

1. System Overview

The Endoscopy Tower is a modular, mobile medical workstation designed to house the complete signal chain for flexible endoscopy. It integrates high-frequency light generation, digital signal processing, and medical-grade visualization.

2. Core Tower Components

A. Video Image Processor

The "brain" of the system, responsible for converting the digital signals from the scope tip into high-definition video.

- **Video Output:** Dual HD-SDI and DVI (1920 x 1080) for lossless digital transmission.
- **Digital Chromoendoscopy:** Must include **Narrow Band Imaging (NBI)** or equivalent to enhance visualization of mucosal micro-vessels.
- **Signal Processing:** Advanced "Structure Enhancement" (Levels 1–5) and "Edge Enhancement" for sharper visualization of lesions.
- **Compatibility:** Backward compatible with previous generation and contemporary endoscopes.

B. Xenon Light Source

High-intensity illumination required for true-color rendering in the GI tract.

- **Lamp Type:** 300W Xenon short-arc lamp (Daylight spectrum).
- **Specialized Filtering:** Integrated motorized filter for NBI (Narrow Band Imaging) modality.
- **Emergency Backup:** Automatic switch to a 35W Halogen or LED backup lamp in case of primary lamp failure.
- **Automatic Brightness:** Real-time feedback loop with the processor to adjust light intensity based on the distance from the mucosa.

C. Medical Grade Monitor

- **Display:** 26-inch to 32-inch High-Definition LED/LCD panel.
- **Optics:** Anti-reflective coating and specialized "Multi-Window" or Picture-in-Picture (PiP) capability.
- **Response Time:** <20 ms to eliminate "ghosting" or lag during rapid scope movement.

D. Gastrointestinal Endoscopes

The system must support high-resolution "Plug-and-Play" scopes:

1. **EVH Gastritis Scope:** Slim-design upper GI scope with dual-focus capability.
2. **EVH Colonoscopy Scope:** Lower GI scope featuring **High Force Transmission** and **Variable Stiffness** to assist in navigating the sigmoid colon.
 - **Connector Type:** Fully waterproof, one-touch connector

3. Integrated Accessories & Peripherals

Component	Technical Specification
Endoscopy Cart (Workstation)	Heavy-duty mobile cart with 4 antistatic wheels (2 locking), adjustable monitor arm, and integrated isolation transformer.
Water Bottle Assembly	Autoclavable 2L bottle with integrated air/water tubing.
Digital Documentation	Integrated USB/Internal drive for JPEG stills and MPEG-4 video capture. DICOM 3.0 ready.
CO2 Insufflator	For controlled bowel distension using CO2 instead of room air to reduce patient post-op pain.
Suction Machine	High-vacuum medical suction unit integrated into the tower base.

4. Performance & Safety Standards

- **One-Touch Connection:** The scope-to-processor connection must be wireless/pin-less for power and data to prevent bent pins and fluid ingress.
- **Classification:** Class I / Type BF or CF applied part.
- **Safety:** Compliance with **IEC 60601-1** (Electrical) and **IEC 60601-2-18** (Endoscopic Safety).
- **Leak Testing:** Must be compatible with automated and manual leak testers to ensure seal integrity before disinfection.

