

Appendix D. Manual of GENPXS

1. Input Description

GENPXS uses an input files, following the standard I/O rules of Windows 98/NT or UNIX system. There are several keywords to describe the in the GENPXS input file, which identify the special meaning of input followed by several data. The Table D.1 shows the keywords and the meanings of the data.

Table D.1. The keywords of GENPXS input and their meaning.

Index	keyword	meaning
1	%JOB_TIT	Problem title
2	%JOB_OPT	The options of GENPXS program.
3	%DAT_SRC	The File contains XS data.
4	%HEL_FMT	Format of HELIOS output file.
5	%BRANCHES	Numbers of branches
6	%STATE	State information for history, reference state and all branch cases
7	%REFL	The reflector information
8	%JOB_END	Job ending flag.

In the GENPXS inputs, there are some general rules. The basic rule is that the all data is given by free format except to the keywords.

1.1. %JOB_TITLE

- Format

%JOB_TIT

PMAXS-file, comments

Variable	Description
PMAXS-file	Character. The name of the output PMAXS format file. The maximum length is 40.
Comments	Character.

	The title of the problem.
--	---------------------------

- Example

```
%JOB_TIT
    PMAXS.C01    "17x17" SMART CORE FUEL ASSEMBLY "08/03/2000"
```

In the above example, in order to distinguish the integer and character-string, the character strings starting with a numeric data are closed by the double quotation mark. The output PMAXS format file will be created in the name of PMAXS.C01.

1.2. DAT_SRC

- Format

```
%DATA_SRC
    SRC-kind XS-file
```

Variable	Description
SRC-kind	IF 1, HELIOS output IF 2, TABLES library
XS-file	Character. The XS file name for making PMAXS file

- Example

```
%DAT_SRC
    1 ZENITH.A01
```

In the above example, the name of the source file is ZENITH.A01 and this file contains the HELIOS results.

1.3. JOB_OPTION

- Format

%JOB_OPTION

ladf lcdf llpp lpff lgff ldet lxes lbet,lamb,lspd ldec

Variable	Description
Ladf	T/F: Write/not ADF to PMAXS
Lcdf	T/F: Write/not CDF to PMAXS
Llpp	T/F: Write/not Local power peaking factors to PMAXS
Lpff	T/F: Write/not power form function to PMAXS
Lgff	T/F: Write/not group-wise form function to PMAXS
Ldet	T/F: Write/not detector parameters to PMAXS
Lxes	T/F: Write/not Xe/Sm XS to PMAXS
Lbet	T/F: Write/not Beta of Delayed neutron to PMAXS
Lamb	T/F: Write/not Lambda of Delayed neutron to PMAXS
Lspd	T/F: Write/not Spectrum of Delayed neutron to PMAXS
Ldec	1/0: Write/not decay parameters to PMAXS

- Example

%JOB_OPTION

1 1 0 0 0 1 1 1 0

1.4.—1.7 these section are used for generate PMAXS from HELIOS output

1.4. HEL_FMT

- Format

%ZEN_FMT

FA-kind Label Width Column XS-file

Variable	Description
FA_kind	Integer. The flag of assembly type. If 0, corner reflector (see also %REFL). IF -1, edge reflector (see also %REFL). IF 1, fuel assembly
Label	Integer. Width of label column in Characters.
Width	Integer. Width of each date columns in Characters.

Column	Integer. Number of data columns in one block.
--------	---

- Example

```
%HEL_FMT
  1 24 13 8
```

In the above example, the HELIOS output file contains the HELIOS results of the fuel assembly, not reflector assembly. The labels takes 24 columns, and there are at most 8 data in a row, the width for each data is 13 columns.

1.5. BRANCHES

- Format

```
%BRANCHES
  IBCR IBMD IBSB IBTF IBTM
```

Variable	Description
IBCR	Integer. Number of control rod branch cases.
IBMD	Integer. Number of moderator density branch cases.
IBSB	Integer. Number of soluble boron branch cases.
IBTF	Integer. Number of fuel temperature branch cases.
IBTM	Integer. Number of moderator temperature branch cases.

NBRA=1+IBCR+IBMD+IBSB+IBTF+IBTM

- Example

```
%BRANCHES
  1 1 4 1 0
```

1.6. STATE

- Format

```
%STATE
```

(name,ind,CR(i), MD(i), SB(i), TF(i),TM(i), i=0,NBRA)

Name =/'HIST'/'REFE'/'CRBR'/'MDBR'/'SBBR'/'TFBR'/'TMBR' /
ind index of branches
CR control rod state.
MD Moderator density (g/cc).
SB Soluble boron concentration (ppm).
TF Fuel Temperature (K).
TM Moderator Temperature (K).

- Example

%STATE

HIST	1	0.000000	0.456652	0.000	900.000	561.220
REFE	1	0.000000	0.456652	0.000	900.000	561.220
CRBR	1	1.000000	0.596226	0.000	900.000	561.220
MDBR	1	0.000000	0.177504	0.000	900.000	561.220
MDBR	2	0.000000	0.317078	0.000	900.000	561.220
MDBR	3	0.000000	0.596226	0.000	900.000	561.220
MDBR	4	0.000000	0.7358	0.000	900.000	561.220
SBBR	1	1.000000	0.7358	1000.000	900.000	561.220
TFBR	1	0.000000	0.456652	0.000	561.220	561.220

1.7. REFL

- Format

%REFL

FA-pitch Shroud-thick

Variable	Description
FA-pitch	Real. The fuel assembly pitch in [cm].
Shroud-thick	Real. The thickness of the shroud in [cm].

- Note

IF the FA-kind of %ZEN_FMT is not -1, then this data is ignored.

If the REFL data is not given, the correction factor becomes 1.0.

- Example

%REFL

21.607 2.23398

In the above example, the fuel pitch and the thickness of shroud are 21.607 and 2.23398 cm, respectively. So, the correction factor becomes 0.8966 by the Eq. (5.8).

2. The Samples input of GENPXS code

2.1. The Sample Input for HELIOS

```
%JOB_TIT
  'GE12B.PMAX'   GE12 FUEL ASSEMBLY Bottom part
%DAT_SRC
  1  'GE12B.out'
%JOB_OPT
  T   T   T   F   F   F   T   T   F
!  adf  cdf  lpp  pff  gff  det  xes  kin  dec
%HEL_FMT
  1 24 13 8
%BRANCH
  1 1 4 1 0
%STATE
  HIST  1  0.000000  0.456652  0.000  900.000  561.220
  REFE  1  0.000000  0.456652  0.000  900.000  561.220
  CRBR  1  1.000000  0.596226  0.000  900.000  561.220
  MDBR  1  0.000000  0.177504  0.000  900.000  561.220
  MDBR  2  0.000000  0.317078  0.000  900.000  561.220
  MDBR  3  0.000000  0.596226  0.000  900.000  561.220
  MDBR  4  0.000000  0.7358    0.000  900.000  561.220
  SBBR  1  1.000000  0.7358    1000.000  900.000  561.220
  TFBR  1  0.000000  0.456652  0.000  561.220  561.220
%JOB_END
```

2.2. The Sample Input for TABLES

```
%JOB_TIT
  'SEG01.PMAX'   RINGHALL SEG01 FUEL ASSEMBLY
%DAT_SRC
  2  'TABLES/SEG01'
%JOB_OPT
  T   T   T   F   F   T   T   T   F
!  adf  cdf  lpp  pff  gff  det  xes  kin  dec
```

Pu/NE-00-20(Rev. 2.0)

%BRANCHES

1 1 4 1 0

%JOB_END