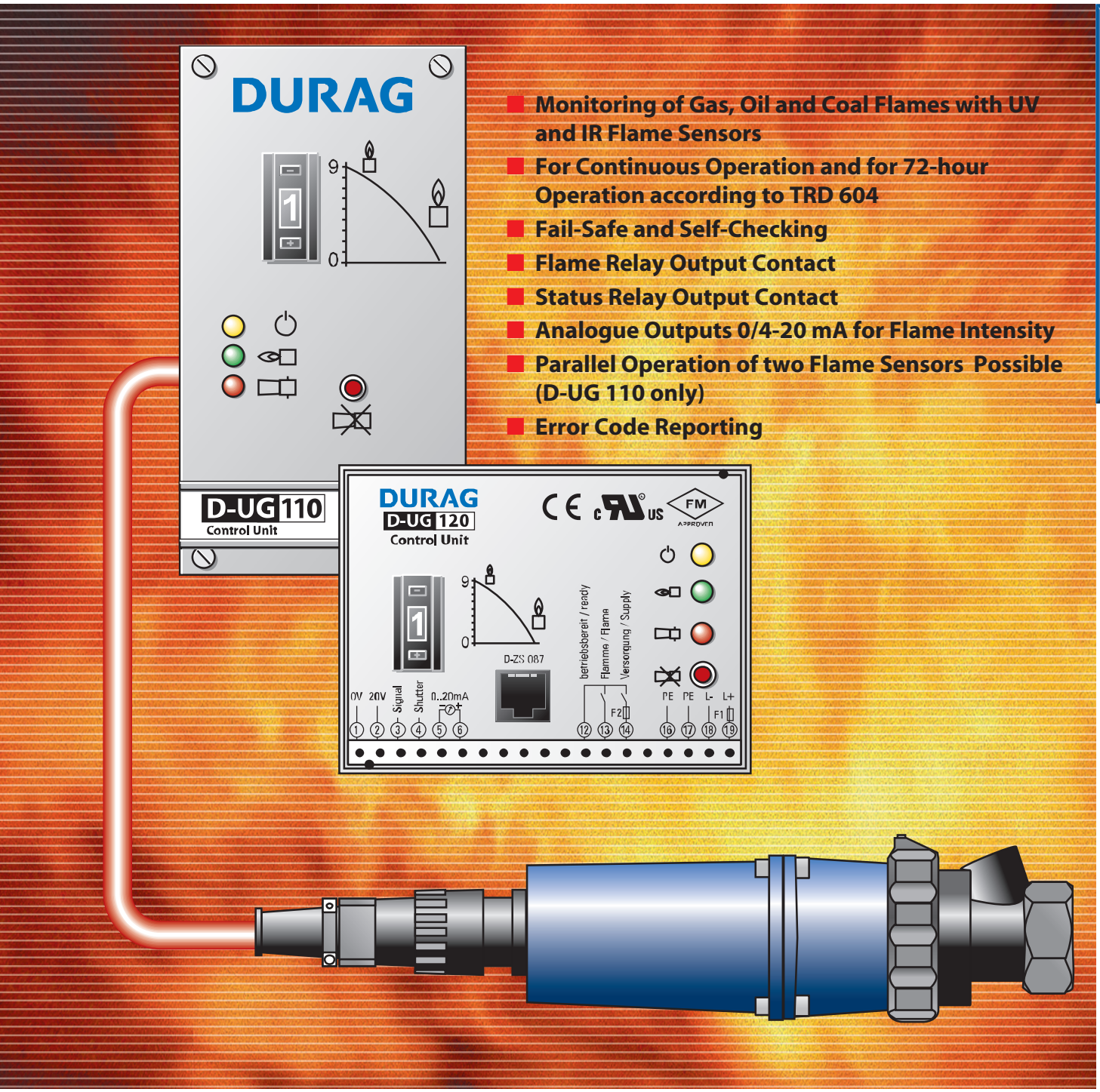
DURAG

D-UG 110/120
D-LE 103



- Monitoring of Gas, Oil and Coal Flames with UV and IR Flame Sensors
- For Continuous Operation and for 72-hour Operation according to TRD 604
- Fail-Safe and Self-Checking
- Flame Relay Output Contact
- Status Relay Output Contact
- Analogue Outputs 0/4-20 mA for Flame Intensity
- Parallel Operation of two Flame Sensors Possible (D-UG 110 only)
- Error Code Reporting

