IMPORTANT: *The booklet provides all FREMO participants with* ***different module-systems*** *and* ***era-neutral proven good practice*** *for direct application during FREMO meetings.* ***Any deviations and specific details are determined by the respective module system group or the meeting's organizing team.***

Note: *British railway (North American railroad in brackets) terminology is used in this booklet.* ***In case of any doubt or misunderstanding, the German version is authoritative. For clarification of German railway operating rules and procedures, please consult an experienced FREMO member.***

Notes:

Further Reading (only in German)

For everyone who wants to deepen or refresh their understanding of signals and markings used on the German railways:

- **Regulations (DB InfraGO):**
  - **Ril 301 Signalbuch**
- **Online Resources:**
  - Website TF-Ausbildiung.de > **Signalbuch-Online** (Signal Book Online)
  - Website Kleinbahnwiki.de > **Betrieb** (Operations and Procedures)
  - Website Stellwerke.de > **Signalsysteme** (Signal Systems Overview)
- **Reference Books:**
  - Hausmann, Anita / Enders, Dirk H.: *Grundlagen des Bahnbetriebs*, 3. Auflage, 2017, Bahn Fachverlag, ISBN 978-3-943214-16-1
  - Krebs, Jürgen: Blocksignal frei: Band 1 – 1835 bis 1945 Aspekte des Bahnbetriebs im Spiegelbild zwischen Organisation und Technik in mehr als 180 Jahren deutscher Eisenbahn, 1. Auflage, 2021, Eigenverlag, ISBN 978-3-981937-12-1
  - Krebs, Jürgen: *Blocksignal frei: Band 2 – nach 1945 Aspekte des Bahnbetriebs im Spiegelbild zwischen Organisation und Technik in mehr als 180 Jahren deutscher Eisenbahn*, 1. Auflage, 2024, Eigenverlag, ISBN 978-3-981937-14-5
  - Carstens, Stefan: *MIBA-Report: Signale 2 - Signalbegriffe, Anordnung und Bauformen, Haupt- und Vorsignale, Signalverbindungen*, 2. Auflage, 2007, Verlagsgruppe Bahn, ISBN 978-3-896102-36-2
  - Carstens, Stefan: *MIBA-Report: Signale 3 - Zusatz-, Sperr- und Langsamfahrsignale, Kennzeichen, Nebensignale, Läute- und Pfeiftafeln*, 2. Auflage, 2009, Verlagsgruppe Bahn, ISBN 978-3-896102-38-6

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FREUNDESKREIS FREMO EUROPÄISCHER MODELLBAHNER

SIGNAL BOOK 301

Deutsche Reichsbahn

DEUTSCHE REICHSBAHN DR

Author Ghim Meng (Jimmy) Low

FREMO Version 1.0 / November 2025

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FREMO Signal Book 301
Deutsche Reichsbahn (GDR)

Introduction

This FREMO Signal Book 301 (SB Reichsbahn GDR) summarizes selected signals and indicators of the Deutsche Reichsbahn according to DV 301 Signal Book, Edition 1971 (with amendments per Authorization No. 1 ff., 1973). The focus lies on the train driver (engineer)'s (*Triebfahrzeugführer (Tf)*) perspective: *Which signals appear in the layout, and how must they be observed during operation?*

Detailed technical descriptions of signal aspects, application types, and areas of validity are contained in the official regulation. This FREMO Signal Book does not replace the DV 301 but provides a practice-oriented selection for model railway operations.

Part 1: Train Movements

Section 1: Semaphore Main (Home) and Distant (Approach) Signals (Hf / Vf) and Colour Light Main (Home) and Distant (Approach) Signals (Hl) on Lines

Semaphore distant (approach) (Vf) and semaphore main (home) signals (Hf) are the classic signals on railway lines in the GDR. They govern and secure train movements.

Semaphore Signal

Signal Vf 1: Expect "Proceed at maximum permitted speed"

Driver (engineer)'s action:

- The next main (home) signal will show Hf 1 ("Proceed at maximum permitted speed").

