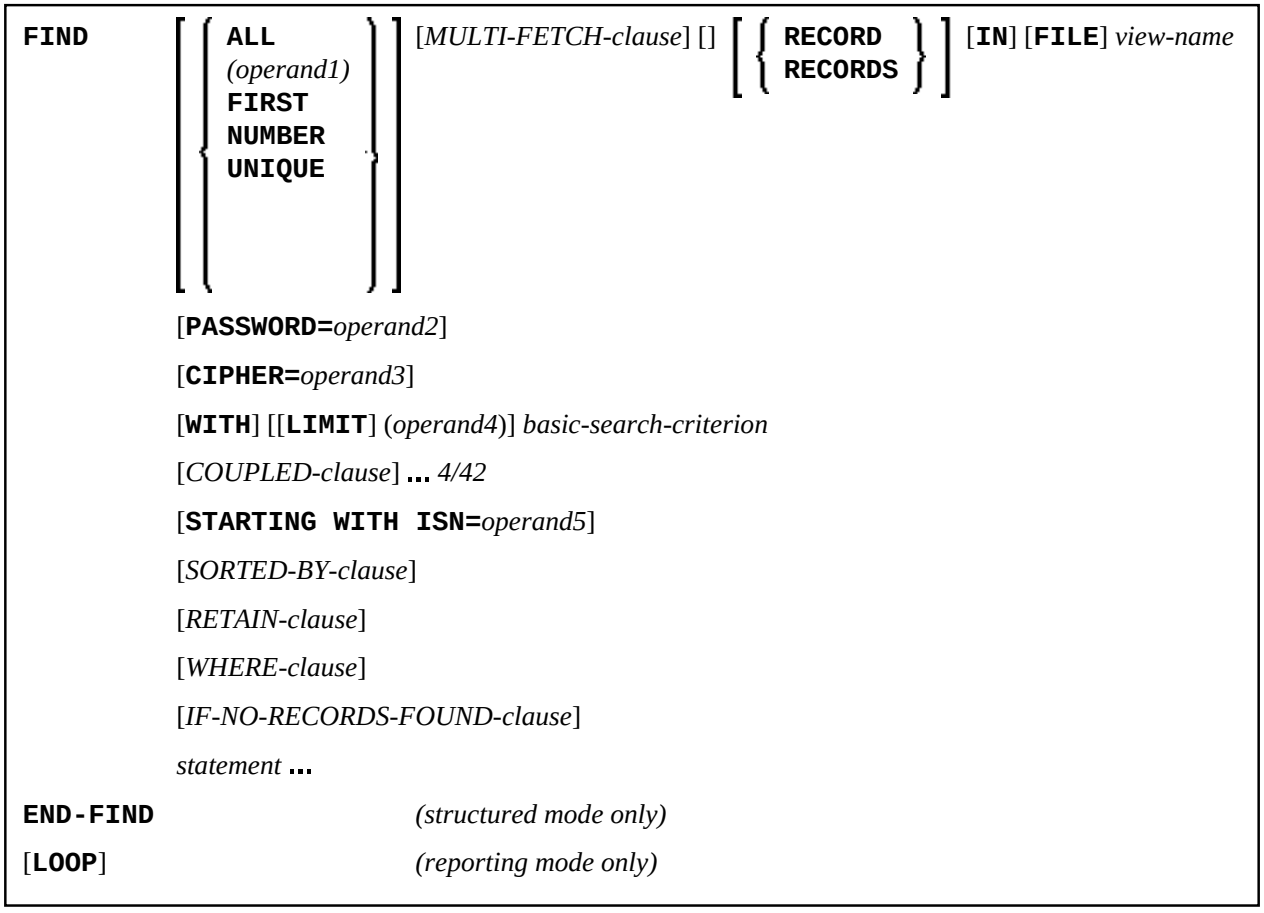
FIND



This chapter covers the following topics:

- Function
- Restrictions
- Syntax Description
- Examples

For an explanation of the symbols used in the syntax diagram, see *Syntax Symbols*.

Related Statements: ACCEPT/REJECT | AT BREAK | AT START OF DATA | AT END OF DATA | BACKOUT TRANSACTION | BEFORE BREAK PROCESSING | DELETE | END TRANSACTION | GET | GET SAME | GET TRANSACTION | HISTOGRAM | LIMIT | PASSW | PERFORM BREAK PROCESSING | READ | RETRY | STORE | UPDATE

Belongs to Function Group: *Database Access and Update*

Function

The FIND statement is used to select a set of records from the database based on a search criterion consisting of fields defined as descriptors (keys).

This statement causes a processing loop to be initiated and then executed for each record selected. Each field in each record may be referenced within the processing loop. It is not necessary to issue a READ statement following the FIND in order to reference the fields within each record selected.

See also *FIND Statement* (in the *Programming Guide*).

System Variables with the FIND Statement

The Natural system variables *ISN, *NUMBER, and *COUNTER are automatically created for each FIND statement issued. A reference number must be supplied if the system variable was referenced outside the current processing loop or through a FIND UNIQUE, FIND FIRST, or FIND NUMBER statement. The format/length of each of these system variables is P10; this format/length cannot be changed.

*ISN	Adabas	*ISN contains the Adabas internal sequence number (ISN) of the record currently being processed. *ISN is not available for the FIND NUMBER statement.
	SQL	*ISN is not available.
	Entire System Server	*ISN is not available.
*NUMBER	Adabas	*NUMBER contains the number of records which satisfied the basic search criterion specified in the WITH clause.
	Entire System Server	*NUMBER is not available.
*COUNTER	The system variable *COUNTER contains the number of times the processing loop has been entered.	

See also *Example 13 - Using System Variables with the FIND Statement*.

Issuing Multiple FIND Statements

Multiple FIND statements may be issued to create nested loops whereby an inner loop is entered for each record selected in the outer loop.

See also *Example 14 - Multiple FIND Statements*.

Restrictions

With Entire System Server, `FIND NUMBER` and `FIND UNIQUE` as well as the `PASSWORD`, `CIPHER`, `COUPLED` and `RETAIN` clauses are not permitted.

Syntax Description

Operand Definition Table:

Operand	Possible Structure					Possible Formats											Referencing Permitted	Dynamic Definition
operand1	C	S					N	P	I		B*						yes	no
operand2	C	S				A											yes	no
operand3	C	S					N										yes	no
operand4	C	S					N	P	I		B*						yes	no
operand5	C	S					N	P	I		B*						yes	no

* Format B of *operand1*, *operand4* and *operand5* may be used only with a length of less than or equal to 4.

Syntax Element Description:

Syntax Element	Description

ALL/*operand1*	**Processing Limit:**
	
	The number of records to be processed from the selected set may be limited by specifying *operand1* either as a numeric constant (in the range from 0 to 4294967295) or as the name of a numeric variable enclosed in parentheses.
	
	ALL may be optionally specified. It emphasizes that all selected records are to be processed.
	
	If you specify a limit with *operand1*, this limit applies to the FIND loop being initiated. Records rejected for processing by the WHERE clause are not counted against this limit.
	
