P-T-S POWER

Turbine Solutions

BFI Fiber Optic Flame Scanners

Chentronics Igniter Systems

BFI Fiber Optic Flame Scanners

- Available for many GE and Siemens turbines
- Proven SIL3 Reliability
- No liquid cooling
- No wires near the turbine
- Fail Safe failure opens contact
- Self-checking every second
- Reads ‘flicker’ - can’t be fooled
- Can be calibrated and repaired
- Predictable life by trending
- Multile output options selectable by jumper

BFI Fiber Optic Flame Scanners

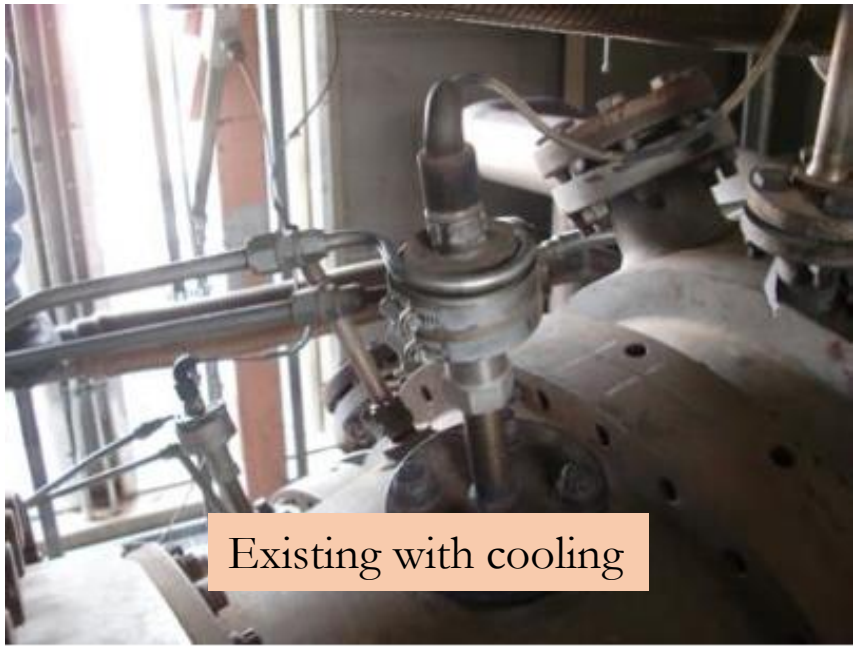
The BFI Automation flame monitoring system has two sections

- Optical section consisting of:
  - Pressure barrier with ¾" NPT female thread for the sight port connection
  - Lens probe made of heat resistant quartz crystal
  - Fiber optic cable of various length depending on the frame size