Signal Hf 1: "Proceed at maximum permitted speed"

Driver (engineer)'s action:

- The main (home) signal shows Hf 1 ("Proceed at maximum permitted speed"). **Maintain speed.**

Signal Vf 1/2: Expect "Proceed at maximum permitted speed" or "Proceed at reduced speed 40 km/h"

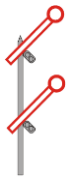
Driver (engineer)'s action:

- The next main (home) signal shows Hf 1 or Hf 2. **Adjust speed in good time.**

Signal Vf 2: Expect "Proceed at reduced speed 40 km/h"

Driver (engineer)'s action

- The next main (home) signal shows Hf 2 ("Proceed at reduced speed 40 km/h"). **Reduce speed in good time.**



Signal Hf 2: "Proceed at reduced speed 40 km/h"

Driver (engineer)'s action:

- The main (home) signal shows Hf 2 ("Proceed at reduced speed 40 km/h").
- **Reduce speed** so that the train can safely pass through the diverging points (switches).

Section 14: Indication of Lever Weights on Mechanically Operated Local Points (Switches)

The colour marking of lever weights indicates whether a mechanically operated local point (switch) is in its normal position.

Point (Switch) in normal position

Driver (engineer)'s action:

- Point (Switch) lies in its normal position (marked "+" in track diagram).

Point (Switch) not in normal position

Driver (engineer)'s action:

- Point (Switch) must be returned to its normal position.

No normal position required

Driver (engineer)'s action:

- Point (Switch) need not be returned to normal.

Change only with permission of pointsman (Weichenwärter)

Driver (engineer)'s action:

- Point (Switch) may be operated only with the pointsman's consent. After use, return to normal position.

Part 7: Miscellaneous

Section 15: Overhead Line Signals (El)

Overhead line signals (El) indicate the condition or special features of the electrical overhead contact line. They are mainly used on electrified lines to inform train crews and staff about the operating state of the catenary.

Form Signal

Signal El 6: Stop for vehicles with raised pantographs!

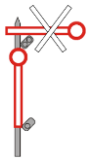
Driver (engineer)'s action:

- Electric locomotives or EMUs with raised pantographs **must stop — continuing is prohibited!**
- Continuing with pantograph raised may cause damage to the overhead line or pantograph.

Part 8: Combined and Invalid Signals

Section 16: Invalid Signals

An invalid signal is temporarily or permanently out of service and has no operational meaning. A signal is invalid if, for example, it is covered by a white cross (X) with black border, veiled, turned away, clearly removed, or otherwise disabled.



Semaphore main (home) signal invalid

Shunting waiting board invalid

Main (home) light signal invalid

Driver (engineer)'s action:

- Invalid signals **may be ignored — but only if clearly marked as invalid**.
- In case of **doubt or uncertainty**, always inform the signaller (operator) (*Fahrdienstleiter (Fdl)*) or train dispatcher (*Zugleiter (Zl)*).
- If the main (home) signal is invalid but the distant (approach) signal is valid — the distant (approach) signal applies (e.g. "Expect stop").
- If both are invalid — the signaller (operator) (*Fahrdienstleiter*) decides whether and how the train may proceed (by written order or verbal instruction).

Graphic Sources:

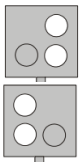
- *Eisenbahn-Bundesamt (EBA) – Compilation of regulations of the Eisenbahn-Signalordnung 1959 (ESO 1959), including signals of temporary validity and implementation instructions. Valid for the Federal Railways network (EdB). Issued by the Federal Railway Authority, Division 333, status 13.12.2020.*
- *Gustav Richard – Graphics under Creative Commons Attribution License (reuse permitted).*
- *Tf-Ausbildung.de – Courtesy of Sven Thaler.*
- *Own illustrations – Supplementary and schematic graphics created for the FREMO Signal Books 301.*

Part 6: Points (Switches)

Section 13: Point (Switch) Signals (Wn)

Point (Switch) signals indicate the position of points (switches). They inform the driver (engineer) which route will be taken.

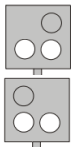
Form Signal | **Light Signal**



Signal Wn 1: Straight route

Driver (engineer)'s action:

- The driver (engineer) continues on the straight track.



Signal Wn 2a: Diverging route

Driver (engineer)'s action:

- The driver (engineer) follows the diverging route.

Signal Wn 2b: Diverging route

Viewed from the frog; for simple or inside-curved points (switches)

Driver (engineer)'s action:

- The driver (engineer) follows the diverging route.

