

GENERAL NOTES

PROJECT: NANOCENTER READY™ RESIDENTIAL GARAGE

1.0 SCOPE & PURPOSE

1.1 These notes and the associated drawing govern the installation of the "Nanocenter Ready™" residential compute appliance rough-in within the designated exterior garage wall stud bay of a single-family residential structure.

1.2 The Nanocenter Ready™ program is a residential appliance pre-installation specification, analogous to pre-wiring for an EV charging port or a solar inverter branch circuit. It is not a commercial data center installation and does not trigger commercial zoning, utility tariff reclassification, or commercial permitting under any recognized residential building code framework.

1.3 The general contractor (GC) shall identify the Nanocenter Ready™ stud bay at the earliest possible stage of construction — ideally prior to MEP rough-in coordination — and shall communicate the bay location to all subcontractors (electrical, low-voltage, plumbing, and HVAC) to prevent MEP obstructions within the designated Clear Zone (see Section 4.0).

1.4 The Nanocenter Ready™ stud bay shall be clearly marked on-site by the GC immediately following wall sheathing and prior to the commencement of any MEP rough-in work.

2.0 STUD BAY REQUIREMENTS

2.1 The Nanocenter Ready™ stud bay may be configured at either **16" OC** or **24" OC** stud spacing. The dimension between the inside faces of the two studs bounding the designated bay shall be verified by the installing electrician prior to device-box placement.

2.2 The bay must be located on an **exterior wall** of the residential garage, permitting upper and lower vent routing through the same stud bay to the exterior of the building envelope.

2.3 The bay shall not contain any load-bearing headers, fire-blocking, or lateral bracing within the vertical span of 24" AFF to 84" AFF, except as required by the structural engineer of record. Any unavoidable structural members within this span shall be brought to the attention of the Nanocenter Ready™ program coordinator prior to MEP rough-in.

2.4 Insulation is permitted within the Clear Zone (see Section 4.0). Insulation type, thickness, and installation method shall conform to the building envelope specifications and applicable energy code. No additional clearance for insulation is required beyond the Clear Zone dimensions specified herein.

3.0 DEVICE BOX PLACEMENT & ELEVATIONS

3.1 Two (2) device boxes shall be installed on the interior face of the studs bounding the Nanocenter Ready™ stud bay:

- **(A) POWER BOX:** One (1) single-gang or double-gang device box for the 10/3 NM-B branch circuit termination.
- **(B) LOW-VOLTAGE BOX:** One (1) low-voltage mounting bracket or open-back box for the Cat 6A cable drop and/or ENT (smurf tube) termination.

3.2 The **top edge of each box** shall be set at exactly **48" AFF (Above Finished Floor)**. This dimension is critical and shall be field-verified.

3.3 Boxes shall be mounted in accordance with **NEC 314.17** (Conductors Entering Boxes) and **NEC 314.29** (Boxes and Conduit Bodies to Be Accessible). All boxes shall

be flush with the finished wall surface and secured per the box manufacturer's instructions.

3.4 Where the stud bay is 16" OC, the power box and low-voltage box may be placed side-by-side within the same bay, maintaining maximum practical horizontal separation. Where the stud bay is 24" OC, the boxes shall be placed on opposite studs within the bay, again maintaining maximum practical separation. In all configurations, **NEC 800.133(A)** separation requirements shall be maintained (see Section 5.0).

3.5 Box elevation tolerances shall not exceed $\pm\frac{1}{4}$ " from the 48" AFF specification. The installing electrician shall verify finished floor elevation prior to setting box heights.

4.0 CLEAR ZONE SPECIFICATION

4.1 A designated "**Clear Zone**" shall be maintained within the Nanocenter Ready™ stud bay, defined as the vertical region from **26" AFF to 42" AFF**.

