

URBAN ASSAULT COURSE (UAC) DOWNRANGE POWER & DATA DISTRIBUTION

Function: This section shall explain in general terms the basic design requirements for the UAC downrange power and data distribution required to control range targetry and its associated equipment.

UAC General Summary: Stations 1-4 shall be powered individually from a dedicated load center. Targetry for stations 1, 2, and 4 shall be provided without control network. The target emplacements in station 3 shall be “daisy-chained” or serially connected with the power and network data cables originating from the station control shed and continuing from emplacement to emplacement until they reach the façade. If any segment length of communication cable between adjacent target emplacements, or the control shed and the nearest target emplacement is greater than 90m (295 ft.), then fiber optic cable must be used instead of copper cable due to signal loss. Each station of the UAC shall have the capability to operate independently and concurrently. All target outlets shall have weatherproof covers and shall maintain a weatherproof integrity while the target power cord is connected.

A network connection from the UAC to installation backbone is not required. A network connection between the Operations/Storage building and training stations is not required. Video collection is also not a requirement in the UAC.

Site Power Summary: Primary power must be installed from five feet outside the range flagpole to a main pad-mounted transformer located inside the Range Operations and Control Area (ROCA) near the Operations/Storage building. Primary power may be overhead or underground depending on site conditions, and coordination with the primary power utility is necessary. All power distribution beyond the main pad-mounted transformer and throughout the training stations shall be installed underground. Where the site layout permits; the designer may elect to combine transformers to feed multiple training stations from one transformer. 120/240V, single-phase power shall be fed underground from the pad-mounted transformer to the Operations/Storage power panel. Each of stations 1-4 shall have a loadcenter, with integral transient voltage surge suppression, mounted on or near the training station location. The loadcenter shall feed the respective station targets with 120/240V. The size of the secondary power cables depends on the number of targets served, the circuit voltage drop, and the circuit protective device rating. Operating voltage at the most distant emplacement should be no less than 95 percent of the supplying transformer’s secondary voltage. The control shed in station 3 shall have a 120V maintenance receptacle.

Power Requirements: Electrical power distribution shall conform to Technical Manual (TM) 5-811-1, NFPA 70 and applicable local codes. Primary power to the site may be three-phase or single-phase depending on power load requirements and site conditions. The voltage supplied must be maintained within 5% at a frequency of 60Hz, +/-0.5; the design agency shall verify the power supply for each site.

Data Summary: Training station 3 targets are controlled via an Ethernet-protocol-based network utilizing an armored cable that is either a fiber optic cable, or a standard Category 5e (or better) shielded twisted pair (STP). The type of cable required is dependant on the length of the data cable. The cable length criteria are provided in the Data Requirements table below. The target control cabling shall be installed underground in the same trench with the target power cable conduits. Provide surge protection for both ends of all copper data cables in each emplacement, the control shed and the facade. All target outlets should have weatherproof covers and should be weatherproof while the target is connected. Data is not required on station 1, 2, and 4.

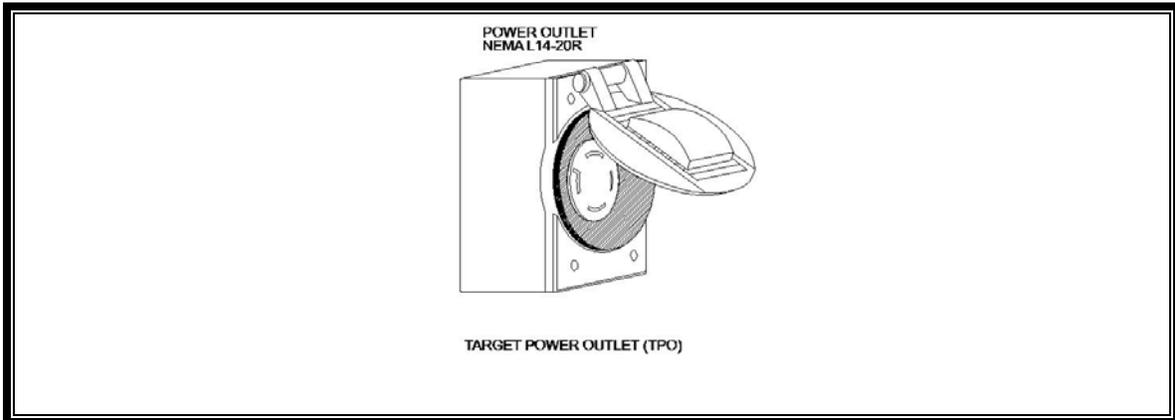
The Ethernet-protocol based network in station 3 is locally controlled through the control shed. Data cables will terminate in Master Target Data Panels (MTDP) in all emplacements, the façade and the control shed. The OPA provided control system for Urban Assault Course training station 3 does not support the use of the smaller Target Data Panels (TDP). Contrary to the criteria for other ranges, all SIT emplacements shall utilize MTDPs regardless of the cable type that is used at each emplacement.