Signal Wn 2c: Diverging route

Viewed from the frog; for simple or inside-curved points (switches)

Driver (engineer)'s action:

- The driver (engineer) follows the diverging route.

Signal Wn 3: Double slip point (switch) (DKW) – Straight, left to right

Driver (engineer)'s action:

- Train runs straight through the DKW, left to right.

Signal Wn 4: Double slip point (switch) (DKW) – Straight, right to left

Driver (engineer)'s action:

- Train runs straight through the DKW, right to left.

Signal Wn 5: Double slip point (switch) (DKW) – Curved, left to left

Driver (engineer)'s action:

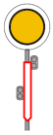
- Train passes through DKW on curved route, left to left.

Signal Wn 6: Double slip point (switch) (DKW) – Curved, right to right

Driver (engineer)'s action:

- Train passes through DKW on curved route, right to right.

Semaphore Signal



Signal Vf 0: "Expect Stop"

Driver (engineer)'s action:

- The next main (home) signal shows Hf 0 (Stop). **Reduce speed in good time; observe braking distance.**

Signal Hf 0: Stop!

Driver (engineer)'s action:

- **The train must stop before the signal!**

Section 2: Colour Light Main (Home) and Distant (Approach) Signals (Hl) on Lines

Hl signals were used on lines of the former Deutsche Reichsbahn (DR). They combine the functions of distant (approach) and main (home) signals in a single unit.

Note: *Driving behaviour varies by locomotive type. Since the FRED throttle has no km/h display, driving speed depends on experience. See also Jörg Lammerschmidt's tip on model speed calibration in FREMO Train Crew Booklet, Part 1: Train Driver (Engineer) (Tf).*

Group 1: From Maximum Speed (Vmax) to ...

Vmax / Clear	Expect 100 km/h	Expect 40 km/h	Expect STOP
			
Hl 1	**Hl 4**	**Hl 7**	**Hl 10**

Group 2: From 100 km/h to ...

100 km/h, clear ahead expected	100 km/h, expect 100 km/h	100 km/h, expect 40 km/h	100 km/h, expect STOP
			
Hl 2	**Hl 5**	**Hl 8**	**Hl 11**

Group 3: From 60 km/h to ...

60 km/h, clear ahead expected	60 km/h, expect 100 km/h	60 km/h, expect 40 km/h	60 km/h, expect STOP
			
Hl 3b	**Hl 6b**	**Hl 9b**	**Hl 12b**

Group 4: From 40 km/h to ...

40 km/h, clear ahead expected	40 km/h, expect 100 km/h	40 km/h, expect 40 km/h	40 km/h, expect STOP
			
Hl 3a	**Hl 6a**	**Hl 9a**	**Hl 12a**

Group 5: Stop

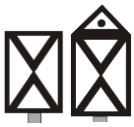
STOP!

Hl 13

Section 3: Other Signals (So)

These signals supplement main (home) and distant (approach) signals or replace them where no complete signal installation exists.

Form Signal | **Light Signal**



Signal So 3a: Distant (Approach) Signal Board (for colour-light distant (approach) signals or two-aspect semaphore distant (approach) signals) or Signal So 3b (For three-aspect semaphore distant (approach) signals)

Driver (engineer)'s action:

- The driver (engineer) anticipates that a main (home) signal will follow shortly.

Signal So 4: Distant (Approach) Signal Marker Boards

Driver (engineer)'s action:

- Marks the approach to a distant (approach) signal. The driver (engineer) prepares for **possible speed reduction** or a stop at the main (home) signal ahead.

Signal So 2: Displacement (Offset) Board (Chequerboard Board)

Driver (engineer)'s action:

- The driver (engineer) pays attention to the **unusual position** of the main (home) signal (usually placed on the right-hand side of the track).
- **Exceptions** exist for certain signals (e.g. shunting signals such as Ra 10 – Shunting Limit Board) that may be installed on the left-hand side).

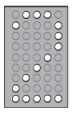
Signal Zs 3: Diamond Board

Driver (engineer)'s action:

- A stop signal Hf 0 or Hl 13 (Stop) **does not apply to shunting (switching) movements**.
- The driver may pass the signal **with permission** of the shunting supervisor (yardmaster) or according to operating instruction, provided it is a shunting (switching) movement.

