

DURAG

**Control unit
D-FW 230-B
for
filter monitors**



DURAG GmbH

Kollastraße 105 · D-22453 Hamburg · Tel. +49 40 / 55 42 18-0 · Fax +49 40 / 58 41 54

Table of Contents

1	Applications	1
2	Basic Characteristics	1
3	Functional Description	1
4	Description of System Components	2
5	Specifications	4
6	Installation	5
6.1	Terminal strip of the control unit.....	5
6.2	Installation of the filter monitor D-FW231	6
6.3	Installation of the filter monitor D-FW240/Ex	7
7	Start-up	7
8	Maintenance	8
9	System Components and Accessories	8
10	Technical Drawings	9
11	Appendices	11

Figures

Fig. 1	System Components	2
Fig. 2	Control Unit	3
Fig. 3	Electrical Installation	5
Fig. 4	Wiring diagram to use the filter monitor D-FW231	6
Fig. 5	Wiring diagram to use the filter monitor D-FW240/Ex	7
Fig. 6	Dimensional Drawing of Control Unit	9
Fig. 7	Dimensional Drawing: Weather protection roof for control unit	10
Fig. 8	EC Declaration of Conformity	11
Fig. 9	Extract of the list of suitable measuring instruments GMBI 1999 Nr. 22.	12

1 Applications

The control unit D-FW 230-B is designed to be connected to a filter monitor D-FW 231 or D-FW 240/Ex.

The control unit reduces wiring cost. Operating the filter monitor is supported, e.g. zero check or display for the measuring value. The measuring value is monitored and in case of a limit overage a limit contact is closed.

2 Basic Characteristics

- Control unit for the filter monitors D-FW 231 and D-FW 240/Ex (take note: the control unit doesn't meet this requirement for potentially explosive atmospheres)
- Displays the measured value and operational status
- Integration of the filter monitor may be activated or switched off
- Zero check of the filter monitors
- Adjustable limit value
- Limit value contact and LED
- Protection from dust or moisture penetration (IP65)
- Easy mounting, installation and operation

3 Functional Description

The sensor records the electrical charge of the dust using a measuring probe inserted directly into the flue gas duct. It then processes the signal into a 4-20 mA signal. In addition to the amplification of the input signal, other necessary tasks are performed during signal processing, including rectification and damping of the signal.

These operations are carried out entirely in the sensor, that is to say, possible interference is minimised (signal processing takes place directly in the sensor, measured values are transmitted as interference-resistant signals).

The measured value is compared in the control unit to a set limit value. In the event of limit exceedence, signalling occurs by means of a relay.

A switch on the control unit allows the measurement signal to be uncoupled so that the limit value may be set. The current limit value is then displayed and may be set using a potentiometer.

The measuring probe may be disconnected electrically from the amplifier chain in order to perform a zero-test ("4mA" switch on the control unit). The unit cannot then display the dust content (measured value 0 = 4 mA).

An integration period may be added to smooth the measurement signal. The zero-test occurs automatically without integration.

4 Description of System Components

Overview

A complete system features two groups of equipment and operations:

1. Sensor
 - Measuring probe
 - Amplifier
 - 20 mA output driver for the measurement signal
 - Setting the sensitivity
 - Selection of the integration period
 - Zero-test

2. Control unit
 - Power supply
 - Connection terminals
 - Display of the measured value
 - Limit-value relay, with LED on the front panel
 - Switch and potentiometer for setting the limit value
 - Change-over switch for the integration period
 - Switch for checking the zero