Flame Monitor for Single Burner Furnaces

D-UG 110 D-UG 120 Control Units

D-LE 103 Flame Sensor

TÜV CERT EN ISO 9001

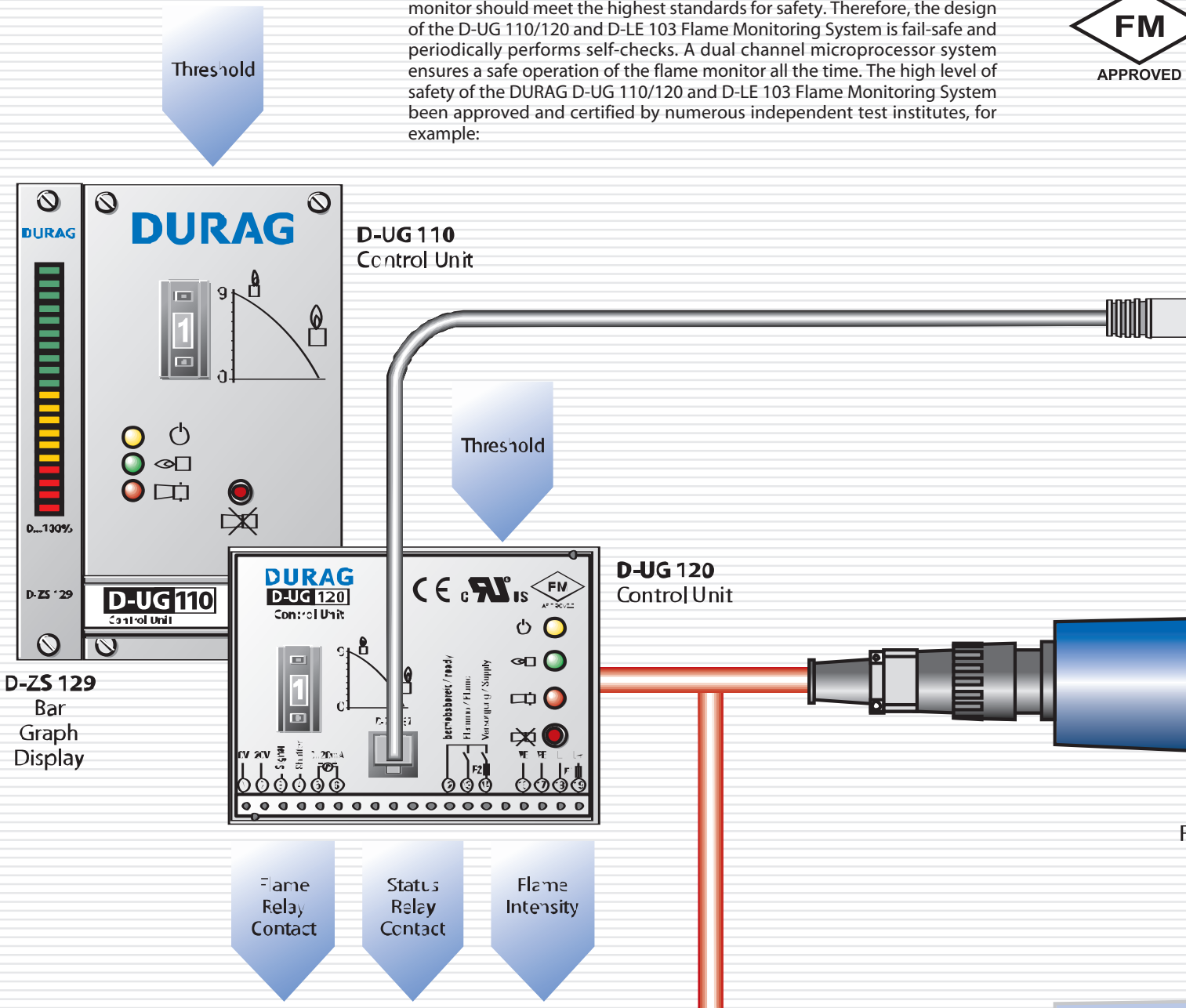
Smart Solutions for Combustion and Emission DURAG GROUP

