

Vegadis 81

A practical guide to vegadis 81, covering the reader intent, the relationship to vegadis 81, key evaluation criteria, common risks, and the information the intended project audience should confirm before taking the next step.



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In the field of industrial process automation, the ability to monitor and configure sensors from a safe and accessible location is a fundamental requirement for operational efficiency and personnel safety. The vegadis 81 is an external display and adjustment unit designed specifically for 4...20 mA/HART sensors. It serves as a bridge between complex instrumentation installed in difficult-to-reach locations—such as the top of a tall silo or inside a hazardous chemical tank—and the technicians responsible for maintaining the system.

By leveraging the Highway Addressable Remote Transducer (HART) protocol, the vegadis 81 allows for both the visualization of measured values and the full parameterization of the connected sensor. This guide explores the technical principles, installation requirements, and selection criteria for integrating such units into modern level measurement infrastructures, such as those provided on our Main Page.

| Measurement and Communication Principles

Before selecting or installing a remote display unit, it is essential to understand the underlying communication technology that enables its functionality. The vegadis 81 operates primarily through the HART protocol, which is the global standard for sending and receiving digital information across analog wires between smart devices and control or monitoring systems.

| The HART Protocol

The HART protocol works by superimposing a digital signal on top of the standard 4...20 mA analog signal. This is achieved using Frequency Shift Keying (FSK), based on the Bell 202 communication standard. The digital signal is composed of two frequencies: 1200 Hz representing a logical "1" and 2200 Hz representing a logical "0". Because the average value of these high-frequency sine waves is zero, the digital signal does not interfere with the 4...20 mA analog signal used for primary process control.

In a typical setup, the vegadis 81 acts as a "master" or a "listener" on the loop. It extracts the digital data packets containing the measured value (Primary Variable), unit of measure, and sensor status. Furthermore, it allows the user to send commands back to the sensor to adjust settings such as zero point, span, and damping.

| Loop-Powered Operation

The vegadis 81 is a loop-powered device. This means it does not require a separate external power supply. Instead, it draws the small amount of energy required for its display and internal electronics directly from the 4...20 mA current loop. This simplifies wiring significantly but requires careful calculation of the total loop resistance to ensure the sensor still has enough voltage to operate correctly.

| Technical Specifications and Features

The vegadis 81 is engineered for durability in industrial environments. Its design focuses on clarity of information and ease of use under varying light conditions.

| Display and Interface

Display Type: High-resolution dot-matrix LCD with integrated background lighting.

Operation: Four-key adjustment system (usually featuring a "turn-push" or standard tactile button interface) that allows users to navigate through a clear, text-based menu.

Visualization: It can display the measured value in large digits, along with a bar graph for quick visual reference of the tank level (0-100%).

| Physical Construction

To accommodate different industrial settings, the unit is available in various housing materials:

Plastic (PBT): Suitable for standard industrial applications and water treatment facilities. Usually rated IP66/IP67.

Stainless Steel (316L): Designed for aggressive environments, offshore applications, or the food and pharmaceutical industries where hygiene and corrosion resistance are paramount.

Aluminum: Offers a balance of weight and ruggedness for general process industries.

Performance Parameters

Feature	Specification
Ambient Temperature	-20 °C to +70 °C
Protection Rating	IP66/IP67 (NEMA 4X)
Signal Input	4...20 mA/HART
Voltage Drop	Approximately 3.5 V (with lighting)
Max. Cable Length	Dependent on loop resistance (typically up to 500 m)

Selection Criteria for External Displays

Choosing the correct external display depends on the specific needs of the process and the physical layout of the plant. While the vegadis 81 is a versatile tool, engineers should evaluate the following factors:

| 1. Adjustment vs. Display Only

Some units only display the 4...20 mA value as a scaled percentage or engineering unit. The vegadis 81 is an adjustment unit, meaning it can change the sensor's internal configuration. If the application only requires a remote readout without the need for periodic recalibration, a simpler digital indicator might suffice. However, for complex radar or ultrasonic sensors, the ability to perform a "false signal suppression" or change the medium density from the ground level is a significant advantage.

| 2. Hazardous Area Requirements

If the sensor is located in an ATEX/Ex zone, the display unit must also carry the appropriate certifications (e.g., Intrinsic Safety 'i'). The vegadis 81 is available in versions approved for use in explosive atmospheres, ensuring that the integrity of the safety loop is maintained.

| 3. Mounting Location

The unit can be mounted in several ways:

Wall Mounting: Ideal for eye-level monitoring near walkways.