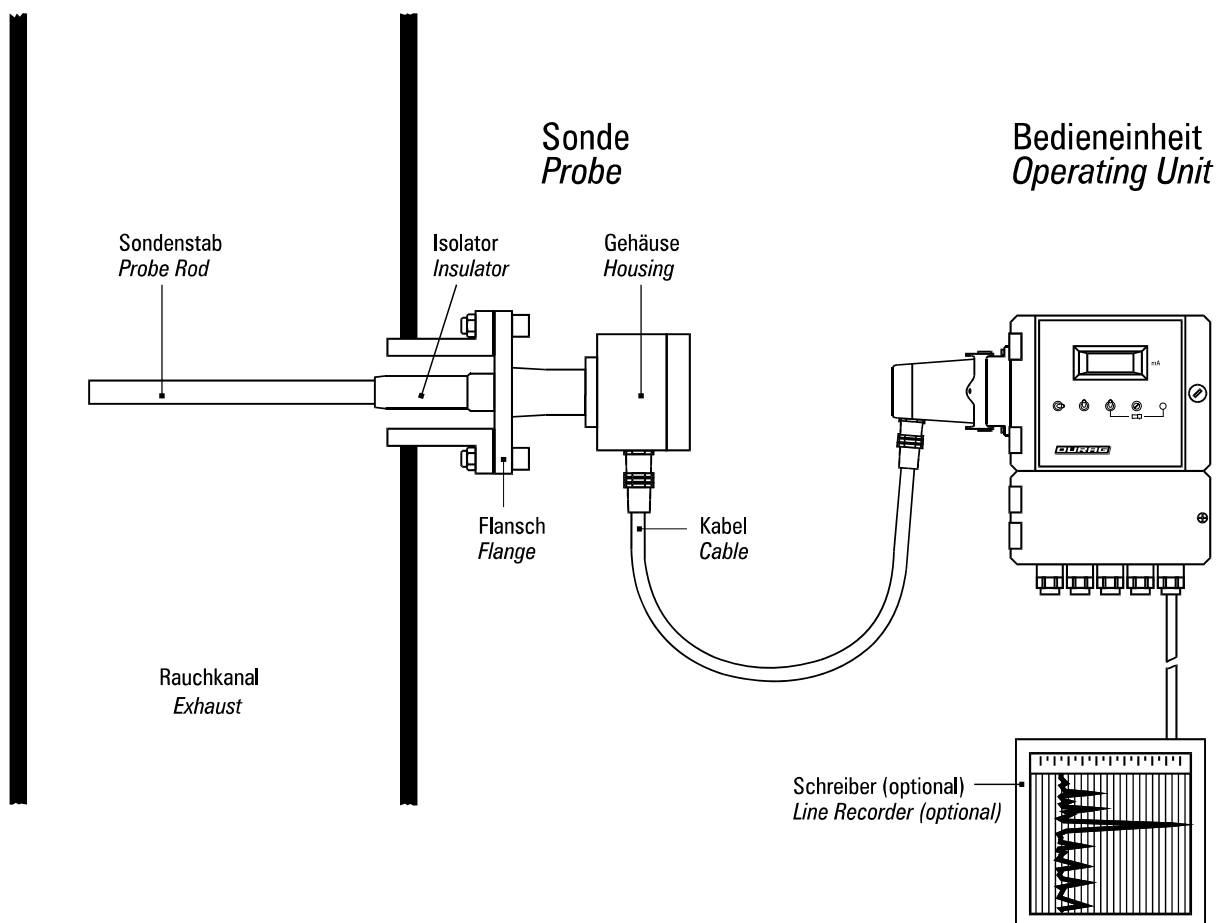


Fig. 1 System Components


Control Unit

The Control Unit may be installed in an easy accessible position and includes the following functions:

Power Supply

Rated voltages 115 or 230 V-AC (as stated on type tag), 50/60Hz
 Safety fuse 100mA at 230VAC, 200mA at 115VAC

Display:

A digital display indicates the current measured value or, if the "  " switch is activated, the set limit value.


"OFF Int. ON" Switch (Integration):

An integration period may be activated or deactivated.

"4mA" Switch (Zero-test):

By activating the "4mA" switch, the measuring probe is separated from the amplifier. This aids in checking the zero. In the case of an exactly set zero point, 4 mA will be displayed. The integration is automatically deactivated during the zero-test.

" " Switch (Limit Value):

The "  " switch brings up the set limit value on the display. This may be set to a desired value via the potentiometer.

Limit-value Exceedence:

An exceedence of the set limit value is signaled via a relay, and also indicated by the LED on the front panel.

