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Module

Ground Frames and Shunter's Releases

For endorsement, authorisation and issue record of this document, please refer to the SSI Applications Manual Contents, NR/L2/SIG/17002.

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User information

This Network Rail standard may contain requirements that are colour-coded according to the following Red–Amber–Green classification.

Red – Mandatory requirements

- **Requirements** that **will** be complied with, and achieved under all circumstances.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner.
- These requirements are monitored for compliance.
- Local non-compliances, discovered through engineering verification visits, will be reported and monitored through the quarterly Engineering Verification Report.
- Corrective actions will be enforced where local non-compliances remain open beyond the agreed mitigation plan dates.
- These are presented in a red box **and with the word “shall” or a direct instruction.**

Amber – Conditional requirements

- **Requirements** that **will** be complied with unless deviation has been approved.
- Accountability for the efficacy of these requirements lies with the Professional Head/ Standard Owner, or their nominated Delegated Authority.
- These requirements are monitored for compliance.
- Derogations **may** be permitted; which are to be approved by Standard Owner in advance.
- Derogations and Temporary Non-Compliances **may** be granted through the existing Delegated Authority arrangements.
- These are presented with an amber sidebar **and with the word “shall” or a direct instruction.**

Green – Guidance

- Guidance based on good practice; representing supporting information, based on good practice, to help achieve **RED** and **AMBER** requirements.
- This guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used, which do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence/documentation.
- This is presented with a dotted green sidebar **and with the word “should” (usually in notes).**

Ref:	SSI8003-64
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Issue record

Issue	Date	Comments
5	August 2004	5 th Issue
6	03/03/2012	6 th Issue

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03/03/2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

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Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

Contents

1 Introduction	5
2 Identities Used	5
3 Examples of Ground Frames and Data	6
3.1 Traffic Ground Frame in a Controlled Area	6
3.2 Traffic Ground Frame in an Auto Area	8
3.3 Emergency Ground Frame in an Auto Area	10
4 Panel Processor Data	11
4.1 Controls	11
4.2 Indications	12
5 Variations	13
5.1 Point Setting Releases	13
5.2 Route Setting Releases	13
5.3 Replacement Buttons on Semi-Auto Signals	15
5.4 Ground Frame Controlled Signal into Siding	17
5.5 Route via Ground Frame Points Reverse	19
5.6 Protection Against Erroneous Release Request	23
6 Push Button Operated Ground Frames	24
6.1 Identities Used	24
6.2 Ground Frame Panel Controls and Indications	25
6.3 Data Example	26
6.4 Panel Data	29
7 Shunter's Releases	29
7.1 Principles	29
7.2 Two-way Switch Data	31
7.3 Two Plunger option without Multiple Movements	33
7.4 Two Plunger option with Multiple Movements	34
7.5 One Plunger option	35
7.6 Cross - boundary case	36
8 Referenced Standards	37

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

1 Introduction

The "standard" ground frame (GF) is taken as lever controlled in Sections 2 to 5, with Section 6 covering the changes required for push button controlled ground frames. Section 7 covers Shunter's Releases.

2 Identities Used

a) Release Requested

Uses a "route" identity in the ROU file. The advantage is that the Technician can use the "route inhibit" facility to take the GF out of use. Thus for 301 release then R301 is the identity. It is set to initiate a release in response to an allowable panel request, and unset to initiate cancellation of a release, again in response to a panel request.

b) Detection Normal

Uses a latch identity in the FLG file, e.g. L301DETN and is set when the GF release lever is locked normal and any GF points detected normal, otherwise it is unset.

c) Release Normal

Uses a latch identity in the FLG file, e.g. L301RELN, and is set when the release is declared normal, i.e. the release has been cancelled and any GF restoration conditions have been satisfied i.e. detection normal (latch L301DETN set) and any other Control Table requirements. These restoration conditions only have to be proved once after release cancellation (or Interlocking power up), i.e. subsequent loss of detection will not unset this latch. The latch is unset when the next release request is initiated.

