dat>','<dir>
/*-----*/
/* SAVE */ /* GESTITA IMPLICITAMENTE DA RECALL, NECESSARIO INTEGRARLA IN
TANGRAM PER EVITARE ERRORI IN IMPORT*/
/*-----*/
<save>::=
    SAVE'/'<var_save> ['','DID<label_name>] #

    /*<var_save>::=
    D<label_1>
    DA<label_2>
    S<label_3>
    SA<label_4>
    FA<label_5>
    RT<label_6>*/
/*-----*/
/* TRANS */
/*-----*/
<trans_def>::=
    D<label_name>='TRANS'/'<var_trans_1> ['','<var_trans_1>...2] #
<var_trans_1>::=
    <orig>','<var_trans_2>
<var_trans_2>::=
    <real_val>
/* |F<label name> */
    |FA<label_name>
    |<single_dat>
    |'-'PRBRAD
    |PRBRAD
/*-----*/
/* WKPLAN */
/*-----*/
/* <wkplan>::= */
/* WKPLAN'/'<plan> # */
/*-----*/
/* Feature STATEMENTS */
/*-----*/
/* BOUND */
/*-----*/
<bound>::=
    BOUND'/'<nominals_label>','<feature_label>['','<feature_label>...] #

```



```

/*-----*/
/* FEATURE DEFINITIONS */
/*-----*/
<feat_def>::=
    F<label_name>='FEAT'/'<var_feat_1> #
    |FA<label_name>='FEAT'/'<var_feat_1> #
    |F<label_name>='FEAT/GCURVE', '<coord_type>', '<vector>' #
/* |F<label_name>='FEAT/GEOM', 'G<label_name>', '<coord_frame>' # */
    |F<label_name>='FEAT/GSURF' #
/* |F<label_name>='FEAT/PATERN', 'F<label_name>',
    F<label_name> ['F<label_name>...]' #*/
<var_feat_1>::=
    ARC', '<var_feat_2>
    |CIRCLE', '<mat_dir>', '<coord_type>', '<vector>', '<positive_real_val>'
    |CONE', '<mat_dir>', '<coord_type>', '<vector>', '<angle>'
/* |CPARLN', '<mat_dir>', '<fr>', '<coord_type>', '<vector>', '<vector>',
    <real_val>', '<real_val>'*/
    |CYLNDR', '<mat_dir>', '<coord_type>', '<vector>', '<positive_real_val>'
    ['<positive_real_val>']
/* |EDGEPT', '<coord_type>', '<vector>', '<vector>' */
/*
    |ELLIPS', '<mat_dir>', '<double_coord_type>', '<ellips_axis>', '<vector>',
    '<positive_real_val>'*/
    |LINE', '<line_type>'
/* |OBJECT', '<cart_coord>', '<vector>', '<string_val>' */
    |OBJECT', '<obj_param>['<obj_param>...]'
/* |PARPLN', '<mat_dir>', '<triple_coord_type>', '<real_val>'*/
    |PLANE', '<coord_type>', '<vector>'
    |POINT', '<coord_type>', '<vector>'
/* |RCTNGL', '<mat_dir>', '<coord_type>', '<vector>', '<positive_real_val>'
    '<vector>', '<positive_real_val>', '<vector>', '<positive_real_val>'*/
    |SPHERE', '<mat_dir>', '<coord_type>', '<positive_real_val>'
    ['<vector>' ['<angle>']]
/* |TORUS', '<mat_dir>', '<coord_type>', '<vector>', '<positive_real_val>'
    '<positive_real_val>'*/
    <var_feat_2>::=
    <mat_dir>', '<coord_type>', '<vector>', '<positive_real_val>', '<angle>',
    <positive_real_val>' ['<vector>']
    |4POINT', '<mat_dir>', '<cart_coord>', '<cart_coord>', '<cart_coord>',
    <cart_coord>
<mat_dir>::=
    INNER
    |OUTER
/*<coord_frame>::=
    CART
    |POL*/
<coord_type>::=
    CART', '<cart_coord>'
    |POL', '<pol_coord>'
<double_coord_type>::=

```

```
CART', '<cart_coord>', '<cart_coord>'
|POL', '<pol_coord>', '<pol_coord>'
/*<triple_coord_type>::=
    CART', '<cart_coord>', '<cart_coord>', '<vector>', '<cart_coord>', '<vector>'
>
    |POL', '<pol_coord>', '<pol_coord>', '<vector>', '<pol_coord>', '<vector>*/
/*<fr>::=
    FLAT
    |ROUND */
/* <ellips_axis>::= */
/* MAJOR */
/* |MINOR */
<line_type>::=
    BND', '<double_coord_type>', '<vector>'
    |UNBND', '<coord_type>', '<vector>', '<vector>'
<obj_param>::=
    <bool_val>
    |<integer_val>
    |<real_val>
    |<string_val>
/*-----*/
/* GEOM */
/*-----*/
/* <geom_def>::= */
/* G<label_name>'='GEOM/'<var_geom_1> # */
/* <var_geom_1>::= */
/* DID<label_name> */
/* |G<label_name>[<var_geom_2>] */
/* |NONE */
/* <var_geom_2>::= */
/* ', 'ENTITY <var_geom_3> [<var_geom_3>...] */
/* |', 'OFFSET', '<real_val>' */
/* <var_geom_3>::= */
/* ', '<string_val>' */
/* |', '<string_val>', 'OFFSET', '<real_val>' */
/*-----*/
/* XTRACT */
/*-----*/
/* <xtract>::= */
/* XTRACT'/'F<label_name>', 'FA<label_name> # */
/*-----*/
/* Feature Construction STATEMENTS */
/*-----*/
/* CONST */
/*-----*/
<const>::=
    CONST'/'<var_const_1> #
<var_const_1>::=
/*    ARC', 'F<label_name>', '<var_const_arc>' */
    |CIRCLE', 'F<label_name>', '<var_circle_1>'
```

```
/* |CONE', 'F<label_name>', '<var_const_2> */
/* |CYLNDR', 'F<label_name>', '<var_const_2> */
/* |CPARLN', 'F<label_name>', '<var_const_cparln> */
/* |ELLIPS', 'F<label_name>', '<var_const_ellips> */
/* |GEOM', 'F<label_name>', 'NEARPT', 'FA<label_name> */
|LINE', 'F<label_name>', '<var_line_1>
/* |PATERN', 'F<label_name>', '<var_const_2> */
|PLANE', 'F<label_name>', '<var_plane_1>
|POINT', 'F<label_name>', '<var_point_1>
/* |RCTNGL', 'F<label_name>', '<var_const_2> */
/* |SGAGE', 'SE<label_name>', 'F<label_name> [' , 'F<label_name>...] */
/* |SPART', 'ST<label_name>', 'FA<label_name> [' , 'FA<label_name>...] */
/* |SPHERE', 'F<label_name>', '<var_const_2> */
/* |TORUS', 'F<label_name>', '<var_const_2> */
<var_const_2>::=
    BF', 'FA<label_name>', '<feature_label> [' , '<feature_label>...]
/* |<var_const_3> */
/* <var_const_3>::= */
/*    TR', 'FA<label_name> [' , '<datum_label>] */
<var_point_1>::=
/* <var_const_3> */
    <var_const_2> /* EXTENSION */
    |INTOF', 'FA<label_name>', '<feature_label>
    |MIDPT', 'FA<label_name>', '<feature_label>
/* |PIERCE', 'FA<label_name>', '<feature_label> */
/* |VERTEX', 'FA<label_name> */
    |PROJPT', 'FA<label_name> [' , '<feature_label>]
/* |MOVEPT', 'FA<label_name>', '<var_point_2> */
/* |CURVE', 'FA<label_name>', '<feature_label> */
/* |EXTREM', '<var_point_3>', 'FA<label_name>', '<var_point_4> */
/* |COG', 'FA<label_name>', '<feature_label> [' , '<feature_label>...] */
/* <var_point_2>::= */
/* <vector> */
/* |<feature_label>', '<real_val> */
/* <var_point_3>::= */
/* MIN */
/* |MAX */
/* <var_point_4>::= */
/* <pos_dir> */
/* |VEC', '<vector> */
/* |<feature_label> */
/* |RADIAL */
<var_line_1>::=
    <var_const_2>
|MIDLI', 'FA<label_name>', '<feature_label>
/* |PROJLI', 'FA<label_name> [' , '<feature_label>] */
/* |TANTO', '<var_line_3> */
|INTOF', 'FA<label_name>', '<feature_label>
/* |PERPTO', '<var_line_2> */
/* |PARTO', '<var_line_2> */
```

