

Separating and protective instruments

Separating and protective instruments

VEGATRENN

149AEx

Separator type KFDO

Barrier type 9001



Product Information



VEGA

Content

1	Product description	3
2	Type overview	5
3	Mounting instructions.	6
4	Connecting to power supply	
4.1	Preparing the connection	7
4.2	Wiring plan	7
5	Operation	
5.1	Adjustment of the separators	9
5.2	Adjustment of the sensor	9
6	Technical data	10
7	Dimensions.	13
8	Product code	14

Take note of safety instructions for Ex applications



Please note the Ex specific safety information which you will find on our homepage www.vega.com/services/downloads and which come with the appropriate instrument with Ex approval. In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units. Each with Ex approval is an associated, intrinsically safe instrument and must not be installed in hazardous areas.

1 Product description

Functional principle

Separators separate intrinsically safe circuits from non-intrinsically safe circuits. In general, a difference is made between galvanic separation by:

- Ex separators (with external energy)
- Separators (without external energy)

Limitation of the electrical variables by:

- Safety barriers

Ex separator VEGATRENN 149AEx

The Ex separator VEGATRENN 149AEx is used as intrinsically safe power supply for Ex approved 4 ... 20 mA/HART sensors. Through the auxiliary energy the sensor can be provided with more power. The instrument ensures a galvanic separation between sensor circuit and processing circuit and hence between Ex and non-Ex areas. The load-independent 4 ... 20 mA current is transmitted linearly to the output. The sockets in the front enable HART communication with the sensor via VEGACONNECT 3. The necessary communication resistance ($R = 250 \Omega$) is already integrated in VEGATRENN 149AEx.

Product properties:

- Universal for all passive 4 ... 20 mA/HART sensors
- HART transmission to the output side
- Sockets in the front for connection of VEGACONNECT
- SIL 2 qualified



Fig. 1: Ex separator VEGATRENN 149AEx

Separator type KFD0

The separator KFD0-CS-Ex1.51P is used for intrinsically safe power supply and signal transmission of Ex approved 4 ... 20 mA sensors. It is loop-powered without external energy. The instrument ensures a galvanic separation between sensor circuit and processing circuit and hence between Ex and non-Ex areas. The load-independent 4 ... 20 mA current is transmitted linearly to the output. However, a HART signal is not transmitted.

Product properties:

- Universal for all passive 4 ... 20 mA sensors
- Also in conjunction with signal conditioning instruments without own Ex approval
- Loop-powered, i.e. no additional power supply required
- Mounting of the separator in Ex zone 2 permitted



Fig. 2: Separator type KFD0-CS-Ex1.51P

Safety barrier type 9001

The safety barrier type 9001 is used for intrinsically safe measuring current transmission in Ex Zone 1 without galvanic separation. It is hence suitable for connection of an indicating instrument to the non-intrinsically safe 4 ... 20 mA output of a signal conditioning instrument. Safety barriers are also called zener barriers.

Product properties:

- Universal use for all 4 ... 20 mA indicating instruments
- Loop-powered, i.e. no additional power supply required



Fig. 3: Safety barrier type 9001

1.1 Application examples

Ex separator VEGATRENN 149AEx

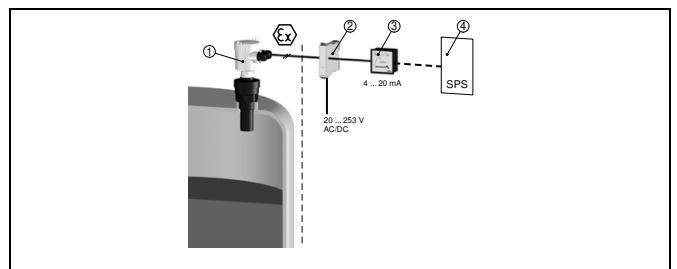


Fig. 4: Intrinsically safe supply of an ultrasonic sensor via VEGATRENN 149AEx, indication of the measured value or transmission to a PLC/control system input card (4 ... 20 mA)

- 1 Sensor
- 2 VEGATRENN 149AEx
- 3 Indication
- 4 PLC/Control system/Processing system