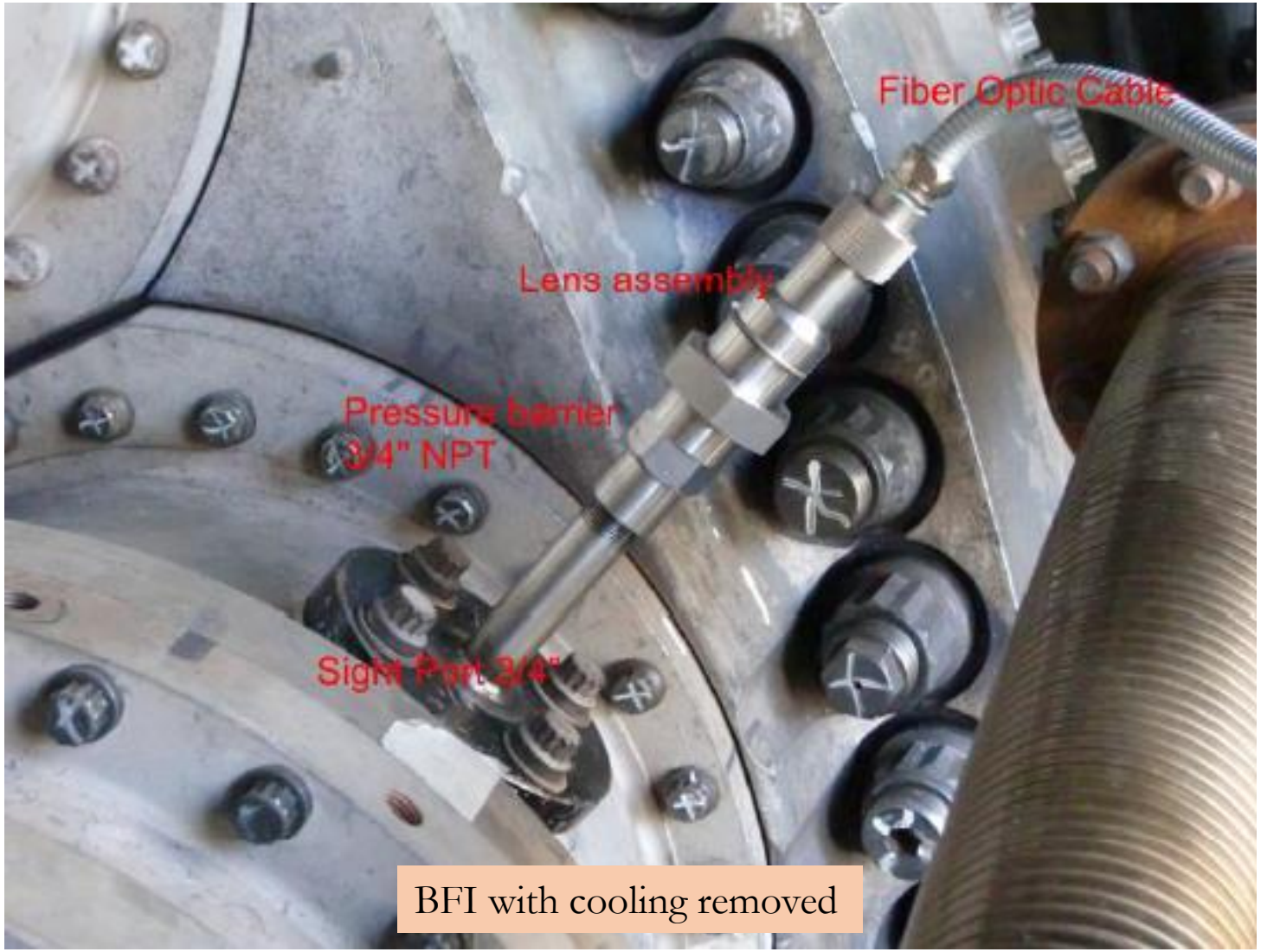
Electronic section consisting of:

- Compact flame controller with fail-safe design
- Connection board with screw terminal connection and output selection
- Optional additional communication board providing additional current outputs for evaluation purposes and RS 485 bus capabilities for remote indication and networking functions

