PREMATECNICA
Equipos e instalaciones para las industrias de proceso y energía

DURAG GROUP

Product Overview Combustion Technology

DURAG GROUP smart solutions for combustion and environment

DURAG combustion technology


(1)

Large-scale power plant


(2)

Chemical process combustion

The DURAG GROUP's products support all types of industrial combustion processes throughout the world. These include, for example, fossil fuel power stations, plants in the chemical industry, refineries, cement plants, waste incinerators, steam generators, thermal power plants and gas turbines.
We can also provide solutions for applications in special environments, such as extreme climatic zones or hazardous areas.


(3)

Gas turbines


(4)

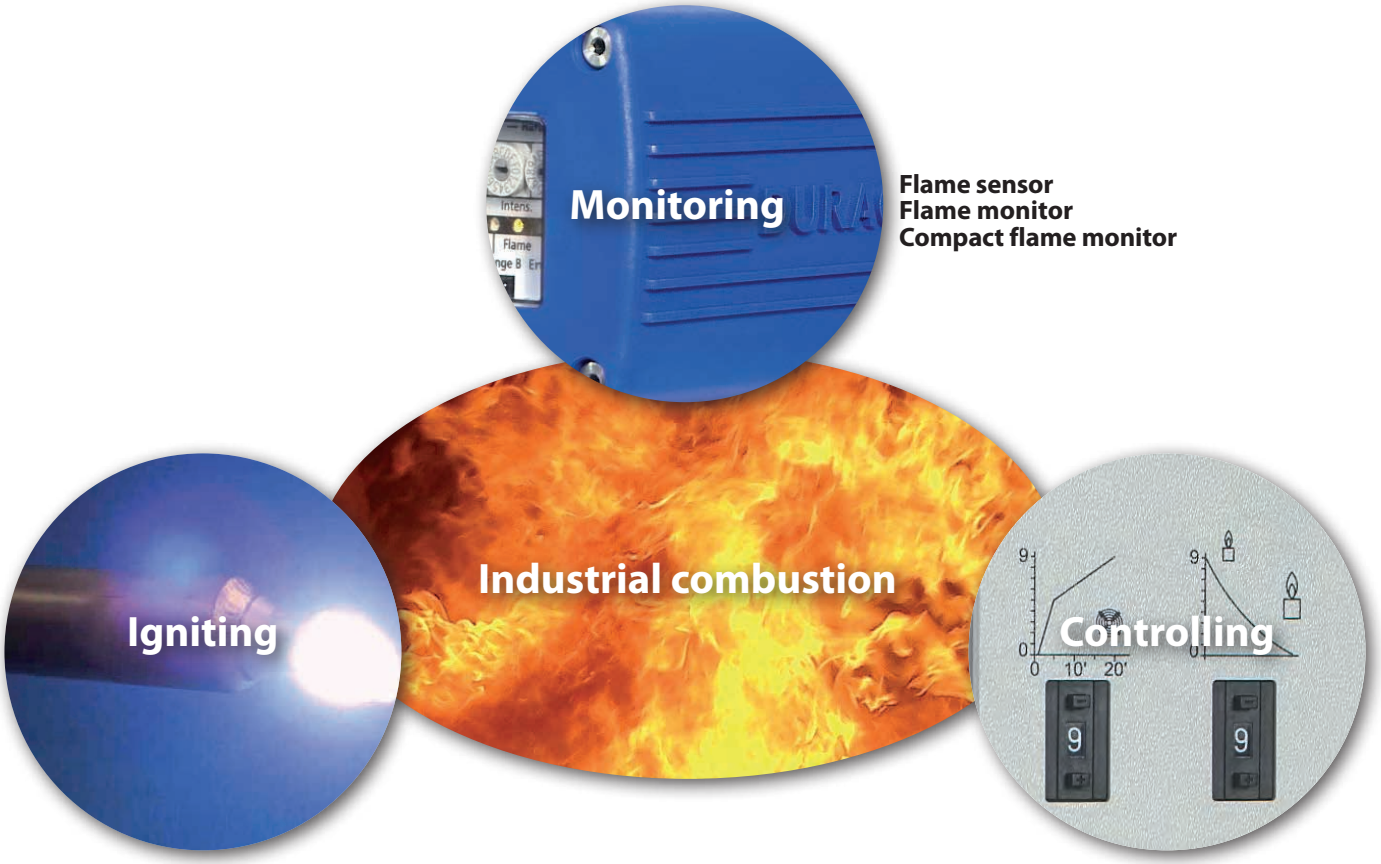
Waste gas heat treatment


(5)

Rotary kiln


(6)

Refinery



Flame monitoring

The monitoring of the flame is a safety engineering element for industrial combustion technology – fuel may only enter the combustion chamber if safe combustion is guaranteed. Therefore high demands are made on the availability and safety of the equipment used. For intermittent operation it is sufficient when the flame monitoring hardware performs a self test during the startup procedure. Continuous operation requires a permanent verification of error free operation, hence it is the more stringent requirement.
The monitoring can be performed by the combination of a flame sensor (also flame scanner) with a control unit. Where the flame sensor transforms characteristic properties of the flame into an electrical signal and the control unit provides the flame signal and ensures error free operation. Alternatively these two parts are combined in one compact flame monitor.
Besides the proper selection of the flame monitor also its correct placement and alignment are important prerequisites for the successful monitoring of the flame. The presence of a flame must be correctly detected independently of the construction of the furnace or its operational mode.

Ionisation detection

Flame monitors with ionisation detectors use the ionising property of flames. They are used primarily on smaller gas burners and pilot burners.

Detection of the optical signal

Large burners are monitored solely by optical flame monitors. Depending on the fuel and combustion technology of the process optical sensors with different spectral sensitivities or combinations of them are used:

Infra-red detectors (IR) react to radiation having a wavelength of 800 nm or higher. It is only the flickering of the flame which is analysed. Constant radiation sources, such as the glowing of the furnace walls, are not detected as a flame.

Flames radiating in the UV range, but whose UV component is absorbed by dust, steam or other substances, can often also be monitored using infra-red detectors. Products with the codes IG, IGA, and ISF use these detectors.

Ultra-violet detectors (UV) detect the flame radiation below 400 nm. Ultra-violet detectors are well suited for monitoring gas flames but can also be used for oil flames. Products with the codes UL, US, UH, UA, and UAF use these detectors.

Detectors for visible radiation (VIS) are suitable for the monitoring of oil and coal flames between 400 and 800 nm. However, product guidelines in some countries stipulate that gas flames must not be monitored in this spectral range. Products with the codes IS, ISE, and ISO use these detectors.

Flame monitor

Particularly cost-effective, fail-safe flame monitors for monitoring gas and oil burners as well as combined gas/ oil burners

AAL 75

D-LE 55 ULD-CG

Features

- Monitoring of gas and oil burners of any load
- Suitable for intermittent operation and continuous operation (only AAL 75 POD)
- Simple installation on TS 35 DIN-rail

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- FM Class 7610
- EAC

Functional description

The flame monitor comprises of a control unit and flame sensor.

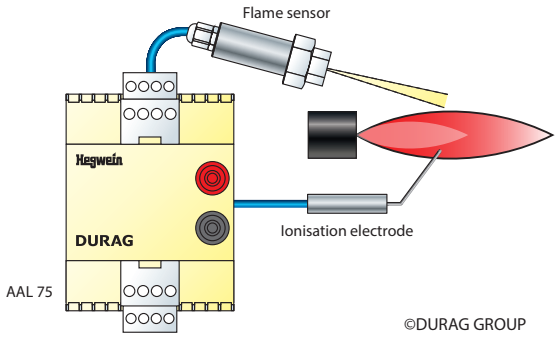
- Optical flame sensors generate a signal from the UV range of the flame radiation
- Flame sensors with an ionisation electrode process a current flowing through the flame

Models

- **AAL 75**
  Ionisation flame monitor for intermittent or continuous operation, also suitable for single electrode operation in conjunction with DURAG ignition transformers, model D-HG 55
- **AAL 75**
  as UV flame monitor in combination with D-LE 55 ULD-CG for the optical monitoring of gas flames in intermittent mode

Accessories

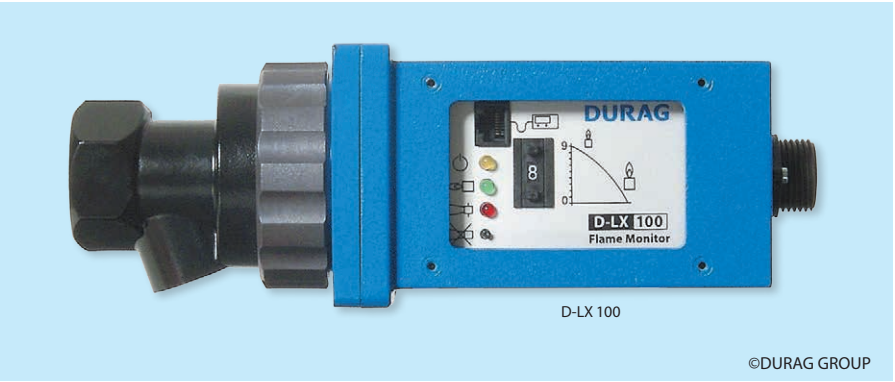
- **Cable** for connecting the ionisation electrode to the ionisation flame monitor (kleZ912F0)
- **Ball valve** for closing the sighting tube (D-ZS 133 III)
- **Swivel mount** for alignment of the flame sensor to the flame to be monitored (D-ZS 033 III)
- **Test light source** for AAL75/ D-LE 55 ULD-CG for functional test of the flame monitor, battery operated (D-ZS 091)
- **Thermal isolator** with electrical insulation for D-LE 55 ULD-CG flame sensor (D-ZS 117 III)



Flame monitor (control unit)		Flame sensor	
Type	AAL 75	Spectral sensitivity	D-LE 55 UD-CG: 190 – 270 nm
Operational mode	Intermittent operation		
Electrical connection	115/ 230 VAC, 50/ 60 Hz		
Perm. ambient temperature	-20 °C bis +60 °C	Perm. ambient temperature	-20 °C to +60 °C
FFDT (safety time)	1 s	Mounting	G 1“ or G ½“
Display	LED	Protection	IP65
Protection	IP20	Dimensions	Ø 27 mm, length 116 mm
Flame relay	2 relay outputs: 250 VAC/ 315 mA and 250 VAC/ 2 A	Weight	0.45 kg
Installation	TS 35 DIN-rail		
Dimensions	68x104x119 mm (WxHxD)		
Weight	0.55 kg		

Compact flame monitor

Self-monitoring and fail-safe compact flame monitor for monitoring gas, oil and coal flames with integrated UV, VIS or IR flame sensor, primarily in single burner view applications



D-LX 100

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Features

- Suitable for intermittent operation as well as continuous operation
- Compact design, flame sensor and control unit in one enclosure, takes up no space in control cabinet
- LED display for settings and operational status
- ATEX approved (D-LX 100.../94Ex for zone 1 and D-LX 100.../97Ex for zone 2)

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- SIL3
- DVGW
- UL 372
- FM Class 7610
- AGA: AS 4625
- EAC
- ATEX

Functional description

The D-LX 100 flame monitor analyses flame radiation using the integrated flame sensor signal. The flame intensity is present as a current at one output 0/4 ... 20mA for further analysis.

