

Uvisor™ SF810i Multi Fuel Integrated Safe Flame Scanner 800 Series Combustion Instruments

ABB has combined the two highly successful flame scanner product lines, Uvisor™ and Safe Flame DFS, into a new advanced Flame Scanner, the Uvisor™ SF810i.

The Uvisor™ SF810i is a multi-fuel scanner designed to provide stable and reliable information of both the flame consistency and the flame quality on utility and industrial boiler burners.

In a single harsh proven housing, the Uvisor™ SF810i embeds the state-of-art technology:

Solid State Sensor module, covering the whole flame radiant spectrum (UV-Vis-IR and dual sensor UVIR).

- Signal Processor Unit. An extremely powerful module capable to run the ABB proprietary flame analysis process. Live measurement of the dynamic flame parameters are constantly subjected to an extensive fail-to-safe validation routine, prior to vote the flame status.
- Communication drivers. Two redundant Profibus DP-V1 links (or alternatively Modbus standard), are available to provide high speed data transfer to external monitoring and supervisory system.
- Termination and configuration board. With local display and push-buttons to allow the preliminary set up and on-line aiming assistance. All I/Os terminations are available on screw type removable connectors.



- The Uvisor™ SF810i flame scanner is available with accessories for the following installations:
- Line of sight (LOS) for wall fired burners' boilers.
- Fiber optic cable (FOC) with outer guide pipe, cooling hose and fitting flanges for corner fired tilting burners' boilers

Extended set-up, parameter files archiving, groups view, advanced diagnostic including flame raw data, real time and historical trends of up to 254 scanner heads networked is possible through the PC based package Flame Explorer™.

Uvisor™ SF810i Multi Fuel Integrated Safe Flame Scanner

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Application:

Utility and Industrial boilers

- Wall fired, corner fired, WHRB, down-shot and cyclone burner types

Multi fuel

- Natural Gas, Coke Oven Gas, Sulphur Gas
- Light & heavy fuel oil, Orimulsion
- Pulverized coal

Features:

Operation

- UV, VL, IR solid state sensors
- Dual sensor UVIR
- Continuous self-check
- F-FFRT Fast Flame Failure Response Time
- Digital Inputs for remote setting (Isolated)
- Autotune

Safety, Communication & Signalling

- Redundant Profibus DP-V1. Isolated
- Redundant Modbus. Isolated
- 4-20 mA. Isolated
- Fail-to-safe Flame Relay N.O. contact
- Fail-to-safe Fault Relay N.O. contact
- Live measure of the flame frequency
- Live measure of the flame intensity
- Live Flame Quality display
- Reject mains frequencies and artificial lighting (EN298 compliant)

Configuration

- Flame Explorer™ monitoring & configuration tool. Proprietary PC based package, running on Windows OS
- Local push-button and digital display
- Firmware download utility

Environment

- ATEX II 2GD Ex d IIC T6 tD A21 IP66-IP67 T80°C Certificate number: ICEPI 06 ATEX 03C024

Installation

- Line of sight with aiming accessories
- Fibre optic cable through the windbox

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Technical specifications

Property	Value
Optical sensor Technology	IR versions: Si photodiode Spectral response peak @ 920nm
	IR versions: Si photodiode Spectral response peak @ 920nm
	VL versions: Si photodiode Spectral response peak @ 560nm
	UV versions: SiC photodiode Spectral response peak @ 280nm
	UVIR version: Si + SiC photodiode ¹ Spectral response peak @280nm and 920nm
	¹ Si and SiC photodiodes signals can be processed individually or both combined as per burner operation
Power supply voltage	24V _{DC} (-25%, +20% = 18 ÷ 29V _{DC})
Power supply current	150mA typical,
Power consumption	3.6W typical, 4W max
Inrush current	6A peak, 2ms settling time
Flame Relay	Contacts: 1 NO, for each relay
Safe Relay	240 V _{AC} / 1.5A cycles ≥ 100,000 240 V _{DC} / 100 mA 30 V _{DC} / 300mA Minimum load 10mA, 5V _{DC}
FFRT	Flame Failure Response Time: 0.2s to 4s
Analog output (4-20mA)	4÷20 mA (R load ≤ 500Ω) Galvanically isolated Precision: +/-5% f.s.
Digital Inputs, 24 VDC	Nr. 2 digital inputs (opto coupled), to allow selection of one out of four different sets of parameters; return signal common to both inputs. Nominal voltage 24VDC (5 mA typical) Max Voltage 36 V _{DC} Off: < 5 V _{DC} On: > 18 Vdc
Communication ports	Two, redundant, RS-485 serial channels configurable in Profibus or Modbus protocols. Profibus: max speed 12 Mbit/s Modbus: max speed 115.200 bit/s
Local configuration interface	4 push buttons (UP, DOWN , LEFT, RIGHT) 3-digits LED display
Air source for lens cleaning	From clean ambient air
Air flow for lens cleaning	LOS (Line Of Sight) versions: 115 l/min (4 SCFM) Excessive contaminants might require a flow up to 400 l/min (14 SCFM) FOC (Fibre Optic Cable) versions: 400 l/min (14 SCFM)
Minimum cleaning air pressure	LOS (Line Of Sight) versions: 20mm H ₂ O (1" W.C.) above the max wind box pressure measured at the "Y" connection inlet. FOC (Fiber Optic Cable) versions: 400mm H ₂ O (12" W.C.) above the max wind box pressure measured at the "Y" connection inlet.