BFI Fiber Optic Flame Scanners -Optical section



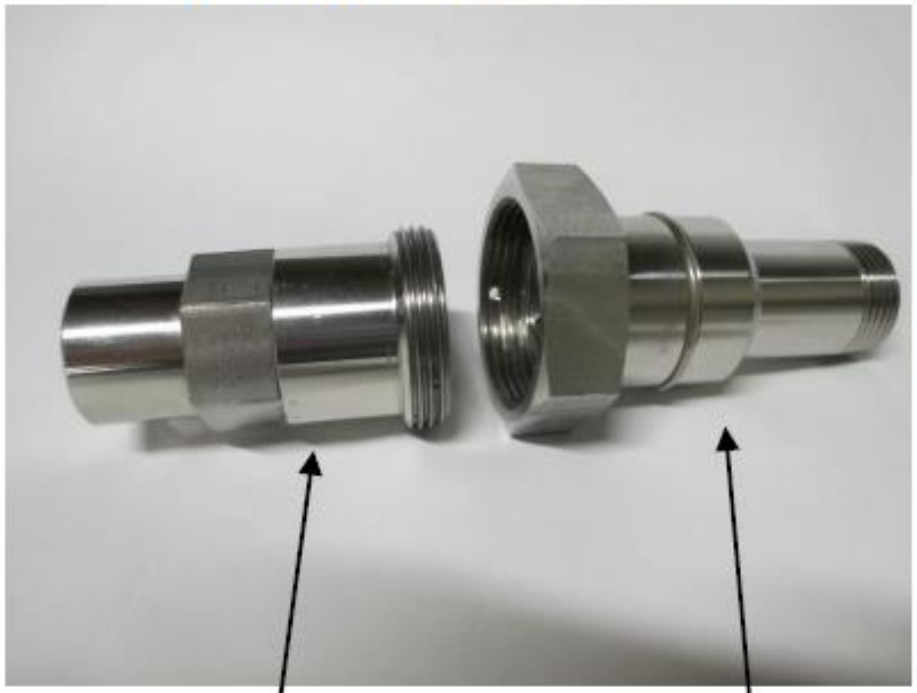
Existing with cooling



BFI with cooling removed

BFI Fiber Optic Flame Scanners -Optical section

Original Two-piece Probe



Pn **B 511.03**
UV Pressure Barrier,
¾"FNPT

Pn **S 720**
UV SKL Lens Unit

One-piece Probe

Pn **S 820.22**
UV SKL3 Lens / Pressure Barrier
¾"FNPT

BFI Fiber Optic Flame Scanners -Compact Flame Controller (CFC)

The BFI Automation System with the Multi Output Board is providing different possibilities for the connection to the various Mark Control Systems:

a) Mark IV - Relay output – (dry switch over contact) or standard DCS

b) Mark V - Fail safe pulse output for Mark V control system

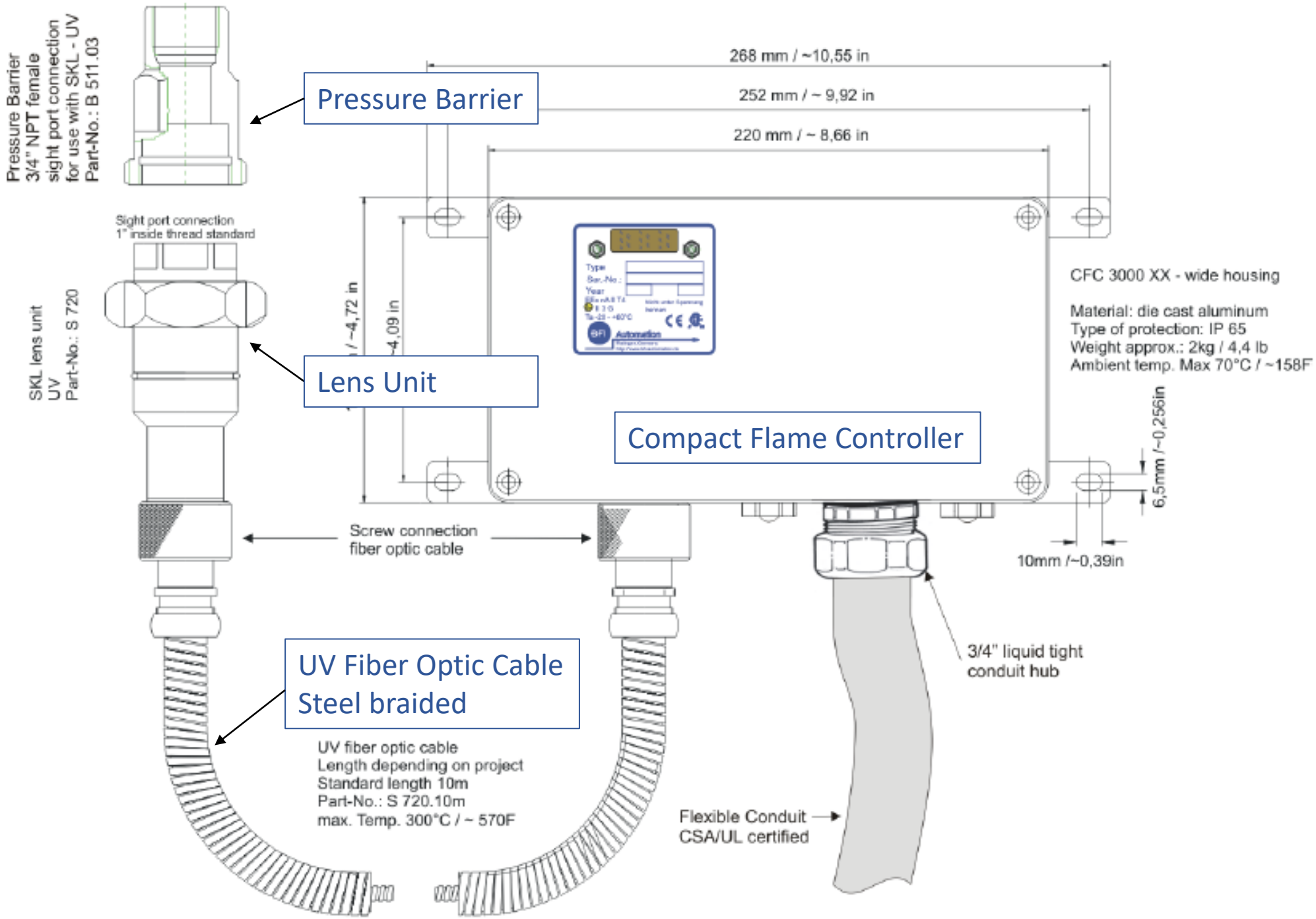
c) Mark VI - Fail safe 4-20 mA output for Mark VI and aftermarket controls.