Design

- Integrated compact device

D-LX 100.../94Ex
D-LX 100.../95Ex

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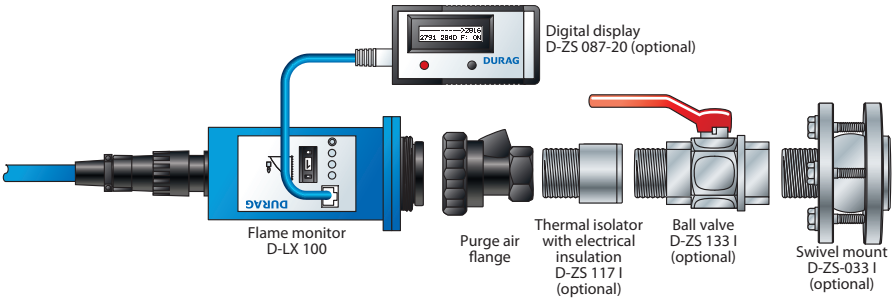
Accessories

- **Digital display** for optimal adjustment of the flame sensors by measuring the pulse rate and its extreme values (D-ZS 087 - 20)
- **Optical adjustment aid** for the alignment of the swivel mount on the sighting tube (D-ZS 118)
- **UV-C test light source** 230 V/ 50 Hz (D-ZS 077-10)
- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Swivel mount** for alignment of flame monitor to the flame to be monitored
- **Thermal isolator** with electrical insulation
- **Ball valve** for closing sighting tube
- **Terminal box** for connecting the flame monitor (D-ZS 140/ 141)
- **Power supply unit** to supply two D-LX 100 (D-NG 24/05)



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Operational mode	Intermittent operation, continuous operation, 72-hour operation without permanent supervision	**Flame intensity**	0/4 ... 20mA
Safety	Self-monitoring and fail-safe	**Perm. ambient temperature**	-20 °C to +60 °C
Electrical connection	24 VDC, 5 W, PELV	**Dimensions Weight**	90x92 mm, length approx. 350 mm/ approx. 1.8 kg
Protection class	IP67	**Sighting tube connection**	G 1¼"
Flame relay	1x NO contact, 230 VAC/ 2 A	**Purge air connection**	G ½"
Status relay	1x NO contact, 230 VAC/ 2 A	**D-LX 100.../9xEx**	
FFDT (safety time)	1, 3, 5 s	**/94Ex /95Ex /96Ex /97Ex**	II 2G Ex de IIC T5/T6 Class I, Div. 1, Group B, C & D Class I, Div. 2, Group A, B, C & D II 3G Ex nAnC IIC T6
Spectral ranges	UV, VIS, IR		
Viewing angle	6°		
Number of ranges	1	**Protection class**	IP65
Switching threshold	0 ... 9	**/94Ex, /95Ex Dimensions Weight**	Ø 130 mm, length 313 mm approx. 4.3 kg
Display	LED display	**Sighting tube connection**	G1" (/94Ex, /95Ex) G 1¼" (/96Ex, /97Ex)

Compact flame monitor

Self-monitoring and fail-safe compact flame monitor for monitoring gas, oil, and coal flames with integrated UV or IR flame sensor

Features

- Wide sensitivity range
- For ambient temperatures from -40 °C up to +85 °C
- Dual channel design throughout
- Measurement of flame flicker frequency
- Selective to individual burners and fuels

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- FM Class 7610
- CSA
- SIL3
- EAC
- AGA: AS 4625
- ATEX , IECEx
- Marine Certifications

Functional description

The D-LX 200 compact flame monitor analyses flame radiation using the integrated flame sensor signal. Current output 0/4 ... 20 mA available for further analysis. Flame properties and parameters of the flame monitor can be transmitted to a PC via a RS485 and an IrDA interface.

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User interface of the flame monitor software

Accessories

- **Optical adjustment aid** for the swivel mount on the sighting tube (D-ZS 118)
- **LED bar graph display** for the flame intensity (D-ZS 129)
- **D-LX 200 Test Kit** for performing software supported tests
- **Swivel mount** for aligning the flame monitor
- **Thermal isolator** with electrical insulation
- **Ball valve** for closing the sighting tube
- **Terminal box** for connecting the flame monitor (D-ZS 140-12)
- **Power supply unit** for supply of up to two D-LX 200 (D-NG 24/05)

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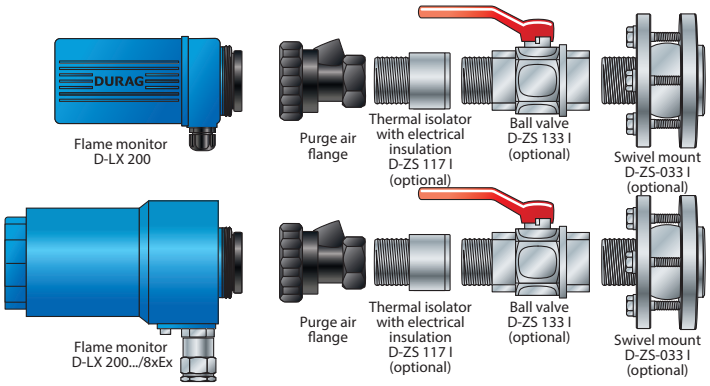


Operational mode	Intermittent operation and continuous operation	**Purge air connection**	G ½" or ½" NPT(F)
Safety	Self-monitoring and fail-safe	**Spectral ranges**	UV, IR
Electrical connection	24 VDC, 5 W, PELV	**Threshold switches**	Flame intensity and flicker frequency
Protection class	IP66/ 68, IP65 (/MP)	**D-LX 200 /8xEx**	
Flame relay	1x NO contact, 24 VDC, 0.5 A	**/84Ex**	II 2G Ex d IIC T6 or T5 Gb II 2D Ex tb IIIC T85 °C or T100 °C Db
Status relay	1x NO contact, 24 VDC, 0.5 A	**/85Ex**	Cl. I, Div. 1, Gr. A, B, C, D T6/T5 Cl. II, Div. 1, Gr. E, F, G T6/T5; Cl. III Type 4 Hazardous locations: indoor/outdoor
FFDT (safety time)	1, 2, 3, 5 s		
Viewing angle	6°		
Ranges	2	**/86Ex**	Cl. I, Div. 2, Gr. A, B, C, D T6/T4 Cl. II, Div. 2, Gr. E, F, G T6/T4; Cl. III Type 4 Hazardous locations: indoor/outdoor
Communication	LED, Modbus RTU, IrDA	**/87Ex**	II 3G Ex nAnC IIC T6 or T4 Gc II 3D Ex tc IIIC T85 °C or T135 °C Dc
Analogue output	0/4 ... 20 mA	**Protection class**	IP66
Ambient temperature range	-40 °C to +85 °C	**Dimensions**	Ø 120 mm, length 307 mm
Dimensions Weight	85x85 mm, length approx. 250 mm approx. 1.25 kg	**Weight**	ca. 3.2 kg
Sighting tube connection	G 1¼" or 1¼" NPT(F)	**T_{max} (/86Ex, /87Ex)**	+65 °C

SIL3

DURAG GROUP smart solutions for combustion and environment

Flame sensor

Flame sensor for monitoring gas, oil and coal flames, primarily in single burner view applications

D-LE 103

Features

- Self-monitoring and fail-safe in conjunction with a control unit/ burner control
- Flame sensors for every spectral range of flame monitoring from UV to IR
- Connection to D-UG 120 and D-UG 660 contol unit as well as D-GF 150 (-MB) burner control
- Uniform output signal thus mutually interchangeable
- Compliant to general safety regulations

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372
- FM Class 7610
- AGA: AS 4625
- EAC
- SIL3

Functional description

The photo element in the flame sensor generates a signal which is proportional to the flame radiation intensity. The output signal of the flame sensor is used as an input signal to a control unit or a burner control.
The D-LE 103 flame sensor is available with different photo elements for optimal selectivity when using different fuels.

Models

- Cable gland (-CG)
- Axial plug (-P)

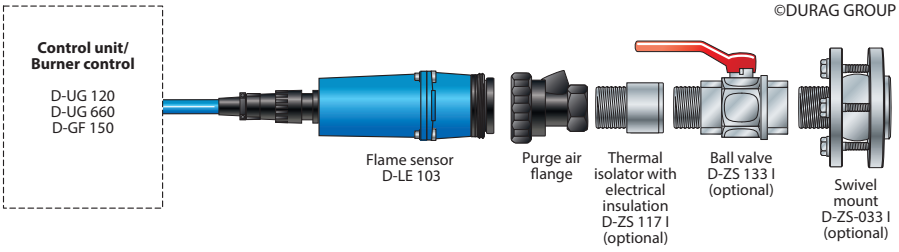
Accessories

- **Optical adjustment aid** for alignment of the swivel mount on the sighting tube (D-ZS 118)
- **UV-C test light source** 230 V/ 50 Hz (D-ZS 077-10)
- **UV-A, UV-B und IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Swivel Mount** for alignment of flame sensor to the flame to be monitored
- **Thermal isolator** with electrical insulation
- **Ball valve** for closing sighting tube
- **Terminal box** for connecting flame sensor (D-ZS 140)

Flame sensor selection

Flame sensor	Suitability for fuels			
	Gas	Oil	Coal	Wood
D-LE 103 UL	++	+		
D-LE 103 UAF	o	++		
D-LE 103 UA	+	++	o	+
D-LE 103 IS	!	++	++	+
D-LE 103 IG	o	++	++	++

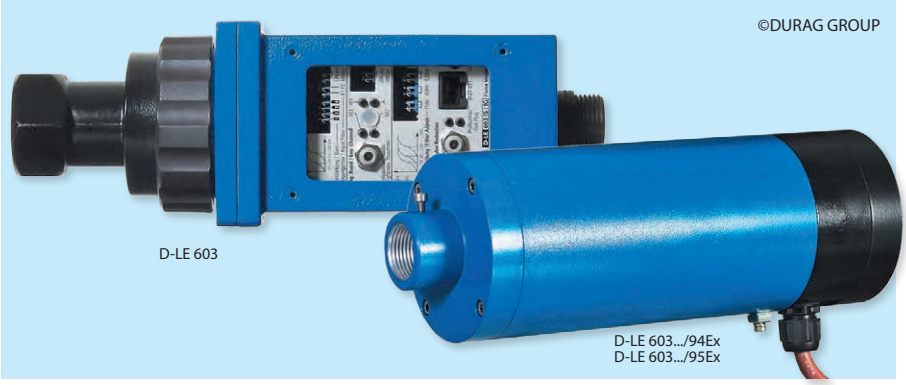
++ ideally suited + well suited **o** conditionally suited **!** not permitted (from experience)



Operational mode	Intermittent operation, continuous operation and 72-hour operation without permanent supervision	**Viewing angle**	6°
Safety	self-monitoring and fail-safe in conjunction with a control unit/ burner control	**Perm. ambient temperature**	-20 °C to +60 °C
Protection	with cable gland (D-LE 103 ... -CG) IP65 with axial plug (D-LE 103 ... -P) IP67	**Dimensions** **Weight**	Ø 80 mm, length approx. 350 mm approx. 1 kg
Gain	pre-set	**Sighting tube connection**	G 1¼"
High-pass filter	pre-set	**Purge air connection**	G ½"
Spectral ranges	UV, VIS, IR		

Flame sensor

Flame sensor for monitoring gas, oil and coal flames, primarily in multi-burner view applications



Features

- Self-monitoring and fail-safe in conjunction with a control unit/ burner control
- Flame sensors for every spectral range from UV to IR
- Connection to the D-UG 120 control unit, D-UG 660 control unit as well as to the D-GF 150 (-MB) burner control
- Uniform output signal thus mutually interchangeable
- Adjustable to different combustion technologies such as exhaust gas recirculation
- Compliance to general safety regulations
- ATEX approved (D-LE 603 .../94 Ex for zone 1 and D-LE 603 .../97Ex for zone 2)

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372
- FM Class 7610
- AGA: AS 4625
- EAC
- ATEX
- SIL3

Functional description

The photo element in the flame sensor generates a signal which is proportional to the flame radiation intensity. The output signal of the flame sensor is used as an input signal to a control unit or a burner control.
The D-LE 603 flame sensor is available with different photo elements for maximum selectivity when using various fuels.