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Technical specifications

Property	Value
Maximum fibre optic continuous operating temperature	482° C (900° F) for VL and IR fiber optic cables 350° C (662° F) for UV and dual sensor UVIR fiber optic cable
Housing mounting thread	1" NPT male
Cable entry thread	¾ " NPT female (N/A for connectorized versions)
Electrical connections (terminal versions)	Removable terminals with screws Allowable cable section: AWG24-AWG12, 0.2-2.5mm ² for Relay contacts (J1 connector) AWG 28-AWG16, 0,08-1.5mm ² for all other terminals

Environmental specifications

Property	Value
Safety Specifications	EN 61010-1 (IEC 61010-1)
Class of installation	I
Over voltage category	II
Pollution degree	2
Protection (EN 60529)	IP66 – IP67

Environmental

Ambient Operating temperature (EN/IEC 60068-2-1/2/14)	-40° to 70°C (-40° to 158 °F)
Ambient Storage and transportation temperature (EN/IEC 60068-2-1/2/14)	-25°C / 85°C (-13 to 185 °F)
Relative humidity (EN/IEC 60068-2-78)	40°C, RH 95%
Vibration sinusoidal operating (IEC 654-3 Severity Class VH4) (IEC 60068-2-6)	Frequency range: 5 ÷ 200 Hz, Acceleration: 20m/s ² peak (2 G) Displacement: 0.15 mm peak
Shock operating (IEC 60068-2-27)	Acceleration: 15G - Duration of pulses: 11 ms duration (half sine wave) - Three shocks in each direction (6 pulses in each axis)

Mechanical specifications

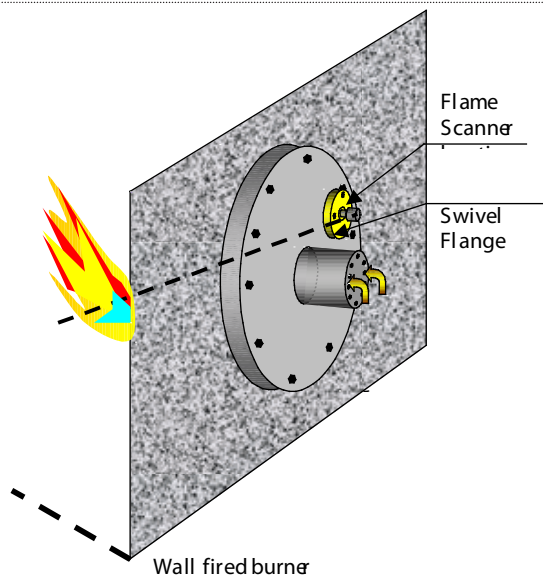
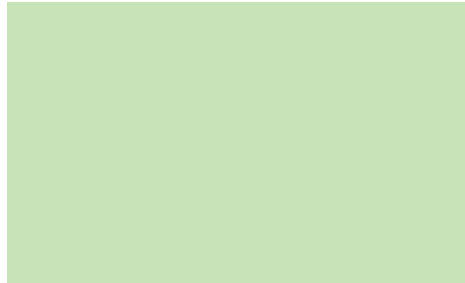
Property	Value
Dimensions	Diameter 95 mm max (3,7") Overall length: 180mm approx (7")
Weight	1.3 Kg approx. (2.86 lb)
Degree of protection	IP66 – IP67 (CEI EN 60529)

Uvisor™ SF810i Multi Fuel Integrated Safe Flame Scanner

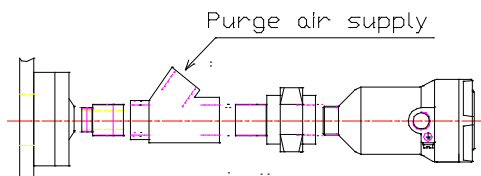
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Uvisor™ SF810. LOS (Line of Sight) installation

