noor parto

Flame Monitoring

# About Us

Following the declaration of need and request of Sirjan Golgohar mining and industrial company in 2013, the design and manufacturing of UV flame scanner started for the first time in Iran in ACECR, Sharif branch. The result was the installation of several flame scanners in pelletizing unit of the company.
The technical inspection and study of the best available products in global market were made, and the suitable model was selected in order to supply the need of this equipment in domestic industries including thermal power plants, refineries, and petrochemical and mining ones. Finally, the design, manufacturing, and expansion of this work in ACECR, Sharif branch led to establishing “Noor Parto” company, and the technical knowledge was transferred to the company for producing and developing the products while ACECR, Sharif branch became one of its shareholders.
By applying the experienced professionals in fields of photonics, power, and mechanics, with more than three decades of design, manufacturing, and management of electro optical systems, the company succeeded to design and mass production of the flame scanners, and to equip several industrial units including Shahid Rajaee and Sahand thermal power plants, Khorasan and Asaluyeh Mobin petrochemical companies, and Mapna-Tuga turbine engineering and manufacturing company.

# Table Of Customers

| Employer | Type of furnace /combustion chamber | Installed flame scanner model | Customer's previous flame scanner model |
|---|---|---|---|
| Gol Gohar mining and industrial company | Pelletizing furnace | UV Flame Scanner | Hans Henning |
| Shahid Rajaee thermal power plant ,steam unit , Qazvin | Steam (boiler) | NFDL-1957<br>NFDL-2540 | Durag - D-LX 200<br>Baily |
| Khorasan petrochemical company | Steam (boiler) | NFDL-1957 | A.S.T - FD77UVS<br>Fireye - 85UVF |
| The Persian Gulf Mobin energy company | Steam (boiler) | NFDL-1957 | Durag - D-LX 100<br>Fireye - 65UV5 1000E |
| Sahand thermal power plant, Bonab | Steam (boiler) | NFDF-1957 | Fireye - 45UVFS1 |
| Shahid Rajaee thermal power plant, combined cycle unit, Qazvin | Gas turbine of combined cycle unit | NFDF-1957<br>NFDF-25110-N1Ex | Honeywell - LG1093A |
| Mapna-Tuga turbine engineering and manufacturing company | Gas turbine | NFDF-1957-N1Ex | ITS<br>BFI - Fiber Optic |
| Mapna-Meco power and control engineering company | Installation in gas turbine control room | NFDC-DR35 | BFI - 3001 Amplifier Card |
| Shahid Mohammad Montazeri thermal power plant, Esfahan | Steam (boiler) | NFDL-2540 | Fireye - 45UVFS1<br>Fireye - 45RM2 |
| Damavand energy company, Asaluyeh | Auxiliary steam boiler (HRSG unit) | NFDL-2545-N2Ex | Durag - D-LE 603<br>Fives Pillard |
| Bid Boland gas refining company, Persian Gulf | Steam (boiler) | NFDL-2545-N2Ex | Durag - D-LX 200 |
| Noori petrochemical company, Asaluyeh | Furnace | NFDL-25110-N2Ex | Fireye - 45UV5 1008 |
| Coal tar refining company | Furnace | NFDL-2540-N2Ex | Fives Pillard |
| Marun petrochemical company | Steam (boiler) | NFDL-25110-N4Ex | Durag - D-LX 200 |
| Kashan combined cycle power plant | Auxiliary steam boiler (HRSG unit) | NFDL-25110-N2Ex | Fives Pillard |
| Shirvan combined cycle power plant | Steam (duct burner) | NFDL-25110-N2Ex | Fives Pillard<br>Durag - D-LX 100 |
| Razi petrochemical company | Steam (boiler) | NFDL-25110-N2Ex | Durag - D-LX 100 |
| Abadan oil refining company | Acid furnace | NFDL-25110-N2Ex | Hans Henning |

# List Of Customers

شرکت پتروشیمی خراسان
Khorasan Petrochemical Co.