- **Optical adjustment** aid for alignment of the swivel mount on the sighting tube (D-ZS 118)
- **UV-C test light source** 230 V/ 50 Hz (D-ZS 077-10)
- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz
- **Swivel mount** for the alignment of the flame sensor
- **Thermal isolator** with electrical insulation
- **Ball valve** for closing the sighting tube
- **Terminal box** for connecting flame sensor (D-ZS 140/ 141).

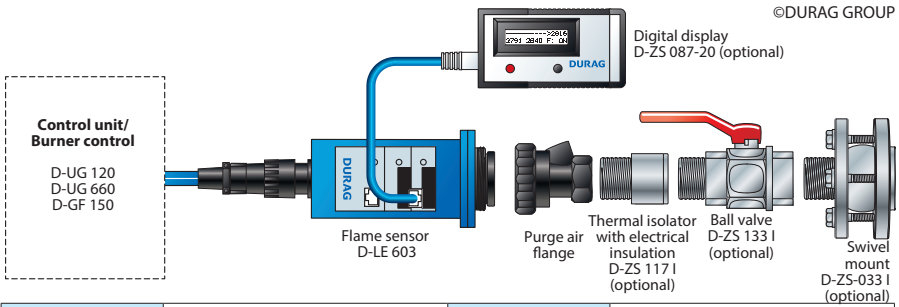
Accessories

- **Digital display** for optimal alignment of flame sensors (D-ZS 087 - 20)

Flame sensor selection

Flame sensor	Suitability for fuels				Features
	Gas	Oil	Coal	Wood	
D-LE 603 UH	++	o			selective single burner monitoring in multiple-burner plants
D-LE 603 US	++	+			at low UV radiation
D-LE 603 UAF	o	++			with intensive ambient light (neighbouring burners), gain switchover
D-LE 603 UA	+	++	+	o	at low NO_x component, gain switch-over
D-LE 603 UI	++	++	+	+	remote changeover of spectral sensitivity
D-LE 603 IS	!	+	++	+	selective single burner monitoring (coal, oil)
D-LE 603 IG	o	+	++	++	selective single burner monitoring (coal, oil, wood)
D-LE 603 ISE	!		++		dual-channel flame sensor (LOG/LOG)
D-LE 603 ISO	!		++		dual-channel flame sensor (LIN/LOG)

++ ideally suited + well suited **o** conditionally suited **!** not permitted (from experience)



Operational mode	Intermittent operation, continuous operation and 72-hour operation without permanent supervision	Dimensions	90x92 mm, length approx. 350 mm
		Weight	approx 1.8 kg
Safety	Self-monitoring and fail-safe in conjunction with a control unit/ burner control	Sighting tube connection	G 1¼"
		Purge air connection	G ½"
Protection class	with cable gland (D-LE 603 ... -CG) IP65 with axial plug (D-LE 603 ... -P) IP67	D-LE 603 .../9xEx	
		Protection class	IP65
Gain	four settings	/94Ex /95Ex /96Ex /97Ex	II 2G Ex de IIC T5/T6 Class I, Div. 1, Group B, C & D Class I, Div. 2, Group A, B, C & D II 3G Ex nAnC IIC T6
High-pass filter	three settings		
Spectral ranges	UV, VIS, IR	/94Ex, /95Ex Dimensions Weight	Ø 130 mm, length 313 mm approx. 4.3 kg
Viewing angle	6°		
Perm. ambient temperature	-20 °C to +60 °C	Sighting tube connection	G1" (/94Ex, /95Ex) G 1¼" (/96Ex, /97Ex)

Flame sensor with fibre optic system

Systems for flame monitoring:

D-LE 701 flame sensor with
– flexible fibre optic system D-LL 701
– rigid fibre optic system D-LL 702

D-LE 703 flame sensor with
– flexible fibre optic system D-LL 703
– rigid fibre optic system D-LL 704

Features

- Self-monitoring and fail-safe flame sensor with a fibre-optic connection in conjunction with a control unit/ burner control
- Monitoring of gas, oil and coal flames
- Connection to the D-UG 120, D-UG 660 control unit and the D-GF 150 (-MB) burner control
- Spectral range from UV to IR
- Uniform output signal thus mutually interchangeable
- Adjustable to different combustion technologies such as exhaust gas recirculation

Applications

- Burners with difficult installation conditions for conventional flame sensors or on those where ambient temperature near the sighting tube is very high
- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- EAC
- SIL3

D-LE 701 D-LE 703

Functional description

The fibre optic system may be integrated directly into the hot area of the burner. It transfers the radiation from the flame over a fibre optic bundle to the flame sensor installed outside the burner. It is available in different lengths.
The photo element in the flame sensor generates a signal which is proportional to the flame radiation intensity. The output signal of the flame sensor is used as an input signal to a control unit or a burner control.

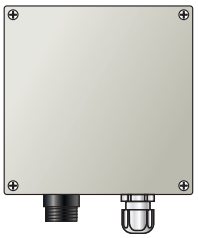
Accessories

- **Digital display** for measuring the pulse rate and its extreme values (D-ZS 087-20)
- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Terminal box** for connecting flame sensor (D-ZS 140)
- **Installation flange** for D-LL 702 for fibre optic system (D-ZS 702)
- **Welding flange** for D-LL 702 for fibre optic system (D-ZS 704)

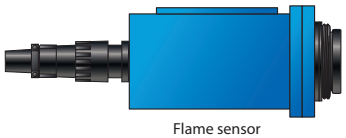
Flame sensor selection

Flame sensor	Suitability for fuels				Features
	Gas	Oil	Coal	Wood	
D-LE 701 / 703 UAF	o	++			with intensive ambient light (neighbouring burners), gain switchover
D-LE 701 / 703 UA	+	++	+		with low NO_x component, gain switchover
D-LE 701 / 703 IS	!	+	++	+	selective single burner monitoring (coal, oil)
D-LE 701 IGA / 703 IG	o	+	++	++	selective single burner monitoring (coal, oil, wood)

++ ideally suited + well suited **o** conditionally suited **!** not permitted (from experience)



Flame sensor D-LE 701



Flame sensor D-LE 703

D-LE 701 flame sensor		D-LE 703 flame sensor	
Operation mode	Intermittent operation, continuous operation and 72-hour operation without permanent supervision	**Operation mode**	Intermittent operation, continuous operation and 72-hour operation without permanent supervision
Safety	Self-monitoring and fail-safe in conjunction with a control unit/ burner control	**Safety**	Self-monitoring and fail-safe
Protection	with cable gland (D-LE 701 ... -CG) IP65 with axial plug (D-LE 701 ... -P) IP67	**Protection**	with cable gland (D-LE 703 ... -CG) IP65 with axial plug (D-LE 703 ... -P) IP67
Gain	four settings	**Gain**	four settings
High-pass filter	three settings	**High-pass filter**	three settings
Spectral ranges	UV, VIS, IR	**Spectral ranges**	UV, VIS, IR
Perm. ambient temperature	-20 °C to +60 °C	**Perm. ambient temperature**	-20 °C to +60 °C
Dimensions Weight	160x185x100 mm (WxHxD) approx. 1.2 kg	**Dimensions Weight**	90x92 mm, length approx. 270 mm approx 1.2 kg

Compact flame monitor with fibre optic system

Application with
- flexible fibre optic system D-LL 703
- or rigid fibre optic system D-LL 704

Features

- Wide sensitivity range
- For ambient temperatures from -40 °C up to +85 °C
- Dual channel design throughout
- Measurement of flame flicker frequency
- Selective to individual burners and fuels

Applications

- Burners with difficult installation conditions for conventional flame sensors or on those where ambient temperature near the sighting tube is too high
- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- FM Class 7610
- CSA
- SIL3
- EAC
- AGA: AS 4625
- ATEX , IECEx
- Marine Certifications

D-LX 720

Functional description

The D-LX 720 compact flame monitor is electronically identical to the D-LX 200. It analyses flame radiation using the integrated flame sensor signal.
Current output 0/4 ... 20 mA available for further analysis.
Flame properties and parameters of the flame monitor can be transmitted to a PC via a RS485 and an IrDA interface.

Accessories

- **LED bar graph display** for the flame intensity (D-ZS 129)
- **D-LX 200 Test Kit** for performing software supported tests
- **Terminal box** for connecting the flame monitor (D-ZS 140-12)
- **Installation flange** for D-LL 703 fibre optic system (D-ZS 703)
- **Welding flange** for D-LL 704 fibre optic system (D-ZS 704)
- **Power supply unit** for supply of up to two D-LX 720 (D-NG 24/05)

User interface of the flame monitor software

D-LX 720.../87Ex

Operational mode	Intermittent operation and continuous operation	**Threshold switches**	Flame intensity and flicker frequency
Safety	Self-monitoring and fail-safe	**D-LX 720 .../8xEx**	
Electrical connection	24 VDC, 5 W, PELV	**/84Ex**	II 2G Ex d IIC T6 or T5 Gb II 2D Ex tb IIIC T85 °C or T100 °C Db
Protection class	IP66/ 68, IP65 (/MP)	**/85Ex**	Cl. I, Div. 1, Gr. A, B, C, D T6/ T5 Cl. II, Div. 1, Gr. E, F, G T6/ T5; Cl. III Type 4 Hazardous locations: indoor/outdoor
Flame relay	1x NO contact, 24 VDC, 0.5 A		
Status relay	1x NO contact, 24 VDC, 0.5 A	**/86Ex**	Cl. I, Div. 2, Gr. A, B, C, D T6/ T4 Cl. II, Div. 2, Gr. E, F, G T6/T4; Cl. III Type 4 Hazardous locations: indoor/outdoor
FFDT (safety time)	1, 2, 3, 5 s		
Ranges	2	**/87Ex**	II 3G Ex nAnC IIC T6 or T4 Gc II 3D Ex tc IIIC T85 °C or T135 °C Dc
Communication	LED, Modbus RTU, IrDA		
Analogue output	0/4 ... 20 mA	**Protection class**	IP66
Ambient temperature range	-40 °C to +85 °C	**Dimensions**	Ø120 mm, length 229 mm
Dimensions Weight	85x85 mm, length approx. 175 mm approx. 1.25 kg	**Weight**	ca. 3.2 kg
Spectral ranges	UV, IR	**T_{max} /86Ex, /87Ex**	+65 °C

SIL3

DURAG GROUP smart solutions for combustion and environment

Fibre optic systems

The flexible and rigid fibre optic systems may be integrated directly into the hot area of the burner. It transfers the radiation from the flame over a fibre optic bundle to the flame sensor installed outside the burner

D-LL 701 fibre optic system

- Flexible fibre optic system
- Flame sensor and optics of the fibre optic system are connected by a glass fibre bundle which is surrounded by a flexible protection hose
- Suitable for temperatures up to 350 °C

D-LL 702 fibre optic system

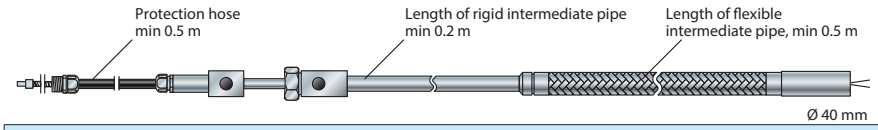
- Rigid fibre optic system
- Flame sensor and optics of the fibre optic system are connected by a glass fibre bundle which is surrounded by a flexible protection hose
- Suitable for temperatures up to 350 °C

D-LL 703 fibre optic system

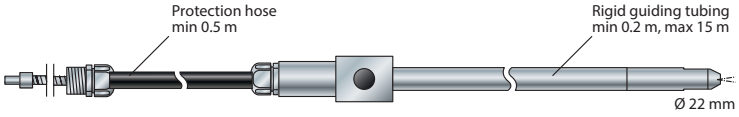
- Flexible fibre optic system
- For combination with flame sensor or compact flame monitor
- The optics of the fibre optic system are connected to the sensor by a multiple protected glass fibre bundle
- Suitable for temperatures up to 350 °C