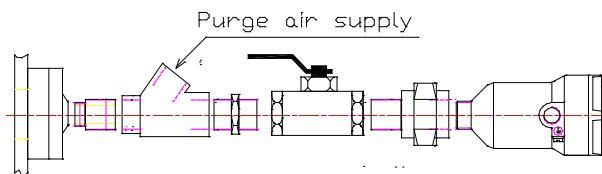
SF810 – SCANNER HEAD



SF810 – with provision for purging air and swivel flange



SF810 – with provision for purging air, swivel flange and isolation valve

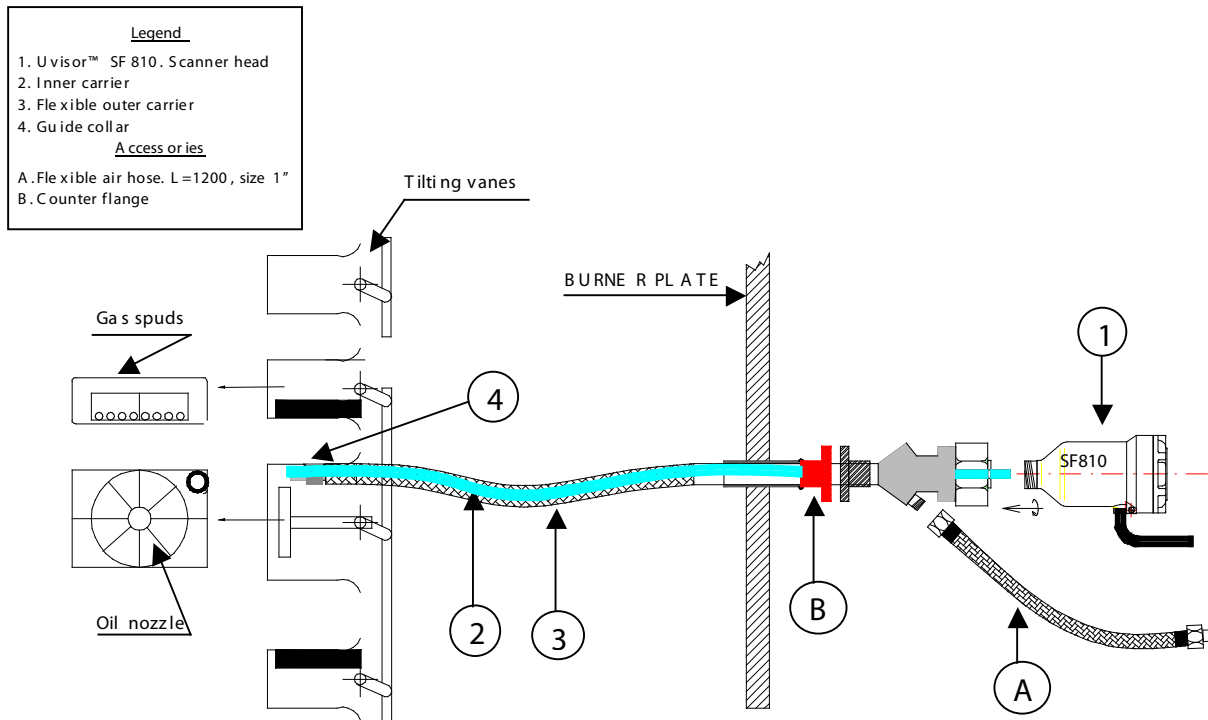


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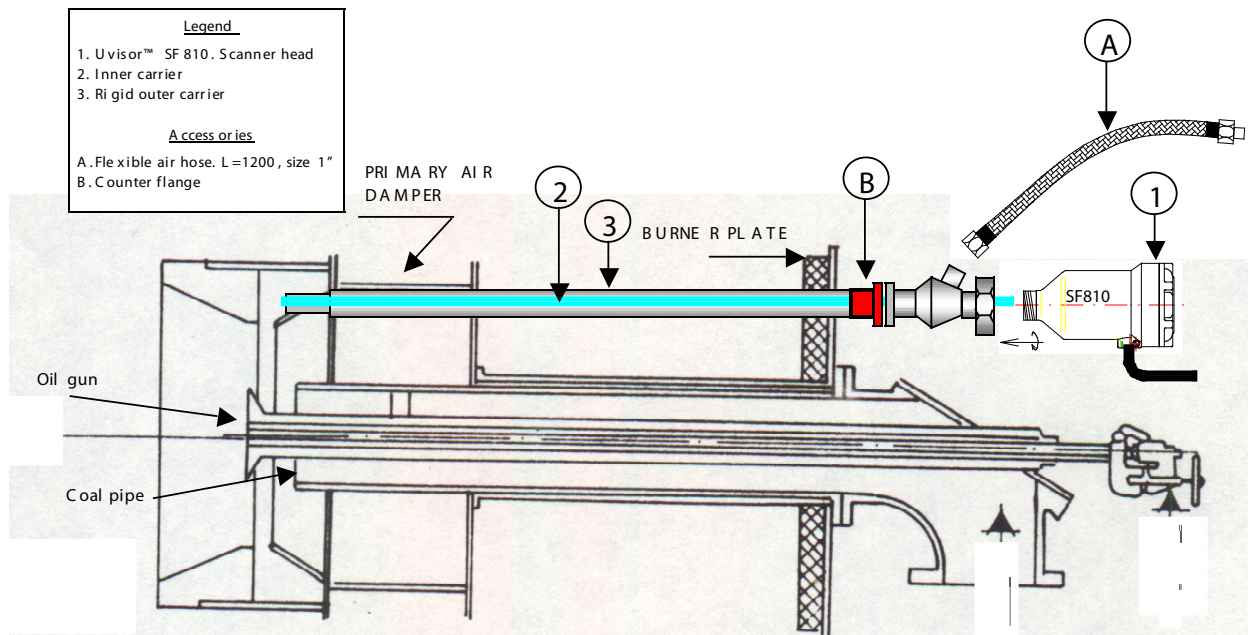
Uvisor™ SF810i FOC (Fiber Optic Cable) installation

