ERL MAINTENANCE SUPPORT SDN BHD

Co. Reg. No. 199901023674 (498574-T)

E-MAS

Effective Railway Operations; Reliable System Maintenance

OPERATIONS DEPARTMENT

PROCEDURE FOR COMMUNICATIONS & SIGNAL BOOK

Ref. No. G00.OMO.M15114.NA.1002.D

Release

Released:	f Thomas Baake	Chief Executive Officer	27.09.23	
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	Name	**Department**	**Date**	**Signature**

Amendments or additions to this procedure must be indicated with a vertical black line in the adjacent left margin.

Change Record and Configuration Control

D	14.08.2023	Revision to reflect Company Registration Number Co. Reg. No. 199901023674 (498574-T) and the change of name for KLIA Terminals.	Norhandee
C	27.02.2019	Revised to update changes to reflect ISO9001:2015 and ISO14001:2015 new requirements.	Norhandee
B	01.08.2014	Amended on principles for communication & passengers information and new signal impose at KLIA2.	Norhandee
A	01.03.2012	Revisions of the entire document. The above version (G00.OMO.M15114.NA.1002.A) supersedes all previous versions of Procedure Manual for Communication (G00.OMO.M15114.NA.0001.B) & Signal Book (G00.OMO.M50600.NA.0001.B). Both procedure manuals have been combined and changing of document number & coding system.	Norhandee
B	25.02.05	Revision of the entire document including additional information. All Operations Instructions from no. 01 to 10 have been incorporated into this document.	James/Azrin
A	13.12.2002	Revision of entire document & changing of coding system. [G00.OMO.M15114.NA.0001.A]	James / Oberkampf
-	01.12.2002	The above version(s) supersede all previous versions of this document with reference number G00.OMC.M15000.NA.0400.A	-
A	7 Dec 2001	New	Hannes Oberkampf
Revision	**Date**	**Modification**	**Name**

Planning Of Changes Reference For Revision: G00.OMO.M15114.NA.1002.D					
Issues To Consider	**Checked** ***(Please mark X)***				**Remarks**
1) Are there any negative impact?	YES		NO	X	
2) Will the integrity of QEMS be affected?	YES		NO	X	
3) Resources available?	YES	X	NO		Adequate
4) Allocation or relocation of responsibilities and authorities required?	YES		NO	X	

TABLE OF CONTENTS **Page**

1 Purpose

This procedure is provided to act as a guideline for communication to all personnel involved when communicating with the Operations Control Centre (OCC). It is therefore absolutely necessary for all instructions and procedures to be followed strictly.

However, any instruction given by the Operations Control Centre does not in any way relieve any staff from their responsibility in observing all necessary Safety Procedures, Rules and Regulations.

2 Scope, Distribution & Access

Access to this procedure shall be given to all Head of Department [HoD] of Operations, Maintenance and Safety & Security via EDMS. Employee without EDMS user access can retrieve this procedure via E-MAS Operations Department portal.

3 Abbreviations, Definitions and References

E-MAS	ERL Maintenance Support Sdn. Bhd. Co. Reg. No. 199901023674 (498574-T)
ERLSB	Express Rail Link Sdn. Bhd. Com. Reg. No: 199601003493 (375839-H)
EDMS	Electronic Document Management System
OCC	Operations Control Centre
ERL	Express Rail Link
CRS	Commuter Rail Service
KLS	Kuala Lumpur Sentral Station
BTS	Bandar Tasik Selatan Station
XA	Crossover
PCS	Putrajaya Cyberjaya Station
STS	Salak Tinggi Station
KLIA T1	Kuala Lumpur International Airport Station Terminal 1
KLIA T2	Kuala Lumpur International Airport Station Terminal 2
OCL	Overhead Catenary Line
PICOP	Person In Charge Of Possession
ATP	Automatic Train Protection
Drivers	Operations Train Driver and Track Vehicle Driver
Block	Track Section – Part of the track between 2 (two) signals

4 Section Separation

This procedure is separated into 2 sections as detailed: -

i. Section A: COMMUNICATIONS

ii. Section B: SIGNAL BOOK

Section A: COMMUNICATIONS

1 General

Only on-duty qualified persons are permitted to use the radio. Qualified persons must use radio communication for matters only directly related to Operations and Maintenance. Any irrelevant, unidentified, or false radio communications including any obscene or impolite language are strictly prohibited.

Failure or improper operation of any communication equipment's must be reported to the OCC as soon as possible by means of the suitable form of communications.

2 Communications Operations

The OCC is the communication center for the ERL - CRS System. All matters concerning operations, maintenance, emergencies, power supply and etc. are to be directed to the OCC.

All communications to/from OCC must be communicated via facilities which are connected to the voice recorder.

3 Type of Communications Equipment's

Radio is an important facility for the communication between OCC and Drivers although the major part of communication shall normally be by signals and also other Operations and Maintenance personnel pertaining to the operational matters.

3.1 Radio

Radio can be divided into 3 types:

1. Based station (radio console) in OCC
2. Trainborne radio (onboard train and shunting locomotive)
3. Handportable radio (walkie-talkie) for moveable used for Operations and Maintenance personnel

3.2 Additional Communication equipment's

1. Private Automatic Branch Exchange (PABX)
2. Handphone
3. Close Circuit Television (CCTV)
4. Passenger Information Display (PIDS)
5. Public Address (PA) system
6. Master/Slave Clock

4 Radio Communications

Prior to commencing duty, employees must perform a radio check and radio test for its functionality.

4.1 Radio

Perform radio check to ascertain it is in good working condition as follows:

Handportable Radio

- Battery condition i.e. fully charge
- Signal coverage i.e. distinct network reception
- Aerial condition
- Set the correct group channel i.e. OPS 1001 (mainline), OPS 1002 (depot)

Trainborne Radio

- Radio Control Panel activate (screen/display illuminated) i.e. after switch on the master switch key
- Fist (Palm) microphone availability

4.2 Radio Test (Test call)

A radio test (test call) has to be executed:

Handportable Radio

- After completion of radio check
- Before train preparation for train driver
- During coupling/uncoupling exercise
- Before opening a Permit to Work
- After battery change during permit to work
- After changing to a new location of permit to work

Trainborne Radio

- During train preparation
- Loss of communication coverage due to blind spot

Sample of communications can be obtained from Annex 5.1 – Radio Test Communications Exercise.

D A N G E R!

IT IS NOT ALLOWED TO COMBINE A RADIO TEST WITH AN APPROVAL TO PROCEED.