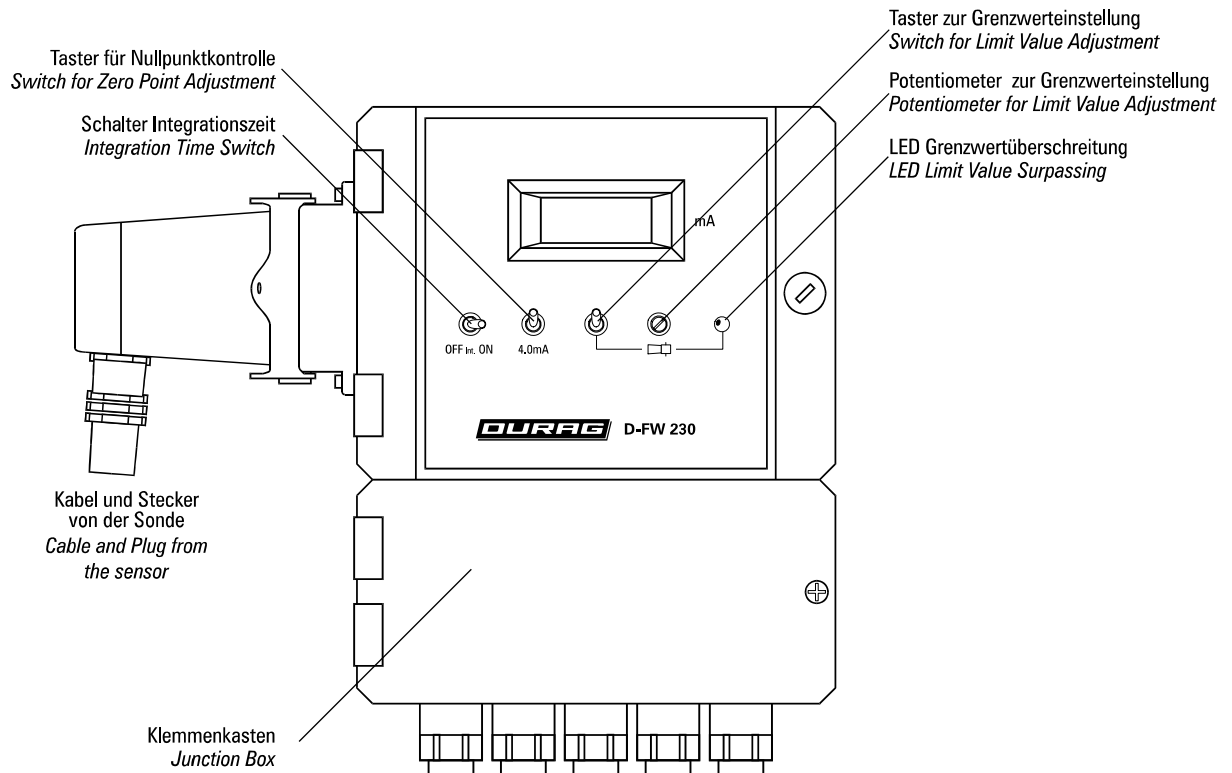


Fig. 2 Control Unit

5 Specifications

Measured-value signal	4-20 mA, load 450 Ω In case of overload, maximum of 28 mA
Limit-value contact	Relay output for signaling limit exceedance: 250V-AC/ 100VA (resistive load), threshold selectable using potentiometer on the front panel
Displays	Digital display of the 20 mA signal Indication of limit exceedance via LED
Ambient temperature	-20..+50°C (-4..+122°F)
Protection class of the electronics	IP65
Power supply	230 V-AC (optional 115V-AC), 50/60 Hz, 10 VA
Weight	3,0 kg
Cable length	Length of connection cable between filter monitor and control unit Standard= 2,80m. Custom length upon request regarding to the specification of the filter monitor.
Connection to the filter monitor	Plug on the left side
Units for the filter monitor	Pushbutton for manual zero-test Switch for integration ON/OFF Power supply for the filter monitor with 24V-DC Output

6 Installation

The electrical connections for the control unit D-FW 230-B are made in the terminal box, as demonstrated in the connection plan. The cables for the power supply, recorder output and switch output must be installed separately. The connection to the recorder should be shielded. The grounded lead for the power supply is to be connected at the control unit housing. The electrical connection from the filter monitor to the control unit is made using a cable with plug connections.

6.1 Terminal strip of the control unit

Contact	Description
X11	Power supply
X12	Potential-free switch contact for the limit exceedence alarm
X13	No function
X14	Connection for measured-value recorder, range 20 mA, mass-related. If no recorder is connected, contacts X14:1 and X14:2 must be bridged.
X15	Connection for current meter (for units manufactured 08/96 and after)