The latch is proved set at time of route setting from a signal requiring the GF normal and also proved set, together with the Detection Normal latch proved set, in the signal aspect controls.

For case B ground frames (see d) below) additionally, the ground frame control relay proved de-energised input is included in the above restoration conditions required for setting the latch. Also, if this proving is subsequently lost then the latch is unset.

d) Release Cancellation

At the ground frame location a Signal Module will output to the GF release lever lock relay. This relay when energised will light a "lever lock free" indication and will allow the lever lock to be energised when the usual plunger is operated.

A "ground frame detected normal" input to the Signal Module is energised when the release lever lock is proved down and, if provided, any points/FPL detected in their closed GF positions. The release lever lock relay is **not** proved de-energised in **this** input, otherwise the flashing indication at the P.S.B., showing release given but GF normal, cannot be provided.

There are two approaches to the problem of not declaring the release fully normal until the GF release lever lock relay has had time to drop. (Consider the situation where the Signaller with the GF detection normal, cancels the release just as the person at the GF reverses the release lever).

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

(i) Case A : Provide a Cancellation Timer

A timer is allocated in the ELT file, typically named E301CANCEL. This timer is started when the release is cancelled (this is done in the IPT file, not the PRR file, because the timer also has to run at Interlocking power up). When the timer has run for four seconds or more (sufficient time for the GF release lever lock relay to drop) and the GF normal detection proved together with any other release restoration proving required, the release is then declared normal (latch L301RELN set). The timer is returned to the "stopped" state in the PRR file when the release is next initiated by the Signaller.

(ii) Case B : Provide an Additional Input from the GF

Here, as well as providing the usual "detection normal" input from the GF, an additional "GF release lever lock relay de-energised" input is provided. Thus after the release is cancelled by the Signaller the GF release lever lock relay is positively proved de-energised together with GF detection normal and any other release restoration proving before the release is declared normal (latch L301RELN set).

Subsequent loss of this input results in the release being declared not normal (latch L301RELN unset). In signalled areas this replaces the relevant signal(s) and prevents route setting. Also the release light is flashed (see Section 4) thus alerting the Signaller, which has a particular advantage for GFs in non-signalled areas.

e) Panel Requests

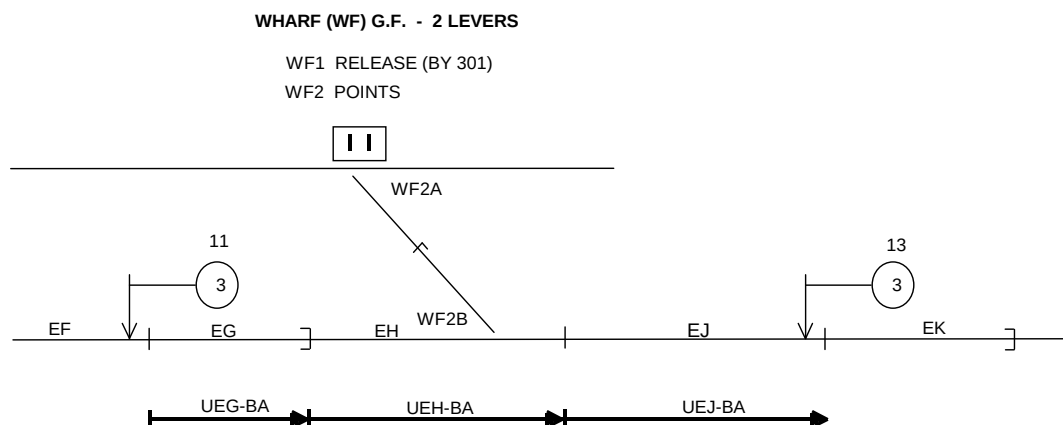
One for giving the release (QR301) and one for cancelling the release (QXR301) in the QST file.

f) Indication and Button/Switch Identities

See Section 4.

