

	Technical Specification for the Verification and Inspection of Average Speed Control Devices	S/N	CNMV 205										
		Rev.	1										
<p>1. This technical specification is developed pursuant to the stipulations in Paragraph 2 of Articles 14 and Paragraph 2 of Articles 16 in the Weights and Measures Act.</p> <p>2. The date of promulgation, document number, date of enforcement and content of amendment are listed as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Rev.</th> <th style="text-align: center;">Date of Promulgation (Ching-Piao-Szu-Tsu)</th> <th style="text-align: center;">Document No.</th> <th style="text-align: center;">Date of Enforcement</th> <th style="text-align: center;">Content of Amendment</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2020-10-20</td> <td style="text-align: center;">No. 10940005770</td> <td style="text-align: center;">2021-01-01</td> <td></td> </tr> </tbody> </table> <p>3. This specification is formulated with reference to the following international regulations and specifications:</p> <ol style="list-style-type: none"> (1) The Speedmeter Handbook (Fourth Edition)—A Guide to Type Approval Procedures for Speedmeters Used for Road Traffic Law Enforcement in Great Britain, Publication No. 15/05. (2) Guide for The Operational Use of Speed and Red-Light Offence Detection Technology, National Police Chiefs’ Council, Version 1.2.1 July 2016. (3) PTB-A 12.03, “Messgrößen im öffentlichen Verkehr zur amtlichen Überwachung Verkehrs-Kontrollsysteme (stationär, transportabel)”, October 2019. (4) PTB-A 18.13, “Messgeräte im Straßenverkehr Video-Uhren”, December 2014. (5) 941.261, “Verordnung des EJPD über Messmittel für Geschwindigkeitskontrollen und Rotlichtüberwachungen im Strassenverkehr (Geschwindigkeitsmessmittel-Verordnung)”, November 2008. (6) “Concept Regeling Voorschriften Meetmiddelen Politie”, August 2010. 				Rev.	Date of Promulgation (Ching-Piao-Szu-Tsu)	Document No.	Date of Enforcement	Content of Amendment	1	2020-10-20	No. 10940005770	2021-01-01	
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NO GUARANTEE ON THE TRANSLATION

In case of discrepancies between the English translation and Chinese text, the Chinese text shall govern.

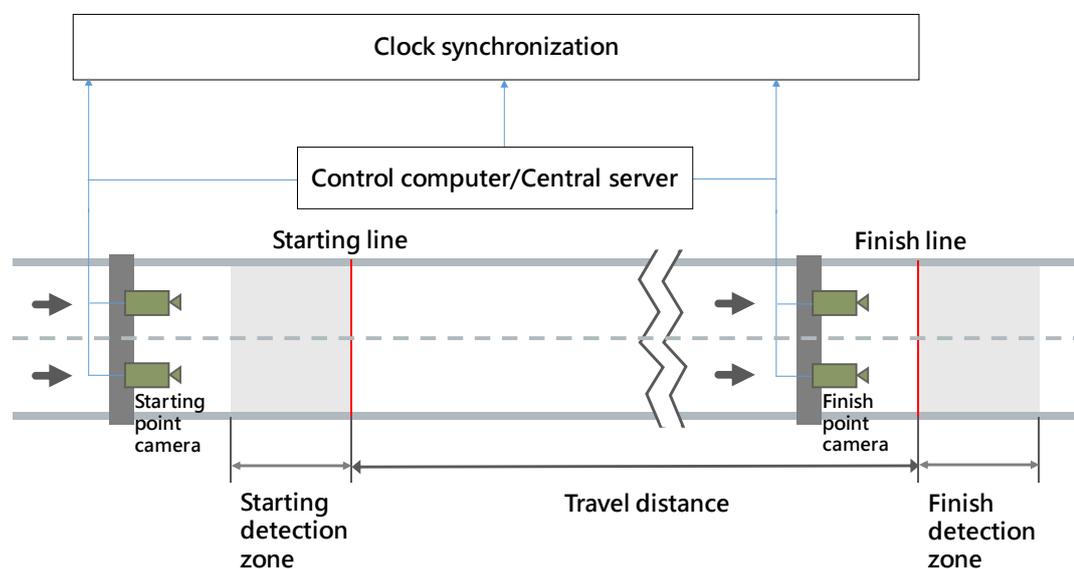
1. Scope

- 1.1 This technical specification applies to stationary Average Speed Control Devices (hereinafter referred to as ASC devices) for road traffic law enforcement.
- 1.2 The ASC devices are able to automatically measure and record the travel time of a vehicle passing through two fixed detection zones, and calculate the average speed of the vehicle.
- 1.3 This technical specification does not apply to ASC devices for road section with travel distances less than 200 times the length of either detection zone.

2. Definition

2.1 Average Speed Control Device

A device composed of both starting point and finish point cameras, and a control computer or central server. A feasible structure of the device is illustrated in the attached diagram. The basic operation mode is that when a vehicle passes through the detection zone, the system records the image of the vehicle passing the detection zone by taking photos or videos, and superimposes a time stamp of the time when the vehicle passes through the detection zone on the image, and calculates the section average speed of the vehicle according to the travel distance of the road section and the travel time obtained by the time stamps on the recorded images.



