```
es-kind-rcv  THM

⊢  ∀es:ES, l:IdLnk, tg:Id, e:E.
|  kind(e) = rcv(l; tg)
|  ⇒
|  isrcv(e) & lnk(e) = l & tag(e) = tg & loc(sender(e)) = source(l)
| by Auto THEN Unfolds [‘es-isrcv‘;‘es-lnk‘;‘es-tag‘] 0
|    THEN
|    HypSubst -1 0
|
|\
| 1. es : ES
| 2. l : IdLnk
| 3. tg : Id
| 4. e : E
| 5. kind(e) = rcv(l; tg)
| ⊢  isrcv(rcv(l; tg))
| |  & lnk(rcv(l; tg)) = l
| |    & tag(rcv(l; tg)) = tg
| |    & loc(sender(e)) = source(l)
| | by Unfolds [‘isrcv‘;‘rcv‘;‘lnk‘;‘tagof‘] 0 THEN Reduce 0
| |    THEN
| |    Analyze 0
| |
| 1. es : ES
| 2. l : IdLnk
| 3. tg : Id
| 4. e : E
| 5. kind(e) = rcv(l; tg)
| 6. True
| ⊢  loc(sender(e)) = source(l)  by Assert isrcv(e)
| |
| |\
| | .....assertion .....
| | 1. es : ES
| | 2. l : IdLnk
| | 3. tg : Id
| | 4. e : E
| | 5. kind(e) = rcv(l; tg)
| | 6. True
| | ⊢  isrcv(e)
| |   by Unfolds [‘es-isrcv‘;‘es-lnk‘;‘es-tag‘] 0 THEN HypSubst -2 0
| |      THEN
| |      Unfolds [‘isrcv‘;‘rcv‘] 0
| |      THEN
| |      Analyze -1
| |      THEN
| |      Reduce 0
| |
| .\
| . 1. es : ES
| . 2. l : IdLnk
| . 3. tg : Id
| . 4. e : E
| . 5. kind(e) = rcv(l; tg)
```

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| . 6. True
| . 7. isrcv(e)
| . ⊢  loc(sender(e)) = source(l)  by SupposeNot
| . |
| . 1. es : ES
| . 2. l : IdLnk
| . 3. tg : Id
| . 4. e : E
| . 5. kind(e) = rcv(l; tg)
| . 6. True
| . 7. isrcv(e)
| . 8. ¬loc(sender(e)) = source(l)
| . ⊢  loc(sender(e)) = source(l)
| . | by Inst_ES_Axiom [sender(e);lnk(e)] 14
| . |
| . |\
| . | .....antecedent .....
| . | 1. es : ES
| . | 2. l : IdLnk
| . | 3. tg : Id
| . | 4. e : E
| . | 5. kind(e) = rcv(l; tg)
| . | 6. True
| . | 7. isrcv(e)
| . | 8. ¬loc(sender(e)) = source(l)
| . | 9. ∀e:E, l:IdLnk. ¬loc(e) = source(l) ⇒ sends(l;e) = nil
| . | ⊢  ¬loc(sender(e)) = source(lnk(e))
| . | | by NthHypEq -2 THEN Analyze THEN Analyze THEN Analyze
| . | |
| . | .....subterm .....
| . | 1. es : ES
| . | 2. l : IdLnk
| . | 3. tg : Id
| . | 4. e : E
| . | 5. kind(e) = rcv(l; tg)
| . | 6. True
| . | 7. isrcv(e)
| . | 8. ¬loc(sender(e)) = source(l)
| . | 9. ∀e:E, l:IdLnk. ¬loc(e) = source(l) ⇒ sends(l;e) = nil
| . | ⊢  lnk(e) = l
| . | | by RepeatFor 3 (Thin -1)
| . | |    THEN
| . | |    Unfolds [‘es-isrcv‘;‘es-lnk‘;‘es-tag‘] 0
| . | |    THEN
| . | |    StrongHypSubst -2 0
| . | |    THEN
| . | |    Unfolds [‘lnk‘;‘rcv‘] 0
| . | |    THEN
| . | |    Reduce 0
| . | |
| . | .....subterm .....
