

About wiseref

wiseref adds type names to cross-references and formats lists of labels. Instead of writing `\ref{picture}`, use `\wref{picture}` and configure the wording in one place. Names may appear before or after numbers; number formats and list separators can be set independently.

- Types are read from label records, so label names need no special prefixes.
- Omitted prefix/suffix arguments keep the settings; empty arguments clear them.
- Number formatting changes the reference text, not the counter's numbering.
- Lists support grouping, sorting, ranges, and a choice of linked text.

Hyperref's `\autoref` adds type names, and `cleveref` and `zref-clever` also format reference lists. Wiseref offers a prefix/suffix interface with separate number formats. Special counters may need additional settings or an adapter. Language profiles contain singular and plural names; they do not handle grammatical inflection. The document supplies fonts and text direction.

1 Installation and first use

The package requires LaTeX 2023-06-01 or later and works with LuaLaTeX, XeLaTeX, and pdfLaTeX. Place `wiseref.sty` beside the main document, or install it in a local TEXMF tree. To extract it from the source, run `xetex wiseref.ins`. The document supplies its own fonts and math environments; wiseref does not load a CJK backend or `amsmath`.

```
\usepackage{amsmath} % If the document contains math displays
\usepackage{wiseref}
\usepackage{hyperref} % Optional: load near the end of the package list
```

Load `hyperref` near the end of the package list, subject to any package-specific ordering requirements. Both `amsmath` and `hyperref` may be loaded before or after `wiseref`. The default, `lang=auto`, follows the current `babel` or `polyglossia` language. Without a language manager, a loaded `ctex` Chinese scheme selects Chinese; otherwise English is the fallback. Existing document names are still inherited. Other Chinese documents may select `lang=zh`; fonts remain the document's responsibility.

Use the standard `\label` command to mark a target, then refer to it with `\wref`:

```
\begin{figure}
  \centering
  \rule{30mm}{10mm}
  \caption{System structure}\label{structure}
\end{figure}
See \wref{structure}.
```

Compile again after first loading the package or changing labels. Use `latexmk`, or compile at least twice and check the log for rerun requests.

Example 1. First reference

```
\wref {structure}
```

Live result

Figure 1

2 Reference commands

`\wref` `\wref[<prefix>]{<label list>}[<suffix>]`. Each optional argument overrides one affix for this call. Omit an argument to keep the configured value; provide an empty argument to remove it. The starred form, `\wref*`, produces no links. The standard commands `\ref`, `\pageref`, and `\eqref` retain their usual roles.

The following results are produced by the commands themselves, using the [numbered targets at the end of this manual](#).

Input	Live output
<code>\wref{picture}</code>	Figure 1
<code>\wref{chapter}</code>	Chapter 2
<code>\wref{equation}</code>	Equation (3)
<code>\wref[Photo~]{picture}</code>	Photo 1
<code>\wref{chapter}[.]</code>	Chapter 2.
<code>\wref[Part~]{chapter}[%]</code>	Part 2!
<code>\wref[]{chapter}[]</code>	2
<code>\wref[]{equation}[]</code>	(3)
<code>\wref*{picture}</code>	Figure 1

Local affixes change reference text, not the target type, caption, or number. Equation parentheses belong to the number format, so clearing both affixes still leaves the parentheses.

2.1 Multiple and mixed references

Separate labels with commas. Input order is preserved by default, and adjacent targets of the same type form a group:

```
\wref{picture-a,picture-b,table-a,equation}
```

The result appears below. A figure–table–figure input remains three groups unless sorting is enabled. Explicit local affixes apply to every group in the call. To change only one type in a mixed list, use that type’s configuration instead.

Example 2. Mixed reference list

```
\wref {picture-a,picture-b,table-a,equation}
```

Live result

Figures 1 and 2, Table 1 and Equation (3)

Affixes surround the group; the number format applies to each number. Thus equations can be printed as “Equations (1) and (2)”, with parentheses around each number. Each number links to its own target. Connectors are not linked.