3 Examples of Ground Frames and Data

3.1 Traffic Ground Frame in a Controlled Area



Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

3.1.1 Control Tables

301 release typically requires:

Release not barred

AND

(EH cl, EJ cl, EK cl, 13 lamp lit or EH occ for N seconds)

AND

route locking free.

An alternative to proving EH occupied for time is to provide a separate short "locating" track circuit at the ground frame points and prove that track circuit is occupied.

11 route locking on 301 release is released when 11 route is normal and EG is clear.

WF1(N)L requires 301 release given.

Restoration of 301 release requires WF2A detected normal and WF1 locked normal.

[GK/RT0041](#) Issue One may require the release to route lock the line from the ground frame through to the overlap of exit signal 13. This is covered by Section 5.2.

3.1.2 Identities

R301

L301DETN L301RELN

(E301CANCEL, case A only)

QR301 QXR301

3.1.3 Data : Case A

IPT File

The GF is detected normal on input No. 5

"L301DETN 5

if G s 5 , E301CANCEL > 4 then L301RELN s \

if R301 xs , E301CANCEL stopped then E301CANCEL = 0 \

(Note that "E301CANCEL > 4" also proves "R301 xs")

PRR File

*QR301

if R301 a

(TEH c , TEJ c , TEK c , S13 set 1p or TEH o> N)

UEG-BA f

then L301RELN xs , R301 s

E301CANCEL stopped

\ .

/ GF release request

*QXR301 R301 xs .

/ GF release cancellation

OPT File

if R301 s then G s 7 \ / Release lever lock relay on O/P No. 7

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

3.1.4 Data : Case B

IPT File

The GF is detected normal on input No. 5 and the GF release lever lock relay is down proved on input No. 4.

```
"L301DETN 5
  if G s 54 , R301 xs then L301RELN s \
  if G c 4 then L301RELN xs \
```

PRR File

```
*QR301
  if R301 a
    ( TEH c , TEJ c , TEK c , S13 set 1p or TEH o> N )
    UEG-BA f
  then L301RELN xs , R301 s
  \ .                               / GF release request

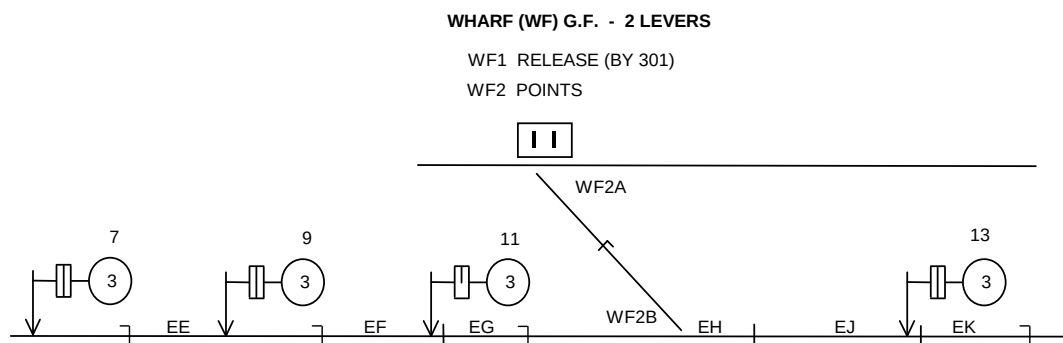
*QXR301 R301 xs .                 / GF release cancellation
```

OPT File

```
if R301 s then G s 7 \           / Release lever lock relay on O/P No. 7
```

In both cases the setting of route 11 will require a test for "L301RELN s" (PRR file) and 11 signal aspect control data will need to include "L301RELN s, L301DETN s" (OPT file).

3.2 Traffic Ground Frame in an Auto Area



Note, see also [SSI8003-77](#) Section 6 where bi-directional signalling is employed.