4.2 Within the Clear Zone, the following requirements apply:

- **(A)** A minimum clear horizontal dimension of **14.5 inches**, measured stud-face to stud-face, shall be maintained at the center of the stud bay.
- **(B)** No MEP obstructions — including but not limited to plumbing lines, ductwork, conduit, cable runs, junction boxes, fire-blocking, or mechanical equipment — shall be installed within the Clear Zone.
- **(C)** Insulation is **permitted** within the Clear Zone.
- **(D)** No fasteners, hangers, strapping, or ancillary hardware shall penetrate the stud faces within the Clear Zone.

4.3 The Clear Zone is reserved for future installation of intake and exhaust ventilation components associated with the Nanocenter wall-mounted unit. The unit chassis measures **25.5" W × 45" H**. The lower portion of the chassis houses the inverter-driven compressor and associated vent ports that will route through the stud bay to the exterior.

4.4 The purpose of the Clear Zone is to ensure that, at the time of Nanocenter unit installation, the installing contractor can cut drywall openings within the Clear Zone

without risk of contacting or damaging any MEP infrastructure.

4.5 The GC shall verify Clear Zone compliance during the pre-drywall MEP inspection. Any MEP violation discovered within the Clear Zone shall be corrected by the responsible trade prior to drywall installation.

5.0 POWER CIRCUIT: 10/3 NM-B BRANCH CIRCUIT

5.1 A 10/3 NM-B (Type NM-B cable with three 10 AWG conductors and one 10 AWG equipment grounding conductor) branch circuit shall be pre-run from the residential service panel to the power device box located in the Nanocenter Ready™ stud bay.

5.2 Circuit protection shall be provided by a **30-amp, 2-pole** circuit breaker at the service panel, in accordance with **NEC 210.21** (Branch-Circuit Requirements) and **NEC 240.4(D)** (Small-Conductor Overcurrent Protection). Breaker size shall be field-verified against the Nanocenter unit nameplate rating at the time of final appliance installation.

5.3 The 10/3 NM-B cable shall be secured and supported in accordance with **NEC 334.30**:

- **(A)** Cable shall be secured by staples, cable ties, straps, hangers, or other approved fittings at intervals not exceeding **4 feet 6 inches** (54 inches).
- **(B)** Cable shall be secured within **12 inches** of each device box, measured from the box to the nearest support point, per **NEC 334.30(A)**.
- **(C)** Where cables are run through bored holes in framing members, the holes shall be bored at least **2 inches** from the nearest edge of the stud, or a listed nail plate shall be installed in accordance with **NEC 300.4(A)**.
- **(D)** Bending radius of NM-B cable shall not be less than **five (5) times** the overall cable diameter, per **NEC 334.24**.

5.4 Where the 10/3 NM-B cable is run parallel with the low-voltage cable (Cat 6A or ENT), a minimum separation of **2 inches** shall be maintained per **NEC 800.133(A)(1)(c)**. However, the Nanocenter Ready™ specification **requires a minimum parallel separation of 6 inches** between the 10/3 NM-B run and any low-voltage cable whenever field conditions permit. The 6-inch target shall be treated as

the design intent, not merely a recommendation.

5.5 All crossover points between the 10/3 NM-B power cable and the low-voltage cable shall occur at a **90-degree perpendicular** angle. No parallel runs of less than 6 inches of separation are permitted within the Nanocenter Ready™ stud bay or within 36 inches of the bay on either side.

5.6 The 10/3 NM-B cable shall not be spliced, tapped, or otherwise interrupted between the service panel and the power device box. A continuous, unbroken run is required.

5.7 At the device box, a minimum of **6 inches** of free conductor shall extend from the face of the box, in accordance with **NEC 300.14** (Length of Free Conductors at Outlets, Boxes, and Junction Boxes).

6.0 LOW-VOLTAGE CABLING: CAT 6A AND/OR ENT (SMURF TUBE)

6.1 A low-voltage cable drop and/or ENT (Electrical Nonmetallic Tubing, commonly referred to as "smurf tube") pathway shall be pre-run from the home's **residential communication hub area** (central distribution point, structured wiring enclosure, or equivalent) to the low-voltage box in the Nanocenter Ready™ stud bay.