	`FIND (5) IN EMPLOYEES WITH ...`
	
	`MOVE 10 TO #CNT(N2)`
	`FIND (#CNT) EMPLOYEES WITH ...`
	
	For this statement, the specified limit has priority over a limit set with a LIMIT statement.
	
	If a smaller limit is set with the LT parameter, the LT limit applies.
	
	Notes:
	
	1. If you wish to process a 4-digit number of records, specify it with a leading zero: (0*nnnn*); because Natural interprets every 4-digit number enclosed in parentheses as a line-number reference to a statement.
	2. *operand1* has no influence on the size of an ISN set that is to be retained by a RETAIN clause. *operand1* is evaluated when the FIND loop is entered. If the value of *operand1* is modified within the FIND loop, this does not affect the number of records processed.

FIND FIRST | FIND NUMBER | FIND UNIQUE	**FIND FIRST, FIND NUMBER, FIND UNIQUE Option:** These options are used - to select the first record of a selected set (see *FIND FIRST*), - to determine the number of records in a selected set (see *FIND NUMBER*), or - to ensure that only one record satisfies a selection criterion (see *FIND UNIQUE*). For a detailed description of these options, see below.

Syntax Element	Description
MULTI-FETCH-clause	**MULTI-FETCH Clause:** For Adabas databases, Natural offers a MULTI-FETCH clause that allows you to read more than one record per database access. For further information, see *MULTI-FETCH Clause*.
view-name	**View Name:** The name of a view as defined either within a DEFINE DATA block or in a separate global or local data. In reporting mode, *view-name* is the name of a DDM if no DEFINE DATA LOCAL statement is used.
PASSWORD=*operand2*	**PASSWORD Clause:** The PASSWORD clause applies only for Adabas databases. This clause is not permitted with Entire System Server. The PASSWORD clause is used to provide a password (*operand2*) when reading/writing data from an Adabas file which is password protected. If you require access to a password-protected file, contact the person responsible for database security concerning password usage/assignment. If the password is specified as a constant, the PASSWORD clause should always be coded at the very beginning of a source-code line; and there should be no blank between the keyword PASSWORD and the equal sign; this ensures that the password is not visible/displayable in the source code of the program. In TP mode, you may enter the PASSWORD clause invisible by entering the terminal command %* before you type in the PASSWORD clause. If the PASSWORD clause is omitted, the default password specified with the PASSW statement applies. The password value must not be changed during the execution of a processing loop. See also *Example 1 - PASSWORD Clause*.

Syntax Element	Description
`CIPHER=`*`operand3`	**CIPHER Clause:** The `CIPHER` clause only applies to Adabas databases. This clause is not permitted with Entire System Server. The `CIPHER` clause is used to provide a cipher key (*`operand3`*) when retrieving data from Adabas files which are enciphered. If you require access to an enciphered file, contact the person responsible for database security concerning cipher key usage/assignment. The cipher key may be specified as a numeric constant with 8 digits or as a user-defined variable with format/length N8. If the cipher key is specified as a constant, the `CIPHER` clause should always be coded at the very beginning of a source-code line; this ensures that the cipher key is not visible/displayable in the source code of the program. In TP mode, you may enter the `CIPHER` clause invisible by entering the Natural terminal command `%*` before you type in the `CIPHER` clause. The value of the cipher key must not be changed during the processing of a loop initiated by a `FIND` statement. See also *Example 2 - CIPHER Clause*.

Syntax Element	Description
`WITH LIMIT operand4 basic-search-criterion`	**WITH Clause:** The `WITH` clause is required. It is used to specify the basic-search-criterion (see *Search Criterion for Adabas Files*) consisting of key fields (descriptors) defined in the database. The following database-specific consideration applies: You may use Adabas descriptors, subdescriptors, superdescriptors, hyperdescriptors, and phonetic descriptors within a `WITH` clause. A non-descriptor (that is, a field marked in the DDM with `N`) can also be specified. The number of records to be selected as a result of a `WITH` clause may be limited by specifying the keyword `LIMIT` together with a numeric constant or a user-defined variable, enclosed within parentheses, which contains the limit value (*operand4*). If the number of records selected exceeds the limit, the program will be terminated with an error message. **Note:** If the limit is to be a 4-digit number, specify it with a leading zero (`0nnnn`); because Natural interprets every 4-digit number enclosed in parentheses as a line-number reference to a statement.
COUPLED-clause	**COUPLED Clause:** This clause may be used used to specify a search which involves the use of the Adabas coupling facility. See *COUPLED Clause*.
`STARTING WITH ISN=operand5`	**STARTING WITH Clause:** This clause may be used for repositioning within a `FIND` loop whose processing has been interrupted. See *STARTING WITH Clause*.
SORTED-BY-clause	**SORTED BY Clause:** This clause may be used to cause Adabas to sort the selected records based on the sequence of one to three descriptors. See *SORTED BY Clause*.

Syntax Element	Description
RETAIN-clause	**RETAIN Clause:** This clause may be used to retain the result of an extensive search in large files for further processing. See *RETAIN Clause*.
WHERE-clause	**WHERE Clause:** This clause may be used to specify an additional selection criterion (*logical-condition*). See *WHERE Clause*.
IF-NO-RECORDS-FOUND-clause	**IF NO RECORDS FOUND Clause:** This clause may be used to cause a processing loop initiated with a `FIND` statement to be entered in the event that no records meet the selection criteria specified in the `WITH` clause and the `WHERE` clause. See *IF NO RECORDS FOUND Clause*.
`END-FIND`	**End of FIND Statement:** The Natural reserved keyword `END-FIND` must be used to end the `FIND` statement.

FIND FIRST

The `FIND FIRST` statement may be used to select and process the first record which meets the `WITH` and `WHERE` criteria.

For Adabas databases, the record processed will be the record with the lowest Adabas ISN from the set of qualifying records.

This statement does *not* initiate a processing loop.

Restrictions with FIND FIRST

- `FIND FIRST` can only be used in reporting mode.
- `FIND FIRST` is not available for SQL databases.
- The `IF NO RECORDS FOUND` clause must not be used in a `FIND FIRST` statement.

System Variables with FIND FIRST

The following Natural system variables are available with the `FIND FIRST` statement:

*ISN	The system variable *ISN contains the Adabas ISN of the selected record. *ISN will be zero if no record is found after the evaluation of the WITH and WHERE criteria. *ISN is not available with Entire System Server.
*NUMBER	The system variable *NUMBER contains the number of records found after the evaluation of the WITH criterion and before evaluation of any WHERE criterion. *NUMBER will be zero if no record meets the WITH criterion. *NUMBER is not available with Entire System Server.
*COUNTER	The system variable *COUNTER contains 1 if a record was found; contains 0 if no record was found.

Example of FIND FIRST Statement: See the program FNDFIR (reporting mode)

FIND NUMBER

The FIND NUMBER statement is used to determine the number of records which satisfy the WITH/WHERE criteria specified. It does *not* result in the initiation of a processing loop and *no data fields from the database are made available*.

Note:
Use of the WHERE clause may result in significant overhead.

Restrictions with FIND NUMBER

- The SORTED BY clause and the IF NO RECORDS FOUND clause must not be used with the FIND NUMBER statement.
- The WHERE clause can only be used in reporting mode.
- FIND NUMBER is not available with Entire System Server.

