iscan® FLAME SCANNER

DSF-2010-MB

KEEP THIS MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE!

Read this manual before using this product. Failure to follow the instructions and safety precautions in this manual can result in serious injury or death or damage to equipment.

Applicable Scanner Part Numbers

PART NUMBER	TYPE (MB, MB)	AREA (NON-HAZ, HAZ)	TEMP RATING	KEY FEATURE	INPUT PINS
2653-271-12	MB	NON-HAZ	-30°C to 70°C	Auto-Gain	14
2653-271-06	MB	HAZ	-30°C to 70°C	Auto-Gain	10

Contact Technical Support +1.866.821.5504 with any questions.

For a list of relevant patents and trademarks, please see *http://www.chentronics.com/legal-notices*

Contents

1 Important Safety Information

IMPORTANT SAFETY INFORMATION

Read All Instructions before Using

The instructions provided in this manual have been prepared to serve as a general guide. It is intended for use by qualified personnel with knowledge of Equipment of this type. It is not intended to cover all possible variations in equipment or to provide for specific operating problems which may arise.

You are responsible for adhering to all warnings or cautions provided in this Manual.

In addition to any general safety measures provided in this Manual, you must comply with all current national, state, local and company safety regulations at all times.

Safety Symbols used in this manual comply with ISO 3864.

Indicates a hazard with a high level of risk which, if not avoided will result in death or serious injury.

Indicates a hazard with a medium level of risk which, if not avoided could result in death or serious injury.

Indicates a hazard with a low level of risk which, if not avoided will result in minor or moderate injury.

EXPLOSION HAZARD

Do not open the equipment cover or service the equipment if an explosive atmosphere may be present. Equipment must be installed and serviced by qualified personnel in accordance with applicable local and national codes, standards, and ordinances.

2 Customer Support

For Technical Support

Inside USA Call: 866.821.5504

Outside USA Call: +1.607.334.5531

Website: wwww.chentronics.com

3 Electrical Area Classification and Safety Markings

3.1 Description of Equipment Protection System

Special Conditions of Use: The flying leads of the flame scanner shall be suitably protected against mechanical damage and terminated within a terminal or junction facility for the conditions of use.

3.2 Hazardous Area

The iScan2 DSF-2010 system hazardous area models have been assessed and comply with the following hazardous area standards:

NEC/CEC/ABS/EAC

FM C US APPROVED

CLASS I, DIVISON 1, GROUPS B, C, & D T5
NEMA TYPE 4X
SIL3

c UL us

20140305-MH26433

ABS DESIGN ASSESSED

21-2116223-PDA

EAC

RU C-US. ГБ04.B.00663

FM3610:2009UL, FM7610:1997
ANSI Z21.20
FM3600:1998, FM3615:1989, FM3810:1989
ISA 60079-1:2002
IEC 61508-1:2010, IEC 61508-2:2010, IEC 61508-3:2010

60730-2-5

CAN/CSA C22.2 No. 60079-0

CAN/CSA C22.2 No. 30

IECEx

Ex d IIC T5 Ta -30°C to +70°C
Ex tD A21 IP66 T100°C Ta -30°C to +70°C
IECEx FME 10.0004X

IEC 60079-0:2004
IEC 61241-0:2004

IEC 60079-1:2007
IEC 61241-1:2004

3.3 Non-hazardous Area

The iScan2 DSF-2010 system has been assessed and complies with the following safety standards:

NEC/CEC/ABS/CE/UKCA

NEMA TYPE 4X
SIL 3

20140305-MH26433

21-2116223-PDA

NB 2797 705806

AB 0086 751491

FM3610:2009UL, FM7610:1997 60730-2-5
CAN/CSA C22.2 No. 199-2007 ANSI Z21.20
IEC 61508-1:2010, IEC 61508-2:2010, IEC 61508-3:2010
EN 298:2012, EN 63000, EN 61000-6-4, EN 61000-6-2

4 General

4.1 Product Description

The ***iScan2*** is designed for detecting burner flames of fossil fuels such as hydrogen blends and 100% hydrogen, natural gas, refinery gas, waste gas, fuel oils, biomass and coals. The iScan2 flame scanner consists of an integrated viewing head and signal processor. No secondary signal processor or amplifier is required.

4.2 Views of Models

4.2.1 Non-hazardous Area (PN 2653-271-12)

4.2.2 Hazardous Area (PN 2653-271-06)

4.3 Product Features

4.3.1 Programmability

Using iScan Software , the SB models have limited programmability (intended for single burner applications). MB models have a high degree of programmability, as outlined in the table below:

For instructions on how to program the scanner, please reference the iScan Software manual.

SCANNER ROOT PART NUMBER (suffix may vary)	USER PROGRAMMABLE FEATURES (with iScan Software)						
	4-20 mA SIGNAL MAPPING	4-20 mA Calibrate	4-20 mA Gain	FLAME RELAYS SERIES –or- INDEPENDENT	RESPONSE TIME (FLAME ON)	MULTIPLE SETUP FILES	RESPONSE TIME (FLAME OFF)
2653-271-12	YES	YES	YES	YES	YES	YES	YES
2653-271-62	YES	YES	YES	YES	YES	YES	YES
2653-271-06	NO	YES	YES	NO	YES	YES	YES
2653-271-11	NO	YES	NO	YES	NO	NO	NO
2653-271-05	NO	YES	NO	NO	NO	NO	NO

4.3.2 Digital Signal Processing with Self Check

The ***iScan2*** is a DSP (digital signal processor) based instrument. The flame scanner uses a solid-state optical detector to generate an analog signal. The optical detector operates in ultraviolet and infrared light spectra. The processor uses DSP techniques to determine if a flame is present.

The flame scanner incorporates a self-check system that tests all critical components every 20 seconds. A self-check failure will automatically de-energize the internal flame relay (relays if configured in Redundant Flame Relay Mode) and energize the fault relay (if configured in the Independent Flame/Fault Relay Mode).

4.3.3 Electronically Assisted Sighting Indicator (EASI)

Non-Hazardous models of the ***iScan2*** include the EASI (Electronically Assisted Sighting Indicator) feature, which assists in optimum sighting of the flame and providing quick diagnostics of the scanner's status.

4.3.4 Configurable Flame Relays

Non-Hazardous models have two relays which can be configured in one of the following two modes:

Redundant Flame Relay Mode: Two relays are connected in series

-OR –

Independent Flame/Fault Relay Mode: Two relays are connected in parallel

4.4 Technical Specifications

4.4.1 Definitions

FLICKER – Flicker refers to the modulation of flame intensity due micro-explosions of the fuel.