BFI Fiber Optic Flame Scanners -Compact Flame Controller (CFC)

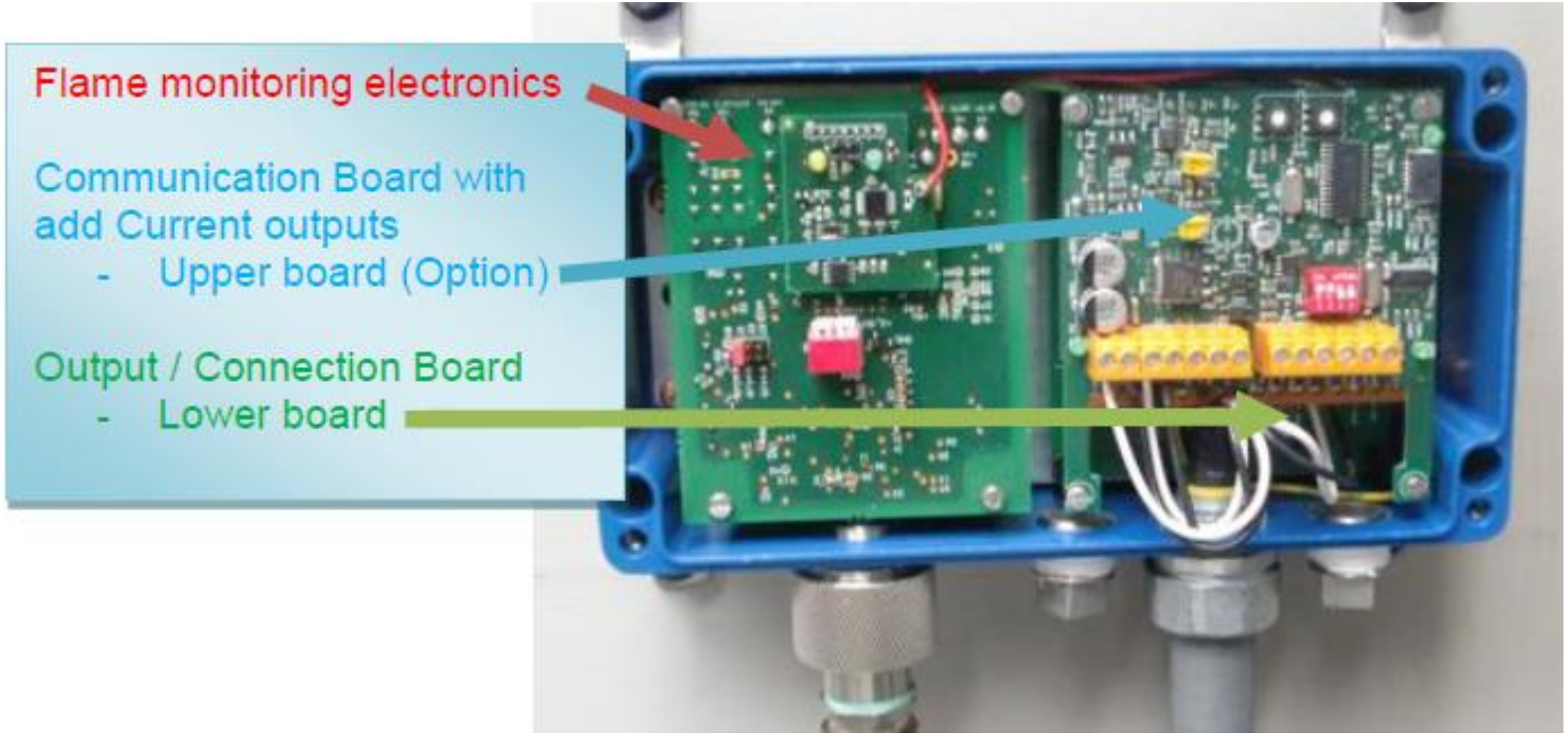
- No vulnerable sensor or cable near the heat
  - We use well-protected fiber optics for many years
- SIL 3 Reliability Rating
  - Per IEC EN 61508, PFD (probability of failure on demand) is 1 in up to 10,000 starts
  - PFH (probability of failure per hour of continuous use) is 1 in up to 100 million hours
- Self-Checking / Fail-Safe
  - The CFC dual channel microprocessor analyzes a wide UV range to ensure the flame is modulating, eliminating false signals. If a problem is detected, the scanner fails open

