NORTH AMERICA TRAFFIC™

WORLD LEADER IN TRAFFIC CONTROL SYSTEMS

PTL 2.4x

Portable Traffic Signal - Technical Specifications

ISO 9001:2008

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Signal Controller Hardware

Each signal controller shall be capable of providing the following feedback information to the user:

- Audible low battery alarm sounds when voltage drops below predetermined level
- Audible feedback when buttons are depressed
- The battery voltage reading of all signal trailers in use
- Controller menu displays the following:
    - Signal status
    - Cycle time countdown
    - Battery voltage
    - Actuation status
    - Time of Day Plan
    - Radio communication
    - System Faults

Each signal controller shall meet the following operational requirements:

- Certified as meeting the NEMA TS-2 Environmental Standards
- Rated for temperatures of -40°C to +85°C (-40°F to +185°F)
- A 3 inch x 4 inch (7.62 cm x 10.16 cm) backlit LCD display
- Housed in a lockable, steel cabinet
- Capable of connection to external malfunction management unit and transfer flasher relay hardware
- Two (2) vehicle detection/actuation inputs
- Emergency vehicle pre-emption input
- Two (2) railroad pre-emption inputs
- Hardwire communication connection capabilities (optional hardware required)
- Remote monitoring capabilities by means of cellular or satellite communications
- Interface capabilities with TS1/TS2 controllers (with additional equipment)
- Operation of one (1) to eight (8) signal trailers on a jobsite
- Activation of advanced warning signals (optional hardware required)
- Plug and play installation

Signal Controller Software

Each signal controller shall have operating software capable of the following:

- Programming of the signal controller without the use of an external interface (i.e. micro terminal, laptop computer)
- Signal controller designation (i.e. Primary, Secondary 1, Secondary 2, etc.) occurs within the software, allowing for the flexibility to assign the designation to any signal controller
- Internal conflict monitoring continually checks for data corruption, communication failures and conflicting signals
- User selectable operating modes of:
    - Fixed time
    - Manual
    - Traffic Actuated

- Programmable signal timing of (one second increments):
    - Red: 1 to 600 seconds
    - Amber: 3 to 10 seconds
    - Green (min): 1 to 300 seconds
    - Green (max): 1 to 300 seconds
- Adjustable green extension times of 3 to 15 seconds
- Cycle time calculator functionality to determine appropriate red, green and amber timing based on distance between stop locations, the posted speed limit and vehicle count per day as entered by the operator
- User selectable traffic volume settings of light, moderate and heavy to modify the green time 'on the fly'
- Six (6) time of day plans based on time of day and day of week
- Turn phase functionality
- User selectable default modes of Solid or Flash red
- Operation in flash amber mode
- Manual override of fixed time operation at the signal controller or by means of wireless hand held radio remote. Manual operation shall not allow the user to interrupt the all red clearance time
- Quick setup by means of user selectable predefined work zone layouts
- Password protection

Radio Communication Systems

The radio communication system shall be capable of operating in the following manner:

- Operational distance of up to one (1) mile (1.6 kilometers) between signal trailers
- A minimum of seven (7) programmable operating addresses (transmitter frequencies)
- Spread spectrum frequency hopping to reduce interference

The radio communication system hardware shall consist of the following:

- High gain, 7 dB antenna
- Radio transceiver rated to operate in environments up to 90% humidity in temperatures ranging from -40°C to +85°C (-40°F to +185°F)
- Components certified as compliant with FCC (Part 15, Subpart C, Section 15.247 Frequency Hopping Spread Spectrum Operating in 902-928 MHz Band)

Signal Heads and Display Requirements

The signal head displays shall consist of the following:

LED Lamps

- Signal lamp comprised of Light Emitting Diodes (LED)
- 12" in diameter (300 mm)
- High flux, 'incandescent look' lens
- 12 Volt input
- Meet the ITE VTCSH Light Emitting Diode (LED) Vehicle Signal Supplement 2005 standards
- Certified as compliant with FCC (47 CFR, Part 15:2006 15.109, Class A)

- Life expectancy of 100,000 hours
- A rear-facing 4 inch (100 mm) amber LED lamp mounted on the signal. Rear-facing lamp behavior must be displayed as:
    - Flashing = Phase status is GREEN
    - Solid = Phase status is RED