FDORT – *Flame Detector ON Response Time* – the period of time from flame intensity rising above the user adjustable threshold to flame relay contacts closed.

FDRT – *Flame Detector Response Time* **–**the period of time between the loss of a sensed flame and the signal indicating the absence of flame.

MFFRT – *Marginal Flame Fail Response Time* – period of time from flame intensity falling below the user adjustable threshold to the flame relay contacts open.

EASI - *Electronically Assisted Sight Indicator* – refers to the red LED (Light Emitting Diode) located on the back of the Non-hazardous Area Models, that flashes to indicate flame intensity. When no flame is present the LED blinks approximately 1 time per second. When a flame is present the LED's blink rate increases proportional to the flame intensity. At optimal sighting and scanner gain, the LED blinks at approximately 30 times per second. If the LED is on solid or off the scanner is faulted and should not be used.

GAIN – When a signal is amplified, GAIN is the ratio of the amplified signal relative to the original.

DISCRIMINATION – is the ability to distinguish between multiple flames. An example of good discrimination is when the MB scanner is able to recognize a pilot flame with other burner's main fuel flame in the background. The status of the main (background) flame does not affect the ability to detect the pilot flame (ON or OFF).

4.4.2 Specification Table

AREA CLASSIFICATION	Non-hazardous Area	Hazardous Area
Part Number	**PN 2653-271-12**	**PN 2653-271-06**
Area Classification	NEMA 4X, IP66	NEMA 4X and IP66 Class 1, Division 1, Groups B, C, & D CE 0359 Ex II 2 G Ex d IIC T5 and II 2 D Ex tD A21 IP66 T100 °C Ta
Input Cable	Quick Disconnect Separate Cable	Individual Wires Attached 10 Ft. (3 m) Long
Weight	3.4 lb. (1.54 kg)	3.8 lb. (1.72 kg)
Mounting	1" NPT(F)	1" NPT(F)
Purge Air NOTE 1 **Flow** **Pressure**	 5 scfm (8.5 Nm^3/hr) 5" w.c. (13 mbar)	 5 scfm (8.5 Nm^3/hr) 5" w.c. (13 mbar)
EASI	Yes	No
Optics	Quartz Lens	Quartz Lens
Sensor Type	Solid-State	Solid-State
Sensor Range	Ultraviolet Peak at 350 nm and Infrared Peak at 700 nm	Ultraviolet Peak at 350 nm and Infrared Peak at 700 nm
Communication	UMB/RS485: up to 127 scanners (with repeaters placed every 30 scanners) may be connected in one loop up to a distance of 4000 Ft. (1200 M).	UMB/RS485: up to 127 scanners (with repeaters placed every 30 scanners) may be connected in one loop up to a distance of 4000 Ft. (1200 M).
Temperature	-30°C to 70°C	-30°C to 70°C
Humidity	0 to 100% Relative Humidity, Condensing	0 to 100% Relative Humidity, Condensing
Input Power NOTE 2	24 ± 4 VDC Filtered 3.36 VA (140 mA) Per Scanner	24 ± 4 VDC Filtered 3.36 VA (140 mA) Per Scanner
Relay Contacts NOTE 3	Normally Open Voltage Free Contacts (i.e. contacts close when flame is detected) 0.5 A @ 125 VAC Resistive Load; 0.3 A @ 230 VAC Resistive Load 1.0 A @ 24 VDC Resistive Load	Normally Open Voltage Free Contacts (i.e. contacts close when flame is detected) 0.5 A @ 125 VAC Resistive Load; 0.3 A @ 230 VAC Resistive Load 1.0 A @ 24 VDC Resistive Load
Signal Output NOTES 4,5	Output #1, 4–20 mA, Flame Signal Output # 2, 4-20 mA, Map Auto Gain, Raw Signal, or Internal Scanner Temperature Maximum Current Loop Resistance = 750 ohms	Output #1, 4–20 mA, Flame Signal Maximum Current Loop Resistance = 750 ohms
FDORT (FLAME ON)	2 seconds SUFFIX -4 Flame ON 1 second	2 seconds SUFFIX -4 Flame ON 1 second
FDRT (FLAME OFF)	1 second SUFFIX -4 Flame OFF 4 seconds	1 second SUFFIX -4 Flame OFF 4 seconds
MFRRT	2 seconds SUFFIX -4 Flame OFF 4 seconds	2 seconds SUFFIX -4 Flame OFF 4 seconds

AREA CLASSIFICATION	Non-hazardous Area	Hazardous Area
Part Number	PN 2653-271-12	PN 2653-271-06
Safety Integrity Level (SIL3) Data	PFDavg = 2.64 X 10-5 λS = 9.05 X 10-7 λDD = 2.81 X 10-7 λDU = 5.51 X 10-9 SFF = 99.5% Proof Test Interval time = 1year NOTE 6	PFDavg = 2.64 X 10-5 λS = 9.05 X 10-7 λDD = 2.81 X 10-7 λDU = 5.51 X 10-9 SFF = 99.5% Proof Test Interval time = 1year NOTE 6

NOTES:

Note 1 Purge air pressure is the minimum differential pressure required between the purge air supply pressure at "Y" (scanner connection) and the back pressure.

Note 2 24 VDC Power supply to iScan2 must not include any inductive load.

Note 3 To achieve higher relay contact voltages, use iScan2 relay contacts to energize the coil of an interstitial relay.

Note 4 Output for monitoring only. Not to be used to prove flame.

Note 5 4-20 mA outputs are calibrated at the factory to a known load. Monitoring hardware will have an impact of the current output. For accurate readings, 4-20 mA output(s) should be calibrated using a milli-ammeter between the scanner's 4-20 mA output and the monitoring hardware. Refer to the 4-20 ma Settings section MNL-iScan Software for details on how to execute the calibration procedure.

Note 6 To maintain SIL3 rating for any system where the scanner is installed, scanners must be re-tested at an interval not to exceed one year. **SIL3 rating for the system is void if scanners are not re-tested annually**. Contact Chentronics to arrange re-test.