```

/* |OFFSET', 'FA<label_name> ['<feature_label>...] */
/* <var_line_2>::= */
/* FA<label_name>', 'THRU', '<feature_label> */
/* |F<label_name>', 'THRU', 'FA<label_name> */
/* <var_line_3>::= */
/* FA<label_name>', '<var_line_4> */
/* |F<label_name>', 'THRU', 'FA<label_name> */
/* <var_line_4>::= */
/* <feature_label> */
/* |THRU', '<feature_label> */
<var_plane_1>::=
  <var_const_2>
  |MIDPL', 'FA<label_name>', '<feature_label>
  |PERPTO', '<var_plane_2>
/* |TANTO', '<var_plane_2> */
  |PARTO', '<var_plane_2>
/* |OFFSET', 'FA<label_name> ['<feature_label>...] */
<var_plane_2>::=
  FA<label_name>', 'THRU', '<feature_label>
  |F<label_name>', 'THRU', 'FA<label_name>
/* <var_const_arc>::= */
/* <var_const_2> */
/* |PROJCT', 'FA<label_name> ['<feature_label>] */
<var_circle_1>::=
  <var_const_2>
/* |PROJCT', 'FA<label_name> ['<feature_label>] */
  |TANTO', '<var_circle_2>
  |INTOF', 'FA<label_name>', '<feature_label>
/* |CONE', '<var_circle_4>', 'FA<label_name> */
<var_circle_2>::=
  FA<label_name>', '<var_circle_3>
/* |F<label_name>', 'THRU', 'FA<label_name> */
<var_circle_3>::=
/*THRU', '<feature_label>*/
  |<feature_label>
/* <var_circle_4>::= */
/* DIAM', '<positive_real_val> */
/* |DIST', '<real_val> */
/* <var_const_cparln>::= */
/* <var_const_2> */
/* |PROJCT', 'FA<label_name> ['<feature_label>] */
/* <var_const_ellips>::= */
/* <var_const_2> */
/* |PROJCT', 'FA<label_name> ['<feature_label>] */
/*-----*/
/* File and machine parameter STATEMENTS */
/*-----*/
/* ACLRAT */
/*-----*/
<aclrat>::=

```

```
ACL RAT'/'<var_aclrat_1> #
<var_aclrat_1>::=
  MESACL', '<var_aclrat_2>
  | POSACL', '<var_aclrat_2>
/* | ROTACL', '<var_aclrat_3> */
<var_aclrat_2>::=
  /*MPMM', '<positive_real_val>*/
  /*|MMPSS', '<positive_real_val>*/
  /*|IPMM', '<positive_real_val>*/
  /*|IPSS', '<positive_real_val>*/
  |<var_aclrat_4>
/* <var_aclrat_3>::= */
/* |RPMM', '<positive_real_val> */
/* |<var_aclrat_4> */
<var_aclrat_4>::=
  |PCENT', '<positive_real_val>
/* |HIGH */
/* |LOW */
/* |DEFAULT*/
/*-----*/
/* DECPL */
/*-----*/
<decpl>::=
  DECPL'/'<var_decpl_1> #
<var_decpl_1>::=
  ALL', '<var_decpl_2>
  |<var_decpl_3> ['<var_decpl_3>...]
<var_decpl_2>::=
  DEFAULT
  |<positive_integer_val>
<var_decpl_3>::=
  ANGLE', '<var_decpl_2>
  |DIST', '<var_decpl_2>
/* |HUMID', '<var_decpl_2> */
/*|DEV', '<var_decpl_2>*/
/* |TEMP', '<var_decpl_2> */
  |VEC', '<var_decpl_2>
/*-----*/
/* ERROR */
/*-----*/
/* <error>::= */
/* ERROR'/'<var_error_1> # */
/* <var_error_1>::= */
/* <jumpto_label>', '<var_error_2> */
/* |OFF */
/* |AUTO', '<var_error_2> */
/* <var_error_2>::= */
/* ALL */
/* |ILLEGALTOUCH */
/* |NOTOUCH */
```

```
/* |<comment_char_list> */
/* |<varname> */
/*-----*/
/* FEDRAT */
/*-----*/
<fedrat>::=
    FEDRAT'/'<var_fedrat_1> #
<var_fedrat_1>::=
    MESVEL','<var_fedrat_2>
    | POSVEL','<var_fedrat_2>
    /* |ROTVEL','<var_fedrat_3> */
    | SCNVEL','<var_fedrat_2>
<var_fedrat_2>::=
    /*MPM','<positive_real_val>
    | MMPS','<positive_real_val>
    | IPM','<positive_real_val>
    | IPS','<positive_real_val>*/
    /*|*/<var_fedrat_4>
/* <var_fedrat_3>::= */
/* |RPM','<positive_real_val> */
/* |<var_fedrat_4> */
<var_fedrat_4>::=
    PCENT','<pct_real>
/* |HIGH */
/* |LOW */
/*|DEFAULT*/
/*-----*/
/* FILNAM */
/*-----*/
/* <filnam>::= */
/* FILNAM'/'<string_val>','<version> # */
/*-----*/
/* FINPOS */
/*-----*/
/* <finpos>::= */
/* FINPOS'/'<on_off_constant> # */
/*-----*/
/* FLY */
/*-----*/
<fly>::=
    FLY'/'<positive_real_val> #
    | FLY'/'OFF #
/*-----*/
/* GECOMP */
/*-----*/
/* <gecomp>::= */
/* GECOMP'/'<on_off_constant> # */
/*-----*/
/* MODE */
/*-----*/
```

```
<mode> ::=
MODE '/' [AUTO','] [PROG','] MAN #
/*-----*/
/* POP */
/*-----*/
/* <pop> ::= */
/* POP '/' <var_push_pop_1> ['', <var_push_pop_1>...] # */
/* <var_push_pop_1> ::= */
/* ALGOR */
/* |DME */
/* |DATSET */
/* |REPORT */
/*-----*/
/* PRCOMP */
/*-----*/
<prcomp> ::=
PRCOMP '/' <on_off_constant> #
/*-----*/
/* PUSH */
/*-----*/
/* <push> ::= */
/* PUSH '/' <var_push_pop_1> ['', <var_push_pop_1>...] # */
/*-----*/
/* RAPID */
/*-----*/
/* <rapid> ::= */
/* RAPID '/' <pct_real> # */
/*-----*/
/* RESUME */
/*-----*/
/* <resume> ::= */
/* RESUME '/' <var_resume> # */
/* <var_resume> ::= */
/* <jumpto_label> */
/* |CURENT */
/* |END */
/* |NEXT */
/* |START */
/* |STOP */
/*-----*/
/* TECOMP */
/*-----*/
<tecomp> ::=
TECOMP '/' <var_tecomp> #
<var_tecomp>
ON ['', <real_val>]
|OFF
/*-----*/
/* UNITS */
/*-----*/
```

```
<units>::=
    UNITS '/' <var_units_1> <var_units_2> [<var_units_3>] #
<var_units_1>::=
    MM
    | CM
    | M
    | INCH
    | FEET
<var_units_2>::=
    ', 'ANGDEC
    | ', 'ANGDMS
    | ', 'ANGRAD
<var_units_3>::=
    ', 'TEMPF
    | ', 'TEMPC
/*-----*/
/* IPV STATEMENTS */
/*-----*/
/* CUTCOM */
/*-----*/
/* <cutcom_def>::= */
/* CC<label_name>='CUTCOM'/'MD<label_name>', '<var_cutcom_1> # */
/* <var_cutcom_1>::= */
/* ADJUST', 'TL<label_name>', '<var_cutcom_2>', '<plan>', '<real_val> */
/* |PARAM', '<cart_coord>', '<vector> */
/* |MATRIX', '<trans_matrix> */
/* |USERDF', '<string_val> */
/* <var_cutcom_2>::= */
/* LEFT */
/* |RIGHT */
/*-----*/
/* MFGDEV */
/*-----*/
/* <mfgdev_def>::= */
/* MD<label_name>='MFGDEV'/'<string_val> # */
/*-----*/
/* TOOLDF */
/*-----*/
/* <tooldf_def>::= */
/* TL<label_name>='TOOLDF/MD<label_name>', '<string_val> # */
/*-----*/
/* QIS STATEMENTS */
/*-----*/
/* <clmpid_def>::= */
/* CI<label_name>='CLMPID'/'<string_val> # */
/* <clmpsn_def>::= */
/* CS<label_name>='CLMPSN'/'<string_val> # */
/* <dmeid_def>::= */
/* DI<label_name>='DMEID'/'<string_val> # */
/* <dmeswi_def>::= */
```



