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### **Power Supply Display Module 3**



Figure 1: PSDM3

Part numbers covered in this manual:

04005800

Power Supply Display Module 3 (PSDM3)

#### 040M5800

Marine Grade Power Supply Display Module 3 (PSDM3)

#### 04005815

Panel Mount Ring of Light (PMROL) indicator accessory (sold separately)

	Fig	ure 2: PMROL				<u> </u>		
<b>KEEP THIS MANUAL IN A SAFE PLACE</b>								
			FOR FUTURE	REFERENCE				
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	PRECAU	TIONS IN THIS MANU	AL CAN RESULT IN SERIOUS I	NJURY, DEATH, OR DAMAGE T	O EQUIPMEN	r <b>.</b>		
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### 1.0 Important Safety Information

### Read All Instructions Before Using The Equipment



The instructions in this manual 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 national, state, local, and company safety regulations.

Safety Symbols used in this manual comply with ISO 3864.

THESE SYMBOLS ARE USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY HAZARDS.

**O**BEY ALL SAFETY MESSAGES THAT FOLLOW THESE SYMBOLS TO AVOID POSSIBLE INJURY OR DEATH.



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



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



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

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### **A DANGER** HAZARDOUS VOLTAGE



This High Energy Ignition System contains **DANGEROUS AND POTENTIALLY LETHAL VOLTAGE.** To avoid the risk of serious injury from electric shock, always follow the safety precautions listed below:

Disconnect power before servicing the equipment.

When energized, do not join or separate any connection to the equipment.

Do not apply power to the equipment without an igniter attached or the igniter port appropriately capped.

Keep the firing end of the igniter away from all personnel and flammable material.

The equipment must be installed and serviced by qualified personnel per local and national codes, standards, and ordinances.

The equipment is not field-repairable. Do not attempt to disassemble or repair the equipment.

### Les symboles de sécurité utilisés dans ce manuel sont conformes à la norme ISO 3864.

CES SYMBOLES SONT UTILISÉS POUR VOUS AVERTIR DES RISQUES DE BLESSURES POTENTIELS.

RESPECTEZ TOUS LES MESSAGES DE SÉCURITÉ QUI SUIVENT CES SYMBOLES POUR ÉVITER LES BLESSURES POTENTIELLES OU LA MORT.



évité, entraînera la mort ou des blessures graves.

Indique un danger avec un niveau élevé de risque qui, s'il n'est pas

**WARNING** Indique un danger avec un niveau de risque moyen qui, s'il n'est pas évité, pourrait entraîner la mort ou des blessures graves.

Indique un danger avec un niveau de risque bas qui, s'il n'est pas évité, entraînera des blessures mineures ou modérées.

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### **A DANGER** TENSION DANGEREUSE



Le système d'allumage à haute énergie contient une **TENSION DANGEREUSE ET POTENTIELLEMENT MORTELLE.** Pour éviter les risques de blessures graves par électrocution, suivez toujours les précautions de sécurité indiquées ci-dessous:

Coupez l'alimentation avant l'entretien du matériel.

Ne pas connecter ou séparer toute connexion à l'équipement lorsque l'appareil est sous tension.

Ne pas appliquer de tension à l'appareil sans un allumeur connecté ou le port d'allumage correctement fermé.

Gardez l'extrémité de l'allumeur loin de tout personnel et de matériels inflammables.

L'équipement doit être installé et entretenu par du personnel qualifié, conformément aux codes locaux et nationaux applicables, aux normes et règlements en vigueur.

L'appareil n'est pas réparable sur site. Ne tentez pas de démonter ou de réparer l'équipement.

### 2.0 Definitions

PSDM3 – Third generation Power Supply Display Module for iScan®3and iScan®2

iScan®3 – Third generation iScan optical flame scanner

iScan<sup>®</sup>2 – Second generation iScan optical flame scanner

PMROL – Panel Mount Ring of Light optional accessory for PSDM3 (sold separately)

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### 3.0 System Specifications

### 3.1 Description of Equipment

The Power Supply Display Module 3 (PSDM3) is powered by mains AC power and provides 24VDC power to an iScan<sup>®</sup>3 or iScan<sup>®</sup>2 while also displaying scanner status via indicator lights. The indicators convey scanner connection status, flame status, and various fault mode statuses.