4.4.3 Default Configuration (Settings)

Flame Detector On Response Time (FDORT)	2 seconds; SUFFIX -4 is 1 second
Flame Detector Response Time (FDRT)	1 second; SUFFIX -4 is 4 seconds
Marginal Flame Failure Response Time (MFFRT)	2 seconds; SUFFIX -4 is 4 seconds
Gain Configuration	Automatic
Gain Channel	High
Signal Gain	3.5 - 1000
Flame Flicker Frequency	26 Hz
Flame Flicker Bandwidth	12 Hz
Flame Flicker Threshold	-45 dB
Mains Filter	Enabled
Rail Filter	Enabled
Solar Filter	Enabled
Flame Filter	Enabled

The following settings apply to the overall scanner and not to an individual scanner file:

Communications Address	COMM 1 NOTE 1
Active File	A
4 To 20 mA Gain	1 mA/dB above threshold

NOTES:

Note 1 As part of setup in iScan Software scanners are assigned unique addresses.

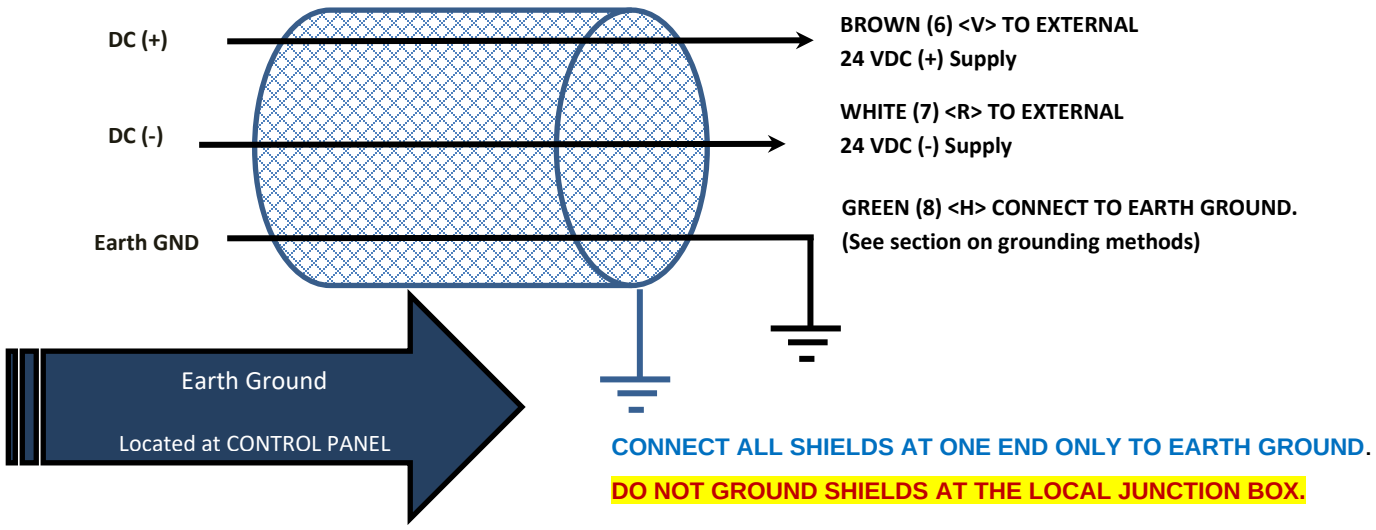
5 Wiring Instructions

All wiring shall be done in accordance with all applicable local and national codes, standards, and ordinances.

The front Non-hazardous Area models use a quick disconnect scanner cable. This cable does not require a flexible conduit if permitted by local authority.

The Hazardous Area model has a ½" NPT (F) flexible conduit connection. The scanner cable for the hazardous area model shall be installed inside a grounded flexible conduit to protect it from mechanical damage and to reduce electrical noise interference. Connections for power, Earth Ground, and Flame Relay (N.O. and Common) are required for all applications. Use of the 4-20 mA outputs and Communications Bus, and connections are "as-required" for each application.

5.1 Shielding Single Point Ground Connection



CONNECT ALL SHIELDS AT ONE END ONLY TO EARTH GROUND.

DO NOT GROUND SHIELDS AT THE LOCAL JUNCTION BOX.

CAUTION

Electrical noise interference from high voltage/energy ignition sources can adversely affect the operation of the flame scanner. To minimize the possibility of electrical noise interfering with the operation of the flame scanner:

- Do **not** install ignition wires in the same conduit as the scanner wires.
- Ignition Systems shall have a dedicated return.
- Do **not** mount an ignition transformer in the same enclosure where the flame scanner wiring is terminated.
- Ignition cables shall be routed a minimum of 12” (305mm) from scanner wiring at all times.
- DSF-2010 complies with IEC 61000-4-3 (RF Radiated Immunity). However if a strong enough RF source, such as a portable radio, is within 3 m of the DSF-2010 or its cable operation may be adversely affected. For safe operation avoid introducing RF energy within 10’ (3m) of the device to avoid false Flame On/Off indication.

5.2 Non-Hazardous Area Model (14 Wire) Installations

The wires on the non-hazardous area models are contained in overall shielded quick disconnect cable. Wires are #20 AWG; all wires are stripped and tinned. Use shielded twisted pair cables as noted in the wiring diagram for all functions from the quick connect cable to the instrument panel. Connect all the shields at one end only to earth ground at the control panel. Do not ground the shields at the local junction boxes.

