



Payments (PRESTO) Add Value Machine (AVM) Standard

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Preface

This is the first edition of the *Payments (PRESTO): Add Value Machine (AVM) Standard*. This standard replaces the previous internal document titled *AVM*.

This document is for use by designers, consultants and contractors involved with the planning, design and construction of projects that include these devices. It is intended for suitably qualified professionals that are familiar with the subject matter. This document is not a substitute for all applicable local codes, standards and manuals.

The *Payments (PRESTO): Add Value Machine (AVM) Standard* was developed by the Operational Readiness Payments Office, Payments (PRESTO) Division, Metrolinx.

Suggestions for revision or improvements, including a description of the proposed change along with information on the background of the application and any other useful rationale or justification, can be sent to the Metrolinx Payments (PRESTO) Office, Attention: Director Operational Readiness Payments. The Director of Operational Readiness Payments ultimately authorizes the changes. Proposals for revisions or improvements to include your name, company affiliation (if applicable), email address, and phone number.

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1. Scope

1.1 Overview

- 1.1.1 This standard sets out the requirements during planning, design, construction, and maintenance.
- 1.1.2 This PRESTO device is for adding value (funds) to a PRESTO card. This device only accepts credit and debit cards. In other contexts, this device is referred to as an Add Value Machine (AVM) or, in some cases, a Self-Serve Reload Machine (SSRM). For the purposes of this document, AVM will be used.

1.2 Purpose

- 1.2.1 The key objective of this standard is to provide accurate details and specifications to plan the design and execution of AVM PRESTO device infrastructure by providing installation details, civil works requirements, and power and data specifications.
- 1.2.2 Compliance with this standard during planning, design, construction, and maintenance will ensure that Work performed aligns with the holistic approach for Payments (PRESTO) elsewhere in the network.
- 1.2.3 The Contracted Party shall perform all Work in accordance with the requirements of this standard and shall support the Metrolinx commitment to always take safety seriously.

2. Definitions, Abbreviations, Interpretation, Codes, and Standards

2.1 Definitions

- 2.1.1 Capitalized terms used in this standard shall have the meanings prescribed in Table 1.

Table 1: Definitions

Term	Definition
Contracted Party	Means the party responsible for the performance of the Work of the project assignment and under contract or agreement with Metrolinx (e.g. Consultant, Contractor, Designer, Design-Builder, Project Co, Technical Advisor, or Developer).

Term	Definition
	Within this standard, wherever the term Contracted Party is used, but there is no Contracted Party, the same item shall apply directly to Metrolinx.
GO Station	Means any GO Transit station.
Metrolinx	Means Metrolinx, a non-share capital corporation continued under the <i>Metrolinx Act</i> , S.O. 2006, c.16 and a Crown Agency in accordance with the <i>Crown Agency Act</i> , R.S.O. 1990, c.48 and includes all operating divisions.
Metrolinx Standards	Means standards developed by Metrolinx as defined in Section 2.4.1.
PRESTO	Means Metrolinx's Regional Fare Card System
Transit Safety	Means the division within Metrolinx that is accountable for the enforcement of the Trespass to Property Act.
Work	Means the design, construction, maintenance, installation, testing, commissioning, and completion of the scope of the project assignment.

2.2 Abbreviations

2.2.1 The abbreviations used in this standard shall have the meaning prescribed in Table 2.

Table 2: Abbreviations

Abbreviation	Definition
ANSI	American National Standards Institute
AVM	Add Value Machine
AWG	American Wire Gauge
CMR	Communications Multipurpose Cable, Riser
I&IT	Innovation & Information Technology
ITFS	Information Technology Field Services
LAN	Local Area Network

Abbreviation	Definition
N/A	Not Applicable
NEMA Box	National Electrical Manufacturer Association Box
SSRM	Self-Serve Reload Machine
TIA	Telecommunications Industry Association
U/UTP	Unshielded Twisted Pair
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus

2.3 Interpretation

2.3.1 This standard shall be interpreted according to the following provisions, unless the context requires a different meaning:

- a) Unless the context specifically states otherwise, all obligations included herein are the responsibility of the Contracted Party to undertake.

2.4 Codes and Standards

2.4.1 All systems, equipment and materials required for Work relating to this standard, shall be provided in accordance with the most current edition of applicable federal, provincial, municipal, and industry codes, standards, and guidelines, including:

- a) Metrolinx/GO Transit standards and guidelines (the "Metrolinx Standards"), including all latest version documents on the GO Site, including amendments and bulletins (http://www.gosite.ca/engineering_public/);
- b) National Building Code of Canada (NRCC 51690), latest version;
- c) Ontario Provincial Standard Specifications (OPSS), latest version;
- d) Ontario Provincial Standard Drawings (OPSD), latest version;
- e) Canadian General Standards Board (CGSB), latest version;
- f) Canadian Standards Association (CSA), latest version;
- g) American National Standards Institute (ANSI), latest version; and
- h) Telecommunications Industry Association (TIA), latest version.