5 Principles for Radio Communication

The radio communication has to be started with proper:

- Identification (name/call sign)
- Location
- Purpose
- Additional info, which related to operational & safety decision (i.e. coupling of vehicle, equipment used, etc)

REMINDER

Operations and Maintenance staff are not allowed to execute any instructions:

- Which is not properly understood and confirmed by the OCC
- Which is obviously affecting safety and may lead to an accident
- Which is given by unauthorized persons

5.1 Radio Communication to/ from OCC

In order to keep transmission time to a minimum the following code words are to be used:

- **Go ahead** - Proceed with your message
- **Over** - My transmission is finished and I expect a response
- **Out** - My transmission is finished and no response is required
- **Standby** - Wait, I will call back
- **Affirmative** - Permission granted/Read back is correct
- **Roger** - I have received and understood your message
- **Negative** - Permission not granted/That is not correct/I do not agree
- **Repeat** - Repeat your last instruction or message to me

5.2 Transmission of alphabet & numbers

A	Alpha	**J**	Juliet	**S**	Sierra
B	Bravo	**K**	Kilo	**T**	Tango
C	Charlie	**L**	Lima	**U**	Uniform
D	Delta	**M**	Mike	**V**	Victor
E	Echo	**N**	November	**W**	Whiskey
F	Fox-trot	**O**	Oscar	**X**	X-ray
G	Golf	**P**	Papa	**Y**	Yankee
H	Hotel	**Q**	Quebec	**Z**	Zulu
I	India	**R**	Romeo		
1	One	**5**	Five	**9**	Nine
2	Two	**6**	Six	**0**	Zero
3	Three	**7**	Seven	**67**	Six Seven
4	Four	**8**	Eight	**0082**	Zero Zero Eight Two

5.3 Conduct Rules

The following conduct rules have to be observed:

- Speak clearly and concise
- Speak without dialect, if possible
- Use short sentences
- Keep the conversation short

REMINDER

All instructions must be repeated and confirmed before execution.

- The OCC issues the complete instruction and should not be interrupted by his counterpart
- The counterpart repeats the instruction
- The OCC confirms that the instruction is properly understood

D A N G E R!

SHOULD THE OCC FIND ANY MISUNDERSTANDING, OCC HAS TO REPEAT OR CORRECT THE INSTRUCTION AGAIN.

6 Principles for Passengers Information

Passengers have to be informed about the actual train runs especially in case of delays and service disruptions to avoid any confusion. The better passengers are informed about the reasons for irregularities the better the situation is accepted and excused. In these cases the announcement should be made both in Bahasa and English.

6.1 Pre-recorded Announcement

Onboard trains and stations have been equipped with selected pre-recorded announcement.

6.2 Manual Announcement

The manual announcements have to be precise and understandable. The announcer has to observe the following:

- Speak clearly with necessary breaks
- Keep the information brief but complete
- Keep a proper distance to the microphone
- Avoid disturbing noises in the background when making announcements

Sample of announcements can be obtained from Annex 5.4 – Announcement onboard train.

7 Detailed Operational Regulations

7.1 Verbal Approval To Proceed

Verbal "**Approval to Proceed**" is an authorization to move when communication by signals malfunction. The verbal "Approval to Proceed" can only be issued by the OCC.

D A N G E R !

NEVER COMBINE VARIOUS APPROVALS TO PROCEED.

REMINDER!

PROVIDE ADDITIONAL INFORMATION IF THIS COULD ENHANCE/SUPPORT SAFETY!

7.2 Movements of Maintenance Track Vehicles

Maintenance Track Vehicles are vehicle used for Maintenance purposes. Before any movement, the Driver has to:

- Get a verbal Shunting Agreement
- Receive the Approval To Proceed from the OCC
- Request for a new Approval To Proceed for:
    - Every new start
    - Change of direction
    - After a break

7.3 Communication for Pushing of Trains

Pushing of train means a Driver that push the stalled train cannot observe track ahead and signal aspect. This is potentially a highly hazardous situation. Both Drivers have to provide full alertness. Pushing another train is only allowed:

- When direct communications is established between the two trains
- Driver of the train in front must keep a sharp lookout for signal indication, turnout or any obstacles and advise the pushing train driver to stop the trains in case of any danger to the movement
- The speed of this movement must not exceed 25km/h
- No movement is allowed if communication is interrupted or any anyone else interferes with the communication of the two drivers
- If communications is interrupted, the trains have to stop and communication has to be re-established before trains can start moving again

7.3.1 Control Call

Control Call is a **one-way communication** whereby the Driver of the pushing train **no need to repeat** the information given by the Driver of the front train.

The Driver of the front train has to inform the Driver of the pushing train the important information for the train movement. Such information may include:

- Information about speed
- Information about signal aspect
- Entering or leaving the workshop
- Approaching and passing stations
- Approaching and passing turnouts

During pushing the Driver of the front train has to communicate with the Driver of the pushing train at least **every 10 second to 1 minutes** to confirm that connection is working properly. This communication also known as **Permanent Announcement.**

7.3.2 Destination Call

Destination Call is a **two-way communication** whereby the Driver of the pushing train has **to repeat immediately** the information given by the Driver of the front train.

The Driver of the front train has to inform the Driver of the pushing train early enough when reaching a potential dangerous zone or the designated stopping point. Both Drivers must **communicate constantly** during pushing of the train. This communication also known as **Permanent Conversation**.

D A N G E R!

SHOULD THE DRIVER OF THE PUSHING TRAIN ASSUME OR RECOGNISE AN INTERRUPTION TO THE DESTINATION CALL OR AN UNCLEAR RECEPTION, HE HAS TO STOP THE TRAIN IMMEDIATELY.

7.4 Communication for Permit to Work

The person who applies for permit to work must establish communication when opening or closing permit to work.

The following types of Permit to Work are:

- Track possession (TPR)
- Notice Call to OCC (NC)

Sample of communications can be obtained from Annex 5.2 – PICOP & OCC Communications Exercise (person applies for Permit to Work and OCC).

8 Emergency Call

Emergency calls have first priority and override other calls to and from the OCC. An emergency call is introduced by the word “EMERGENCY”. An emergency call must be transmitted by the most expedient means of communication facilities available in order that the recipient(s) receive the message immediately and clearly.

An emergency call should at least have the following content:

- Leading word: **EMERGENCY**
- Name and department/company
- Train or vehicle name/number
- Type of incident
- Location of the incident
- Other details which are important

REMINDER

Passengers should not be addressed with full information to avoid panic, such as:

- Bomb threat
- Terrorist attack
- Hijack
- Gas explosion

Section B: SIGNAL BOOK

1 General

Drivers must ensure that they are fully familiar and must obey all signals applicable to their movement.