MAPNA GROUP
TUGA
MAPNA TURBINE ENGINEERING AND MANUFACTURING COMPANY

MAPNA GROUP
MECO
Mapna Electric & Control, Engineering & Manufacturing Co.

SHAHID RAJAEI MANAGEMENT OF POWER GENERATION Co.

شرکت دماوند انرژی عسلویه
DAMAVAND ENERGY Co

MONTAZERI POWER PLANT
www.montazericcpp.ir

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co.
P G P I C
شرکت پالایش گاز پیدبلند خلیج فارس

شرکت صنایع پتروشیمی خلیج فارس
Persian Gulf Petrochemical Industries Co
PGPIC
شرکت مبین انرژی خلیج فارس (سهامی خاص)
MECO

شرکت معدنی و صنعتی گل گهر
GOLGOHAR MINING & INDUSTRIAL COMPANY

PGPIC
شرکت پتروشیمی نوری
NOPC

شرکت مدیریت تولید برق آذربایجان شرقی
Azarbaijan Power Generating Company

CTR Co.
Coal Tar Refining Company

Shirvan power plant

شرکت پتروشیمی مارون
MARUNPetrochemical Co.

MPC

سبانوین
Kashan power plant

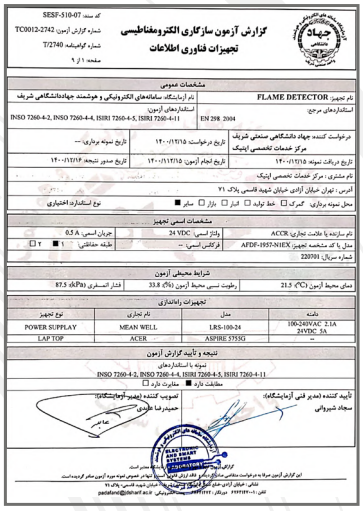
RPC
شرکت پتروشیمی رازی
RAZI PETROCHEMICAL CO.

Abadan oil refining

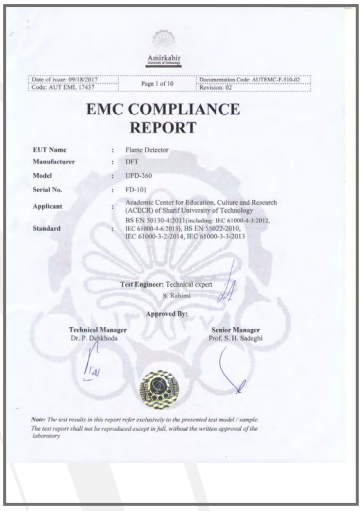
# Standards

| Row | Test title | Standard number | Equivalent national standard number |
|---|---|---|---|
| 1 | Electrostatic discharge immunity test | IEC 61000-4-2 | INSO 7260-4-2 |
| 2 | Electrical fast transient/burst immunity test | IEC 61000-4-4 | INSO 7260-4-4 |
| 3 | Surge immunity test | IEC 61000-4-5 | ISIRI 7260-4-5 |
| 4 | Immunity to conducted disturbances, induced by radio-frequency fields | IEC 61000-4-6 | INSO 7260-4-6 |
| 5 | Techniques-Voltage dips, short interruptions and voltage variations immunity tests | IEC 61000-4-11 | INSO 7260-4-11 |
| 6 | Flame scanner IP66 test | IEC 60529 | INSO 2868 |
| 7 | Flame scanner temperature test | EN 298<br>EN 13611 | INSO 10254<br>INSO 22107 |
| 8 | Flame scanner vibration test | EN 298 | INSO 10254 |
| 9 | Flame scanner explosion-proof test<br>ATEX Ex<br>II 2G Ex db IIC T6 Gb<br>II 2D Ex tb IIIC T85°C Db | IEC 60079-0<br>IEC 60079-1<br>IEC 60079-31 | --- |
| 10 | Flame scanner explosion-proof test<br>IECEx ExTR:<br>Ex db IIC T6 Gb<br>Ex db IIC T5 Gb<br>Ex tb IIC T85°C Db<br>Ex tb IIC T100°C Db | IEC 60079-0<br>IEC 60079-1<br>IEC 60079-31 | --- |