6.2 Either of the following low-voltage media is acceptable for Nanocenter Ready™ compliance:

- **(A) Cat 6A U/UTP or F/UTP** cable, terminated (or left unterminated with 6" of slack) at the low-voltage box, and home-run to the residential communication hub.
- **(B) ENT (smurf tube), ¾" minimum trade size**, installed as a dedicated pathway from the low-voltage box to the residential communication hub, left open for future cable pull-through. ENT shall be installed in accordance with **NEC Article 362**.

6.3 Both Cat 6A and ENT installations may be provided simultaneously (conduit with pre-installed cable). This is the preferred configuration where field conditions permit.

6.4 Regardless of media type, the following separation rules apply:

- **(A) Parallel separation from all NM-B power cables: minimum 6 inches**

(exceeds the 2-inch minimum required by **NEC 800.133(A)(1)(c)** and **NEC 362.10** provisions regarding proximity to power conductors).

- **(B) All crossover points: 90-degree perpendicular** only. No parallel runs of less than 6 inches separation are permitted at any location.
- **** (C)** Low-voltage cabling or ENT shall not share any bored hole, notch, or notch-plate with NM-B power conductors at any point.

6.5 Where ENT (smurf tube) is used as the sole low-voltage pathway:

- **(A)** ENT shall be supported per **NEC 362.30** at intervals not exceeding **3 feet**.
- **(B)** ENT shall be secured within **3 feet** of each termination point.
- **(C)** A pull string shall be installed within the ENT run and left accessible at both ends for future cable installation.
- **(D)** Bending radius of ENT shall not be less than **six (6) times** the trade size of the tubing, per **NEC 362.24**.

6.6 Cat 6A cable shall be terminated (if applicable) in accordance with the cable manufacturer's published specifications and **ANSI/TIA-568.2-D**. Category 6A cable bend radius shall not be less than **4 times** the cable outside diameter during installation, and **8 times** the cable outside diameter when terminated, in accordance with manufacturer instructions.

6.7 Low-voltage cabling and ENT shall not enter the same device box as the 10/3 NM-B power conductors. A separate low-voltage mounting bracket or box is required.

7.0 GROUNDING & BONDING

7.1 The 10/3 NM-B circuit shall include the equipment grounding conductor (10 AWG), bonded at the service panel grounding bus in accordance with **NEC 250.134** (Equipment Grounding Conductor — Fastened in Place or Connected by Receptacles) and **NEC 250.8** (Termination of Equipment Grounding and Bonding Conductors).

7.2 The low-voltage cabling system shall be grounded per the requirements of **NEC 800.93** (Grounding of Communications Wires and Cables) where applicable. Shielded Cat 6A (F/UTP) shall be grounded at the residential communication hub per

manufacturer instructions.

8.0 DRYWALL & FINISH

8.1 Drywall installation shall proceed normally over the Nanocenter Ready™ stud bay. The device boxes shall be standard flush-mount and will be covered by blank plates until the Nanocenter unit is installed.

8.2 No special markings, access panels, or removable drywall sections are required at this stage. The Clear Zone will be accessed at the time of Nanocenter unit installation by standard drywall cutting methods.

8.3 The installing electrician shall verify that device boxes are properly secured and set to the correct depth prior to drywall installation. The GC shall verify that the Clear Zone is free of MEP obstructions prior to drywall installation.

8.4 Blank cover plates (or equivalent) shall be installed on both the power and low-voltage boxes following drywall finishing. Plates shall be labeled "NANOCENTER READY™ — DO NOT REMOVE" using the labels provided by the Nanocenter Ready™ program.

9.0 INSPECTION & VERIFICATION

9.1 Prior to drywall installation (at the pre-drywall / "rough-in" inspection), the GC shall verify the following:

- ☐ Nanocenter Ready™ stud bay is identified and labeled on-site.
- ☐ Power device box top edge is at 48" AFF ($\pm 1/4"$).
- ☐ Low-voltage box top edge is at 48" AFF ($\pm 1/4"$).
- ☐ 10/3 NM-B branch circuit is home-run from the service panel to the power box with no splices.
- ☐ 10/3 NM-B is secured per NEC 334.30 ($\leq 54"$ intervals; $\leq 12"$ from box).