All fixed signals are equipped with identification markers which must be quoted to OCC when required.

2 Category & Type of Signals

The ERL-CRS Signalling system can be categorized as Signal and Markers/Signboards as follows:

- Type of Signal
  - Main Signals
  - Subsidiary Signals
  - Hand Signals

- Type of Markers/Signboards
  - Permanent
  - Temporary

Signal direction number for down track (direction from KLS to KLIA respectively) is indicated with alphabet T for 'TURUN' while for up track (direction from KLIA to KLS respectively) is indicated with alphabet N for 'NAIK'.

3 Main Signal

Main Signals are normally placed at the left hand side of the track at the OCL poles or on it's own mast. For the bi-directional (reverse direction) the Main Signal is placed at the right hand side of the track. The distance between the signals varies between 950 m to 1850 m.

Main Signal is a multi colored light signal and used to indicate the status of the block ahead. Indications are as follows:

- GREEN Aspect: **PROCEED**
  - Block ahead is cleared and movement is allowed
  - Allows the maximum speed according to the line speed, except if there are no other speed restrictions or instructions

- YELLOW Aspect: **CAUTION**
  - Reduce speed and prepare to stop at the next signal (if STOP Aspect)
  - Reduce speed for diverging of track

- RED Aspect: **STOP**
  - Block ahead is occupied and no movement is allowed
  - Stop for all trains, maintenance vehicles and locomotive
  - Stop approximate 10 meters in front of Red Aspect signal

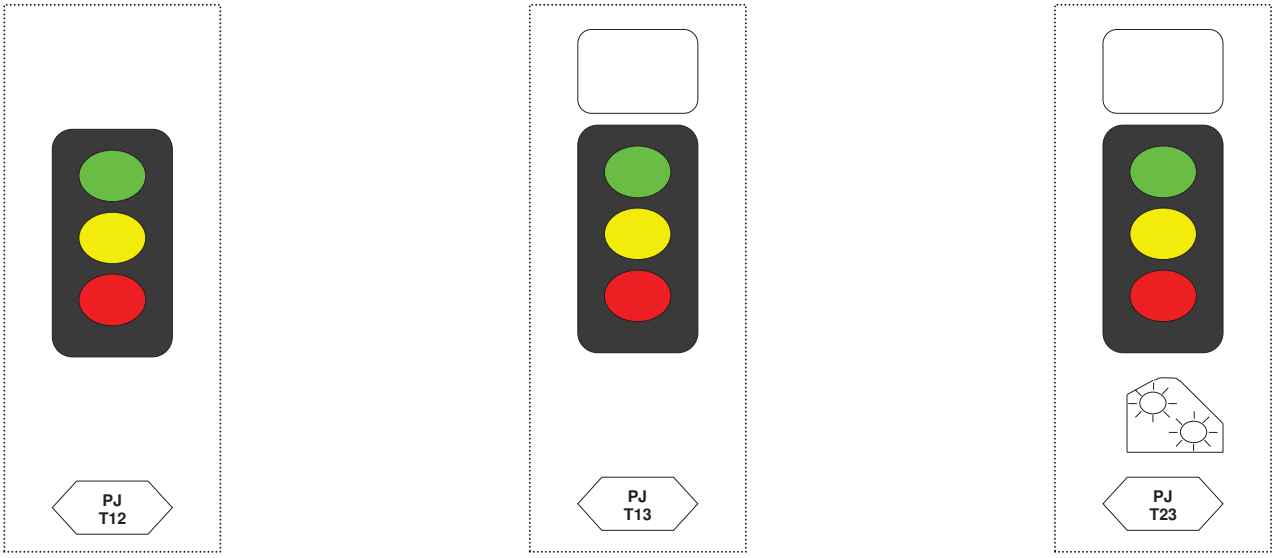
3.1 Home Signal

Home Signals are stop signal and in normal the aspect of this signal is RED. The location of these signals is when entering into a station and terminal. The identification marker number '1' to indicate signal for Outer Home and '2' signal for Inner Home.

The Home Signals with a Route Indicator if there are possibilities to divert into another track and Call-On Signal to enter occupied track. Signal identification consists of:

- Section code: KS, BS, XA, PJ, ST, KA
- Direction of travel: T or N
- Identification marker: 1 or 2
- Track: 2 or 3

Sample: PJ_T12, ST_T13, ST_T23, XA_N22



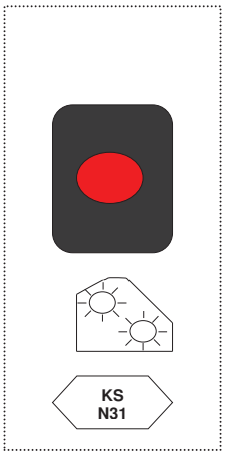
3.2 Exit Signal

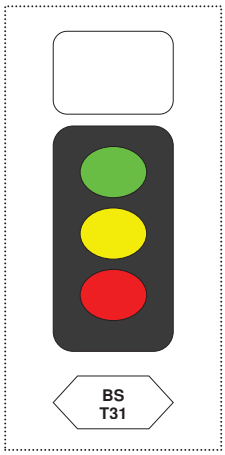
Exit Signals are stop signal and in normal condition the aspect of this signal is RED. The location of these signals are when leaving a station and terminal or into reversing track.

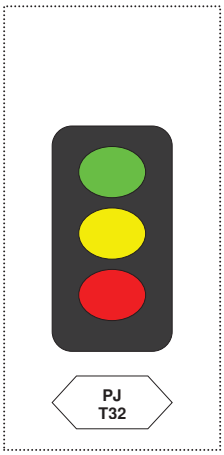
The Exit Signals with a Route Indicator if there are possibilities to divert into another track. Signal identification consists of:

- Section code: KS, BS, XA, PJ, ST, KA
- Direction of travel: T or N
- Identification marker: 3, 4 or 5
- Platform or track: 1, 2, 3 or 4