Vibration Test Report



Electromagnetic Compatibility Test Report



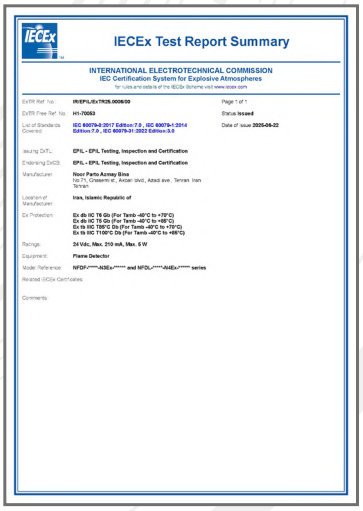
Electromagnetic Compatibility Test Report

Electromagnetic Compatibility Test Report

ATEX Explosion-Proof Test Report(Internal)

National Petroleum Association Explosion-proof Certificate

ATEX Explosion-proof Certificate from IMQ(Europe)



IECEx Explosion-proof Certificate(International)

Flame scanner series

# NFDL

to detect gas, oil and coal flames

## Features

- For ambient temperatures from -40°c up to +85°c;
- Two parallel channels to increase the safety of the device;
- Flame flicker frequency measurement;
- Usable for all burners with different fuels.

## Applications

- Power stations;
- Petrochemical industry;
- Steel industry;
- Cement factory;
- Refineries;
- Steam generators;
- Waste incinerators;
- Heating systems.

## Standards obtained

EMC Standards
- IEC 61000-4-2
- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-11

Vibration Standard
Temperature Standard
IP66 Standard

## Functional description

This model is a Line of sight flame scanner that is installed directly on the furnace. The light of flame by the optical lens is focused on the photodetector sensor. The sensor converts the light into electrical signals. The flame signal is analyzed by the central processor and monitored in the output.

| model | NFDL... | | |
|---|---|---|---|
| Spectral sensitivity | ...**1957**: 190 - 570 nm<br>...**2540**: 245 - 400 nm<br>...**2545**: 250 - 450 nm<br>...**2565**: 250 - 650 nm<br>...**25110**: 250 - 1100 nm<br>...**60170**: 600 - 1700 nm<br>...**50260**: 500 - 2600 nm | System status relay contact | 1x NO contact, 24 VDC, 0.5 A |
| Operating voltage | 24 VDC ±20% | Flame intensity analogue output | 0/4 ... 20 mA, max. load 750 ohm |
| Power consumption | 5 W | Interface protocol | RS485, Modbus RTU |
| Ambient temperature | -40°C to +85°C | Protection class | IP66 |
| Safety | Safety Self-monitoring and fail-safe | Optical viewing angle | 6° |
| Safety time (FFRT) | 1, 2, 3, 5 s | Dimensions | Ø120 mm, length 258 mm |
| Flame relay contact | 1x NO contact, 24 VDC, 0.5 A | Weight | approx. 2.5 kg |

Flame scanner series

# NFDL-N4EX

to detect gas, oil and coal flames

## Features

- For ambient temperatures from -40°c up to +85°c;
- Two parallel channels to increase the safety of the device;
- Flame flicker frequency measurement;
- Usable for all burners with different fuels;
- Explosion-proof.

## Functional description

This model is a Line of sight flame scanner that is installed directly on the furnace. The light of flame by the optical lens is focused on the photodetector sensor. The sensor converts the light into electrical signals. The flame signal is analyzed by the central processor and monitored in the output.

## Applications

- Power stations;
- Petrochemical industry;
- Steel industry;
- Cement factory;
- Refineries;
- Steam generators;
- Waste incinerators;
- Heating systems.

