Functional key parts must adhere to the following rules. An error occurs if a key part definition contains disallowed constructs.

- In index definitions, enclose expressions within parentheses to distinguish them from columns or column prefixes. For example, this is permitted; the expressions are enclosed within parentheses:

  ```
  INDEX ((col1 + col2), (col3 - col4))
  ```

  This produces an error; the expressions are not enclosed within parentheses:

  ```
  INDEX (col1 + col2, col3 - col4)
  ```

- A functional key part cannot consist solely of a column name. For example, this is not permitted:

  ```
  INDEX ((col1), (col2))
  ```

  Instead, write the key parts as nonfunctional key parts, without parentheses:

  ```
  INDEX (col1, col2)
  ```

- A functional key part expression cannot refer to column prefixes. For a workaround, see the discussion of `SUBSTRING()` and `CAST()` later in this section.

- Functional key parts are not permitted in foreign key specifications.

For `CREATE TABLE ... LIKE`, the destination table preserves functional key parts from the original table.

Functional indexes are implemented as hidden virtual generated columns, which has these implications:

- Each functional key part counts against the limit on total number of table columns; see Section 8.4.7, “Limits on Table Column Count and Row Size”.

- Functional key parts inherit all restrictions that apply to generated columns. Examples:

  - Only functions permitted for generated columns are permitted for functional key parts.

  - Subqueries, parameters, variables, stored functions, and loadable functions are not permitted.

  For more information about applicable restrictions, see Section 13.1.20.8, “CREATE TABLE and Generated Columns”, and Section 13.1.9.2, “ALTER TABLE and Generated Columns”.

- The virtual generated column itself requires no storage. The index itself takes up storage space as any other index.

`UNIQUE` is supported for indexes that include functional key parts. However, primary keys cannot include functional key parts. A primary key requires the generated column to be stored, but functional key parts are implemented as virtual generated columns, not stored generated columns.

`SPATIAL` and `FULLTEXT` indexes cannot have functional key parts.

If a table contains no primary key, `InnoDB` automatically promotes the first `UNIQUE NOT NULL` index to the primary key. This is not supported for `UNIQUE NOT NULL` indexes that have functional key parts.

Nonfunctional indexes raise a warning if there are duplicate indexes. Indexes that contain functional key parts do not have this feature.

To remove a column that is referenced by a functional key part, the index must be removed first. Otherwise, an error occurs.