Separator type KFD0-CS-Ex1.51P

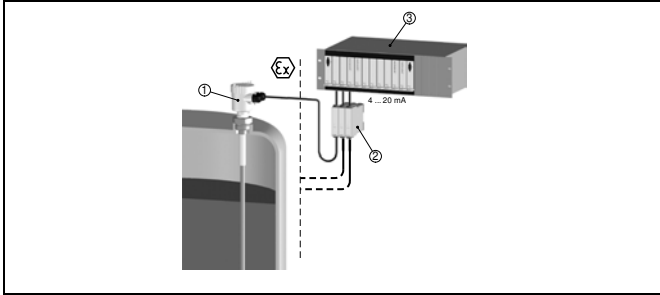


Fig. 5: Connection of a guided microwave sensor to a VEGALOG 571 processing system via the separator type KFD0

- 1 Sensor
- 2 Separator type KFD0-CS-Ex1.51P
- 3 VEGALOG 571 processing system

Safety barrier type 9001

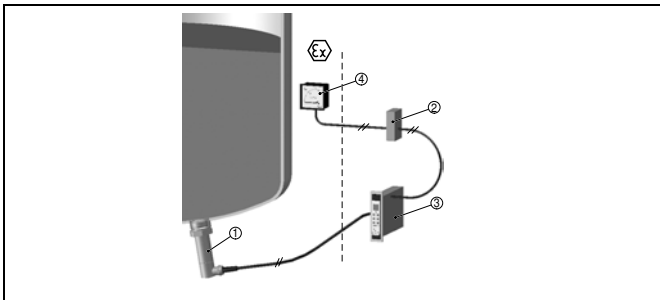


Fig. 6: Connection of an indicating instrument to a VEGAMET signal conditioning instrument via the safety barrier type 9001

- 1 Sensor
- 2 Safety barrier type 9001
- 3 VEGAMET signal conditioning instrument
- 4 Indication

2 Type overview

**Ex separator
VEGATRENN 149AEx**



**Separator
Type KFD0-CS-Ex1.51P**



**Safety barrier
Type 9001**



Applications:	Galvanically separated voltage supply of Ex approved 4 ... 20 mA sensors	Galvanic separation of intrinsically and non-intrinsically safe 4 ... 20 mA circuits	Intrinsically safe measuring current transmission in Ex zone 1
HART signal transmission:	Yes	No	No
Sensors:	4 ... 20 mA passive	4 ... 20 mA passive	4 ... 20 mA indication
Mounting:	Carrier rail	Carrier rail	Carrier rail
Ignition protection label:	II (1)G D [Ex ia] IIC	II (1)G D [Ex ia] IIC	II (1/2)G [Ex ia/ib] IIC/IIB

3 Mounting instructions

Installation

All separators described in this product information manual are mounted on carrier rail 35 x 7.5 according to EN 50022.

4 Connecting to power supply

4.1 Preparing the connection

Note safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed



Tip:

We recommend VEGA overvoltage arresters B61-300 (external energy) and B62-36G (sensor supply).

Take note of safety instructions for Ex applications



In hazardous areas you should take note of the appropriate regulations, conformity and type approval certificates of the sensors and power supply units.

Select power supply

The voltage supply for the Ex separator VEGATRENN 149AEx must be in the range of 20 ... 250 V AC, 50/60 Hz or 20 ... 250 V DC.

Selecting connection cable

For power supply of VEGATRENN 149AEx, an approved installation cable with PE conductor is necessary.

The sensor or the signal conditioning instrument are connected with standard two-wire cable to the separator. If strong electromagnetic interference is expected, screened cable should be used.

Cable screening and grounding

If screened cable is used, connect the cable screen on both ends to ground potential. In the sensor, the screen must be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the potential equalisation.

If potential equalisation currents are expected, the screen connection on the separator or signal processing instrument must be made via a ceramic capacitor (e. g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

Select connection cable for Ex applications



Take note of the corresponding installation regulations for Ex applications. In particular, make sure that no potential equalisation currents flow over the cable screen. In case of grounding on both sides this can be achieved by the use of a capacitor or a separate potential equalisation.

