

**Construction Specification For
Pedestrian Crossover (PXO) Equipment**

Table of Contents

TTS 812.100.01	SCOPE	3
TTS 812.100.02	REFERENCES	3
TTS 812.100.03	DEFINITIONS – Not Used.....	3
TTS 812.100.04	SUBMISSION AND DESIGN REQUIREMENTS – Not Used	3
TTS 812.100.05	MATERIALS.....	3
TTS 812.100.05.01	General.....	3
TTS 812.100.05.02	LED PXO Fixtures.....	4
TTS 812.100.05.03	Flashing Beacons	4
TTS 812.100.05.04	Pedestrian Pushbuttons	4
TTS 812.100.05.05	Hanger Assembly.....	4
TTS 812.100.05.06	Static Signage.....	4
TTS 812.100.05.07	Enclosure.....	4
TTS 812.100.05.08	Flashing Mechanism	5
TTS 812.100.05.09	Cables	5
TTS 812.100.05.10	Conduits and Fittings	5
TTS 812.100.05.11	Grounding.....	5
TTS 812.100.05.12	Tape	5
TTS 812.100.05.13	Wire Connectors	5
TTS 812.100.05.14	Junction Boxes and Fittings	5
TTS 812.100.05.15	Strapping	5
TTS 812.100.05.16	Grommets	5
TTS 812.100.06	EQUIPMENT – Not Used	6
TTS 812.100.07	CONSTRUCTION	6
TTS 812.100.07.01	Mast Arm Installation.....	6
TTS 812.100.07.02	Aerial Installation.....	6
TTS 812.100.07.03	Wiring Apertures	6
TTS 812.100.07.04	Conduit Systems.....	6
TTS 812.100.07.05	Wiring	6
TTS 812.100.07.06	Grounding.....	7
TTS 812.100.07.07	Static Signage.....	7
TTS 812.100.07.08	Equipment Modification.....	7
TTS 812.100.07.09	Quality Control	7
TTS 812.100.08	QUALITY ASSURANCE.....	7

TTS 812.100.09	MEASUREMENT OF PAYMENT	8
TTS 812.100.09.01	Actual Measurement.....	8
TTS 812.100.09.01.01	Pedestrian Crossover	8
TTS 812.100.09.02	Plan Quantity Measurement	8
TTS 812.100.10	BASIS OF PAYMENT	8
TTS 812.100.10.01	Pedestrian Crossover – Item	8

TTS 812.100.01 SCOPE

This specification covers the requirements for the installation of Pedestrian Crossover (PXO) equipment, including flashing beacons, flashing mechanisms/timers, beacon mounting arms, LED fixtures, pedestrian pushbuttons, traffic signs and sign mounting bracket, junction boxes, wiring, at the crossing.

TTS 812.100.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

City of Toronto Standard Specifications

TS 801	Electrical Work - General
TS 804	Cables
TTS 809.210	Material Specification for Traffic Signal Controller and Cabinet TS2 Type 1
TTS 810.100	Construction Specification for Traffic Actuation Equipment
TTS 811.100	Construction Specification for Flashing Beacons
TTS 812.200	LED Pedestrian Crossover (PXO) Fixtures Material
TTS 813.100	Grounding and Bonding
TTS 815.100	Construction Specification for The Removal of Electrical Equipment

City of Toronto Standard Drawings

TTD 812.010	Mounting Brackets for Split Pedestrian Cross-Over Installation
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Canadian Standards Association

C22.2 No. 38	Thermoset – Insulated Wires and Cables
C22.2 No. 45.2-08 (R2013)	Electrical Rigid Metal Conduit
C22.2 No. 65-13	Wire Connectors
C22.2 No. 84 – 95 (R2004)	Incandescent Lamps
C22.2 No. 85-14	Rigid PVC Boxes and Fittings
C22.2 No. 197-M1983 (R2013)	PVC Insulating Tape
C22.2 No. 211.2-M1984 (R2021)	Rigid PVC (Unplasticized) Conduit
C22.2 No. 239	Control and Instrumentation Cables
C57-16	Electric Power Connectors for Use in Overhead Line Conductors

US Federal Highway Administration

MUTCD	Manual on Uniform Traffic Control Devices
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TTS 812.100.03 DEFINITIONS – Not Used

TTS 812.100.04 SUBMISSION AND DESIGN REQUIREMENTS – Not Used

TTS 812.100.05 MATERIALS

TTS 812.100.05.01 General

The PXO system shall be manually activated by a pushbutton.