Signal Lamp Housing

- Three section, consisting of Red, Green and Amber signal lamps
- ITE certified polycarbonate housing
- Aluminum back plate (back board)
- Ball cap visors, extending over each LED lamp by 10 inches (25.4 cm)

Signal Display Operational Requirements

The signal head displays shall be configured as per the following standards and requirements:

- Meet the physical display and operational requirements as outlined in Part IV of the Manual on Uniform Traffic Control Devices (MUTCD) 2009
- Dual signal head configuration (designated Head 1 and Head 2) mounted on each signal trailer
- Signal heads rotate 180 degrees
- Head 1 on horizontal signal post can be extended an additional 44 inches (111.76 cm) over laneway by way of an electric actuator

The signal trailer shall be capable of accommodating both of the following signal head placements with corresponding measurements:

- Standard Heads (High-Low Configuration)
    - Center of the Upper Signal (Head 1) when extended, measured from the nearest fender is 12 feet (3.66 meters)
    - Height of Upper Signal (Head 1) measured from the surface of the roadway is 17 feet (5.18 meters) minimum, 19 feet (5.79 meters) maximum
    - Height of Lower Signal (Head 2) measured from surface of roadway shoulder to the bottom of the signal housing is 9 feet (2.74 meters)
- Raised Heads (High-High Configuration)
    - Center of Head 1 when fully extended, measured from the nearest fender is 13.5 feet (4.11 meters)
    - Center of Head 1 when fully extended to center of Head 2 is 10 feet (3.05 meters)
    - Height of Head 1 and Head 2 measured from the surface of the roadway to the bottom of the signal housing is 17 feet (5.18 meters) minimum, 19 feet (5.79 meters) maximum

Power Systems

The power supply system shall consist of the following:

Batteries

- Twelve (12), 6 Volt deep cycle batteries with 1,392 Amp hours of storage at 12 VDC supply (available upgrade to sixteen (16) battery configuration with 1,856 Amp hours of storage)
- Autonomy (twenty-four (24) hours per day use without solar assistance):
    - 16 battery configuration: thirty (30) days
    - 12 battery configuration: twenty-four (24) days
- Housed in a lockable, steel box and seated on a rubber mat
- Secured with steel hold-downs to eliminate movement during travel
- Anticorrosion spray applied to terminal posts

Battery Charger

- 75 Amp smart charger
- External, corrosion proof plug for connection to a 120 VAC source
- In-line surge protection

Solar Array

- 396 Watt solar array with rotation range of 180 degrees and a tilt range of 0 to 60 degrees
- Panels welded to the mounting bracket for theft prevention
- Panel mounting bracket is secured to the trailer by way of anti-theft mechanism
- Housed in anodized aluminum frame
- UL1703, IEC 61215, VDE Certification
- Manufactured under ISO9001 and ISO14001 standards
- Tolerance +10% /-5%
- Maximum Power Voltage 18 Volts
- Maximum Power Current 22.0 Amps
- Open Circuit Voltage 20.3 Volts
- Short-Circuit Current 24.0 Amps
- Loss of output is 10% or less within 12 years and less than 25% within 25 years

Wiring

All wiring and connection points on the signal trailer shall meet the following standards and requirements:

- Wires meet applicable SAE, UL and ITE standards
- Wire protection - Wire Loom 100% of length, Metal conduit - 90%
- Wire connectors meet standards for applicable UL standards
- Terminal blocks coated to prevent corrosion
- Installation procedures follow ISO 9001 quality guidelines

Hand Held Radio Remote Control and Manual Operation

The wireless hand held radio remote shall have the following physical and operational attributes:

- Three color coded buttons:

    - RED – All stop
    - GREEN – Phase 1 green activation
    - BLACK – Phase 2 green activation
- Expiration of the 'all red' clearance time before a green phase command is recognized and accepted
- Two (2) second button delay to prevent accidental activation
- A red LED indicator light confirms receipt of command
- Weighs less than 0.5 lbs. (227 grams)
- Powered by four (4) AA batteries that power the unit for a minimum of six (6) months with daily use
- Splash resistant (to water)
- Includes a nylon pouch with a belt clip and spare AA batteries

Trailer Structure

Frame

The trailer frame shall be fabricated using the following parts and processes:

- 3 inch x 3 inch, $^1/_4$ inch gauge steel tongue
- 6 inch, $^1/_4$ inch gauge steel channel front and back bumpers
- 12 inch, $^1/_4$ inch gauge steel channel side rails
- 2 inch x 6 inch, $^1/_4$ inch gauge steel vertical light post support uprights
- 6 inch diameter, $^1/_4$ inch gauge aluminum vertical light post
- Welding performed and inspected by welders, under ISO 9001 quality guidelines
- Safety redundancy at pivot points with through stainless steel rod and bearing block assemblies
- Removable tongue with two (2) locking points
- Four (4) flat-mount screw jacks to level and stabilize, with minimum 7,000 lbs. (3,175.15 kg) lift capacity per jack
- 2 inch class I and II ball coupler
- $^1/_4$ inch, high test grade safety chains
- #10 Dexter Torsion bar suspension axle
- ST205/75R15 tires
- Electric brakes
- Walk-on aluminum fenders with grit tape

The trailer frame shall comply with the following operational requirements:

- Wind load rating of 90 mph (144.84 km/h)
- Maximum assembled weight of 3,000 lbs (1,360.78 kg)
- 2 inch (5.08 cm) red and white retro-reflective tape around perimeter of the frame
- Brake, turn and marker lights conform to US DOT regulations and Canadian transportation regulations

Light Post Lift System

The signal light post lift system shall consist of the following parts and capabilities:

- Maintenance-free electric winch
- High-test steel cable
- Three (3) snatch block pulleys in-line
- Maximum lift rating of 3,000 lbs. (1,360.78 kg)
- Motor protected with auto reset breaker inside motor housing
- Weather resistant enclosure and seals

Powder Coat and Steel Preparation

The powder coat process and materials shall comply with the following:

- Shot blasting preparation
- Dry-off and cure oven
- Powder coating procedures comply with ASTM B117 specifications for resistance to salt air environment
- 'North America Traffic' FHWA safety orange powder color

Dimensions

The trailer frame shall conform to the following dimensions:

- Length
  - Operating (tongue removed): 11.58 feet (3.53 meters)
  - Stowed: 14.83 feet (4.52 meters)
- Width
  - Operating: 7.08 feet (2.16 meters)
  - Stowed: 7.08 feet (2.16 meters)
- Height
  - Operating: 21.42 feet to 23.42 feet (6.53 meters to 7.14 meters)
  - Stowed: 7.83 feet (2.39 meters)

Optional Equipment

If peripheral equipment is required, the following shall be used:

Remote Monitoring Systems

Cellular/GPS

- Digital cellular response system for use anywhere that has cellular reception
- Communicates system faults to four (4) cell phone numbers via text message and four (4) email addresses
- GPS system allows for asset location tracking and geo-fencing via secured website
- Remotely monitor battery bank voltage

Satellite

- Satellite based response system for use anywhere in the world, specifically in remote areas that do not have cellular coverage

- Communicates system faults to four (4) cell phone numbers via text message and four (4) email addresses
- GPS system allows for asset location tracking
- Remotely monitor battery bank voltage

Vehicle Detection

Microwave Traffic Sensors

- MS-Sedco model TC-26B
- User adjustable range and delay settings
- Detection range of up to 250 feet (76.2 meters)
- Approach or depart detection selection
- Detects vehicle movement as low as 1 mph (1.6 km/h)
- Vehicle extension/passage times of 3 to 15 seconds

Video Traffic Detection

- Traficam Systems
- Camera housing ratings of IP67, UV resistant, shock and vibration compliant with NEMA II specifications
- Configuration via dedicated software on portable PC
- USB connectivity
- Up to eight (8) direction sensitive vehicle presence detection zones
- Multiple direction sensitive detection zones and detection outputs