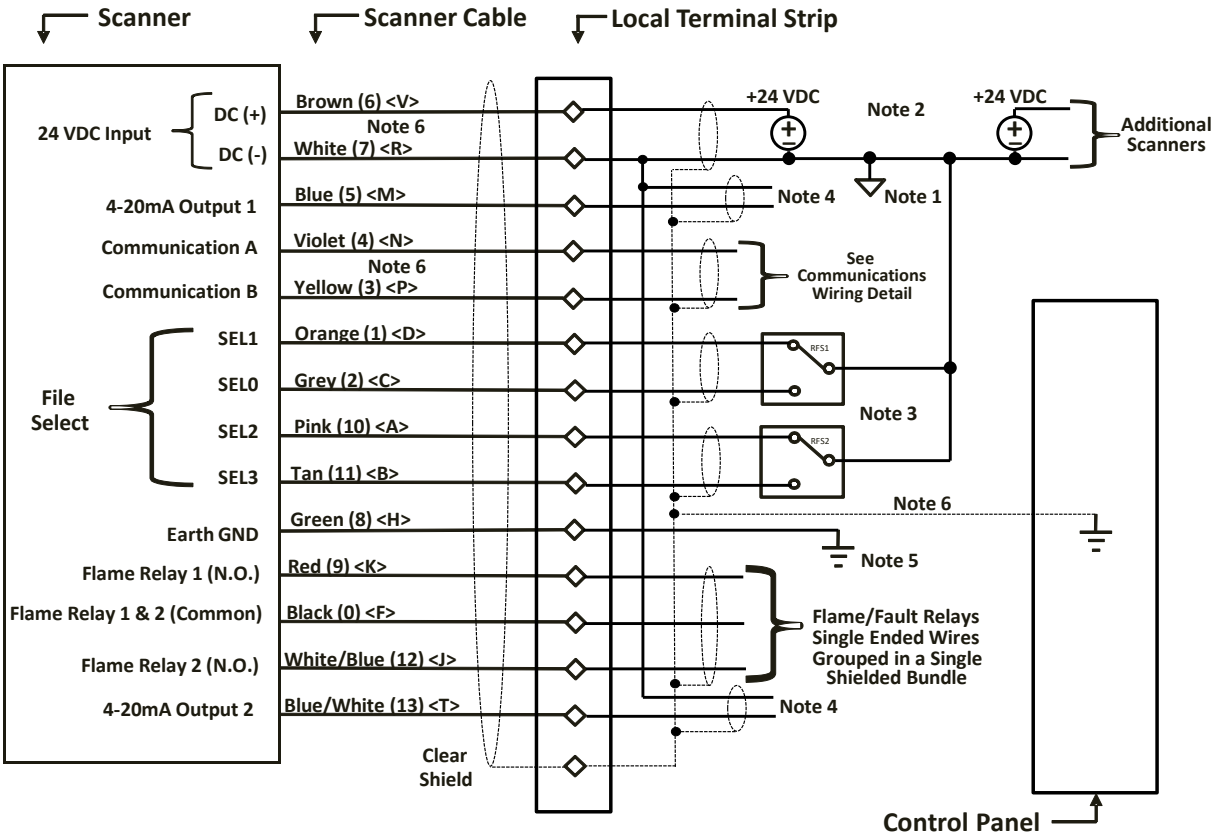
NOTE: Do not ground the shields at the local junction boxes.

1. If more than one 24 VDC supply is required, the 24 VDC returns labeled as “DC (-)” shall be connected to each other. The 24 VDC return line shall be isolated from earth ground.
2. If more than one 24 VDC supply is required, the 24 VDC returns labeled as “DC (-)” shall be connected to each other. The 24 VDC return line shall be isolated from earth ground.
3. If more than one 24 VDC supply is required, the 24 VDC source connections labeled as “DC (+)” shall be isolated from all other power supplies. If switching power supplies are used the supplies may be connected via a wired OR diode configuration.

NOTE: the BLOCKING DIODE must be rated for a minimum of 50 volts and 10 Amps.

4. File Select is not available on MB models.
5. The 24 VDC return, “DC (-)”, is the return for the 4–20 mA output loop(s). Input must be isolated type. Maximum current loop resistance is 750 ohms.
6. Connect the scanner Earth GND (Green, 8, <H>) to EARTH GROUND. A short BRAIDED CONDUCTOR (alternately a short AWG #12 wire) is recommended.

All shields are tied to EARTH GROUND in the Control Panel only.



5.3 Hazardous Area Model (10 Wire) Installations

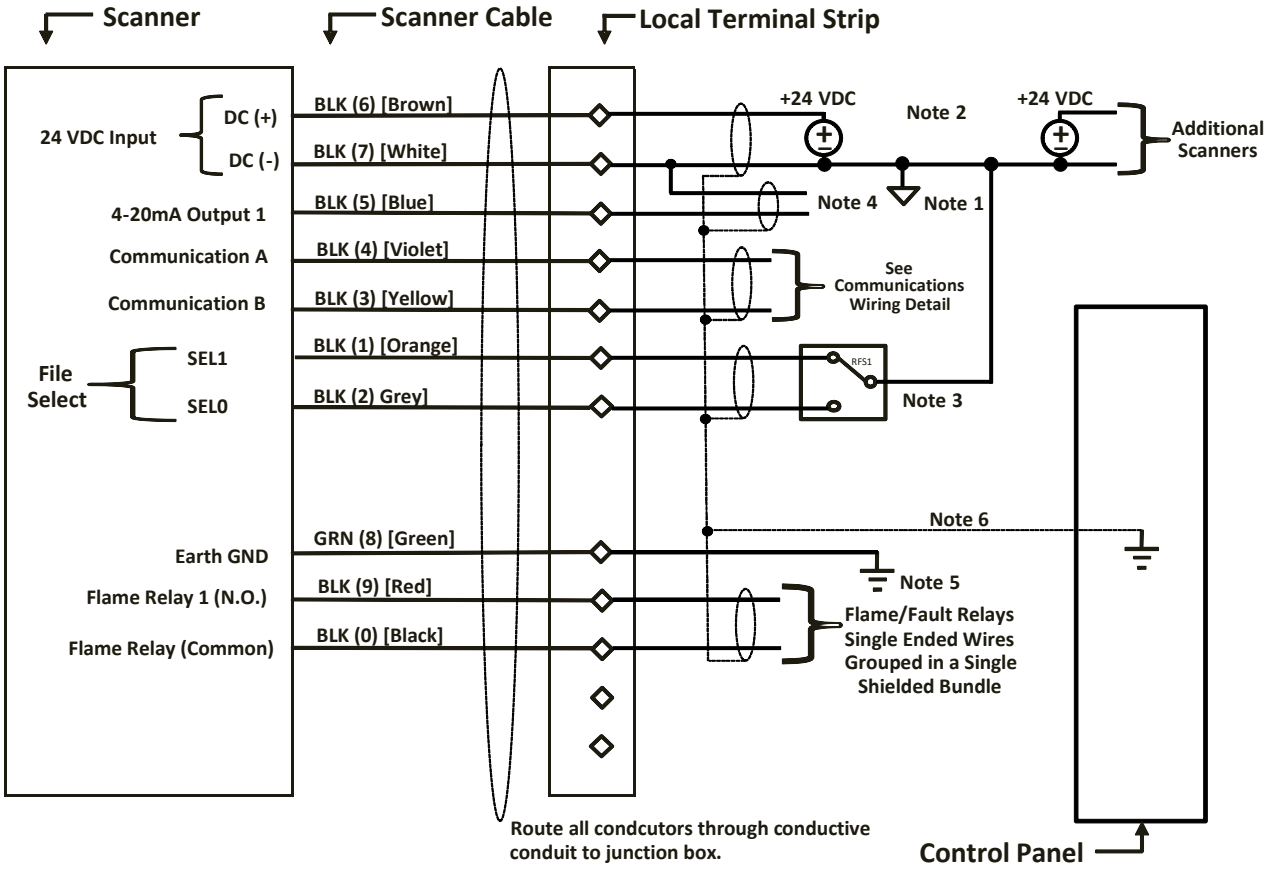
The hazardous area model has black wires and is numbered as shown. Wires are #24 AWG; all wires are stripped and tinned. Use shielded twisted pair cables as noted in the wiring diagram for all functions from the scanner to the instrument panel. Connect all the shields at one end only to earth ground at the control panel. Do not ground the shields at the local junction boxes.

