

ENGINEERING NOTE

ENCLOSURE

NEMA Electrical Control Enclosures

Enclosures for electrical controls and electronic equipment such as pushbutton enclosures, junction boxes, cabinets, etc., are designed by NEMA according to the degree of environmental protection given to the enclosed equipment. Following is a listing of common NEMA types of enclosures encountered and a brief description of each.



Surface Mounting

NEMA Type 1 — General-Purpose — Indoor enclosures are intended for use indoors, primarily to prevent accidental contact of personnel with the enclosed equipment, in areas where unusual service conditions do not exist. Available as surface mount or flush mount for installation into machine frames and plaster walls.

NEMA Type 2 — Dripproof — Indoor enclosures are intended for use indoors to protect the enclosed equipment against falling noncorrosive liquids and falling dirt.

NEMA Type 3 — Dusttight, Raintight and Sleet-Resistant (Ice-Resistant) — Outdoor enclosures are intended for use outdoors to protect the enclosed equipment against wind-blown dust, rain, sleet, and external ice formation.



NEMA Type 3R — Rainproof and Sleet-Resistant (Ice-Resistant) — Outdoor enclosures are intended for use outdoors to protect the enclosed equipment against falling, sleet, rain and are constructed so the accumulation and melting of sleet (ice) will not damage the enclosure and its external mechanisms.



NEMA Type 4 — Watertight and Dusttight — Indoor and Outdoor enclosures are intended for use indoors or outdoors to protect the enclosed equipment against splashing water, seepage of water, falling or hose-directed water, and severe external condensation and windblown dust.

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NEMA Type 4X — Watertight, Dusttight and Corrosion-Resistant — Indoor and Outdoor enclosures have the same provisions as Type 4 enclosures and in addition are corrosion-resistant. NEMA Type 4 enclosures are often made of stainless steel or are non-metallic fiberglass, ABS, polyester, etc.

NEMA Type 6P — Watertight — Indoor and Outdoor enclosures are intended to provide a degree of protection against entry of water during prolonged submersion at limited depth.

 **NEMA Type 7 — Class II, Group Cor D — Indoor Hazardous Locations** enclosures are intended for use indoors in the atmospheres and locations as defined as Class I, Division 1 or 2, and Group C or D in the “National Electrical Code” and capable of withstanding the pressures resulting from an internal explosion of specified gases, and contain such an explosion sufficiently that an explosive gas-air mixture existing in the atmosphere surrounding the enclosure will not be ignited.

 **NEMA Type 3R, 7 and 9 — Unilock Enclosures for Hazardous Locations** are intended for the same applications and designed to meet the same tests as NEMA Types 3R, 7 and 9. Additionally these enclosures are cast from “copper-free” aluminum and is entirely bronze chromated. For NEMA Type 3R applications, it is necessary to add a drain.

 **NEMA Type 9, Class II, Division I Group E, F or G — Indoor Hazardous Locations — Air-Break Equipment** enclosures are intended for use indoors in the atmospheres and locations defined as Class II, Division 1 or Division 2, and Group E, F, or G in the “National Electrical Code” to prevent the entrance of explosive amounts of hazardous dust.

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NEMA Type 12 — Industrial Use - Dusttight and Driptight — Indoor enclosures are intended for use indoors to protect the enclosed equipment against fibers, flyings, lint, dust and dirt, and light splashing, seepage, dripping and external condensation of noncorrosive liquids.

NEMA Type 13 — Oiltight and Dusttight — Indoor enclosures are intended for use indoors primarily to house pilot devices such as limit switches, foot switches, pushbuttons, selector switches, pilot lights, etc., and to protect these devices against lint and dust, seepage, external condensation, and spraying of water, oil or coolant.

The preceding descriptions are not intended to be complete representations of National Electrical Manufacturers Association standards for enclosures. For definitions, descriptions, and test criteria, see NEMA Standard No. 250.

SEW-Eurodrive standard analog speed indicators supplied with the mechanical variable speed drives are in a NEMA Type 1 enclosure. Digital speed indicators can be supplied with a NEMA Type 4 front face designed for installation into a NEMA Type 4 enclosure. SEW-Eurodrive electronic variable speed controllers are commonly available in NEMA Type 1 or NEMA Type 4 enclosure. Other enclosure types are optionally available.

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