



Eltav's Wireless Monitoring— Valve Device



A typical actuator Installation



The Operator's Device



The VDR

Eltav's Success

The Eltav Wireless Valve Monitoring System has consistently proved itself in all industrial installations.

Valve Device Overview

The Eltav Valve Device (VD) is the basic component of the Eltav Wireless Monitoring System. It is installed on top of the monitored valve or actuator and consists of a stem attached mechanically to the valve or actuator axle. The VD incorporates the means and sensors to measure the angle which corresponds to the opening status of the valve (in degrees or opening percentage). The valve status is transmitted by an internal bi-directional transceiver that is based on the standard Zigbee protocol. A dedicated Low Frequency (LF) receiver, in the VD, supports unique maintenance and provisioning procedures.

VD Operation

The VD is a smart device with three integrated processors that continuously maintain the highest quality of performance for fast response times, high communications reliability, and optimal battery consumption (5 years with one set of replaceable batteries). The VD is packaged in a compact plastic enclosure that complies with the environmental requirements typical of the process industry.

Eltav's wireless valve monitoring system brings breakthrough wireless technology that provides real-time information about a valve's status directly into the control process reducing failure and risk while increasing safety and yield – all for a fraction of the cost of traditional wired systems.

The Eltav Valve Device can be installed directly on valves using ISO/DIS 5211.2 F03 to F12 flanges and on actuators using the NAMUR interface. On other valves a mechanical bracket is used.

Ordering Information

- VDA00012: Quarter turn Wireless Monitoring Valve Device with Zigbee, non-EX
- VDA00014: Quarter turn Wireless Monitoring Valve Device with Zigbee, EX certified
- VAL00001: 1" manual valve
- EAC00012: Valve Simulator
- VDA80002: Metal bracket for 1" manual valve EAC00011
- VDA80001: Plastic leg for NAMUR actuator



System Configuration

The Eltav Wireless Valve Monitoring System consists of the following components:

VD (Valve Device)

Installed on the valve (or actuator) and reports on valve status (by measuring stem angle) at predetermined times or whenever a deviation in stem angle is detected.

VDR (Valve Device Router)

Collects reported data from all associated VDs and wirelessly transfers the information to the next VDR on a "mesh" topology.

TVDR (Tunneling VDR)

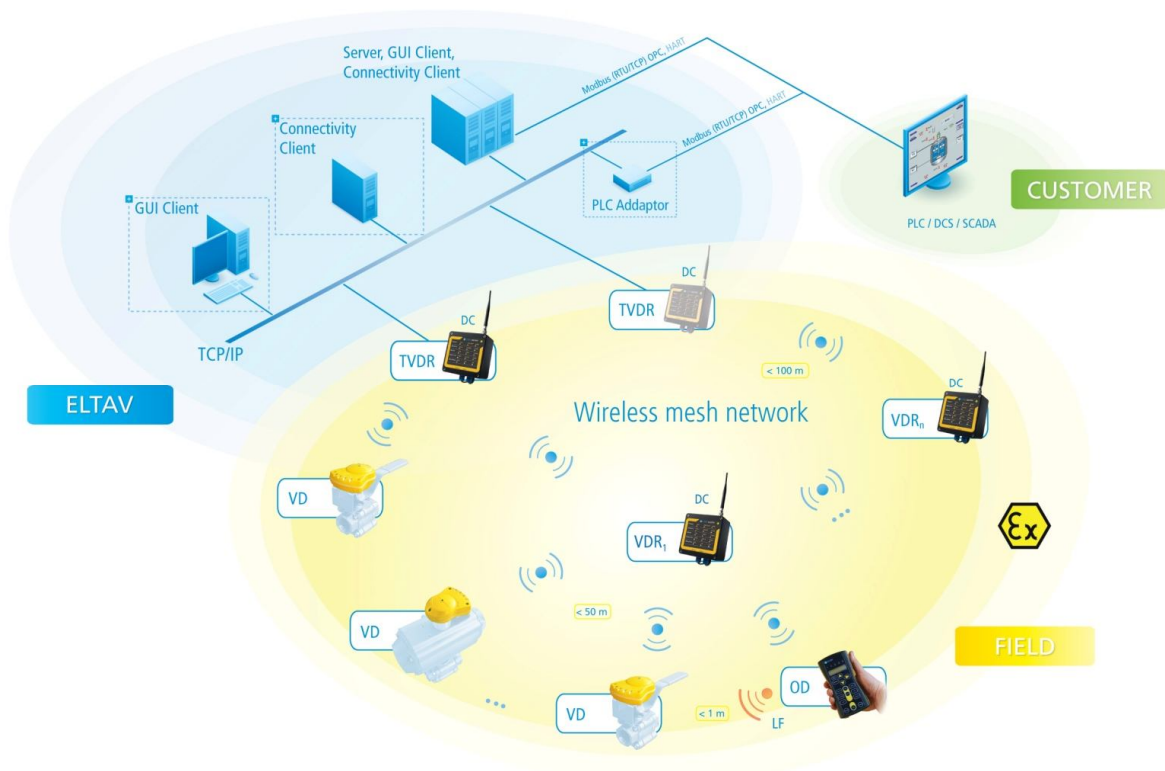
Last-hop VDR that transfers collected data from VDRs to the Eltav Gateway. Several TVDRs can be connected, via TCP/IP, to the Eltav Gateway (thus ensuring full redundancy and avoiding a single point of failure).