- ☐ Cat 6A or ENT is home-run to the residential communication hub.
 - ☐ Parallel separation between NM-B and low-voltage is ≥ 6 inches.
 - ☐ All crossovers are 90° perpendicular.
 - ☐ Clear Zone (26" AFF to 42" AFF) is free of all MEP obstructions.
 - ☐ Minimum 14.5" clear horizontal dimension maintained at center of stud bay within Clear Zone.
 - ☐ Batt Insulation is OK, spray foam is NOT!
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10.0 CODE COMPLIANCE & AHJ VERIFICATION

10.1 All work shall be performed in accordance with the most current edition of the **National Electrical Code (NFPA 70)** as adopted by the local Authority Having Jurisdiction (AHJ), the **International Residential Code (IRC)** as adopted and amended locally, and all applicable state and local building codes.

10.2 (*) Always verify with your local AHJ before commencing work. Local amendments to the NEC, IRC, or energy code may impose additional requirements, including but not limited to: listed fire-blocking requirements at penetrations, smoke alarm circuit interaction, GFCI/AFCI protection on garage branch circuits, and insulation contact restrictions. The installing contractor is responsible for confirming compliance with all local code provisions.

10.3 Where local code provisions conflict with the Nanocenter Ready™ specification, the **more stringent requirement shall govern**. Conflicts shall be brought to the attention of the Nanocenter Ready™ program coordinator for resolution.

10.4 The Nanocenter Ready™ specification is a residential appliance pre-installation standard. It does not constitute a commercial data center installation, does not require commercial load calculations, and does not trigger commercial electrical service sizing under any recognized code framework. The branch circuit specified herein is a standard residential branch circuit, analogous to those installed for EV charging equipment per **NEC Article 625** or solar inverter interconnection per **NEC Article 690**.

11.0 ABBREVIATIONS

Abbreviation	Definition
AFF	Above Finished Floor
AHJ	Authority Having Jurisdiction
Cat 6A	Category 6A (augmented) telecommunications cable, per ANSI/TIA-568.2-D
ENT	Electrical Nonmetallic Tubing (NEC Article 362)
GC	General Contractor
GFCI	Ground-Fault Circuit Interrupter
MEP	Mechanical, Electrical, Plumbing
NEC	National Electrical Code (NFPA 70)
NM-B	Nonmetallic-Sheathed Cable, Type NM-B (NEC Article 334)
OC	On Center (stud spacing)
SFH	Single-Family Home
U/UTP	Unshielded / Unshielded Twisted Pair
F/UTP	Foiled / Unshielded Twisted Pair

12.0 REFERENCE STANDARDS

Standard	Title
NFPA 70 (NEC)	National Electrical Code — Current Adopted Edition
IRC	International Residential Code — Current Adopted Edition

Standard	Title
NEC Art. 210	Branch Circuits
NEC Art. 240	Overcurrent Protection
NEC Art. 250	Grounding and Bonding
NEC Art. 300	Wiring Methods
NEC Art. 314	Outlet, Device, Pull and Junction Boxes
NEC Art. 334	Nonmetallic-Sheathed Cable (NM-B)
NEC Art. 362	Electrical Nonmetallic Tubing (ENT)
NEC Art. 800	Communications Circuits
ANSI/TIA-568.2-D	Balanced Twisted-Pair Telecommunications Cabling and Components

13.0 WARRANTY & LIABILITY

13.1 The Nanocenter Ready™ program provides installation, insurance, maintenance, and homeowner agreements for the Nanocenter unit at the time of appliance installation. The builder and homeowner carry **zero liability** and **zero operational burden** for the Nanocenter unit.

13.2 The pre-installation rough-in specified herein is a standard residential construction practice and does not create any special warranty obligation on the part of the builder beyond standard residential construction warranties applicable to electrical and low-voltage rough-in work.

13.3 Questions regarding this specification should be directed to: **Nanocenter Ready™ Program Coordinator — Nanocenter, Inc. — Nanocenter.ai**

END OF NOTES