## Standards obtained

EMC Standards
- IEC 61000-4-2
- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-11

Vibration Standard
Temperature Standard
IP66 Standard
Explosion-proof standard (ATEX)
Explosion-proof standard (IECEx)

| model | NFDL...-N4Ex | | |
|---|---|---|---|
| Spectral sensitivity | ...**1957**: 190 - 570 nm<br>...**2540**: 245 - 400 nm<br>...**2545**: 250 - 450 nm<br>...**2565**: 250 - 650 nm<br>...**25110**: 250 - 1100 nm<br>...**60170**: 600 - 1700 nm<br>...**50260**: 500 - 2600 nm | System status relay contact | 1x NO contact, 24 VDC, 0.5 A |
| Operating voltage | 24 VDC ±20% | Flame intensity analogue output | 0/4 ... 20 mA, max. load 750 ohm |
| Power consumption | 5 W | Interface protocol | RS485, Modbus RTU |
| Ambient temperature | -40°C to +85°C | Protection class | IP66<br>Ex db IIC T6 Gb<br>Ex db IIC T5 Gb<br>Ex tb IIC T85°C Db<br>Ex tb IIC T100°C Db |
| Safety | Safety Self-monitoring and fail-safe | Optical viewing angle | 6° |
| Safety time (FFRT) | 1, 2, 3, 5 s | Dimensions | Ø130 mm, Length 285 mm |
| Flame relay contact | 1x NO contact, 24 VDC, 0.5 A | Weight | approx. 2.7 kg |

Flame scanner series

# NFDF

to detect gas, oil and coal flames

## Features

- For ambient temperatures from -40°c up to +85°c;
- Two parallel channels to increase the safety of the device;
- Flame flicker frequency measurement;
- Usable for all burners with different fuels.

## Applications

- Power stations;
- Petrochemical industry;
- Steel industry;
- Cement factory;
- Refineries;
- Steam generators;
- Waste incinerators;
- Heating systems.

## Standards obtained

EMC Standards
- IEC 61000-4-2
- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-11

Vibration Standard
Temperature Standard
IP66 Standard

## Functional description

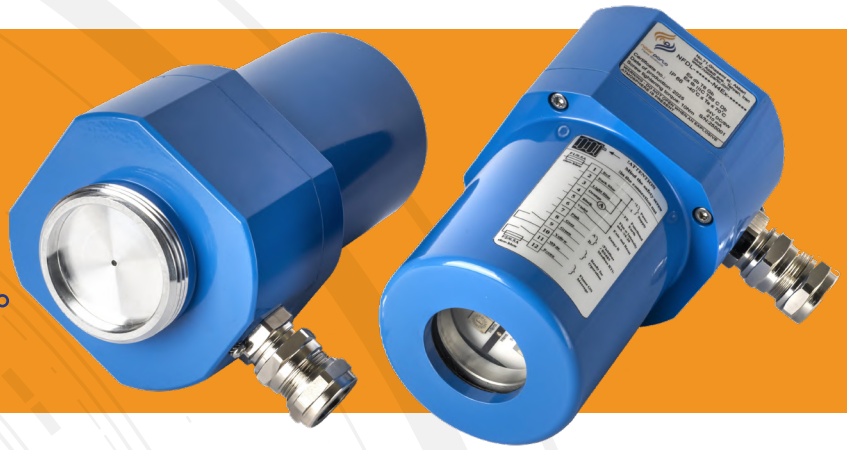
This model is one of the fiber optic flame scanners which is connected to furnace or combustion chamber through optical fiber; and in this way, the flame reflected light is focused on photodetector sensor.
The sensor produces electrical signals proportional to the light received, and then, after measuring flame light specifications, and processing by system processors based on specific algorithm, the data are put in system outputs.