3.2.1 Control Tables

301 release requires release not barred. The release replaces 11 signal.

WF1(N)Lock typically requires 301 release given and (train not approaching signal or train past 11 signal or train brought to a stand at 11 signal, i.e. timed out) and (train proved waiting to go into siding or conditions for train waiting to leave siding).

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

Thus WF1(N)L requires:

301 release given

AND

[(EE, EF clear)

OR (EG & EH occd then EG cl & EH occd)

OR ATR X secs]

AND

[(EH occd for N seconds) OR (EG, EH, EJ, EK clear and 13 lamp lit)]

The contents of the first [] are in fact the approach lock release conditions that would be provided if 11 were a controlled signal, hence the use of 'S11 data below to provide this feature. X is the appropriate approach locking time for 11 signal.

Restoration of 301 release requires WF2A detected normal and WF1 locked normal.

3.2.2 Identities

Note: case A example only shown.

R301

L301DETN L301RELN

E301CANCEL

QR301 QXR301

3.2.3 Data

S11 signal data is used for the GF approach locking.

IPT File

```
"L301DETN 5
  if G s 5 , E301CANCEL > 4 then L301RELN s \
  if R301 xs , E301CANCEL stopped then E301CANCEL = 0 \
```

PRR File

```
*QR301
  if R301 a
  then L301RELN xs , R301 s , E301CANCEL stopped
      S11 set bpull
  \ .                      / GF release request
```

Note "S11 set bpull", as well as replacing signal 11, will also initiate the approach locking release if the train has not already satisfied TISP conditions.

```
*QXR301    R301 xs , S11 clear bpull .
              / GF release cancellation
```

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

OPT File

```

if R301 s , S11 set foal
  ( TEH o> N or TEG c , TEH c , TEJ c , TEK c , S13 set 1p )
then G s 7
\
/ Release lever lock relay on O/P No. 7

```

11 Signal Data:

```

if TEH o then else S11 set tisp0 \

'S11
  #TEG    #TEH
                                     . / TISP
                                     . / No SSU
                                     . / No RSU

  if TEG c , TEH c , TEJ c , TEK c
    L301RELN s , L301DETN s
    S13 set 1p
  \
  if TEF o \
                                     . / ACD
                                     . / TAC
                                     . / No RJI

  G s 7 \
  S13 seq 3 , G s 765
  G s 4
  S11 alt> X , if TEF c , TEE c \
                                     . / ASD
                                     . / AWS
                                     . / ALR
                                     . / No RR
                                     / MAP file could be used instead

$ / End of Signal Special

```

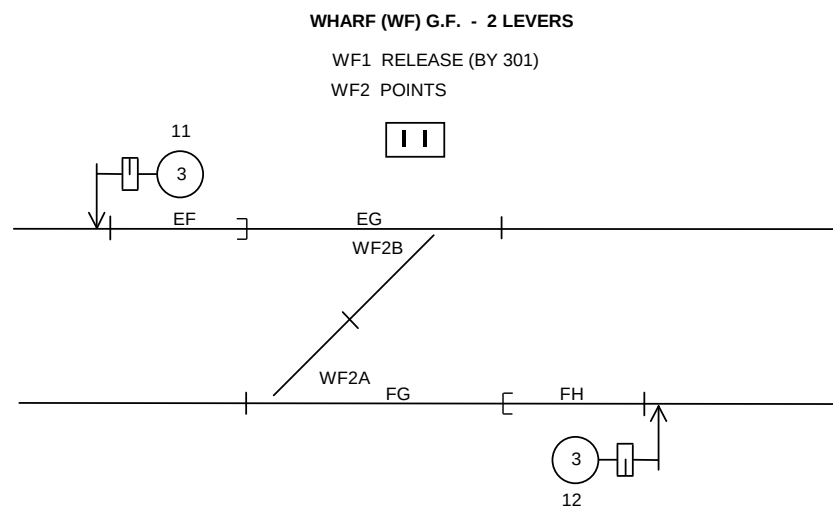
Note:

Auto mode is ignored (the "auto" bit will remain cleared).