DURAG Flame Monitor for Single Burner

Safety and Certification

Due to the potentially high risk of combustion processes, every flame monitor should meet the highest standards for safety. Therefore, the design of the D-UG 110/120 and D-LE 103 Flame Monitoring System is fail-safe and periodically performs self-checks. A dual channel microprocessor system ensures a safe operation of the flame monitor all the time. The high level of safety of the DURAG D-UG 110/120 and D-LE 103 Flame Monitoring System been approved and certified by numerous independent test institutes, for example:

FM APPROVED



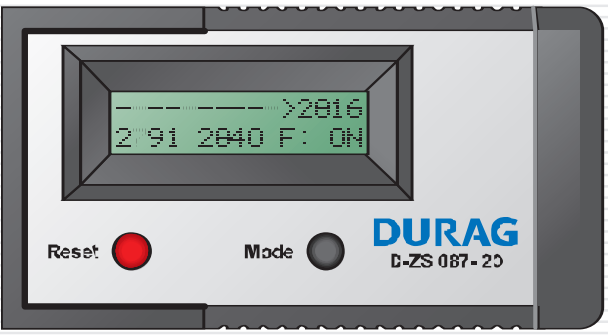
Application

The DURAG Flame Monitoring System consisting of a D-UG 110 or D-UG 120 Control Unit in combination with a D-LE 103 Flame Sensor is able to monitor flames of all burner types, fuels and combustion modes. The D-LE 103 Flame Sensor is available for different spectral ranges from UV to IR. UV flame sensors are mainly used for gas firings, whereas in the case of liquid and solid fuels it is the high emission in the IR-region that will be evaluated. The 10 stage adjustable threshold setting permits optimum adaptation of the flame monitor to the brightness of the flame.

The flexibility of the DURAG Flame Monitoring System D-UG 110/120 and D-LE 103 is perfectly suitable for all kinds of single burner furnaces, even under difficult conditions. Typical applications of DURAG flame monitors are e.g.:

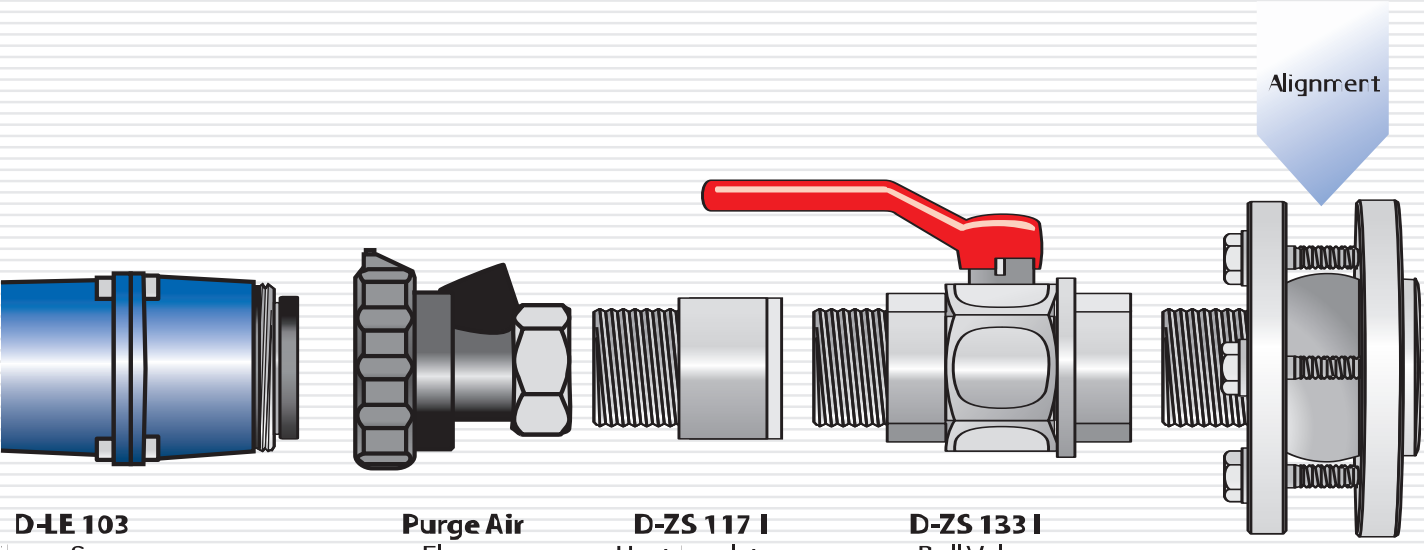
- Power Station
- Chemical Industries
- Refineries
- Cement Plants
- Waste Incinerators