1. If more than one 24 VDC supply is required, the 24 VDC returns labeled as “DC (-)” shall be connected to each other. The 24 VDC return line shall be isolated from earth ground.
2. If more than one 24 VDC supply is required, the 24 VDC source connections labeled as “DC (+)” shall be isolated from all other power supplies. If switching power supplies are used the supplies may be connected via a wired OR diode configuration.

***NOTE:* the BLOCKING DIODE must be rated for a minimum of 50 volts and 10 Amps.**

3. The 24 VDC return, “DC (-)”, shall be used as the low side of the File Select relays.
4. The 24 VDC return, “DC (-)”, is the return for the 4–20 mA output loop(s). Input must be isolated type. Maximum current loop resistance is 750 ohms.
5. Connect the scanner Earth GND (GRN (8)) to EARTH GROUND. A short-BRAIDED CONDUCTOR (alternately a short AWG #12 wire) is recommended.
6. All shields are tied to Earth Ground in the Control Panel only.
7. All conductors are black except Earth GND (GRN (8)) which is green/yellow. Older models have a wraparound cloth label with the wire numbers. Recent models have a sleeve of color-coded heat shrink at both ends of the conductor with the wire number printed on it. The corresponding wire number/color is shown in the diagram below, for example BLK (6) [Brown].

All conductors are black except Earth GND (GRN (8)) which is green/yellow. Older models have a wraparound cloth label with the wire numbers. Recent models have a sleeve of color-coded heat shrink at both ends of the conductor with the wire number printed on it. The corresponding wire number/color is shown in the diagram below, for example BLK (6) [Brown].



5.4 Communication Wiring Detail

Communication with the iScan2 is RS-485 via a UMB to RS-485 Converter (PN 3425-057-01). RS-485 is a differential multi-drop network. For iScan2, the network is a half-duplex, 2-wire, echo-off configuration operating at 19200 KBAUD. The maximum allowable number of nodes on a given section of the network is 32 including the UMB to RS-485 converter and any repeaters. If more than 32 loads are connected (1 UMB converter, 1 RS-485 repeater and 30 iScan2s) then an RS-485 repeater is required between sections to boost the signal. The repeater must be compatible with the EIA-485 standard, must have input to output DC isolation, must operate on 24VDC over the operating temperature range of -30°C to +70°C and must have agency approvals sufficient to meet the area classification. B&B Electronics 485 repeater model 485OPDRI-PH meets these requirements. Additional repeaters may be added to extend the network to 127 scanners.

***NOTE:** When calculating 32 loads, include the UMB to RS-485 converter and the number of repeaters in a section). For the extended sections, up to 30 iScan2s may be connected. The maximum length of any given section is 4000 FT (1200 M).*

If using the B&B Electronics 485 repeater model referred to above, configure the DIP switches on ports as follows:

1	2	3	4	5	6	7	8
ON	ON	ON	ON	OFF	OFF	ON	OFF

Note 1: In this configuration TDA and RDA are connected as TDB and RDB so either TD or RD terminals will work.
Note 2: The green screw terminal on the case is for earth ground, not the GND terminals.

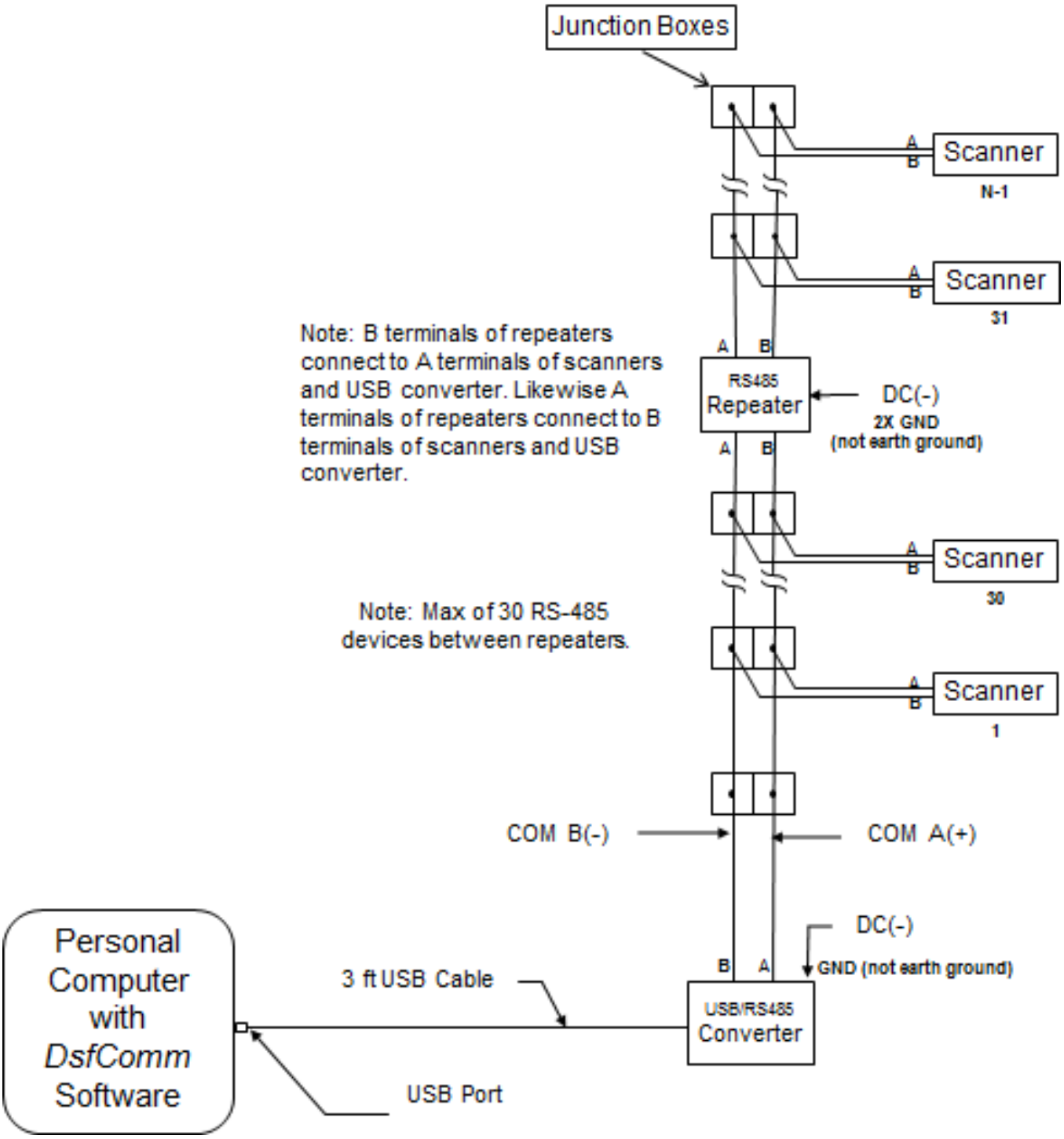
Since there is no dedicated signal reference, the 24 VDC return labeled as DC (-) is used. The UMB to RS-485 and the Repeaters must have their GND terminals connected to the DC (-) as well. Failure to provide the signal reference may result in communication errors and potentially damage the iScan2.