"Signal stick" is ignored (this bit will remain cleared).

Routes of signal are not used.

3.3 Emergency Ground Frame in an Auto Area



Note, see also [SSI8003-77](#) Section 6 where bi-directional signalling is employed.

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

3.3.1 Control Tables

301 release requires release not barred. The release replaces 11 and 12 signals.

WF1(N)Lock typically requires 301 release initiated for time (this allows train(s) to come to a stand) and EF, EG, FH, FG clear (train(s) are not between protecting signals and GF). An alternative is to apply comprehensive approach locking using ALR conditions on signals 11 and 12 (as in Section 3.2) thus avoiding a compulsory wait every time.

Restoration of 301 release requires WF1 locked normal. (There is no detection of WF2 points in this example).

3.3.2 Identities

Note: case A example only shown.

R301

L301DETN L301RELN

E301CANCEL E301REL

QR301 QXR301

3.3.3 Data

IPT File

```
"L301DETN 5
if G s 5 , E301CANCEL > 4 then L301RELN s \
if R301 xs , E301CANCEL stopped then E301CANCEL = 0 \
```

PRR File

```
*QR301
  if R301 a
  then L301RELN xs , R301 s
      E301CANCEL stopped , E301REL = 0
  \ .                      / GF release request

*QXR301    R301 xs , E301REL stopped .
                             / GF release cancellation
```

OPT File

```
if E301REL > 240 , TEF c , TEG c , TFH c , TFG c then G s 7 \
                                                     / Release lever lock relay on O/P No. 7
```

In the aspect control data of both 11 and 12 signals "L301RELN s , L301DETN s" will be required. L301RELN will replace both the signals when the release is initiated.

4 Panel Processor Data

4.1 Controls

Although both push button and rotary switch control of the release are covered below, the latter is considered as better practice as only this option is shown in [GK/GN0525](#) section F (ref. 1).

Ref:	SSI8003-64
Issue:	6
Date:	03/03/2012
Compliance date:	01/09/2012

4.1.1 Button Operation

A button with the usual F & FM contacts is provided and the relevant data in the PBK first button list will typically be:

B301F s =QR301
B301FM s =QXR301

4.1.2 Switch Operation

A switch with N & R contacts is provided with the PBK data similar to above:

B301R s =QR301
B301N s =QXR301

Unlike point keys, the switch position is not continually monitored for the Interlocking via data in the POD file, and thus it is successful switch operation that influences the indications, not actual switch position.

4.2 Indications

The ground frame normal light is lit when the release and the detection are both normal, and extinguished if otherwise.

The ground frame release light is lit when the release has been given and taken. The release light flashes when the release and the ground frame are out of correspondence i.e. detection broken (or release not normal) with the release not given or detection normal with the release given. Otherwise the release light is extinguished. This applies irrespective of whether switch control or button control (with the light in the button) is used.

The above proving of “release not normal” adds benefits as follows. For Case A ground frames, on cancelling the release with the detection already normal, this indication continues to flash thus indicating the time-out period whilst cancellation timer is running until the release is declared normal. For Case B ground frames the release light flashes if the lever-lock-de-energised proving is lost whilst the release is not given. This is of a particular benefit where the ground frame is not in a signalled area, i.e. it is in sidings.

The following table illustrates these conditions controlling the ground frame release light:

Release: Given or cancelled?	Release: Normal?	GF detected normal?	Resulting Release Indication State
Given	Don't care	Yes	Flashing
Given	Don't care	No	Lit steady
Cancelled	Yes	Yes	Out
Cancelled	Yes	No	Flashing
Cancelled	No	Yes	Flashing
Cancelled	No	No	Flashing