M9.5 User Manual

for STM ATB

Colophon	
Document ID	M9.5
Version	2.0
Revision	784702
Author	AVO
Reviewed	784702 ,STMA-81272
Approved	784702 ,STMA-81276
Archive	SID-ERTMS-1000813
Date:	2023/03/08 15:30

Authorization

Compiled by: JW Signature/E-sign: 784702 ,STMA-81274	Date: 2023/03/08 20:49
Reviewed by: WD Signature/E-sign: 784702 ,STMA-81272	Date: 2023/03/08 15:32
Approved by: BVB Signature/E-sign: 784702 ,STMA-81276	Date: 2023/03/09 08:14

Contents

1 Preface

Text, STMA-75118 - This document describes the way the STM ATB shall be used for the different users, especially train drivers.
The content of this generic user manual shall be used as a basis for vehicle specific user manuals for the ATC systems, at least including ETCS and ATBEG. The interface between the STM ATBEG and the users shall be implemented at the ETCS DMI.

1.1 What is an STM ATB

Text, STMA-65625 - An STM ATB is a train protection system providing ATB functionality in cooperation with an ETCS system. When integrated with an onboard ETCS system, the combination of STM ATB and the ETCS onboard system ensures all ATB-EG and ATB-Vv functionalities on ATB-EG equipped lines. The specific characteristics of the embodiment "STM" is explained below.

An STM (a “Specific Transmission Module”) is an embodiment of a (national) automatic train protection (ATP) or automatic train control (ATC) system, with the feature of being manageable by an ETCS on-board system. I.e. the ETCS on-board system is master over the STM and can activate and deactivate it. This way transitions between different national ATP/ATC areas, and between national ATP/ATC areas and ETCS areas can be managed in a harmonized way. It allows ETCS equipped trains to operate on conventional (non ETCS) lines.
To optimize the overall configuration, a standard has been developed for the interface between ETCS and the STMs. This interface not only allows the ETCS system to switch on/off the specific ATP/ATC functionality, but also to share generic ATP/ATC facilities provided by the ETCS on-board system:

- Train specific parameters: Parameters entered during "Data Entry" and fixed parameters are sent by ETCS to the STMs
- Speed and distance measurement (odometry): Speed and distance information is sent by ETCS to the STMs
- Driver Machine Interface (DMI): information sent by an STM to ETCS will be presented at the ETCS DMI and inputs given by the driver will be passed by ETCS to the addressed STM.
- Control of traction and brakes (Traction Cut Off and Service/Emergency Brake Commands): Commands to cut of traction of to initiate braking sent by the STM will be passed to the traction and/or braking systems by the ETCS system.
- Cabin selection and driving direction: information concerning the currently selected cabin and the driving direction is sent by ETCS to the STMs.
- Juridical data and diagnostic data storage: The ETCS on-board will take care of storing juridical data and diagnostic data sent by the STM to the ETCS on-board.

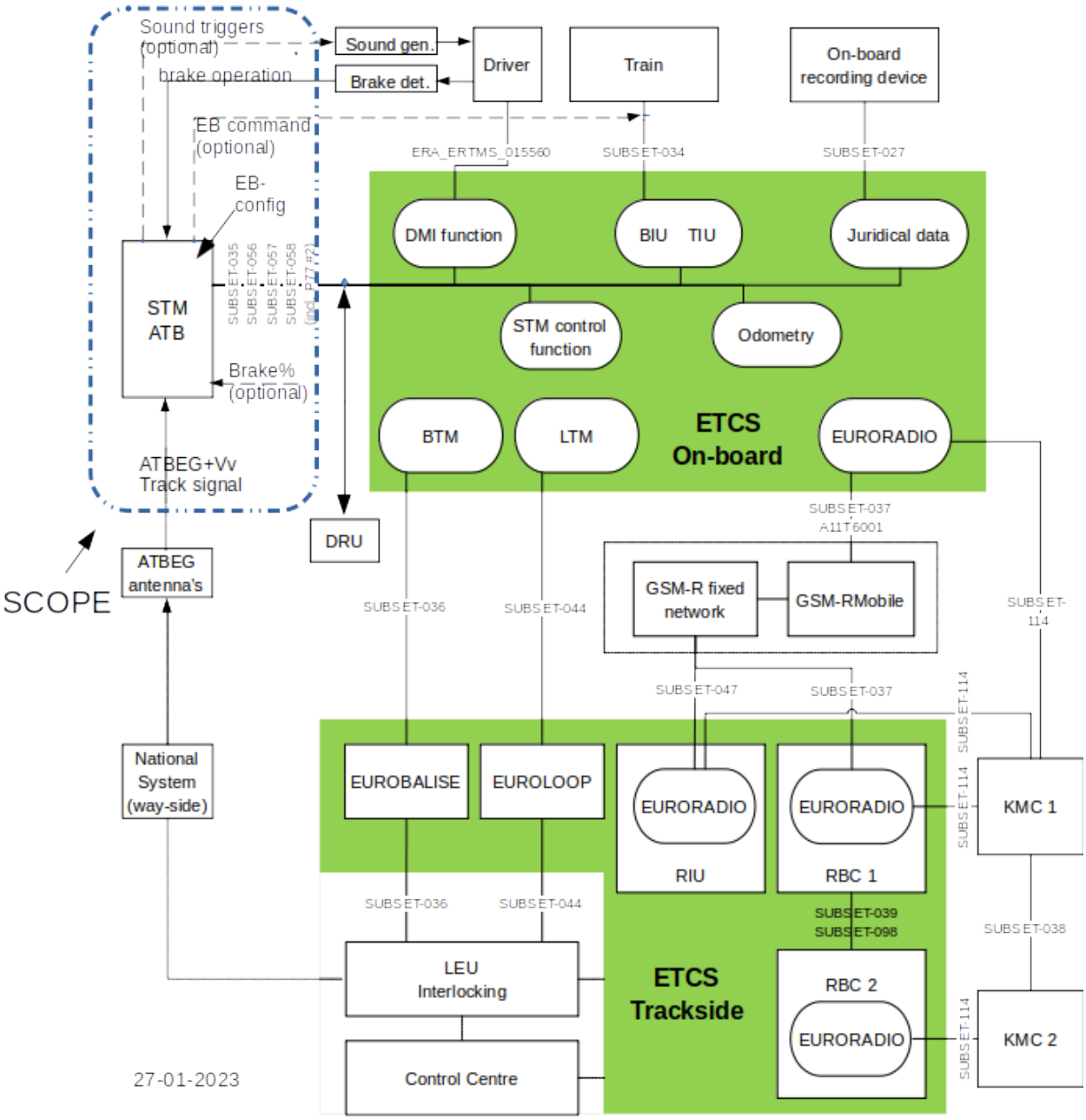
The standardized interface specifications and the way ETCS and STMs should cooperate is defined in ERA ERTMS specifications, specifically in subsets-035/056/057/058/059.