Section 4: Supplementary (Marker) Signals (Zs)

Additional supplementary (marker) signals (Zs) supplement main (home) signals. They provide extra operating instructions or modify the effect of the main (home) signal.



Signal Zs 5: Speed Indicator

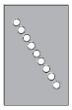
Driver (engineer)'s action:

- **From this signal onward**, in the following point (switch) area, only the indicated speed (numeral × 10 km/h) may be observed.

Signal Zs 4: Route Indicator

Driver (engineer)'s action:

- The main (home) signal applies to the indicated route or named track.



Signal Zs 7: Left-Track Movement Indicator

Driver (engineer)'s action:

- The route leads onto the opposite track (left-hand running).

Note: *The following signals are acoustic or optical and can only be used if the locomotive is equipped with a sound function.*

Form Signal

Signal Pf 1: Whistle Board – Give Warning Signal (Zp 1)!

Driver (engineer)'s action:

- The driver (engineer) must sound a moderately long whistle.

Signal Pf 2: Whistle Board before Level Crossing – Whistle Twice!

Driver (engineer)'s action:

- The driver (engineer) must sound **whistle twice.**

Section 12: Derail (Gsp) and Protection Stop Signals (Gsp / Sh)

Derail and protection stop signals secure shunting (switching) and train movements in stations or sidings (spurs). They indicate whether a track section may be entered or must be protected.

Signal Gsp 1: Stop!

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately** — no further movement allowed.

Signal Gsp 1: Proceed for shunting (Yard Proceed)

Driver (engineer)'s action:

- This signal permits **shunting (switching) movements to pass**, even if an associated main (home) signal shows Hf 0 or Hl 13 (Stop).

Signal Gsp 2: Derail Device Lifted

Driver (engineer)'s action:

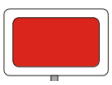
- The track may be used.

Signal Sh 1: Circular Hand Signal – Stop immediately! Danger!

- **Execution: With flag** – move a white-red-white flag in a circular motion.

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately!**
- If it is uncertain whether the signal was observed, give Signal Sh 5.



Signal Sh 2: Protection Stop Signal / Water Tower Arm Signal

Driver (engineer)'s action:

- **The driver (engineer) must stop!**

Signal Sh 3: Expect "Stop" Board

Driver (engineer)'s action:

- The driver (engineer) must **reduce speed** and be prepared to stop.

Note: *The following signal may only be used if the locomotive has a sound function.*

Signal Sh 5: Horn or Whistle Signal

- **Execution:** With horn or whistle – several times three short tones in quick succession.

Driver (engineer)'s action:

- **The driver (engineer) must stop immediately!** Serves as replacement or reinforcement of the circular hand signal Sh 1.

Section 10: Signals for Driving Regulations (Zp)

Form Signal | Light Signal

Signal Zp 10: K-Disc – "Shorten running time!"

Driver (engineer)'s action:

- The driver (engineer) gives **Signal Zp 1 (Warning (Acknowledge) signal)** as acknowledgement when this signal is shown by the signaller (operator) (Fdl) or local staff.
- After passing the signal, the driver (engineer) may accelerate up to the permitted maximum speed, but **only once the rear of the train has passed the signal.**

Signal Zp 11: L-Disc – "Reduce speed!"

Driver (engineer)'s action:

- Proceed only once the crossing has been secured by protection staff, or after giving warning (acknowledge) signals and passing at slow pace (walking speed).

Part 5: Protections

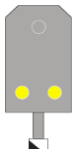
Section 11: Signals for Level Crossings

These signals secure level crossings (WÜ) for both railway and road traffic. They may also be used in advance of crossings equipped with barriers.

Signal Zs 9: Level Crossing Board – Stop before the crossing! Proceed only after securing the crossing. Observe any monitoring signal.

Driver (engineer)'s action:

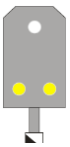
- The driver (engineer) must stop before the level crossing. Continue only when the crossing is secured, or—if not protected—after giving attention signals and proceeding at slow pace (walking speed).



Signal So 16b: Level crossing not protected – proceed cautiously at walking speed!