System Variables with FIND NUMBER

The following Natural system variables are available with the FIND NUMBER statement:

*NUMBER	The system variable *NUMBER contains the number of records found after the evaluation of the WITH criterion.
*COUNTER	The system variable *COUNTER contains the number of records found after the evaluation of the WHERE criterion. *COUNTER is only available if the FIND NUMBER statement contains a WHERE clause.

Example for FIND NUMBER: See the program FNDNUM (reporting mode).

FIND UNIQUE

The FIND UNIQUE statement may be used to ensure that only one record is selected for processing. It does *not* result in the initiation of a processing loop. If a WHERE clause is specified, an automatic internal processing loop is created to evaluate the WHERE clause.

If no records or more than one record satisfy the criteria, an error message will be issued. This condition can be tested with the ON ERROR statement.

Restrictions with FIND UNIQUE

- FIND UNIQUE can only be used in reporting mode.
- FIND UNIQUE is not available with Entire System Server.
- For SQL databases, FIND UNIQUE cannot be used. (Exception: On mainframe computers, FIND UNIQUE can be used for primary keys; however, this is only permitted for compatibility reasons and should not be used.)
- The SORTED BY and IF NO RECORDS FOUND clauses must not be used with the FIND UNIQUE statement.

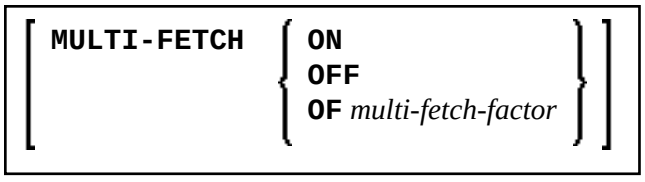
System Variables with FIND UNIQUE

*ISN	The system variable *ISN contains the unique ISN number of the record, which itself must be unique.
*NUMBER	The system variable *NUMBER always contains 1 for a valid FIND UNIQUE execution. *NUMBER may contain any other positive value (= 0 or >= 2) if an error has occurred. This error condition may be used by the ON ERROR statement. *NUMBER is not allowed if the WHERE clause is missing.
*COUNTER	The system variable *COUNTER contains the number of records found after the evaluation of the WHERE criterion. *COUNTER is not allowed if the WHERE clause is missing.

Example for FIND UNIQUE: See the Program FNDUNQ (reporting mode).

MULTI-FETCH Clause

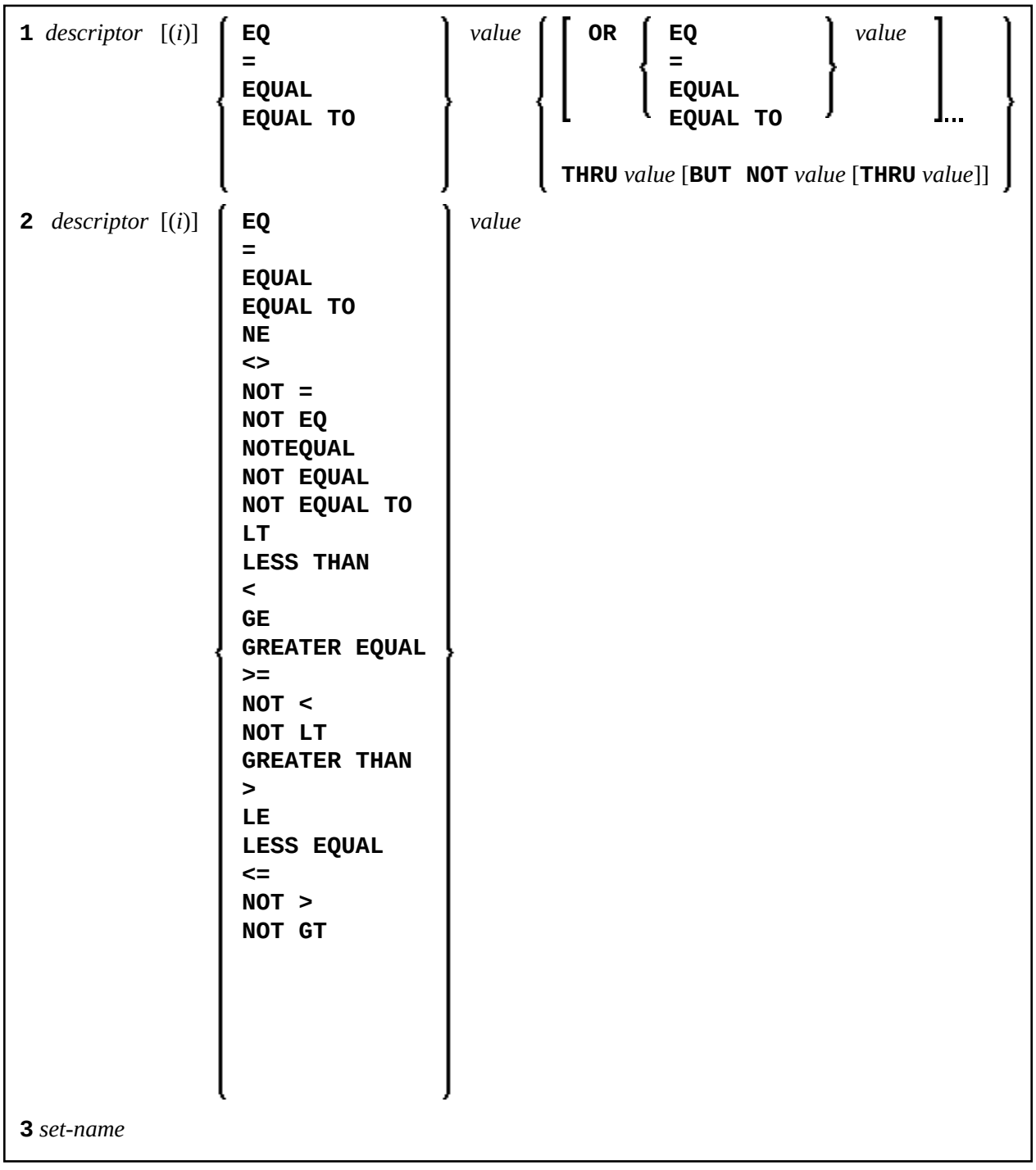
Note:
This clause can only be used for Adabas databases.



Note:
[MULTI-FETCH OF *multi-fetch-factor*] is not evaluated for database types ADA and ADA2. The default processing mode is applied; see profile parameter MFSET. When used in conjunction with database type ADA2, the MULTI-FETCH clause is ignored completetly; see *Database Management System Assignments* in the *Configuration Utility* documentation.

For more information, see the section *Multi-Fetch Clause* (Adabas) in the *Programming Guide*.

