VEGA T2

The Electronic Counter for Road Tanker Operations

CE (Ex) *IECEx* MID OIML R117-1

VEGA T2 is the ultimate solution in terms of electronic register & controller for tank truck applications.

VEGA T2 allows to enhance the tank truck deliveries, where precision meets convenience, increasing the operational efficiency, with an advanced electronic register.

VEGA T2 register can handle two meters at the same time for fuel unloading operations, both by pump and gravity. It shall take care of all the metrology relevant metering operations and controlling the delivery automation by managing the preset valve, if any, in order to deliver the exact required amount.

Up to 4 different products may be associated to each flow meter, each one identified on the display with a clear coloured label, and each one associated to a specific k-factor and error curve.

With its large and bright colour display, VEGA T2 guarantees the operator a very intuitive and easy to use interface, with clear output messages and progress status bars, supported by a full-size keyboard, with layout available in multiple languages.

VEGAT2 is very much communication oriented, thanks to its multiple serial ports (Modbus RTU), Ethernet port (Modbus TCP) and WiFi / Bluetooth compatible interface. This opens a very broad range of opportunities of integration with on board computers or externals devices, for both data sharing and for service applications.

	Integrated ON-OFF button		WiFi & Bluetooth Compatible	
LED	7" Color Display		Web App for Remote Control	App
	Color Progress Bar		Freeware Windows Toolkit	
	Smart Membrane Keyboard		Metrology Optical Seal	

Functions

Measurement unit	Preset and calculations in: • litres, gallons (US, UK), cubic meters, cubic centimeters (volume) • grams, kilograms, pounds, tons (mass) • customized measurement unit of max 8 alphanumeric digits (upon request) • measurement unit/min or measurement unit/hour (flow rate) • °C or °F (temperature).
Quantity acquisition	• Dual pulse counting for dual channel pulse emitters by continuous monitoring of pulses managing according to OIML R117, ISO 6551 level B, and to API chapter 5.5 level B. • Connection to ISOIL EM6422 via protected CanBus protocol in order to improve safety of data transmission, immunity against tampering and to enhance the self-diagnosis functions. • Interface to electronic unit able to transmit quantities information via serial line by ModBus RTU protocol (e.g., Promass E+H Coriolis mass meter). Specific parameters are used to set slave address, registers number and data types.
Density acquisition	Base density (standard conditions) or observed density (ambient temperature) can be acquired via 4÷20 mA input or via ModBus RTU serial line. VEGA T2 calculates the density average value during product delivery.
Temperature acquisition	Temperature can be acquired via PT100 thermoresistance or from a temperature probe via ModBus RTU serial line. VEGA T2 calculates the temperature average value during product delivery (°C o °F).

Temperature compensation	VEGA T2 (with compensating function) calculates of product volume with reference to base temperature (Tb), usually 15°C or 20°C, for the petrochemical products with configurable API compensation tables (tables 5, 6, 23, 24, 53, 54, 59, 60 product group A, B, C, D) and BRASIL table.
Volume to mass conversion	Calculation is made with: • observed density if available • compensated volume (GSV) and density at standard conditions (VEGA T2 with compensation function only).
Meter calibration	For each meter VEGA T2 allows the setting of: • k-factor (pulses/measurement unit, meter factor) • correction curve (up to 10 pairs of flow rate/correction values for error correction throughout flow rate range) • meter factor (average calibration factor) for each measured product.
Transaction data	Transactions data are automatically stored in binary and CSV (Comma Separated Value) formats files on FIFO mass memories. Repositories can be consulted locally thanks to a graphical tool on the menu. VEGA T2 also integrates an FTP server that allows to access to transactions files (read only mode) via FTP clients.

Operations

Delivery management

Management of:

- up to six compartments valves;
- up to three hoses selection valves;
- pump or gravity unloading selection.

Product delivery can be performed in different modes according to the START/STOP button and to the preset of the required quantity.

- Free discharge: the operator manages product supply by acting on the pump or on the manual valve. The electronic counter measures the delivered quantity.

- With START/STOP (no preset): product delivery can be started and stopped with the START and STOP buttons thus enabling the electronical counter to open and close the valve that intercepts product flow.

- With preset: the operator sets the desired quantity and starts product delivery with the START button. The electronic counter opens/closes the valve in order to supply the preset quantity. Whenever required the operator can stop, restart or terminate product delivery.

When in remote mode VEGA T2 is controlled by an OBC (On Board Computer) and once initialized it works independently controlling product delivery by means of the devices it is connected to. The system can control the following functions:

- driver/customer identification (if required)
- insert PO number (if required)
- delivery start and stop, method selection (automatic/ semiautomatic.), reset of quantity
- alarm reset

- data acquisition (status)
- preliminary and final data summary
- download of product delivery data.