Sharing facilities allows the design of lean STMs which only provide the specific national functionality, mostly analyzing trackside data sent by the national wayside systems and performing the specified protection/control functions.
The use of the ETCS facilities is not mandatory for an STM (only the control of switching on/off is), therefore not all STMs are lean systems.

1.2 Scope

Text, STMA-65620 - Figure STMA-4891 is taken from the ETCS specifications (subset-035 STM FFFIS Specific Transmission Module). It shows the ETCS reference architecture and the integration of STM ATB with the ETCS onboard system. The scope for this installation manual is marked.

Definition, STMA-4891 - (figure)
STM ATB system scope



1.3 References

Text, STMA-14296 - Reference documents

All the documents references used in this document can be found in the document P6.1 Bibliography available in the Polarion folder Processes

Abbreviations, definitions and terminology

An overview of the abbreviations, definitions and terminology used in this document can be found in document P6.2 List of abbreviations, definitions and terms available in the Polarion folder Processes

Requirement identification

The STM ATB project makes use of an automated requirement management system. In this system each requirement has been identified as a work item. Each work item has been automatically assigned with a unique ID, with the format "STMA-<number>". As a result requirement ID's are not in logical order. An overview of all the used STMA-numbers is given in document P6.3 Requirement Overview available in the Polarion folder Processes

1.4 Audience

Text, STMA-80472 - This STM ATB user manual is intended to be used by staff responsible for compiling a train type specific user manual for equipment including the STM ATB (mostly an ERTMS onboard equipment).

2 System overview

Text, STMA-75120 - The STM ATB implements, in combination with the ERTMS on-board equipment, the ATBEG functions as specified in the RIS ("Regeling Indienststelling Spoorvoertuigen, D3.1 Requirements from Regeling Indienststelling Spoorvoertuigen) and the ATBVv function as specified in the document ATBVv requirements (D3.2 ATBvv requirements plus correction in V12). A short description of both functions is added below.

2.1 Train protection ATBEG

Text, STMA-25806 - ATBEG is a function which was introduced at the Dutch Railway network in the late 1960's to enhance safety after an accident in 1962. The way-side part of the system is an addition to the "75Hz track circuits" used for train detection. Those "75Hz track circuits" (with a length between 50 and 1200m) cover almost the complete network. To communicate the maximum speed at the next signal, the 75Hz current of the track circuits is "amplitude modulated". The modulation frequency codes the maximum speed (at the next signal). On-board of the trains equipment is installed capable of detecting the 75Hz currents in the rails and decoding the "track signal". The on-board shall calculate the maximum speed at the next line side signal(*) based on the "track signal".
If the train exceeds the maximum speed retrieved from the ATBEG code while the driver is not braking (during a situation depending time) then the ATB on-board shall apply the brakes.
The relation between the maximum speed and the ATBEG code is fixed. However alternative values are mentioned in the RIS (regeling indienststelling spoorvoertuigen), and speed levels can be changed dynamically using ATBNG technology (ATBM+ mode). The same is possible using ETCS technology.

(*) More detailed: the track signal gives the minimum of the maximum speeds at the previous and the next line side signal. Therefore the current maximum speed and the maximum speed at the next line side signal are monitored.)