Driver (engineer)'s action:

- Proceed only once the crossing has been secured by protection staff, or after giving warning (acknowledge) signals and passing at slow pace (walking speed).



Signal So 16a: Level crossing protected – may be passed at normal speed.

Driver (engineer)'s action:

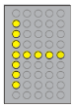
- The driver (engineer) may pass the crossing **without stopping.**

Signal So 15: Warning board – Expect level crossing monitoring signal

Driver (engineer)'s action:

- A level crossing monitoring signal So 16a or So 16b is to be expected. The driver prepares accordingly.

Form Signal | Light Signal



Signal Zs 6: Dead-End (Stub) Track and Early Stop Indicator

Driver (engineer)'s action:

- **Significantly reduce speed.**

Section 5: Reduced Speed (Approach Medium) Signals (Lf)

Reduced Speed (Approach Medium) signals (Lf) prescribe or announce reduced speeds. They are mainly found in sections with restrictions (e.g. points, bridges, construction sites, tight curves).

Temporary Speed Restrictions:

Signal Lf 1: Reduced Speed Warning Board

Driver (engineer)'s action:

- The driver (engineer) must **reduce speed** to the value shown (numeral 1–9 × 10 km/h).

Signal Lf 1/2: Start of Reduced Speed Section

Driver (engineer)'s action:

- From this point onward, the **indicated speed** (numeral × 10 km/h) applies until the entire train has passed the affected section.

Signal Lf 2: Start Board

Driver (engineer)'s action:

- **From this point onward**, the reduced-speed section announced in the timetable or by signal applies. **Reduce speed accordingly.**

Signal Lf 3: End Board

Driver (engineer)'s action:

- **From this point**, the train may **accelerate again** to the permissible timetable speed.

Permanent Speed Restrictions:

Signal Lf 4: Speed Board

Driver (engineer)'s action:

- The driver (engineer) **must reduce speed to the value indicated.**

Signal Lf 5: Corner Board

Driver (engineer)'s action:

- When the front of the train (e.g. locomotive or leading cab) reaches this board, the reduced-speed section is ended.
- The driver (engineer) may then accelerate to the scheduled line speed.

Part 2: Shunting (Switching) Duty

Section 6: Shunting (Switching) Signals (Ra)

Shunting (switching) signals (Ra) govern shunting (switching) movements only within stations and sidings (spurs). They do not apply to train movements on open line sections.

Signal Ra 11a (orange) / Signal Ra 11b (white): Shunting Waiting (Stop and Wait) Board

Driver (engineer)'s action:

- **Signal Ra 11a: Stop at the waiting (stop and wait) board. Do not pass until permission for shunting (switching) is given** (e.g. verbally, by shunting signal, or written order).
- **Signal Ra 11b:** No stop required. **Proceed, provided that the shunting (switching) movement is authorised.**

Signal Ra 12: Shunting (Proceed for shunt) Movement Signal – Shunting (Proceed for shunt) permitted

Driver (engineer)'s action:

- **The driver (engineer) may carry out the shunting (switching) movement.** The maximum shunting speed applies (generally 25 km/h).
- The movement must stop immediately if the signal goes dark or changes to Stop.

Form Signal

Signal Ra 10: Shunting Limit Board

Driver (engineer)'s action:

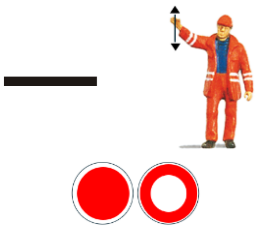
- Shunting (switching) beyond this board is not permitted. **The driver (engineer) must stop at this point.**

Signal So 12: Boundary Marker

Driver (engineer)'s action:

- The driver (engineer) must not pass the boundary marker.

Note: *The following signals are acoustic or optical. They can only be used if the locomotive is equipped with a sound function.*



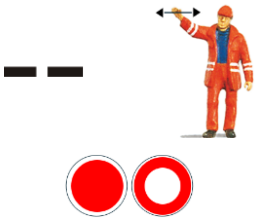
Signal Ra 1: Move Away!

Execution:

- **With whistle or horn:** One long tone.
- **With arm:** Vertical arm movement, from top to bottom.
- **With red-white signal disc / staff with white light** (signalman or pointsman only): Vertical arm movement, from top to bottom.