```
/* DS<label_name>='DMESWI'/'<string_val> # */
/* <dmeswv_def>::= */
/* DV<label_name>='DMESWV'/'<string_val> # */
/* <fixtid_def>::= */
/* FI<label_name>='FIXTID'/'<string_val> # */
/* <fixtsn_def>::= */
/* FS<label_name>='FIXTSN'/'<string_val> # */
/* <lotid_def>::= */
/* LI<label_name>='LOTID'/'<string_val> # */
/* <operid_def>::= */
/* OP<label_name>='OPERID'/'<string_val> # */
/* <partid_def>::= */
/* PN<label_name>='PARTID'/'<string_val> # */
/* <partrv_def>::= */
/* PR<label_name>='PARTRV'/'<string_val> # */
/* <partsn_def>::= */
/* PS<label_name>='PARTSN'/'<string_val> # */
/* <planid_def>::= */
/* PL<label_name>='PLANID'/'<string_val> # */
/* <prevop_def>::= */
/* PV<label_name>='PREVOP'/'<string_val> # */
/* <procid_def>::= */
/* PC<label_name>='PROCID'/'<string_val> # */
/* <qisdef_def>::= */
/* Q<label_name>='QISDEF'/'<string_val> ['<string_val>] # */
/*-----*/
/* Input / Output STATEMENTS */
/*-----*/
/* CLOSE */
/*-----*/
<close>::=
    CLOSE/DID<label_name> [<var_close>] #
/*<var_close>::=
    |, 'KEEP
    |, 'DELETE
    |, 'END*/
/*-----*/
/* DEVICE */
/*-----*/
<device_def>::=
    DID<label_name>='DEVICE'/'<devices>', '<string_val> #
<devices>::=
    PRINT
    /* |TERM */
    /* |COMM */
    |STOR
    |INCR
    /*|CSTM Exstension di Tangram*/
/*-----*/
/* DISPLY */
```

```

/*-----*/
/* <disply>::= */
/* DISPLAY'/'<var_disply_1> # */
/* <var_disply_1>::= */
/* <var_disply_2> ['','<var_disply_2>...] */
/* |OFF */
/* <var_disply_2>::= */
/* PRINT','<var_disply_3> */
/* |TERM','<var_disply_3> */
/* |COMM','<var_disply_3> */
/* |STOR','<var_disply_3> */
/* <var_disply_3>::= */
/* DMIS ['','V<label_name>] */
/* |V<label_name> */
/*-----*/
/* EVAL */
/*-----*/
/* <eval>::= */
/* EVAL'/'<var_eval_1> # */
/* <var_eval_1>::= */
/* FA<label_name>','T<label_name> ['','T<label_name>...] */
/* |FA<label_name>','<var_eval_2>','T<label_name> */
/* |<var_eval_3>','FA<label_name>','T<label_name> */
/* <var_eval_2>::= */
/* <feature_label> */
/* |<dat_label> */
/* <var_eval_3>::= */
/* F<label_name> */
/* |<dat_label> */
/*-----*/
/* OPEN */
/*-----*/
<open>::=
    OPEN/DID<label_name><var_open_1> #
<var_open_1>::=
/* ','DIRECT','<var_open_2> */
|','FDATA','<var_open_3>','OUTPUT['','<var_open_4>]
/* |','CAD ['','<var_open_5>] */
/* |['','<var_open_6>...] */
/*<var_open_2>::=
    INPUT
    |OUTPUT ['','<var_open_4>]*/
<var_open_3>::=
    V<label_name>
/* |DMIS */
/* <var_open_4>::= */
/* APPEND */
/* |OVERWR */
/* <var_open_5>::= */
/* STEP */

```

```
/* |IGES */
/* |VENDOR','<string_val> */
/* <var_open_6>::= */
/* SNS */
/* |PCS */
/* |FEATUR */
/* |RTAB */
/*-----*/
/* OUTPUT */
/*-----*/
<output>::=
    OUTPUT'/'<var_output_1> #
<var_output_1>::=
/* <single_dat>','FA<label_name>','TA<label_name> ['','R<label_name>] */
|FA<label_name> <var_output_2>
|F<label_name> <var_output_3>
/* |R<label_name> */
/* |S<label_name> */
/* |SA<label_name> [<var_output_5>] */
/* |SE<label_name> */
/* |ST<label_name> */
|T<label_name>
|TA<label_name>
<var_output_2>::=
    ['','TA<label_name>...]['','R<label_name>]
/* |','<var_output_4>','TA<label_name> ['','R<label_name>] */
<var_output_3>::=
    ['','T<label_name>...]['','R<label_name>]
    |','F<label_name>','T<label_name> ['','R<label_name>]
    |','FA<label_name>','TA<label_name> ['','R<label_name>]
/* <var_output_4>::= */
/* <feature_label> */
/* |<single_dat> */
/* <var_output_5>::= */
/* ','<var_output_6> [<var_output_7>...] */
/* |','CURENT */
/* <var_output_6>::= */
/* <string_val> */
/* |<positive_integer_val> */
/* <var_output_7>::= */
/* ','SW<label_name>','<string_val>','<angle> [<var_output_8>...] */
/* <var_output_8>::= */
/* ','<string_val>','<angle> */
/*-----*/
/* PROMPT */
/*-----*/
/* <prompt_def>::= */
/* <varname>='PROMPT'/'<var_prompt_1> # */
/* <var_prompt_1>::= */
/* <string_val> ['','<real_val>...2] */
```

```
/* |<var_prompt_2>[<var_prompt_2>...] */
/* <var_prompt_2>::= */
/* BUTTON', '<string_val>', '<integer_val> */
/* |CHECK', '<string_val>', '<varname> */
/* |EDIT', '<varname> [' , '<real_val>] [' , '<real_val>] */
/* |GROUP', '<string_val>', '<varname>', '<string_val>', ' */
/* <string_val> [' , '<string_val>...] */
/* |LIST', '<varname>', '<string_val>', ' */
/* <string_val> [' , '<string_val>...] */
/* |PICTURE', '<string_val> [' , '<positive_integer_val>] */
/* |PIXBTN', '<string_val> [' , '<string_val>] ' , '<integer_val> */
/* |SOUND', '<string_val> */
/* |TEXT', '<string_val> */
/* |TITLE', '<string_val> */
/*-----*/
/* PSTHRU */
/*-----*/
/* <psthru>::= */
/* PSTHRU'/'<var_psthru> # */
/* <var_psthru>::= */
/* COMAND', '<string_val> */
/* |CONTIN */
/* |PAUSE */
/* |START */
/* |STOP */
/* |TRMATX', '<trans_matrix> */
/*-----*/
/* PTBUFF */
/*-----*/
/* <ptbuff>::= */
/* PTBUFF'/'<on_off_constant> # */
/*-----*/
/* READ */
/*-----*/
/* <read>::= */
/* READ/DID<label_name>', '<var_read> [' , '<var_read>...] # */
/* <var_read>::= */
/* <varname>:<positive_integer_val>:<positive_integer_val> */
/* |<varname>:<positive_integer_val> */
/* |<varname> */
/*-----*/
/* REPORT */
/*-----*/
/* <report_def>::= */
/* R<label_name>'='REPORT'/'<var_report> */
/* [' , '<var_report>...] [' , '<string_val>] # */
/* <var_report>::= */
/* ALGOR */
/* |CC<label_name> */
/* |CI<label_name> */
```

```

/* |CS<label_name> */
/* |DATE */
/* |DI<label_name> */
/* |DS<label_name> */
/* |DV<label_name> */
/* |FI<label_name> */
/* |FS<label_name> */
/* |HUMID */
/* |LI<label_name> */
/* |MD<label_name> */
/* |MODE */
/* |OP<label_name> */
/* |PC<label_name> */
/* |PL<label_name> */
/* |PN<label_name> */
/* |PR<label_name> */
/* |PS<label_name> */
/* |PV<label_name> */
/* |Q<label_name> */
/* |TEMPC */
/* |TEMPF */
/* |TEMPWC */
/* |TEMPWF */
/* |TIME */
/* |TL<label_name> */
/*-----*/
/* TEXT */
/*-----*/
<text>::=
TEXT'/'<var_text_1>','<string_val> #
<var_text_1>::=
/* MAN */
  |OPER
/* |OUTFIL */
/* |QUERY','<label_name>','<positive_integer_val>','<var_text_2>',' */
/* <var_text_3> */
/* <var_text_2>::= */
/* A */
/* |N */
/* |AN */
/* <var_text_3>::= */
/* L */
/* |R */
/*-----*/
/* VFORM */
/*-----*/
<vform_def>::=
V<label_name>'='VFORM'/'<var_vform> ['','<var_vform>...] #
<var_vform>::=
/* NOM ['','<string_val>] */

```