Data Requirements:

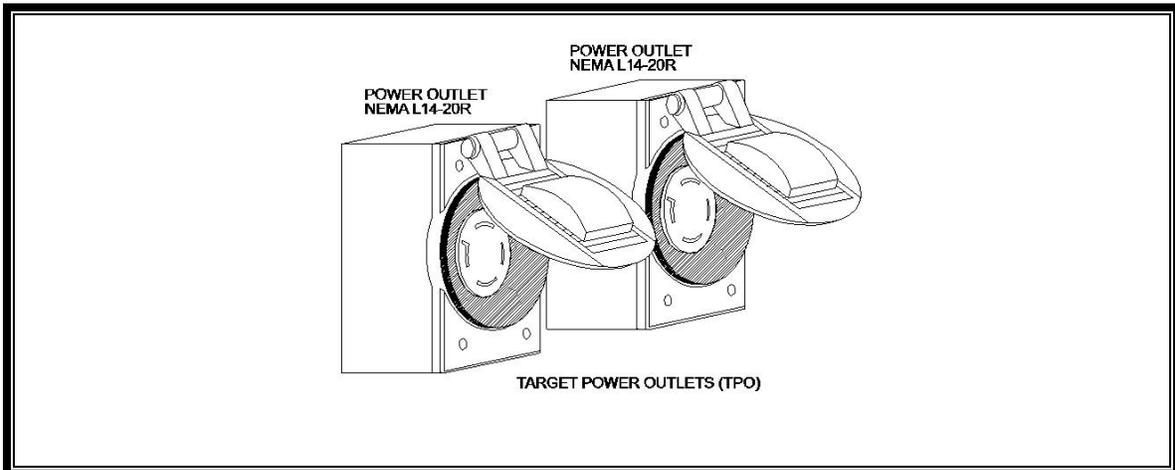
DISTANCES	MEDIUM	SPEED	BANDWIDTH	WAVELENGTH/ FREQUENCY
Over 90m	Singlemode Fiber Optic Cable	Minimum 10Mbps Maximum Unlimited	Unlimited	1310nm to 1550nm
90m & under	Category 5e or better Cable	Minimum 10Mbps	200Mhz	200Mhz

Training Building Target Outlets: Each target location inside training buildings will have power outlets for target power, but data will not be provided for these targets. The target power outlet shall be a NEMA L14-20R outlet. Maximum of four single target outlets can be fed from one 120/240V, 20Amp circuit. All target outlets shall be mounted at a minimum 2134mm (7 ft) A.F.F. to the bottom of the outlet box. Conduits shall not be installed on the interior walls below 2134mm (7 ft) A.F.F. but are allowed to be placed on the exterior walls if necessary. Minimize the use of plywood walls to mount outlets and conduit so that plywood walls can easily be maintained and replaced. Target outlets can be either single or double in their configuration with single being the standard (See Representative Target Outlet Drawings in this document).

