



PROCESS INSTRUMENTATION

Your pipeline to **process transparency**

Lifecycle instrumentation solutions for midstream oil and gas

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SIEMENS



Delivering oil and gas with greater efficiency

Vast distances requiring extensive infrastructure. Remote environments characterized by harsh, often hazardous conditions. Increasingly strict governmental regulations.

Transporting and storing hydrocarbon in its various forms are complex, ever-evolving processes that can present costly challenges – challenges with the potential to threaten profitability, worker safety and the environment.

To face these obstacles head-on, process transparency is key. That's why midstream oil and gas operators need to protect every infrastructure investment with rugged, reliable measurement technology. From pipelines to tank farms, from crude oil to natural gas to LNG, Siemens has an array of high-performance field instruments to monitor the health and efficiency of any midstream application. Our flow, pressure, temperature, level and positioning products meet the stringent measurement standards set by the oil and gas industry without high installation costs – helping you to manage your assets more effectively and maximize throughput.

By choosing Siemens, you'll also gain access to a broad range of solutions designed to complement and optimize our process instrumentation – including weighing and batching systems, analyzers, industrial communication components and process controllers – along with an expert-level technical support network covering every corner of the globe.

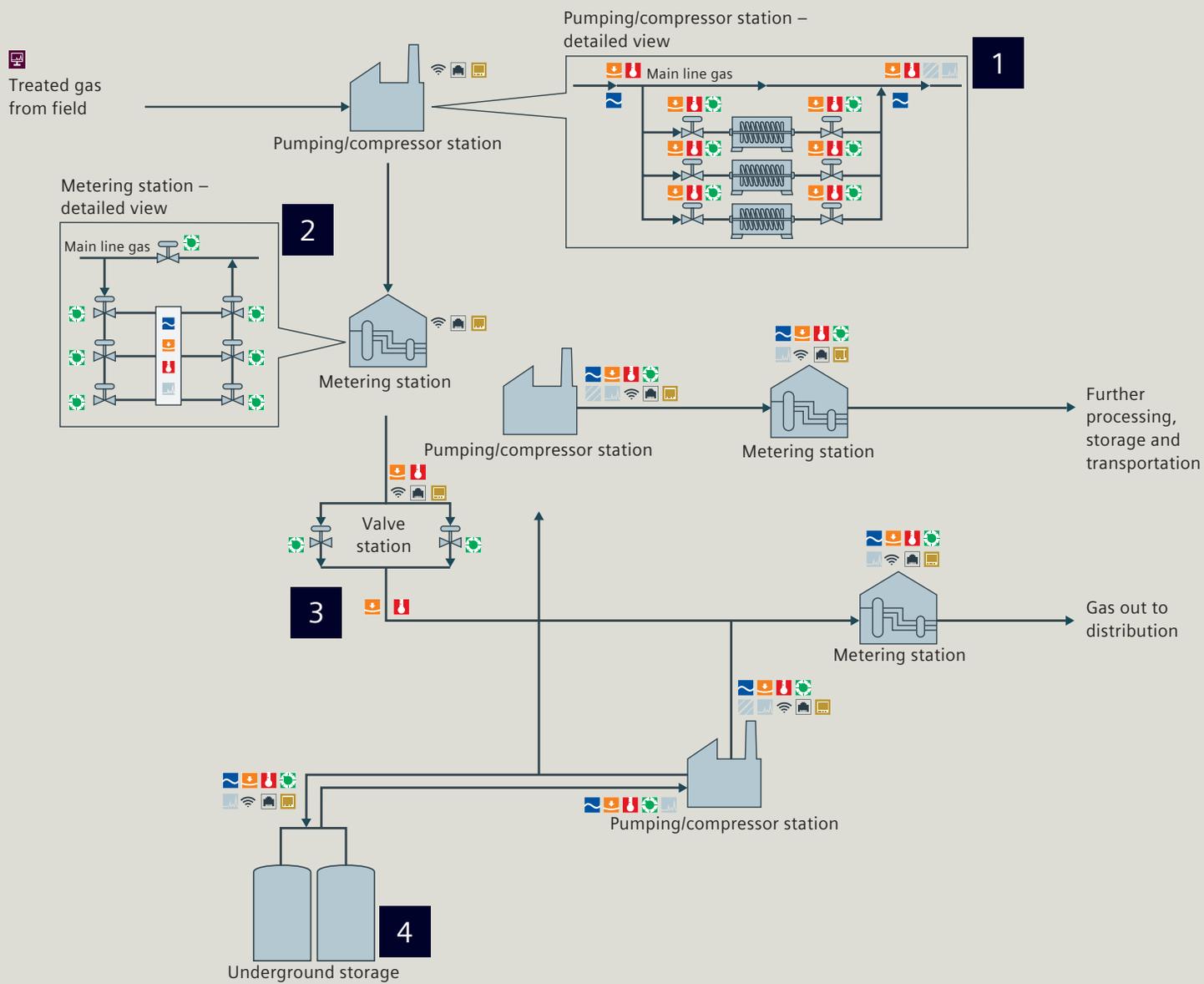
And with our digital solutions for the oil and gas and other process industries, you can prepare confidently for the future. The SITRANS IQ digital field device platform includes a growing range of connectivity devices and applications that help you achieve more with the data collected by your instruments – from higher performance and reliability to easier servicing and reduced downtime.