Furnaces — D-UG 110 / 120 Control Units and D-LE



Setup Utility

The D-UG 120 Control Unit has a test plug for the connection of a D-ZS 087-20 Digital Display. Using this utility, the installation and adjustment of the D-UG 120 / D-LE 103 Flame Monitor is greatly eased. By displaying the current flame intensity, the D-LE 103 Flame Sensor can be aligned optimally to the flame. Further information such as minimum and maximum flame intensity are displayed as well as a recommended setting for the response threshold.



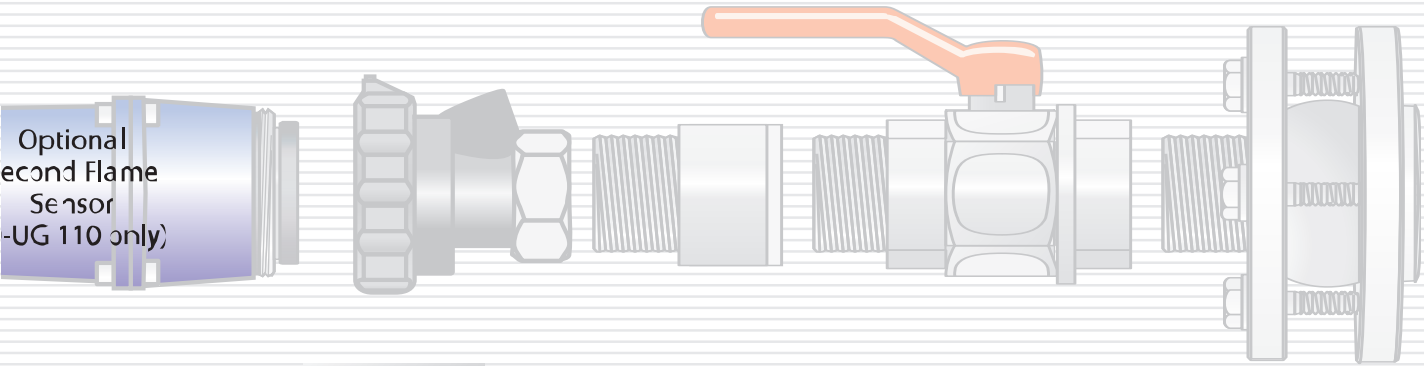
D-LE 103
ame Sensor

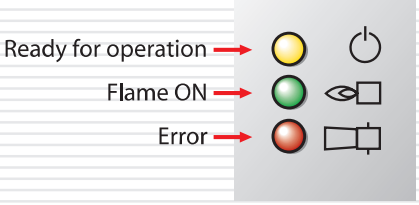
Purge Air
Flange

D-ZS 117 I
Heat Insulator

D-ZS 133 I
Ball Valve

D-ZS 033 I
Ball Type
Adjustment Flange





Full Information

The built in LED display provides the operator with all required information. In case of an internal error the type of error is indicated by special blinking code of the LEDs.