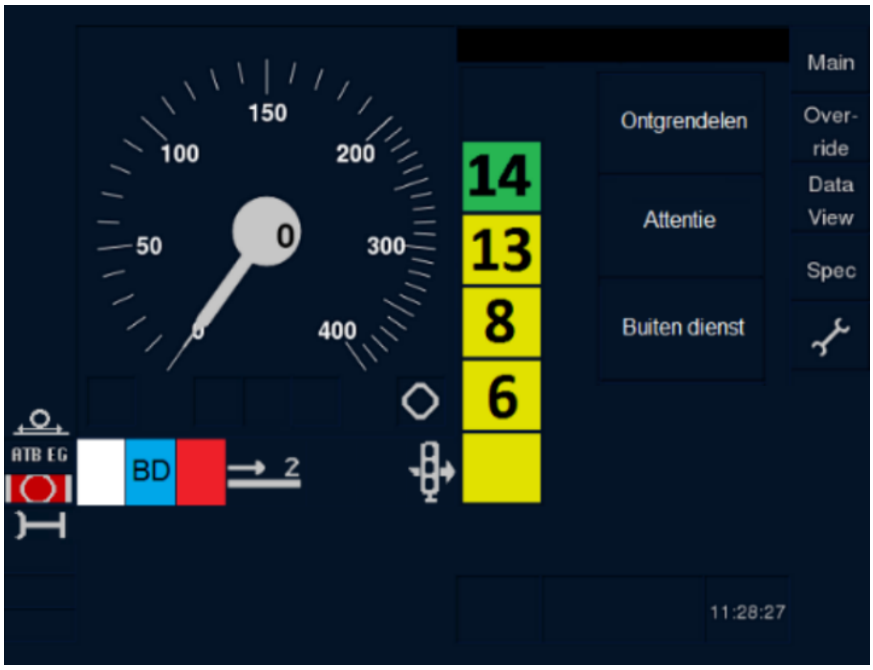
2.2 Train protection ATBVv

Text, STMA-25807 - ATBVv was introduced to reduce the risk concerning passing signals at danger. As ATBEG function doesn't know the distance to the next signal, trains will always be allowed by the ATBEG function to proceed at a certain speed (40km/h), independent of the ATBEG code in the track. This has led to a number of incidents were a train passed a signal at danger at low speed (<40km/h).
To protect trains against this danger a functionality (ATBVv) was developed (and meanwhile installed at the majority of the signals) to communicate the distance to a signal at danger (at 3m, 30m or 120m), using an active (not fail-safe) EM signal near the rails.
Trains are equipped with the functionality to detect and evaluate the information at a voluntary basis. However all available ATB on-board systems are equipped with the function. As the way-side equipment is not fail safe and the system only provides background protection without information to the driver (thus no misleading of the driver possible), also the on-board functionality only has to comply with an availability requirement (i.e. no safety requirements). The availability of the train borne equipment shall at least be comparable to the availability of the track side equipment, and is specified in [D1.4.2.2].

3 Train driver information

Text, STMA-75117 - The STM ATB is an ATB system to be used in combination with ETCS on-board. All information provided to the driver will be displayed at the ETCS display in the cabin. Configuration data concerning the train, like maximum speed, the type of train and the brake type, will be derived from the configuration stored in the ETCS on-board system and ETCS data entered by the driver.

Definition, STMA-75116 - Figure: ATBEG information displayed to the driver via the ETCS display (example).
A part of the information shown is ETCS information which can also be relevant during ATBEG operation, e.g. the speed dial, transition information, RBC connection, override status and buttons. From the latter the Override button has a double function, it can be used as override in ETCS area's and to override ATBVv monitoring.



note: The layout above is an example based on a touch screen implementation specified by NS.
If a different set of requirements or if soft key technology is used, then it is the responsibility of the system integrator to adapt the vehicle specific user manual.
note: Only if the maximum speed can be guaranteed text will be displayed at the green cab signal.

Text, STMA-75213 - The different indicators and buttons shown in STMA-75116 - Figure: ATBEG information displayed to the driver via the ETCS display (example)... will be described below. For this purpose ATB specific icons and buttons, and ETCS information used during ATBEG operation is distinguished.

3.1 ATB specific icons, buttons and sounds

Text, STMA-75257 - The ATB specific icons and buttons shown in figure STMA-75116 are:

- The white, blue and red indicators (at the left hand side beneath the speed dial: ), also refered to as "white lamp", "blue lamp" and "red lamp"
- The yellow and green "cab signals" (vertically ordered at the right hand side of the speed dial)
  The highest speed will always be "green", while the lower speed signals are yellow.
- The number of possible speeds depends on the maximum speed.
  Only one of the cab signals will lit at the same time.
  Eventual numbers displayed at the "Cab Signals" indicate the maximum speed if the concerning "Cab Signal" is "on". The maximum speed is in those cases equal to 10 times the displayed number.
- The ATBEG buttons (vertically ordered at the right hand side of the cab signals):
  "Ontgrendelen", "Attentie" and "Buiten dienst"

3.1.1 White, blue and red indicators

Definition, STMA-75258 - White Lamp

The "White Lamp" indicator is shown if the ATBEG function is active and the ATBEG function is monitoring the maximum speed. Therefore in "Buiten Dienst mode" and during an intervention the "White Lamp" indicator is not shown. If the indicator is shown it can be "on" (light colour) or "off" (dark colour).
If shown, the "White Lamp" indicator is "on" if the driver operates the brakes sufficiently to avoid an intervention by the ATBEG system, and "off" if the driver doesn't operate the brakes sufficiently.

Definition, STMA-75216 - Blue Lamp

The "Blue Lamp" indicator is shown if the ATBEG function is active. If the indicator is shown it can be "on" (light colour) or "off" (dark colour).
If shown:

- The "Blue Lamp" indicator is "on" with text "BD", if the ATBEG is running in "Buiten Dienst mode"
- The "Blue Lamp" indicator is "on" with text "Vv", if the ATBVv function is overridden.
- The "Blue Lamp" indicator is "off" in all other cases.