Remote control is achieved though Ethernet, WiFi, Bluetooth compatible connection or serial communication with proprietary or ModBus TCP/RTU protocol.

Report printing

VEGA T2 can be connected to following ticket printers:

- ST100/201/202 (Epson TM295) impact ticket printer
- Epson TM-U220 impact roll paper printer
- Epson TMT88VI thermal roll paper printer

At the end of each transaction a print report is generated.

The report can be configured to print desired data from those available according to parameters settings.

Inputs and outputs configuration

The VEGA T2 firmware grants maximum flexibility to fit the needs of different devices and field signals.

Each digital input can be programmed defining:
- predefined list of interlocks and signals
- generic interlock with programmable labels
- layer management (system, meter, product/additive)
- input logic (not inverted/ inverted).

Each digital output can be programmed defining:
- predefined list of signals
- layer management (system, meter, product/additive)
- input logic (not inverted/ inverted).

```
AVERAGE
CTPL                          1,00478
CPL                           1,00000
CTL                           1,00478
PRESSURE                   1,20 kPag
DENSITY
891,7 kg/m³
887,5 kg/m³(15,0°C)
TEMPERATURE                     9 °C
FLOWRATE                 1074 L/min

COMP. TABLE                      54B

MASS                        kg(mass)
END TOT.                        37731
START TOT.                      36815
DELIVERED                         916

VOLUME (GSV)        L(15,0°C-0kPag)
END TOT.                        39943
START TOT.                      38911
DELIVERED                        1032

VOLUME (GST)            L(15,0°C)
END TOT.                        42518
START TOT.                      41486
DELIVERED                        1032

VOLUME (GOV)                        L
END TOT.                        55362
START TOT.                      54335
DELIVERED                        1027

PRICE                               €
PER €/L                         1,450
TOTAL                        1489,15

PRESET                        1000 L

PRODUCT                     GASOLINE

END TIME                     18:52:37
START TIME                   18:51:28
BATCH N°                         1394

TAS Field 1                   Test 1
TAS Field 2                   Test 2

DRIVER ID                          24
CUSTOMER ID                        63
ORDER ID                           41

PIN CODE                         1468

METER N°                       MET 1
VEGA T2                   VT2-012345

DATE                       26/01/2023
```

Pulse output can be additionally programmed to represents factorizable measured quantities.

4÷20 mA inputs

The 4÷20mA inputs can be configured to:

- receive actual product density. It's possible to select two types of data to be represented in the input: density at base temperature condition and density at observed condition.
- receive observed pressure.

Connectivity

VEGA T2 offers a broad range of data connections:

- N°1 Ethernet 1Gbps port
- WiFi and Bluetooth compatible (optional board)
- N°4 Serial ports RS485 – RS232
- N°1 USB port

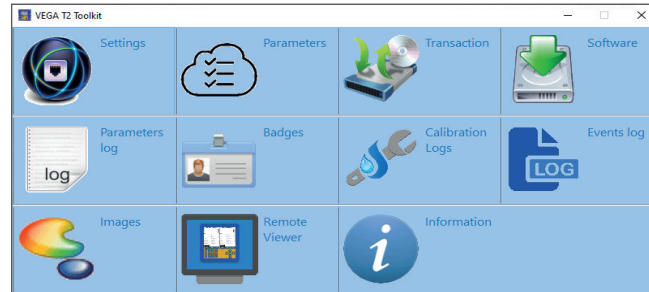Ready for comms with most of the OBCs (On Board Computers).

Each port can be interfaced with VEGA T2 by:

- ModBus RTU/TCP protocol
- FTP protocol
- Proprietary ASCII protocol
- Remote viewer protocol

Toolkit

The Freeware Toolkit app for Windows platform, can be used for diagnostic and maintenance purpose via Ethernet, WiFi or using USB Pen drive.

VEGA T2 Toolkit

Transaction Data

Main functions:

- Parameters transfer
- Parameters editing
- Parameters modification logs
- Transactions downloading

- Events logs downloading
- Software update
- Remote viewer (display view and keyboard control)

Approvals

VEGA T2 is approved according to:

- International IECEx scheme
- European directive 2014/34/UE "ATEX" (explosive atmospheres)
- European directive 2014/30/UE "EMC" (electromagnetic compatibility)
- European directive 2014/53/UE "RED" (radio equipment)
- European directive 2014/35/EU "LVD" (low voltage)
- European directive 2014/32/UE "MID" (measuring instrument)

Metrological Characteristics

VEGA T2 is a calculator-indicating device to be used in measuring systems for liquids other than water (MI-005 - Measuring Instruments Directive 2014/32/UE) approved by the notified body LNE (France) with the Evaluation Certificate n. 38495, according WELMEC guides 8.8 and 7.2 and according OIML R117-1.