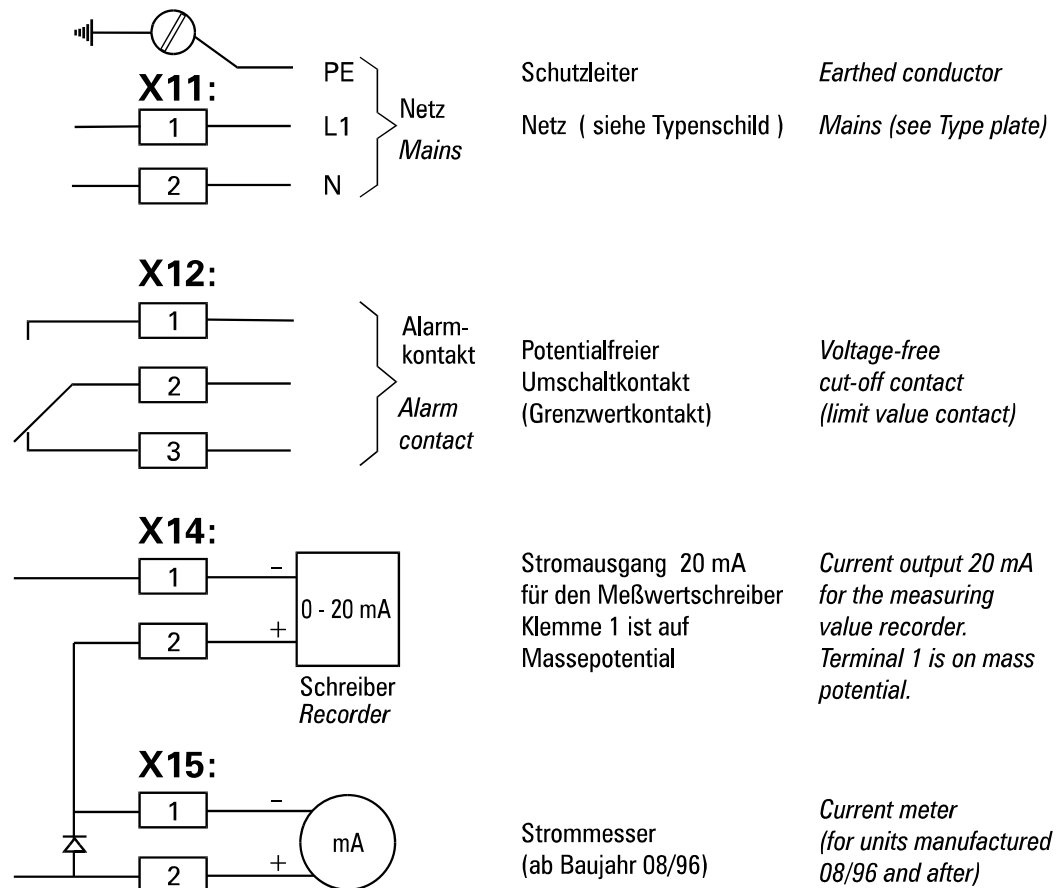


Fig. 3 Electrical Installation

Caution!
 All installations involving the sensor and control unit must observe the relevant VDE regulations, and those of the local public utilities.

6.2 Installation of the filter monitor D-FW231

The control unit D-FW 230-B can also be connected to the filter monitor D-FW231. When the control unit D-FW230-B is used with the Filter Monitor D-FW231, it is possible to have distances between the control unit and the measuring point of several 100m. Please find the wiring diagram below. For distances more than 20m it's recommended to use shielded cable, the shield has to be connected only on the Control Unit side. The connector is specified for cable diameters AWG22 to AWG20 (0,32-0,52mm²).

The cable can be provided by DURAG in a customer defined length, see chapter "System Components and Accessories" of this manual.