| . | 1. es : ES
| . | 2. l : IdLnk
| . | 3. tg : Id
| . | 4. e : E
```

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| . | 5. kind(e) = rcv(l; tg)
| . | 6. True
| . | 7. z : Knd
| . | 8. z = rcv(l; tg)
| . | ⊢  1of(outl(z)) ∈ IdLnk
| . | | by Unfold `rcv` -1 THEN Analyze -2 THEN All Reduce
| . | |
| . | |\
| . | | 1. es : ES
| . | | 2. l : IdLnk
| . | | 3. tg : Id
| . | | 4. e : E
| . | | 5. kind(e) = rcv(l; tg)
| . | | 6. True
| . | | 7. x : IdLnk×Id
| . | | 8. inl(x) = inl(<l,tg>)
| . | | ⊢  1of(x) ∈ IdLnk  by Analyze -2 THEN Reduce 0
| . | |
| . | .\
| . | . 1. es : ES
| . | . 2. l : IdLnk
| . | . 3. tg : Id
| . | . 4. e : E
| . | . 5. kind(e) = rcv(l; tg)
| . | . 6. True
| . | . 7. y : Id
| . | . 8. inr(y) = inl(<l,tg>)
| . | . ⊢  1of(outl(inr(y))) ∈ IdLnk
| . | . | by Folds [`locl`;`rcv`] -1
| . | . |    THEN
| . | . |    AssertBY (rcv(l; tg) = locl(y)) Auto
| . | . |
| . | . 1. es : ES
| . | . 2. l : IdLnk
| . | . 3. tg : Id
| . | . 4. e : E
| . | . 5. kind(e) = rcv(l; tg)
| . | . 6. True
| . | . 7. y : Id
| . | . 8. locl(y) = rcv(l; tg)
| . | . 9. rcv(l; tg) = locl(y)
| . | . ⊢  1of(outl(inr(y))) ∈ IdLnk  by Subst (Knd ~ Knd) -1
| . | . |
| . | . |\
| . | . | .....equality .....
| . | . | 1. es : ES
| . | . | 2. l : IdLnk
| . | . | 3. tg : Id
| . | . | 4. e : E
| . | . | 5. kind(e) = rcv(l; tg)
| . | . | 6. True
| . | . | 7. y : Id
| . | . | 8. locl(y) = rcv(l; tg)
| . | . | 9. rcv(l; tg) = locl(y)
| . | . | ⊢  Knd ~ Knd
```

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| . | . |   by Repeat
| . | . |      (Unfolds
| . | . |       [`es-Knd`
| . | . |       ;`es-Loc`
| . | . |       ;`es-Tag`
| . | . |       ;`es-A`
| . | . |       ;`es-types`
| . | . |       ;`dstype`]
| . | . |       0)
| . | . |      THEN
| . | . |      Trivial
| . | . |
| . | . .\
| . | . . 1. es : ES
| . | . . 2. l : IdLnk
| . | . . 3. tg : Id
| . | . . 4. e : E
| . | . . 5. kind(e) = rcv(l; tg)
| . | . . 6. True
| . | . . 7. y : Id
| . | . . 8. locl(y) = rcv(l; tg)
| . | . . 9. rcv(l; tg) = locl(y)
| . | . . ⊢  1of(outl(inr(y))) ∈ IdLnk
| . | . .   by FwdThru
| . | . .      Thm* ∀a:Id, l:IdLnk, tg:Id.