4.2 Wiring plan

Ex separator VEGATRENN 149AEx

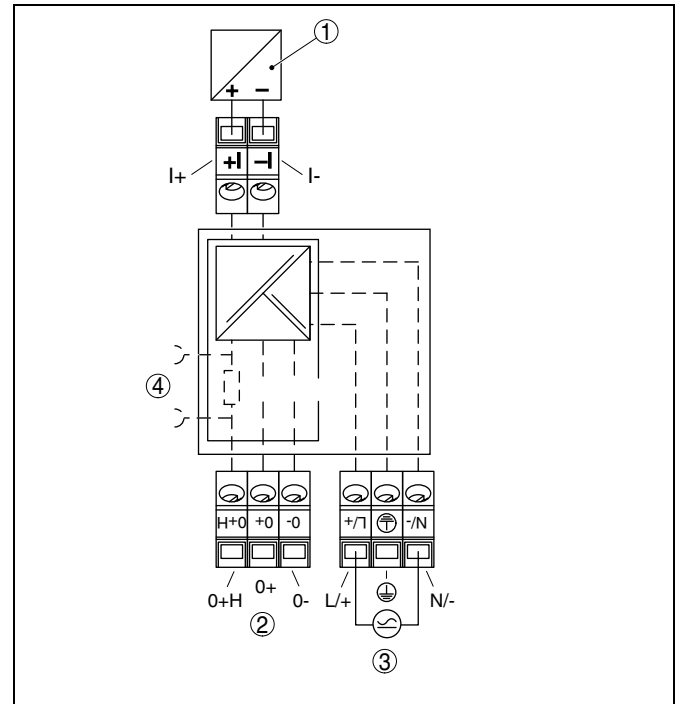


Fig. 7: Terminal assignment VEGATRENN 149AEx

- 1 Sensor circuit
- 2 Processing circuit
- 3 Power supply
- 4 HART communication sockets