| model | NFDF... | | |
|---|---|---|---|
| Spectral sensitivity | ...**1957**: 190 - 570 nm<br>...**2540**: 245 - 400 nm<br>...**2545**: 250 - 450 nm<br>...**2565**: 250 - 650 nm<br>...**25110**: 250 - 1100 nm<br>...**60170**: 600 - 1700 nm<br>...**50260**: 500 - 2600 nm | System status relay contact | 1x NO contact, 24 VDC, 0.5 A |
| Operating voltage | 24 VDC ±20% | Flame intensity analogue output | 0/4 ... 20 mA, max. load 750 ohm |
| Power consumption | 5 W | Interface protocol | RS485, Modbus RTU |
| Ambient temperature | -40°C to +85°C | Protection class | IP66 |
| Safety | Safety Self-monitoring and fail-safe | Optical viewing angle | 6° |
| Safety time (FFRT) | 1, 2, 3, 5 s | Dimensions | Ø120 mm, length 258 mm |
| Flame relay contact | 1x NO contact, 24 VDC, 0.5 A | Weight | approx. 2.5 kg |

Flame scanner series

# NFDF-N3EX

to detect gas, oil and coal flames



## Features

- For ambient temperatures from -40°c up to +85°c;
- Two parallel channels to increase the safety of the device;
- Flame flicker frequency measurement;
- Usable for all burners with different fuels;
- Explosion-proof.

## Applications

- Power stations;
- Petrochemical industry;
- Steel industry;
- Cement factory;
- Refineries;
- Steam generators;
- Waste incinerators;
- Heating systems.

## Standards obtained

EMC Standards
- IEC 61000-4-2
- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-11

Vibration Standard
Temperature Standard
IP66 Standard
Explosion-proof standard (ATEX)
Explosion-proof standard (IECEx)

## Functional description

This model is one of the fiber optic flame scanners which is connected to furnace or combustion chamber through optical fiber; and in this way, the flame reflected light is focused on photodetector sensor.
The sensor produces electrical signals proportional to the light received, and then, after measuring flame light specifications, and processing by system processors based on specific algorithm, the data are put in system outputs.

| model | NFDF...-N3Ex | | |
|---|---|---|---|
| Spectral sensitivity | ...**1957**: 190 - 570 nm<br>...**2540**: 245 - 400 nm<br>...**2545**: 250 - 450 nm<br>...**2565**: 250 - 650 nm<br>...**25110**: 250 - 1100 nm<br>...**60170**: 600 - 1700 nm<br>...**50260**: 500 - 2600 nm | System status relay contact | 1x NO contact, 24 VDC, 0.5 A |
| Operating voltage | 24 VDC ±20% | Flame intensity analogue output | 0/4 ... 20 mA, max. load 750 ohm |
| Power consumption | 5 W | Interface protocol | RS485, Modbus RTU |
| Ambient temperature | -40°C to +85°C | Protection class | IP66<br>Ex db IIC T6 Gb<br>Ex db IIC T5 Gb<br>Ex tb IIC T85°C Db<br>Ex tb IIC T100°C Db |
| Safety | Safety Self-monitoring and fail-safe | Optical viewing angle | 6° |
| Safety time (FFRT) | 1, 2, 3, 5 s | Dimensions | Ø130 mm, Length 285 mm |
| Flame relay contact | 1x NO contact, 24 VDC, 0.5 A | Weight | approx. 2.7 kg |

Fiber optic system

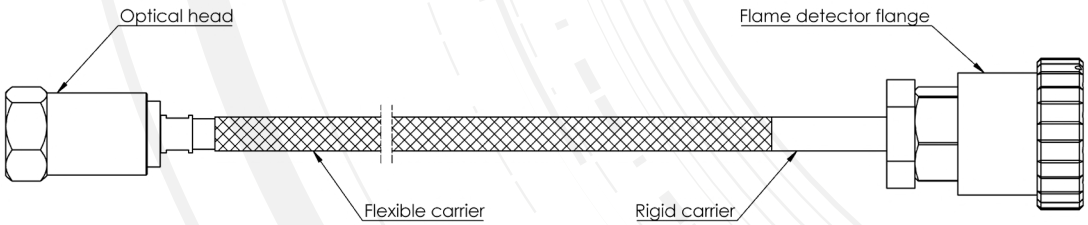
# NFOS-GT

Used for gas turbines

## General description of the system

If the environment temperature, where the flame scanner is installed, exceeds +85°C, or if the vibration of the turbine installed near the detector is so high that has a negative effect on its performance, then a flexible optical fiber for transferring the flame light towards the scanner is used. In normal condition, this system can withstand the temperature up to +300°C, and with cooling air up to +600°C. With this system, the scanner can be installed in further distance with respect to combustion chamber.