Search Criterion for Adabas Files



Operand Definition Table:

Operand	Possible Structure					Possible Formats													Referencing Permitted	Dynamic Definition
descriptor		S	A			A	U	N	P	I	F	B	D	T	L				no	no
value	C	S				A	U	N	P	I	F	B	D	T	L				yes	no
set-name	C	S				A													no	no

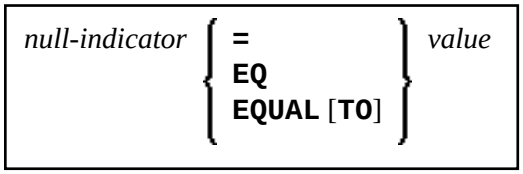
Syntax Element Description:

Syntax Element	Description
descriptor	**Descriptor:** Adabas descriptor, subdescriptor, superdescriptor, hyperdescriptor, or phonetic descriptor. A field marked as non-descriptor in the DDM can also be specified.
(*i*)	**Index Specification:** A descriptor contained within a periodic group may be specified with or without an index. If no index is specified, the record will be selected if the value specified is located in any occurrence. If an index is specified, the record is selected only if the value is located in the occurrence specified by the index. The index specified must be a constant. An index range must not be used. No index must be specified for a descriptor which is a multiple-value field. The record will be selected if the value is located in the record regardless of the position of the value.
value	**Search Value:** The formats of the descriptor and the search value must be compatible.
set-name	**Set Name:** Identifies a set of records previously selected with a `FIND` statement in which the `RETAIN` clause was specified. The set referenced in a `FIND` must have been created from the same physical Adabas file. *set-name* may be specified as a text constant (maximum 32 characters) or as the content of an alphanumeric variable. *set-name* cannot be used with Entire System Server.

See also:

- *Example 3 - Basic Search Criterion in WITH Clause*
- *Example 4 - Basic Search Criterion with Multiple-Value Field*

Search Criterion with Null Indicator



Operand Definition Table:

Operand	Possible Structure					Possible Formats											Referencing Permitted	Dynamic Definition
null-indicator		S							I								no	no
value	C	S					N	P	I	F	B						yes	no

Syntax Element Description:

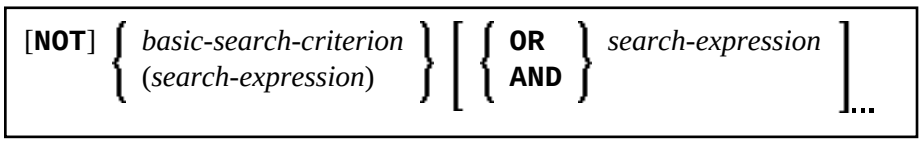
Syntax Element	Description
null-indicator	The null indicator.
value	**Possible Values:** **Meaning:** `-1` The corresponding field contains no value. `0` The corresponding field does contain a value.

Connecting Search Criteria (for Adabas Files)

Basic-search-criteria can be combined using the Boolean operators AND, OR, and NOT. Parentheses may also be used to control the order of evaluation. The order of evaluation is as follows:

1. `( )`: Parentheses
2. `NOT`: Negation (only for a *basic-search-criterion* of form [2]).
3. `AND`: AND operation
4. `OR`: OR operation

Basic-search-criteria may be connected by logical operators to form a complex *search-expression*. The syntax for such a complex *search-expression* is as follows:



See also *Example 5 - Various Samples of Complex Search Expression in WITH Clause*.

Descriptor-Key Usage

Adabas users may use database fields which are defined as descriptors to construct basic search criteria.

Subdescriptors, Superdescriptors, Hyperdescriptors and Phonetic Descriptors

With Adabas, subdescriptors, superdescriptors, hyperdescriptors and phonetic descriptors may be used to construct search criteria.

- A subdescriptor is a descriptor formed from a portion of a field.
- A superdescriptor is a descriptor whose value is formed from one or more fields or portions of fields.
- A hyperdescriptor is a descriptor which is formed using a user-defined algorithm.
- A phonetic descriptor is a descriptor which allows the user to perform a phonetic search on a field (for example, a person’s name). A phonetic search results in the return of all values which sound similar to the search value.

Which fields may be used as descriptors, subdescriptors, superdescriptors, hyperdescriptors and phonetic descriptors with which file is defined in the corresponding DDM.

Values for Subdescriptors, Superdescriptors, Phonetic Descriptors

Values used with these types of descriptors must be compatible with the internal format of the descriptor. The internal format of a subdescriptor is the same as the format of the field from which the subdescriptor is derived. The internal format of a superdescriptor is binary if all of the fields from which it is derived are defined with numeric format; otherwise, the format is alphanumeric. Phonetic descriptors always have alphanumeric format.

Values for subdescriptors and superdescriptors may be specified in the following ways:

- Numeric or hexadecimal constants may be specified. A hexadecimal constant must be used for a value for a superdescriptor which has binary format (see above).
- Values in user-defined variable fields may be specified using the `REDEFINE` statement to select the portions that form the subdescriptor or superdescriptor value.

Using Descriptors Contained within a Database Array

A descriptor which is contained within a database array may also be used in the construction of basic search criterion. For Adabas databases, such a descriptor may be a multiple-value field or a field contained within a periodic group.

A descriptor contained within a periodic group may be specified with or without an index. If no index is specified, the record will be selected if the value specified is located in any occurrence. If an index is specified, the record is selected only if the value is located in the occurrence specified by the index. The index specified must be a constant. An index range must not be used.

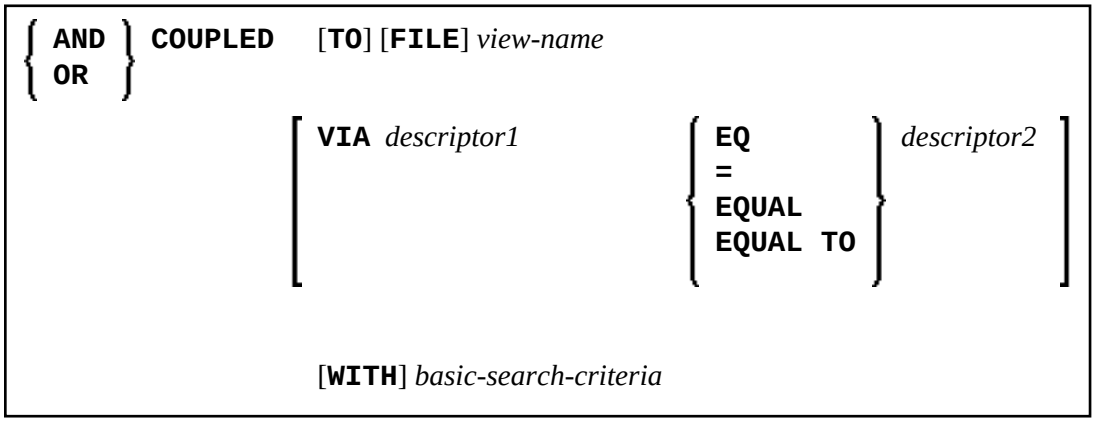
No index must be specified for a descriptor which is a multiple-value field. The record will be selected if the value is located in the record regardless of the position of the value.

See also *Example 6 - Various Samples Using Database Arrays*.

COUPLED Clause

This clause only applies to Adabas databases.

This clause is not permitted with Entire System Server.



