



The midstream sector of the oil and gas industry focuses on the transportation and storage of hydrocarbons. The midstream sector concerns itself with the movement of the raw product from the upstream/supply-side sector to the downstream/demand-side sector of refining and distribution of processed products for industrial and consumer applications. Studies show that demand for equipment used in midstream oil and gas applications in the USA is projected to be around US\$10 billion in 2019, a cumulative decline since the overall downturn in oil and gas prices since 2014. Nevertheless, the market for midstream equipment is expected to return to normal demand by 2019, especially in pipeline construction, liquefied petroleum gas (LPG) and natural gas liquids (NGLs) segments.

Commercial Operations in Midstream

The midstream links between the oil/gas source and refining are comprised of the following operations:

- Gathering systems – collection of the crude oil, gas and liquid as they comes out of the ground at the wellheads prior to entering into the main pipeline system.
- Gas processing – systems that extracts natural gas liquids, separates gases; e.g., methane, ethane, propane, and butane, and impurities; e.g., water vapor, carbon dioxide, helium, hydrogen sulfide, and nitrogen, from the oil and/or natural gas stream in order to produce and deliver quality product into the main transmission system.
- Pipelines – main transmission system and hubs of interconnecting lines consisting of pump stations, compression stations, looped routes, as well as cleaning, integrity, safety meters and maintenance systems.
- Trucks/Roads, Barges/Waterways, and Trains/Railroads – alternative and flexible transportation options than pipelines alone or where a pipeline infrastructure is not available.
- Storage – above ground tanks and underground facilities (depleted oil/gas reservoirs, aquifers and caverns) for long-term and short-term; i.e., peak shaving, requirements.



Using Beijer HMIs in Midstream Oil/Gas Applications

Beijer HMIs are positioned to support OEM projects for oil/gas applications that are intended to improve productivity at less cost. Beijer HMIs are designed to integrate into OEM devices that need to operate flawlessly in what are often harsh and hazardous oil/gas environments. The equipment must support the following deployment requirements:

- Extreme mechanical stress – vibrations, shock, shaking, pressures
- Extreme heat and cold – -40°C / $+70^{\circ}\text{C}$
- Direct sun – readability and UV durability
- Dust – minerals, metals, ash, sand
- Water – rain, snow, ice, fog, humidity, high-pressure wash-down
- Chemicals – saltwater, fuels, corrosive gases
- Hazardous – gases & vapors (Class I Div 1 or 2, ATEX / IECEx Zone 1 or 2)

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Controls Applications in the Midstream Oil/Gas Sector

- Gathering operations control and management of pressures and flows.
- Gas processing removal, separation, and treatment.
- Pipeline operations control and monitoring of pumps, compressors, motors, flow, pressures, volumes, integrity.
- Tanks operations such as temperature, volume, pressure, content, flash-points and material integrity.
- On-truck/barge/rail controls, monitoring, and measurement requirements.
- Other controls such as electrical voltages & frequencies, heating & cooling, performance indicators, emissions monitoring, time settings, preventative maintenance, and premises security & access controls.

Configuration, Sizing & Integration for Midstream Sector

HMI's must be sized for the applications. HMI displays range in size from 3'-5" on the low-end, 7"-12" in the mid-range, and 15"-24" on the high-end. Midstream oil/gas equipment can use all sizes, depending on the application, operator requirements and cost of the OEM machine. HMI's must understand the controls intelligence in the OEM devices. Some machinery will use standard controls protocols like Modbus, others use proprietary ones. HMI's most often communicate to PLCs through serial protocols – RS232/422/485 – or via Ethernet.

Why Rugged HMI's from Beijer Electronics?

Beijer's iX HMI's are advanced operator terminals that provide remote access and control, log events and activities. Logs can be pushed or pulled into standard formats for analysis, trending and long-term storage. The alarm viewer provides real-time awareness of abnormal conditions. Operators can view system and component manuals, videos and web pages for quick and accurate access to pertinent information. The operator interface terminals provide the control, data repository, and drill-down capabilities required by administrators and technicians.

Much of the electronic and controls equipment deployed in midstream oil and gas environments require certifications and approvals. Equipment usually must meet IP 66, NEMA-4X, and UL 50E Type 4X outdoor ratings. They often require certifications such as UL 61010-2-201 (replacement for UL 508), CE (EN61000-6-4, EN61000-6-2), ISA 12.12.01 (Class I Division 2) (replacement for UL 1604), and ATEX (Zone 2) / IECEx (Zone 2). Beijer's rugged iX operator terminals address most of the requirements needed by midstream oil/gas OEM devices, providing maximum configurability, flexibility and durability.

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