BFI Fiber Optic Flame Scanners -Compact Flame Controller (CFC)

- Wide Spectral Range
  - Not affected by start-up condensate or water wash cycle
- No Programming Required to Operate
  - Field-selectable output (256 or 512 pulse/relay/4-20mA)
- Adjustable
  - Performance can be data-logged and analyzed. Adjustments are possible for effects on flame by physical aspects such as nozzles, cross-fire, fuel , and air pressure
- Rapid Response
  - In milliseconds, not waiting on the turbine control for signal interpretation


Pressure Barrier
3/4" NPT female
sight port connection
for use with SKL - UV
Part-No.: B 511.03
Pressure Barrier
268 mm / ~10,55 in
252 mm / ~ 9,92 in
220 mm / ~ 8,66 in
Sight port connection
1" inside thread standard
SKL lens unit
UV
Part-No.: S 720
Lens Unit
~4,72 in
~4,09 in
CFC 3000 XX - wide housing
Material: die cast aluminum
Type of protection: IP 65
Weight approx.: 2kg / 4,4 lb
Ambient temp. Max 70°C / ~158F
Compact Flame Controller
6,5mm /~0,256in
10mm /~0,39in
Screw connection
fiber optic cable
3/4" liquid tight
conduit hub
UV Fiber Optic Cable
Steel braided
UV fiber optic cable
Length depending on project
Standard length 10m
Part-No.: S 720.10m
max. Temp. 300°C / ~ 570F
Flexible Conduit
CSA/UL certified

BFI Fiber Optic Flame Scanners
-Compact Flame Controller (CFC)



Chentronics®
IGNITING INNOVATION

SureSpark™
High Energy Ignition System

MAXIMIZE YOUR PERFORMANCE. MINIMIZE YOUR COSTS.

Our SureSpark High Energy Ignition System is expertly engineered to provide the most reliable fuel ignition for your toughest combustion applications. Whether you're firing gas, light oils, bio-diesel or heavy oils (residual fuels), SureSpark gives you efficient, effective performance light after light.

System Model: LO-4

Suitable Fuels: Gas, light oils, bio diesel

Diagnostics: Built-in predictive life diagnostics

Moisture Protection: Moisture seal available

Solid State Electronics: Internal electronics are rated Class 1, Division 2

System Input Power: 100-240 VAC 50/60 Hz

Stored Energy (Joules): 12

Spark Rate (nominal SPS): 4

Typical Exciter Size: 11 x 7 x 7 in. (279.4 x 177.8 x 177.8 mm)

Igniter Temperature Rating: Up to 1,832°F (1,000°C)

Exciter Temperature Range: -13 to 167°F (-25 to 75°C)

Dual-output exciter

Igniter tips

Single-output exciter

Chentronics Igniter System

- **Built-in predictive life diagnostics**
  - Local and remote indicators
  - Tip wear indication
- 4 Sparks-per-second (SPS) optimized for natural gas and fuel oil
- Moisture seal-out designs of igniter tips and cables
- AC and DC input power options
- Flex rod technology
- Hazardous area rating certified for your environment:
  - ATEX, CE, UL, CSA, ETL Listed
  - Class 1, Div 2, Groups A,B,C and D
- Caustic environment resistant (including H2S “Sour Gas”)
- Solid-state technology
  - Capacitive discharge vs. coil type