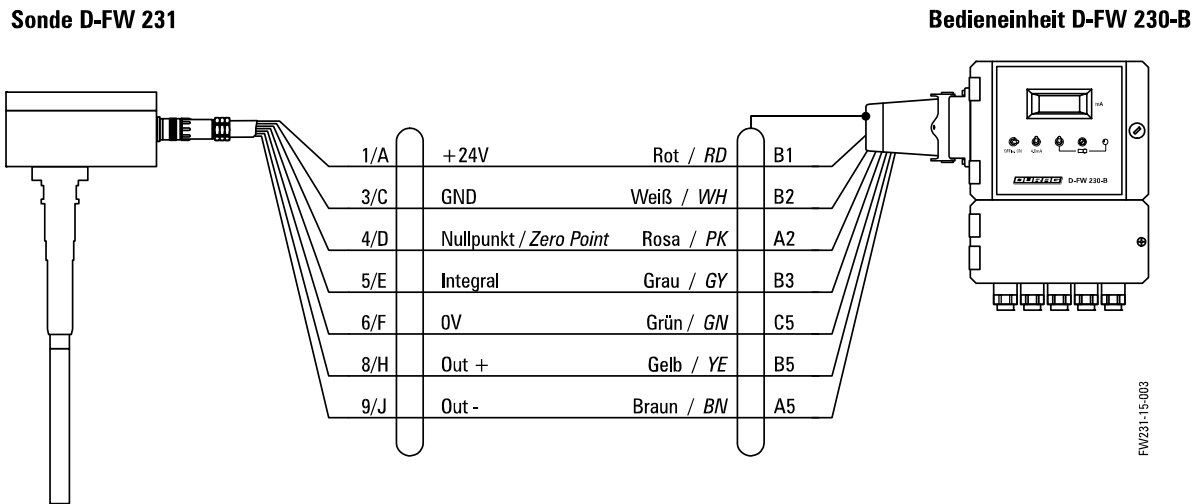


Fig. 4 Wiring diagram to use the filter monitor D-FW231

6.3 Installation of the filter monitor D-FW240/Ex

The control unit D-FW 230-B can also be connected to the filter monitor D-FW231. When the control unit D-FW230-B is used with the Filter Monitor D-FW231, it is possible to have distances between the control unit and the measuring point of several 100m. Please find the wiring diagram below. For distances more than 20m it's recommended to use shielded cable, the shield has to be connected only on the Control Unit side.

For the type of the cable and the assembling see the guidelines of the manual of the filter monitor D-FW 240/Ex. Especial take care for the explosion probe requirements.

The cable can be provided by DURAG in a customer defined length, see chapter "System Components and Accessories" of this manual. Take care: For outdoor installation the DURAG made cable should be protected against ultraviolet radiation and it should be fixed.

Please take note that the control unit must be mounted outside the potentially explosive atmospheres, because the control unit doesn't meet this requirement.

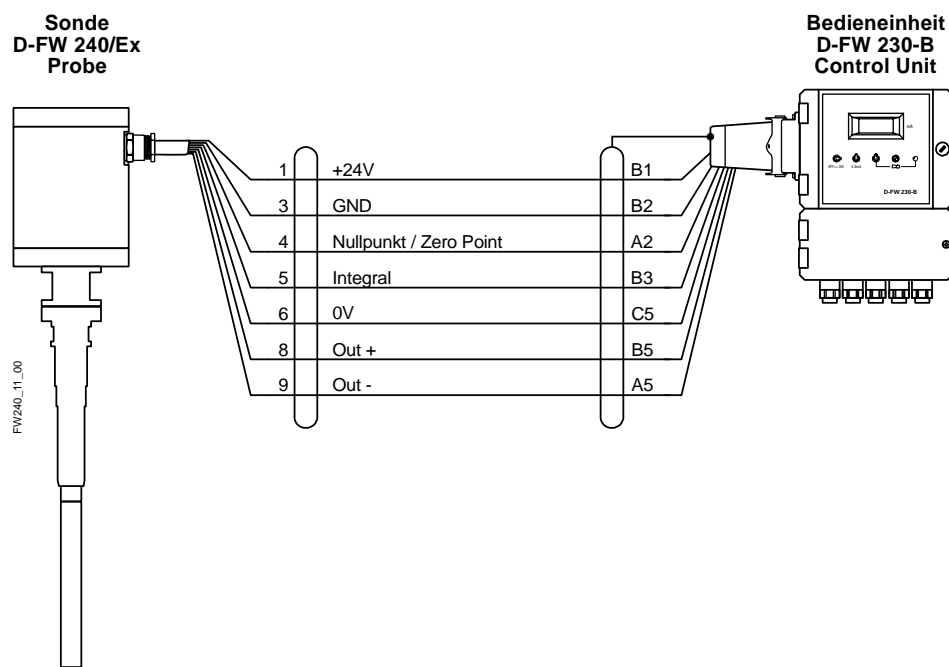


Fig. 5 Wiring diagram to use the filter monitor D-FW240/Ex


7 Start-up


Caution: Operating voltage must be compared with that of the nameplate!

Start-up may begin after proper mounting and installation. The filter monitor is aligned at the factory, so that only the amplification needs to be set, see manual of the filter monitor.

At the control unit the limit value must be adjusted.

Limit Value:

The limit value may be set anywhere between 4 and 20 mA. The "  " switch is activated, and, by turning the potentiometer, the display is set to the desired value.

Take note: When the "  " switch is activated, the current output indicates the limit value, not the measuring value.

8 Maintenance

Maintenance activities are only at the filter monitor necessary, according to the separate manual of the filter monitor.