```

|ACT ['<string_val>]
|DEV ['<string_val>]
|AMT ['<string_val>]
/* |HIST ['<string_val>] */
/* |PLOT ['<string_val>] */
/* |STAT ['<string_val>] */
/* |ALL*/
|DME ['<string_val>]
/*-----*/
/* WRITE */
/*-----*/
/* <write>::= */
/* WRITE/DID<label_name>','<var_write> ['<var_write>...] # */
/* <var_write>::= */
/* <varname>':'<positive_integer_val>':'<positive_integer_val> */
/* |<varname>':'<positive_integer_val> */
/* |<varname> */
/* |<string_val> */
/*-----*/
/* Macro STATEMENTS */
/*-----*/
/* MACRO...ENDMAC sequence */
/*-----*/
/* <macro_seq>::= */
/* M<label_name>='MACRO [<var_macro_1>] # */
/* [<dmis_seq>] */
/* ENDMAC # */
/* <var_macro_1>::= */
/* '/'<varname>[<var_macro_2>...] */
/* |/'<label_name>[<var_macro_2>...] */
/* <var_macro_2>::= */
/* ','<varname> */
/* |','<label_name> */
/*-----*/
/* CALL */
/*-----*/
/* <call>::= */
/* CALL/'<var_call_1> # */
/* <var_call_1>::= */
/* M<label_name> ['<var_call_param>...] */
/* |EXTERN','<var_call_2> */
/* <var_call_2>::= */
/* DMIS','M<label_name> ['<var_call_param>...] */
/* |DMIS','<string_val> */
/* |<var_call_3>','<string_val> ['<var_call_4>] ['<var_call_param>...]
*/
/* <var_call_3>::= */
/* DME */
/* |SYS */
/* <var_call_4>::= */

```

```

/* WAIT */
/* |CONT */
/* |SPAWN */
/* |ATTACH */
/* <var_call_param>::= */
/* <label_name> */
/* |<bool_val> */
/* |<integer_val> */
/* |<real_val> */
/* |<string_val> */
/*-----*/
/* Measurement STATEMENTS */
/*-----*/
/* MEAS...ENDMES sequence */
/*-----*/
<meas_seq>::=
    MEAS '/' <var_meas> ',' F<label_name> ',' <positive_integer_val> #
    [<meas_block_allowed>...]
    ENDMES #
<var_meas>::=
    ARC
    | CIRCLE
    | CONE
    | CPARLN
    | CYLNDR
    | EDGEPT
    | ELLIPS
    | GCURVE
    | GSURF
    | LINE
    | OBJECT
    | PARPLN
    | PATTERN
    | PLANE
    | POINT
    | RCTNGL
    | SPHERE
    | TORUS
<meas_block_allowed>::=
    <assign_def>
    | <obtain_def>
    | <value_def>
    | <jumptarget>
    | <do_seq>
    | <if_seq>
    | <motion_seq>
    | <select_seq>
    | <aclrat>
    | <badtst>
    | <crslct>

```

```
<czslct>
<dmehw>
<dmesw>
<error>
<fedrat>
<finpos>
<from>
<gohome>
<goto>
<includ>
<jumpto>
<ptmeas>
<rapid>
RECALL '/'<var_sensor>
<rotab>
<rotset>
SAVE '/'<var_sensor>
<scan>
<scnpln>
<snset>
<snslct>
<text>
<wkplan>
/*-----*/
/* RMEAS...ENDMES sequence */
/*-----*/
/* <rmeas_seq>::= */
/* RMEAS '/'<var_rmeas_1> # */
/* [<meas_block_allowed>...] */
/* ENDMES # */
/* <var_rmeas_1>::= */
/* ARC', 'F<label_name>', '<positive_integer_val><var_rmeas_2> */
/* |CIRCLE', 'F<label_name>', '<positive_integer_val><var_rmeas_2> */
/* |ELLIPS', 'F<label_name>', '<positive_integer_val><var_rmeas_2> */
/* |OBJECT', 'F<label_name>', '<positive_integer_val><var_rmeas_2> */
/* |CONE', 'F<label_name>', '<positive_integer_val><var_rmeas_3> */
/* |CYLNDR', 'F<label_name>', '<positive_integer_val><var_rmeas_3> */
/* |PARPLN', 'F<label_name>', '<positive_integer_val><var_rmeas_3> */
/* |PATTERN', 'F<label_name>', '<positive_integer_val><var_rmeas_3> */
/* |RCTNGL', 'F<label_name>', '<positive_integer_val><var_rmeas_3> */
/* |CPARLN', 'F<label_name>', '<positive_integer_val><var_rmeas_2>['', 'ORIENT]
*/
/* |GCURVE', 'F<label_name>', '<positive_integer_val><var_rmeas_4> */
/* |LINE', 'F<label_name>', '<positive_integer_val><var_rmeas_4> */
/* |PLANE', 'F<label_name>', '<positive_integer_val><var_rmeas_5> */
/* |GSURF', 'F<label_name>', '<positive_integer_val><var_rmeas_5> */
/* |SPHERE', 'F<label_name>', '<positive_integer_val><var_rmeas_5> */
/* |TORUS', 'F<label_name>', '<positive_integer_val><var_rmeas_5> */
/* |POINT', 'F<label_name>', '<positive_integer_val><var_rmeas_6> */
/* |EDGEPT', 'F<label_name>', '<positive_integer_val><var_rmeas_7> */
```



```
/* <var_rmeas_2>::= */
/* ', 'FA<label_name> */
/* |', 'VECBLD', '<positive_real_val>', '<positive_integer_val> */
/* <var_rmeas_3>::= */
/* ', 'FA<label_name> */
/* <var_rmeas_4>::= */
/* ', 'F<label_name>['', '<axis>] */
/* |', 'FA<label_name> ['', '<axis>] */
/* |', 'VECBLD', '<positive_real_val>', '<positive_integer_val> */
/* |', '<axis> */
/* <var_rmeas_5>::= */
/* ', 'FA<label_name> ['', '<axis>] */
/* |', '<axis> */
/* <var_rmeas_6>::= */
/* ', 'FA<label_name> ['', '<axis>] */
/* |', 'VECBLD', '<positive_real_val>', '<positive_integer_val> */
/* |', '<axis> */
/* <var_rmeas_7>::= */
/* ', 'FA<label_name> ['', '<axis>] */
/* |', 'VECBLD', '<positive_real_val>', '<positive_integer_val>', ' */
/* <real_val> ['', '<pos_dir>] ['', '<axis>] */
/* |', '<axis> */
/*-----*/
/* PTMEAS */
/*-----*/
<ptmeas>::=
    PTMEAS '/' '<coord type> ['', '<vector>] #
/*-----*/
/* Miscellaneous STATEMENTS */
/*-----*/
/* ALGDEF */
/*-----*/
/* <algdef_def>::= */
/* VA<label_name>='ALGDEF'/'<var_algdef> # */
/* <var_algdef>::= */
/* CODE', '<positive_integer_val> */
/* |<string_val> ['', '<algdef_param>...] */
/* <algdef_param>::= */
/* <bool_val> */
/* |<integer_val> */
/* |<real_val> */
/* |<string_val> */
/*-----*/
/* DMEHW */
/*-----*/
/* <dmehw>::= */
/* DMEHW'/'<var_dmehw> # */
/* <var_dmehw>::= */
/* CONTIN */
/* |PAUSE */
```

```
/* |SINGLE */
/* |AUTO */
/*-----*/
/* DMESW */
/*-----*/
/* <dmesw>::= */
/* DMESW'/'<var_dmesw> # */
/* <var_dmesw>::= */
/* COMAND', '<string_val> */
/* |CONTIN */
/* |DELAY', '<positive_integer_val> */
/* |PAUSE */
/*-----*/
/* DMIS */
/*-----*/
/* <dmis>::= */
/* DMIS'/'<on_off_constant> # */
/*-----*/
/* GEOALG */
/*-----*/
<geoalg>::=
    GEOALG'/'<var_geoalg_1> #
<var_geoalg_1>::=
    ARC', '<var_geoalg_2>
    |CIRCLE', '<var_geoalg_3>
    |CONE', '<var_geoalg_3>
/* |CPARLN', '<var_geoalg_7> */
    |CYLNDR', '<var_geoalg_3>
    |ELLIPS', '<var_geoalg_2>
    |GCURVE', '<var_geoalg_4>
    |GSURF', '<var_geoalg_5>
    |LINE', '<var_geoalg_2>
/* |OBJECT', '<var_geoalg_7> */
    |PARPLN', '<var_geoalg_3>
    |PLANE', '<var_geoalg_2>
    |RCTNGL', '<var_geoalg_2>
    |SPHERE', '<var_geoalg_3>
    |TORUS', '<var_geoalg_3>
<var_geoalg_2>::=
    LSTSQR
    |MINMAX
    |DEFAULT
    |EXTERN', '<var_geoalg_6>
<var_geoalg_3>::=
    <var_geoalg_2>
    |MAXINS
    |MINCIR
<var_geoalg_4>::=
    <var_geoalg_2>
/* |BSPLIN */
```