3 Configuration

`\wiserefsetup` `\wiserefsetup{<key-value list>}` configures subsequent references. Unspecified values remain unchanged, later settings replace earlier ones, and changes made inside a TeX group remain local to that group. Settings are passed to `\wiserefsetup` after loading the package, not as `\usepackage` options. Enclose values containing commas in braces.

```
\wiserefsetup{
  lang=en,
  figure={prefix={Photo~},suffix={}},
  equation={prefix={Eq.~},suffix={},number-format={\textup{(#1)}}},
}
```

Built-in profiles cover English (**en**), Chinese (**zh**), French (**fr**), German (**de**), Spanish (**es**), Portuguese (**pt**), Italian (**it**), Dutch (**nl**), Russian (**ru**), Greek (**el**), Japanese (**ja**), and Arabic (**ar**). Full language names are also accepted. Changing **lang** does not erase explicit settings. Profiles supply defaults at each reference call; user settings take precedence. These profiles provide standalone names and singular/plural forms, not automatic grammatical case or Arabic dual inflection. Override affixes for another grammatical context. Fonts, script support, and text direction are supplied by the document.

Example 3. Selecting a built-in language

```
\wiserefsetup {lang=fr}
\wref {picture-a,picture-b,table-a}
```

Live result

Figures 1 et 2 et Table 1

3.1 Following the document

Auto mode resolves the profile at each reference and respects local language switches. Document names, including `\figurename` and `\tablename`, are read when needed. Chapters, appendices, and custom types also use available name or `autoref-name` commands. Names are not frozen when the package loads.

Unlocalized English defaults do not replace a different language profile. If an inherited name differs from the profile's known singular form, its plural is not guessed: use **prefix-plural** or **suffix-plural** if needed. The per-type switch **use-document-name=true** enables document names in auto mode; **false** keeps the profile's affixes instead. It defaults to **true** and does not affect explicit **lang** selections. Explicit affixes always take precedence, including empty values. English names normally form a prefix; Chinese and Japanese chapter/section names form a suffix. To place a name elsewhere, set **prefix** and **suffix** directly, as in the example below.

Example 4. Putting the figure name after the number

```
\wiserefsetup {figure={prefix={},suffix={~\figurename }}}
\wref {picture}
```

Live result

1 Figure

This keeps the current `\figurename`; the document's language switches or later redefinitions still apply. Set **suffix-plural** separately if needed. To print just the number, clear both affixes or use `\wref[] {picture} []`. Turning off document names alone does not remove the profile's names.

With `ctex`'s default **scheme=chinese**, auto mode selects Chinese without loading a language manager. This works with `ctex` classes and the `ctex` package, including loading `ctex` after `wiseref`. Detection uses LaTeX's loaded-file information for the Chinese scheme, not private `ctex` variables or caption text. **scheme=plain** alone retains the English fallback. `Babel` or `polyglossia` takes precedence, and explicit **lang** selection takes precedence over both. Changing caption names does not change the detected language. When none of these sources is available, auto mode uses the English fallback. An unregistered language reported by a language manager produces a warning and the fallback. An explicitly selected unregistered profile produces an error.

3.2 Adding or updating a language profile

Register profiles with **langs** and optional aliases with **lang-aliases**. Profile names and aliases are ASCII identifiers; **auto** is reserved. Names are case-insensitive and start with an ASCII letter; following characters may be ASCII letters, digits, hyphens, or underscores. Partial profiles inherit unspecified English values. Updating an existing profile preserves its unspecified values.

```
\wiserefsetup{
  langs={french={
    figure={prefix={Figure~},prefix-plural={Figures~}},
    table={prefix={Tableau~},prefix-plural={Tableaux~}},
    number-last-separator={~et~},group-last-separator={~et~},
  }},
  lang-aliases={fr=french},
  lang=auto,
}
```

This example updates the built-in French profile, preserving its other fields. With babel or polyglossia, selecting French selects the updated profile. `lang=fr` selects it explicitly, regardless of the document language. Profile declarations, aliases, and ordinary settings all respect TeX grouping. Aliases may refer to later declarations, but cycles are rejected. Profile declarations accept type formats and connectors, not sorting or link options.