Operand Definition Table:

Operand	Possible Structure					Possible Formats											Referencing Permitted	Dynamic Definition
descriptor1		S	A			A	N	P			B						no	no
descriptor2		S	A			A	N	P			B						no	no

Note:
Without the `VIA` clause, the `COUPLED` clause may be specified up to 4 times; with the `VIA` clause, it may be specified up to 42 times.

The `COUPLED` clause is used to specify a search which involves the use of the Adabas coupling facility. This facility permits database descriptors from different files to be specified in the search criterion of a single `FIND` statement.

The same Adabas file must not be used in two different `FIND COUPLED` clauses within the same `FIND` statement.

A *`set-name`* (see *RETAIN Clause*) must not be specified in the *`basic-search-criteria`*.

Database fields in a file specified within the `COUPLED` clause are not available for subsequent reference in the program unless another `FIND` or `READ` statement is issued separately against the coupled file.

Note:
If the `COUPLED` clause is used, the main `WITH` clause may be omitted. If the main `WITH` clause is omitted, the keywords `AND`/`OR` of the `COUPLED` clause must not be specified.

Physical Coupling without VIA Clause

The files used in a COUPLED clause without VIA must be physically coupled using the appropriate Adabas utility (as described in the Adabas documentation).

See also *Example 7 - Using Physically Coupled Files*.

The reference to NAME in the DISPLAY statement of the above example is valid since this field is contained in the EMPLOYEES file, whereas a reference to MAKE would be invalid since MAKE is contained in the VEHICLES file, which was specified in the COUPLED clause.

In this example, records will be found only if EMPLOYEES and VEHICLES have been physically coupled.

Logical Coupling - VIA Clause

The option VIA *descriptor1 = descriptor2* allows you to logically couple multiple Adabas files in a search query, where:

- *descriptor1* is a field from the first view.
- *descriptor2* is a field from the second view.

The two files need not be physically coupled in Adabas. This COUPLED option uses the soft-coupling feature of Adabas Version 5 and above, as described in the Adabas documentation.

See also *Example 8 - VIA Clause*.

STARTING WITH Clause

This clause applies only to Adabas databases.

You can use this clause to specify as *operand5* an Adabas ISN (internal sequence number) which is to be used as a start value for the selection of records.

This clause may be used for repositioning within a FIND loop whose processing has been interrupted, to easily determine the next record with which processing is to continue. This is particularly useful if the next record cannot be identified uniquely by any of its descriptor values. It can also be useful in a distributed client/server application where the reading of the records is performed by a server program while further processing of the records is performed by a client program, and the records are not processed all in one go, but in batches.

Note:
The start value actually used will not be the value of *operand5*, but the next higher value.

Example:

See the program FNDSISN in the library SYSEXSYN.

SORTED BY Clause

This clause only applies to Adabas and SQL databases.

This clause is not permitted with Entire System Server.

SORTED [**BY**] *descriptor* **...** *3* [**DESCENDING**]

The SORTED BY clause is used to cause Adabas to sort the selected records based on the sequence of one to three descriptors. The descriptors used for controlling the sort sequence may be different from those used for selection.

By default, the records are sorted in *ascending* sequence of values; if you want them to be in descending sequence, specify the keyword DESCENDING. The sort is performed using the Adabas inverted lists and does not result in any records being read.

Note:
The use of this clause may result in significant overhead if any descriptor used to control the sort sequence contains a large number of values. This is because the entire value list may have to be scanned until all selected records have been located in the list. When a large number of records is to be sorted, you should use the SORT statement.

Adabas sort limits (see the ADARUN LS parameter in the Adabas documentation) are in effect when the SORTED BY clause is used.

A descriptor which is contained in a periodic group must not be specified in the SORTED BY clause. A multiple-value field (without an index) may be specified.

Non-descriptors may also be specified in the SORTED BY clause. However, this function is not available on mainframes.

If the SORTED BY clause is used, the RETAIN clause must not be used.

See also *Example 9 - SORTED BY Clause*.

Considerations for Combined Use of STARTING WITH and SORTED BY Clauses

If both the STARTING WITH and the SORTED BY clause are used in the same FIND statement and the underlying database is Adabas, the following should be considered.

With Adabas for Mainframes

On Adabas for Mainframes, the FIND statement is executed in the following steps:

1. All records matching the search criterion are gathered and put in ISN sequence.
2. The records are sorted by the descriptor specified in the SORTED BY clause.

3. The record whose ISN value is specified in the `STARTING WITH` clause is positioned in the "sorted-by-descriptor" record list.

4. The records following the record found under Step 3 are returned in the `FIND` loop.

With Adabas for OpenSystems

On Adabas for OpenSystems (UNIX, OpenVMS, Windows) the same statement is executed as follows:

1. All records matching the search criterion are gathered and put in ISN sequence.

2. The record whose ISN value is specified in the `STARTING WITH` clause is positioned in the "sorted-by-ISN" record list.

3. All records following the record found under Step 2 are sorted by the descriptor specified in the `SORTED BY` clause and returned in the `FIND` loop.

Example:

If the following program is executed with Adabas Version 8 for mainframes and Adabas Version 6.1 for UNIX/OpenVMS/Windows:

```
DEFINE DATA LOCAL
1 V1 VIEW OF EMPLOYEES
  2 NAME
  2 FIRST-NAME
  2 CITY
1 #ISN (I4)
END-DEFINE
FORMAT NL=5 SG=OFF PS=43 AL=15
*
PRINT   'FIND' (I)
FIND V1 WITH NAME = 'B' THRU 'BALBIN'
  RETAIN AS 'SET1'
  IF *COUNTER = 4 THEN
    #ISN := *ISN
  END-IF
  DISPLAY *ISN V1
END-FIND
*
PRINT / 'FIND .. SORTED BY NAME' (I)
FIND V1 WITH 'SET1'
  SORTED BY NAME
  DISPLAY *ISN V1
END-FIND
*
PRINT / 'FIND .. STARTING WITH ISN = ' (I) #ISN (AD=I)
FIND V1 WITH 'SET1'
  STARTING WITH ISN = #ISN
  DISPLAY *ISN V1
END-FIND
*
PRINT / 'FIND .. STARTING WITH ISN = ' (I) #ISN (AD=I)
        ' .. SORTED BY NAME' (I)
FIND V1 WITH 'SET1'
  STARTING WITH ISN = #ISN
```

```
  SORTED BY NAME
  DISPLAY *ISN V1
END-FIND
END
```

The result is as follows:

Results on Natural for Mainframes (Adabas Version 8)

```
ISN        NAME         FIRST-NAME         CITY
----- --------------- --------------- ---------------

FIND V1 WITH NAME = 'B' THRU 'BALBIN'
   12 BAILLET         PATRICK         LYS LEZ LANNOY
   58 BAGAZJA         MARJAN          MONTHERME
  351 BAECKER         JOHANNES        FRANKFURT
  355 BAECKER         KARL            SINDELFINGEN
  370 BACHMANN        HANS            MUENCHEN
  490 BALBIN          ENRIQUE         BARCELONA
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY

FIND .. SORTED BY NAME
  370 BACHMANN        HANS            MUENCHEN
  351 BAECKER         JOHANNES        FRANKFURT
  355 BAECKER         KARL            SINDELFINGEN
   58 BAGAZJA         MARJAN          MONTHERME
   12 BAILLET         PATRICK         LYS LEZ LANNOY
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY
  490 BALBIN          ENRIQUE         BARCELONA

FIND .. STARTING WITH ISN = 355
  370 BACHMANN        HANS            MUENCHEN
  490 BALBIN          ENRIQUE         BARCELONA
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY

FIND .. STARTING WITH ISN = 355 .. SORTED BY NAME
   58 BAGAZJA         MARJAN          MONTHERME
   12 BAILLET         PATRICK         LYS LEZ LANNOY
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY
  490 BALBIN          ENRIQUE         BARCELONA
```