```
<var_geoalg_5>::=
  <var_geoalg_2>
/* |BEZIER */
/* |NURBS */
<var_geoalg_6>::=
/* DMIS', 'M<label_name> ['<geoalg_param>...] */
  DME', '<string_val> ['<geoalg_param>...]
/* |SYS', '<string_val> ['<geoalg_param>...] */
/* <var_geoalg_7>::= */
/* |DEFAULT */
/* |EXTERN', '<var_geoalg_6> */
<geoalg_param>::=
  <bool_val>
  | <integer_val>
  | <real_val>
  | <string_val>
  | <label_name>
/*-----*/
/* Intrinsic Functions */
/*-----*/
/*-----*/
/* Define the intrinsic functions that return a Boolean in an expression */
/*-----*/
/* <intrinsic_bool_func>::= */
/* BADGT('')' */
/* |BADPT('')' */
/* |EOF('DID'('<label_name>'))' */
/* |EOLN('DID'('<label_name>'))' */
/*-----*/
/* Define the rest of the intrinsic functions */
/*-----*/
<intrinsic_real_func>::=
ABS('<real_expr>')
/* |ACOS('<real_expr>')' */
/* |ASIN('<real_expr>')' */
/* |ATAN('<real_expr>')' */
/* |ATAN2('<real_expr>', '<real_expr>')' */
|COS('<angle_expr>')
/* |DBLE('<real_expr>')' */
/* |DTOR('<real_expr>')' */
|EXP('<real_expr>')
/* |INDX('<string_val>', '<string_val>')' */
/* |INT('<real_expr>')' */
|LEN('<string_expr>')
/* |LN('<positive_real_expr>')' */
/* |LOG('<positive_real_expr>')' */
/* |MN('<real_expr>', '<real_expr>['<real_expr>...])' */
|MOD('<real_expr>', '<real_expr>')
/* |MX('<real_expr>', '<real_expr>['<real_expr>...])' */
/* |NINT('<real_expr>')' */
```

```
/* |ORD'('<string_expr>')' */
/* |ORD'('<bool_expr>')' */
/* |RL'('<real_expr>')' */
/* |RTOD'('<real_expr>')' */
/* |SIGN'('<real_expr>', '<real_expr>')' */
|SIN'('<angle_expr>')'
|SQRT'('<non_negative_real_expr>')'
|TAN'('<angle_expr>')'
/* |VAL'('<string_expr>')' */
/* |VDOT'('<vector_expr>', '<vector_expr>')' */
/* |VECX'('<vector_expr>')' */
/* |VECY'('<vector_expr>')' */
/* |VE CZ'('<vector_expr>')' */
/* |VMAG'('<vector_expr>')' */
<intrinsic_char_func>::=
/* CHR'('<real_expr>')' */
    |CONCAT'('<string_expr>', '<string_expr>['<string_expr>...]' )'
/* |ELEMNT'('<real_expr>', '<string_expr>', '<string_expr>')' */
/* |SCFEAT'('')' */
/* |SCSNS'('')' */
/* |SDATE'('')' */
/* |SENSNOTOUCH'('')' */
/* |SERROR'('')' */
/* |SILTCH'('')' */
/* |SMODE'('')' */
/* |STIME'('')' */
    |STR'('<real_expr>')'
/* |SUBSTR'('<string_expr>', '<real_expr>['<real_expr>]' )' */
/* <intrinsic_vector_func>::= */
/* |VCART'('<real_expr>', '<real_expr>', '<real_expr>')' */
/* |VCROSS'('<vector_expr>', '<vector_expr>')' */
/* |VMCS'('<vector_expr>')' */
/* |VPCS'('<vector_expr>')' */
/* |VPOL'('<real_expr>', '<angle_expr>', '<real_expr>')' */
/* |VUNIT'('<vector_expr>')' */
/*-----*/
/* MATDEF */
/*-----*/
/* <matdef_def>::= */
/* MA<label_name>'=MATDEF'/'<var_matdef_1> # */
/* <var_matdef_1>::= */
/* F<label_name>', 'FA<label_name> ['<label_name>...] [<var_matdef_2>] */
/* |G<label_name>', 'FA<label_name> ['<label_name>...] [<var_matdef_2>]
*/
/* <var_matdef_2>::= */
/* ', 'PT2PT', '<var_matdef_3>', '<real_val> ['<real_val>] [<var_matdef_4>]
*/
/* |', 'PT2LN', '<var_matdef_3>', '<real_val> ['<real_val>] [<var_matdef_4>]
*/
```

```
/* |','PT2PL','<var_matdef_3>','<real_val> ['','<real_val>] [<var_matdef_4>]
*/
/* |','LN2LN','<var_matdef_3>','<real_val> ['','<real_val>] [<var_matdef_4>]
*/
/* <var_matdef_3>::= */
/* BF */
/* |FZ */
/* <var_matdef_4>::= */
/* |','MMC','T<label_name> */
/* |','LMC','T<label_name> */
/*-----*/
/* Motion STATEMENTS */
/*-----*/
/* FROM */
/*-----*/
/* <from>::= */
/* FROM'/'<cart_coord> # */
/* FROM'/'POL','<pol_coord> # */
/*-----*/
/* GOHOME */
/*-----*/
/* <gohome>::= */
/* GOHOME # */
/*-----*/
/* GOTARG...ENDGO sequence */
/*-----*/
<motion_seq>::=
    GOTARG'/'<var_motion> #
    <goto>
    <goto>
    [<goto>...]
    ENDGO #
<var_motion>::=
    <cart_coord>
    |POL','<pol_coord>
/*-----*/
/* GOTO */
/*-----*/
<goto>::=
GOTO'/'<var_motion_1> #
/* |GOTO'/'INCR','<real_val>','<vector> # */
/* |GOTO'/'ARC','<cart_coord>','<cart_coord> # */
/*-----*/
/* Program Flow STATEMENTS */
/*-----*/
/* XTERN...ENDXTN sequence */
/*-----*/
/* <xtern_seq>::= */
/* XTERN # */
/* [<extfil>...] */
```

```
/* ENDXTN # */
/* <extfil>::= */
/* EXTFIL'/'<var_extfil>', '<string_val> # */
/* <var_extfil>::= */
/* DMIS */
/* |DME */
/* |SYS */
/*-----*/
/* INCLUD */
/*-----*/
/* <includ>::= */
/* INCLUD'/'<var_includ>', '<string_val> # */
/* <var_includ>::= */
/* DMIS */
/* |DME */
/*-----*/
/* Rotary Table STATEMENTS */
/*-----*/
/*-----*/
/* CALIB...ENDMES sequence */
/*-----*/
/* <calib_seq>::= */
/* CALIB'/'<var_calib_1> */
/* |CALIB'/'<var_calib_2> */
/* <var_calib_1>::= */
/* SENS', 'S<label_name>', '<feature_label>', '<var_calib_3> # */
/* [<rotab>...] */
/* [<calib_block_allowed>...] */
/* ENDMES # */
/* <var_calib_2>::= */
/* RTAB', 'RT<label_name>', 'FA<label_name>', '<var_calib_4> # */
/* [<crslct>...] */
/* [<from>...] */
/* [RECALL'/'<var_sensor>...] */
/* [<var_calib_rotab>...] */
/* [SAVE'/'<var_sensor>...] */
/* [<snslct>...] */
/* [<calib_block_allowed>...] */
/* ENDMES # */
/* <var_calib_3>::= */
/* <positive_integer_val> */
/* |<string_val> */
/* |<string_val>', '<positive_integer_val> */
/* <var_calib_4>::= */
/* F<label_name>', '<positive_integer_val> */
/* |FA<label_name>', 'FA<label_name> */
/* <var_sensor>::= */
/* S<label_name> # */
/* |S<label_name>', 'DID<label_name> # */
/* |SA<label_name> # */
```