The precedence is: per-call affixes, explicit setup values, inherited document names in auto mode, the selected profile, then the English fallback. Explicit language selection uses profile names rather than document-name inheritance. A class may provide an expandable language selector, such as `lang={\DocumentLang}`, without replacing user formats.

3.3 Type-specific settings

Type names identify the numbered object. The following types have built-in default names and formats; further types can be configured as described below.

Objects	Built-in type identifiers
Figures	<code>figure</code> , <code>subfigure</code>
Tables	<code>table</code> , <code>subtable</code>
Equations	<code>equation</code>
Headings	<code>chapter</code> , <code>section</code> , <code>subsection</code> , <code>subsubsection</code>
Appendices	<code>appendix</code>
Statements	<code>theorem</code> , <code>lemma</code> , <code>definition</code> , <code>proposition</code> , <code>corollary</code>
List items	<code>enumi</code> , <code>enumii</code>
Footnotes	<code>footnote</code>

Each type accepts the following settings:

prefix, **suffix** Text before and after a reference group.

prefix-plural, **suffix-plural** Affixes for groups with multiple targets. If absent, the singular value is used. Setting a singular affix also sets its plural to the same value; set a different plural afterwards if needed.

number-format The display format of each number. The placeholder `#1` is the raw number stored by the label. It is not a label key: formatting does not change counters or numbering rules. For raw number 2-3, `number-format={#1}` gives 2-3, while `number-format={\textup{(#1)}}` gives (2-3). Recorded bare tags, such as amsmath's `\tag*`, bypass this number format; their prefix and suffix settings still apply.

use-document-name `true` (default) or `false`. Controls use of the document's type name in `lang=auto`. The profile's affixes remain when disabled, and explicit **prefix/suffix** settings take precedence.

When placing a number-format setting inside another macro definition, write `##1` there so the stored format receives `#1`, following ordinary TeX parameter escaping.

Example 5. Changing only the displayed number

```
\wiserefsetup {equation={number-format={\textup {[#1]}}}}
\wref {equation}
```

Live result

Equation [3]

```
\wiserefsetup{
  figure={prefix={Figure~},prefix-plural={Figures~},suffix={}},
  chapter={prefix={Chapter~},suffix={},number-format={#1}},
}
```

Type names usually follow LaTeX counter names, such as **figure** and **chapter**; they are identifiers, not the printed names or label prefixes. Match the recorded identifier exactly; type names are case-sensitive. Appendix and theorem adapters can record a more specific type than the backing counter. Formats are open to additional recorded types, provided their names do not conflict with general options such as **lang** and **links**. Registering a format does not reclassify existing labels.

3.3.1 Counters supplied by other packages

Packages using the standard reference mechanism usually work directly: `\refstepcounter` establishes a target number, then `\label` records it. Reading the type does not imply a built-in translated name. In auto mode, available document names can be inherited; otherwise configure the type's affixes. Common identifiers include:

Provider or object	Type identifier
listings	<code>lstlisting</code>
minted listing float	<code>listing</code>
algorithm	<code>algorithm</code>
algorithm2e	<code>algocf</code>
tcolorbox theorem	<code>tcb@cnt@<i><environment></i></code>

These names depend on the provider's counter declarations. For custom environments or nonstandard label mechanisms, use `\wisereftype` or a suitable adapter; simply creating a counter or stepping it with `\stepcounter` is insufficient. A custom counter can be referenced as follows:

```
\newcounter{experiment}
\wiserefsetup{experiment={prefix={Experiment~},suffix={}}}
\refstepcounter{experiment}\label{exp:first}
See \wref{exp:first}.
```

To check the recorded type, inspect the auxiliary file after compilation. The middle field in this record is the configuration identifier:

```
\wiserefRecord{exp:first}{experiment}{normal}
```

This is generated auxiliary data, not a format-setting command. The last field distinguishes ordinary numbers (**normal**), tags (**tag**), and unparenthesized tags (**bare**). Use `\wiserefsetup` and `\wisereftype` for user configuration.