Results on Natural for OpenSystems (Adabas Version 6.1)

```
ISN        NAME         FIRST-NAME         CITY
----- --------------- --------------- ---------------

FIND V1 WITH NAME = 'B' THRU 'BALBIN'
   12 BAILLET         PATRICK         LYS LEZ LANNOY
   58 BAGAZJA         MARJAN          MONTHERME
  351 BAECKER         JOHANNES        FRANKFURT
  355 BAECKER         KARL            SINDELFINGEN
  370 BACHMANN        HANS            MUENCHEN
  490 BALBIN          ENRIQUE         BARCELONA
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY

FIND .. SORTED BY NAME
  370 BACHMANN        HANS            MUENCHEN
  351 BAECKER         JOHANNES        FRANKFURT
  355 BAECKER         KARL            SINDELFINGEN
   58 BAGAZJA         MARJAN          MONTHERME
   12 BAILLET         PATRICK         LYS LEZ LANNOY
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY
  490 BALBIN          ENRIQUE         BARCELONA

FIND .. STARTING WITH ISN = 355
  370 BACHMANN        HANS            MUENCHEN
  490 BALBIN          ENRIQUE         BARCELONA
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY

FIND .. STARTING WITH ISN = 355 .. SORTED BY NAME
  370 BACHMANN        HANS            MUENCHEN
  650 BAKER           SYLVIA          OAK BROOK
  913 BAKER           PAULINE         DERBY
  490 BALBIN          ENRIQUE         BARCELONA
```

A `FIND` statement with at most one of these options (`SORTED BY` or `STARTING WITH ISN`) always returns the same records in the same sequence, regardless under which system the statement is executed. If, however, both clauses are used together, the result returned dependends on which Adabas platform is used to serve the database statement.

Therefore, if a Natural program is intended to be used on multiple platforms, the combination of a `SORTED BY` and `STARTING WITH ISN` clause in the same `FIND` statement should be avoided.

RETAIN Clause

This clause only applies to Adabas databases.

This clause is not permitted with Entire System Server.

RETAIN AS *operand6*

Operand Definition Table:

Operand	Possible Structure					Possible Formats										Referencing Permitted	Dynamic Definition
operand6	C	S				A										yes	no

Syntax Element Description:

Syntax Element	Description
`RETAIN AS`	By using the `RETAIN` clause, the result of an extensive search in large files can be retained for further processing. The selection is retained as an `ISN-set` in the Adabas work file. The set may be used in subsequent `FIND` statements as a basic search criterion for further refinement of the set or for further processing of the records. The set created is file-specific and may only be used in another `FIND` statement that processes the same file. The set may be referenced by any Natural program.
operand6	**Set Name:** The set name is used to identify the record set. It may be specified as an alphanumeric constant or as the content of an alphanumeric user-defined variable. Duplicate set names are not checked; consequently, if a duplicate set name is specified, the new set replaces the old set.

See also *Example 10 - RETAIN Clause*.

Releasing Sets

There is no specific limit for the number of sets that can be retained or the number of ISNs in a set. It is recommended that the minimum number of ISN sets needed at one time be defined. Sets that are no longer needed should be released using the `RELEASE SETS` statement.

If they are not released with a `RELEASE` statement, retained sets exist until the end of the Natural session, or until a logon to another library, when they are released automatically. A set created by one program may be referenced by another program for processing or further refinement using additional search criteria.

Updates by Other Users

The records identified by the ISNs in a retained set are not locked against access and/or update by other users. Before you process records from the set, it is therefore useful to check whether the original search criteria which were used to create the set are still valid: This check is done with another `FIND` statement, using the set name in the `WITH` clause as basic search criterion and specifying in a `WHERE` clause the original search criterion (that is, the basic search criteria as specified in the `WITH` clause of the `FIND` statement which was used to create the set).

Restriction

If the RETAIN clause is used, the SORTED BY clause must not be used.

WHERE Clause

```
WHERE logical-condition
```

The WHERE clause may be used to specify an additional selection criterion (*logical-condition*) which is evaluated *after* a value has been read and *before* any processing is performed on the value (including the AT BREAK evaluation).

The syntax for a *logical-condition* is described in the section *Logical Condition Criteria* in the *Programming Guide*.

If a processing limit is specified in a FIND statement containing a WHERE clause, records which are rejected as a result of the WHERE clause are *not* counted against the limit. These records are, however, counted against a global limit specified in the Natural session parameter LT, the GLOBALS command, or LIMIT statement.

See also *Example 11 - WHERE Clause*.

IF NO RECORDS FOUND Clause

Structured Mode Syntax

```
IF NO   [RECORDS] [FOUND]
       { ENTER          }
       { statement ...  }
END-NOREC
```

Reporting Mode Syntax

```
IF NO [RECORDS] [FOUND]
{ ENTER                  }
{ statement              }
{ DO statement ... DOEND }
```

The IF NO RECORDS FOUND clause may be used to cause a processing loop initiated with a FIND statement to be entered in the event that no records meet the selection criteria specified in the WITH clause and the WHERE clause.

If no records meet the specified WITH and WHERE criteria, the IF NO RECORDS FOUND clause causes the FIND processing loop to be executed once with an "empty" record. If this is not desired, specify the statement ESCAPE BOTTOM within the IF NO RECORDS FOUND clause.

If one or more statements are specified with the `IF NO RECORDS FOUND` clause, the statements will be executed immediately before the processing loop is entered. If no statements are to be executed before entering the loop, the keyword `ENTER` must be used.

See also *Example 12 - IF NO RECORDS FOUND Clause*.

Database Values

Unless other value assignments are made in the statements accompanying an `IF NO RECORDS FOUND` clause, Natural will reset to empty all database fields which reference the file specified in the current loop.

Evaluation of System Functions

Natural system functions are evaluated once for the empty record that is created for processing as a result of the `IF NO RECORDS FOUND` clause.

Restriction

This clause cannot be used with `FIND FIRST`, `FIND NUMBER` and `FIND UNIQUE`.

Examples

- Example 1 - PASSWORD Clause
- Example 2 - CIPHER Clause
- Example 3 - Basic Search Criterion in WITH Clause
- Example 4 - Basic Search Criterion with Multiple-Value Field
- Example 5 - Various Samples of Complex Search Expression in WITH Clause
- Example 6 - Various Samples of Using Database Arrays
- Example 7 - Using Physically Coupled Files
- Example 8 - VIA Clause
- Example 9 - SORTED BY Clause
- Example 10 - RETAIN Clause
- Example 11 - WHERE Clause
- Example 12 - IF NO RECORDS FOUND Clause
- Example 13 - Using System Variables with the FIND Statement
- Example 14 - Multiple FIND Statements

See also the example for `FIND NUMBER`: program `FNDNUM`.