The PSDM3 includes terminal block connections for all wires of the iScan<sup>®</sup>3 or iScan<sup>®</sup>2 equipment and connections to the user control system and power. These terminals are conveniently divided into opposite sides of the PSDM3 – scanner side to the flame scanner and the user side to the user control system and power. Safety-critical relay signals (Flame Relay - COM, N.O., N.C.; Secondary Relay - COM, N.O.) and RS485 network signals are passed directly through the PSDM3 scanner terminals to the user side terminals within the PSDM3. RS485 network lines are also connected to an extra set of user-side terminals to facilitate the connection of additional daisy-chained PSDM3/scanner installations on the RS485 network. PSDM3 reads the analog 4-20mA signals (4-20mA#1 and 4-20mA#2) before outputting to the user. The PSDM3 utilizes these signals to determine the flame scanner status and to provide the 0-10V Flame Strength output signal.

The PSDM3 additionally provides an informational, non-safety critical Fault Relay COM/N.C. contact (closes on fault) which is not available directly from the flame scanner. This feature offers backward compatibility when the PSDM3 replaces an original PSDM.

The PSDM3 can utilize the optional (sold separately) Panel Mount Ring of Light (PMROL) indicator accessory. This mountable panel accessory will replicate the indicator display ring found on the iScan<sup>®</sup>3product and may be conveniently placed for user viewing. The PSDM3 drives the PMROL accessory from the scanner side terminal connections. The PMROL requires the use of the PSDM3; it cannot be used directly with the iScan<sup>®</sup>3 or iScan<sup>®</sup>2.

### 3.2 Description of Equipment Protective System

- The PSDM3 passes all Flame Relay contacts and Secondary Relay contacts from a connected iScan®3 or iScan®2 directly through the PSDM3 from the input terminal to the output terminal without additional connections, modifications, or other disturbances. This configuration maintains the fail-safe safety critical nature of the iScan®3 or iScan®2 products and their certification requirements.
- The PSDM3 includes a 1.25A slow blow fuse (not user replaceable) on each mains line input (L1 and L2).
- PN 04005800 includes line-to-line and line-to-earth MOVs for the mains line's transient voltage suppression.

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• PN 040M5800 does not include line-to-line and line-to-earth MOVs to improve performance when installed on marine vessels.

### 3.3 Equipment Conditions of Use

PSDM3 equipment is subject to the following conditions of use and limitations:

- The equipment shall not be subjected to a source of heating or cooling (process temperature) greater than +70°C or less than -30°C in operating conditions.
- The equipment's 24V DC+ output power connection (Terminal pin 18) shall not be shorted to DC- (Terminal pins 17, 19, 20, or 4).
- PSDM3's output of 24V power may be used only to power a single iScan<sup>®</sup>3 or iScan<sup>®</sup>2. DO
   NOT use this power supply to power more than one iScan<sup>®</sup>3or iScan<sup>®</sup>2 flame scanner or any other equipment.
- The PSDM3 equipment's Fault N.C. and associated COM relay contact is an informational output and may NOT be used in safety-critical process feedback loops to control fuel flow.
- The equipment shall not be operated above 6000ft elevation above sea level.
- The PSDM3 equipment shall be mounted in an ambient environment-appropriate weatherproof enclosure or cabinet.