```
/* |SA<label_name>', 'DID<label_name> # */
/* <var_calib_rotab>::= */
/* ROTAB/'/RT<label_name>', '<var_calib_rotab_1>,ROTNUL', '<angle> # */
/* <var_calib_rotab_1>::= */
/* ABSL', '<var_calib_rotab_2> */
/* |INCR', '<var_calib_rotab_3> */
/* <var_calib_rotab_2>::= */
/* CW */
/* |CCW */
/* |SHORT */
/* <var_calib_rotab_3>::= */
/* CW */
/* |CCW */
/* <calib_block_allowed> */
/* <aclrat> */
/* |<assign_def> */
/* |<badtst> */
/* |<czslct> */
/* |<do_seq> */
/* |<if_seq> */
/* |<dmehw> */
/* |<dmesw> */
/* |<error> */
/* |<fedrat> */
/* |<finpos> */
/* |<from> */
/* |<gohome> */
/* |<goto> */
/* |<includ> */
/* |<jumptarget> */
/* |<jumpto> */
/* |<motion_seq> */
/* |<obtain_def> */
/* |<ptmeas> */
/* |<rapid> */
/* |<rotset> */
/* |<scan> */
/* |<scnpln> */
/* |<select_seq> */
/* |<snset> */
/* |<text> */
/* |<value_def> */
/* |<wkplan> */
/*-----*/
/* CROSCL */
/*-----*/
/* <croscl>::= */
/* CROSCL/'/ '<on_off_constant> # */
/*-----*/
/* ROTAB */
```

```

/*-----*/
/* <rotab>::= */
/* ROTAB/'RT<label_name>', '<var_rotab_1>', '<var_rotab_2>', '<angle> # */
/* <var_rotab_1>::= */
/* ABSL', '<var_rotab_3> */
/* |INCR', '<var_rotab_4> */
/* <var_rotab_2>::= */
/* ROTTOT */
/* |ROTORG */
/* |ROTNUL */
/* <var_rotab_3>::= */
/* CW */
/* |CCW */
/* |SHORT */
/* <var_rotab_4>::= */
/* CW */
/* |CCW */
/*-----*/
/* ROTDEF */
/*-----*/
/* <rotdef_def>::= */
/* RT<label_name>'='ROTDEF'/'<cart_coord>', '<vector> ['', 'RT<label_name>] #
*/
/*-----*/
/* ROTSET */
/*-----*/
/* <rotset>::= */
/* ROTSET/'RT<label_name>', '<angle> # */
/*-----*/
/* Sensor STATEMENTS */
/*-----*/
/* CALIB...ENDMES sequence is defined in Rotary Table STATEMENTS */
/*-----*/
/*-----*/
/* CMPNTGRP */
/*-----*/
/* <cmpntgrp_def>::= */
/* SG<label_name>'='CMPNTGRP'/'BUILD <var_cmpntgrp> [<var_cmpntgrp>...] # */
/* <var_cmpntgrp>::= */
/* ', 'SG<label_name> */
/* |', 'SW<label_name> */
/* |', 'SX<label_name> */
/* |', 'RM<label_name> */
/*-----*/
/* EXTENS */
/*-----*/
/* <extens_def>::= */
/* SX<label_name>'='EXTENS'/'<var_extens> # */
/* <var_extens>::= */
/* <cart_coord> */

```



```

/* |VEC', '<vector>', '<real_val> */
/*-----*/
/* FILDEF */
/*-----*/
/* <fildef_def>::= */
/* VF<label_name>'='FILDEF'/'CODE', '<integer_val> # */
/*-----*/
/* GROUP */
/*-----*/
/* <group_def>::= */
/* GSA<label_name>'='GROUP'/'SA<label_name>', ' */
/* SA<label_name> [','SA<label_name>...] # */
/*-----*/
/* LITDEF */
/*-----*/
/* <litdef_def>::= */
/* VL<label_name>'='LITDEF'/'<var_litdef_1> # */
/* <var_litdef_1>::= */
/* <var_litdef_2>', '<vector> */
/* |STROBE', '<var_litdef_3>', '<positive_real_val>', '<vector> */
/* <var_litdef_2>::= */
/* SURF */
/* |BACK */
/* |GRID */
/* |OBLQ */
/* <var_litdef_3>::= */
/* CYCLE', '<positive_real_val> */
/* |TRIGER */
/*-----*/
/* PRCOMP is defined in File and machine parameter STATEMENTS */
/*-----*/
/*-----*/
/* REFMNT */
/*-----*/
/* <refmnt_def>::= */
/* RM<label_name>'='REFMNT'/'XVEC', '<vector>', 'ZVEC', '<vector> */
/* ', 'MNTLEN', '<vector> # */
/*-----*/
/* SENSOR */
/*-----*/
/* <sensor_def>::= */
/* SS<label_name>'='SENSOR'/'<var_sensor_1> # */
/* <var_sensor_1>::= */
/* PROBE', '<var_sensor_3> */
/* |MLTPRB', '<positive_integer_val>', '<var_sensor_6> */
/* |VIDEO', '<var_sensor_2>', '<real_val>', '<real_val> [<var_sensor_5>] */
/* |LASER', '<var_sensor_2>', '<real_val> [<var_sensor_5>] */
/* |INFRED', '<var_sensor_2>', '<real_val>', '<positive_real_val>', ' */
/* <positive_real_val> [<var_sensor_5>] */
/* |NONCON', '<var_sensor_2> [<var_sensor_5>] */

```

```
/* |XRAY', '<var_sensor_2>', '<positive_real_val>', '<positive_real_val> */
/* [<var_sensor_5>] */
/* |POINT', '<var_sensor_2> [<var_sensor_5>] */
/* |LINE', '<var_sensor_2>', '<real_val> [<var_sensor_5>] */
/* |AREA', '<var_sensor_2>', '<real_val>', '<real_val> [<var_sensor_5>] */
/* <var_sensor_2>:::= */
/* <cart_coord>', '<vector>', '<vector>', '<real_val> */
/* <var_sensor_3>:::= */
/* <cart_coord>', '<vector>', '<positive_real_val> */
/* [<var_sensor_4>] [<var_sensor_5>] */
/* <var_sensor_4>:::= */
/* ', 'SPHERE */
/* |', 'CYLNDR', '<positive_real_val> */
/* |', 'DISK', '<positive_real_val> */
/* <var_sensor_5>:::= */
/* ', '<string_val>', '<string_val>', '<string_val> */
/* |', '<string_val>', '<string_val>', '<positive_integer_val> */
/* <var_sensor_6>:::= */
/* <var_sensor_7> [<var_sensor_7>...][<var_sensor_5>] */
/* <var_sensor_7>:::= */
/* <string_val>', '<cart_coord>', '<vector>', '<positive_real_val> */
/* |<positive_integer_val>', '<cart_coord>', '<vector>', ' */
/* <positive_real_val> */
/*-----*/
/* SNSDEF */
/*-----*/
<snsdef_def>:::=
    S<label_name>='SNSDEF'/'<var_snsdef_1> #
<var_snsdef_1>:::=
    PROBE', '<var_snsdef_2>', '<var_snsdef_3> [' , '<var_snsdef_4>]
/* |VIDEO', '<var_snsdef_2>', '<var_snsdef_5>', '<positive_real_val>', ' */
/* <real_val>', '<real_val> */
/* |LASER', '<var_snsdef_2>', '<var_snsdef_5>', '<real_val>', '<real_val> */
/* |INFRED', '<var_snsdef_2>', '<var_snsdef_5>', '<real_val>', ' */
/* <real_val>', '<positive_real_val>', '<positive_real_val> */
/* |NONCON', '<var_snsdef_2>', '<var_snsdef_5>', '<positive_integer_val> */
/* |XRAY', '<var_snsdef_2>', '<var_snsdef_5>', '<real_val>', ' */
/* <real_val>', '<positive_real_val> */
/* |BUILD', '<var_snsdef_6><var_snsdef_9> */
<var_snsdef_2>:::=
    FIXED
    |INDEX
<var_snsdef_3>:::=
    CART', '<cart_coord>', '<vector>', '<positive_real_val>
/* |POL', '<angle>', '<angle>', '<vector>', '<positive_real_val>', ' */
/* <positive_real_val> */
/* |VEC', '<vector>', '<vector>', '<positive_real_val>', ' */
/* <positive_real_val> */
/* |<sensor_label>', 'CART', '<cart_coord>', '<positive_real_val> */
/* |<sensor_label>', 'VEC', '<vector>', '<positive_real_val>', ' */
```