Schematic of a feasible structure of the ASC device.

2.2 Detection zone

The designated road area immediately before the starting line or after the finish line in the road section, for the camera to detect and record the time when the vehicle enters the start line or leaves the finish line.

2.3 Travel distance

The distance of a vehicle travels from the starting line to the finish line of the road section, in unit of meter (m). The lengths of the starting detection zone and the finish detection zone do not count into this distance.

2.4 Travel time

The time of the vehicle travels from the starting detection zone to the finish detection zone of the road section, in unit of 10 millisecond (10 ms).

2.5 Time stamp

A sequence of characters or coded information used to identify the time of the recorded event. See section 5.6 for the time stamp format to be used by the ASC device.

2.6 Section average speed

The speed obtained by dividing the travel distance by the travel time of the road section, in kilometers per hour (km/h), and the calculation result is unconditionally rounded down after the decimal point.

2.7 Clock synchronization

To coordinate two or more system clocks to make the time of each clock consistent through network, satellite, or other far end or near end communication technologies.

3. General requirement

3.1 The applicant shall provide the following supporting documents when applying for verification:

- (1) Evidentiary documents of the device for use in road traffic law enforcement.
- (2) The user manual, product specification and equipment list, in which the electrical specifications, system architecture, measurement method, measurement range, range of detection zones (including the position and dimension of the starting detection zone, starting line, finish line and finish detection zone), travel distance, clock synchronization mechanism between related devices in the system, error range, fault warning, automatic error detection, debugging function, and assembly structure diagram and related technical documents of complete product (including starting point camera, finish point camera, and control computer or central server, etc.).
- (3) Relevant equipment or modules used in the ASC device that are subject to mandatory inspection of the Commodity Inspection Act or the Telecommunications Act shall comply with the relevant regulations prescribed by the competent authority, and evidentiary documents of compliance with the regulations shall be provided.
- (4) The actual image records of the starting detection zone and finish detection zone of each lane obtained by the ASC device (covering all lanes).
- (5) The electronic file of the time calibration event record of each equipment for 5 consecutive days within 1 month before the application for verification, the record shall be able to prove that the ASC device meets the clock

synchronization requirements of this technical specification.

- (6) Evidentiary document of travel distance of the road section announced or issued by highway or police authorities.

3.2 When performing the verification of the ASC device on the site where the device is installed, the applicant shall apply to the police department for implementing necessary traffic control to ensure the smooth progress of the verification operation and the safety of relevant staff.

3.3 The user shall pay attention to the following:

- (1) The ASC device shall be installed and used correctly according to the original equipment manufacturer manual.
- (2) After the ASC device has passed verification, the software settings of the control computer or central server and the camera and other components shall not be changed that cause altering of measurement accuracy of the ASC device.
- (3) The user shall be responsible for repairs, maintenance and regular inspections to maintain the stability of the ASC device.
- (4) If the detection zone is moved or changed due to road construction, natural disasters such as typhoon or earthquake, or other factors, the user shall readjust the ASC device and apply for re-verification.
- (5) If the equipment in the ASC device is adjusted, repaired, or moved that may affect the measurement results of the device, the user shall apply for re-verification.
- (6) The integrity and authenticity of archived images and related records used as evidence of road traffic law enforcement shall be ensured, and the image content and measurement data shall be protected from unauthorized access, use, control, disclosure, damage, alteration, destruction and other infringement, the relevant requirements shall comply with the Cyber Security Management Act.

4. Verification and inspection equipment

4.1 Assessment reports covering system traceability and uncertainty evaluation for the verification and inspection equipment shall be provided. Verification and inspection equipment shall include:

- (1) Vehicle-mounted timing equipment: Timing resolution ≤ 1 ms, measurement range is equal to or more than 999 seconds. The time indicators of the timing equipment shall use fonts of appropriate size so that they can be clearly identified and interpreted from the images taken by the ASC device.
- (2) Vehicle-mounted Vehicle speed measurement equipment: vehicle speed measurement resolution ≤ 1 km/h, measurement range is 30 km/h ~ 200 km/h.

5. Structure of ASC device

5.1 The ASC device shall be marked with the following information that are clearly

identifiable and indelible on prominent positions of the central server and control computer:

- (1) Manufacturer's name or trademark.
- (2) Product model and serial number.
- (3) Software version and date.
- (4) The product model and serial number of cameras, network communication equipment, power supplies and other equipment.
- (5) Power supply specifications.

5.2 The operation of all switches, connectors, buttons and knobs on the ASC device's control computer shall be flexible and reliable. There shall be no improper contact, looseness, jamming, etc. that affect the operation.

5.3 ASC device shall be clearly marked on the road surface with marking lines or marks at the installation site to indicate the range of starting detection zone and the finish detection zone, and the starting line and the finish line between which the travel distance is measured.