Flexible fiber optic assembly



Uvisor™ SF810i FOC (Fiber Optic Cable) installation

Fixed fiber optic assembly

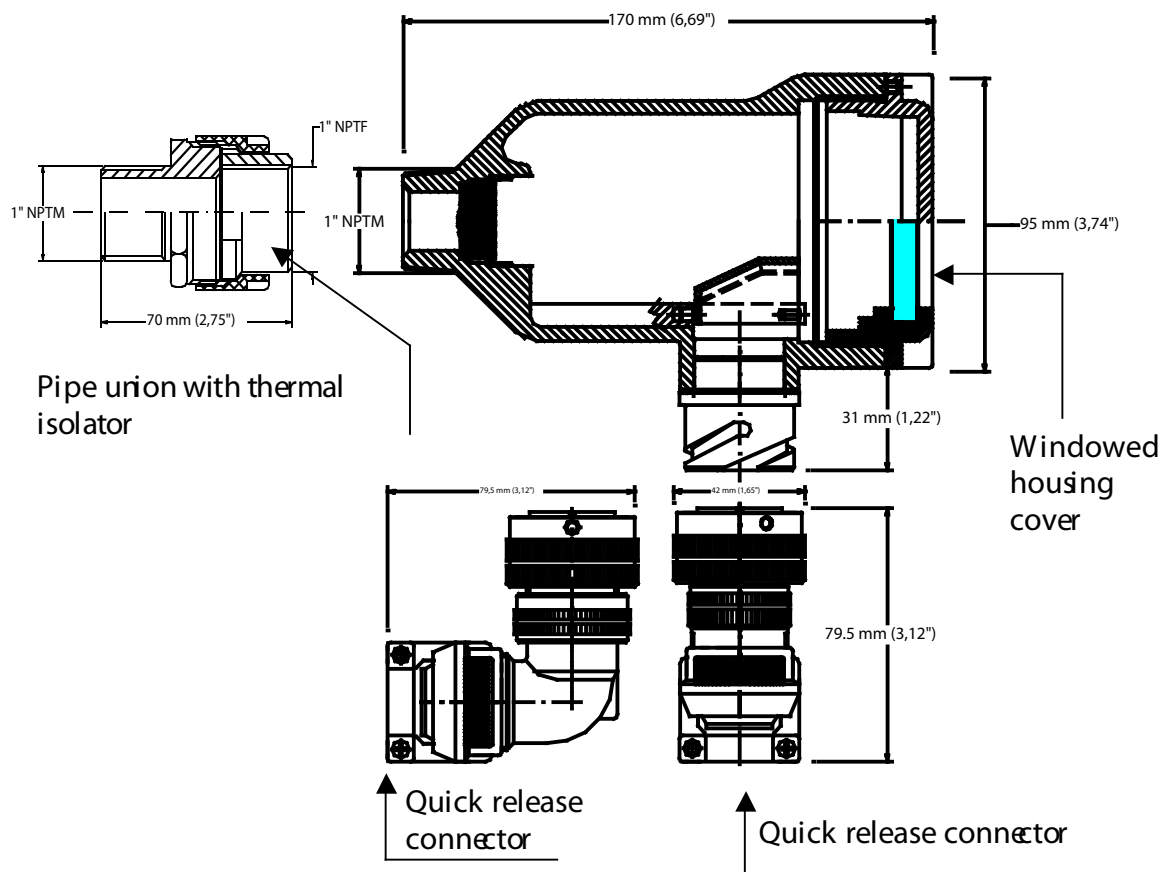
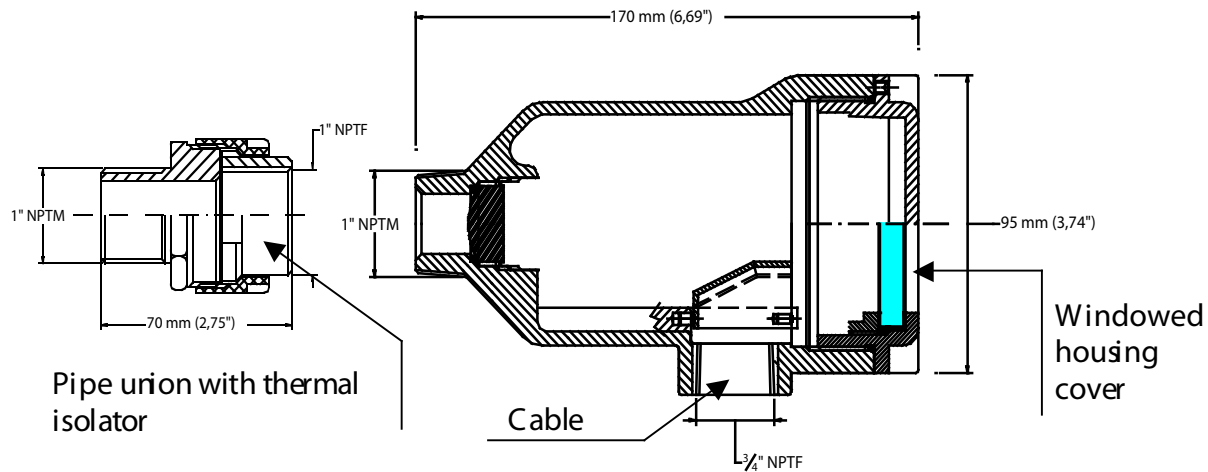


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Uvisor™ SF810i Line of Sight (LOS). Measurements