- Single and dual meters management

- Multiple products management: up to 4 products per meter

- Security:

  - Weight and Measure Switch seal
  - Up to 8 user accounts
  - Log parameters modification function
  - Continuous self-diagnosis

- Approved for interruptible and non-interruptible measuring systems

- Hardware certification:

  - Mechanical class: M3
  - Electrical class: E3
  - Humidity class: H3

- Temperature range: from -40°C to +55°C

- Software certification according Welmec Guide 7.2 with the following extensions:

  Extension S (Software separation):

  the metrological part of the software is separated from the automation one;

  Extension L (Long term data storage):

  delivery data (100,000 deliveries) are saved and stored in a structure with MID criteria.
  Data can also be downloaded via serial line or directly consulted on the display thanks to a specific tool.

  Extension T (Legally relevant data transmission):

  delivery data can be sent to a printer via serial line with legally relevant protocol.

  Extension I (Specific Software Requirement)

Technical Specifications

ENVIRONMENTAL CHARACTERISTICS

Ambient Working Temperature:	-40°C to +55°C (233 K to 328 K)
Ambient Storage Temperature:	-40°C to +65°C (233 K to 338 K)
Humidity:	5 to 95 % UR

ENCLOSURE PROTECTION

ATEX-IECEX:	II 2 G Ex db ib IIB T6 Gb
Mechanical Protection:	IP66 (according IEC 60529), outdoor use

MECHANICAL CHARACTERISTICS

Enclosure Material:	Aluminium
Dimensions:	247 x 247 x 94 mm
Weight:	7.5 kg approximately
Mounting:	On panel with n°4 threaded holes M6x12 mm
Cable Entries:	n° 7 holes threaded ½" NPT (ANSI ASME B1.20.1)

ELECTRICAL CHARACTERISTICS

Power Supply:	Tank Truck Version C: 9 to 32 VDC	
Maximum Power Consumption:	18W 12W (internally dissipated) and 6W (power supply to external accessories)	
Fuse:	Tank Truck Version C: 4A 32V mini blade fuse for vehicles	
Overvoltage category:	2	
N° 2 Counting Inputs:	Voltage:	+12 VDC
	Max. Current:	100 mA
	Input type:	Dual channel 90° shifted (quadrature)
	Max. Frequency:	5 KHz
N° 6 Digital Inputs:	Connection Type:	from dry contacts or from NPN open collector
	Input Type:	
	V(low-min.)	3.3Kohm internal pull-up towards +12 VDC 30W
	V(high-max.):	+2 VDC
		+7 VDC
N°2 PT100 Inputs (Optional Board 2PTC)	Inputs:	n° 2 inputs for platinum temperature probe - IEC751, DIN 43760 (0.00385 Ω/°C)
	Temperature range:	-50°C to +250°C
	Resolution:	0.025°C min. (10 000 effective points)
	Deviation (all gain):	±0.125°C max. (500 ppm max)
	Refresh:	500 ms.
N°4 4-20mA Inputs (Optional Board 4IN)	Input resistance:	25 Ω
	Resolution:	2 µA min. (10 000 effective points)
	Deviation (all gain):	±10 µA max. (600 ppm max.)
	Updating time:	min. 500 ms
	Max. connected devices per line:	5

N° 6 Mosfet Digital Outputs (Tank Truck Version C):	Max Operating Voltage:	30 VDC
	Max. Current:	1 A
	Max commutable load:	30 W
	Min commutable load:	9 V, 2 mA
N° 4 Open Drain Digital Outputs:	Max Operating Voltage:	30 VDC
	Max. Current:	250 mA
	Max Frequency (pulses):	10 KHz
	Duty cycle (pulses):	50%
	Max. delay (pulses):	100 ms
N°4 4-20mA Outputs (Optional Board 4IN)	Resolution:	4 µA min. (5 000 effective points)
	Deviation (all gain):	±20 µA max. (1 000 ppm max.)
	Updating time:	500 ms
	Max. loop resistance:	500 Ω
Serial Communication Lines:	n°4 ports RS485 (2 wires) RS232 switchable	
CAN-bus:	n°2 communication lines from external devices	
Display:	TFT colors, resolution VGA (800 x 480 pixel), dimension: 7", LED backlight	
Keyboard:	Membrane keyboard with 23 keys	
Ethernet:	N°1 Ethernet 1Gbits	
Wireless (WiFi – Bluetooth compatible) (Optional Board)	WiFi	2,4Ghz IEEE Std 802.11b, 802.11g, and 802.11n
	Bluetooth compatibility	Bluetooth and Bluetooth LE (Bluetooth 5.1)