### 3.4 Electrical Area Classification and Safety Markings

The MARINE GRADE PSDM3 (040M5800) has been assessed and complies with the following standards

The PSDM3 (04005800) has been assessed and complies with the following standards





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### 3.5 System Electrical and Physical Specifications

PSDM3
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<u> '</u> )		
	Application:	Supply DC power to iScan3/2 and display status locally
	Input Power:	100-240VAC 50/60Hz
	Operating Temperature Limits:	-30°C to 70°C
	Storage Temperature Limits:	-30°C to 70°C
	Enclosure:	35mm DIN rail mount, UL94 HB, ABS
	Electronics Assembly Weight:	Approximately 0.75 lb. [0.34 kg]
	Dimensions:	Approximately 3x3x5 inches with output connectors
	Power Output:	24VDC, 0.5A max
	Flame Relay Connection:	Passed directly through PSDM3
	Secondary Relay Connection:	Passed directly through PSDM3
	Fault Relay N.C. Contact:	Generated inside PSDM3 (Not for safety-critical operation)
		(contact closes with 4-20mA fault)
		0.5 A @ 120 VAC Resistive Load
		1.0 A @ 24 VDC Resistive Load
	Flame Signal VDC Output:	0–10 VDC for flame strength indication only
	Flame Signal mA Output:	4–20 mA for flame strength indication only
		Maximum 4-20mA current loop resistance = 1000 Ohms
P	anel Mount Ring of Light	
	Max Voltage:	5V
	Ingress protection:	IP66
	Operating Temperature Limits:	-30°C to 70°C
	Storage Temperature Limits:	-30°C to 70°C
	Mounting:	1/2in NPT (0.885in nominal) hole in 0.125in plate max
	Inner Clearance Depth:	2.0in behind plate minimum
	Outer Protrusion Depth:	1.0in above plate maximum

### 4.0 Installation Instructions

#### 4.1 PSDM3 Installation

The PSDM3 supports mounting to standard 35mm DIN rail. The PSDM3 must be in a weatherproof electrical enclosure when installed outdoors. Mount the PSDM3 before wiring terminal connections and powering up the equipment. Do not make or break connections to the PSDM3 when it is powered. Be sure all wires are fully tightened into terminal blocks when fastening.

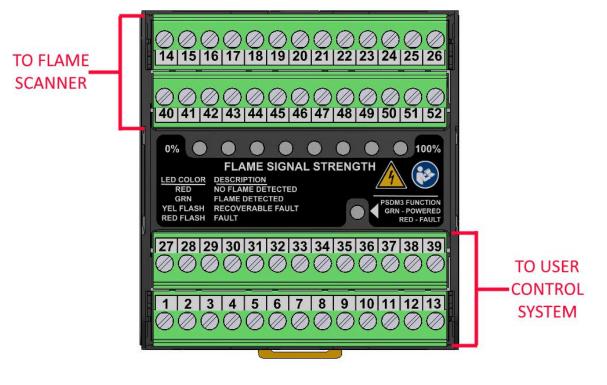
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### 4.2 Terminal Block Connections

The following section describes PSDM3 terminal connections and their functions. The terminal blocks (14-26 and 40-52) connect to the flame scanner. The terminal blocks (1-13 and 27-39) connect to the user control system and optional PMROL indicator accessory. All terminal blocks accept 26-14AWG wire. Use 300VAC minimum-rated wire for all connections.



#### Figure 3: PSDM3 Terminal Block Connections

#### 4.2.1 Scanner Connections

Connect the iScan flame scanner wires to the PSDM3 terminals as shown below:

#### Terminal Description

14	RS485 COMMUNICATION A
15	RS485 COMMUNICATION B
16	4–20mA #1
48	4–20mA #2
17	DC(-)
18	DC(+)
22	FILE SELECT 0
23	FILE SELECT 1

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49	FILE SELECT 2
50	FILE SELECT 3
24	FLAME RELAY N.O.
25	FLAME RELAY COMMON
52	FLAME RELAY N.C.
51	SECONDARY RELAY N.O. (iScan <sup>®</sup> 2 – FAULT RELAY N.O.)
26	EARTH GROUND

#### 4.2.2 User Connections

Connect the user/installation wires and optional PMROL accessory to the PSDM3 terminals as shown below:

**Terminal Description** 

-		
	1, 27	RS485 COMMUNICATION A
	2, 28	RS485 COMMUNICATION B
	3	4–20mA #1
	35	4–20mA #2
	4, 19, 20	DC(-)
	5	FILE SELECT 0
	6	FILE SELECT 1
	36	FILE SELECT 2
	37	FILE SELECT 3
	9	FLAME RELAY N.O.
	10	FLAME RELAY COMMON
	39	FLAME RELAY N.C.
	38	SECONDARY RELAY N.O. (iScan <sup>®</sup> 2 - FAULT RELAY N.O.)
	13	EARTH GROUND
	7	FAULT RELAY N.C.
	8	FAULT RELAY COMMON
	11	100-240VAC (L1)
	12	100-240VAC (L2)
	21	0–10 FLAME SIGNAL
	40-44	PANEL INDICATORS 1 TO 5

Refer to the iScan system manual for further information regarding scanner operation.

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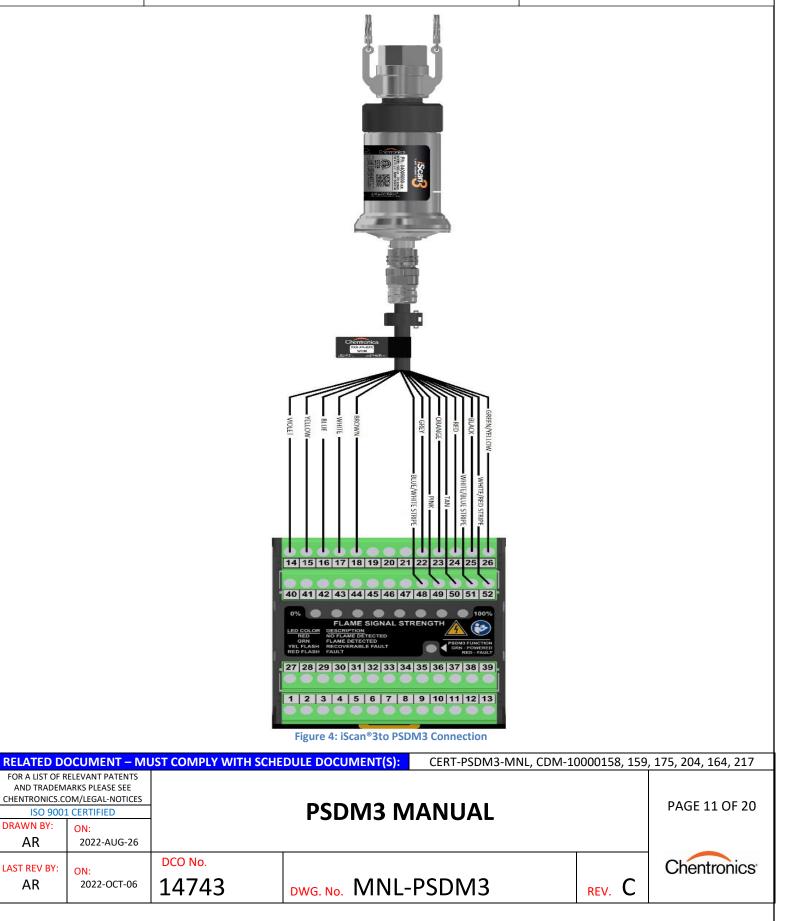
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#### 4.3 Equipment Earth Locations

Earth connection to PSDM3 is terminal 13. Terminal 13 is internally connected to terminal 26, which connects to the iScan<sup>®</sup>3 or iScan<sup>®</sup>2 earth wire.

#### 4.4 Panel Mount Ring of Light Optional Accessory Installation

The PMROL accessory can be connected to the PSDM3 to provide a local display ring replicating the display ring of the connected iScan<sup>®</sup>3. This allows for convenient scanner status viewing of one or several scanners at a user's desired location. For further information regarding the iScan<sup>®</sup>3 operational status and display ring, consult the iScan<sup>®</sup>3 system manual.