3. Installation Parameters

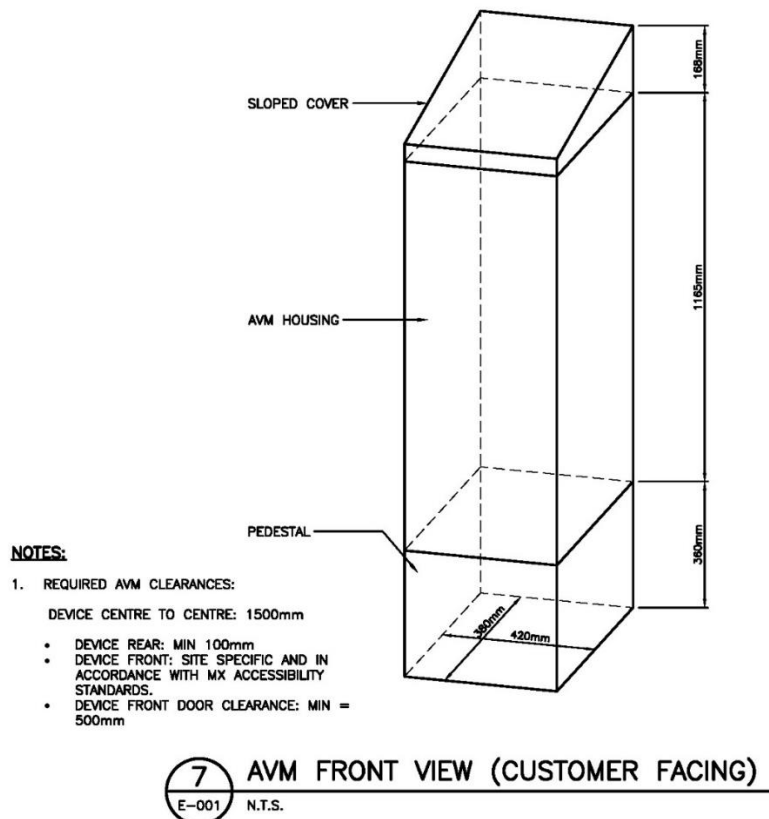
3.1 Dimensions, Weight, and Clearances

3.1.1 Table 3 shows the AVM's dimensional parameters, weight, and clearances.

Table 3: Dimension and Weight Parameters

	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
AVM Housing+Pedestal	1525	420	380	119
AVM Housing+Pedestal+Lid	1693	420	380	125

Figure 1: AVM Dimensions & Clearances



3.2 AVM Infrastructure Requirements

3.2.1 For GO Transit and UP Express sites, infrastructure requirements for the AVM are as follows.

3.2.1.1 Power and Data Conduits

- a) The AVM is designed to accept power and data conduits either through the device base or through the device back.

See Figure 2 for details.

3.2.1.2 Mounting Surface

- a) The AVM shall be installed on a solid surface. The recommended is a concrete surface, flushed to the top of the adjacent surface where the customers will be standing or locating the mobility devices while using the AVM
- b) The ground shall be level and horizontal to allow the system to be affixed correctly.

See Figure 2 for details.

3.2.1.3 Power Requirements

The AVM requires the following power specifications:

- a) 100V AC / 20 A breaker;
- b) Two (2) meters of slack shall be provided within the device;
- c) Recommended power cable shall be 12 AWG (max 8 AWG) wire gauge at terminal block;
- d) Wire gauge transitions shall not occur within the device. Transition of the wire gauge will need to occur at the closest junction box to the device, not in the device;
- e) Provide dedicated neutral per device/circuit, not shared;
- f) Provide dedicated ground per device/circuit, not shared; and
- g) Conduit size to be determined by Civil Works Contractor.

3.2.1.4 Data Requirements

The AVM requires two CAT 6 cables with the following specifications:

- a) CAT 6 cables run between demarcation and device/equipment shall not exceed 90 m (300 ft), within conduit;
- b) Cables shall be dedicated and not shared;
- c) RJ45 connector type shall be provided, per Metrolinx I&IT standards; and

d) CAT 6 data cable type shall be provided, per Metrolinx I&IT standards.