9 System Components and Accessories

Quantity	Art-Code	Description
1	D-FW230-B	Control unit D-FW 230-B for filter monitors rated voltages 230V, 50/60Hz manual
1	D-FW230-B 115V	Control unit D-FW 230-B for filter monitors rated voltages 115V, 50/60Hz manual
Accessories / Replacement Parts		
1	D-FW----	Manual for D-FW230-B (German)
1	D-FW----	Manual for D-FW230-B (English)
1	D-WSH 230 D	Weather protection roof for control unit D-FW 230-B material V2A / 1.4301
1	D-FW231	Filter monitor D-FW 231 length of measuring probe: 400 mm mounting: 1“(1G) thread.
1	D-FWx	Cable between control unit D-FW 230-B and the filter monitor D-FW 231 Standard length 2,8m Other length upon request
1	D-FW----	Manual for filter monitor D-FW231 (German)
1	D-FW----	Manual for filter monitor D-FW231 (English)
1	D-FW240/Ex	Filter monitor D-FW 240/Ex length of measuring probe: 400 mm mounting: 1“(1G) thread.
1	D-FW----	Cable between control unit D-FW 230-B and the filter monitor D-FW 240/Ex Standard length 2,8m Other length upon request
1	D-FW----	Manual for filter monitor D-FW240/Ex (German)
1	D-FW----	Manual for filter monitor D-FW240/Ex (English)
Additional accessories or replacement parts see separate manual of the filter monitors		