```
/* <positive_real_val> */
/*<var_snsdef_4>::=
    SPHERE
        |CYLNDR','<positive_real_val>
        |DISK','<positive_real_val>*/
/* <var_snsdef_5>::= */
/* CART','<cart_coord>','<vector> */
/* |POL','<angle>','<angle>','<vector> */
/* |VEC','<vector>','<vector> */
/* <var_snsdef_6>::= */
/* SG<label_name> [<var_snsdef_7>...] */
/* |SW<label_name> [<var_snsdef_8>...] */
/* |SX<label_name> [<var_snsdef_7>...] */
/* |RM<label_name> [<var_snsdef_7>...] */
/* <var_snsdef_7>::= */
/* ','SG<label_name> */
/* |','SW<label_name>['','<string_val>','<angle>...] */
/* |','SX<label_name> */
/* |','RM<label_name> */
/* <var_snsdef_8>::= */
/* ','<string_val>','<angle> */
/* |<var_snsdef_7> */
/* <var_snsdef_9>::= */
/* ','SS<label_name> */
/* |','SGS<label_name> */
/*-----*/
/* SNSET */
/*-----*/
<snset>::=
    SNSET/'<var_snsdef_1> ['','<var_snsdef_1>...] #
<var_snsdef_1>::=
    APPRCH','<positive_real_val>
    |RETRCT','<positive_real_val>
    |SEARCH','<positive_real_val>
/* |CLRSRF','<var_snsdef_2> */
/* |DEPTH ','<var_snsdef_2> */
/* |VA<label_name> */
/* |VF<label_name> */
/* |VL<label_name>','<pct_real> */
/* |VW<label_name> */
/* |FOCUSY */
/* |FOCUSN */
/* |SCALEX','<real_val> */
/* |SCALEY','<real_val> */
/* |MINCON','<positive_real_val> */
/* <var_snsdef_2>::= */
/* F<label_name>['','<real_val>] */
/* |FA<label_name>['','<real_val>] */
/* |<single_dat>['','<real_val>] */
/* |<real_val> */
```

```
/* |OFF */
/*-----*/
/* SNSGRP */
/*-----*/
/* <snsgrp_def>::= */
/* SGS<label_name>='SNSGRP'/'BUILD <var_snsgrp_1> */
/* [<var_snsgrp_1>...]<var_snsgrp_2> # */
/* <var_snsgrp_1>::= */
/* ','SG<label_name> */
/* |','SW<label_name> */
/* |','SX<label_name> */
/* |','RM<label_name> */
/* <var_snsgrp_2>::= */
/* ','SS<label_name> */
/* |','SGS<label_name> */
/*-----*/
/* SNSLCT */
/*-----*/
<snslct>::=
    SNSLCT'/'<var_snslct_1> #
<var_snslct_1>::=
/* GSA<label_name><var_snslct_2> */
    <sensor_label> ['<sensor_label>...] [<var_snslct_3>...]
/* |<sensor_label> <var_snslct_5> [<var_snslct_3>...] */
/* <var_snslct_2>::= */
/* ','<feature_label> ['FZ','<angle>] */
/* |','VEC','<vector> ['FZ','<angle>] */
/* <var_snslct_3>::= */
/* ','SW<label_name> [<var_snslct_4>...] */
/* |<var_snslct_2> */
/* <var_snslct_4>::= */
/* ','<string_val>','<angle> */
/* |','<string_val> <var_snslct_2> */
/* <var_snslct_5>::= */
/* ','<string_val> */
/* |','<positive_integer_val> */
/*-----*/
/* SNSMNT */
/*-----*/
/* <snsmnt>::= */
/* SNSMNT'/'XVEC','<vector>','ZVEC','<vector>','MNTLEN','<cart_coord> # */
/*-----*/
/* THLDEF */
/*-----*/
/* <thldef_def>::= */
/* TH<label_name>='THLDEF'/'<var_thldef> ['<var_thldef>...] # */
/* <var_thldef>::= */
/* S<label_name>','<positive_integer_val> */
/* |SS<label_name>','<positive_integer_val> */
/* |SGS<label_name>','<positive_integer_val> */
```

```
/* |SG<label_name>', '<positive_integer_val> */
/* |SW<label_name>', '<positive_integer_val> */
/* |SX<label_name>', '<positive_integer_val> */
/* |RM<label_name>', '<positive_integer_val> */
/*-----*/
/* WINDEF */
/*-----*/
/* <windef_def>::= */
/* VW<label_name>'='WINDEF'/'<var_windef> # */
/* <var_windef>::= */
/* EDGE LN', '<cart_coord>', '<angle>', '<real_val> */
/* |BOX', '<cart_coord>', '<real_val>', '<real_val>', '<angle> */
/*-----*/
/* WRIST */
/*-----*/
/* <wrist_def>::= */
/* SW<label_name>'='WRIST'/'<var_wrist_1> ['', '<var_wrist_1>...]', ' */
/* MNTLEN', '<cart_coord> ['', '<string_val>', '<string_val>', '<var_wrist_4>] #
*/
/* <var_wrist_1>::= */
/* ROTCEN', '<cart_coord>', '<vector>', '<vector>', 'ANGLE', '<string_val>', ' */
/* <var_wrist_2>', '<var_wrist_3> */
/* <var_wrist_2>::= */
/* <angle>', '<angle> */
/* |THRU */
/* <var_wrist_3>::= */
/* <angle> */
/* |CONTIN */
/* <var_wrist_4>::= */
/* <string_val> */
/* |<positive_integer_val> */
/*-----*/
/* Scanning STATEMENTS */
/*-----*/
/*-----*/
/* SCAN */
/*-----*/
/* <scan>::= */
/* SCAN'/'<var_scan> # */
/* <var_scan>::= */
/* PAUSE */
/* |CONTIN */
/*-----*/
/* SCNMOD */
/*-----*/
<scnmod>::=
    SCNMOD'/'<on_off_constant> #
/*-----*/
/* SCNPLN */
/*-----*/
```

```
/* <scnpln> ::= */
/* SCNPLN '/' <var_scnpln> # */
/* <var_scnpln> ::= */
/* VEC', '<vector> */
/* |<feature_label> */
/* |AUTO */
/*-----*/
/* SCNSET */
/*-----*/
<scnset> ::=
    SCNSET '/' <var_scnset_1> #
<var_scnset_1> ::=
/* PECK', '<var_scnset_2> */
|DRAG', '<var_scnset_2> [' , 'FORCE', '<positive_real_val>]
/* |NONCON', '<var_scnset_2> */
<var_scnset_2> ::=
    DIST', '<positive_real_val> [' , '<axis>]
/* |CHORD', '<positive_real_val> [' , '<positive_real_val>] */
/* |TIME', '<positive_real_val> */
/* |ANGLE', '<real_val> */
/* |DEFAULT */
/*-----*/
/* Tolerance STATEMENTS */
/*-----*/
/* BOUND is defined in Feature STATEMENTS */
/*-----*/
/*-----*/
/* TOLERANCE DEFINITIONS */
/*-----*/
<tol_def> ::=
    T<label_name> = 'TOL' / <var_tol_1> #
<var_tol_1> ::=
    ANGL', '<real_val>', '<real_val>
    |ANGLB', '<angle>', '<real_val>', '<real_val>
    |ANGLR', '<angle>', '<positive_real_val> [<var_tol_2>]
    <var_tol_3> [<var_tol_3>] [<var_tol_4>]
/* |CIRLTY', '<positive_real_val> */
/* |COMPOS', 'PATTERN', '<positive_real_val> [<var_tol_2>] */
/* <var_tol_3> [<var_tol_3>...2] ', 'FEATUR', ' */
/* <positive_real_val> [<var_tol_2>] [<var_tol_3>...3] */
/* |CONCEN', '<positive_real_val><var_tol_18> */
/* |CORTOL', '<var_tol_6>', '<real_val>', '<real_val> */
/* |CPROFS, ', '<real_val>', '<real_val>', '['<var_tol_3>...3] [' , 'AVGDEV] */
/* ', '<real_val>', '<real_val>', '['<var_tol_3>...3] [' , 'AVGDEV] */
/* |CRNOUT', '<positive_real_val>', '<single_dat> [<var_tol_18>...2] */
/* |CYLCTY', '<positive_real_val> */
    |DIAM', '<real_val>', '<real_val> [<var_tol_5>] [<var_tol_20>]
    |DISTB', '<var_tol_11>', '<var_tol_8> [' , '<var_tol_9>]
    |FLAT', '<positive_real_val> [<var_tol_7>]
```