Example 1 - PASSWORD Clause

```
** Example 'FNDPWD': FIND (with PASSWORD clause)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 NAME
  2 PERSONNEL-ID
*
1 #PASSWORD (A8)
END-DEFINE
*
INPUT 'ENTER PASSWORD FOR EMPLOYEE FILE:' #PASSWORD (AD=N)
LIMIT 2
*
FIND EMPLOY-VIEW PASSWORD = #PASSWORD
                 WITH NAME = 'SMITH'
  DISPLAY NOTITLE NAME PERSONNEL-ID
END-FIND
*
END
```

Output of Program FNDPWD:

```
ENTER PASSWORD FOR EMPLOYEE FILE:
```

Example 2 - CIPHER Clause

```
** Example 'FNDCIP': FIND (with PASSWORD/CIPHER clause)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 NAME
  2 PERSONNEL-ID
*
1 #PASSWORD (A8)
1 #CIPHER   (N8)
END-DEFINE
*
LIMIT 2
INPUT 'ENTER PASSWORD FOR EMPLOYEE FILE:   ' #PASSWORD (AD=N)
    / 'ENTER CIPHER KEY FOR EMPLOYEE FILE: ' #CIPHER   (AD=N)
*
FIND EMPLOY-VIEW PASSWORD = #PASSWORD
                 CIPHER   = #CIPHER
                 WITH NAME = 'SMITH'
  DISPLAY NOTITLE NAME PERSONNEL-ID
END-FIND
*
END Output of Program FNDCIP:

ENTER PASSWORD FOR EMPLOYEE FILE:
ENTER CIPHER KEY FOR EMPLOYEE FILE:
```

Example 3 - Basic Search Criterion in WITH Clause

```
FIND STAFF WITH NAME = 'SMITH'
FIND STAFF WITH CITY NE 'BOSTON'
FIND STAFF WITH BIRTH = 610803
```

```
FIND STAFF WITH BIRTH = 610803 THRU 610811
FIND STAFF WITH NAME = 'O HARA' OR = 'JONES' OR = 'JACKSON'
FIND STAFF WITH PERSONNEL-ID = 100082 THRU 100100
                                BUT NOT 100087 THRU 100095
```

Example 4 - Basic Search Criterion with Multiple-Value Field

When the descriptor used in the basic search criterion is a multiple-value field, basically four different kinds of results can be obtained (the field MU-FIELD in the following examples is assumed to be a multiple-value field):

```
FIND XYZ-VIEW WITH MU-FIELD = 'A'
```

This statement returns records in which *at least one* occurrence of MU-FIELD has the value A.

```
FIND XYZ-VIEW WITH MU-FIELD NOT EQUAL 'A'
```

This statement returns records in which *at least one* occurrence of MU-FIELD does *not* have the value A.

```
FIND XYZ-VIEW WITH NOT MU-FIELD NOT EQUAL 'A'
```

This statement returns records in which *every* occurrence of MU-FIELD has the value A.

```
FIND XYZ-VIEW WITH NOT MU-FIELD = 'A'
```

This statement returns records in which *none* of the occurrences of MU-FIELD has the value A.

Example 5 - Various Samples of Complex Search Expression in WITH Clause

```
FIND STAFF WITH BIRTH LT 19770101 AND DEPT = 'DEPT06'

FIND STAFF WITH JOB-TITLE = 'CLERK TYPIST'
                    AND (BIRTH GT 19560101 OR LANG = 'SPANISH')

FIND STAFF WITH JOB-TITLE = 'CLERK TYPIST'
                    AND NOT (BIRTH GT 19560101 OR LANG = 'SPANISH')

FIND STAFF WITH DEPT = 'ABC' THRU 'DEF'
                    AND CITY = 'WASHINGTON' OR = 'LOS ANGELES'
                    AND BIRTH GT 19360101

FIND CARS WITH MAKE = 'VOLKSWAGEN'
                   AND COLOR = 'RED' OR = 'BLUE' OR = 'BLACK'
```

Example 6 - Various Samples of Using Database Arrays

The following examples assume that the field SALARY is a descriptor contained within a periodic group, and the field LANG is a multiple-value field.

```
FIND EMPLOYEES WITH SALARY LT 20000
```

Results in a search of all occurrences of SALARY.

```
FIND EMPLOYEES WITH SALARY (1) LT 20000
```

Results in a search of the first occurrence only.

```
FIND EMPLOYEES WITH SALARY (1:4) LT 20000    /* invalid
```

A range specification must not be specified for a field within a periodic group used as a search criterion.

```
FIND EMPLOYEES WITH LANG = 'FRENCH'
```

Results in a search of all values of LANG.

```
FIND EMPLOYEES WITH LANG (1) = 'FRENCH'        /* invalid
```

An index must not be specified for a multiple-value field used as a search criterion.

Example 7 - Using Physically Coupled Files

```
** Example 'FNDCPL': FIND (using coupled files)
** NOTE: Adabas files must be physically coupled when using the
**       COUPLED clause without the VIA clause.
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 NAME
1 VEHIC-VIEW VIEW OF VEHICLES
  2 MAKE
END-DEFINE
*
FIND EMPLOY-VIEW WITH CITY = 'FRANKFURT'
     AND COUPLED TO
     VEHIC-VIEW WITH MAKE = 'VW'
  DISPLAY NOTITLE NAME
END-FIND
*
END
```

Example 8 - VIA Clause

```
** Example 'FNDVIA': FIND (with VIA clause)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 NAME
  2 FIRST-NAME
1 VEHIC-VIEW VIEW OF VEHICLES
  2 PERSONNEL-ID
END-DEFINE
*
FIND EMPLOY-VIEW WITH NAME = 'ADKINSON'
     AND COUPLED TO VEHIC-VIEW
     VIA PERSONNEL-ID = PERSONNEL-ID WITH MAKE = 'VOLVO'
  DISPLAY PERSONNEL-ID NAME FIRST-NAME
END-FIND
*
END
```

Output of Program FNDVIA:

```
Page      1                                                    05-01-17  13:18:22

PERSONNEL          NAME               FIRST-NAME
   ID
--------- ------------------- --------------------

20011000  ADKINSON             BOB
```

Example 9 - SORTED BY Clause

```
** Example 'FNDSOR': FIND (with SORTED BY clause)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 CITY
  2 NAME
  2 FIRST-NAME
  2 PERSONNEL-ID
END-DEFINE
*
LIMIT 10
FIND EMPLOY-VIEW WITH CITY = 'FRANKFURT'
                 SORTED BY NAME PERSONNEL-ID

  DISPLAY NOTITLE NAME (IS=ON) FIRST-NAME PERSONNEL-ID
END-FIND
*
END
```