Definition, STMA-75260 - Red Lamp

The "Red Lamp" indicator is shown if the ATBEG function is active. If the indicator is shown it can be "on" (light colour) or "off" (dark colour).
If shown:

- The "Red Lamp" indicator is "on" without text, in case of an intervention triggered by the ATBEG function.
- The "Red Lamp" indicator is "on" with text "Vv", in case of an intervention triggered by the ATBVv function.
- The "Red Lamp" indicator is "off" in all other cases.

Definition, STMA-80476 - Blue, red, white on/off icons (examples)

on off on off on off

3.1.2 Cab signals

Definition, STMA-75270 - Cab Signals

For each speed level which can be monitored by the ATBEG function for the vehicle in which the system is installed, one cab signal is shown. The cab signals are shown if the ATBEG function is active and the ATBEG system is not in "Buiten Dienst Mode".

If shown, one "Cab Signal" indicator will be "on" and the rest will be "off".

At all yellow "Cab Signal" indicators except the "Cab Signal" for the lowest speed level, the maximum speed is indicated at the "Cab Signal" indicator.

At the "Cab Signal" indicator corresponding to the highest speed ("Green") the maximum speed is not indicated.

Definition, STMA-80475 - cab signal icons: green, yellow on/off

(size and colors are examples)

on off on off

The size in this example is 56x50 pixels (WxH), the minimum size is 40x50

3.1.3 ATBEG buttons

Text, STMA-75272 -

There are three ATBEG buttons defined. In addition the ETCS override button can be used to override ATBVv. The three ATBEG buttons are:

Definition, STMA-75274 - The "Ontgrendel Knop" ("Ontgrendelen")

The "Ontgrendel Knop" is a button used to release the brakes at standstill after an ATBEG or ATBVv intervention

Definition, STMA-75275 - The "Attentie Knop" ("Attentie")

The "Attentie Knop" is a button used to leave the "Buiten Dienst Mode"

Definition, STMA-75273 - The "Buiten Dienst Knop" ("Buiten Dienst")

The "Buiten Dienst Knop" is a button used to enter "Buiten Dienst Mode" at standstill

Text, STMA-81136 - In addition two buttons are defined in the DMI configuration table, but not used:

- The override button: On request of the NS-drivers the ETCS override button and ATB override button are combined
- A test button, which is not necessary as all tests are performed automatically.

For completeness an icon can be assigned in the DMI to those two buttons.

Definition, STMA-80477 - button icons: attention, BD, override, release, test (examples)

3.1.4 Sounds

Definition, STMA-80473 - Sounds: BD_signal, Bel-damping, Gong, Losbel, gong-bell and Bell10s (examples)

3.2 ETCS information used during ATBEG operation

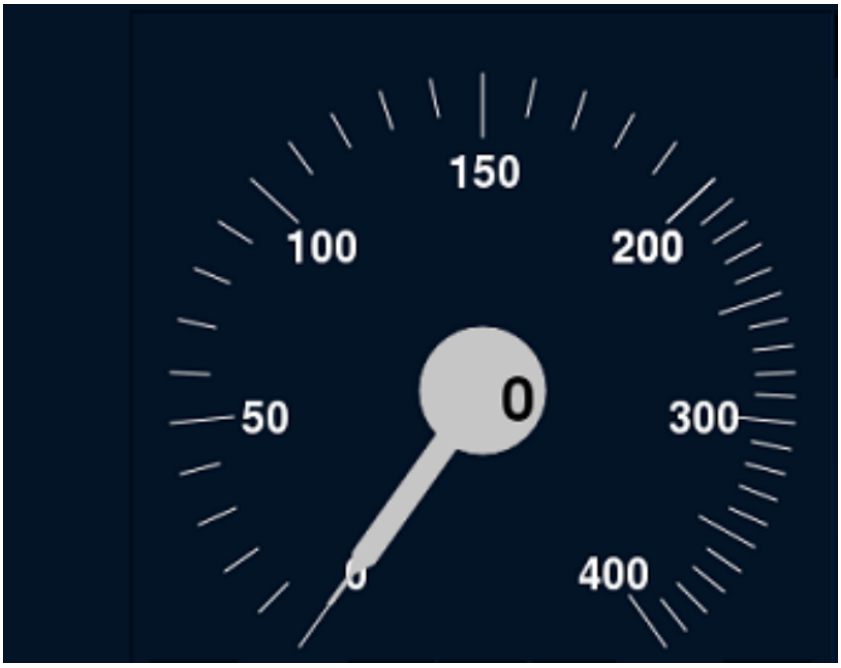
Text, STMA-75197 - A part of the information during ATBEG operation is provided by the ETCS on-board system and shall comply with the design given in document "ETCS Driver Machine Interface", reference: ERA_ERTMS_015560 v3.6.0. However compliance with this document is not relevant for the safe operation of the STM ATB, and outside the scope of this document. In case implementations deviate from the concerning document it is the responsibility of the system integrator to adapt this part in the vehicle specific ATBEG user manual.

Text, STMA-75208 - During ATBEG operation the standard ETCS speed dial is used for indication of the current speed of the train, see STMA-75204 - Figure: ETCS speed dial as used during ATBEG operation The range of the speed di...

3.2.1 Speed dial

Definition, STMA-75204 - Figure: ETCS speed dial as used during ATBEG operation

The range of the speed dial (400km/h in this example) is vehicle/customer specific.