The recommended topology is “Daisy Chain” as shown in the wiring diagrams below. A split or Y configuration is acceptable. **NO OTHER CONFIGURATION IS ACCEPTABLE**. Please refer to the EIA-485 specification for further information on RS-485 networks.

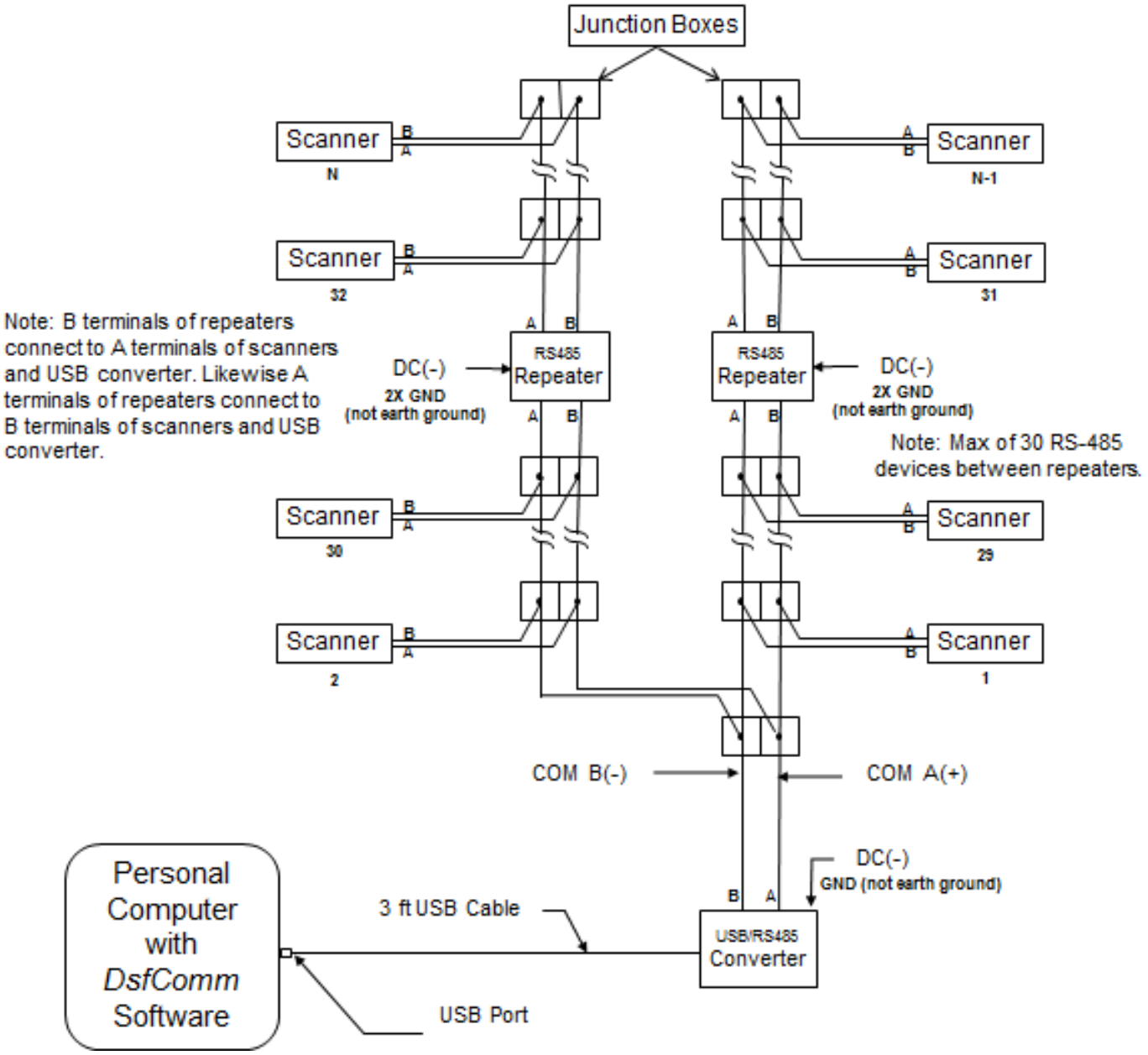
COMMUNICATION WIRING SUMMARY:

- Wiring must be twisted pair shielded cable. Ground the shield only at the control panel to prevent ground loops.
- Use only “Daisy Chain” or “Y” configurations. Connect all of the “Com A” wires together. Connect all of the “Com B” wires together. Make sure that the “Com A” and “Com B” wires are connected to the correct terminals on the converter.
- An RS-485 repeater is required for every 30 scanners or 4000 ft (1200 m) of length for a maximum of 127 scanners in a network.
- Ensure the DC (-) of all scanners are tied together as a reference for RS-485 communications. The GND terminal of the UMB to RS-485 converter and the repeaters must also be connected to the DC (-) of the scanners.