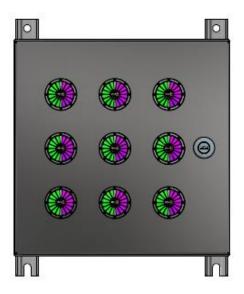


Figure 5: Panel Mount Ring of Light Accessory and Example Enclosure Door Mounting

The PMROL is mounted to a 1/2in NPT (0.885in nominal) diameter hole in a panel or enclosure wall of 0.125in max thickness. To install the PMROL, remove the backing nut from the PMROL. Guide the cable lead through the panel hole, install the backing nut hand tight, then a quarter turn.



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TOLERANCE NOTES
FABRICATED TOLERANCES
$\ge 2$ ft (610 mm) $\pm 0.250$ in (6.4 mm)
< 2ft (610 mm) ± 0.125 in (3.2 mm)
MACHINED TOLERANCES
± 0.050 DECIMAL DIM (1 PLACE)
± 0.010 DECIMAL DIM (2 PLACES)
± 0.005 DECIMAL DIM (3 PLACES)

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Connect the PMROL flying lead wires to the PSDM3 terminals 40-44, as shown here.

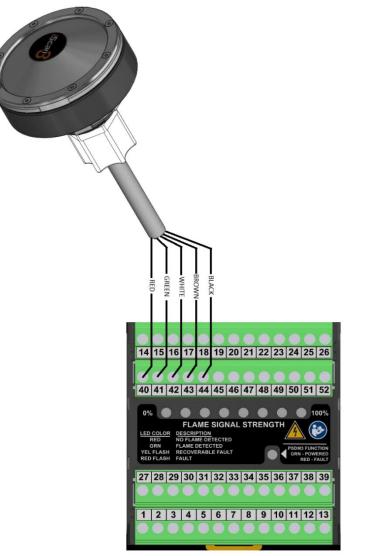


Figure 6: PMROL Connection to PSDM3

#### 4.5 System Schematic Diagram

The schematic diagram shows that 24V output is generated by the PSDM3 and supplied to the iScan<sup>®</sup>3.

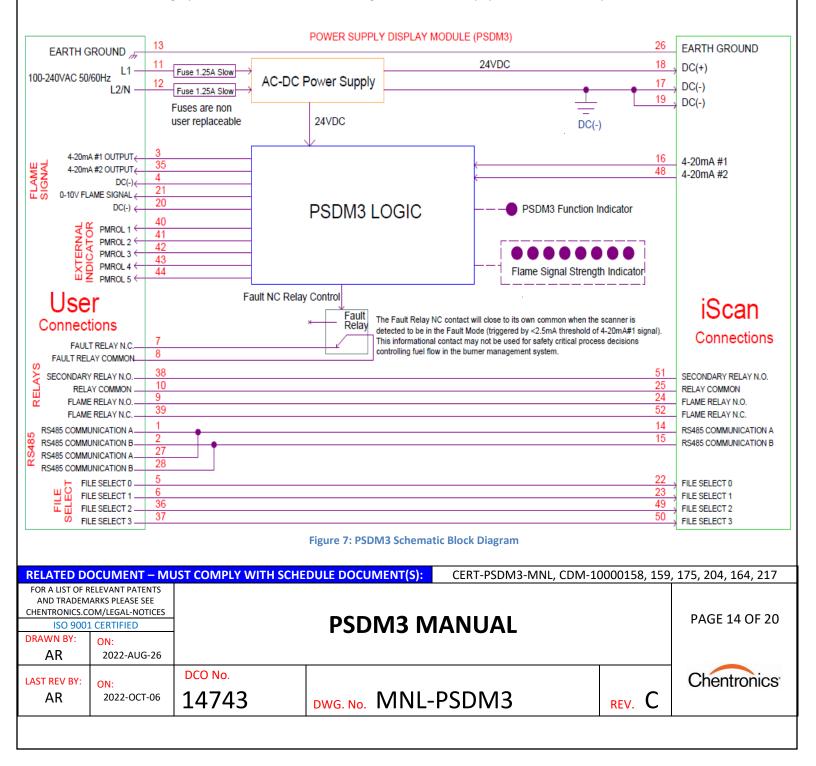
The PSDM3 reads the 4-20mA#1 and 4-20mA#2 signals from the iScan<sup>®</sup>3 or iScan<sup>®</sup>2, then generates PMROL drive signals, 0-10V Flame Signal, and regenerates 4-20mA#1 and 4-20mA#2 output signals for downstream connected user instrumentation.