Output of Program FNDSOR:

```
        NAME               FIRST-NAME       PERSONNEL
                                               ID
-------------------- -------------------- ---------

BAECKER              JOHANNES             11500345
BECKER               HERMANN              11100311
BERGMANN             HANS                 11100301
BLAU                 SARAH                11100305
BLOEMER              JOHANNES             11200312
DIEDRICHS            HUBERT               11600301
DOLLINGER            MARGA                11500322
FALTER               CLAUDIA              11300311
                     HEIDE                11400311
FREI                 REINHILD             11500301
```

Example 10 - RETAIN Clause

```
** Example 'RELEX1': FIND (with RETAIN clause and RELEASE statement)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 CITY
  2 BIRTH
  2 NAME
*
1 #BIRTH (D)
END-DEFINE
*
```

```
MOVE EDITED '19400101' TO #BIRTH (EM=YYYYMMDD)
*
FIND NUMBER EMPLOY-VIEW WITH BIRTH GT #BIRTH
     RETAIN AS 'AGESET1'
IF *NUMBER = 0
  STOP
END-IF
*
FIND EMPLOY-VIEW WITH 'AGESET1' AND CITY = 'NEW YORK'
  DISPLAY NOTITLE NAME CITY BIRTH (EM=YYYY-MM-DD)
END-FIND
*
RELEASE SET 'AGESET1'
*
END
```

Output of Example 10:

```
        NAME                 CITY            DATE
                                              OF
                                            BIRTH
-------------------- -------------------- ----------

RUBIN                NEW YORK             1945-10-27
WALLACE              NEW YORK             1945-08-04
```

Example 11 - WHERE Clause

```
** Example 'FNDWHE': FIND (with WHERE clause)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 NAME
  2 JOB-TITLE
  2 CITY
END-DEFINE
*
FIND EMPLOY-VIEW WITH CITY = 'PARIS'
                 WHERE JOB-TITLE = 'INGENIEUR COMMERCIAL'
  DISPLAY NOTITLE
          CITY JOB-TITLE PERSONNEL-ID NAME
END-FIND
*
END
```

Output of Program FNDWHE:

```
        CITY                  CURRENT          PERSONNEL         NAME
                             POSITION             ID
-------------------- ------------------------ --------- --------------------

PARIS                INGENIEUR COMMERCIAL      50007300  CAHN
PARIS                INGENIEUR COMMERCIAL      50006500  MAZUY
PARIS                INGENIEUR COMMERCIAL      50004700  FAURIE
PARIS                INGENIEUR COMMERCIAL      50004400  VALLY
PARIS                INGENIEUR COMMERCIAL      50002800  BRETON
PARIS                INGENIEUR COMMERCIAL      50001000  GIGLEUX
PARIS                INGENIEUR COMMERCIAL      50000400  KORAB-BRZOZOWSKI
```

Example 12 - IF NO RECORDS FOUND Clause

```
** Example 'FNDIFN': FIND (using IF NO RECORDS FOUND)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 NAME
  2 FIRST-NAME
1 VEHIC-VIEW VIEW OF VEHICLES
  2 PERSONNEL-ID
  2 MAKE
END-DEFINE
*
LIMIT 15
EMP. READ EMPLOY-VIEW BY NAME STARTING FROM 'JONES'
  /*
  VEH. FIND VEHIC-VIEW WITH PERSONNEL-ID = PERSONNEL-ID (EMP.)

    IF NO RECORDS FOUND
      MOVE '*** NO CAR ***' TO MAKE
    END-NOREC
    /*
    DISPLAY NOTITLE
            NAME (EMP.) (IS=ON)
            FIRST-NAME (EMP.) (IS=ON)
            MAKE (VEH.)
  END-FIND
  /*
END-READ
END
```

Output of Program FNDIFN:

```
        NAME              FIRST-NAME              MAKE
-------------------- -------------------- --------------------

JONES                VIRGINIA             CHRYSLER
                     MARSHA               CHRYSLER
                                          CHRYSLER
                     ROBERT               GENERAL MOTORS
                     LILLY                FORD
                                          MG
                     EDWARD               GENERAL MOTORS
                     MARTHA               GENERAL MOTORS
                     LAUREL               GENERAL MOTORS
                     KEVIN                DATSUN
                     GREGORY              FORD
JOPER                MANFRED              *** NO CAR ***
JOUSSELIN            DANIEL               RENAULT
JUBE                 GABRIEL              *** NO CAR ***
JUNG                 ERNST                *** NO CAR ***
JUNKIN               JEREMY               *** NO CAR ***
KAISER               REINER               *** NO CAR ***
```

Example 13 - Using System Variables with the FIND Statement

```
** Example 'FNDVAR': FIND (using *ISN, *NUMBER, *COUNTER)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
```

```
  2 PERSONNEL-ID
  2 NAME
  2 CITY
END-DEFINE
*
LIMIT 3
FIND EMPLOY-VIEW WITH CITY = 'MADRID'
  DISPLAY NOTITLE PERSONNEL-ID NAME
                  *ISN *NUMBER *COUNTER
END-FIND
*
END
```

Output of Program FNDVAR

```
PERSONNEL         NAME            ISN         NMBR        CNT
   ID
--------- ------------------- ----------- ----------- -----------

60000114  DE JUAN                     400          41           1
60000136  DE LA MADRID                401          41           2
60000209  PINERO                      405          41           3
```

Example 14 - Multiple FIND Statements

In the following example, first all people named SMITH are selected from the EMPLOYEES file. Then the PERSONNEL-ID from the EMPLOYEES file is used as the search key for an access to the VEHICLES file.

```
** Example 'FNDMUL': FIND (with multiple files)
************************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 PERSONNEL-ID
  2 NAME
  2 FIRST-NAME
1 VEHIC-VIEW VIEW OF VEHICLES
  2 PERSONNEL-ID
  2 MAKE
END-DEFINE
*
LIMIT 15
EMP. FIND EMPLOY-VIEW WITH NAME = 'SMITH'
  /*
  VEH. FIND VEHIC-VIEW WITH PERSONNEL-ID = EMP.PERSONNEL-ID
    IF NO RECORDS FOUND
      MOVE '*** NO CAR ***' TO MAKE
    END-NOREC
    DISPLAY NOTITLE
            EMP.NAME (IS=ON)
            EMP.FIRST-NAME (IS=ON)
            VEH.MAKE
  END-FIND
END-FIND
END
```

Output of Program FNDMUL:

The resulting report shows the NAME and FIRST-NAME (obtained from the EMPLOYEES file) of all people named SMITH as well as the MAKE of each car (obtained from the VEHICLES file) owned by these people.

```
        NAME              FIRST-NAME              MAKE
-------------------- -------------------- --------------------

SMITH                GERHARD              ROVER
                     SEYMOUR              *** NO CAR ***
                     MATILDA              FORD
                     ANN                  *** NO CAR ***
                     TONI                 TOYOTA
                     MARTIN               *** NO CAR ***
                     THOMAS               FORD
                     SUNNY                *** NO CAR ***
                     MARK                 FORD
                     LOUISE               CHRYSLER
                     MAXWELL              MERCEDES-BENZ
                                          MERCEDES-BENZ
                     ELSA                 CHRYSLER
                     CHARLY               CHRYSLER
                     LEE                  *** NO CAR ***
                     FRANK                FORD
```