The flashing beacons shall be activated simultaneously within 1 second of pushbutton activation. Pressing the pushbutton within the flashing cycle shall add another flashing cycle to the current one.

TTS 812.100.05.02 LED PXO Fixtures

PXO fixtures shall be according to TTS 812.200.

TTS 812.100.05.03 Flashing Beacons

Flashing beacons shall be according to TTS 811.100.

TTS 812.100.05.04 Pedestrian Pushbuttons

Pedestrian pushbuttons shall be according to TTS 810.100.

TTS 812.100.05.05 Hanger Assembly

The hanger assembly for the mast arm mounting of the internally illuminated pedestrian crossover sign and the flasher beacons shall be composed of U-bolts and custom brackets as shown on TTD 812.010.

For aerial mounting, the internally illuminated pedestrian crossover sign and the flasher beacons shall be suspended on the slack span wire with trunnion type suspension clamp. The clamp shall be made of ductile iron with galvanized steel nuts and bolts.

TTS 812.100.05.06 Static Signage

When indicated in the Contract, all static signs required for installation on the mast arms are to be provided by the City's sign shop. The Contractor shall submit the list of all static signs required by the Contract to the Contract Administrator for fabrication.

The Contractor shall provide all necessary mounting hardware for all the static sign installations.

TTS 812.100.05.07 Enclosure

Equipment enclosure shall aluminum in construction, be pole mounted type, rated NEMA 3R or better with forward facing access door.

Conduit knockouts along with the accompanying conduit, conduit fittings and wiring systems shall be provided by the Contractor.

The enclosure shall be equipped with a keyed lock according to TS 809.210.

The enclosure shall come complete with manufacturer provided pole mounting kit.

The enclosure shall be as described elsewhere in this document and shall be of size to accommodate all required equipment.

TTS 812.100.05.08 Flashing Mechanism

The flashing mechanism shall be capable of driving the flashing beacons with wigwag and MUTCD compliant 0.5 second on/0.5 second off flashing patterns.

TTS 812.100.05.09 Cables

Low-voltage multiconductor cables shall be according to CAN/CSA C22.2 No. 239.

Low-voltage single conductor cables shall be type RWU90 according to CSA C22.2 No. 38.

Conductors shall be insulated stranded copper and be according to CAN/CSA C22.2 No. 239.

TTS 812.100.05.10 Conduits and Fittings

Rigid PVC conduit and fittings for the installation of pole-mounted equipment shall be according to CSA C22.2 No. 211.2.

TTS 812.100.05.11 Grounding

Grounding shall be according to TTS 813.100

TTS 812.100.05.12 Tape

Electrical insulating tape shall meet the requirements of CSA C22.2 No. 197-M1983 (R2003), rated for -18°C to 90°C use, 600V.

TTS 812.100.05.13 Wire Connectors

Wire connectors shall be of the insulated wing nut vibration proof spring type and shall meet the requirements of CSA C22.2 No. 65.

TTS 812.100.05.14 Junction Boxes and Fittings

PVC junction boxes and fittings shall be according to CAN/CSA C22.2 No. 85.

TTS 812.100.05.15 Strapping

Stainless steel strapping and buckles shall have a minimum ultimate strength of 4.5 kN.

TTS 812.100.05.16 Grommets

Grommets shall be rubber or neoprene sized to suit the aperture metal thickness and cable diameter.

TTS 812.100.06 EQUIPMENT – Not Used

TTS 812.100.07 CONSTRUCTION

TTS 812.100.07.01 Mast Arm Installation

The internally illuminated pedestrian crossover fixture of split pedestrian crossover installation shall be as specified in the Contract Drawings.