| . | . .           rcv(l; tg) = locl(a) ⇒ False
| . | . .      {not_rcv_locl}
| . | . .      [-1]
| . |
| . .\
| . . 1. es : ES
| . . 2. l : IdLnk
| . . 3. tg : Id
| . . 4. e : E
| . . 5. kind(e) = rcv(l; tg)
| . . 6. True
| . . 7. isrcv(e)
| . . 8. ¬loc(sender(e)) = source(l)
| . . 9. sends(lnk(e);sender(e)) = nil
| . . ⊢  loc(sender(e)) = source(l)
| . . | by AssertBY (index(e) ∈ ℕ||sends(lnk(e);sender(e))||) Auto
| . . |
| . . 1. es : ES
| . . 2. l : IdLnk
| . . 3. tg : Id
| . . 4. e : E
| . . 5. kind(e) = rcv(l; tg)
| . . 6. True
| . . 7. isrcv(e)
| . . 8. ¬loc(sender(e)) = source(l)
| . . 9. sends(lnk(e);sender(e)) = nil
| . . 10. index(e) ∈ ℕ||sends(lnk(e);sender(e))||
| . . ⊢  loc(sender(e)) = source(l)
| . . | by Subst' (||sends(lnk(e);sender(e))|| = ||nil||) -1
| . . |
```

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| . . |\
| . . | 1. es : ES
| . . | 2. l : IdLnk
| . . | 3. tg : Id
| . . | 4. e : E
| . . | 5. kind(e) = rcv(l; tg)
| . . | 6. True
| . . | 7. isrcv(e)
| . . | 8. ¬loc(sender(e)) = source(l)
| . . | 9. sends(lnk(e);sender(e)) = nil
| . . | 10. index(e) ∈ ℕ||sends(lnk(e);sender(e))||
| . . | ⊢  ||sends(lnk(e);sender(e))|| = ||nil||  by Analyze
| . . |
| . . .\
| . . . 1. es : ES
| . . . 2. l : IdLnk
| . . . 3. tg : Id
| . . . 4. e : E
| . . . 5. kind(e) = rcv(l; tg)
| . . . 6. True
| . . . 7. isrcv(e)
| . . . 8. ¬loc(sender(e)) = source(l)
| . . . 9. sends(lnk(e);sender(e)) = nil
| . . . 10. index(e) ∈ ℕ||nil||
| . . . ⊢  loc(sender(e)) = source(l)  by Reduce -1
|
.\
. .....wf .....
. 1. es : ES
. 2. l : IdLnk
. 3. tg : Id
. 4. e : E
. 5. kind(e) = rcv(l; tg)
. 6. z : Knd
. ⊢  (isrcv(z)
. |   & lnk(z) = l & tag(z) = tg & loc(sender(e)) = source(l))
. |  ∈ Type
. | by Unfolds [`isrcv`;`rcv`;`lnk`;`tagof`] 0 THEN Analyze -1
. |    THEN
. |    Reduce 0
. |
. |\
. | 1. es : ES
. | 2. l : IdLnk
. | 3. tg : Id
. | 4. e : E
. | 5. kind(e) = rcv(l; tg)
. | 6. x : IdLnk×Id
. | ⊢  (True & 1of(x) = l & 2of(x) = tg & loc(sender(e)) = source(l))
. | |  ∈ Type  by Analyze -1 THEN Reduce 0
. | |
. | 1. es : ES
. | 2. l : IdLnk
. | 3. tg : Id
. | 4. e : E
```

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. | 5. kind(e) = rcv(l; tg)
. | 6. IdLnk
. | 7. Id
. | 8. True
. | ⊢  isrcv(e)
. |   by RepeatFor 3 (Thin -1) THEN Unfold ‘es-isrcv‘ 0
. |      THEN
. |      HypSubst -1 0
. |      THEN
. |      Unfolds [‘isrcv‘;‘rcv‘] 0
. |      THEN
. |      Analyze -1
. |      THEN
. |      Reduce 0
. |
. .\
. . 1. es : ES
. . 2. l : IdLnk
. . 3. tg : Id
. . 4. e : E
. . 5. kind(e) = rcv(l; tg)
. . 6. y : Id
. . ⊢  (False
. .     & 1of(outl(inr(y))) = l
. .       & 2of(outl(inr(y))) = tg
. .       & loc(sender(e)) = source(l))
. .    ∈ Type  by Auto

END
```