| | |
|---|---|
| Fiber optic wavelength | UV type 200 – 1100 nm<br>IR type 400 – 2500 nm |
| Fiber optic working temprature | -40°C to +300°C<br>-40°C to +600°C (with cooling air) |
| Fiber optic cable length | 1 to 20 meter |



Fiber optic system

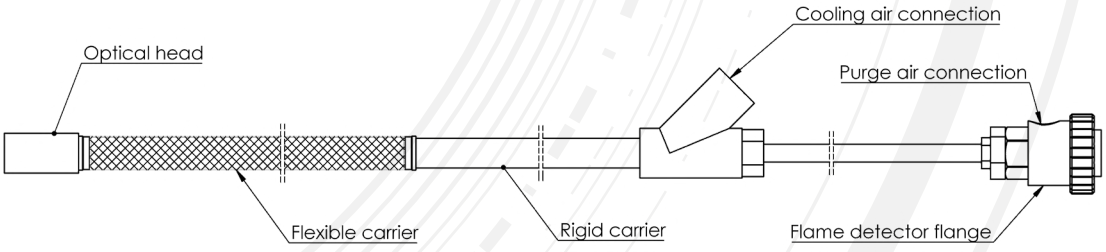
# NFOS-BL

Used for boilers

## General description of the system

In cases where the path of the flame scanner vision up to the flame inside the furnace is not direct and in line, or if the vibration of the turbine installed near the scanner is so high that has a negative effect on its performance, then a flexible optical fiber for transferring the flame light towards the scanner is used. In normal condition, this system can withstand the temperature up to +300°C, and with cooling air up to +600°C. With this system, the scanner can be installed in further distance with respect to furnace or boiler.

| | |
|---|---|
| Fiber optic wavelength | UV type 200 – 1100 nm<br>IR type 400 – 2500 nm |
| Fiber optic working temprature | -40°C to +300°C<br>-40°C to +600°C (with cooling air) |
| Fiber optic cable length | 1 to 20 meter |

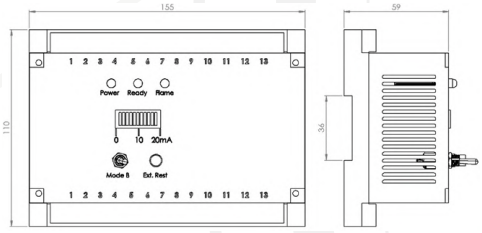


Flame scanner electronic card

# NFDC-DR35

## General description of the system

This card consists of an electronic board which is connected to flame scanner through 12-strand fiber optic cable. It is located in control room in order to receive and observe the output signals.





| | | | |
|---|---|---|---|
| Working voltage | 24 VDC ±20% | Installation method | DIN Rail 35 mm |
| Consumption power | 5 W | Communication protocol | RS485, Modbus RTU |
| Environmental temperature | 0°C to +70°C | Analog current output | 0/4–20 mA, max. load 750 ohm |
| Dimensions (L x W x H) mm | 155x110x59 | Flame relay contact | 1x closing contact 24 VDC, 0.5 A |
| Weight | approx. 600 g | System status relay contact | 1x closing contact 24 VDC, 0.5 A |

# Application software

## Specifications and capabilities

- Connection to 64 flame scanners, with only two strands of wires, by using RS485 connector and Modbus RTU protocol.
- Display of switches regulation status of intensity and frequency thresholds, and the signal gain coefficient.
- Display of wave shape, light intensity, and frequency of measured fluctuations from the stored flame light for required analyses.
- The possibility of storing and implementing information in Excel format.
- Installation capability on Windows operation system.

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Flame Monitoring