Emergency Vehicle Preemption

Strobe Detection

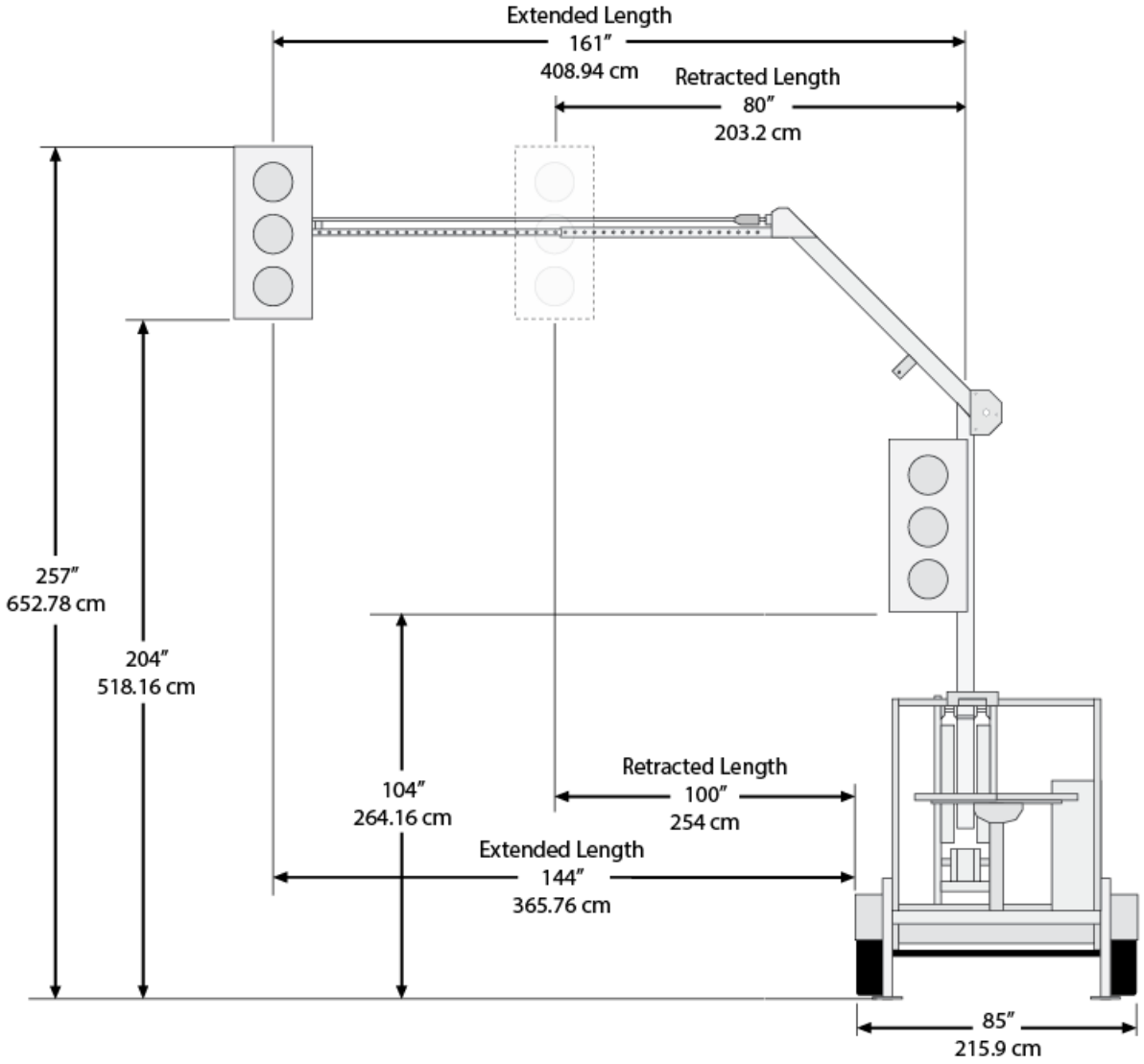
- Tomar Electronics model Strobecom II
- Detects emergency vehicles outfitted with optical signal emitters
- Allows emergency vehicles faster response times in time-critical situations
- Interfaces with the TOMAR model 780–1228–PRE or 3M OPTICOM® traffic preemption optical signal emitters

Siren Detection

- Traffic Systems model Sonem 2000
- Proprietary, sound-based siren detection of approaching emergency vehicles
- Detects ‘Class A’ sirens (hi-lo, wail and yelp)
- Siren profiling to determine if the siren meets the requirements for "Class A", Federal Regulations and States Statutes
- Activates 4 inch (10.16 cm), flashing white floodlight to notify emergency vehicles of detection

Drawings

High – Low Signal Head Configuration



High – High Signal Head Configuration