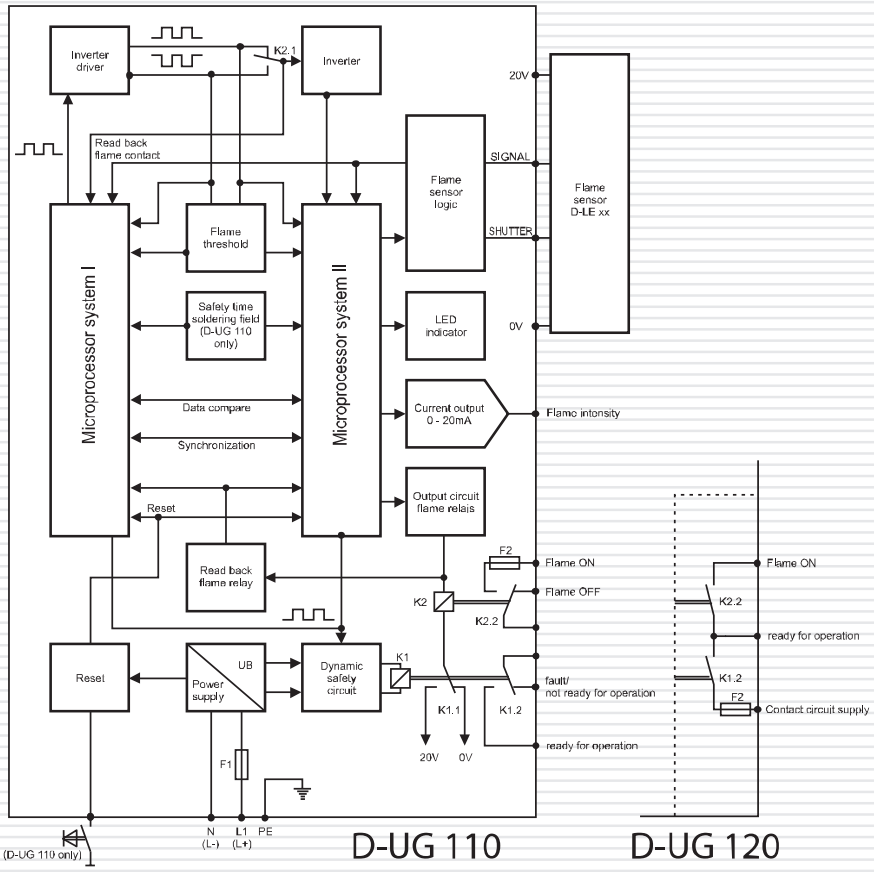
103 Flame Sensor

DURAG

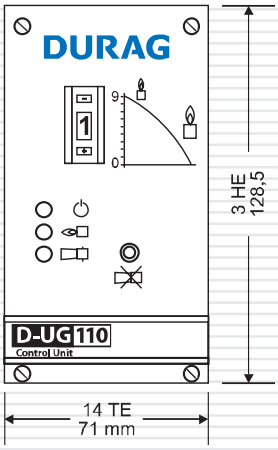
Functional description

After start-up the D-UG 110/120 Control Units perform a self test which is periodically repeated during operation. The threshold for the 'Flame ON' indication can be set in 10 steps, so that the flame on/off threshold can be ideally adapted to the intensity of the flame. For interference-free transmission through extensive cable lengths, all D-LE 103 Flame Sensors convert the flame signal into strong pulse frequency signals, which are transmitted to and counted by the D-UG 110 or D-UG 120 Control Unit. An analogue output of 0/4...20 mA is indicating the weighted flame intensity which depends on the pulse frequency signal and on the threshold setting.

The analogue output signal (flame signal) informs the user on the stability of the burner flame. Changes of the flame structure lead to changes of the pulse frequency and are recognizable through the analogue output of the control unit. This is important information for obtaining and preserving optimal operational conditions.



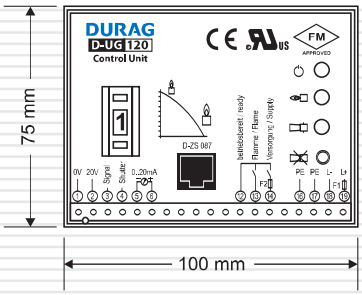
Schematic Diagrams of D-UG 110 and D-UG 120