10 Technical Drawings

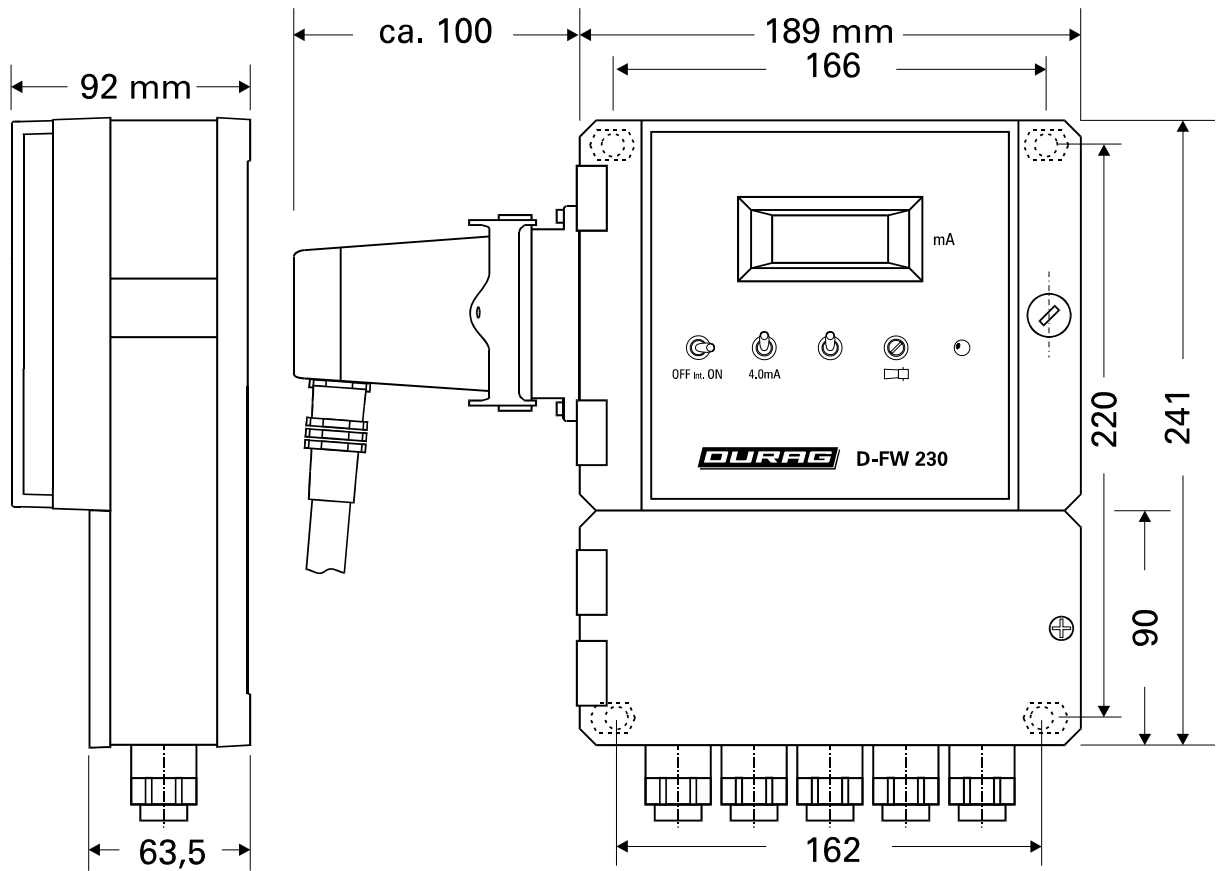


Fig. 6 Dimensional Drawing of Control Unit

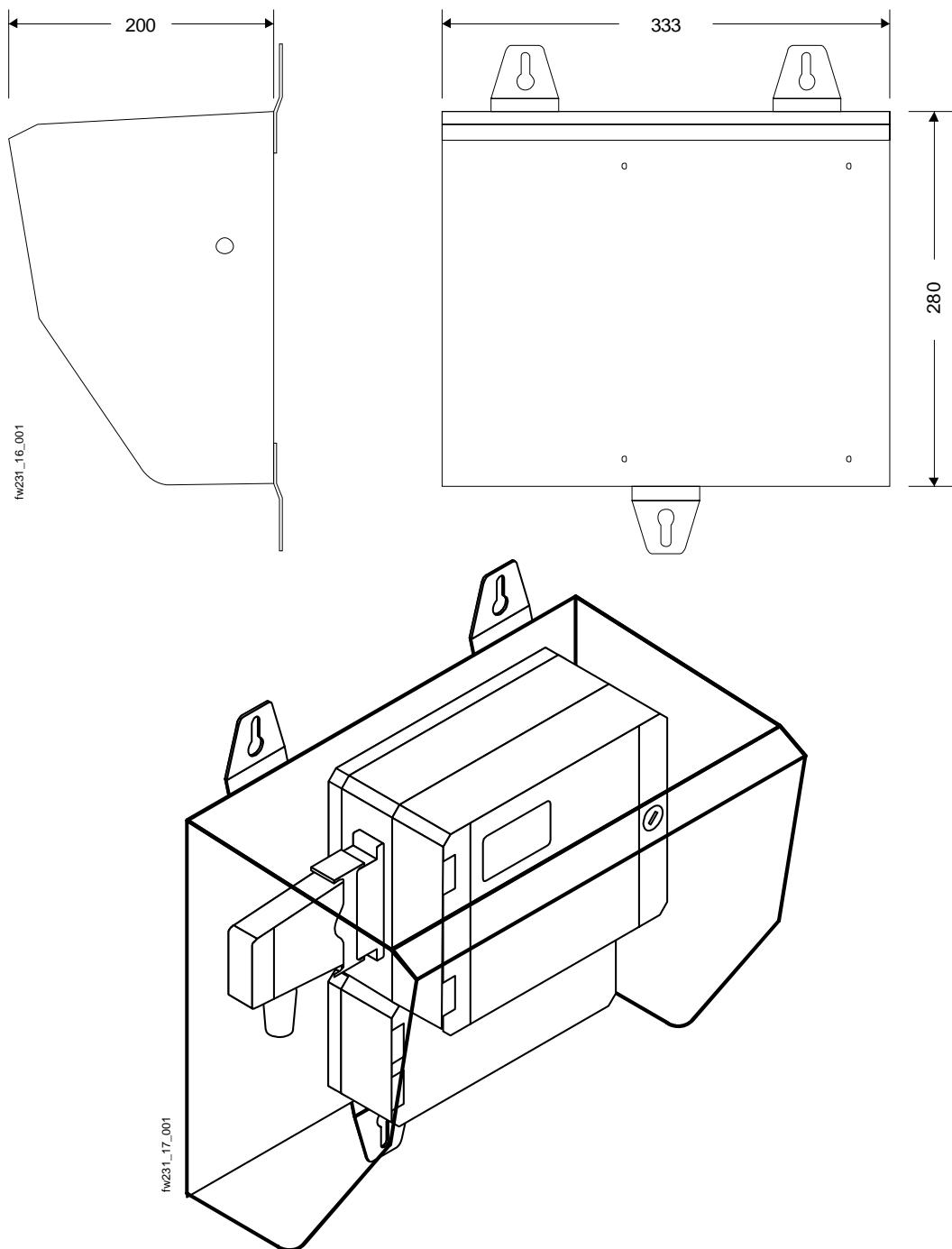


Fig. 7 Dimensional Drawing: Weather protection roof for control unit

11 Appendices



INDUSTRIE ELEKTRONIK GMBH & CO KG

EG-Konformitätserklärung EC Declaration of Conformity

Hersteller <i>Manufacturer</i>	DURAG Industrie-Elektronik GmbH & Co KG
Anschrift <i>Address</i>	Kollastr. 105, D22453 Hamburg
Produktbezeichnung <i>Product description</i>	Filterwächter D - FW 230 <i>Filterwatch D - FW 230</i>