5.4.1 "Daisy Chain" Configuration



5.4.2 Split or "Y" Configuration



5.5 Remote File Select Wiring Configuration

The Remote File Select feature provides a means for automatically selecting one the configuration files resident within the scanner. For the non-hazardous models the selection of one of four configuration files is available while for the hazardous area models the selection of one of two configuration files is available.

Non-hazardous Area Scanner "Enable 4 Inputs" - File Select Relay Logic

File Select	SEL 3	SEL 2	SEL 1	SEL 0
A	Energized	De-energized	Energized	De-energized
B	De-energized	Energized	Energized	De-energized
C	De-energized	Energized	De-energized	Energized
D	Energized	De-energized	De-energized	Energized

Note: Not all configurations are legal for the non-hazardous area models. Illegal configuration will cause iScan2 to go into a fault condition. Refer to Remote File Select (RFS) section of MNL-IScan Software for instructions on setting up and using the Remote File Select feature.

Non-hazardous Area "Enable 2 Inputs" and Hazardous Area - File Select Relay Logic

File Select	SEL 1	SEL 0
B	Energized	De-energized
C	De-energized	Energized

Note: Connect iScan2 SEL (File Select) wires to the high side of the File Select relays. Connect the low side of the File Select relays to 24 VDC return. Remote File Select must be enabled otherwise SEL inputs are ignored. Refer to Remote File Select (RFS) section of MNL-IScan Software for instructions on setting up and using the Remote File Select feature.

6 Non-hazardous Area Model and Hazardous Area Model Mounting

6.1 Purge Air Connections

The iScan2 flame scanners (Non-hazardous Area Model and Hazardous Area Model) have a 1" NPT (F) mounting connection. Use of a swivel mount assembly is recommended to permit proper sighting adjustment of the flame scanner. (See Section "SIGHTING THE SCANNER" for instructions).

6.2 Mounting Instructions:

STEP 1 Remove the mounting ring and the mounting adapter from the scanner by unscrewing the mounting ring.

STEP 2 Slip the mounting ring over the scanner mount.

STEP 3 Thread the mounting adapter onto the scanner mount and tighten by hand only.

STEP 4 Attach the scanner housing to the mounting adapter with the mounting ring and tighten by hand only.

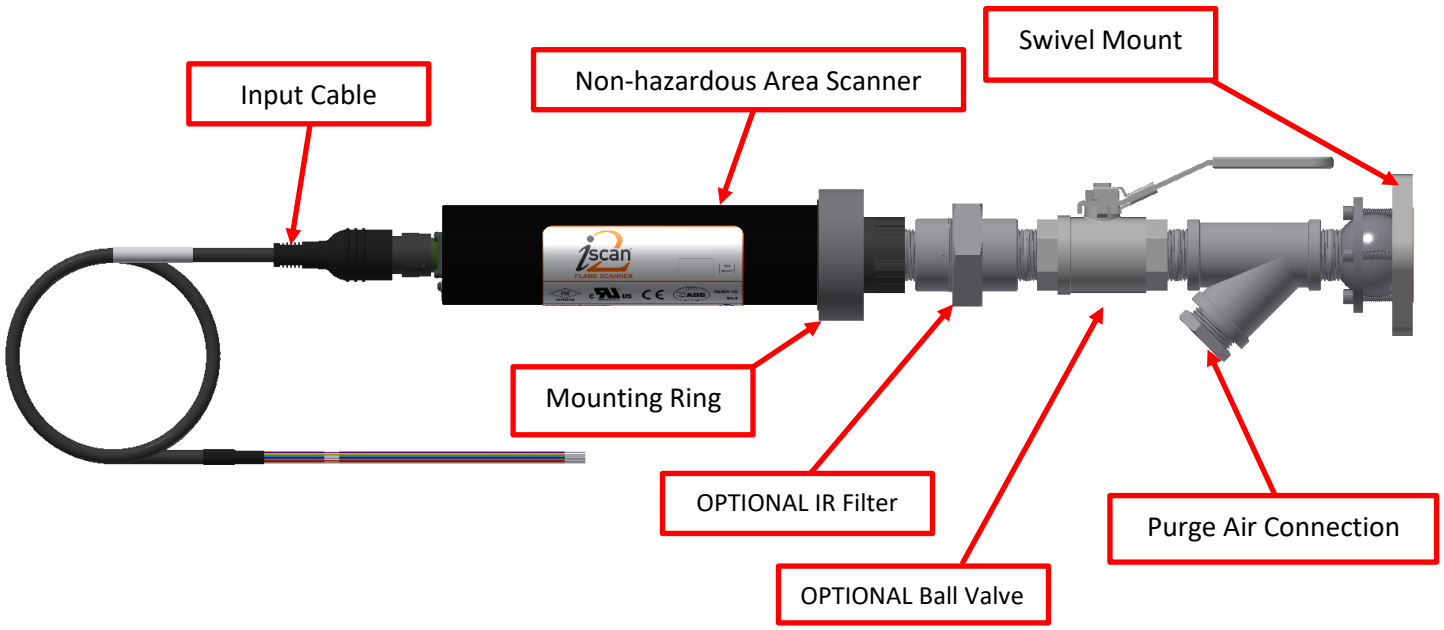
STEP 5 Avoid a sharp bend radius of scanner cable's quick disconnect. Provide strain relief if required in order to maintain proper seating for the quick disconnect connectors.

NOTE: ***The mounting ring must be tightened and removed by hand only to allow for ease of removal and to prevent mechanical damage.***