Pipe Mounting: Useful for attaching the display to existing process piping.

Carrier Rail: For installation inside local control panels or junction boxes.

| Installation and Commissioning Considerations

Correct installation is critical to ensure reliable communication between the sensor and the vegadis 81.

| Wiring Configuration

The unit is typically connected in series within the 4...20 mA loop. However, because it uses HART communication, it can also be connected in parallel across the sensor if the loop resistance is sufficient.

Important Note on Resistance: For successful HART communication, the total loop resistance (including the load of the PLC/DCS and the cable) must be at least 250 Ohms. If the resistance is too low, the digital signal will be dampened, and the vegadis 81 will be unable to communicate with the sensor. Conversely, if the resistance is too high, the voltage drop may prevent the sensor from functioning at a full 20 mA output.

| Commissioning Steps

1. **Mounting:** Secure the housing to a vibration-free surface.
2. **Electrical Connection:** Connect the two-wire cable to the terminals, ensuring correct polarity. If the unit is loop-powered, the display should activate immediately once the loop is energized.
3. **Sensor Detection:** The unit will automatically search for connected HART slaves. Once detected, the sensor type and current measured value will appear on the screen.
4. **Parameterization:** Use the menu to set the min/max adjustment (e.g., 0% = 5.000 m, 100% = 0.500 m).
5. **Scaling:** Define how the value should be displayed (e.g., Liters, Cubic Meters, or Percentage).

| Practical Selection Table

To assist in the engineering phase, use the following table to determine the necessity of an external adjustment unit like the vegadis 81.

Requirement	Recommended Solution
Sensor is mounted > 3m high or in a confined space	External Display/Adjustment Unit
Frequent changes to process media (e.g., different liquids)	Adjustment Unit (HART enabled)
Simple level monitoring for non-critical tanks	Standard 4-20mA Digital Indicator
Integration into a central SCADA with local backup	HART Display with Analog Output Loop
High-vibration environments at the tank top	Remote Display mounted on a stable structure

| Limitations and Operational Constraints

While the vegadis 81 is a robust tool, there are limitations to its application:

Update Rate: HART communication is relatively slow compared to pure analog signals or Fieldbus protocols like Profibus. Digital values typically update 1-2 times per second. This is sufficient for level measurement but may be too slow for high-speed flow or pressure control loops.

Voltage Drop: As a loop-powered device, it introduces a voltage drop (approx. 3.5 V). If the power supply is only 24 V and the loop has long cable runs and multiple barriers, the remaining voltage might fall below the sensor's minimum operating threshold (usually 12-15 V).

Compatibility: While HART is a standard, some proprietary advanced diagnostic features of specific sensors may only be accessible via the manufacturer's dedicated software or specific DTMs (Device Type Managers). However, standard adjustment functions are almost always supported.

| Frequently Asked Questions (FAQs)

Q: Can one vegadis 81 monitor multiple sensors?

A: Standard configurations are designed for a 1:1 relationship in a 4...20 mA loop. However, in HART multidrop mode, it is theoretically possible to address multiple sensors, though this is less common for local display applications where a dedicated readout for each tank is preferred.

Q: Does the unit require a battery?

A: No, it is powered by the 4...20 mA current loop. It retains its settings and the sensor's configuration in non-volatile memory even during power failures.

Q: Can I use the vegadis 81 with sensors from other manufacturers?

A: Yes, provided the sensor supports the HART protocol. While it is optimized for specific product lines, the core HART commands for reading PV (Primary Variable) and basic scaling are standardized.

Q: What happens if the display fails?

A: Since the unit is connected in series, a total electronic failure of the display could potentially interrupt the 4...20 mA loop. However, most modern units are designed with bypass circuitry to ensure the analog signal remains intact even if the display logic encounters an error.

| Conclusion

The vegadis 81 represents a critical component in the user-centric design of industrial measurement systems. By separating the point of measurement from the point of operation, it enhances safety and simplifies the maintenance of complex level sensors. For engineers looking to optimize their process monitoring, integrating reliable external displays ensures that critical data is always accessible where it is needed most. For more information on compatible radar and ultrasonic sensors, visit our [Main Page](#) to explore our full range of industrial solutions.