Example 6. Custom counter

```
\wiserefsetup {experiment={prefix={Experiment~},suffix={}}}
\wref {exp:first}
```

Live result

Experiment 1

3.4 General options

Option	Default	Purpose
<code>lang</code>	<code>auto</code>	Document language or an explicit profile
<code>sort</code>	<code>false</code>	Group types and sort numbers
<code>compress</code>	<code>false</code>	Compress consecutive numeric labels
<code>links</code>	<code>numbers-and-affixes</code>	Choose which text is linked

`links` accepts `none`, `numbers`, or `numbers-and-affixes`. `none` suppresses all links; `numbers` links only numbers. The default, `numbers-and-affixes`, also links the prefix to the first target and the suffix to the last target. Connectors remain unlinked. Without `hyperref`, all modes produce plain text. `\wref*` suppresses links for that call without changing the configured mode. Blue text in these live examples is clickable; the links lead to the demonstration targets.

Example 7. Comparing link scopes

```
\wref [Head~]{picture-a,picture-b}[-Tail]
```

Setting	Live result
<code>links=none</code>	Head 1 and 2 Tail
<code>links=numbers</code>	Head 1 and 2 Tail
<code>links=numbers-and-affixes</code>	Head 1 and 2 Tail

Connectors are configurable: `number-separator` and `number-last-separator` separate numbers within a group; `group-separator` and `group-last-separator` separate groups; `range-separator` separates range endpoints. English defaults are comma-space, space-and-space, comma-space, space-and-space, and an en dash, respectively. `name-separator` supplies the gap between an inherited prefix name and its number: a nonbreaking space in English, and no added gap in Chinese. Connector settings respect grouping and survive language changes like other explicit settings. An empty value removes that connector; for example:

```
\wiserefsetup{
  number-separator={,~}, number-last-separator={~and~},
  group-separator={;~}, group-last-separator={;~},
  range-separator={--}, name-separator={},
}
```

3.5 Sorting and ranges

With `sort=true`, types follow their first occurrence in the input. Numeric labels of the same type and with the same number prefix are sorted in ascending order. With `compress=true`, a run of at least three consecutive numeric labels becomes a range. Two labels are not compressed, and compression alone does not sort reversed input.

```
\wiserefsetup{sort=true,compress=true}
\wref{picture-c,picture-a,picture-b}
```

Example 8. Sorting and compressing a range

```
\wiserefsetup {sort=true,compress=true}
\wref {picture-c,picture-a,picture-b}
```

Live result
[Figures 1–3](#)

Both endpoints link to their figures. Custom equation tags, alphabetic sublabels, and differing number prefixes are not compressed as ordinary numeric ranges. Repeated labels are retained; no automatic

deduplication is performed.

4 Numbering and compatibility

wiseref records type information alongside standard labels. It does not infer a type from a label’s spelling. Appendices are identified through `\appendix`. Standard LaTeX and amsthm theorem environments retain separate types even when sharing a counter. Wiseref records the type at theorem entry, so nested wrappers do not change it; equations and footnotes keep their own types. Subfigure numbers and destinations follow the settings of subcaption or the corresponding provider; wiseref creates no extra float anchors.

Unicode-math has been tested with LuaLaTeX and XeLaTeX using Latin Modern Math and TeX Gyre Termes Math. With mathtools’ `showonlyrefs`, wref marks referenced equations through the public `\noeqref` interface; recompile until the numbers settle. Coexistence tests also cover cleveref, varioref, zref-clever, caption/subcaption, subfig, enumitem, listings, longtable, algorithm packages, biblatex/Biber, minted highlighting, and numbered theorem boxes. Extra counters such as `lstlisting`, `algorithm`, and `algocf` need their own type formats. Zref labels alone do not replace standard labels.