Separator type KFD0-CS-Ex1.51P

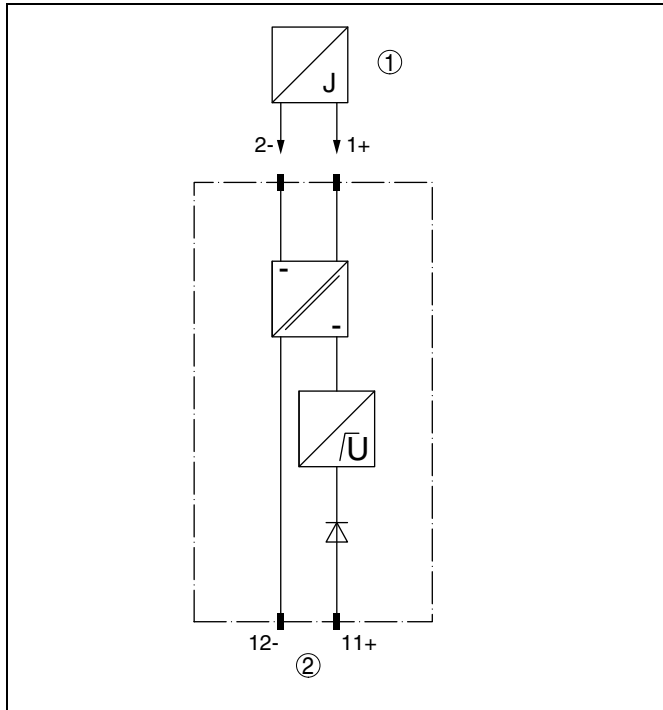


Fig. 8: Terminal assignment separator type KFD0-CS-Ex1.51P

- 1 Sensor circuit
- 2 Processing circuit

Safety barrier type 9001

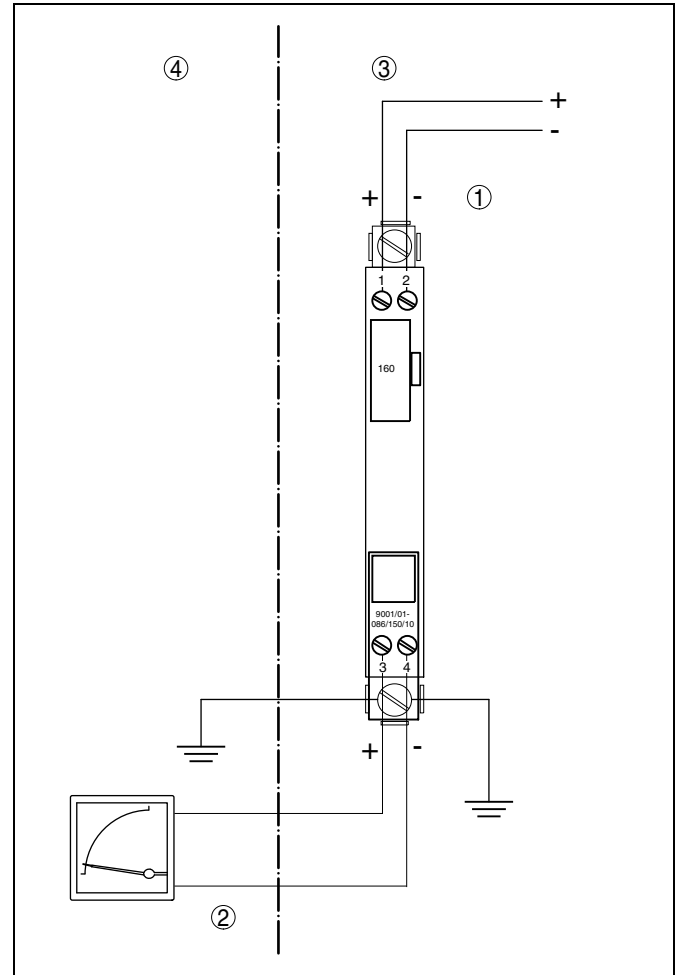


Fig. 9: Terminal assignment safety barrier type 9001

- 1 Input circuit (non-intrinsically safe)
- 2 Output circuit (intrinsically safe)

5 Operation

5.1 Adjustment of the separators

After installation, the separators described in this product information manual are immediately ready for operation. An adjustment is not required.

5.2 Adjustment of the sensor

A VEGA sensor powered via the VEGATRENN 149AEx can be also adjusted via the VEGATRENN 149AEx. You will need a Windows-PC with the configuration software PACTware™ and a suitable instrument driver (DTM) according to the FDT standard. For connection, the VEGACONNECT 3 interface converter with corresponding cable is required.

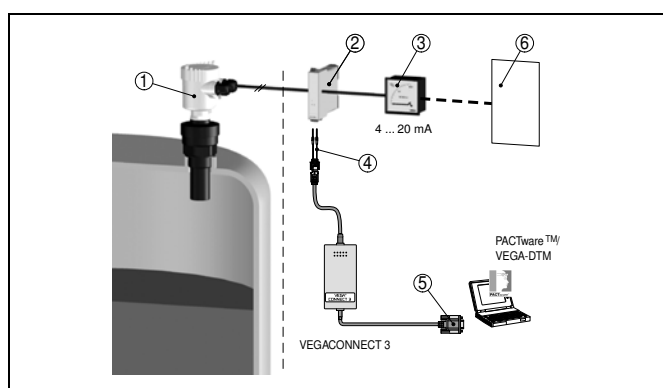


Fig. 10: Adjustment of the sensor via VEGACONNECT 3 and VEGATRENN 149AEx

- 1 Sensor
- 2 VEGATRENN 149AEx
- 3 Indication
- 4 HART adapter cable for VEGACONNECT 3
- 5 RS232 connection
- 6 PLC/Control system/Processing system

Necessary components:

- Sensor
- PC with PACTware™ and suitable VEGA DTM
- VEGACONNECT 3 with HART adapter cable
- VEGATRENN 149AEx

6 Technical data

General data

VEGATRENN 149AEx

Series	Instrument for mounting on carrier rail 35 x 7.5 according to EN 50022
Dimensions	W = 22.5 mm (0.89 in), H = 112 mm (4.41 in), D = 110 mm (4.33 in)
Housing material	Polycarbonate ABS, flammability class UL94V-0
Weight approx.	150 g (0.44 lbs)

Separator type KFD0-CS-Ex1.51P

Series	Instrument for mounting on carrier rail 35 x 7.5 according to EN 50022
Dimensions	W = 20 mm (0.79 in), H = 115 mm (4.53 in), D = 107 mm (4.21 in)
Weight approx.	100 g (0.22 lbs)