```

/* |GTOL','<var_tol_12><var_tol_13>','<positive_integer_val>','<real_val>','
*/
/* <real_val> [<var_tol_14>] */
    |PARLEL','<positive_real_val> [<var_tol_15>]
    <var_tol_3> [<var_tol_3> ][<var_tol_4>]
    |PERP','<positive_real_val> [<var_tol_15>]
    <var_tol_3> [<var_tol_3> ][<var_tol_4>]
    |POS','<var_tol_10>','<positive_real_val>
    [<var_tol_2>][<var_tol_3>...3][<var_tol_6>]
/* |PROFL','<real_val>','<real_val> [<var_tol_3>...3] */
/* |PROFP','<real_val> ','<real_val> [<var_tol_3>...3] */
/* |PROFS','<real_val> ','<real_val> [<var_tol_3>...3][','AVGDEV] */
/* |RAD','<real_val>','<real_val> [<var_tol_16>][','MINMAX] */
/* |STRGHT','<positive_real_val> [<var_tol_17>] */
/* |SYM','<positive_real_val><var_tol_3> */
/* |TRNOUT','<positive_real_val>','<single_dat> [<var_tol_18>...2] */
/* |USETOL','<string_val> */
    |USETOL','<var_usetol_param>[','<var_usetol_param>...]
/* |WIDTH','<real_val>','<real_val> [<var_tol_19>] [','MINMAX] */
<var_tol_2>::=
    |','MMC
    |','LMC
    |','RFS
<var_tol_3>::=
    |','<single_dat> [<var_tol_2>]
    |','F<label_name>
    |','FA<label_name> [<var_tol_2>]
/* <var_tol_4>::= */
/* |','TANGPL */
/* |','PARPLN */
/* <var_tol_5>::= */
/* |','MAJOR */
/* |','MINOR */
/* <var_tol_6>::= */
/* |','XAXIS */
/* |','YAXIS */
/* |','ZAXIS */
/* |','RADIUS */
/* |','RADIAL */
/* |','ANGLE */
/* <var_tol_7>::= */
/* |','<positive_real_val>','<positive_real_val>','<positive_real_val> */
/* |','<positive_real_val>','<positive_real_val> */
<var_tol_8>::=
    |XAXIS
    |YAXIS
    |ZAXIS
    |PT2PT
/* <var_tol_9>::= */
/* AVG */

```

```
/* |MAX */
/* |MIN */
<var_tol_10>::=
  2D
  |3D
<var_tol_11>::=
  NOMINL','<positive_real_val>','<real_val>','<real_val>
  |LIMIT','<real_val>','<real_val>
/* <var_tol_12>::= */
/* XDIR */
/* |YDIR */
/* |ZDIR */
/* |XYDIR */
/* |YZDIR */
/* |ZXDIR */
/* |XYZDIR */
/* |NOTRAN */
/* <var_tol_13>::= */
/* |,'XAXIS */
/* |,'YAXIS */
/* |,'ZAXIS */
/* |,'XYAXIS */
/* |,'YZAXIS */
/* |,'ZXAXIS */
/* |,'XYZAXI */
/* |,'NOROT */
/* <var_tol_14>::= */
/* |,'PERCNT */
/* |,'INTFPT */
<var_tol_15>::=
  |,'MMC /*[','MAX','<real_val>]*/
  |,'LMC
  |,'RFS
/* <var_tol_16>::= */
/* |,'AVG */
/* |,'CRAD */
/* <var_tol_17>::= */
/* |,'MMC */
/* |,'LMC */
/* |,'RFS */
/* |,'<positive_real_val> */
/* |,'<positive_real_val>','<positive_real_val> */
/* <var_tol_18>::= */
/* |,'<single_dat> */
/* |,'<feature_label> */
/* <var_tol_19>::= */
/* |,'<vector> */
/* |,'SHORT */
/* |,'LONG */
/* <var_tol_20>::= */
```



```

/* ', 'AVG */
/* |', 'MINMAX */
<var_usetol_param>::=
    <bool_val>
    | <integer_val>
    | <real_val>
    | <string_val>
/*-----*/
/* Variable Assignment and declaration STATEMENTS */
/*-----*/
/* ASSIGN */
/*-----*/
<assign_def>::=
    <varname>'='ASSIGN'/'<expr> #
/*-----*/
/* DECL */
/*-----*/
<decl>::=
    DECL'/' [<var_decl_1> <var_decl_2> <var_decl_3> [<var_decl_3>...] #
<var_decl_1>::=
    COMMON', '
    | GLOBAL', '
    | LOCAL', '
<var_decl_2>::=
    BOOL
    | INTGR
    | LONG
    | REAL
    | DOUBLE
    | CHAR', '<positive integer val>
    | VECTOR
<var_decl_3>::=
    ', '<varname>
    | ', '<varname>' ['<positive integer val>['<positive integer val>...]]
'
/*-----*/
/* OBTAIN */
/*-----*/
<obtain_def>::=
    <varname>'='OBTAIN'/'<var_obtain_1>', '<positive integer val> #
<var_obtain_1>::=
    <var_obtain_2> <label_name>
/* |F<label_name> ['['<positive integer val>']] */
/* |FA<label_name> ['['<positive integer val>']] */
<var_obtain_2>::=
/* CC |CI |CR |CS |D |DA |DI |DID |DS |DV |FI |FS |G */
/* |GSA |LI |MA |MD |OP |PC |PL |PN |PR |PS |PV |Q |R */
/* |RM |RT */
    |S |SA
/* |SG |SGS |SS |SW |SX |T |TA |TH |TL */

```

```
/* |V |VA |VF |VL |VW */
/*-----*/
/* VALUE */
/*-----*/
/* <value_def>::= */
/* <varname>='VALUE'/'<var_value> # */
/* <var_value>::= */
/* ACLRAT[','<var_value_aclrat>] */
/* |BADTST */
/* |BOUND','<var_value_bound> */
/* |CRMODE */
/* |CROSCL */
/* |CRSLCT */
/* |CZSLCT','<label_name> */
/* |DATSET */
/* |DMISMD','<var_value_dmismd> */
/* |DMISMN','<var_value_dmismd> */
/* |ERROR','<var_value_error> */
/* |FEDRAT[','<var_value_fedrat>] */
/* |FILNAM','<var_value_dmismd> */
/* |FINPOS */
/* |GECOMP */
/* |GEOALG','<var_value_geoalg> */
/* |GOTO','<var_value_goto> */
/* |MODE */
/* |PRCOMP */
/* |PTBUFF */
/* |PTMEAS','<var_value_goto> */
/* |SCNMOD */
/* |SNSSET','<var_value_snsset> */
/* |SNSLCT */
/* |SNSMNT','<var_value_snsmnt> */
/* |TECOMP */
/* |UNITS','<var_value_units> */
/* |WKPLAN */
/* |FA<label_name>','<var_value_fa> */
/* |RT<label_name>','<var_value_rt> */
/* |SA<label_name>[','<var_value_sa>] */
/* |SW<label_name>','ANGLE','<string_val> */
/* |TA<label_name>','<var_value_ta> */
/* <var_value_fa>::= */
/* PTDATA */
/* |SIZE ['','<positive_integer_val>] */
/* <var_value_rt>::= */
/* ANGL','CW */
/* |ANGL','CCW */
/* <var_value_sa>::= */
/* <string_val> */
/* |<positive_integer_val> */
/* <var_value_ta>::= */
```

```
/* INTOL ['<positive_integer_val>] */
/* |OUTOL ['<positive_integer_val>] */
/* |ACT ['<positive_integer_val>] */
/* |DEV ['<positive_integer_val>] */
/* |AMT ['<positive_integer_val>] */
/* <var_value_aclrat>::= */
/* MESACL', 'ACEL */
/* |POSACL', 'ACEL */
/* |ROTACL', 'ACEL */
/* <var_value_bound>::= */
/* <feature_label>', 'COUNT */
/* |<feature_label>', '<positive_integer_val> */
/* |<tolerance_label>', 'COUNT */
/* |<tolerance_label>', '<positive_integer_val> */
/* <var_value_dmismd>::= */
/* NAME */
/* |VERSION */
/* <var_value_error>::= */
/* ERR */
/* |ERRMODE */
/* <var_value_fedrat>::= */
/* MESVEL', 'FEED */
/* |POSVEL', 'FEED */
/* |ROTVEL', 'FEED */
/* |SCNVEL', 'FEED */
/* <var_value_geoalg>::= */
/* ARC */
/* |CIRCLE */
/* |CONE */
/* |CPARLN */
/* |CYLNDR */
/* |ELLIPS */
/* |EDGEPT */
/* |GCURVE */
/* |GSURF */
/* |LINE */
/* |OBJECT */
/* |PARPLN */
/* |PLANE */
/* |RCTNGL */
/* |SPHERE */
/* |TORUS */
/* <var_value_goto>::= */
/* <axis> */
/* |POS */
/* <var_value_snset>::= */
/* APPRCH */
/* |RETRCT */
/* |SEARCH */
/* |CLRSRF */
```

```
/* |CLRSRF', 'DIST */
/* |DEPTH */
/* |DEPTH', 'DIST */
/* <var_value_snsmt>::= */
/* XVEC */
/* |ZVEC */
/* |MNTLEN */
/* <var_value_units>::= */
/* DIST */
/* |ANGL */
/* |TEMP */
/*=====*/
/*==== End of Productions of DMIS major words for Input section ===*/
/*=====*/

ENDCH1
CHFIL2
ENDCH2
ENDCHF
```