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinie überein, vorausgesetzt, daß es installiert, gewartet und entsprechend seiner Bestimmung eingesetzt wird. Die einschlägigen Vorschriften und Hinweise aus der Bedienungsanleitung sind zu beachten.


The described product complies with the following provisions of Council Directive, provided that it is installed, maintained and used in applications for which it was made, in accordance with relevant installation standards and manufacturer's instructions.

Richtlinie des Rates 89/336/EWG (EMV), geändert durch 91/263/EWG, 92/31/EWG und 93/68/EWG
Council Directive 89/336/EEC (EMC), changed by 91/263/EEC, 92/31/EEC and 93/68/EEC

Wir bestätigen die Konformität des oben bezeichneten Produktes entsprechend den Normen:

We confirm the conformity of the above mentioned product according to the standards:

EN	50 081-1	(93)
EN	50 082-2	(96)

Aussteller <i>Issuer</i>	DURAG Industrie Elektronik GmbH & Co KG
Ort, Datum <i>Place, date</i>	Hamburg, 16.09.96
Rechtsverbindliche Unterschrift <i>Legally binding Signature</i>	 (Prof. Dr.-Ing. Martin)

KONFORM.DOT/KFW230.DOC

Postfach / P.O. Box: 61 02 20, 22422 Hamburg · Kollastraße 105, 22453 Hamburg
Telefon: 040 / 55 42 18-0 · Fax: 040 / 58 41 54 · USt-IdNr.: DE 118034482
Banken: Hamburgische Landesbank 149 161, BLZ 200 500 00 · Commerzbank 19 511 10, BLZ 200 400 00
Postgiroamt Hamburg 50612-206, BLZ 200 100 20
Kommanditgesellschaft: Hamburg HRA 82808 · Persönlich haftende Gesellschafterin:
Duraag Industrie Elektronik GmbH, Hamburg HRR 39787

Fig. 8 EC Declaration of Conformity

Bundesministerium für
Umwelt, Naturschutz und Reaktorsicherheit

Bundeseinheitliche Praxis
bei der Überwachung der Emissionen
und der Immissionen

– RdSchr. d. BMU v. 28. 4. 1999 – IG I 3 – 51134/2 –

I.

Eignung von Meßeinrichtungen
zur kontinuierlichen Überwachung von Emissionen

Unter Bezugnahme auf Nummer 3 der Richtlinie über die Bundeseinheitliche Praxis bei der Überwachung der Emissionen – RdSchr. d. BMU vom 08. 06. 1998 – IG I 3 – 51 134/3 (GMBI 1998, S. 543) – wird die Eignung der folgenden Meßeinrichtungen bekanntgegeben:

1. Staubförmige Emissionen: qualitativ

1.1 Filterwächter D-FW 230 und D-FW 231

Hersteller:

DURAG Industrie Elektronik GmbH & Co. KG,
22453 Hamburg

Eignung:

Zur qualitativen Überwachung von Staubgehalten;

Kleinster Meßbereich bei der Eignungsprüfung:

0 – 35 mg/m³

Einschränkungen:

1. Die Meßeinrichtung soll nur an Anlagen mit konstanten Volumenströmen ($\pm 10\%$) und konstanten Abgasbedingungen eingesetzt werden.
2. Das Gerät besitzt keine Referenzpunktkontrolle.
3. Das Gerät kann nur eingesetzt werden, wenn eine Unterschreitung des Taupunkts ausgeschlossen werden kann.

Hinweise:

1. Die Kalibrierfähigkeit des Meßsystems wurde im Meßbereich 0 – 35 mg/m³ nachgewiesen.
2. Nach einer Filterstörung mit hohem Staubanfall ist die Sonde zu reinigen.

Prüfbericht:

Gesellschaft für Umweltschutz, TÜV Nord GmbH, Hamburg, Nr. 98 CN 026 vom 12.01.1999

Fig. 9 Extract of the list of suitable measuring instruments GMBI 1999 Nr. 22.