The flashing beacons shall be installed 300 mm from either side of the illuminated pedestrian crossover fixture. The flashing beacons shall be aligned facing the direction of approaching traffic.

Both the illuminated pedestrian crossover fixture and the flashing beacons shall be supported on the mast arm using offset hanger brackets specified in this Document.

TTS 812.100.07.02 Aerial Installation

The Contractor shall install all equipment and fittings, hardware, junction boxes and accessories necessary for the mounting of equipment on aerial messenger cable systems. All compression units, locknuts and fitting hardware shall be securely tightened to prevent shifting of equipment by wind.

Both the illuminated pedestrian crossover fixture and the flashing beacons shall be supported on the span wire using clamps, bull ring and eyebolts.

TTS 812.100.07.03 Wiring Apertures

Wiring apertures shall be drilled in metal poles as required. Apertures shall be de-burred and painted with grey zinc rich paint. Rubber grommets shall be installed after paint is dry.

TTS 812.100.07.04 Conduit Systems

Where pedestrian crossover signal devices are to be installed on poles and mast arms, the Contractor shall install conduit systems inclusive of junction boxes and all necessary fittings and hardware. Conduit shall be installed along the centre of the arm using stainless steel strapping at 1.5 m maximum spacing. Conduits shall be kept free of kinks or scorch marks.

TTS 812.100.07.05 Wiring

Wiring shall be installed from the pedestrian crossover fixtures and flashers to either the pole handhole or the pole mounted junction box. A minimum length of 600 mm of riser cable shall be coiled and secured inside pole handholes. Drip loops shall be left on all external cable. Cable shall be protected with rigid PVC conduit where slack lengths of more than 450 mm are externally exposed. Aerial cable from the junction box to the pedestrian cross over assembly shall be installed in accordance with the requirements of TS 804.

Riser cables shall be connected to terminal blocks. Lampholder leads shall be disconnected from internal terminal strips in the flashing or pedestrian crossover fixture housing and connected to riser cables with insulated wingnut vibration proof spring connectors. All insulated spring connectors shall be held in place with three half wraps of electrical vinyl tape. Upon completion of connections, all conductors shall be neatly bundled together and secured with four wraps of electrical vinyl tape.

TTS 812.100.07.06 Grounding

All metal parts of pedestrian crossover assembly shall be grounded in accordance with the requirements of TTS 813.100.

Grounding shall be done with the use of the designated spare conductor in the riser cable, connected securely to the ground terminal at the pole ground stud or the system ground wire in junction boxes. Ground system on TTC poles shall not be used.

TTS 812.100.07.07 Static Signage

When required, all static signs shall be installed on the mast arms as shown in the Contract documents.

All static signs shall be mounted only with mounting hardware recommended by the City sign shop.

TTS 812.100.07.08 Equipment Modification

When required, removal of existing equipment shall be done in accordance with the requirements of TTS 815.100 and TS 801. Installation of new, refurbished or modified equipment shall be done in accordance with the requirements for installation of the particular items of equipment as described herein.

TTS 812.100.07.09 Quality Control

The Contractor shall locate, space and aim flashing beacons and internally illuminated fixtures.

TTS 812.100.08 QUALITY ASSURANCE

The Contractor shall perform all tests on wiring of equipment in accordance with the requirements in TS 804.

The Contractor shall perform all tests on grounding of equipment in accordance with the requirements in TTS 813.100.

Equipment and Materials, as supplied by Contractor, are subject to inspection by the Contract Administrator prior to installation.

TTS 812.100.09 MEASUREMENT OF PAYMENT

TTS 812.100.09.01 Actual Measurement

TTS 812.100.09.01.01 Pedestrian Crossover

For measurement purposes, a count shall be made of the number of pedestrian crossovers installed.

TTS 812.100.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

TTS 812.100.10 BASIS OF PAYMENT

TTS 812.100.10.01 Pedestrian Crossover – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the Work.