D-LL 704 fibre optic system

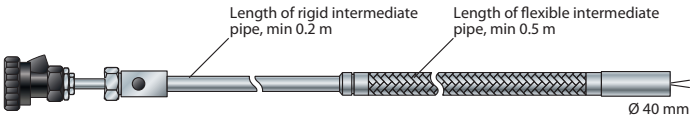
- Rigid fibre optic system
- For combination with flame sensor or compact flame monitor
- The optics of the fibre optic system are connected to the sensor by a multiple protected glass fibre bundle
- Suitable for temperatures up to 350 °C



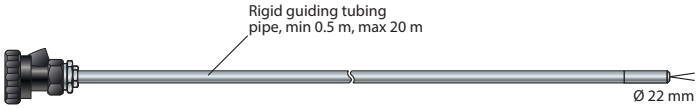
D-LL 701: flexible fibre optic system for D-LE 701			
Spectral ranges	UV, IR	**Purge air connection**	G ½"
Viewing angle	6°	**Intermediate pipe material**	1.4301
Perm. ambient temperature	-40 °C to +350 °C (optical system)	**Weight**	approx. 1.6 kg + 1 kg/m



D-LL 702: rigid fibre optic system for D-LE 701			
Spectral ranges	UV, IR	**Purge air connection**	G ½"
Viewing angle	6°	**Guiding tube material**	1.4301
Perm. ambient temperature	-40 °C to +350 °C (optical system)	**Weight**	approx. 1.6 kg + 1 kg/m



D-LL 703: flexible fibre optic system for D-LE 703 and D-LX 720			
Spectral ranges	UV, IR	**Cooling air connection**	G ½"
Viewing angle	6°	**Intermediate pipe material**	1.4301
Perm. ambient temperature	-40 °C to +350 °C (optical system)	**Weight**	approx. 3 kg + 1 kg/m
Purge air connection	G ½"		



D-LL 704: rigid fibre optic system for D-LE 703 and D-LX 720			
Spectral ranges	UV, IR	**Cooling air connection**	G ½"
Viewing angle	6°	**Guiding tube material**	1.4301
Perm. ambient temperature	-40 °C to +350 °C (optical system)	**Weight**	approx. 2 kg + 1 kg/m
Purge air connection	G ½"		

Applications

- Tilting burner (flexible system)
- Burners with difficult installation conditions for conventional flame sensors or on those whose ambient temperature near the sighting tube is too high
- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators, heating plants

Flame sensor

Flame sensor for monitoring gas and oil flames, primarily in gas turbines or in particularly harsh environments

D-GT 800-P

Features

- Self-monitoring and fail-safe in conjunction with a control unit/ burner control
- Deployable with high combustion chamber overpressure and with strong vibrations
- Connection to the D-UG 120, D-UG 660 control units and the D-GF 150 (-MB) burner control
- Optionally available with air/water cooling
- Compliant to general safety regulations
- Flame monitoring in the UV-range from 190 to 570 nm
- ATEX-approved (D-GT 800/801../Ex)

Applications

- Burners with difficult installation conditions for conventional flame sensors or on those where ambient temperature near the sighting tube is very high
- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants
- Gas turbines

Certifications (only D-GT 800/801)

- DVGW
- EAC
- ATEX

Functional description

With its combination of a highly sensitive photo element and sturdy design, the D-GT 800/801 flame sensors are ideal for use in harsh environments such as in gas turbines. The photodiode used can detect almost all blue burning flames, such as gas flames having only a low radiation component in the visible range.
The D-GT 800/801 is available with different photo elements for optimal selectivity when using different fuels.

Models

- Cable gland connection (-Ex)
- Axial plug (-P)
- Available with air or water cooling for very high temperatures (D-GT 800)

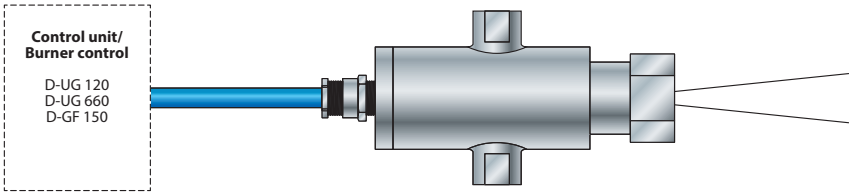
Accessories

- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Terminal box** for connecting the flame sensor (D-ZS 140, D-ZS 141)

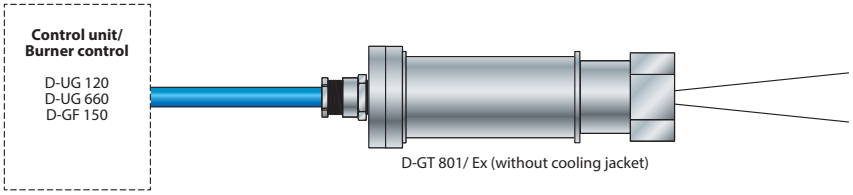
Flame sensor selection

Flame sensor	Suitability for		Features
	Gas	Oil	
D-GT 800/801 UAF	o	++	with intensive ambient light (neighbouring burners)
D-GT 800/801 UA	+	++	at low NO_x component

++ ideally suited + well suited o conditional suited ! not permitted (from experience)



D-GT 800/ Ex

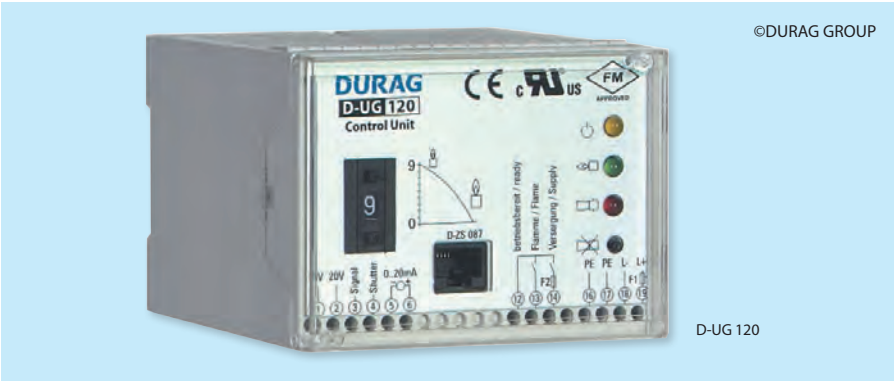


D-GT 801/ Ex (without cooling jacket)

Operational mode D-GT 800/801	Intermittent operation, continuous operation and 72-hour operation without permanent supervision	**Perm. ambient temperature**	Without cooling: -20 °C to +120 °C Air cooling: -20 °C to +200 °C Water cooling: -20 °C to +300 °C
Safety	Self-monitoring and fail-safe in conjunction with a control unit/ burner control	**Vibration**	10 g
		Dimensions	Ø 100 mm; length approx. 190 mm
Protection	With cable gland (D-GT 800/801 -P) IP67 Ex-Version (D-GT 800/801 .../Ex) IP66	**Weight**	Without cooling: approx. 1.5 kg with cooling: approx. 2.0 kg
Ex-Protection (D-GT 800/801../ Ex)	II 2G Ex d T4/T5/T6	**Max combustion chamber overpressure**	30 bar
Spectral range	UV	**Sighting tube connection**	¾" NPT (F)
Viewing angle	6°	**Cooling connection**	½" NPT (F)

Control unit

Self-monitoring and fail-safe control unit for monitoring gas, oil and coal flames with DURAG UV, UV+IR or IR flame sensors, primarily in single burner view applications



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D-UG 120

Features

- Suitable for intermittent operation as well as continuous operation
- LED display
- Installation on DIN-rail

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372
- FM Class 7610
- EAC
- SIL3

Functional description

The D-UG 120 control unit analyses the flame radiation via the signal of the flame sensor connected.
The easy-to-read LED display shows the operational status of the flame monitor.
The flame intensity is present as a current at an output 0/4 ... 20 mA for further analysis.

Flame sensors

- D-LE 103 for standard applications
- D-LE 603 for selective flame monitoring
- D-LE 701/703 for special applications (fibre optics)
- D-GT 800 for particularly harsh environments
- Sensors for Ex-applications are also available

Design

- Enclosure for DIN-rail mounting

Accessories

- **Power supply unit** for connecting the D-UG 120 to 230VAC (D-NG 24/05)
- **Digital display** for optimal adjustment of the flame sensors by measuring the pulse rate and its extreme values (D-ZS 087 - 20)
- **Optical adjustment aid** for the alignment of the swivel mount on the sighting tube (D-ZS 118)
- **UV-C test light source** 230 V/ 50 Hz (D-ZS 077-10)
- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Swivel mount** for alignment of flame monitor to the flame to be monitored
- **Thermal isolator** with electrical insulation
- **Ball valve** for closing sighting tube
- **Terminal box** for connecting flame monitor (D-ZS 140/ 141)

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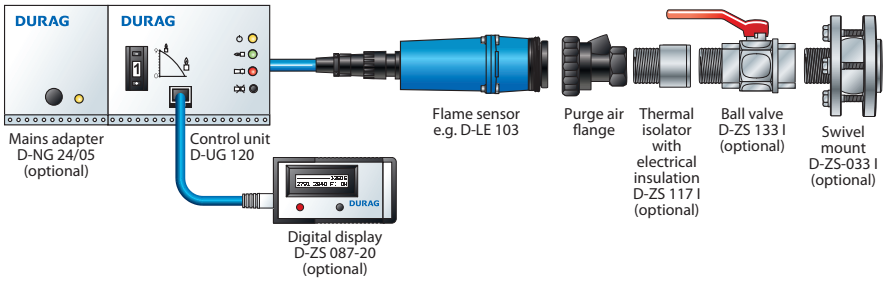


Operation mode	Intermittent operation, continuous operation, 72-hour operation without permanent supervision	**Configurable switching thresholds**	1
Safety	Self-monitoring and fail-safe	**Threshold setting**	0 ... 9
Electrical connection	24 VDC, 5 W, PELV	**Flame sensor**	1
Protection	IP20	**Display**	LED
Flame relay	1x NO contact, 230 VAC, 2 A	**Flame intensity**	0/4 ... 20 mA
Status relay	1x NO contact, 230 VAC, 2 A	**Perm. ambient temperature**	-20 °C to +60 °C
Installation	TS 35 DIN-rail	**Dimensions**	100x75x118 mm (WxHxD)
FFDT (safety time)	1 s	**Weight**	approx. 0.45 kg

Control unit

Self-monitoring and fail-safe control unit for monitoring gas, oil and coal flames with DURAG UV, UV+IR or IR-flame sensors, primarily in multi-burner view applications

D-UG 660

Features

- Suitable for intermittent operation as well as continuous operation
- Optional parallel operation of two flame sensors in any combination: UV/ UV, UV/IR or IR/ IR
- Three different settings supported for various modes (e.g. dependent on fuel or combustion technology), automatic activation by burner management system
- Plain text display

Applications

- Power stations
- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372
- FM Class 7610
- AGA: AS 4625
- EAC
- SIL3

Functional description

The D-UG 660 control unit analyses the flame radiation via the pulse signal of the flame sensor connected.
The easy-to-read LCD display continually shows information on the defined setting and operational status.
The flame intensity and signal are present at two current outputs 0/4 ... 20 mA for further analysis.