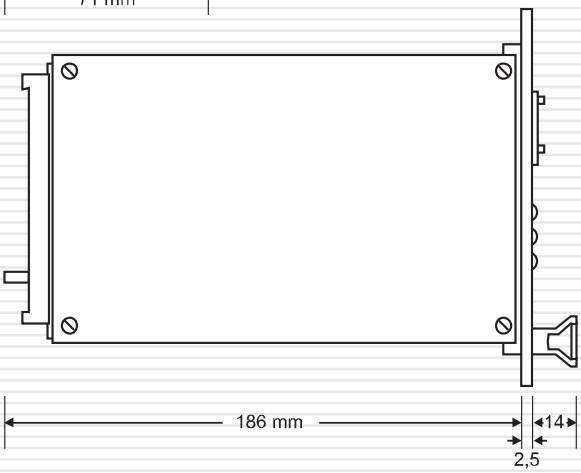


Design

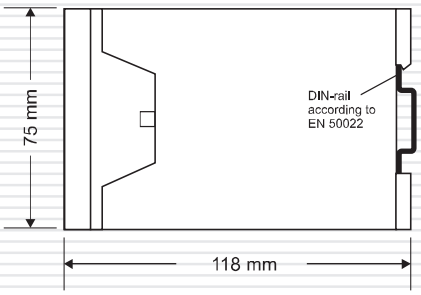
The D-UG 110 Control Unit is a plug-in module for 19" racks. Special mounting racks for panel mounting of 19" racks (both with IP00) are also available as well as enclosures (IP 66) for wall mounting.

The D-UG 120 Control Unit is supplied in a plastic enclosure (100 x 75 x 118 mm, IP 20) for DIN-rail mounting.





Dimesional drawing of D-UG 110



Dimesional drawing of D-UG 120

DURAG

Survey of D-LE 103 Flame Sensors

Flame Sensor	Photo element	Spectral range (nm)	Suitable for fuels				All flame sensors have been tested according to EN 230 (oil) and EN 298 (gas). They are approved for continuous operation without capacity limit and 72h operation according to TRD 604.
			Gas	Oil	Coal	Wood	
D-LE 103 UL-xx	Low voltage UV cell	190 - 260	++	+			Monitoring of gas and oil flames in single burner installations (increased viewing angle of 12°).
D-LE 103 UAF-xx	GaP with UV-filter	280 - 410	o	++			Monitoring of gas and oil flames in single burner installations.
D-LE 103 UA-xx	GaP without UV-filter	190 - 520	+	++	o	+	Monitoring of oil flames in single burner installations as well as oil burners where additional fuels are burned.
D-LE 103 IS-xx	Si	300 - 1100	!	++	++	+	Monitoring of oil and wood dust flames.
D-LE 103 IG-xx	Ge	780 - 1800	o	++	++	++	Monitoring of oil and wood dust flames as well as gas flames from pilot or main burners in single burner installations.

xx = P: **Axial plastic plug cable connection IP 67 / NEMA 4X**

xx = MP: **Axial metal plug cable connection IP 54 / NEMA 3S**

xx = CG: **Cable connection with M20x1.5 cable gland IP 65 / NEMA 4X**

Explanation of symbols:

++ The flame sensor is **ideally suitable** for this fuel considering its flame detection and flame selectivity.

+ The flame sensor is **well suited** to this fuel, although under certain conditions it may show an increased flame simulation signal. This is especially possible with combination operation (e.g. oil and gas).

o The flame sensor is **conditionally suited** to this fuel. The monitoring characteristics depend mainly upon the combustion technique.

! Due to local regulations the flame sensor might not be approved for monitoring of gas flames.

This information is based on years of experience in a great proportion of combustion systems. Variations due to differing flame behaviour, caused by special combustion techniques cannot be taken into account or excluded.