3.2.2 ETCS mode indication

Text, STMA-75210 - The icon shown in STMA-75198 - Figure: Icon to indicate that a national system (ATB in the current case) is act... indicates that a national system is active. This icon is displayed at the right hand side beneath the speed dial (see figure STMA-75116).

If this icon is flashing yellow, then the driver shall acknowledge the STM ATBEG mode. The way this shall be done is to be described in the ETCS on-board user manual, i.e. out of scope for the STM ATBEG.

Definition, STMA-75198 - Figure: Icon to indicate that a national system (ATB in the current case) is active

Text, STMA-75211 - If the active national system is ATBEG, then this is indicated with the icon shown in STMA-75203 - Figure: Icon to indicate that the active function is ATBEG at the left side of the display beneath the speed dial (see figure STMA-75116).

Definition, STMA-75203 - Figure: Icon to indicate that the active function is ATBEG

3.2.3 ETCS service or emergency brake command indicator

Text, STMA-75214 - According to the standard ATBEG functionality a "red lamp" (indicator) is shown in case of an ATBEG intervention. In addition the standard icon indicating that the EB has been commanded by ETCS (in this case triggered by the STM ATB) will be shown, see STMA-75201 - Figure: Icon to indicate that the EB (emergency brake) has been commanded note:...

Definition, STMA-75201 - Figure: Icon to indicate that the EB (emergency brake) has been commanded

note: the icon can also be used to indicate an SB (service brake command), however the service brake is not used during

ATBEG operation.

3.2.4 ETCS overridden indicator

Text, STMA-75217 - In a specific state (standstill etc.) the driver can switch the ETCS on-board in "overridden state". In this state the driver can exceed a movement authority. The state is indicated by the icon shown in STMA-75199 - Figure: Icon to indicate that the override state is active. This applies for ETC....
The "overridden state" is also relevant for ATBVv. At the moment the ETCS "overridden state" is switched on, also the ATBVv state "overridden" will be activated. However the conditions for switching the state off again are different. Therefore the ETCS "overridden" indicator cannot be used to recognize that ATBVv is in "overridden state". For the latter purpose the "Blue Lamp" is used (STMA-75216 - Blue Lamp The "Blue Lamp" indicator is shown if the ATBEG function is active. If...).

Definition, STMA-75199 - Figure: Icon to indicate that the override state is active. This applies for ETCS. For the ATBVv override status another indicator is used (STMA-75216 - Blue Lamp The "Blue Lamp" indicator is shown if the ATBEG function is active. If...).

3.2.5 ETCS slippery track indicator

Text, STMA-75209 - Via the ETCS "Special" window (see button "spec", STMA-75256), the driver can switch on the "slippery track condition". Switching on this condition is out of the scope of the STM ATB en shall be described in the ETCS on-board user manual.
In case the "slippery track condition" has been set this is displayed to the driver using the icon shown in STMA-75205 - Figure: Icon for slippery track condition. If the condition is set, the driver shall take into account that the maximum braking deceleration may be limited. In addition the maximum deceleration for ATBVv braking curve monitoring is limited to 0.8m/s2.

Definition, STMA-75205 - Figure: Icon for slippery track condition

3.2.6 ETCS RBC-connection indicator

Text, STMA-75207 - The icon in STMA-75200 - Figure: Icon to indicate that a connection with the RBC is available is used to inform the driver that the system is connected with an RBC.

Definition, STMA-75200 - Figure: Icon to indicate that a connection with the RBC is available

3.2.7 ETCS level transition announcement

Text, STMA-75225 - When driving in ATBEG operation the icon shown in STMA-75202 - Figure: Icon used to announce a transition to ETCS level 2 will be displayed when approaching an ETCS level 2 area. This announcement and other level transition announcements are outside the scope of the STM ATB and shall be described in the ETCS on-board user manual.

Definition, STMA-75202 - Figure: Icon used to announce a transition to ETCS level 2

3.2.8 ETCS buttons

Text, STMA-75256 - During ATBEG operation a number of ETCS buttons are displayed. Those buttons are partly also relevant for the ATBEG+Vv function. In STMA-75206 - Figure: ETCS buttons displayed during ATBEG operation note: The buttons are disp... from left to right the purpose of the buttons is:

- Main: Opens the "Main" menu, only relevant for ETCS
- Override: Operating this button will, if the further conditions are fulfilled, start the "override status". This will also start the ATBVv overridden mode, to pass an ATBVv protected signal at danger.
- Data view: Shows the data entered by the driver. This is an ETCS specific function, however a part of the data is also used during ATBEG operation.
- Spec: Opens the "Special" window. The only button relevant for ATBEG operation in this window is the adhesion button.
- Settings: Opens the "settings" window. Settings are ETCS specific, e.g. used to set the language of the driver.

Definition, STMA-75206 - Figure: ETCS buttons displayed during ATBEG operation

note: The buttons are displayed here in horizontal ordening. This ordening is used in case of implementing a "soft key DMI". In the touch screen solution the buttons are shown ordered vertically at the right hand side of the screen.

4 Normal operation

Text, STMA-75297 - Normal operation of the STM ATB is triggered from the ETCS on-board, i.e. the ETCS on-board is started, after "opening the drivers desk" and after data entry the system will present the option to select "level NTC ATB". The STM ATB doesn't require specific data entry. The procedure to enter ETCS data and eventual data for further STMs shall be described in the ETCS on-board user manual.
How the driver shall "open the drivers desk" shall be described in the user manual concerning the vehicle ("vehicle user manual").