Robust instrumentation designed with flexibility in mind

- Conforms with the most rigorous industry standards, ensuring full compliance with tightening safety and environmental regulations
- Exceptional accuracy even in harsh and fluctuating conditions
- Customizable selection of process connections, materials of construction and mounting options to meet the widely varying demands of pipelines, storage tanks and other midstream installations
- Low total cost of ownership

Everything you need from a single supplier

- Comprehensive product portfolio to improve performance and increase productivity for more cost-effective operations
- Seamless integration of all Siemens process instrumentation, analytics and industrial communication into automation systems



- | | | | | | |
|--|---|---|--|--|--|
|  Flow |  Pressure |  Temperature |  Positioner |  Level |  Continuous gas analytics |
|  Gas chromatography |  Industrial wireless communication |  Industrial Ethernet |  Remote terminal unit |  Automation and engineering solutions | |

Midstream transmission and storage of hydrocarbon/gas

1 Pumping/compressor station

The pumping and compressor stations are responsible for maintaining forward momentum of crude oil and gas, respectively, as the fluid moves through the pipeline. Siemens instruments provide a variety of process measurements to ensure that the pumps and compressors are operating at maximum efficiency.

Flow: SITRANS FS230, FS-DSL

- Capability for interface detection and product identification in multiproduct pipelines, as well as scraper and pig detection
- Cost-efficient external sensors that can be installed without the need for pipe alterations or process shutdown
- 100 Hz update rate ensures quick responses to even the smallest changes in flow
- Low power usage for remote installation

Pressure: SITRANS P320/P420

- Hazardous-area classifications with intrinsically safe and explosion-proof options
- Local transmitter operation via 4 push buttons without a “hot work” permit or via the relevant communications interface

Temperature: SITRANS TS series

- Modular design makes it possible to customize the sensor for most applications while still using many standardized individual components
- Intrinsically safe 2-chamber enclosure in die-cast aluminum or stainless steel with IP67 and SIL 2/3 approvals

2 Metering station

The metering station is where crude oil or gas changes hands for revenue, so it must be equipped with measurement devices that allow for the most accurate billing possible. The Siemens portfolio of process instrumentation demonstrates consistently high accuracy even in challenging environments.

Flow: SITRANS FC330

- Multiple communication options for excellent performance and versatile configuration in the field or from the control room
- Precise multiparameter outputs individually configurable for mass flow, volume flow, density, temperature or fraction flow
- Custody transfer approvals

Positioner: SIPART PS2

- Simple installation and automatic commissioning, including self-adjustment of zero and span
- Local operation and configuration of the device using 3 pushbuttons and a user-friendly 2-line display
- Negligible air consumption in stationary operation

3 Valve station

The valve station allows individual sections of a pipeline to be closed off for maintenance or in the event of an emergency. When integrated into a valve station, Siemens instruments help maintain full control by responding quickly to changing process conditions.