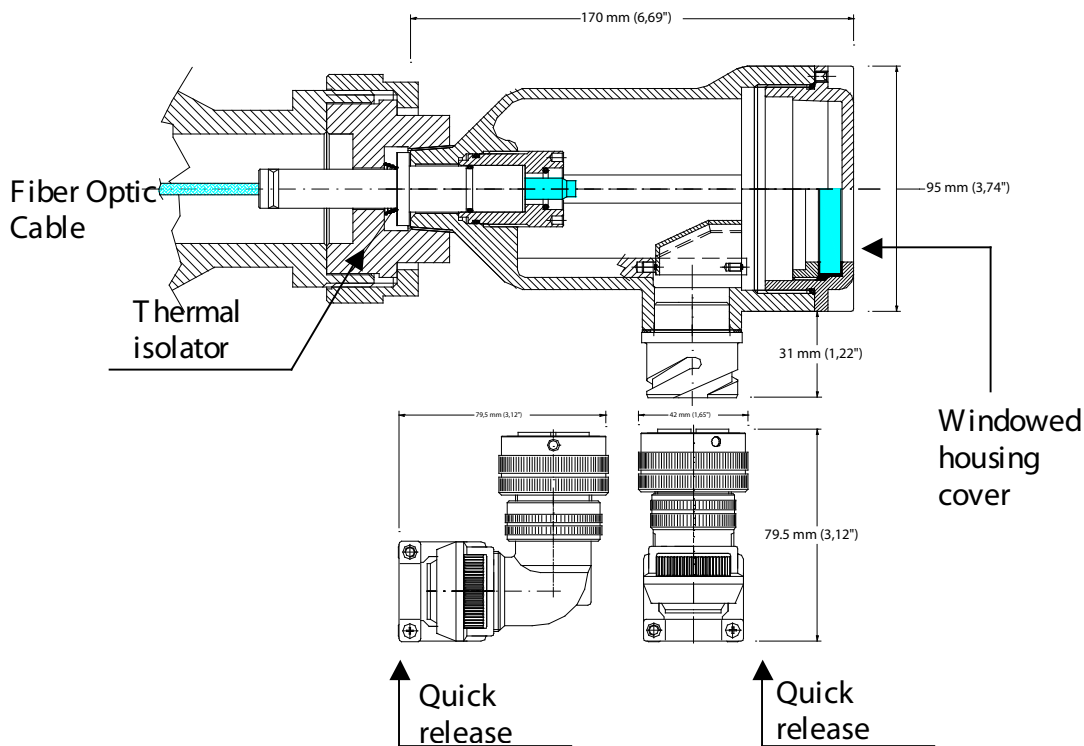
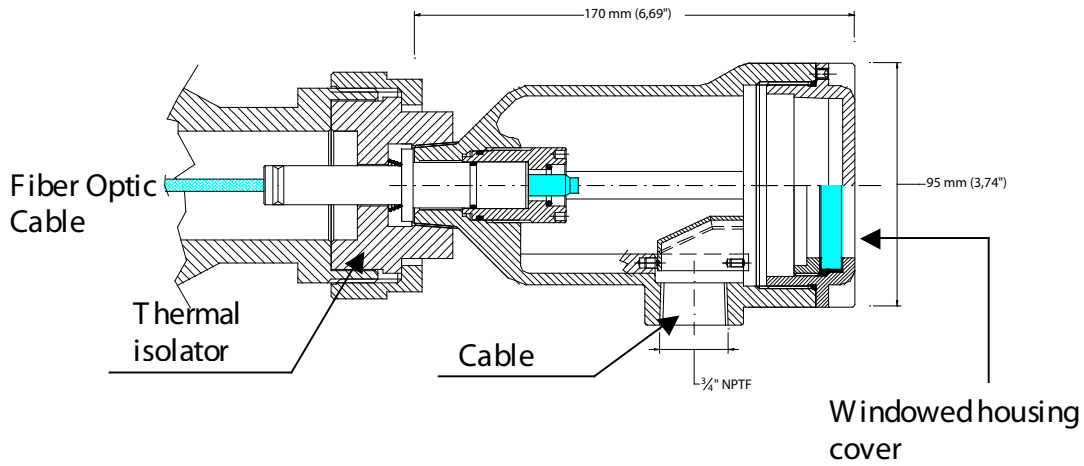
SF810i. Mechanical dimension



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Uvisor™ SF810i FOC (Fiber Optic Cable). Measurements