Predictive Failure

- Chentronics includes 2 LEDs for each exciter/igniter that provide real-time status for operation:
  - Red- Igniter fault (on/off),
  - Yellow/blue- Spark indicator and status (multi function dual-color LED)
    - Yellow- Steady, when powered and in standby
    - Blue- 4 blinks/sec at spark rate when successful spark output currents detected
    - Blue- Erratic flashing indicates tip wear and should be replaced
    - Blue- Steady, indicated tip at end of life and replace immediately
- Output to the DCS, which is essentially a dry-contact output
- Igniter Wear- Provides a closed contact output signal when spark rate is greater than the minimum spark rate -or- provides an open contact output signal when spark rate is less than the minimum spark rate.

Single-output exciter

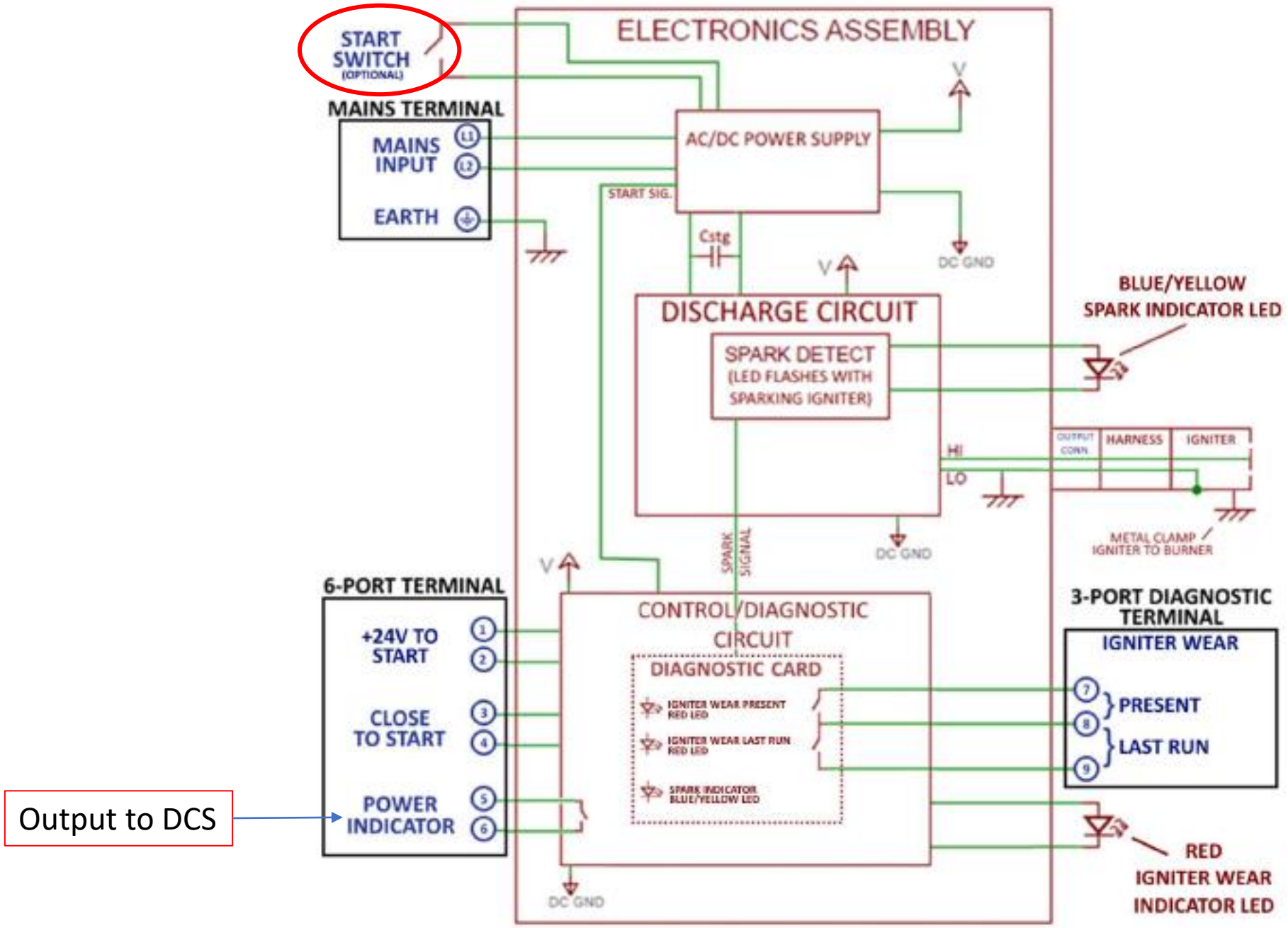
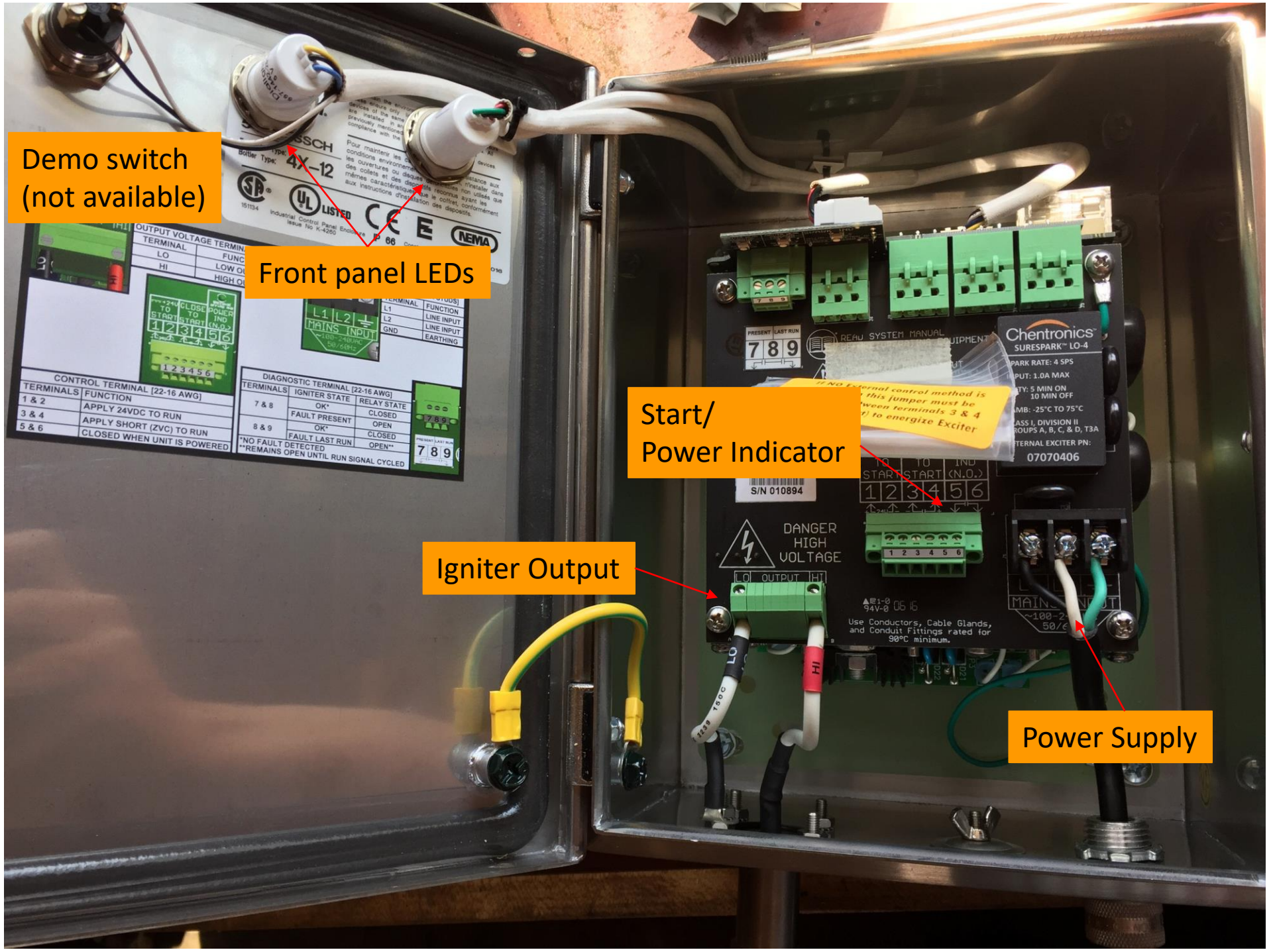
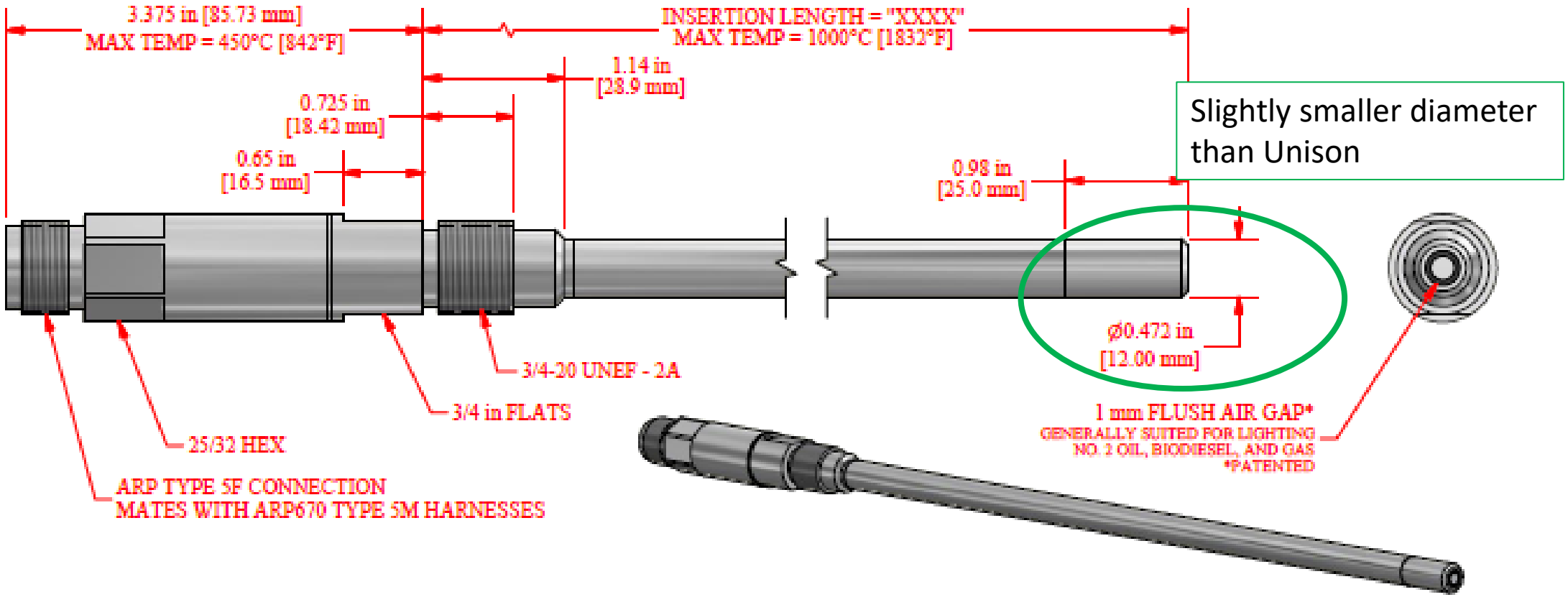


Figure 14: System schematic diagram.


Demo switch
(not available)
Front panel LEDs
Start/
Power Indicator
Igniter Output
Power Supply
Chentronics
SURESPARK™ LO-4
07070406
S/N 010894
DANGER
HIGH
VOLTAGE
Use Conductors, Cable Glands,
and Conduit Fittings rated for
90°C minimum.

Chentronics Igniter System- Igniter Rod

MATERIAL	TIP END: INCONEL BODY: 304 STAINLESS STEEL
MAXIMUM TEMPERATURE	SEE DRAWING BELOW
MAXIMUM PRESSURE	508 psi [35 bar]



Chentronics Igniter System- Igniter Rod

- Inconel tip
- 304 Stainless Steel body
- Rod diameter is thinner than Unison greatly reducing binding
- High-Amperage/Lower voltage than Unison
- Proprietary conductive material between spark gap
- Different igniters for 7EA, 7EA non-retractable, 7EA DLN

Chentronics Igniter System- Cable

- Overall length depending on turbine and routing
- Nickel outer braid, stainless steel inner core
- Voltage rating: 375 RMS, 2.5kV DC, 7kV transient
- Temperature rating: -40 °C to 240 °C