Pressure: SITRANS P320/P420

- High reliability under extreme chemical and mechanical loads
- Consistently accurate performance even at low pressures
- Diverse portfolio of top-quality accessories and spare parts with long service life

Temperature: SITRANS TS series

- Local display, field-changeable electronics and remote-mount options available
- Sensors and transmitters for head, rail and field mounting offer total installation flexibility

Positioner: SIPART PS2

- Adaptable to hundreds of different configurations of rotary and linear actuators from dozens of manufacturers
- Optional external non-contacting sensor for extreme ambient conditions
- One version applicable to both linear and part-turn actuators

4 Underground storage

Careful, continuous monitoring of hydrocarbon and gas as it flows into storage tanks ensures employee safety and protects the valuable inventory being stored. Siemens designs measurement solutions that are flexible and rugged enough for use in virtually any process environment.

Flow: SITRANS FS230, FS-DSL

- No pressure drop or energy loss
- Modular design allows for quick and easy replacement of modules to minimize costs and storage needs
- Easily accessible USB user interface for quick servicing and minimized downtime

Pressure: SITRANS P320/P420

- Wide measuring range of 20 mbar to 700 bar
- Local display, programming and extensive diagnostic and simulation functions for the industry's best on-site usability

LNG – step 1

1 Wellhead

An essential component of LNG processing, the wellhead is responsible for managing the flow and pressure of the gas emerging from the reservoir. Siemens instrumentation provides the high levels of accuracy and reliability necessary to maintain strict oversight of this application at all times.

Pressure: SITRANS P320/P420

- Hazardous-area classifications with intrinsically safe and explosion-proof options
- Wetted parts made of high-grade materials (e.g. stainless steel, Hastelloy, gold, Monel and tantalum)

Temperature: SITRANS TS series

- Universal use as a transmitter (connected to a resistance thermometer, thermocouple element, Ω or mV sensor) or as a field indicator for any 4-20 mA signal
- Local display, field-changeable electronics and remote-mount options available

2 Separator – first stage

Separation is one of the most crucial steps in gas treatment, as it removes all liquids produced in the well to ensure that the end product meets strict quality standards. The comprehensive Siemens portfolio provides you with high-quality solutions to measure the fluid leaving the separator.

Flow: SITRANS FC330

- Simultaneous monitoring of flow, density and temperature
- 100 Hz update rate ensures quick responses to even the smallest changes in flow

Level: SITRANS LR510

- Advanced Process Intelligence for fast commissioning, reliable performance and remote communication under the most difficult process conditions
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Convenient and easy to install thanks to extremely narrow beam angle of only 3° and Bluetooth Technology

3 Absorber

Specific ambient conditions must be achieved to assure that gas is processed correctly and safely during absorption, which makes stringent monitoring of the absorber indispensable to the process. Siemens builds the highest levels of quality and safety into every product to keep this critical operation running smoothly.

Level: SITRANS LG250

- Strong performance in challenging open- and closed-loop systems where vapors and buildup are concerns

Positioner: SIPART PS2

- Ultra-low air consumption during operations, giving it one of the lowest costs of ownership on the market
- Adaptable to hundreds of different configurations of rotary and linear actuators from dozens of manufacturers

4 Regenerator

The efficiency of acid gas removal depends largely on the regeneration process. As a result, operators must be certain that all amine is clean before it is processed again. Siemens instrumentation facilitates continuous control over – and quick response to – the many variables of this application.

Pressure: SITRANS P320/P420

- Wide variety of process connections provide enough flexibility for installation virtually anywhere
- Diverse portfolio of high-quality accessories and spare parts with long service life
- Total flexibility for all of your tank storage pressure needs (e.g. gauge, absolute, differential pressure or flow and level)

Temperature: SITRANS TS series

- Modular design makes it possible to customize the sensor for most applications while still using many standardized individual components