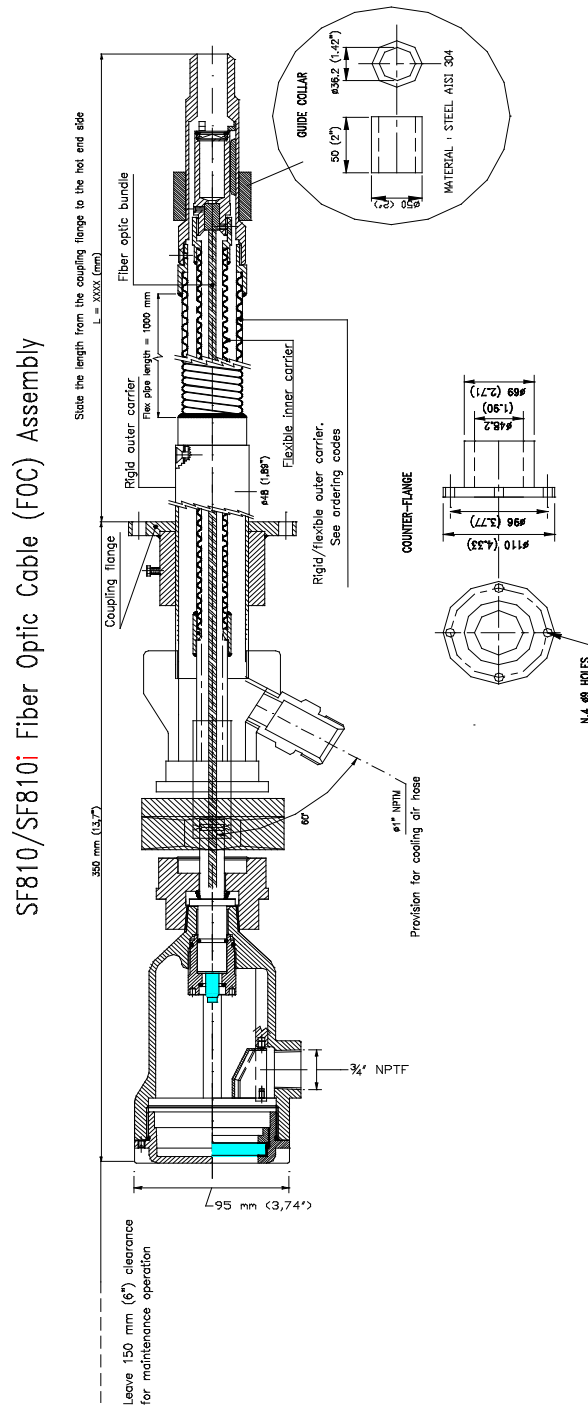


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Uvisor™ SF810i Line of Sight (LOS). Measurements

Figure A: Uvisor™ SF810i with fiber optic assembly



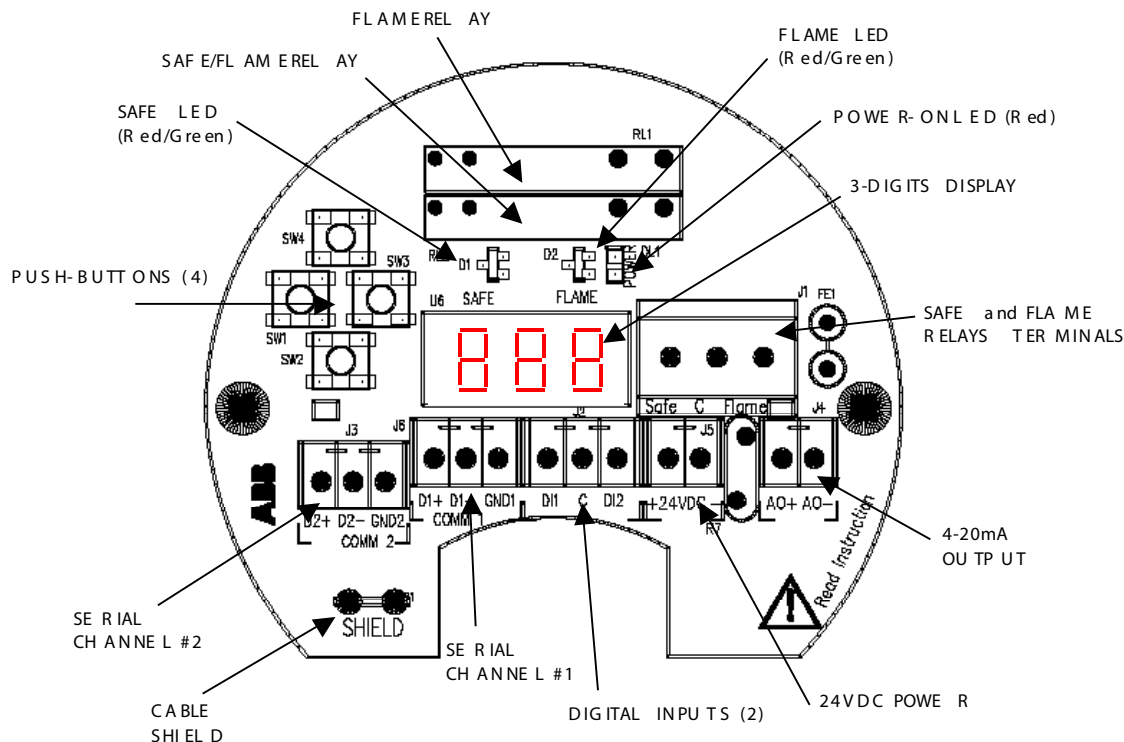
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Uvisor™ SF810i. Electrical connection Dual

Sensor Faceplate

Single Sensor Faceplate



Connector / Terminal	Signal name	Description
24VDC / +	+24V _{DC}	Power supply positive input
24VDC / -	GND	Return of power supply, ground ref. for all internal electronics
J4 / AO+	AO+	Analog output (4-20mA) positive
J4 / AO-	AO-	Analog output (4-20mA) negative
J2 / DI1	DI1	Digital input 1
J2 / DI2	DI2	Digital input 2
J2 / C	DI_common	Common return for DI1 and DI2
COMM1 / D1+	D1+	Serial communication port 1, data TX/RX, positive
COMM1 / D1-	D1-	Serial communication port 1, data TX/RX, negative
COMM1 / GND1	GND1	Ground ref. for serial comm. Port 1
COMM2 / D2+	D2+	Serial communication port 2, data TX/RX, positive
COMM2 / D2-	D2-	Serial communication port 2, data TX/RX, negative
COMM2 / GND2	GND2	Ground ref. for serial comm. Port 2
J1 / SAFE	SAFE	Safe relay contact (NO)
J1 / FLAME	FLAME	Flame relay contact (NO)
J1 / C	Common	Common for both Safe and Flame relay contacts
SHIELD	Shield	Earth connection point for the shields of the cable(s)

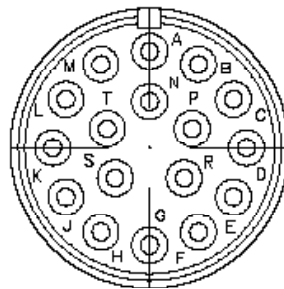
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Uvisor™ SF810i. Quick Release Connector data and wiring