Sample: KS_T43, BS_T31, ST_N52, KA_T34





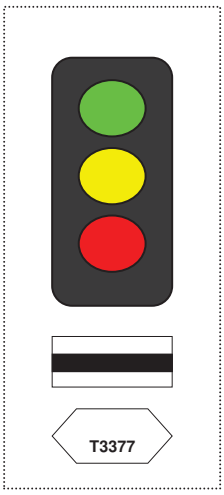


3.3 Automatic Block Signal

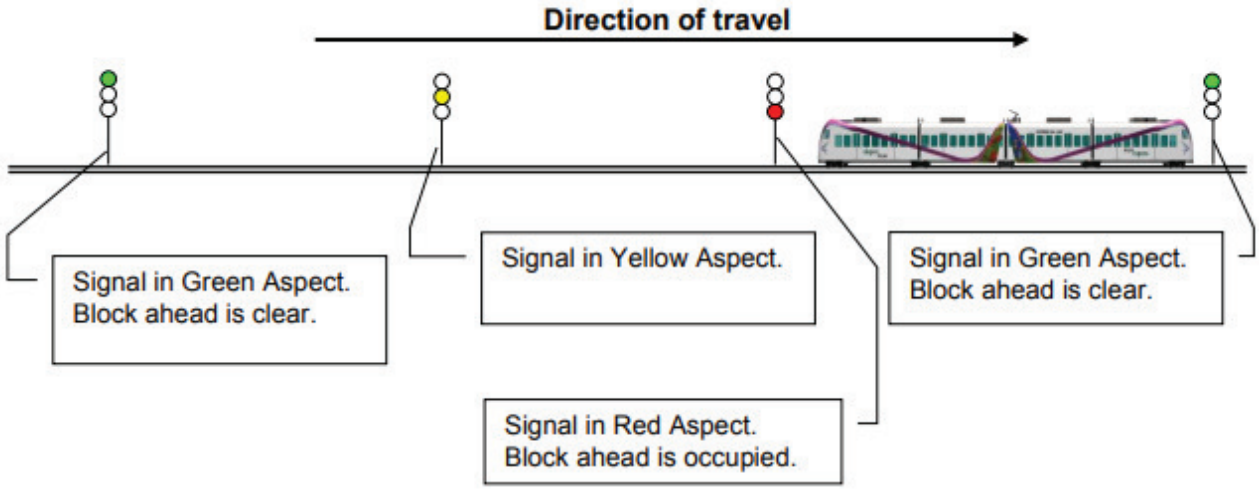
Automatic Block Signal (ABS) is an automatic signal and in normal condition the aspect of this signal is GREEN or YELLOW (Proceed Aspect). The signal automatically changes to RED (Stop / Danger Aspect) when block ahead occupied and/or signal ahead is RED. Equipped with a marker plate with black horizontal bar on white background. Signal identification consists of:

- Direction of travel: T or N
- Track: 2 or 3

Sample: T3125, T3377, N2195, N2281



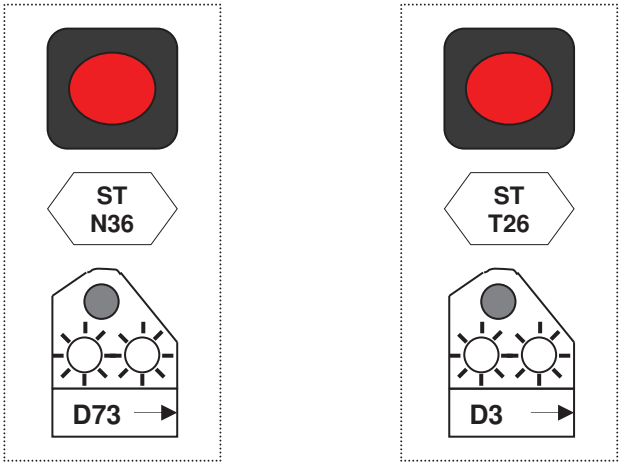
- Signal function is based on track occupancy. (Refer diagram below)



3.4 Entering Depot Signal

The main signal always indicates a Permanent Red Aspect. The drivers must obey the shunt signal when entering depot.

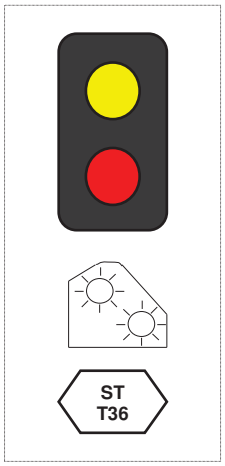
- Signal number for signal entering depot from KLIA: ST_N36
- Signal number for signal entering depot from KLS: ST_T26

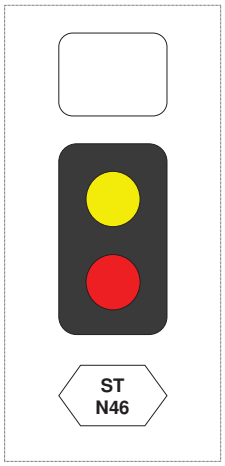


3.5 Leaving Depot Signal

The main signal has 2 (two) aspects Yellow and Red. Signal for leaving the depot heading towards KLS is equipped with Route Indicator and signal for leaving depot heading towards KLIA T2 equipped with Call-On Signal.

- Signal number for signal leaving depot heading to KLIA T1: ST_T36
- Signal number for signal leaving depot heading to KLS: ST_N46





4 Subsidiary Signal

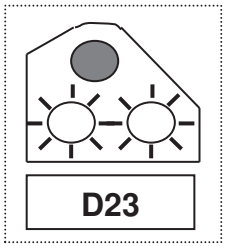
Subsidiary Signals are signals that are attached to support the functionality of the main signals for bi-directional movement and depot movement.

4.1 Shunt Signal

Shunt Signals are located at the depot area and reversing tracks in the terminal station KLS. Shunt Signal are valid for trains as well as for other rail vehicles.

Shunt Signal are normally placed at the left hand side of the track on their own pole. An arrow on the signal number plate indicates signal of the track concerned. Permissible speed for train or vehicle is 25 km/h.

- Signal number
    - Start with alphabet ‘D’ to indicate signal in Depot
    - Start with alphabet ‘S’ to indicate signal at Reversing Track



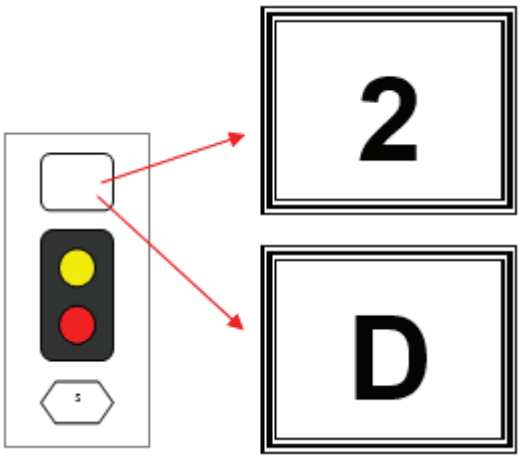
- **STOP** Aspect: Two white lights in a horizontal line
- PROCEED Aspect: Two white lights illuminate at 45 degrees horizontal (slanting)

4.2 Route Indicator

Route Indicators are located at relevant Home and Exit Signals to indicate the particular route setting when more than one diverging track is possible.