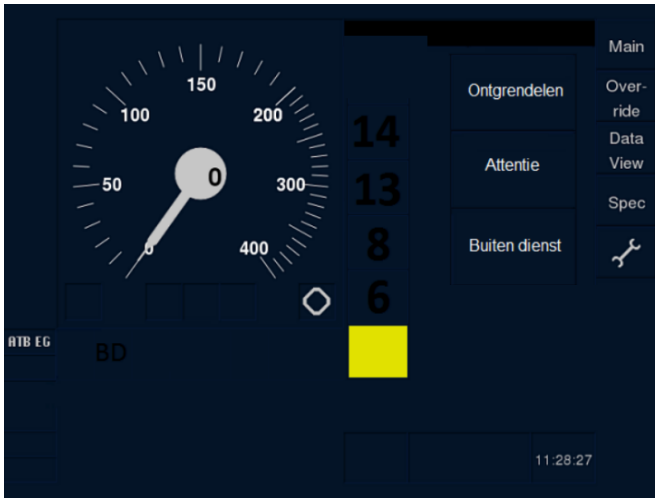
The STM ATB is installed behind a sealed circuit breaker, which can be deactivated/reactivated if required in specific circumstances. The operation of the circuit breaker is logged in the onboard Juridical Recorder. The location of the switch and the procedure for operation of the switch is vehicle specific and shall be described in the specific user manual by the system integrator.

4.1 System startup

Text, STMA-75301 - After "opening the drivers desk", "entering ETCS data" and "selecting level NTC ATB" the ATBEG indicators will appear at the ETCS display (see STMA-75298 - Figure: ETCS display after starting in "level NTC ATB" note: this example is bas...).

"level NTC ATB" may only be selected at standstill while the selected driving direction is "neutral.

Definition, STMA-75298 - Figure: ETCS display after starting in "level NTC ATB"
note: this example is based on a touch screen implementation as specified by NS (however the maximum speed is not according to this specification). The location of the information is vehicle/customer specific. This shall be adapted in the vehicle specific user manual.



Text, STMA-75300 - After selecting driving direction forward (see the "vehicle user manual") the cab signal will be adapted according to the ATBEG code present in the track. If the cab signal is different from "Yellow" the "Gong" will sound. The "Cab Signal" shown depends on the code in the track, the speed levels related to the concerning code and the maximum speed of the train (see examples in STMA-75299 - Figure: Examples with different "Cab Signals" note: Only if the maximum speed ca...).

Definition, STMA-75299 - Figure: Examples with different "Cab Signals"

note: Only if the maximum speed can be guaranteed text will be displayed at the green cab signal.

Text, STMA-75302 -

If the maximum speed cannot be guaranteed, no speed value in the green "Cab Signal" will be shown.
The speed value cannot be guaranteed if the braking percentage is not provide by the ETCS on-board (in packet STM-176), therefore the system integrator shall adapt the pictures and description if the braking percentage is not provided by the ETCS on-board.
Further the minimum to which the maximum speed may be limited based on the braking percentage is 100km/h. This to avoid strandings in tunnels. For poorly P-braked freight trains (< 72%) and for freight trains the actual maximum speed will be lower. Therefore for those trains, the maximum speed will never be displayed at the green "Cab Signal".

4.2 System operation

Text, STMA-75426 - If the STM ATB is activated ("Level NTC ATB") two functions are performed:

- The ATBEG speed monitoring according to the "Regeling Indienststelling Spoorvoertuigen", which is mandatory for trains operating in the Netherlands.
- The ATBVv distance monitoring according to the "ATBVv systeembeschrijving", which is optional for trains operating in the Netherlands.

The use of both functions is detailed below.

4.2.1 ATBEG

Text, STMA-75339 - During ATBEG operation the maximum speed is communicated via "Cab Signal" indicators (see S TMA-75116 - Figure: ATBEG information displayed to the driver via the ETCS display (example)...). If the speed level changes, another "Cab Signal" indicator will be "on" and the "Gong" will sound.

Text, STMA-75340 - If the driver has to brake according to the information provided by ATBEG, then an acoustical signal "rembel" will sound. The driver shall then operate the brake "sufficiently" or decrease the speed below the speed monitored, within a defined response time. The driver can recognize that the brakes are operated "sufficiently" from the "White Lamp" indicator which is "on" if the brakes are operated "sufficiently".

4.2.1.1 Ceiling speed monitoring

Text, STMA-75342 - If the speed indicated by the "Cab Signal" indicator is exceeded with some margin, the acoustical warning "rembel" will sound.
The margin in case of ceiling speed monitoring is ("ceiling speed margin"):

- 5km/h for passenger trains and
- 3km/h for freight

If the brake is not operated "sufficiently" and the speed is not reduced below the monitored speed level within 5s, then the emergency brake will be commanded ("ATBEG Intervention").

4.2.1.2 Speed monitoring after a maximum speed reduction

Text, STMA-75341 - If the maximum speed is reduced (normally when passing an outside signal) then the "Cab Signal" indicator corresponding to the new speed level will be switched "on", and an acoustical signal "Gong" is given.
In case the train speed exceeds the new speed level with some margin, while the driver is not yet braking "sufficiently" then the acoustical signal "Gong" will be followed by the acoustical signal "rembel".
The margin in case of speed reduction is ("speed reduction margin"):

- 5km/h for passenger trains and
- 12km/h for freight

Once the rembel sounds the driver should operate the brake "sufficiently" within approximately 2s, otherwise the emergency brake will be commanded ("ATBEG Intervention"), and the "Red Lamp" indicator will be switched "on".