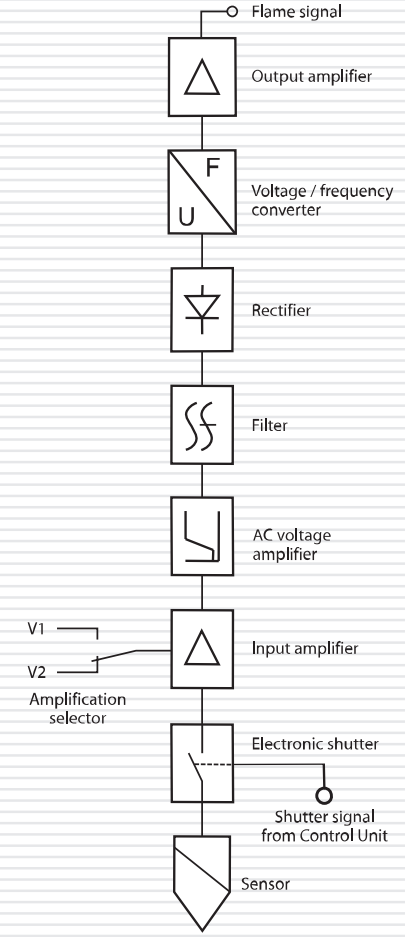
D-LE 103 UL / UA / UAF Ultraviolet Flame Sensors

These flame sensors have a spectral range of either 190 to 260 nm, 190 to 520 nm or 280 to 410 nm, depending on the model. All blue-burning flames, e.g. gas flames whose portion of visible light is low, may be monitored by these flame sensors.

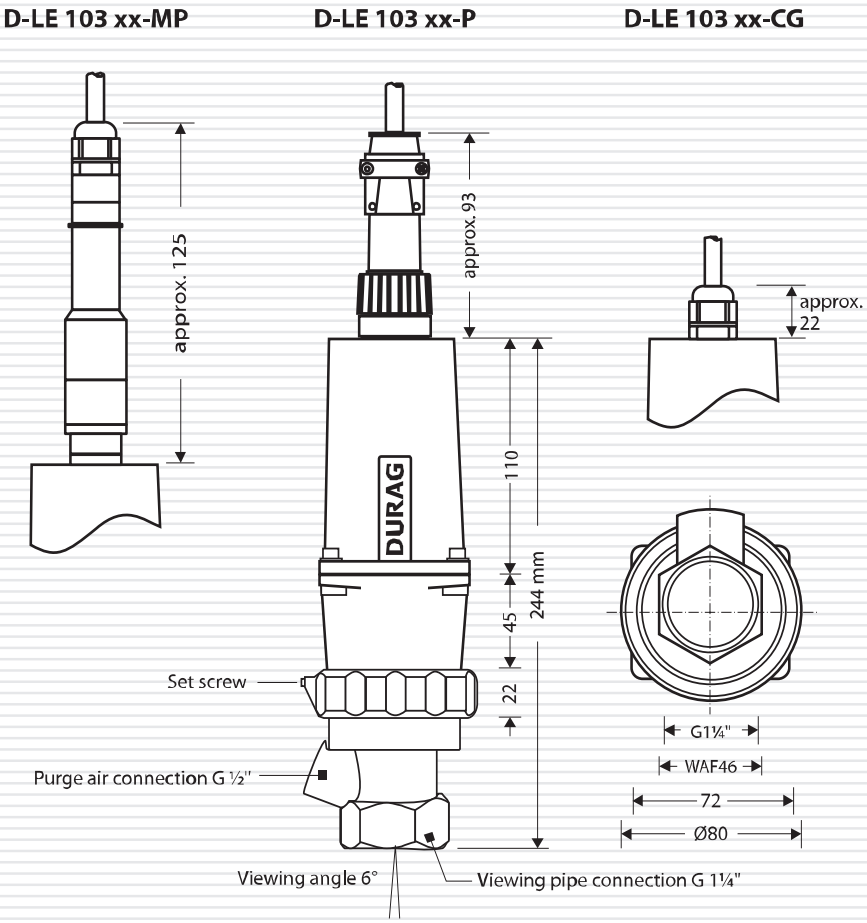
D-LE 103 IS / IG Infrared Flame Sensors

These IR flame sensors have a spectral sensitivity of either 300 to 1100 nm or 780 to 1800 nm, depending on the model. Only those signals are processed which correspond to flame flickering. Thus flame monitoring is not influenced by ambient light, as far as constant light is concerned. Flames whose UV radiation is absorbed by dust, water vapour or other materials may be monitored in the infrared range. A waste incinerator would be an example of such an application. IR flame sensors with a sensitivity of up to 1800 nm have proven themselves in monitoring gas and oil combustion systems employing NO_x reduction techniques such as flue gas recirculation.