Eltav Gateway

An industrial computer running the EMS package used to manage the Eltav Network, and the OPC Server which establishes the interfaces to the OPC data clients and/or PLCs.

OD (Operator Device)

A hand-held device, that enables the operator to communicate with the Eltav System and its devices, using wireless communication. The OD also delivers messages to operators, reports on performance and is used to support installations, configuration, provisioning and maintenance.



Valve Device Specifications

Wireless Communication (RF)	
Mode	Two way Radio – IEEE 802.15.4 – 2006 at 2.4 GHz.
Communication Protocol	Zigbee Pro version (will be modified to ISA-100 when released and available).
VD max Transmitted Power	+3dBm.
VD Antenna	Internal +2 dBi peak. Optional external antenna F-SMA connector (VD mounted or remote).
Communication range VD/VDR	Open space – about 70m / Indoors at non obstructed environment – about 25 m.
Latency	Less than 0.1 sec in average (assuming one hop)
Approach	
Measurement	Angle of valve's stem position.
Update Rate	VD is at sleep at all times. It transmits its status every 15 min or when a valve is moved more than 1.5°.
Sense Movement Duration	Between 30 msec to 7 minutes
Sector	Quarter turn: - 10° to +100°
Resolution	0.1°
Accuracy	±1°
Calibration and setup on valve	This is done using the Operator Device (OD) with short range low frequency wireless communication between OD and VD.
Message timing	Each message is sent by the VD with a real time stamp.
Low Frequency (LF)	
Characteristics	125kHz (3 channels) – Short range receiver continuously open, also when VD is turned OFF - VD on/off, calibration, identification, commissioning, test, etc.
Sensitivity	~2 mV each channel
Data Rate	1,366 bps
Modulation	OOK Manchester
LF Range (with OD)	~1 meter
General	
Additional VD Data	VD internal temperature, battery voltage and unit's house-keeping parameters.
Battery	2 X Lithium Tadiran ½ AA TLL5902. Field replaceable.
Battery Life	5 years assuming one valve position change per hour and nominal configuration.
Valve Transition Measurement (optional)	After 1.5° move of valve, VD collects up to 64 readings of valve position every 5 ms up to 9 sec (user selectable in discrete steps) and transmits them as a packet.
VD software upgrade	Both Zigbee stack and MCU application can be upgraded through the Zigbee link (Download Over Radio).
Case Material	Nylon 12 with 50% glass beads, UV stable
Operating Temperature	-40°C to 85°C
Sealing	IP66 grade
ATEX	Category 2 / Division 1 - II 2 G Ex ia IIC T4 (intrinsic safety Zone 1/21)



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