5 Scrubber

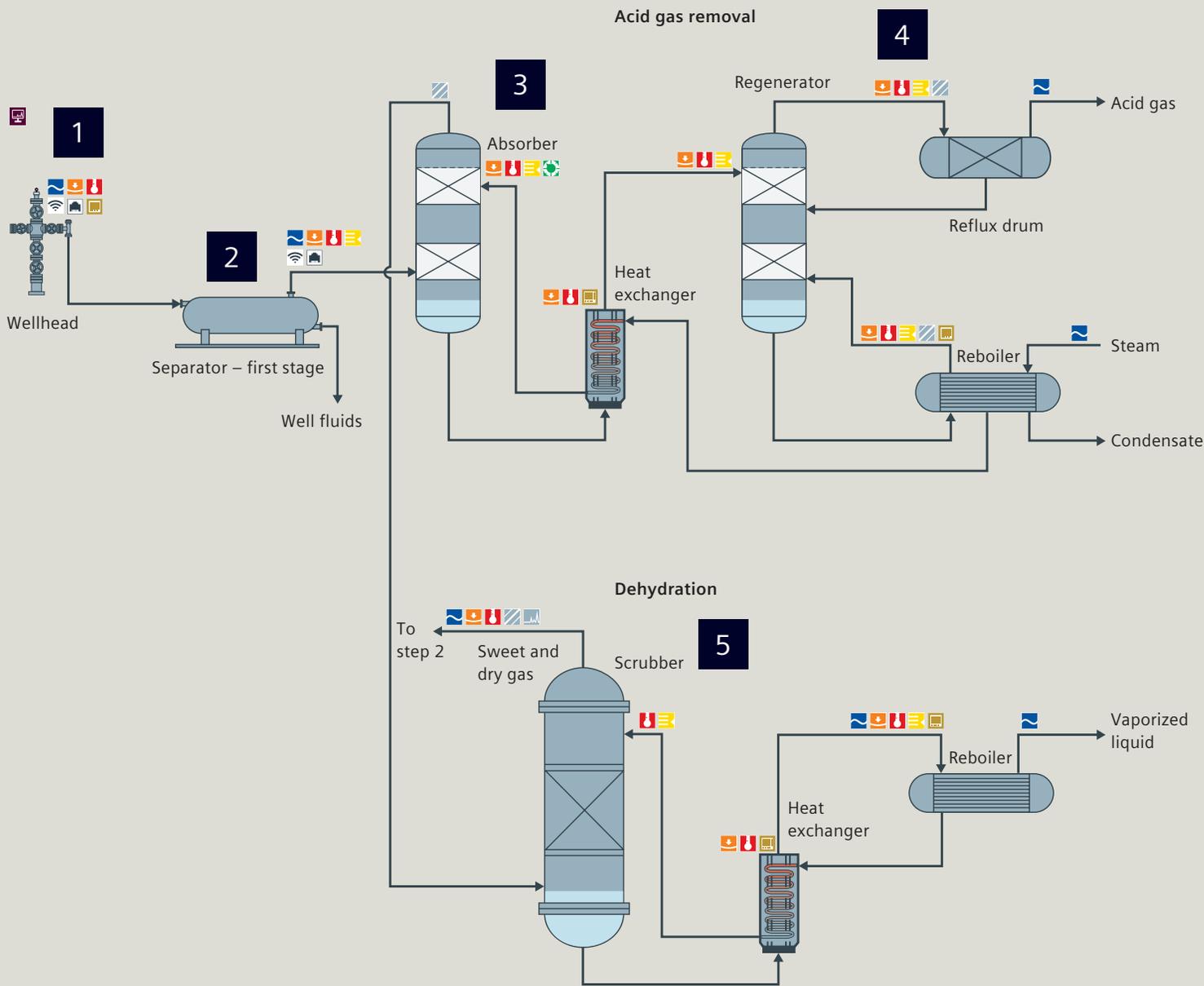
The scrubber carries out the challenging task of controlling pollution by removing liquid particulates from the gas stream. For maximum efficiency, the scrubber must be kept within a very specific range of operating parameters. Siemens measurement devices help to maintain ideal conditions for the process.