- The number 1 to 4 indicates the track to which the route has been set

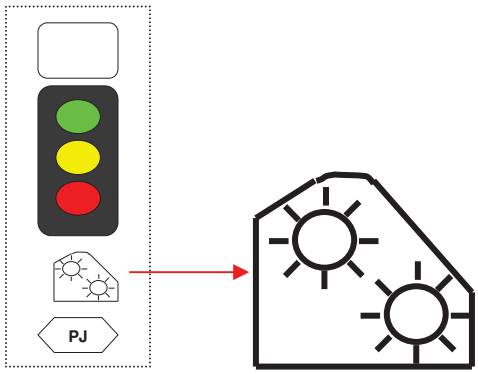
- The alphabet 'D' and 'T' indicates Depot and Test Track respectively



4.3 Call-On Signal

Call-on Signals are mounted at the Main Signal of all Inner Home Signal and Exit Signals to the reversing track. This signal is only illuminated when a route is set from a Main Signal into a reversing track or into an occupied platform.

Normal aspect of Call-On Signal is dark (blank). STOP indication is by the Main Signal aspect. When Proceed Aspects the two white lights will illuminate at 45-degree slanting.



The driver has the approval to proceed on sight and under caution and the permissible speed is restricted to:

- 40 km/h entering station
- 25 km/h entering reversing track

NOTE

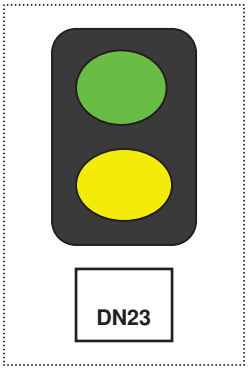
The drivers are to be aware possibilities of another train or vehicle on the same block ahead.

4.4 Distant Signal

Distant Signal is a Proceed signal with either a Green or Yellow Aspect. These signals are identified by the alphabet 'DN' or 'DT' followed by number of the relevant Home Signal.

This signal is located in braking distance in front of Home Signal. This signal indicates the status of the Home Signal and normally place at the right hand side on the mainline. Only used during bi-directional operation.

- Distant Signal at Green Aspect:
  - Proceed as per normal line speed next signal is Green or Yellow Aspect
- Distant Signal at Yellow Aspect:
  - Reduce speed and prepare to stop, as next signal is Red Aspect

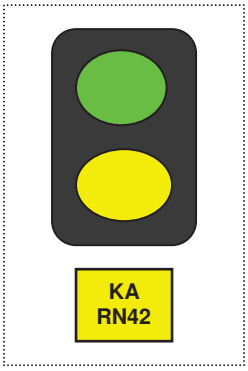


4.5 Repeater Signal

Repeater Signal is a Proceed signal with either a Green or Yellow Aspect. These signals are identified by the alphabet 'RN' or 'RT' followed by number of the relevant Main Signal.

This signal repeats the status of the Main Signal ahead and normally located in area where signal visibility is not available due to an obstruction or sharp curves in front of the Main Signal. Repeater signal can be placed at right or at the left hand side of the track.

- Repeater Signal at Green Aspect:
  - Proceed as per normal line speed next signal is Green or Yellow Aspect
- Repeater Signal at Yellow Aspect:
  - Reduce speed and prepare to stop, as next signal is Red Aspect

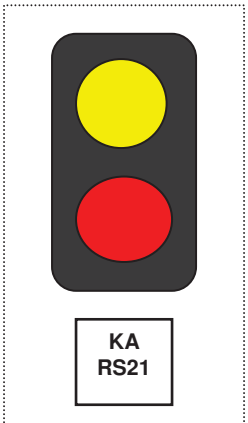


4.6 Route Set Signal

Route Set signal is a stop signal with either a Yellow or Red aspect. These Signals are identified by the alphabet 'RS' followed by number of the relevant main signal and to inform drivers that the route has been set.

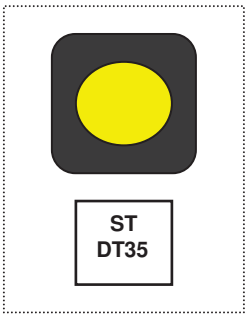
This signal located at KLIA T2 to permit train depart to KLIA T1. The signal indicates the status of the in-front signal KA_S24 and KA_S21.

- Route Set Signal at Yellow Aspect:
  - Proceed as per normal line speed, as next signal is Yellow Aspect
- Route Set Signal at Red Aspect:
  - Stop and Hold position, as next signal is Red Aspect



4.7 Permanent Yellow

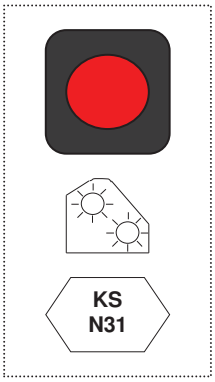
The Permanent Yellow signal is located at test track. It indicates that the next signal (Main Signal entering STS) is Red Aspect or Yellow Aspect.

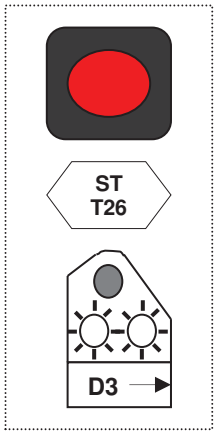


4.8 Permanent Red

These signals are located at both entrances into the depot & reversing track. It indicates that function of Main Signal ends here or border between depot/ reversing track with mainline.

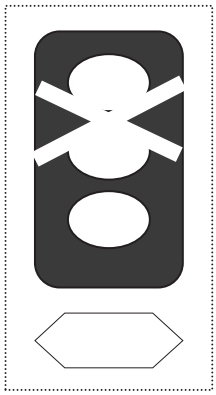
- Switch to shunting mode on ATP MMI (25kmh)
- The drivers to obey the Shunt Signals or Call-On Signal as an approval to proceed





5 Crossed Signal

Any signal with a white cross is invalid. The drivers allowed the signal without an Approval to Proceed from the OCC.



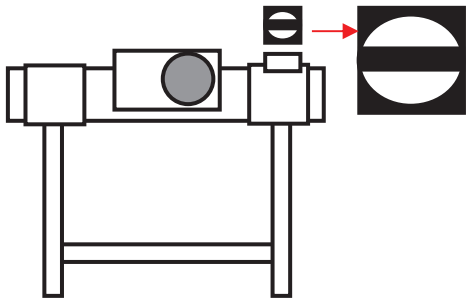
6 Buffer Stop

6.1 End of Shunting Route

The End of Shunting Route is placed on each buffer stop in the depot area and at the end of the reversing track.