Technical Specifications - Accessories

P.D. Meters for Tank Trucks

• Light aluminium construction

• Full assembly, complete of strainer air separator & preset valve

4" GRAVITY FLOW - S9000	
Max flow rate:	1 000 litres/min (with full liquid head)

4" PUMP AND GRAVITY FLOW - S9500	
Max flow rate:	1 000 litres/min (pump/gravity with full liquid head)

PUMP FLOW	
2" SBM75	
Max flow rate:	500 litres/min
3" SBM150	
Max flow rate:	1 300 litres/min

EM6422 Pulse Emitter

EM6422	
Resolution:	64 or 256 pulses/revolution
Output:	Dual pulse in quadrature Can-bus transmission
Electrical Protection:	II 2 G Ex db IIB T6 Gb Tcable 80°C
Power supply:	5 to 30 VDC
Temperature Range:	-40°C to +75°C

PT100 Probe

PT100	
Electrical Protection:	Ex d IIC T6 Gb
Type:	Four wires Class A RTD

LFD-6 Large Figure Display
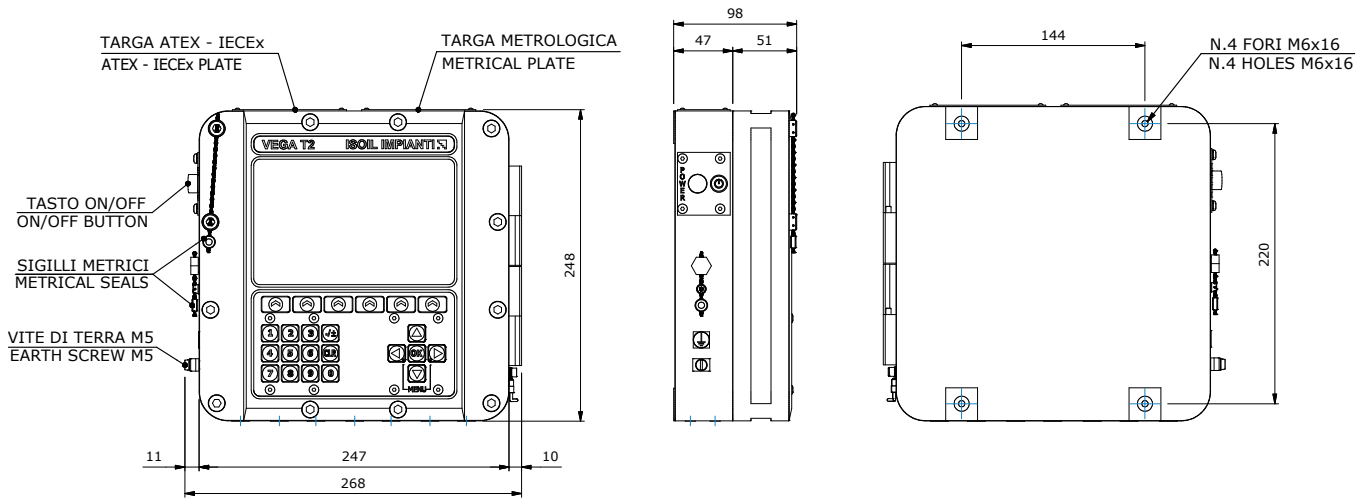
LFD-6	
Six digits high visibility remote indicator	
Digital signal input:	Pulses and Reset
Serial link option:	RS232 and RS485
Digit size:	63(H)x30(L) mm
Electrical Protection:	II 2 G Ex db IIB T6 Gb
Mechanical Protection:	IP66
Power supply:	10 to 30 VDC
Temperature Range:	-25°C to +55 °C

ST201 Ticket Printer

ST201
Epson TM295 ticket printer with stainless steel support
Equipped with anti-vibration supports and provided with integrated power supply for automotive application
Automatic switch on from VEGA T2
Screw terminals

Dimensions

TARGA ATEX - IECEx
ATEX - IECEx PLATE

TARGA METROLOGICA
METRICAL PLATE

TASTO ON/OFF
ON/OFF BUTTON

SIGILLI METRICI
METRICAL SEALS

VITE DI TERRA M5
EARTH SCREW M5

N.4 FORI M6x16
N.4 HOLES M6x16

98
47   51
144
220
248
11   247   10
268

Ordering Code

VEGA T2 Electronic Counter	-	X	-	X	X	X	X	X

Power Supply 9÷32 V	C

Slot 1- No Optional Board	0
Slot 1- 2PTC Optional Board	1
Slot 1- 4AIN Optional Board	2

Slot 2- No Optional Board	0
Slot 2- 4AOUT Optional Board	1
Slot 2- 4AIN Optional Board	2

Slot 3 (mini) - No Optional Board	0

No WiFi/BT	0
With WiFi/BT	1

1 Meter	1
2 Meters	2