Schematic Diagram of D-LE 103



Dimensional Drawing of D-LE 103 Flame Sensors



DURAG

D-UG 110/120
D-LE 103

Technical Data

D-UG 110 Control Unit

Mains voltage	115/230 V AC, +10% -15%
Mains frequency	42-60 Hz
D.C. voltage	24/48 VDC ±20%
Power consumption	20 W
Permissable ambient temperature	-20°C to +60°C (0°F to 140°F)
Safety time	1 s (other times on request)
Flame Relay	SPDT (230 VAC, 2 A)
Status Relay	SPDT (230 VAC, 2 A)
Analogue Output	0/4...20 mA / 750 Ohms
Protection (EN 60529)	IP00
Weight	approx. 1 kg (2.2 lb.)
Mounting	19" plug-in unit

D-UG 120 Control Unit

Power supply	24 VDC ±20%
Power consumption	5 W
Permissable ambient temperature	-20°C to +60°C (0°F to 140°F)
Safety time	1 s
Flame Relay	SPST (230 VAC, 2 A)
Status Relay	SPST (230 VAC, 2 A)
Analogue Output	0/4...20 mA / 200 Ohms
Protection (EN 60529)	IP20
Weight	approx. 0.5 kg (1.1 lb.)
Mounting	DIN-rail

D-LE 103 Flame Sensor

Supply voltage	20 VDC (from control unit)
Spectral sensitivity (depending on type of flame sensor)	190-1800 nm
Permissable ambient temperature	-20°C to +60°C (0°F to 140°F)
Viewing Pipe Connection	G 1¼"
Purge Air Connection	G ½"
Optical Viewing Angle	6°
Protection (EN 60529):	
- cable version (-CG)	IP65 / NEMA 4X
- standard plug version (-P)	IP67 / NEMA 4X
- metal plug version (-MP)	IP54 / NEMA 3S
Weight	approx. 1.5 kg (3.3 lb.)

Extensive descriptions of these units with specifications, setting instructions, dimensions and connection plans are available upon request.

Available Accessory Equipment

D-NG 24-05
AC power supply for operation of two D-UG 120 at 115 / 230 VAC +10% -15%, 42 - 60 Hz

D-ZS 087 - 20
Digital display for optimal alignment of flame sensors through pulse frequency measurement and for storing pulse peak values

D-ZS 118
Optical adjustment auxiliary unit for alignment of the ball-type adjustment flange on the scanner tubes

D-ZS 077-10
UV-C test light source 230 V / 50 Hz

D-ZS129
Bar graph display for flame intensity

D-ZS 093
UV-A, UV-B and IR test light source 230 V / 50 Hz

D-ZS 033 - I
Swivel mount for D-LE 103

D-ZS 117 - I
Heat insulator with electrical disconnection

D-ZS 133 - I
Ball-type valve for closing the viewing pipe

D-BT 110
Installation module (IP00) for panel mounting of one or several control units D-UG 110

D-UG 110 / G11
Plastic enclosure (IP54) for the installation of one control unit D-UG 110

Further installation modules and enclosures are available upon request.

DURAG GROUP *Smart Solutions for Combustion and Emission*

www.durag.de

DURAG Industrie Elektronik GmbH & Co KG
Kollaustr. 105
D-22453 Hamburg, Germany
Tel. +49 40 55 42 18-0
Fax +49 40 58 41 54

Georg Hegwein GmbH & Co. KG
Am Boschwerk 7
D-70469 Stuttgart, Germany
Tel. +49 711 13 57 88-0
Fax+49 711 13 57 88-5

VEREWA Umwelt- und Prozessmesstechnik GmbH
Kollaustr. 105
D-22453 Hamburg, Germany
Tel. +49 40 55 42 18-0
Fax +49 40 58 41 54

ORFEUS Combustion Engineering GmbH
An der Pönt 53a
D-40885 Ratingen, Germany
Tel. +49 2102 9974-0
Fax +49 2102 9974-41

DURAG, Inc.
Southridge Business Center
1355 Mendota Heights Road #200
Mendota Heights,
Minnesota 55120, USA
Tel. +1 651 451-1710
Fax +1 651 457-7684