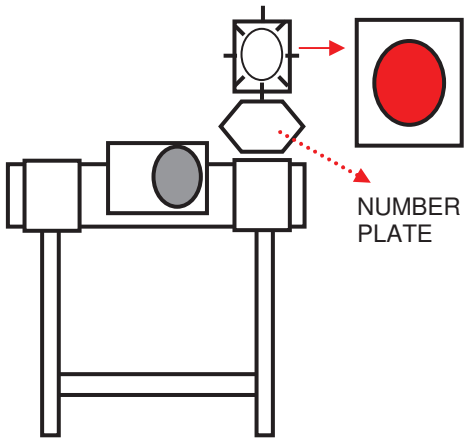
It can be identified with two white semicircular sign separated by a black horizontal bar on a black background.

- Switch to shunting mode on ATP MMI (25km/h)



6.2 End of Track

The End of Track is placed on each buffer stop at the end of track 2 KA T32 and track 3 KA T33 at the formerly known as CRS platform in KLIA T1, at the end of test track (Track 143), at KLIA T2 T41 & T44 and KLS N42



7 Hand Signal

Hand signals are used where main or subsidiary signals and signal boards are unavailable or impractical. Hand signals can be performed using the hands and arms of the body, coloured flags or coloured signal lamp.

The signal flag used to perform hand signals can be in a rectangular or any beacons or rounded devices of distinctive color and design, used as a symbol and /or signal of specific indication as follows:

- Green: PROCEED
- Yellow: CAUTION
- Red: STOP

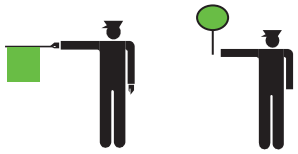
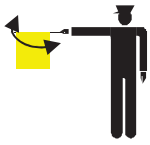
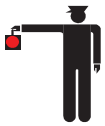
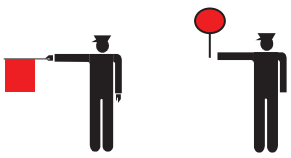
The signal lamp used to perform hand signals shall be capable of displaying Red, Yellow and Green lights. Visibility of at least 50m must be ensured.

DANGER

For safety reasons, any ambiguous flag, hand or night signal aspect must be considered as a STOP aspect and the Driver must immediately stop the train/vehicle and inform the OCC.

7.1 Hand Signal Application

The hand signals are shown as follows:

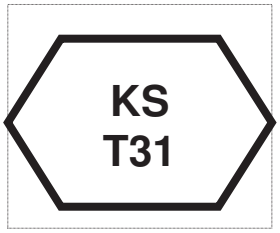
Meaning	By Day	By Night	Flag (Day)
Proceed! Resume Authorised Speed!	One arm out-stretched parallel to ground 	One arm out-stretched with **Green** signal lamp 	One arm out-stretched with **Green** signal flag/rounded device 
Slow down. Caution. Prepare to stop	One arm out-stretched and waving down/up from side 	One arm out-stretched and waving down/up from side with **Yellow** signal lamp 	One arm out-stretched and waving down/up from side with **Yellow** signal flag 
Stop! Come to a full stop before the signal	Arms out-stretched with upright forearms 	One arm outstretched with **Red** signal lamp 	One arm outstretched with **Red** signal flag/rounded device 

8 Permanent Markers/Signboards

8.1 Main Signal Board (Signal Number Plates)

This signal number plate identifies a Main Signal with the abbreviation of the location and respective tracks.

The board can be identified with a white background hexagon and a black alphabet & numerals.



8.2 Distant Signal Board

The Distant Signal number plate can be identified with the alphabet 'D' as the first letter of the signal number on a White background with black alphabet and respective signal number.

8.3 Repeater Signal Board

The Repeater signal number plate can be identified with the alphabet 'R' as the first letter of the signal number on a Yellow background with black alphabet and respective signal number.

8.4 Route Set Signal Board

The Route Set signal number plate can be identified with the alphabet 'R' as the first letter of the signal number on a White background with black alphabet and respective signal number.

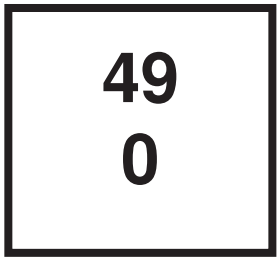
8.5 Automatic Block Signal Board

The Automatic Block Signal board mounted underneath the signal can be identified with black horizontal bar on white background.

8.6 Kilometer Board

The Kilometer board is placed in a distance of 200 m and 300 m left from the track at the OCL pole. The board can be identified with white background and black numerals.

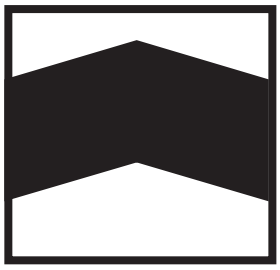
- The digits above indicate the kilometer distance
- The digit below indicates the hundred-meter distance



8.7 Line Speed Board (Bi-directional)

This Line Speed Board is valid for bi-directional train runs. After passing this board the driver is permitted to accelerate the train to the normal line speed.

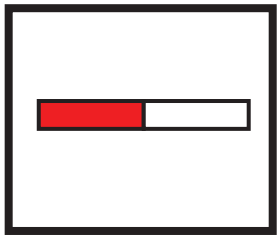
The board can be identified with a black arrowhead on white background. Located at right hand side of track.



8.8 Fouling Point Marker

The Fouling Point marker is a piece of steel mark with red and white colour.

The marker is placed between two converging tracks. Drivers has to stop the train approximately 10 meters in front of fouling point to ensure the clearance limit is applied (to avoid contact with other vehicle moving from the adjacent track).



8.9 Countdown Marker

The Countdown marker is to indicate the distant of the stopping point ahead. It is counting in decreasing number i.e. 5, 4, 3, 2 & 1.

8.10 Stopping Points Board

The Stopping Point board is to indicate the actual stopping point.
Placed at all stations to guide train driver stop the train at designated area.

8.11 Shunting ON Board

The Shunting "ON" located on both entrances to depot and at the reversing track, to indicate location of shunting mode activation area.

NOTE
OTD to press soft key button "S" at ATP MMI to switch "ON" shunting mode.

8.12 Traction Marker

Traction marker is to indicate the point to traction while leaving/entering the workshop at southern side of track 9 and 10.