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Safety critical signals from iScan<sup>®</sup>3 (Secondary Relay N.O., Relay Common, Flame Relay N.O., and Flame Relay N.C.) are each directly passed through the PSDM3 to the User side terminals. The Fault Relay N.C. contacts, which close to Fault Relay Common, is generated by the PSDM3's logic and is intended to indicate a problem with the connected flame scanner. File select signals are also directly connected to user-side terminal pins. RS485 signals COMA and COMB are provided on two sets of terminals on the User Side connection terminal blocks for daisy chaining additional PSDM3/iScan installations to the RS485 network.

The following operational schematic block diagram describes equipment functionality:



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### 5.0 System Indicators

The following section describes the PSDM3 and Panel Mount Ring of Light accessory indicators and their meanings. The PSDM3 determines flame scanner operational condition by measuring the 4-20mA#1 and 4-20mA#2 signals and uses this information to drive onboard indicators and PMROL indicators<sup>1</sup>.

### 5.1 PSDM3 Function Indicator

The PSDM3 Function indicator is comprised of one multi-color indicator. This indicator conveys the status of the PSDM3.

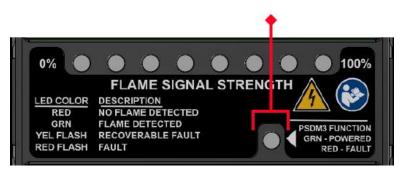


Figure 8: PSDM3 Function Indicator Location

### 5.1.1 Output Voltage OK Indication

When the PSDM3 is supplied with 100-240VAC 50/60Hz power, the PSDM3 Function indicator will turn on solid green, indicating the PSDM3 is powered up and is correctly supplying 22-26VDC output. When the PSDM3 Function indicator is green, the Flame Signal Strength indicator will display the status of the flame scanner as described in Section 5.2.

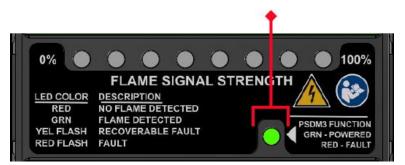


Figure 9: Output Voltage OK Indication

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### 5.1.2 Output Voltage Fault Indication

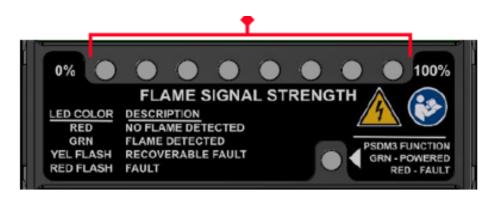
When the PSDM3 output voltage is outside the range of 22-26VDC, the PSDM3 Function indicator will blink red, indicating a PSDM3 fault. When the PSDM3 Function indicator flashes red, all Flame Signal Strength indicator lights will be off, and the output power supply to the flame scanner will be turned off.



Figure 10: Output Voltage Fault Indication

#### 5.2 Flame Strength Indicator

The Flame Signal Strength indicator is comprised of eight multi-color indicator lights. These lights visually convey the flame strength or the fault mode status of a connected iScan<sup>®</sup>3 or iScan<sup>®</sup>2 flame scanner.



### 5.2.1 Flame Off Indication

When the flame scanner detects a flame OFF condition, the Flame Signal Strength indicator will display one red indicator light in the leftmost position. The remaining seven indicator lights will be off. This indication will match the eight left-side indicators on the back of the flame scanner.