Flame sensors

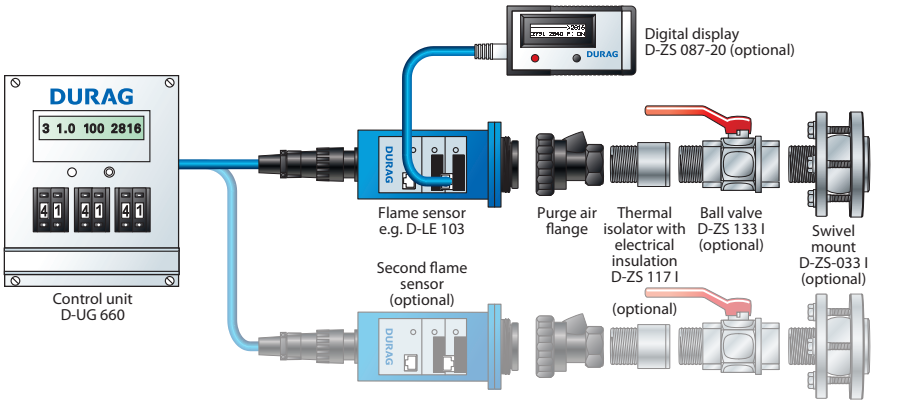
- D-LE 103 for standard applications
- D-LE 603 for selective flame monitoring
- D-LE 701/ 703 for special applications (fibre optics)
- D-GT 800 for particularly harsh environments
- Sensors for Ex-applications are also available

Design

- Plug-in module (21HP and 3RU) for 19" racks (IP00)

Accessories

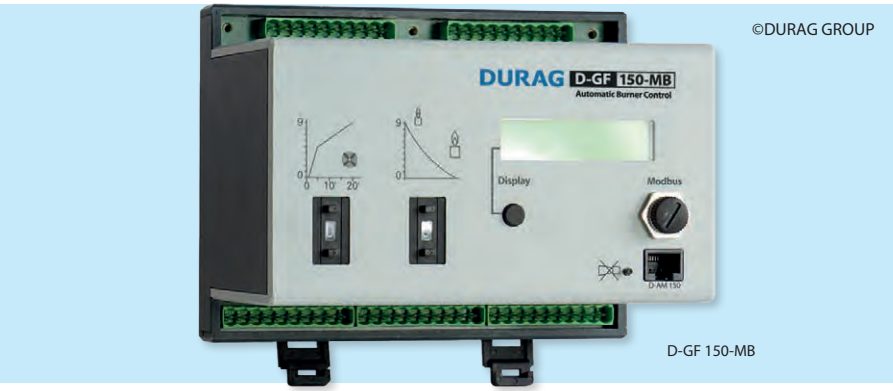
- **Digital display** for optimal adjustment of the flame sensors by measuring the pulse rate and its extreme values (D-ZS 087 - 20)
- **Optical adjustment aid** for the alignment of the swivel mount on the sighting tube (D-ZS 118)
- **UV-C test light source** 230 V/ 50 Hz (D-ZS 077-10)
- **UV-A, UV-B and IR test light source** 230 V/ 50 Hz (D-ZS 093)
- **Swivel mount** for alignment of flame monitor to the flame to be monitored
- **Thermal isolator** with electrical isolation
- **Ball valve** for closing sighting tube
- **Terminal box** for connecting flame monitor (D-ZS 140/ 141)
- Various **enclosures and racks** for 1 to 4 devices



Operation mode	Intermittent operation, continuous operation, 72-hour operation without continual supervision	**Pre-configurable combinations of switching threshold and safety time**	3
Safety	Self-monitoring and fail-safe	**Flame sensor connection**	1 or 2 (parallel)
Electrical connection	24/ 48 VDC, 115/ 230 VAC	**Display**	alpha-numeric LCD display
Protection	IP00	**Flame intensity**	0/4 ... 20 mA
Flame relay	1x switch-over contact, 230 VAC, 2 A	**Flame signal**	0/4 ... 20 mA
Status relay	1x switch-over contact, 230 VAC, 2 A	**Perm. ambient temperature**	-20 °C to +60 °C
Threshold setting	00 ... 99	**Dimensions**	19" plug-in module, 3 RU, 21 HP
FFDT (safety time)	1 ... 5.5 s	**Weight**	approx. 1 kg

Burner control

Self-monitoring and fail-safe burner control for the control of gas and oil burners as well as combined gas/ oil burners of any capacity



Features

- Controlling and monitoring of gas and oil burners of any capacity
- Suitable for intermittent operation as well as continuous operation
- Integrated gas valve monitoring system
- Separate outputs for control of gas and oil fuel valves
- Quick fuel change "on the fly" without burner shut down
- Adjustable pre-purge timer
- Integrated flame monitor
- Input for external flame monitor
- Data interfaces
- Status displays (LED or text)

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372
- FM Class 7610
- AGA: AS 4625
- EAC

Functional description

Generally used fuel types and burners require certain synchronised program cycles and safety times for burner start-up which are controlled and monitored electronically with the burner control.
The following program cycles may be selected on the D-GF 150 automatic firing device:

- Gas fuel with boiler pre-purge
- Gas fuel without boiler pre-purge
- Oil fuel with boiler pre-purge
- Oil fuel without boiler pre-purge.

D-GF 150-MB

- Integrated text display for messages of status, program step and errors
- RS485 communication port for supply of parameters, settings and present status via Modbus protocol

Flame sensors

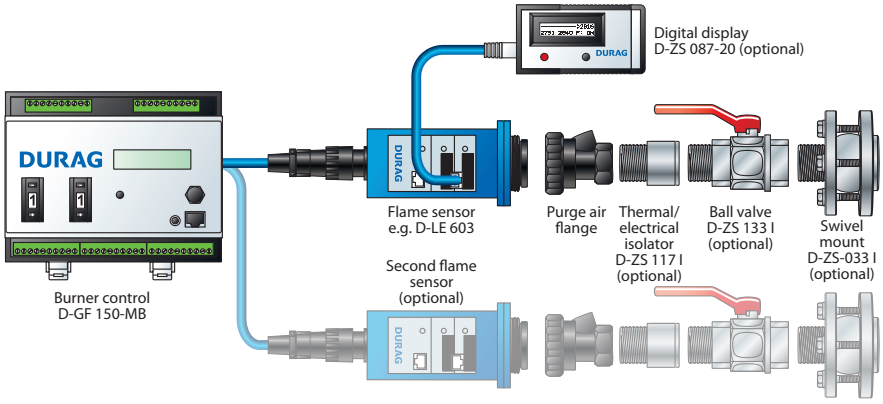
- D-LE 103 for standard applications
- D-LE 603 for selective flame monitoring
- D-LE 701/ 703 for special applications with fibre-optic systems
- D-GT 800 for particularly harsh environments
- Flame sensor for use in potentially explosive atmospheres are also available

Design

- Device installed on the TS 35 DIN-rail.

Additional equipment

- **First out annunciator, plain text display, fieldbus communication** (D-AM 150)
- **Digital display** for optimal adjustment of the flame sensors by measuring the pulse rate and its extreme values (D-ZS 087 - 20)



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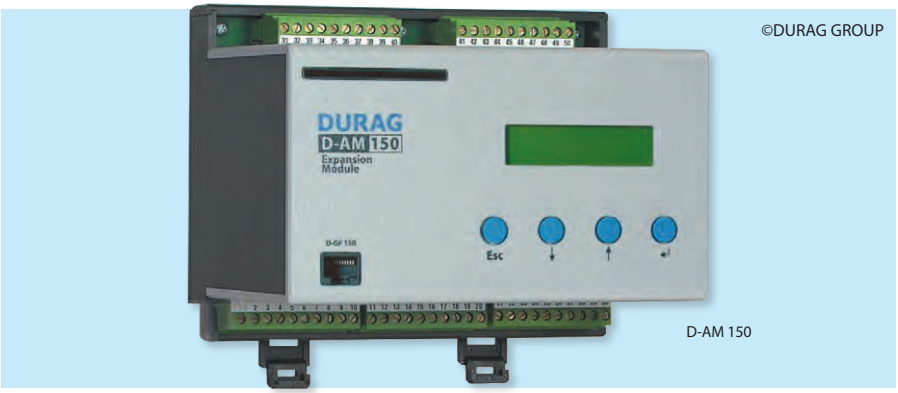
Operational mode	Intermittent operation, continuous operation, 72-hour operation without permanent supervision	**Flame sensor**	1, 2 parallel or external flame
		Display	LED
Safety	Self-monitoring and fail-safe	**Flame intensity**	0/4 ... 20 mA
Electrical connection	115/ 230 VAC , 50/ 60 Hz	**Data output**	to D-AM 150/ D-ZS 087-20
Protection	IP20	**Dimensions Weight**	170x130x114 mm (WxHxD) approx. 1.5 kg
Perm. ambient temperature	-20 °C to +60 °C	**D-GF 150-MB**	
Installation	DIN-rail TS 35	**Display**	Text display of status, program step and errors
Threshold setting	0 ... 9	**Data output**	Direct Modbus port
Pre-purge	30 s ... 20 min		

Display module

Extension module for the D-GF 150 automatic firing device with functions ranging from first out annunciator to plain text display up to fieldbus communication



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D-AM 150

Features

- Plain text display for the burner control D-GF 150
- Initial value indicator with 24 inputs in three groups
- Fault memory
- Text editor for plain text display
- Output relay for control via Fieldbus
- Operational hours counter
- Cycle counter
- Chip card for ease of programming
- Fieldbus communication (MODBUS-RTU) for up to 32 devices
- Can be combined with D-GF 150 as well as D-GF 150-MB

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- UL 372

Functional description

The D-AM 150 display module upgrades the burner control D-GF 150 with

- A plain text display (LCD) for showing the current program cycle of the burner control as well as the remaining run-time.
- The supported user displays include:
  - Flame signal
  - Error message
  - Operational hours of the burner
  - Burner cycles
  - Date and time
- A first out annunciator for the continuous monitoring of all connected limiters and monitor chains. Should the system be shut down, the position in which chain the shutdown is performed is stored.
- A MODBUS interface for outputting status and process information for the burner and D-GF 150 burner control.

Design

- Device for assembling onto TS 35 DIN-rail

Additional equipment

- **Chip card for data storage** and parameterisation (D-AM 150 CC)

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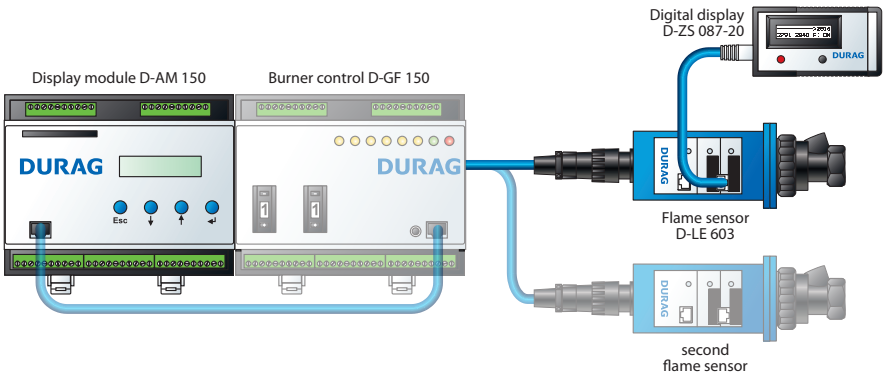
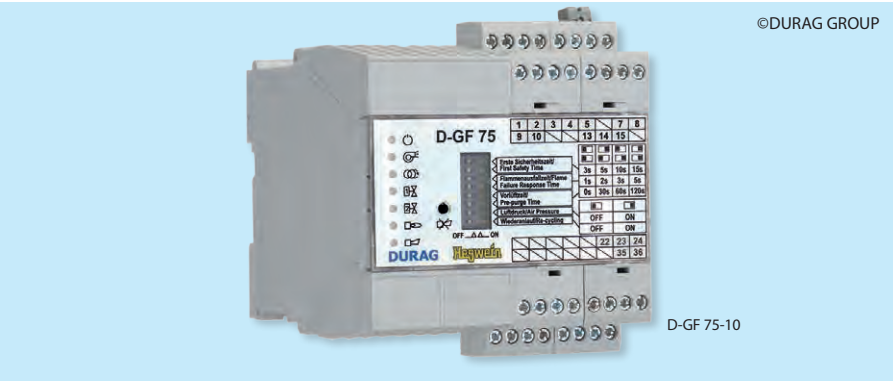