Pin	Wire colour (Internal wiring)	Section mm ²	Signal name	Power supply positive input
K	RED	1	+24V _{DC}	Return of power supply, ground ref. for all internal electronics
L	BLACK	1	GND	Analog output (4-20mA) positive
M	WHITE/RED	0.22	AO+	Analog output (4-20mA) negative
N	WHITE/BLACK	0.22	AO-	Digital input 1
G	YELLOW/RED	0.5	DI1	Digital input 2
J	YELLOW/BROWN	0.5	DI2	Common return for DI1 and DI2
H	YELLOW/BLUE	0.5	DI_common	Serial communication port 1, data TX/RX, positive
D	GREEN/BLACK	0.22	D1+	Serial communication port 1, data TX/RX, negative
E	GREEN/RED	0.22	D1-	Ground ref. for serial comm. Port 1
F	GREEN/BLU	0.22	GND1	Serial communication port 2, data TX/RX, positive
A	GREEN/ORANGE	0.22	D2+	Serial communication port 2, data TX/RX, negative
B	GREEN/PURPLE	0.22	D2-	Ground ref. for serial comm. Port 2
C	GREEN/BLU	0.22	GND2	Safe relay contact (NO)
P	ORANGE	SAFE	SAFE	Flame relay contact (NO)
S	PINK	FLAME	FLAME	Common for both Safe and Flame relay contacts
R	LIGHT BLUE	Common	Common	Earth connection point for the shields of the cable(s)
T	GRAY	Shield	Shield	Earth connection point for the shields of the cable(s)

ARRANGEMENT	20-29
NO. of CONTACTS	17
CONTACTS SIZE	16
SERVICE RATING	A



Front view male contacts insert

SERVICE RATING	Min. distance air spacing guaranteed	Min. distance creepage guaranteed
A	1.6mm	3.2mm

SERVICE RATING	OPERATING VOLTAGE V D.C.	OPERATING VOLTAGE V A.C.	TEST VOLTAGE V A.C. RMS	MINIMUM FLASHOVER V A.C. RMS
A	700	500	2000	2800

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Flame scanners application table

Scanner	Gas (Hydrogen, Propane, NG)		Oil (Heavy Oil - steam atom)		Oil & Gas		Low NOx Pulverized Coal /Oil & Coal			Gas/Lfo Pilot	Gas Turbine	Notes
	W.F	T.F	W.F	T.F	W.F	T.F	W.F	T.F	D.S			
SF810i -LOS-IR												Stable signal and excellent target flame discrimination in wall and CF fired multi burner boiler. Side igniters and GT application can also be supported.
SF810i -FOC-IR												
SF810i -LOS-VL												Stable signal and excellent target flame discrimination in wall and CF fired multi burner boiler. Side igniters and GT application can also be supported.
SF810i -FOC-VL												
SF810i -LOS-UV												Stable signal and excellent target flame discrimination in wall and CF fired multi burner boiler. Side igniters and GT application can also be supported.
SF810i -FOC-UV												
SF810i -LOS-UVIR												Stable signal and excellent target flame discrimination in the whole operating range. Recommended in combined fuel operation.
SF810i -FOC-UVIR												

Abbreviation and symbols:

W.F	Wall fired boilers
D.S	Down Shot boilers
T.F	Tangential fired boilers
FOC	Fiber Optic Cable (Through the windbox)
LOS	Line of Sight (Direct view)
	Acceptable performance
	Good performance
	Excellent performance

Uvisor™ SF810i Multi Fuel Integrated Safe Flame Scanner

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Uvisor™ SF810i ordering codes

Installation type	• FOC (Scanner head for FiberOptic Cable)	SF810	-	FOC	-	-	...	-	...	-	...
	• LOS (Scannerhead for Line Of Sight)	SF810	-	LOS	-	.....	-	...	-	...	-	...
Spectral range	• IR	SF810	-	.....	-	IR	-	...	-	...	-	...
	• UV	SF810	-	.....	-	UV	-	...	-	...	-	...
	• VL	SF810	-	.....	-	VL	-	...	-	...	-	...
	• IR+UV (dual sensor)	SF810	-	.....	-	UVIR	-	...	-	...	-	...
	• IR+VL (dual sensor)	SF810	-	.....	-	VLIR	-	...	-	...	-	...
Cabling method, protection index, hazardous areas	• Removable screw terminals (IP66/IP67 and ATEX G/D See note ²)	SF810	-	.....	-	.....	-	T	-	...	-	...
	• Removable screw terminals (IP66/IP67, no-ATEX)	SF810	-	.....	-	.....	-	TL	-	...	-	...
	• Quick release connector (IP66/IP67, no-ATEX)	SF810	-	.....	-	.....	-	Q	-	...	-	...
	• Quick releaseconnector (IP66/IP67 and ATEX G/D) See note ²	SF810	-	.....	-	.....	-	QC	-	...	-	...
Housing	Conformal coating Aluminium case	SF810	-	.....	-	.....	-	...	-	C	-	W
Housing	Windowed Stainless steel AISI316 case	SF810	-	.....	-	.....	-	...	-	...	-	X
Notes		1) Greyed product codes are presently not available 2) IP66/IP67 and ATEX on FOC assemblies is guaranteed only with ABB fibre optic cable P/N: SF810-FO-G-XXXX-mm, SF810-FO-Q-XXXX-mm or SF810-FO-GQ-XXXX-mm										