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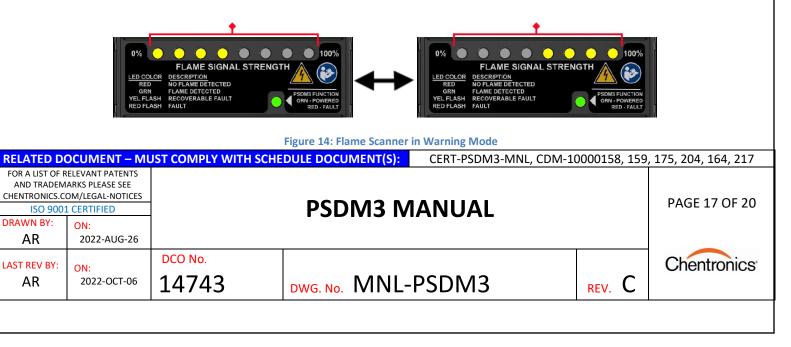


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Figure 13: Flame On Signal Strength

### 5.2.3 Warning Mode Indication

When the flame scanner communicates that it is in Warning Mode, the Flame Signal Strength indicator will repeatedly alternate the four leftmost indicators in yellow with the four rightmost indicators in yellow. In this mode, the iScan<sup>®</sup>3 display ring will constantly alternate left half-ring indicators (yellow) to the right half-ring indicators (yellow)<sup>1</sup>.





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### 5.2.4 Fault Mode Indication

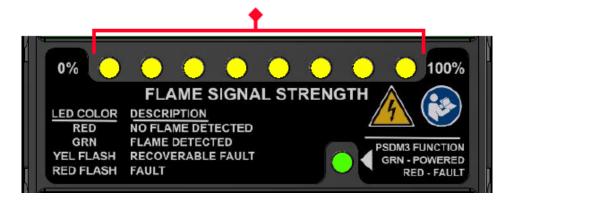
When the flame scanner communicates that it is in Fault Mode, all eight indicators on the Flame Signal Strength indicator will blink yellow. In this mode, the iScan<sup>®</sup>3 display ring will display a full blinking yellow ring indicator<sup>1</sup>.



Figure 15: Flame Scanner in Fault Mode

### 5.2.5 Disabled Mode Indication

When the flame scanner communicates that it is in Disabled Mode, all eight indicators on the Flame Signal Strength indicator will be solid yellow. In this mode, the iScan<sup>®</sup>3 display ring will display a full solid yellow ring indicator<sup>1</sup>.



#### Figure 16: Flame Scanner in Disabled Mode

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#### 5.2.6 No Flame Scanner Connected Indication

When no flame scanner signals are detected by the PSDM3, all eight indicators on the Flame Signal Strength indicator will be off, conveying that no scanner is connected.



Figure 17: No Flame Scanner Attached

#### 5.3 Panel Mount Ring of Light Indicator Optional Accessory (Can only be used with the PSDM3)

The Panel Mount Ring of Light indicator comprises 16 multicolor indicators in a display ring pattern. When connected to PSDM3, this indicator will replicate the display ring on the iScan<sup>®</sup>3 in all operational modes and fault conditions<sup>1</sup>.



Figure 12: PMROL Example Indication

<sup>1</sup>For further detail regarding iScan<sup>®</sup>3and iScan<sup>®</sup>2 equipment operation, signals, and modes, consult respective equipment installation and operation manuals.

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### 6.0 Standard Components and Accessories

The following section contains standard parts available for use with the PSDM3. For additional product information, technical drawings, and product catalogs, please get in touch with Chentronics<sup>™</sup>.

- 6.1.1 Panel Mount Ring of Light: PN 04005815
- 6.1.2 iScan®3 Flame Scanner-Single Burner: PN 04005000-SB
- 6.1.3 iScan®3 Flame Scanner- Multi Burner: PN 04005000-MB
- 6.1.4 iScan®3 Quick Disconnect Cable: PN 03005000

### 7.0 Warranty Instructions

For warranty-related inquiries, please get in touch with Chentronics<sup>™</sup> at TEL: +1.607.334.5531 or info@chentronics.com

### 8.0 Technical Support

For technical support-related inquiries beyond the scope of this Installation and Operation Manual, please get in touch with Chentronics<sup>™</sup> at TEL: +1.607.334.5531 or <u>info@chentronics.com</u>

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