

Product: **Model X-90 High-Density Polymer Enclosure**

1. General Overview

This document specifies the materials, dimensions, and tolerances required for the manufacture of the **Model X-90 Enclosure**, a protective casing intended for the Series 3 control board. The enclosure must provide reliable ingress protection (IP65) and maintain structural integrity under standard operating conditions (0°C to 50°C).

2. Material Specifications

Component	Material Specification	Notes	Main Body
(Housing)	Polycarbonate (PC)	UL94-V0 Rated, UV-Stabilized Color: RAL 7035 (Light Grey)	
Gasket (Seal)	Silicone Rubber	Shore Hardness A 50 ± 5	Must meet IP65 rating standards
Fasteners	Stainless Steel	ASTM A240, Type 304	Required for lid attachment (See Section 4)

3. Dimensional Tolerances

All dimensions refer to the primary engineering drawing **DRW-X90-001 Rev B**.

- Overall Dimensions:** 150.00 mm × 100.00 mm × 45.00 mm (Length × Width × Height).
- Tolerance:** ± 0.30 mm on all overall dimensions.
- Wall Thickness:** 2.50 mm nominal.
- Tolerance:** +0.20 mm / -0.05 mm.
- Mounting Holes (Internal):** M3 threaded inserts required in four corner posts.
- Position Tolerance:** ± 0.10 mm relative to the center axis.
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## 4. Processing and Finishing

### 4.1. Molding

The Main Body (Housing) shall be manufactured via **Injection Molding**. The mold must incorporate adequate draft angles ( $\geq 1.5^\circ$ ) to prevent part damage during ejection. Minimal flash is acceptable, limited to  $\leq 0.10 \text{ mm}$  at the parting line.

### 4.2. Surface Finish

The external surface finish shall be  **$\text{MT-11010}$  (Medium Texture)** to minimize visible scratches. The interior surface may have a standard  $\text{SPI A-3}$  finish.

### 4.3. Post-Molding Requirements

1. **Threaded Inserts:** Four (4) brass heat-set inserts ( $\text{M3} \times 5 \text{ mm}$  length) must be installed into the lid attachment posts.
2. **Gasket Channel:** The channel designed for the Silicone Gasket must be clean and free of debris to ensure a proper seal.

## 5. Quality Assurance and Inspection

- **Critical Dimensions:** Dimensional verification must be performed on the first article (FAIR) and for every 500 units thereafter.
- **Leak Test:** A sample of 5% of each batch must undergo a water ingress test to confirm the  $\text{IP65}$  rating is met.
- **Visual Inspection:** All finished units must be visually inspected for warpage, sinks, voids, or color inconsistencies.



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