Safety barrier type 9001

Series	Instrument for mounting on carrier rail 35 x 7.5 according to EN 50022
Dimensions	B = 12.2 mm (0.48 in), H = 71.5 mm (2.81 in), T = 102 mm (4.01 in)
Housing material	Polyamide 6 GF
Weight approx.	115 g (0.44 lbs)

Sensor circuit

VEGATRENN 149AEx

Range	4 ... 20 mA
Supply voltage	16.7 V \pm 0.2 V (at 20 mA)
Open-circuit voltage	26 V \pm 5 %
Shortcircuit current	\leq 32 mA
Inner resistance	328 Ω

VEGATRENN 149AEx intrinsically safe (max. values in case of failure)

Open-circuit voltage	$U_o \leq 27.3$ V
Shortcircuit current	$I_o \leq 84.1$ mA
Power	$P_o \leq 576$ mW
Capacitances	
– EEx ia IIC	$C_o \leq 86$ nF
– EEx ia IIB	$C_o \leq 683$ nF
– EEx ia IIA	$C_o \leq 683$ nF
Inductances	
– EEx ia IIC	$L_o \leq 5.5$ mH
– EEx ia IIB	$L_o \leq 20$ mH
– EEx ia IIA	$L_o \leq 20$ mH

Separator type KFD0-CS-Ex1.51P

Range	4 ... 20 mA
Output voltage	
– at 4 V < supply voltage < 24 V	\geq supply voltage - (0.4 x current in mA)V - 1 V
– with supply voltage \geq 24 V	23 V - (0.4 x current in mA)V
Shortcircuit current	\leq 65 mA

Separator type KFD0-CS-Ex1.51P intrinsically safe (max. values in case of failure)

Open-circuit voltage	$U_o \leq 25$ V
Shortcircuit current	$I_o \leq 93$ mA
Power	$P_o \leq 585$ mW
Capacitances	
– EEx ia IIC	$C_o \leq 2.41$ μ F
– EEx ia IIB	$C_o \leq 16.8$ μ F
– EEx ia IIA	$C_o \leq 75$ μ F
Inductances	
– EEx ia IIC	$L_o \leq 4$ mH
– EEx ia IIB	$L_o \leq 17$ mH
– EEx ia IIA	$L_o \leq 32$ mH

Input circuit

Safety barrier type 9001

Nominal voltage	6 V DC
Zener voltage	8.6 V
Leakage current against ground with U_{Nom}	$\leq 1 \mu A$
min. longitudinal resistance	64 Ω
max. longitudinal resistance	73 Ω

Processing/Output circuit

VEGATRENN 149AEx

Open-circuit voltage	24 V $\pm 10 \%$
Max. load	
– without communication resistance	700 Ω
– with communication resistance	450 Ω

Separator type KFD0-CS-Ex1.51P

Voltage	4 ... 35 V DC
Current	40 mA
Power loss	
– with 40 mA and voltage < 24 V	700 mW
– with 40 mA and voltage ≥ 24 V	1.2 W

Indication circuit

Safety barrier type 9001

Shortcircuit current	≤ 150 mA
Capacitances	
– EEx ia IIC	$C_o \leq 6.2 \mu F$
– EEx ia IIB	$C_o \leq 55 \mu F$
Inductances	
– EEx ia IIC	$L_o \leq 1.3$ mH
– EEx ia IIB	$L_o \leq 7$ mH

Ambient conditions

VEGATRENN 149AEx

Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
Storage and transport temperature	-40 ... +70 °C (-40 ... +158 °F)

Separator type KFD0-CS-Ex1.51P

Ambient temperature	-20 ... +60 °C (-4 ... +140 °F)
---------------------	---------------------------------

Safety barrier type 9001

Ambient temperature	-20 ... +60 °C (-4 ... +140 °F)
Storage and transport temperature	-40 ... +75 °C (-40 ... +167 °F)

Voltage supply

VEGATRENN 149AEx

Supply voltage	20 ... 253 V AC, 50/60 Hz 20 ... 253 V DC
Max. power consumption	2.4 W