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Uvisor™ SF810i FOC Assembly ordering codes

Feature	Available choices	Part number assignment															
Fiber optic extension type	Flexible extension	<table border="1"> <tr> <td>SF810</td> <td>-</td> <td>FOC</td> <td>-</td> <td>.....</td> <td>-</td> <td>...</td> <td>-</td> <td>...</td> <td>-</td> <td>...</td> <td>-</td> <td>FE</td> <td>-</td> <td>xxxx</td> </tr> </table> <p>For the assignment of the first 5 suffixes see previous table XXXX = length (in mm) See Figure "A" FE assembly includes: Scanner Head Fiber optic cable Inner fiber optic cable guide pipe with lens assembly Flexible external guide pipe with coupling flange and guide ring</p>	SF810	-	FOC	-	-	...	-	...	-	...	-	FE	-	xxxx
	SF810	-	FOC	-	-	...	-	...	-	...	-	FE	-	xxxx		
Rigid extension	<table border="1"> <tr> <td>SF810</td> <td>-</td> <td>FOC</td> <td>-</td> <td>.....</td> <td>-</td> <td>...</td> <td>-</td> <td>...</td> <td>-</td> <td>...</td> <td>-</td> <td>RE</td> <td>-</td> <td>xxxx</td> </tr> </table> <p>For the assignment of the first 5 suffixes see previous table XXXX = length (in mm) See Figure "A" RE assembly includes: Scanner Head Fiber optic cable Inner fiber optic cable guide pipe with lens assembly Rigid external guide pipe with coupling flange and guide ring</p>	SF810	-	FOC	-	-	...	-	...	-	...	-	RE	-	xxxx	
SF810	-	FOC	-	-	...	-	...	-	...	-	RE	-	xxxx			

Uvisor™ SF810 Parts Ordering Codes

Description	Ordering Code	Ordering information
Glass Fiber (for IR and VL FOC versions)	SF810i-FO-G-XXXX-mm	State the length XXXX of the fiber optic cable
Quartz Fiber (for UV FOC version)	SF810i-FO-Q-XXXX-mm	State the length XXXX of the fiber optic cable
Dual sensor Fiber (for UVIR FOC version)	SF810i-FO-GQ-XXXX-mm	State the length XXXX of the fiber optic cable
Inner guide pipe - flexible	SF810i-IGP-XXXX-mm	State the length XXXX of the guide pipe
Outer guide pipe - rigid	SF810i-OGP-R-XXXX-mm	State the length XXXX of the extended pipe
Outer Guide pipe - flexible	SF810i-OGP-F-XXXX-mm	State the length XXXX of the extended pipe
Flame Explorer SW	EC-PI-G018UTL220	Monitoring and configuration PC tool

Uvisor™ SF810 Multi-core cable codes

Cable	P/No	Ordering information
ABB cable for SF810 Single Sensor Cable only, no connectors, suitable for both ATEX and non-ATEX versions	C99-94510 (in use with Safe Flame Scanners) Or SF810-CBL-yyyy	SF810-XXX-IR/UV/VL-T-X-X SF810-XXX-IR/UV/VL-TL-X-X
ABB cable for SF810 Single or Dual Single Sensor Cable only, no connectors, suitable for both ATEX and non-ATEX versions	SF810-CBL-yyyy	SF810-XXX-IR/UV/VL-T-X-X SF810-XXX-IR/UV/VL-TL-X-X
ABB connectorized cable for SF810 Non-ATEX Cable with pre-assembled quick-release plug at one side only (non-ATEX version)	SF810-CBL-Q-yyyy	SF810-XXX-XX-Q-X-X
ABB connectorized cable for SF810 ATEX Cable with pre-assembled quick-release plug at one side only (ATEX version)	SF810-CBL-QC-yyyy	SF810-XXX-XX-QC-X-X

Uvisor™ SF810i Multi Fuel Integrated Safe Flame Scanner

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Uvisor™ SF810 Fitting accessories

Description	P/No	Notes
1" NPTM / 1" NPTF Thermal isolation union	THU-1NPTMF	
Isolating Valve 1" NPTF / 1" NPTF	IV-1NPTF	
Purging air "Y" 1" NPTF / 1" NPTF Air inlet 3/4" NPTF with Nipple 1" NPTM / 1" NPTM	PAY-1NPTFF	
Swivel flange assembly with 1" NPTM nipple and gasket Ø _{EXT} =85 mm (3.346")	SWF-1NPTM	
Purging air flexible house Armoured hose type 2TE DIN 2021 EN854 ND-19 Temperature -30 to 80°C (-22 to 176°F) L=1200 mm (47.2")	84410-S-0400000	
Purging air flexible house Armoured hose type 2TE DIN 2021 EN854 ND-25 Temperature -30 to 80°C (-22 to 176°F) L=1200 mm (47.2")	84410-S-0400001	
Armoured cable gland ATEX II 2GD T6 IP66 (gas & dusts)	CG3/4-EEEx	
Counter flange for FOC external guide pipe	84410-S-0400002	

For more information please contact:

ABB Ltd.

Business Unit Power Generation

P.O. Box 8131

8050 Zürich

SWITZERLAND

Phone: +41 (0) 43 317-5380

Fax: +41 (0) 43 317-5382

Internet: www.abb.com/powergeneration

Support: CI.Supportcenter@it.abb.com

Local ABB Unit Address