Note: *Current Metrolinx I&IT standards supersede all wiring requirements stated within this document. Refer to the latest Metrolinx I&IT standards.*

3.3 Fully Installed AVM

3.3.1 The fully installed AVM is shown in Figure 3.

Figure 3: Fully Installed AVM



3.4 GO AVM Requirements

Table 4: GO AVM Requirements

Demarcation to Device	Requirements
Description	<p>PRESTO Add Value Machine (AVM) is used for loading value to PRESTO cards.</p> <p>Power and data connections shall meet or exceed Metrolinx I&IT / ITFS Standards. Consult the following documents:</p> <ol style="list-style-type: none"> 1. The latest version of the <i>Innovation & Information Technology (I&IT) Telecommunication and Systems Standard</i> for details; and 2. <i>Electrical Identification and Nomenclature Specification</i>.
Wire Run for Power	<p>Pull power wires through completed power conduits from the power panel to the AVM installation location. The wire shall be pulled in power conduits from UPS backed-up power panels in the communications rooms or mini-hub rooms.</p>
Power Wires Requirement (rating)	<p>750 watts maximum; dedicated 20A breaker/circuit;</p> <p>Recommende power supply cable shall be 12 AWG (max 8 AWG) at the terminal block. 8 AWG;</p> <p>Wire gauge transitions shall not occur within the device. Transition of the wire gauge shall occur at the closest junction box to the device, not in the device;</p> <p>Provide dedicated neutral per device/circuit, not shared; and</p> <p>Provide dedicated ground per device/circuit.</p>
Termination of Power Wires	<p>Marretted ends: Protect all terminations from exposure, protected with an enclosure if necessary.</p> <p>For safety and security:</p> <ol style="list-style-type: none"> 1. Label Power Distribution Panels ~6 inches from both wire ends; Labeling (Denote "Denote "PV 1" for PRESTO Vending 1). 2. Wires shall be protected with an enclosure if necessary.
Cables Run for Comms	<p>Pull comms cables (two cables per device) through a conduit from the demarcation to the device/equipment end.</p> <p>CAT 6 between demarcation and device/equipment shall not exceed 90 m (300 ft) (within conduit run, not including service coil); cabling shall be dedicated and not shared.</p>

	<p>Two CAT 6 cable runs per device (One for the main PRESTO connection / One for the payment terminal connection).</p> <p>Note: Current Metrolinx I&IT standards supersede all wiring requirements stated within this document. Refer to the latest Metrolinx I&IT standards.</p>
UPS	<p>AVM devices are not equipped with an internal UPS.</p> <p>The internal backup battery shall only allow devices to close current transaction and perform a scheduled shutdown.</p> <p>All AVM shall be connected to UPS backed-up power panels in communication rooms.</p> <p>Consult the latest version of the Innovation & Information Technology (I&IT) Telecommunication and Systems Standard for details.</p>
Comms Cable (CAT 6)	<p>CMR Category 6 U/UTP, four twisted pair 22-24 AWG.</p> <p>All communication cables shall comply with ANSI/TIA-568-B.2 Comms connectivity with ends terminated.</p> <p>Protect all terminations from exposure, covered with an enclosure if necessary.</p> <p>Mini-hub rooms shall be used to span beyond the 90 m limitations of the CAT 6.</p> <p>Power and data connections shall meet or exceed Metrolinx I&IT / ITFS Standards.</p> <p>Consult the latest version of the Innovation & Information (I&IT) Telecommunication and Systems Standard for details.</p> <p>Refer to Section 7.4.3, Metrolinx Innovation & Information (I&IT) Telecommunication and Systems Standards.</p>
Termination of Comms Cables	<p>CAT 6 termination type at device end: Male RJ45 Rev-connects or equivalent.</p> <p>CAT 6 termination type at patch panel: Female RJ45 Keystone punched down.</p>
Wireless Solution	<p>If a LAN connection is unavailable, AVM shall be equipped with a wireless cellular (LTE) router.</p> <p>Consult with ITFS and the PRESTO team when planning for installation at such locations.</p>
Service Coil	<p>Power: 2-3 m (7-9 ft)</p> <p>Comms: 2-3 m (7-9 ft)</p>

Readiness: Comms Cable (Cable Integrity/Continuity)	Fluke metre report or equivalent to validate comms continuity. Test results shall be provided to Metrolinx I&IT for review.
Data Cable Labeling	For safety and security: <ol style="list-style-type: none">1. Label network patch panels ~6 inches from both cable ends; Labeling (Denote "AVM1" for PRESTO AVM 1 and "AVM1-Moneris" for secondary data cable for Moneris)2. Cables shall be protected with an enclosure if necessary. Post-installation data cables shall be updated with device identification (ID) at the device level and in the patch panel.

4. Handover and Commissioning

4.1 Handover and Commissioning

- 4.1.1 The final handover of all new assets to Metrolinx shall follow the Rail Corridor Asset Handover Protocol.

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