

## **NAG Library Chapter Introduction**

### **x04 – Input/Output Utilities**

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## 1 Scope of the Chapter

This chapter contains file opening and closing functions and matrix printing utility functions.

## 2 Background to the Problems

Functions are provided to allow formatted output of

- (a) general matrices stored in a two-dimensional array (real and complex data types);
- (b) triangular matrices stored in a packed one-dimensional array (real and complex data types);
- (c) band matrices stored in a packed two-dimensional array (real and complex data types).

Functions in (b) and (c) allow printing of matrices stored in formats used in particular by Chapters f06 and f07 of the Library.

By appropriate choice of arguments you can specify titles, labels, maximum output record length, and the format of individual matrix elements. All output is directed to a specified file, or to `stdout`.

Functions for reading, writing or appending to files are required for functions with option setting facilities in the library.

## 3 Functionality Index

Accessing external formatted file,

reading a record ..... `nag_read_line` (x04bbc)  
writing a record ..... `nag_write_line` (x04bac)

Closing an external file ..... `nag_close_file` (x04adc)

Opening an external file ..... `nag_open_file` (x04acc)

Printing matrices,

comprehensive functions,

general complex matrix ..... `nag_gen_complx_mat_print_comp` (x04dbc)  
general real matrix ..... `nag_gen_real_mat_print_comp` (x04cbc)  
packed complex band matrix ..... `nag_band_complx_mat_print_comp` (x04dfc)  
packed complex triangular matrix ..... `nag_pack_complx_mat_print_comp` (x04ddc)  
packed real band matrix ..... `nag_band_real_mat_print_comp` (x04cfc)  
packed real triangular matrix ..... `nag_pack_real_mat_print_comp` (x04cdc)

easy-to-use functions,

general complex matrix ..... `nag_gen_complx_mat_print` (x04dac)  
general real matrix ..... `nag_gen_real_mat_print` (x04cac)  
packed complex band matrix ..... `nag_band_complx_mat_print` (x04dec)  
packed complex triangular matrix ..... `nag_pack_complx_mat_print` (x04dcc)  
packed real band matrix ..... `nag_band_real_mat_print` (x04cec)  
packed real triangular matrix ..... `nag_pack_real_mat_print` (x04ccc)

Utility functions,

convert integer to NAG enum type ..... `nag_enum_value_to_name` (x04nbc)  
convert integer to NAG error code string ..... `nag_code_to_error_name` (x04ndc)  
convert NAG enum type name to integer ..... `nag_enum_name_to_value` (x04nac)  
convert NAG error code string to integer ..... `nag_error_name_to_code` (x04ncc)

## 4 Auxiliary Functions Associated with Library Function Arguments

None.

## **5 Functions Withdrawn or Scheduled for Withdrawal**

The following lists all those functions that have been withdrawn since Mark 23 of the Library or are scheduled for withdrawal at one of the next two marks.

<b>Withdrawn Function</b>	<b>Mark of Withdrawal</b>	<b>Replacement Function(s)</b>
nag_example_file_io (x04aec)	25	No replacement required.

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