Text, STMA-75343 - Once the new speed level plus "speed reduction margin" is reached while the driver is braking, an acoustical signal "losbel" is given to indicate that the brakes may be released.
After this indication the speed shall be reduced further to speed level plus "ceiling speed margin" within 20s, otherwise the acoustical signal "rembel" will sound again.If, in this case, the brake is not operated "sufficiently" and the speed is not reduced below the monitored speed level within 5s, then the emergency brake will be commanded. ("ATBEG intervention"), and the "Red Lamp" indicator will be switched "on".

4.2.1.3 Buiten Dienst

Text, STMA-75428 - At lines which are not equipped with ATBEG but which are part of the area where trains are operated in "level NTC ATB", the ATBEG function is switched in "Buiten Dienst Mode". This is done automatically when leaving the ATBEG area, indicated with a track side plate (see STMA-75429 - Figure: Track side sign to indicate that the ATBEG area is being exited.)
At the moment the ATBEG function is switched to "Buiten Dienst Mode" while driving, the "Cab Signal" indicators are no longer shown (also not "off"), the "Blue Lamp" indicator is switched on with text "BD" and the acoustical signal "Gong" will sound five times.

Definition, STMA-75429 - Figure: Track side sign to indicate that the ATBEG area is being exited.

Text, STMA-75431 - When starting the train in an "level NTC ATB" area, which is not equipped with ATBEG, the driver shall activate the "Buiten Dienst Mode" at standstill. This can be done by operating the "BD knop" (see STMA-75273) for at least 2s.
When starting the train in an "level NTC ATB" area with code75 in the track, then the system will start in "Buiten Dienst Mode" automatically.

Text, STMA-75432 - At standstill the "Buiten Dienst Mode" is left immediately if an ATBEG signal is found in the track.

Text, STMA-75433 - The "Buiten Dienst Mode" can also be left at standstill by operating the "Attentie Knop" (see STMA-75275) for at least 2s.

Text, STMA-75435 - Each transition from and to "Buiten Dienst Mode" at standstill is indicated by an acoustical signal "Gong".

Text, STMA-75436 - If an ATB equipped area is entered while the ATBEG function is in "Buiten Dienst Mode" then the driver shall operate the "Attentie Knop" (see STMA-75275) within 5 seconds before till 5 seconds after passing the sign marking the start of the ATBEG equipped area (STMA-75430 - Figure: Track side sign that an ATBEG area is entered.) . After the "Attention Button" is operated the "Blue Lamp" indicator will be switched "off".
As soon as the system has detected ATBEG code (after the "Attention Button" is operated) the "Cab Signal" indicators will be shown, with the "Cab Signal" indicator corresponding to the detected ATBEG code "on" and the other "Cab Signal" indicators "off". At the same moment the acoustical signal "Gong" will sound.
If the driver fails to operate the "Attentie Knop" within the correct time frame, or when no ATBEG code is detected while the "Attention Button" is operated, then the emergency brake will be commanded ("ATBEG Intervention"), and the "Red Lamp" indicator will be switched "on" (and "Blue Lamp" indicator "off").
If necessary the driver has to reactivate the "Buiten Dienst Mode") in that case after releasing the EB intervention at standstill.

Definition, STMA-75430 - Figure: Track side sign that an ATBEG area is entered.

4.2.1.4 ATBEG brake intervention

Text, STMA-75439 - If for any of the above described reasons the emergency brake is commanded ("ATBEG Intervention"), then the train will brake until standstill while the "Red Lamp" indicator is "on" and the "Cab Signal" indicators are shown.
Only when the train is at standstill the driver can release the emergency brake by operating the "Ontgrendel Knop" (see STMA-75274). After operating the "Ontgrendel Knop" the brakes are released, speed monitoring is active and operation can be continued.

4.2.2 ATBVv

4.2.2.1 Distance monitoring

Text, STMA-75397 - A number of signals at the Dutch rail network is equipped with ATBVv. In case the concerning signal is at danger, the STM ATB will guard the speed while approaching the signal during the last 120m in front of the signal, without giving any indication to the driver. If the speed is considered too high in comparison to the remaining distance the emergency brake will be commanded ("ATBVv intervention"), and the "Red Lamp" indicator will be switched "on" with the text "Vv".

4.2.2.2 Override

Text, STMA-75422 - In case permission is given to pass a signal at danger, while the signal is equipped with ATBVv, then the driver has to override the ATBVv monitoring in order to be able to pass the signal without intervention.
For this purpose the driver shall use the "ETCS override button" (STMA-75206 - Figure: ETCS buttons displayed during ATBEG operation note: The buttons are disp...). If this button is operated while the train is at standstill, then ATBVv monitoring is switched off for a distance of 200m.

Text, STMA-75423 - If the ATBVv monitoring is overridden, then the "Blue Lamp" indicator will be "on" with text "Vv"

Text, STMA-75421 - If the STM ATB receives information indicating that the signal is not at danger while the ATBVv monitoring is overridden, then the emergency brake will be commanded ("ATBVv intervention"), and the "Red Lamp" indicator will be switched "on" with the text "Vv".