Flow: SITRANS FC330

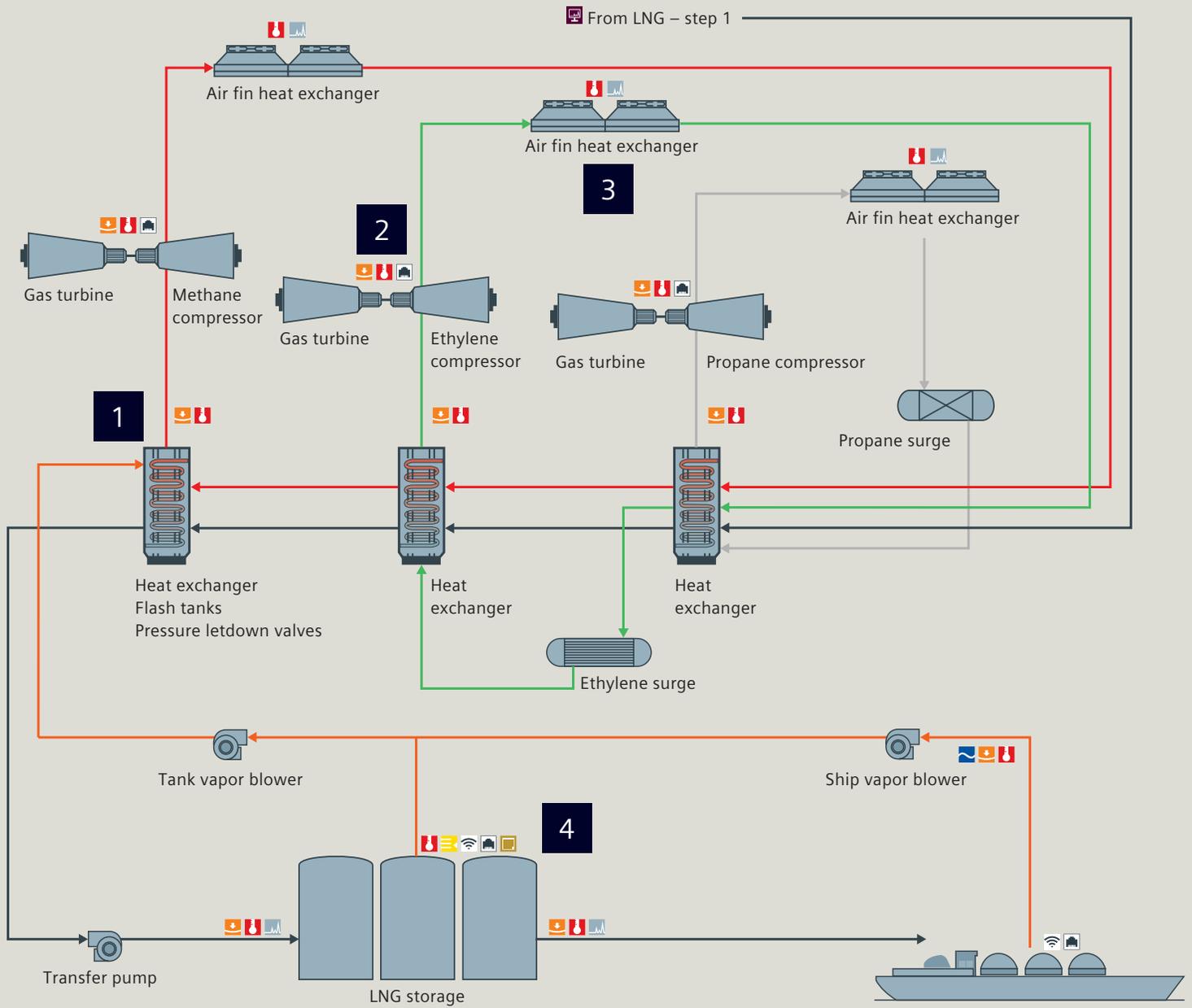
- High-accuracy performance for liquids with significant amounts of entrained gas
- Various mounting and communication options including local display, remote design and direct to PLC via Modbus

Level: SITRANS LG250 / LG270

- Perfect for side pipe/bypass tube installations, with a wide selection of process connections, probe types and materials
- High-temperature and high-pressure configurations available



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LNG – step 2

1 Heat exchanger

The heat exchanger transforms gas into a liquid state for easier and more cost-efficient transport, making it a very important piece of equipment in LNG processing. Equipping the heat exchanger with accurate Siemens instrumentation enhances the efficiency of liquefaction and improves safety conditions for workers and the surrounding environment.