Targetry Interface Requirements:



Representative Single Target Outlet (Not to Scale)



Representative Double Target Outlet (Not to Scale)

TARGET POWER RECEPTACLE	CAT 5E CABLE CONNECTORS	FIBER OPTIC CABLE CONNECTORS
NEMA L14-20R	RJ-45	Type "SC"

SIT Emplacement Target Interface Specifics



Representative Reactive and Non-Precision Targets

Control Shed: The control shed shall contain an MTDP to terminate the data cable(s) that runs to station 3 targets. The MTDP shall be constructed to same requirements as a standard target MTDP. The OPA funded instrumentation contractor will provide networking equipment in the MTDP and provide for data connectivity to a laptop computer utilized in the shed to control station 3 training scenarios. A 120 V duplex receptacle with a weather proof cover shall be installed above the counter in the control shed. Lighting shall be provided in the control shed to allow for night time use of the control shed. During development of construction documents, coordination must be done with installation range control to verify that night time training will be conducted which would require the installation of additional red lights in the control shed. All electrical devices and components installed in the control shed shall be suitable for installation in damp locations. See UAC station 3 layout drawing for more information on the control shed.

Design Details: See the Layout Details for UAC stations and the Civil Details/Electrical Details for the SIT emplacement, Double SIT emplacement, Façade, and the MTDP in the Appendix of this document.

Design Examples and Requirements:

Station #1-Individual and Team Trainer. See drawing layout for targetry power receptacles. All target outlets shall be mounted at a minimum 2134mm (7 ft) A.F.F. to the bottom of the outlet box. Conduits shall not be installed on the interior walls below 2134mm (7 ft) A.F.F. but are allowed to be placed on the exterior walls if necessary. One 120-volt Ground Fault Circuit Interrupter (GFCI) maintenance

receptacle shall be provided per training room with weatherproof covers. Data outlets are not required for targets on this station.

Station #2-Squad & Platoon Task-Technique. See drawing layout for targetry power receptacles. All target outlets shall be mounted at a minimum 2134mm (7 ft) A.F.F. to the bottom of the outlet box. Conduits shall not be installed on the interior building walls below 2134mm (7 ft) A.F.F., but are allowed on the exterior walls, excluding the center “alley” of the interior training building area. Two 120-volt Ground Fault Circuit Interrupter (GFCI) maintenance receptacles shall be provided per building and per floor with weatherproof covers. Data outlets are not required for targets on this station.

Station #3-Grenadier Gunnery. Target emplacements shall be “daisy-chained” or serially connected with the power and network data cables. The network cables shall originate from the control shed with a one meter service loop and continue from emplacement to emplacement until they reach the façade SIT emplacement MTDP enclosure. The power shall originate from the loadcenter located inside the control shed. Two emplacements shall contain dual target lifters in extra-wide double SIT emplacement pits. SIT emplacements require one duplex 120-volt receptacle inside each MTDP, one target power outlet, and two auxiliary power outlets. The façade requires a standard double SIT emplacement with an MTDP, two loadcenters, and target outlets to accommodate one SIT lifter. Additional power outlets and data outlets terminated with male RJ45 connectors are required in the façade to control an additional 3 SIT lifters. See Façade Emplacement details for the complete power and data requirements in the façade.

Station #4-Offense/Defense. See drawing layout for targetry and auxiliary power receptacles. All target outlets shall be mounted at a minimum 2134mm (7 ft) A.F.F. to the bottom of the outlet box. Conduits shall not be installed on the interior building walls below 2134mm (7 ft) A.F.F., but are allowed on the exterior walls, excluding the center “alley” of the interior training building area. Minimize the use of plywood walls to mount outlets and conduit so that plywood walls can easily be maintained and replaced. Two 120-volt Ground Fault Circuit Interrupter (GFCI) maintenance receptacles shall be provided per building and per floor with weatherproof covers. Consult with local user requirements to determine the method of interior light switching. Lights will either be switched locally in each room with recessed mounted light switches or be all switched by a lighting contactor controlled by panic hardware installed at each building entrance.

Station #5-Underground Trainer. This station does not require instrumentation.