Operational mode	Intermittent operation, continuous operation, 72-hour operation without permanent supervision	**Installation**	DIN-rail TS 35
		Dimensions	170x130x114 mm (WxHxD)
Safety	First our annunciator: fail-safe	**Weight**	approx. 1.2 kg
Electrical connection	115/ 230 VAC, 50/ 60 Hz	**Display**	Alpha-numeric LCD display
Protection	IP20	**Data output**	Modbus RTU
Perm. ambient temperature	-20 °C to +60 °C		

Burner control

Self-monitoring and fail-safe burner control for the control of gas and oil burners as well as combined gas/oil burners of any capacity



Features

- Controlling and monitoring of gas and oil burners of any capacity
- Suitable for intermittent operation (D-GF 75-10) and continuous operation (D-GF 75-20)
- Integrated ionisation flame monitor
- Input for external flame monitor
- Adjustable pre-purge time
- Adjustable safety times
- Optinional recycling after flame loss in operation position

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants

Certifications

- DVGW
- EAC

Functional description

Generally used fuel types and burners require certain synchronised program cycles and safety margins for burner start-up which are controlled and monitored electronically with the burner control:

- The pre-purge of the boiler with optional air pressure check
- The ignition of the burner
- The fuel valves
- Flame monitoring

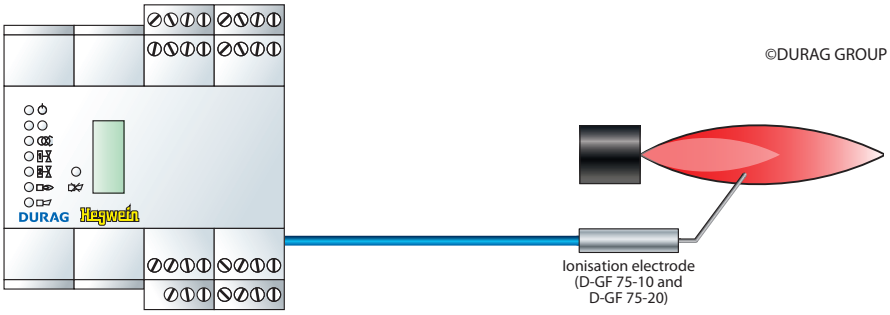
After the release of the ignition sequence by a thermostat for example, the device performs a check of ambient light. If no flame is detected, the ignition sequence starts. If no flame forms during the ignition sequence or if it is extinguished whilst the burner is in operation, an interlock is activated.

Design

- Enclosure for DIN-rail installation

Models

- **D-GF 75-10**
  for intermittent operation
  – Operation with ionisation electrode
  – Connection for external flame monitors (for continuous operation) e.g. DURAG D-LX 100 compact flame monitor or the combination of D-UG 120 with a D-LE 103 flame sensor.
- **D-GF 75-20**
  for continuous operation
  – Operation with ionisation electrode
  – Connection for external flame monitors (for continuous operation) e.g. DURAG D-LX 100 compact flame monitor or the combination of D-UG 120 with a D-LE 103 flame sensor

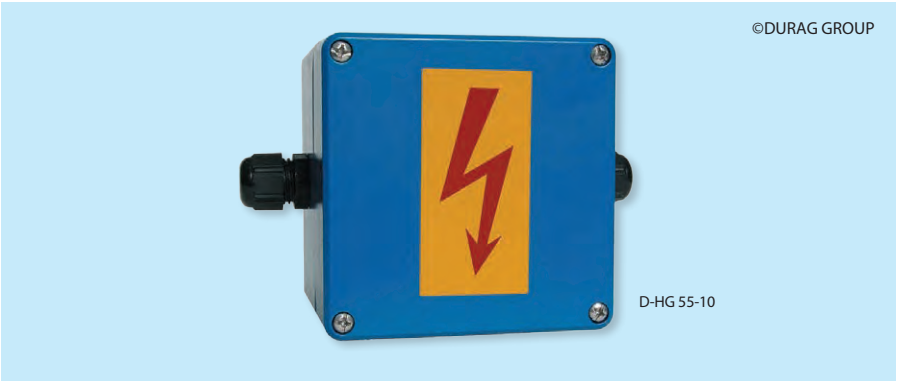


D-GF 75-10 Burner control

Operational mode	D-GF 75-10: Intermittent operation D-GF 75-20: Intermittent operation and continuous operation	**Start-up safety time**	3, 5, 10 or 15 s
		Pre-purge time	0, 30, 60 or 120 s
Safety	Self-monitoring and fail-safe	**Operational safety time**	1, 2, 3 or 5 s
Electrical connection	115/ 230 VAC, 50/ 60 Hz	**Flame intensity**	0 ... 50 µA
Protection	IP20	**Display**	LED
Perm. ambient temperature	-20 °C to +60 °C	**Dimensions**	91x103x118 mm (WxHxD)
Flame sensor	- Ionisation electrode - External flame monitor	**Weight**	approx. 1 kg
Installation	DIN-rail TS 35		

Electronic ignition transformer

The D-HG 55 electronic ignition transformer is suitable for the ignition of gases and liquid fuels in small burners



Features

- Ignition of oil and gas
- High-performance and reliable ignition
- Simple to use and install
- Robust enclosure for industrial use
- Maintenance-free because no wearing parts
- 100 ignition sparks/second with a mains frequency of 50Hz, 120 ignition sparks/second with a mains frequency of 60Hz
- Suitable as "Ignitor Class 3 Special" in accordance with NFPA 85

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incineration
- Steam generators
- Heating plants

Certifications

- EAC

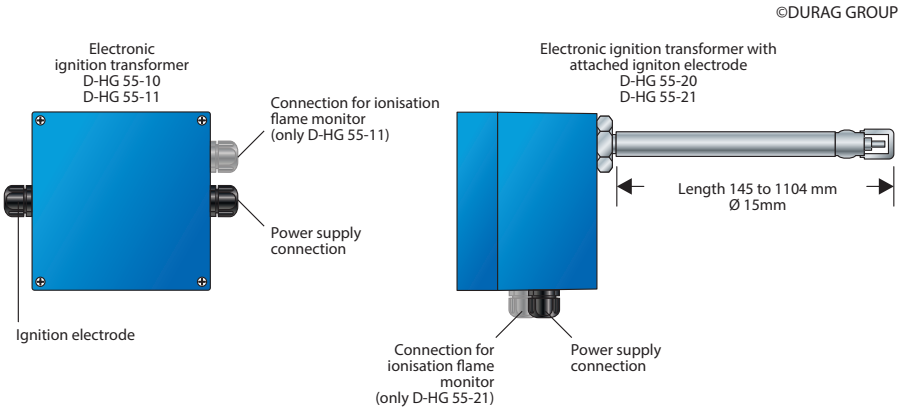
Functional description

A capacitor is charged up in the electronic ignition transformer. Once the required energy level has been reached, a non-wearing electronic switch (thyristor) triggers a spark discharge at the ignition tip.

The D-HG 55-11 and -21 electronic ignition transformers allow the use of the electrode as a common ignition and ionisation electrode for flame monitoring. The electrode is automatically switched over after powering off the ignition. The ionisation current may be tapped off at a terminal. The HEGWEIN AAL 75 ionisation flame monitor is suitable as a flame monitor.

Models

- **D-HG 55-10**
  Electronic ignition transformer for connection to an external ignition electrode
- **D-HG 55-11**
  Electronic ignition transformer for connection to an external ignition electrode with the option of connecting the electrode to an ionisation flame monitor
- **D-HG 55-20**
  Electronic ignition transformer with attached ignition electrode
- **D-HG 55-21**
  Electronic ignition transformer with attached ignition electrode with the option of connecting to an ionisation flame monitor



Electrical connection	115/ 230 VAC, 50/ 60 Hz	**Perm. ambient temperature**	-20 °C to +60 °C
Power consumption	15 VA	**Protection**	IP55
Ignition voltage	5000 V	**Dimensions**	100x100x80 mm (LxWxD) (without ignition electrode)
Duty cycle	max 300 s (Duty cycle 50%)	**Weight**	approx. 0.7 kg

High energy ignition

The high energy ignition devices of the D-HG 400 and D-HG 500 series are suitable for the ignition of gas or liquid fuels in industrial burners of any capacity

Features

- Reliable ignition of gaseous fuels
- Ignition of liquid fuels, up to heavy oil grade 6
- Suitable as „Ignitor Class 3 Special" in accordance with NFPA 85
- Compact set-up with integrated ignition lance
- Separated set-up of ignition device and ignition lance for safe and hazardous areas
- Thyristor controlled and therefore non-wearing electronic
- Ignition feedback signal via potential-free relay output
- LED indication at device
- Integrated protection and control functionalities

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Power plants
- Steam generators
- Claus plants

Certifications

- ATEX/ IECEx
- EAC

Function

At the high energy igniters D-HG 400 and D-HG 500 a high-voltage capacitor is discharged and a spark is created at the ignition lance's tip. The spark discharge is triggered by a non-wearing switch (thyristor). Every spark produces –depending on the model – an energy of up to 5,6 Joule at a maximum ignition frequency of 20 sparks per second.

Capacity types

- **D-HG 400**
  Ignition feedback signal via LED at the device and potential-free relay output to the control room, maximum ignition energy of 90 Joule at a maximum ignition frequency of 20 sparks per second
- **D-HG 500**
  Ignition feedback and status signal via LEDs at the device and potential-free relay outputs to the control room, maximum ignition energy of 112 Joule at a maximum ignition frequency of 20 sparks per second
- **D-HG 550**
  As D-HG 500 but with the additional possibility for customizing of parameters and optional available control functionalities (via software D-ESI 100 by user or DURAG-Service)

Models

- **D-HG ...-50**
  Compact set-up, electronics and ignition lance are one unit
- **D-HG ...-51**
  Compact set-up as D-HG ... -50 with push-button for manual ignition
- **D-HG ...-52**
  Compact set-up as D-HG ... -50 with separated connections for signalling and power supply
- **D-HG ...-60**
  Separated set-up for safe areas: Electronic unit and ignition lance are connected by a high voltage cable
- **D-HG ...-61**
  Separated set-up as D-HG..-60 with push-button for manual ignition
- **D-HG ...-62**
  Separated set-up as D-HG..-60 with separated connections for signalling and power supply
- **D-HG ...-..Ex**
  Separated set-up for potentially explosive atmospheres 1&21 (ATEX)
- **Optional**
  Customized and project specific versions with flexible ignition lances for tilting burners

Electrical connection	115 VAC/ 230 VAC, 48-60 Hz	**Perm. ambient temperature**	D-HG 400: -20 °C to +60 °C D-HG 5x0: -40 °C to +80 °C
Power consumption	200 VA	**Display**	LEDs (Ignition feedback, status (only D-HG 5x0))
Ignition voltage	1500 V	**Protection**	IP65 (D-HG ..-5x/-6x) IP66 (D-HG ..-7xEx/-9xEx)
Inition energy/ second (max)	D-HG 400: 90 J D-HG 5x0: 112 J	**Dimension (D-HG-5x/6-6x)**	108x188x237 (BxHxT)
Ignition frequency	Max 20 sparks/ second	**Weight (appr., without ignition lances)**	D-HG ...-5x/6x: 4,5 kg D-HG ...-7xEx: 16 kg D-HG ...-9xEx: 18 kg
Power on time	50 %		

Ignition lances

For the connection to the high energy ignition devices of the D-HG 400 and D-HG 500 series in order to ignite gas or liquid fuels in industrial burners of any capacity – also in hazardous areas

Features

- Flexible customization for specific installation conditions by various combination of components
- Easily replaceable ignition tips – available as normal or high temperature-proof models
- Special igntion tips for the ignition of HFO or at high pressure
- Ignition lance lenghts up to 15 meter
- Up to 50 m distance can be overcome by using robust high voltage cables – without any loss of performance!
- Compatible with retractions units D-VE 500