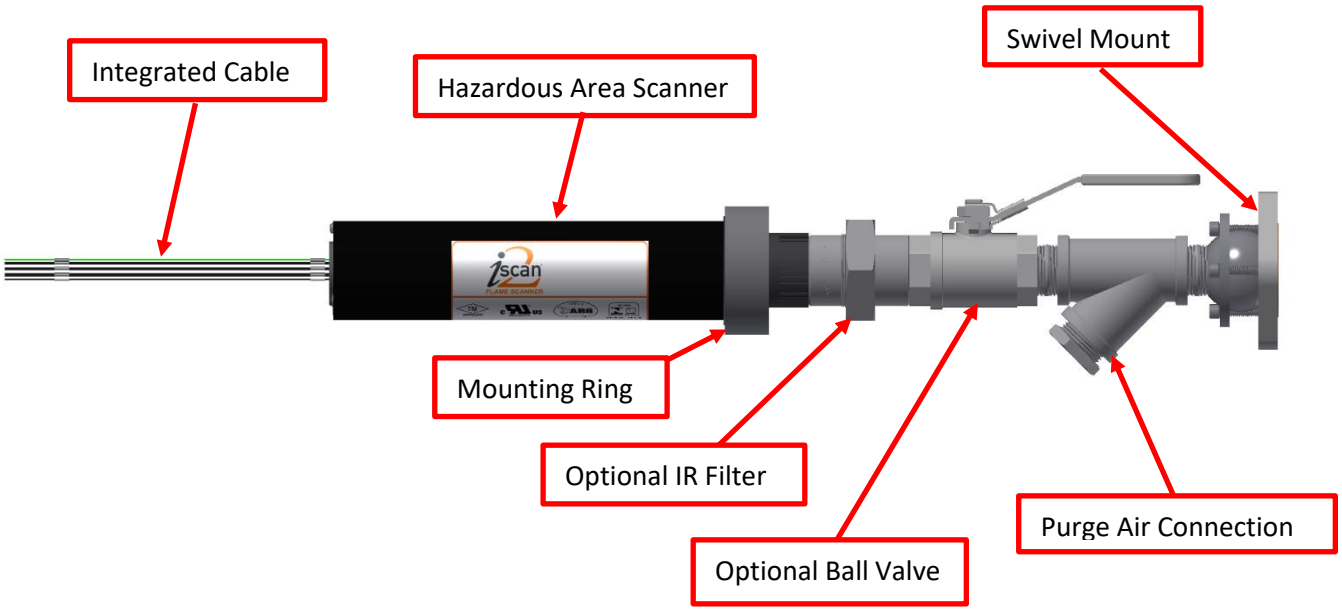
STEP 6 For applications requiring CE marking, specifically for EN298:2012, the input cable (PN 2649-026) must have ferrite added to meet CISPR 14-1. The ferrite must be installed within 6" (15 cm) of the scanner body. The cable must pass through the ferrite 3 times as shown in the picture below.

Ferrite is manufactured by Fair-Rite. Part number is 0431177081.

6.3 Non-hazardous Area Model (PN 2653-271-12) General Arrangement



6.4 Hazardous Area Model (PN 2653-271-05) General Arrangement



7 Sighting the Scanner

DANGER

EXPLOSION HAZARD

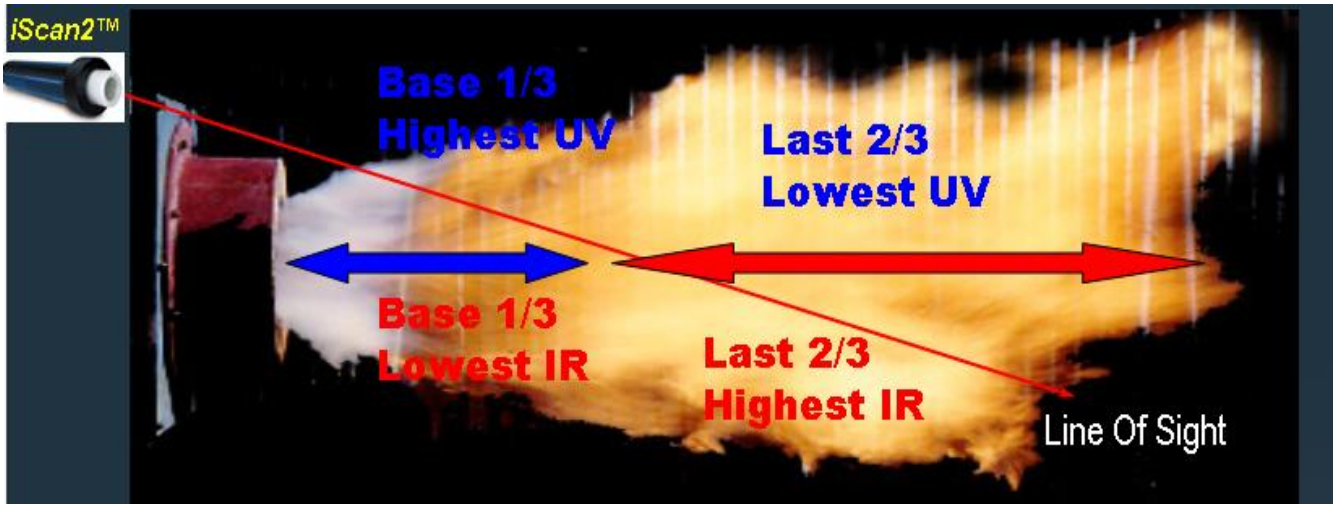
Failure to sight the scanner properly can cause an explosion. This Equipment must be installed and serviced by qualified personnel in accordance with applicable local and national codes, standards, and ordinances.

Proper sighting of the flame is required for proper flame scanner detection and discrimination. The view through the sighting port should be full flame, as illustrated below.

CORRECT

INCORRECT

7.1 Flame Line of Sight



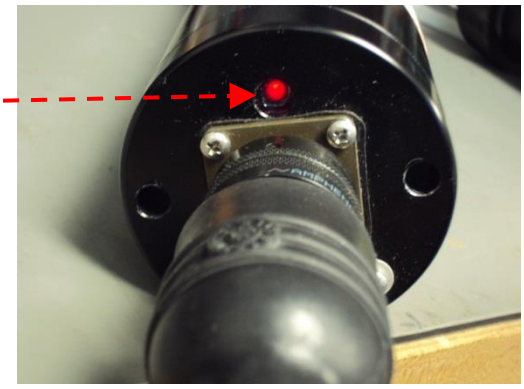
7.2 Sighting Non-hazardous Area Models

Move the scanner while observing the EASI on the back of the scanner. The red LED blinks 1 time per second when no flame is detected. The LED's blink rate increases proportional to the intensity of the flame detection. For optimal sighting, the LED will blink at approximately 30 times per second.

CAUTION

DO NOT use the scanner if the LED is on solid or off.
If the LED is on solid or off, the scanner is faulted and will not work properly.

Best flame view is indicated when the EASI (LED) is blinking the fastest.



7.3 Sighting Hazardous Area Models

Hazardous area models require measurement of flame strength during the sighting process. Use an ammeter to observe the signal from the 4-20 mA output. This can be observed as current flow between pin 5 to the DC (-) return. Adjust the line of sight to achieve the highest 4-20 mA reading. Ideal aiming provides the highest signal (dB) above the threshold (-45) and the lowest gain value.

8 Maintenance

The scanner is a rugged, high temperature device, and contains no moving parts.

CAUTION

NEVER open the scanner housing. Doing so may damage the scanner and will void the warranty.