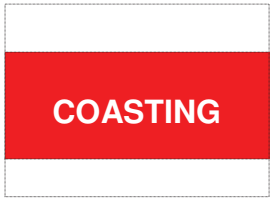
The marker can be identified with a red background with white alphabet in the middle.

NOTE
OTD to observe main switch component on DDU after OCL power restore back before traction.

8.13 Coasting Marker

Coasting marker is to indicate the point to coast while entering/leaving the workshop at southern side of track 9 and 10.

The marker can be identified with a red background with white alphabet in the middle.



8.14 Workshop Lookout-man Board

The Workshop Lookout-man board is located on both entrances to workshop track 9, 10, 11 & 12. No movement into or out from workshop without the presence of the lookout-man.

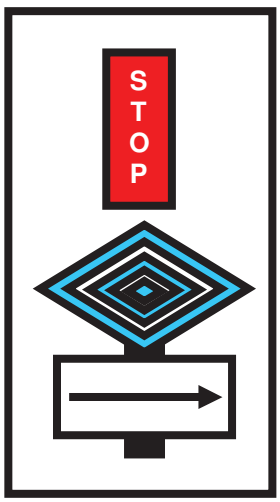
8.15 Shunting Locomotive Re-fueling Board

This board is to assist locomotive driver the correct positioning of the shunting loco for refueling. The stopping point board is located at auxiliary workshop track 8.

8.16 End of OCL Board

The End of Overhead Catenary Line can be identified as a diamond square shape with 2 (two) light blue lines on a white background. Underneath the diamond square shape is a black arrow pointing the direction of the non-electrified section. Located at track 8, 11 and 12 in depot areas.

Trains and vehicles with raised pantograph must stop immediately in front of the signage and contact OCC.



9 Temporary Markers/Signboards

9.1 Speed Restriction Board

Speed Restriction board should be provided if the reduction is one third or greater of the track design speed. This board consists of Speed Limit, Beginning of Speed Limit & Ending of Speed Limit.

9.1.1 Speed Limit Board

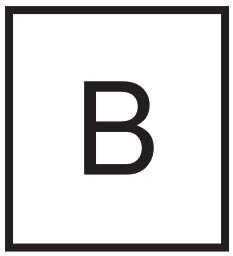
The Speed Limit Board is placed in braking distance of a speed restriction. It can be identified with a yellow background triangle pointing to the ground and a number in black letters in the middle.

The Speed Limit board indicates that a temporary speed restriction is ahead and the driver must reduce speed. The number on the board indicates maximum permitted speed and must not be exceeded.

The Speed Limit board can indicate the numbers 2, 4 or 6. This number has to be multiplied with 10, meaning 20 km/h, 40 km/h and 60 km/h.

9.1.2 Beginning of Speed Limit Board

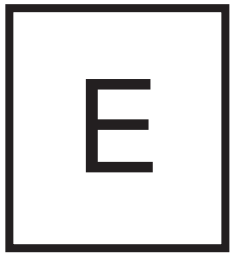
The Beginning of Speed Limit board indicates the beginning of the speed restriction. It can be identified with a white background rectangle and a black alphabet ‘B’ in the middle.



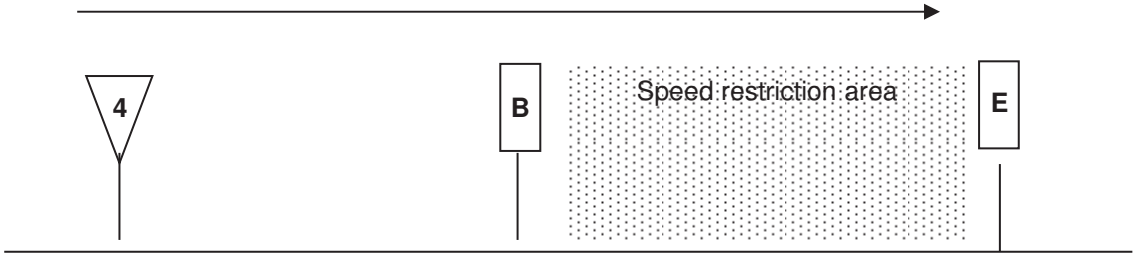
The board is positioned at the beginning of a temporary speed restricted section. The board indicates to the driver the point where they must reduce the speed of the train/vehicles to the limit indicated on the ‘Speed Limit board’.

9.1.3 Ending of Speed Limit Board

The Ending of Speed Limit board indicates the ending of the speed restriction. It can be identified with a white background rectangle and a black alphabet ‘E’ in the middle.



The board is positioned at the ending of a temporary speed restricted section. The board indicates to the driver the point where they may resume/permitted to accelerate the train to the normal line speed.



9.2 STOP Board

The STOP board is double sided, reflective and displays a stop indication with white alphabet on a red background. During the night time the STOP board must be equipped with a hazard light.

The STOP board shall be placed in a safety distance of approximately 50m away from the block to be protected.

- To protect a block which is temporary not passable
- To indicate a temporary stopping point for trains and other rail vehicles

5 ANNEXES

5.1 Radio Communication Exercise

1. Radio Test (Test Call)

"Control Centre. This is XXX on radio test 1-2-3-3-2-1, how do you read me, over?"

"XXX. This is Control Centre, reading you loud and clear, radio test from Control Centre 1-2-3-3-2-1, how do you read me over."

"Control Centre, this is XXX. Reading you loud and clear, over."

2. Signal remain in RED aspect (STOP)

"Control Centre. This is Express 07."

"Express 07. This is Control Centre, go ahead."

"Control Centre, Express 07 direction to KLS on track 2. Signal ST N32 is in RED aspect, over."

'Express 07, Standby."

"Express 07 you have an "Approval to Proceed" to override ATP and pass signal ST N32 at RED aspect with the maximum allowable speed of 40km/h to the next signal."

"Control Centre, Express 07, have an "Approval to Proceed" to pass signal ST N32 at RED aspect with the maximum allowable speed of 40km/h to the next signal."

"Express 07, your read back correct, out."

3. Turnout Failure

Operations Control Centre to Operations Station Supervisor

"OSS STS. This is Control Center"

"Control Centre. This is OSS *name*:…….STS, go ahead"

"OSS *name*:…..STS, kindly proceed to a Turnout 115 STS, we having a detection missing"

"Control Centre, Turnout 115 STS having detection missing. Request permission to enter track 01 STS and to proceed to Turnout 115 STS"

"OSS *name:*…..STS, permission granted and remember to wear your PPE and bring along your tools"

5.2 PICOP and OCC Communication exercise

Communication between PICOP and OCC on: -

1. Opening of TPR
2. Closing of TPR
3. Opening of TPR with OCL power isolation
4. Closing of TPR with OCL Re-energizing

a. Opening of TPR.