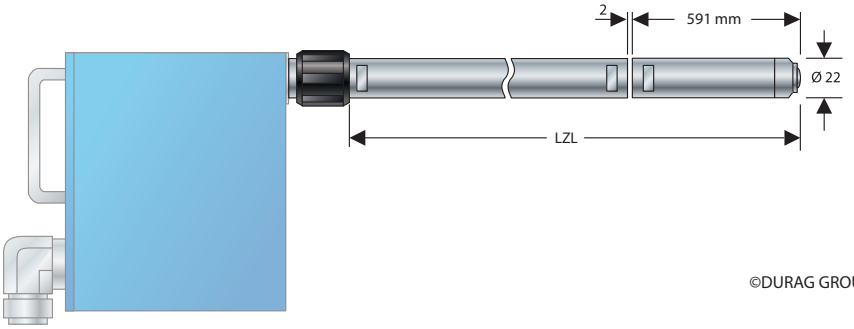
Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Power plants
- Steam generators
- Claus plants

Certifications

- ATEX/ IECEx
- EAC

D-ZL 500 - directly mounted at D-HG ... -50/ -51/ -52



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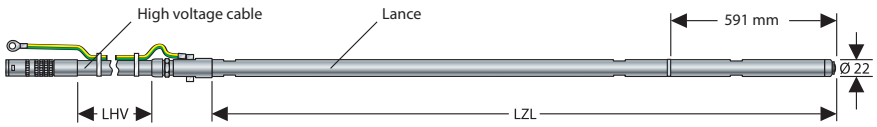
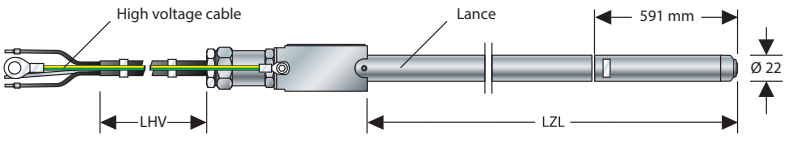
Length ignition lance LZL	Min 0,7 m, max 15 m (grid dimension: 100 mm)	**Weight ignition lance**	1,6 kg/m at Ø 22mm
Diameter ignition lance	Standard: 22 mm Others on request	**Operational life of ignition tip**	10^6 sparks
Max temperature ignition tip	Normal temperature (NT): 600 °C, briefly 800 °C High temperature (HT): Up to 1000 °C		

D-ZL 521- seperated ignition lance for D-HG ...-60/ -61/ -62



Length ignition lance LZL	Min 0,7 m, max 15 m (grid dimension 100 mm)	**Weight ignition lance**	1,6 kg/m at Ø 22mm
Length high voltage cable LHV	Min 3 m, max 50 m (grid dimension 5 m)	**Weight high voltage cable**	0,5 kg + 0,5 kg/m
Diameter ignition lance	Standard: 22 mm Other on request	**Operational life of ignition tip**	10^6 sparks
Max temperature ignition tip	Normal temperature (NT): Up to 600 °C, briefly 800 °C High temperature (HT): Up to 1000 °C	**Cable take-off**	At side of device: 0°/ 90° At side of lance: 0°/ 90°

D-ZL 441Ex - connectable to D-HG ...-..Ex for hazardous areas



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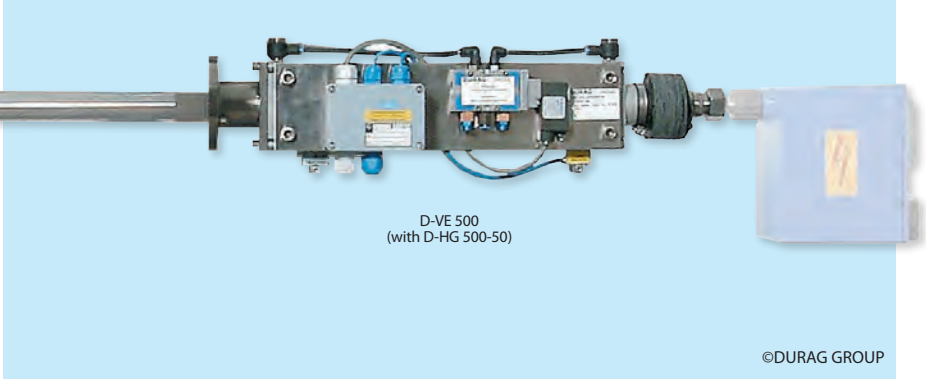
Length ignition lance LZL	Min 0,7 m, max 15 m (grid dimension: 100 mm)	**Weight ignition lance**	1,6 kg/m at Ø 22mm
Length high voltage cable LHV	Min 3 m, max 50 m (grid dimension: 5 m)	**Weight high voltage cable**	0,5 kg + 0,5 kg/m
Diameter ignition lance	Standard: 22 mm Other on request	**Operational life of ignition tip**	10^6 sparks
Max temperature ignition tip	Normal temperature (NT): Up to 600 °C, briefly 800 °C High temperature (HT): Up to 1000 °C	**Cable take-off**	At side of lance: 0°/ 90°
Ex protection (ATEX/IECEx)	II 2G Ex d IIC T6, T5, T4 Gb II 2D Ex tb IIIC T80, 95, 130 °C Db IP65	**Perm. ambient temperature**	-40 °C to +80 °C

Pneumatic retraction unit

Pneumatic retraction unit for the insertion and retraction of ignition lances and ignition devices



D-VE 500
(with D-HG 500-50)

Features

- Automatic insertion and retraction of ignition lances
- Compressed air drive
- Direction change with solenoid valve
- Speed control
- Non-contact limit switch
- For use with ignition device D-HG 400-5x/ 5x0-5x or ignition lances ZL 441Ex/ 521
- Available stroke lengths: 300, 400, 500 and 600 mm
- Pressure-tight and/ or explosion protected models also available
- Operational overpressure up to 10 bar

Applications

- Chemical industry
- Refineries
- Cement plants
- Waste incinerators
- Steam generators
- Heating plants
- Claus plants

Certification

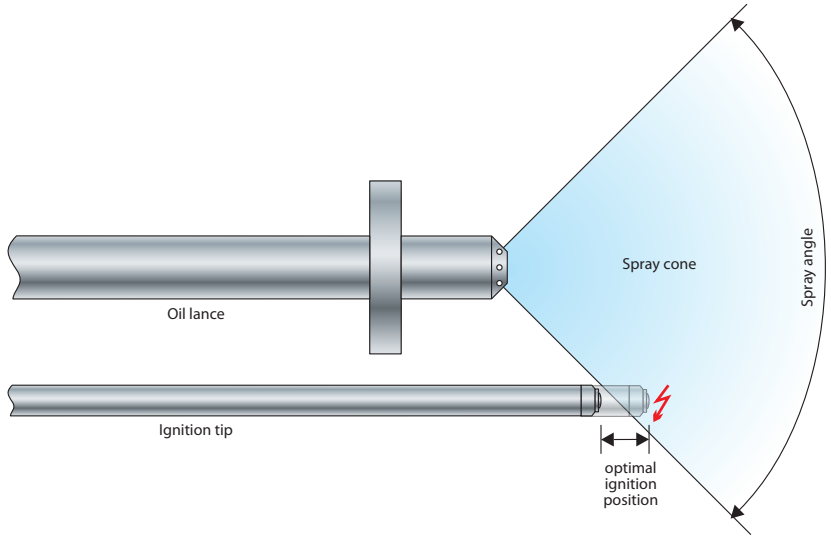
- EAC
- ATEX

Functional description

Correct positioning of the ignition tip at the edge of the fuel/ air mixture is a pre-requisite for reliable ignition of a burner with a high-energy ignition device. But temperatures in the optimal ignition zone are usually much too high during burner operation, resulting in possible damage to the ignition tip.
The pneumatic retraction mechanism assumes the task of positioning the ignition tip precisely into the ignition zone of the burner and retracting it again after successful ignition.

Accessories

- **Terminal box**
  for connecting solenoid valve and limit switch:
  - IP66 (normal environment)
  - IP65 (explosion protected model)
    Ex-protection: II 2 G Ex e ia IIC T6
- **Weather protection hoods**
  - for 300 mm stroke
  - for 400 mm stroke
  - for 500 mm stroke
  - for 600 mm stroke

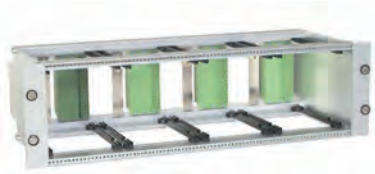


Max perm. pressure of instrument air	10 bar	**Electrical connection**	24/ 48 VDC or 115/ 230 VAC
Max ambient temperature	-5 °C to +40 °C, others on request	**Protection**	IP65
Sheer force at 6 bar	1870 N	**Display**	LED
Retraction force at 6 bar	1682 N	**Ex- protection limit switch NAMUR (optional)**	II 2 G Ex ia IIC T4...T6
Weight (approx.)	300 mm stroke: 9.0 kg 400 mm stroke: 11.0 kg 500 mm stroke: 12.5 kg 600 mm stroke: 14.0 kg	**Ex-solenoid valve (optional)**	II 2 GD Ex m II T5

D-BT 0...

19" rack for front panel mounting of D-UG 660 control unit

- For switching cabinet mounting in the inner area (IP00), e.g. hinged frame assembly
- Cable connection via 48-pin screwed multi-point socket connector
- Terminal connection from rear



D-BT 043

Models

- **D-BT 013**
  Rack for **one** D-UG 660 control unit, 3RU, 24HP
- Dimensions 178x132,5x213 mm (WxHxD)
- Weight 0.9 kg

- **D-BT 023**
  Rack for **two** D-UG 660 control units, 3RU, 42HP
- Dimensions 269x132,5x213 mm (WxHxD)
- Weight 1.45 kg

- **D-BT 043**
  Rack for **four** D-UG 660 control units, 3RU, 84HP
- Dimensions 482x132,5x213 mm (WxHxD)
- Weight 2.3 kg

D-BT 660...