Electrical protective measures

VEGATRENN 149AEx

Protection	IP 20
------------	-------

Separator type KFD0

Protection

IP 20

Safety barrier type 9001

Protection

- Terminal bearing
- Housing

IP 20

IP 40

Electrical separating measures**VEGATRENN 149AEx**

Galvanic separation

Output circuit of all other circuits

Separator type KFD0-CS-Ex1.51P

Galvanic separation

Output circuit to input circuit

Approvals¹⁾**VEGATRENN 149AEx**

ATEX

II (1)G D [EEx ia] IIC

Separator type KFD0-CS-Ex1.51P

ATEX

II (1)G D [EEx ia] IIC

Safety barrier type 9001

ATEX

II (1/2)G [EEx ia/ib] IIC/IIB

Environmental instructions

VEGA environment management system

You can find detailed information under www.vega.com.

certified according to DIN EN ISO 14001

¹⁾ Deviating data in Ex applications: see separate safety instructions.

7 Dimensions

VEGATRENN 149AEx

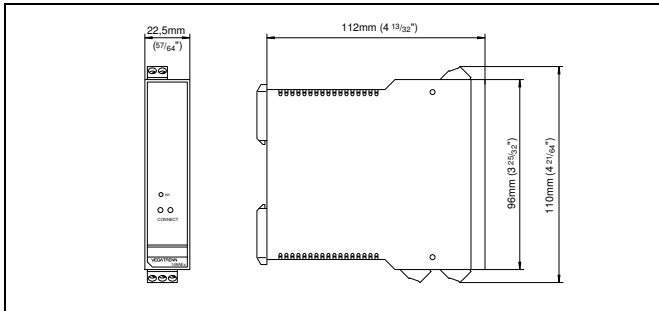


Fig. 11: Dimensions VEGATRENN 149AEx

Separator type KFD0-CS-Ex1.51P

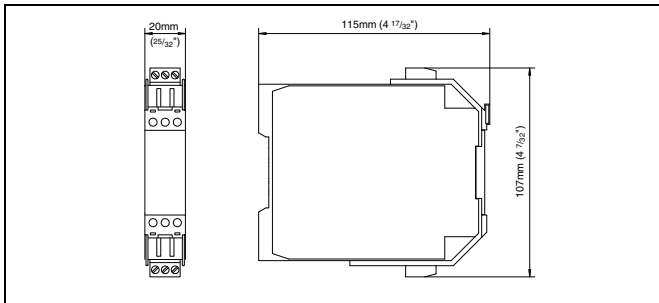


Fig. 12: Dimensions separator type KFD0-CS-Ex1.51P

Safety barrier type 9001

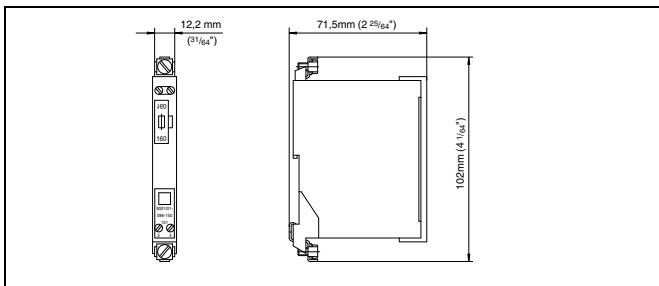
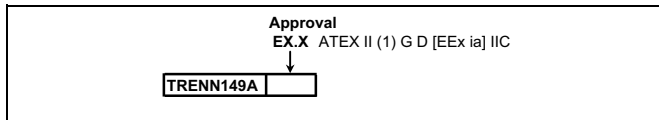


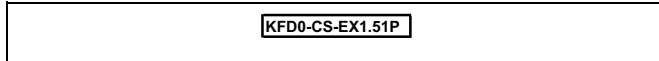
Fig. 13: Dimensions safety barrier type 9001

8 Product code

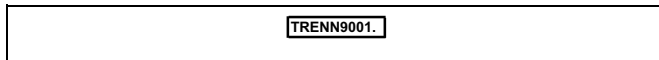
VEGATRENN 149AEx



Separator type KFD0-CS-Ex1.51P



Safety barrier type 9001





VEGA

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany
Phone +49 7836 50-0
Fax +49 7836 50-201
E-Mail: info@de.vega.com
www.vega.com



You can find at www.vega.com downloads of the following

- operating instructions manuals
- menu schematics
- software
- certificates
- approvals

and much, much more