PICOP: Control Centre, this is PICOP XX. Over

Control: PICOP XX. Go ahead

PICOP: PICOP XX would like to open TPR XXX for XXX work at XXX. Over

Control: PICOP XX, TPR XXX for XXX work at station XXX open at time xxxxhrs. Over

PICOP: Control Centre, this is PICOP XX repeat TPR XXX for XXX work at station XXX open at time xxxxhrs. Over

Control: That is affirmative, you may proceed with your work. Out!

b. Closing of TPR.

PICOP: Control Centre, this is PICOP XX. Over

Control: PICOP XX. Go ahead

PICOP: PICOP XX would like to close TPR XXXX work at XXX. Over

Control: PICOP XX, confirmed that all personnel and equipment are cleared from your working area? Over

PICOP: That is affirmative. All personnel and equipment are cleared from working area, over.

Control: PICOP XX, TPR XXXX closed at time xxxxhrs,

PICOP: PICOP XX repeat. TPR XXX closed at xxxxhrs

c. Opening of TPR with OCL Power Isolation.

PICOP: Control Centre, this is PICOP XXX. Over

Control: PICOP XXX. Go ahead

PICOP: PICOP XXX would like to open TPR XXXX for XXXX work at km xx until xx on track 2/3. Request OCL to be de-energized from {section} to {section} on track x. Over

Control: PICOP XXX, TPR XXXX for XXXX work at km xx until xx on track x. Request OCL to be de-energized from {section} to {section} on track 2/3. Is that confirmed? Over

PICOP: That is affirmative.

Control: Stand by for OCL power to be de-energized

PICOP: Control Centre, PICOP XXX stand by for power to be de-energized

Control: PICOP XXX, this is control, OCL power from {section} to {section} on track 2/3 is de-energized, TPR XXXX for XXXX work at km xx until xx on track 2/3 open at time xxxxhrs. Please inform Control Centre the location of the earthing devices applied. Over

PICOP: Control Centre, OCL power from {section} to {section} on track 2/3 is now de-energized. Please stand by for earthing device location. Over

Control: Control Centre acknowledge and standby.

PICOP: Control Centre, this is PICOP XXX, earthing device applied at OCL pole no XXXX and XXXX on track 2/3. Over

Control: PICOP XXX, Control Centre acknowledge earthing device applied at OCL pole no XXXX and XXXX on track 2/3. You may proceed with your work. Out!

d. Closing of TPR with OCL Power to be Re-energize.

PICOP: Control Centre, this is PICOP XXX, over

Control: PICOP XXX. Go ahead

PICOP: PICOP XXX would like to close TPR XXXX, all personnel and equipment are cleared from the area and both earthing device and stop signal board at poles no XXXX and XXXX were removed. Over.

Control: PICOP XXX, this is Control Centre. Confirmed all personnel and equipment are cleared from the track area and both earthing devices and stop signal board were removed and confirm that OCL power can be re-energized, over

PICOP: That is affirmative.

Control: PICOP XXX, TPR XXXX closed at time xxxxhrs,

PICOP: Control Contre, PICOP XXX repeat TPR XXXX closed at time xxxxhrs,

5.3 Radio Control Panel (RCP) Button & Function

Number	Description	Function
1	**Rotary**	Increase and decrease volume selector
2	**Emergency Call Button**	Activation of Emergency Call to gain immediate voice call to OCC. To activate Emergency call Press and Hold down the Emergency Button till the Mobile start beeping & screen flashing in Red **(EMERGENCY) – DEPOT & MAINLINE**
3	**Depot RTT** (Request to Talk)	Press Depot Request To Talk (Depot RTT) Wait for OCC to initiate the voice call from Train Driver **(NORMAL) - DEPOT**
4	**Deport HRTT** (High Priority Request to Talk)	Press Depot High Priority Request To Talk (Depot HRTT) if DC didn't responses to the Deport RTT or Train Driver urgently need to communicate with OCC. **(URGENT) - DEPOT**
5	**Depot HELP**	Press Depot Help button (Depot Help) to notify the OCC that, Train Driver need Help or assistance. **(NEED ASSISTANCE) - DEPOT**
6	**Mainline RTT** (Request to Talk)	Press Mainline Request To Talk (Mainline RTT) Wait for OCC to initiate the voice call from Train Driver **(NORMAL) - MAINLINE**
7	**Mainline HRTT** (High Priority Request to Talk)	Press Mainline High Priority Request To Talk (Mainline HRTT) If LC didn't responses to the Mainline RTT or Train Driver urgently need to communicate with OCC **(URGENT) - MAINLINE**
8	**Mainline HELP**	Press Mainline Help button (Mainline Help) to notify the OCC that, Train Driver need Help or assistance **(NEED ASSISTANCE) - MAINLINE**

5.4 Announcement On-Board Train

KLIA T1 bring belongings (Passing through STS)

English:

The next station is Kuala Lumpur International Airport T1. Please ensure that you disembark at the correct airport terminal. Do remember to bring along all your belongings with you. We hope you've had a pleasant journey. Thank you for using the KLIA Ekspres. We looking forward to welcoming you onboard again soon.

Bahasa:

Stesen berikutnya Lapangan Terbang Antarabangsa Kuala Lumpur. Sila pastikan anda turun di terminal lapangan terbang yang betul. Jangan lupa membawa bersama semua barangan anda. Kami harap anda telah menikmati perjalanan anda sebentar tadi. Terima kasih kerana menggunakan KLIA Ekspres. Kami mengalu-alukan kedatangan anda semula.

KLIA T2 bring belongings (Approaching KLIA T2)

English:

Do remember to bring along all your belongings with you. We hope you've had a pleasant journey. Thank you for using the KLIA Ekspres. We look forward to welcoming you onboard again soon.

Bahasa:

Jangan lupa membawa bersama semua barangan anda. Kami harap anda telah menikmati perjalanan anda sebentar tadi. Terima kasih kerana menggunakan KLIA Ekspres. Kami mengalu-alukan kedatangan anda semula.

KLS bring belongings (Passing through BTS)

English:

The next station is KL Sentral. Do remember to bring along all your belongings with you. We hope you've had a pleasant journey. Thank you for using the KLIA Ekspres. We look forward to welcoming you onboard again soon.

Bahasa:

Stesen berikutnya KL Sentral. Jangan lupa membawa bersama semua barangan anda. Kami harap anda telah menikmati perjalanan anda sebentar tadi. Terima kasih kerana menggunakan KLIA Ekspres. Kami mengalu-alukan kedatangan anda semula.