Driver (engineer)'s action:

- The driver (engineer) moves the shunting (switching) movement away from the signalman.



Signal Ra 2: Come Here!

Execution:

- **With whistle or horn:** Two moderately long tones.
- **With arm:** Slow horizontal arm movement side to side.
- **With red-white signal disc / staff with white light** (signalman or pointsman only): Vertical arm movement, from top to bottom.

Driver (engineer)'s action:

- The driver (engineer) moves slowly toward the signalman.

Signal Ra 3: Push!

Execution:

- **With whistle or horn:** Two short tones in quick succession.
- **With arm:** Both arms raised forward, hands brought together.

Driver (engineer)'s action:

- The driver (engineer) pushes the vehicles for coupling or uncoupling. After this, the movement must stop — even without an explicit stop order.

Signal Ra 5: Stop!

Execution:

- **With whistle or horn:** Three short tones in quick succession.
- **With arm:** Circular arm movement.

Driver (engineer)'s action:

- The shunting (switching) movement **must stop immediately!**

Part 3: Other Signals (So) on Main Lines or Non-Federal Railways (NE)

Section 7: Other Signals (So)

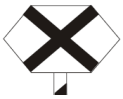
Other signals are used on main and branch lines and by non-federal railways (NE) operating under train-dispatcher-controlled operation (*Zugleitbetrieb (ZLB)*). They regulate train movements at stations or halts without extensive main signalling.

Signal So 5: Stop (Train Order Stop) Board (Halt for Permission)

Driver (engineer)'s action:

- The driver (engineer) must stop before the trapeze board (So 5) if this is noted in the working timetable or ordered by the train dispatcher.
- After stopping, the driver (engineer) waits for authorisation to enter from the train dispatcher (*Zugleiter*) or signaller (operator) (*Fahrdienstleiter*) — either verbally, by written order (Befehl), or by a visible signal (e.g. raised arm or Signal Zp 6 "Come").

Form Signal | Light Signal



Signal So 5: Cross Board

Driver (engineer)'s action:

- The driver (engineer) expects a main (home) signal ahead where no distant (approach) signal is provided.

Signal So 9: Stopping Point Board

Driver (engineer)'s action:

- The driver (engineer) prepares for a scheduled stop at the platform and reduces speed accordingly.

Signal So 8: "H" Board (Stop Marker)

Driver (engineer)'s action:

- Stop the train at the H-board (So 8). If necessary, move forward slightly, but do not pass the board.

Part 4: Train Crew

Section 8: Signals for Drivers (Zp)

Zp signals are directed specifically to the train driver (engineer) (*Triebfahrzeugführer*). They provide instructions for special operational situations.

Note: *In FREMO operation, these signals can only be used when the locomotive is equipped with a sound function.*

Signal Zp 1: Attention (Acknowledge) Signal

- **Execution:** With horn – one moderately long tone.

Driver (engineer)'s action:

- The driver (engineer) gives this signal to attract attention.
- Use the horn when: persons are on or near the track, a level crossing appears unsafe, or to acknowledge an operational instruction, e.g. departure or through-passage order (Signals Zp 9a / Zp 9b).

Signal Zp 5: Emergency Signal

- **Execution:** With whistle – two moderately long tones.

Driver (engineer)'s action:

- **Stop immediately! Set controller to zero, apply brakes fully!**

Signal Zp 6: "Come"

- **Execution:** With horn or light – one long, one short, one long tone (or corresponding light pattern).

Driver (engineer)'s action:

- The driver (engineer) is being called or receives permission to enter a station without an entry signal under train-dispatcher-controlled operation (*Zugleitbetrieb*). When instructed to enter, proceed slowly into the station (see also Signal So 5 – Stop (Train Order Stop) Board)

Section 9: Signals for Station Staff and Train Guard (Conductor) (Zp)

Zp signals for station staff or train guards (conductors) authorize departure or through-passage or are used by signalmen to regulate movement.

Signal Zp 9a: Departure / Through-passage Order from Station Staff

Signal Zp 9b: Departure / Through-passage Order from Train Guard (Conductor)

Driver (engineer)'s action:

- **Departure order:** The driver (engineer) may depart as soon as the signal is clearly given and acknowledged.
- **Through-passage order:** The driver (engineer) may pass through the station without stopping.