4.2.2.3 ATBVv brake intervention

Text, STMA-75440 - If for any of the above described reasons the emergency brake is commanded ("ATBVv Intervention"), then the train will brake until standstill while the "Red Lamp" indicator is "on" with text Vv.
Only when the train is at standstill the driver can release the emergency brake by operating the "Ontgrendel Knop" (see STMA-75274). After operating the "Ontgrendel Knop" the brakes are released.
If the train has come to a standstill in front of the signal, then the monitoring of the distance to the signal is resumed.
If the train has passed the signal and/or the intervention was caused while ATBVv monitoring was overridden, then no monitoring is active after releasing the brakes.

4.3 Transitions

Text, STMA-75281 - Transitions from and to ATBEG area are controlled by the ETCS on-board, requirements concerning operation of the system during a transition shall be described in the ETCS on-board user manual.

4.4 System shutdown

Text, STMA-77408 - If the "cabin is closed", the STM ATB will be deactivated and the ETCS on-board is switched to stand-by mode. The way to proceed is managed by the ETCS on-board and shall be described in the ETCS on-board user manual.

The STM ATB is installed behind a sealed circuit breaker, which can be deactivated/reactivated if required in specific circumstances. The operation of the circuit breaker is logged in the onboard Juridical Recorder. As this is a vehicle specific implementation, the procedure according the operation of the circuit breaker shall be described in the vehicle specific user manual.

5 Abnormal operation

Text, STMA-75262 - "White Lamp" indicator is "on" while the brakes are not operated.
If the "White Lamp" indicator is "on" while the brakes are not operated, then the driver shall switch off the STM ATB as to be described in the vehicle specific user manual, and proceed operation at 80km/h up to reaching the first location where the train can be taken out of service. At that location the train shall be taken out of service.

Text, STMA-75268 - Unexpected "Cab Signal" Yellow (40km/h)
If "Cab Signal" Yellow (40km/h) icon is unexpectedly "on", thus while the line side signal aspect is "Yellow 6" or higher, then the driver shall report the location of occurrence.

Text, STMA-75267 - Unexpected "Cab Signal" different from Yellow (40km/h)
If a "Cab Signal" is shown which is not expected based on the outside signals, then the driver shall report the location. In case the fault is not due to a known infrastructure issue the train shall be taken out of service at the end station for investigation.
In case of a second "unexpected "Cab Signal" different from Yellow (40km/h)" at a different location, the driver shall switch off the STM ATB as to be described in the vehicle specific user manual, and proceed operation at 80km/h up to reaching the first location where the train can be taken out of service. At that location the train shall be taken out of service.

Text, STMA-75269 - "Cab Signal" indicators are not shown while ATBEG should be monitoring the speed.
If "Cab signal" indicators are not shown while ATBEG is active and the mode is different from "Buiten Dienst", this can be caused by a fault in the measurement of the track signals, the availability of the "Emergency Brake" or a problem concerning speed measurement.
If the "Cab Signal" indicators don't return at the display within 10s, then the driver shall restart the system or proceed operation at 80km/h up to reaching the first location where the train can be taken out of service. At that location the train shall be taken out of service, or the system shall be restarted. In the latter case the train may proceed if the "Cab Signals" are displayed again after restarting ATBEG operation. If not or if the "Cab Signal" indicators disappear a second time during one trip for more than 10s, then the train shall be taken out of service (at a feasible location which shall be reached at maximum 80km/h).

Text, STMA-75276 - The "White Lamp" indicator is not shown at the display.
If the "White Lamp" indicator is not shown at the display, thus not "on" nor "off", then this can be caused by a fault in the

circuits to detect brake operation.
In this state the STM ATB is not able to detect brake operation by the driver. Therefore a speed reduction shall be realized before reaching the signal where the speed reduction is announced (otherwise an inevidable EB intervention will be triggered). The driver shall restart the system or proceed up to a convenient location to take the train out of service. At that location the train shall be taken out of service or the system shall be restarted.
If the "White Lamp" indicator disappears a second time during one trip, then the train shall be taken out of service (at a feasible location).

Text, STMA-75277 - ATBEG "rembel" sounds below 40km/h (or 30km/h for trains with a braking percentage below 54%)

In case of a disturbing signal in the coil circuits (or in the rails) which could lead to not detecting and ATBVv signal, the lowest speed level monitored by ATBEG is lowered to 20km/h during 120m. The speed reduction is announced with an accoustical signal "Gong"
If a warning is given between 20km/h (+ ceiling speed margin) and 40kn/h (+ ceiling speed margin) this will be caused by this measure. The driver shall proceed at the reduced speed until the speed level is increased again to 40km/h or until an ATBEG code is detected. In both cases an acoustical signal "Gong" will be given.

Text, STMA-75279 - Failure of the STM ATB

In case of an STM ATB failure preventing the train from driving with ATBEG active, then the driver shall switch off the STM ATB as to be described in the vehicle specific user manual, and proceed operation at 80km/h up to reaching the first location where the train can be taken out of service. At that location the train shall be taken out of service.

Text, STMA-75282 - Level NTC ATB is not indicated as option at startup

If level NTC ATB is not presented at the ETCS DMI as an option after start-up, then either the STM ATB is switched off, or the STM ATB didn't pass the self test and didn't start. In such a case, if the train has to run at an ATBEG equipped line, the train shall be taken out of service (at a feasible location).