5.4 The clock synchronization of the main equipment in the ASC device shall be continuous implemented. The implementation period of clock synchronization shall not exceed 5 minutes, and the difference between the time of each main equipment and the national standard time shall not exceed 1 second.

5.5 Timing debugging:

- (1) In addition to the main travel time measurement equipment, the ASC device shall be furnished with a second set (or more) of travel time measurement equipment for error detection of measurement results.
- (2) The clock or time stamp system of the second set of travel time measurement equipment shall be independent of the clock or time stamp system of the main travel time measurement equipment.
- (3) The function of the ASC device's main travel time measurement equipment shall be checked by the second set of travel time measurement equipment. The checking method is to continuously compare the measurement results of the main equipment and the second set of equipment, and give the deviation between the two measurement results.
- (4) When the deviation between the measurement results of the main travel time equipment and the second set of travel time equipment is greater than 200 milliseconds (200 ms) within 1 minute, the ASC device shall automatically generate an alarm signal, and the image taken before the deviation is eliminated and normal condition is restored shall not be used as evidence of traffic law violation.

5.6 The images taken by the ASC device shall clearly show the shooting time, license plate number, road marking lines and marks. The shooting time shall include at least the information of year, month, day, hour, minute, second, 100 milliseconds, and 10 milliseconds.

5.7 The image records for evidence of traffic law violation generated by the ASC

device shall at least clearly display the information of ASC device serial number, camera serial number, travel distance, travel time, section average speed, and measurement location.

5.8 The speed value displayed by the ASC device shall be in kilometers per hour (km/h).

5.9 The speed calculation resolution of the ASC device shall be ≤ 1 km/h.

6. Verification procedure

6.1 The structure and specifications of the ASC device shall be verified according to the following items:

- (1) Structure inspection.
- (2) Travel time verification.
- (3) Average speed verification.

6.2 Travel time verification

- (1) Install the vehicle-mounted timing equipment on the test vehicle, and adjust the display screen of the timing equipment so that it can be clearly displayed in the image recorded by the camera of the ASC device.
- (2) Drive the test vehicle on each lane passing through the starting detection zone and the finish detection zone. The test vehicle shall be maintained in the middle of the lane during the verification process.
- (3) The speed of the test vehicle is based on the maximum speed limit specified on the road section. However, the speed may be increased or decreased according to the actual road conditions. The average speed of the test vehicle shall be within the specified maximum speed limit ± 10 km/h.
- (4) The reference travel time is defined as: the difference between the displayed values of the vehicle-mounted timing equipment in the image of the test vehicle taken by the ASC device at the starting and finish detection zones.
- (5) The relative error of travel time is defined as: $(\text{the travel time measured by the ASC device} - \text{reference travel time}) / \text{reference travel time}$.
- (6) Travel time verification shall be performed for at least 3 times, and at least one measurement shall be performed on each lane.

6.3 Average speed verification

- (1) Install the vehicle-mounted vehicle speed measurement equipment on the test vehicle, and drive the test vehicle on each lane to pass the starting detection zone and the finish detection zone. The test vehicle shall be maintained in the middle of the lane during the verification process.
- (2) The speed of the test vehicle is based on the maximum speed limit specified for the road section. However, the speed may be increased or decreased according to the actual road conditions. The average speed of the test vehicle shall be within the specified maximum speed limit ± 10 km/h.
- (3) The reference average speed is defined as: the average value calculated from the continuously speed measurements of the test vehicle passing from the

starting detection zone to the finish detection zone with the vehicle-mounted vehicle speed measurement equipment.

- (4) The average speed error is defined as: the average speed measured by the ASC device - the reference average speed.
- (5) The relative average speed error is defined as: (The average speed measured by the ASC device - reference average speed)/reference average speed.
- (6) The average speed verification shall be performed for at least 3 times, and at least one measurement shall be performed on each lane.

6.4 In the process of travel time verification and average speed verification, if the ASC device has abnormal function or detection failure which consequently results in the failure of obtaining the verification result for more than 3 times, the subsequent verification procedure shall be terminated and the verification result shall be determined as failed.

7. Maximum permissible errors for verification

7.1 The maximum permissible errors (MPE) for the verification of the ASC device are the following:

- (1) The MPE of the travel time: $\pm 1 \%$.
- (2) The MPE of the average speed: when the average speed is equal to or less than 100 km/h, the positive MPE is 2 km/h, and the negative MPE is 4 km/h; when the average speed is greater than 100 km/h, the positive MPE is 2 %, negative MPE is 4 %.

8. Verification mark and certificate

8.1 The validity period of the verification is starting from the date on which the verification mark is attached, to one year after the first day of the month following the month of the date on which the verification mark is attached.

8.2 The verification mark shall be attached on a prominent position on the shell of the central server and control computer of the ASC device.

8.3 After the ASC device has passed verification, a verification certificate shall be issued.

9. Inspection procedure

9.1 The inspection may be implemented in accordance with all or part of the verification items in this technical specification.

9.2 The MPE for the inspection is the same as the MPE for the verification.