Ntheorem environments are recognized automatically, including shared counters, nested labels, and unnumbered styles. Optional titles do not replace type names. With a LaTeX record-property interface and a supporting xr/xr-hyper version, external types and tag modes are imported automatically. The source document must load the current wiseref and be recompiled; missing type records retain standard number-only fallback. Different PDFs are never compressed into one range. For an external file `other.tex` whose label is `result`, compile that file with wiseref first. A main-document example is:

```
\usepackage{xr-hyper}
\externaldocument[other-]{other}
\usepackage{wiseref}
\usepackage{hyperref}

\wref{other-result}
```

The first four lines belong in the preamble and the wref call in the document body. The prefix affects label identifiers, not the source numbering. Recompile the source after changing its labels and the main document after updating its aux file.

On the tested 2026 kernel, thmtools siblings need the named first-aid hook removed before loading amsthm, as below. Wiseref does not disable it globally. Basic tagged-PDF references passed. The comprehensive tagging test fails even without wiseref, so full tagged-PDF compatibility has not been established. Tested versions and configurations are listed in `test/PACKAGE-COMPATIBILITY.md`.

```
\RemoveFromHook{package/amsthm/after}[firstaid/aliascounter]
\usepackage{amsthm,thmtools}
```

With amsmath, `\tag{S}` is referenced as “Equation (S)”, while `\tag*{S}` is referenced as “Equation S”. Classes that change label or equation-tag implementations may require an adapter. Auto mode skips name formatters that require arguments and borrowed autoref-name macros containing undefined commands, with a warning. Multiple-appendix commands such as IEEEtran’s `\appendices` are also recognized.

Example 9. A custom equation tag

```
\wref {live-tag}
```

Live result

Equation (S)

Example 10. An unparenthesized equation tag

```
\wref {live-bare}
```

Live result

Equation S

`\wisereftype` Use `\wisereftype{<type>}` inside a custom environment's group:

```
\AddToHook{env/mytheorem/begin}{\wisereftype{theorem}}
```

The override applies to subsequent labels in the current TeX group and ends with that group; it is not a next-label-only setting. `\wisereftype{}` restores automatic selection within the group. It does not create a number or link destination: the environment still needs a valid standard reference target.

In headings that also produce PDF bookmarks, supply plain bookmark text with `hyperref`'s `\texorpdfstring` if the formatted reference cannot be expanded there:

```
\section{\texorpdfstring{See \wref{structure}}{System structure}}
```

An unconfigured type falls back to the number with a warning. An undefined label prints `??`. An unnumbered target falls back to the standard reference with a warning rather than being treated as a new numbered target. Existing auxiliary records remain readable if the package is removed.

Maintenance and license Maintainer: Junhao Wu. andrew.junhao.wu@gmail.com

Source and issue tracker: <https://github.com/hithesis/wiseref>

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Demonstration targets

The examples link to the objects below. Captions number the figures and table; amsmath numbers the equations. Chapter and experiment examples use `\refstepcounter` and `\label`, with counters separate from the manual’s headings.

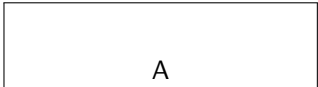


Figure 1 System structure

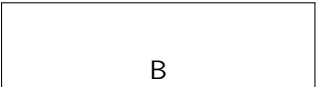


Figure 2 Second target

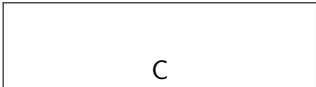


Figure 3 Third target

Table 1 Sample data

A	B
1	2

Chapter-type target 2

This article-class manual uses a dedicated counter for the chapter example.

Experiment target 1

$a = b$ $c = d$ $e = f$

(3)

(S)

S