B19"-rack for rear panel mounting of D-UG 660 control unit

- For switching cabinet mounting in the inner area (IP00), e.g. rear panel assembly
- Cable connection via connection terminals
- Clamp connection from front

D-BT 660/2

Models

- **D-BT 660**
  Rack for **one** D-UG 660 control unit, 3RU, 24HP
- Dimensions 171x149,5x215mm (WxHxD)
- Weight 0.8 kg

- **D-BT 660/2**
  Rack for **two** D-UG 660 control units, 3RU, 42HP
- Dimensions 263x149,5x215 mm (WxHxD)
- Weight 1.25 kg

- **D-BT 660/4**
  Rack for **four** D-UG 660 control units, 3RU, 84HP
- Dimensions 476x149,5x215 mm (WxHxD)
- Weight 2.1kg

D-UG 660 G66

19" field plastic housing, for D-UG 660 control unit

- For wall mounting in the outdoor area
- Cable connection via terminals in separate terminal box
- Protection IP55

D-UG 660 G66/2

Models

- **D-UG 660 G66**
  Enclosure for **one** D-UG 660 control unit
- Dimensions 135x149,5x250 mm (WxHxD)
- Weight 1.5 kg

- **D-UG 660 G66/2**
  Enclosure for **two** D-UG 660 control units
- Dimensions 340x236x275 mm (WxHxD)
- Weight 3.65kg

D-ZS 140/ 141

Terminal box for D-LE... flame sensor and D-LX... compact flame monitor

- Protection IP65

Models

- **D-ZS 140** 8-pole version for safe environments
- Dimensions 105x105x66 mm (WxHxD), Weight 0.35 kg
- **D-ZS 140-12** 12-pole version for D-LX 200/720

- **D-ZS 141**
  8-pole version for potentially explosive atmospheres II 2G Ex e II T5/T6
- Dimensions 110x75x55 mm (WxHxD), Weight 0.4 kg

- **D-ZS 141-12**
  12-pole version for D-LX 200/720

D-ZS 087-20

Digital display for displaying the flame signal

- For optimal alignment of flame sensor with the ball flange and/ or for displaying the configuration of flame sensor and switching device
- Display of the flame signal (pulse rate)
- Storing of minimum and maximum pulse rate values
- Voltage supply via the flame sensor

D-ZS 087-20

- Dimensions 157x87x30 mm (WxHxD)
- Weight 0.3 kg

D-ZS 129-30/ -40

LED bar graph display for the flame intensity

- Installation in 19" frame
- 3RU/ 3HP
- Input 0/4 ... 20 mA

Models

- **D-ZS 129-30**
  Electrical connection 24 VDC
- Dimensions
  15.2x128.4x107.5 mm
  (WxHxD)
- Weight 0.2 kg

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D-ZS 129-30

- **D-ZS 129-40**
  Power supply 230 VAC
- Dimensions
  15.2x128.4x107.5 mm
  (WxHxD)
- Weight 0.2 kg

D-ZS 077-10

UV-C test light source for the functional test of flame sensors

- For the functional test of flame sensor models D-LE 103 UL, D-LE 603 UH/US and compact flame monitor D-LX 100 UL
- Electrical connection 230 VAC/ 50 Hz

- Dimensions
  120x80x81.7 mm (WxHxD)
- Weight 0.65 kg

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D-ZS 077-10

D-ZS 093

Combined test light source for the UV-A, UV-B and IR spectral range

- For the functional test of flame sensor models D-LE 603 UA/UAF/IS/IG/ISE/ISO, D-LE 701 UA/UAF/IS/IGA, D-LE 703 UA/UAF/ IS/IG, D-GT 800 UA/UAF, as well as compact flame monitors D-LX 100 UA/UAF/IS/IG and D-LX 200 UA/UAF/IG
- Electrical connection 230 VAC/ 50Hz

- Dimensions
  120x80x81.7mm (WxHxD)
- Weight 0.65 kg

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D-ZS 093

D-LX 200 Test kit

For software supported tests of the compact flame monitors D-LX 200/ 720, including printed output of protocols for documentation

- Set containing a test light source and relay tester, software D-LX 200 InformationCentre
- Mobile use, uncluding robust transport case
- Electrical connection 100-240 VAC/ 50-60 Hz

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D-LX 200 Test kit

D-ZS 118

Optical adjustment aid for alignment of the swivel mount on the sighting tube

- Dimensions L=200 mm
  Ø=87 mm
- Weight 0.5 kg

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D-ZS 118

D-ZS 130

Fail-safe relay card

- Installation in 19" rack/ enclosure
- 3RU/ 10HP
- Electrical connection 24VDC
- Protection IP00

- Dimensions
  50.5x128x190.5 mm (WxHxD)
- Weight 0.25 kg

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D-ZS 130

D-NG 24/05

Power supply for D-UG 120, D-LX 100 or D-LX 200

- To supply two D-UG 120 switching devices or D-LX 100 and D-LX 200/720 compact flame monitors
- DIN-rail installation
- Input voltage 115/ 230 VAC, output voltage (unregulated) 24 VDC/ 0.5 A
- Protection IP20

D-NG 24/05

- Dimensions 70x75x118 mm (WxHxD)
- Weight 0.55 kg

D-ZS 033

Swivel mount for flexible alignment of a flame sensor at the sighting tube of a burner

- T_{max} = 180 °C

Models

- **D-ZS 033 I**
  for standard flame sensor
  G 1¼" thread
- Dimensions L=90, Ø=115 mm
- Weight 1.6 kg

- **D-ZS 033 III**
  for Ex-flame sensor, G 1" thread
- Dimensions L=160, Ø=115 mm
  Weight 3.4 kg
- Other models on request

D-ZS 114

Separable screw pipe connection for the installation of a D-LE 603.../94 Ex or a D-LE 603.../95 Ex on a standard port of a D-LE 603... flame sensor

D-ZS 114

- Dimensions L=86, Ø=46 mm
- Weight=400 g
- Thread G 1"

D-ZS 117/ D-ZS 117 HT

Thermal isolator with electrical insulation for the isolation of the heat transfer and/ or for electrical isolation between sighting tube and flame sensor

Features

- Rigid up to 120 °C, HT up to 180 °C

D-ZS 117 I

Models

- **D-ZS 117 I**
  for standard flame sensor
  G 1¼" thread
- Dimensions L=56, Ø=51mm
- Weight 0.05 kg

- **D-ZS 117 III**
  for Ex-flame sensor, G 1" thread
- Dimensions L=56, Ø=51 mm
  Weight 0.05 kg
- High-temperature model on request
- Other models on request

D-ZS 133

Ball valve for closing the sighting tube

Recommended when removing the flame sensor at increased furnace pressure

- T_{max} = 150 °C

D-ZS 133 I

Models

- **D-ZS 133 I**
  for standard flame sensor
  G 1¼" thread
- Dimensions L=216, Ø=58 mm
- Weight 1.4 kg

- **D-ZS 133 III**
  for Ex-flame sensor, G 1" thread
- Dimensions L=174, Ø=46 mm
- Weight 0.9 kg
- Other models on request

Requirements and Certifications

The DURAG GROUP, synonymous with a demand for high quality standards, has been ISO 9001 certified for years and has fully implemented its requirements. DURAG products are manufactured and tested in accordance with both European and international standards such as:

- APAVE International (France)
- Australian Gas Association (AGA)
- Deutsche Vereinigung des Gas- und Wasserfaches e.V. (DVGW)
- Factory Mutual Research Cooperation (FM)
- EAC
- ATEX
- Underwriters Laboratories Inc. (UL)
- Underwriters Laboratories for Canada (C-UL)

Combustion technology stipulates that fuel may not enter the combustion chamber if safe combustion can not be guaranteed. If no flame is detected, the fuel supply must be closed, often within 1s. European and international regulations therefore specify a high degree of fail safety and reliability for equipment deployed. Monitoring of the flame must also be unaffected by the construction of the furnace and its operational mode.

Requirements for flame monitoring and burner control (selection)

	Europe		USA		Canada	
Steam Boilers	**EN 12952** **EN 12953**	Water Tube Boilers Shell Boilers	**NFPA 85**	Boiler and Combustion Systems Hazards Code		
Firings	**EN 746** **2009/142/EG**	Industrial Thermoprocessing Equipment EC Gas Appliance Directive	**NFPA 86**	Standard for Ovens and Furnaces		
Burner			**UL 726** **UL 795**	Oil-Fired Boiler Assemblies Commercial-Industrial Gas Heating Equipment		
Flame Monitors and Automatic Burner Control Devices	**EN 298** **EN 60730-2-5**	Automatic burner control systems for burners and appliances burning gaseous and liquid fuels Automatic Electrical Controls for Household Use and Similar Use	**UL 372** **FM Class 7610**	Primary Safety Controls for Gas- and Oil-Fired Appliances Combustion Safeguards and Flame Sensing Systems	**CSA 22.2. No. 199-M89**	Combustion Safety Controls and Solid-State Igniters for Gas- and Oil Burning Equipment
Functional safety	IEC 61508					

(7)

Questionnaire for Selection of Flame Monitors (1/2)

Customer/ Partner _____ Date _____

Contact person _____ Preferred contact method

Project _____ ◯ Tel. ◯ Email

_____ _____

Plant Details

Plant type _____

Load of individual burners _____ MW

Burner layout ◯ Front ◯ Boxer ◯ Corner
◯ Ceiling ◯ Floor ◯ Others _____

Number of burners at plant _____ pcs

Alignment of burners _____ pcs vertical _____ pcs horizontal

Distance between burners _____ m vertical _____ m horizontal

Dimensions of furnace (LxWxH) _____ m x _____ m x _____ m

Distance btw. flame & flame monitor _____ m Expected flame length _____ m

Sighting tube length _____ m Sighting tube diameter _____ mm

Burner type ☐ Igniter ☐ Pilot burner ☐ Main burner
☐ Start-up/ heat-up burner ☐ Fluidized bed burner ☐ Others _____

Specification of Fuel and Process

Fuels ☐ Gas _____ ☐ Coal _____ ☐ Oil _____ ☐ Others _____

For oil: type of atomization ◯ Steam ◯ Air ◯ Pressure ◯ Others _____

Operational mode ◯ Intermittent ◯ Continuous

Combustion ◯ Low NO_x ◯ Exhaust recirculation

Required accessory ☐ Burner control ☐ Ignition device

Environmental Conditions

Ambient temperature Minimum _____ °C Maximum _____ °C Average _____ °C

Area of installation ◯ Indoor ◯ Outdoor ◯ Off-Shore

Required Certifications/ Type Approvals

☐ DVGW ☐ ATEX ☐ IECEx ☐ FM
☐ UL ☐ AGA ☐ GOST ☐ Others _____

Attached Documents

☐ Fuel composition ☐ Furnace/ burner drawing
☐ Climate conditions ☐ Others _____

Questionnaire for Selection of Flame Monitors (2/2)

Flame Monitor Details

Existing flame monitor Make _____ Type _____

Flame Monitor Requirements

Flame monitor design ◯ Flame sensor with separate control unit ◯ Compact flame monitor

Fiber optic version ◯ Yes ◯ No

If yes, length of fiber optic _____ m flexible length _____ m rigid length

Planned sensor type ◯ UV ◯ IR ◯ UV&IR

Expected wave length _____ nm to _____ nm

Monitoring mode ☐ Burner selective ☐ Fuel selective ☐ Furnace monitoring
☐ Pilot burner selective

FFDT (safety time) ☐ 1s ☐ 2s ☐ 3s ☐ 5s

Analog output ◯ 0–20 mA ◯ 4–20 mA

Supply voltage _____ V ◯ DC ◯ AC _____ Hz

Minimum IP-Class ☐ Flame sensor IP _____ ☐ Control unit IP _____
☐ Compact flame monitor IP _____

Ex-Protection Flame Sensor/ Compact Flame Monitor ◯ Yes ◯ No

ATEX Zone _____ Ⓔx II _____ Ex _____ II _____ T _____ Please specify the minimum requirement for Ex-protection (zone, category, type of protection, group, gas group, temperature class)

NEC 500 Class _____ Division _____ Group _____ T _____ Please specify the minimum requirement for Ex-protection (class, division, gas group, temperature class)

Ex-Protection Control Unit ◯ Yes ◯ No

Viewing window ◯ Yes ◯ No

ATEX Zone _____ Ⓔx II _____ Ex _____ II _____ T _____ Please specify the minimum requirement for Ex-protection (zone, category, type of protection, group, gas group, temperature class)

NEC 500 Class _____ Division _____ Group _____ T _____ Please specify the minimum requirement for Ex-protection (class, division, gas group, temperature class)

Installation Details

Electr. connection flame sensor/ compact flame monitor ◯ Cable gland ◯ Plug

Length of cable: flame sensor ⟷ control unit/ compact flame monitor _____ m

Sighting tube connection ◯ G ◯ NPT ◯ 1“ ◯ 1¼“ ◯ Others _____

Position/line of sight to flame ◯ Axial ◯ <20° ◯ <90° _____ ° ◯ Opposite
◯ Others _____

Optional accessories ☐ Swivel Mount ☐ Thermal/ electr. insulator ☐ Ball valve ☐ Others

Mounting of control unit ◯ 19"-rack frame for front panel mounting ◯ 19"-rack frame for rear panel mounting ◯ Wall enclosure plastic ◯ Wall enclosure metal

Number of control units per rack/ enclosure _____ pcs

Additional Information

PREMATECNICA
Equipos e instalaciones para las industrias de proceso y energía

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