Pressure: SITRANS P320/P420

- Large selection of process seals, materials of construction, mounting options and communication protocols for maximum installation flexibility
- High reliability even under extreme chemical and mechanical loads
- Excellent long-term stability with the capacity to measure very small positive or negative pressures

Temperature: SITRANS TS series

- Wide range of process connections, advanced communication options, certifications and materials
- Sensors and transmitters for head, rail and field mounting offer total installation flexibility

2 Compressor

Compression is the force that moves gas from one point to another, and it plays a vital role in transporting product to other plants or end customers. Siemens solutions serve as the “eyes and ears” of the compressor, providing detailed insight into the health of the process to optimize operations and prevent potentially costly interruptions.

Pressure: SITRANS P320/P420

- Extensive diagnostic and simulation functions provide necessary insight during commissioning and operation
- Wide variety of materials/wetted parts (e.g. stainless steel, Hastelloy, gold, Monel and tantalum) and pressure options to provide long-term stability

Temperature: SITRANS TS series

- Local display, field-changeable electronics and remote-mount options available

3 Air fin heat exchanger

The air fin heat exchanger must demonstrate continuously high performance under the demanding conditions of the heat transfer process. Siemens’ broad range of temperature sensors and transmitters provide dependable control over the temperature of the exchanger by keeping it within normal operating ranges at all times.

Temperature: SITRANS TS series

- Intrinsically safe 2-chamber enclosure in die-cast aluminum or stainless steel with IP67 and SIL 2/3
- Modular design makes it possible to customize the temperature sensor for most applications while still using many standardized individual components

4 LNG storage

Operators can prevent dangerous spills by continuously monitoring the level of LNG being stored inside the tank, even when product is being transferred in or out. Siemens level instrumentation safeguards the well-being of workers, the environment and the overall process.

Level: SITRANS LR500 Series

- Advanced process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions, providing easy commissioning and best-in-class performance
- Versatile applicability for use in many different processes under challenging conditions, including liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, cryogenic temperatures, and low dielectric media.

Our portfolio has you fully covered

Siemens brings you a broad spectrum of process instrumentation, analytics, communication and automation solutions suitable for virtually every midstream oil and gas application.

Flow			
Electromagnetic	Coriolis	Clamp-on ultrasonic	Vortex
			
Reliable SITRANS F flowmeters are capable of meeting even the toughest challenges by monitoring gases and liquids of varying consistencies.			

Pressure	
Transmitters	Remote seals
	
Siemens offers a wide range of accurate, robust and intuitive devices for all types of pressure measurement.	

Temperature	
Sensors	Transmitters
	
SITRANS T temperature devices are designed to support all common RTDs, thermocouples, resistance and millivolt sensors.	

Level			
Radar	Guided wave radar	Point level	Ultrasonic
			
Whether you need to detect liquids, slurries, bulk solids, foam or interfaces, Siemens provides the right level measuring technology for all types of applications.			

Positioner

The SIPART PS2 electropneumatic valve positioner features extensive diagnostic functions and minimal loss of process air.

Weighing		
Static weighing	Dynamic weighing	Integrators
		
SIWAREX PLC-based weighing electronics allow for direct integration into the Siemens range of PLCs, providing unparalleled flexibility and ease of use.		

 Process protection	
Acoustic sensors	Motion sensors
	
Siemens' non-contacting sensors for process protection form a highly reliable early warning system.	

 Gas analysis	
Continuous gas analytics	
	
Gas analysis instruments from Siemens cover a wide range of measuring tasks and are the ideal solution for process and quality control.	

 Industrial communication			
Switching and routing	Wireless communication	Remote communication	Network security
			
Siemens' industrial-grade communication solutions enable secure, reliable and high-availability network connectivity in harsh environments.			

 Automation and engineering solutions			
SIMATIC PCS 7	COMOS	SIMIT	XHQ
			
To maximize efficiency and competitiveness in an increasingly digitalized world, Siemens provides innovative solutions for process control, plant engineering, simulation and operations intelligence.			

Measuring everything that matters:

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Siemens Process Instrumentation offers best-in-class measurement and seamless integration into your automation system. We are the total solution provider for flow, level, pressure, temperature, weighing, positioners and more.

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