- **New 19” chassis with keypad for test/ reset, operation and configuration**
- **Very high light sensitivity < 1 Lux**
- **Fast arc response time < 2µs**
- **Up to 16 arc detector modules with FSMA input for fiber optic cable**
- **Photo detector voltage monitor**
- **System interface modules with up to 4 logic programmable interlocks**
- **Optical test modules**
- **Option: adjustable sensitivity and auto-reset time via USB interface**
- **Option: Web browser access via Ethernet and LAN interface**

1. Product Introduction

The new generation ***ARC4 2.0*** *optical arc detector system* detects light produced by an arc with very *short response time*, using a *high-sensitivity, wide-spectrum* photodiode in the optical input stage. It is designed to effectively protect high-power RF equipment from damage due to unwanted electrical breakdown, corona discharge and arcing.
The modular system is available with up to 16 **Arc Detector Modules (ADM)** cased in a 19” rack mountable chassis. Function keypads at the front panel as well as remote control interfaces allow testing, resetting and customizing of modules and system. Arc detection is signalled in three ways: (1) visually indicated by keypad LEDs, (2) via a digital output signal as TTL and Open Collector, and (3) via a digital optical output signal. The output signals are typically used for interlock purpose in high-power RF systems. An analog output provides access to the photo voltage of each detector for monitoring and analysis purpose. As a safety option the modules come with a power failure signal.
For making use of its full functionality ARC4 can be complemented by up to 2 **System Interface Modules (SIM)**. These modules allow customer programmable logical combinations of the electrical output signals provided by the arc detector modules. Two independent GLOBAL ARC (GLBARC) output signals are available on each interface module for interlocking two separate RF systems. Each GLBARC output signal can form a different configurable logic (AND/OR). These signals are available as TTL or O.C. With two SIMs one ARC4 system is capable of forming a total of four interlock signals (A, B, C, D) and thus to interlock up to four separate RF systems. The coincidental arc detection scheme, realized by an AND connection of two arc signals at the same observation point, can increase the reliability of arc detection in a radiative environment. The time window for coincidental detection is given by the auto reset time.
ARC4 2.0´s **Optical Test Module (OTM)** comes with two independent FSMA optical test outputs driven by high-power CREE diodes. Multiple test modules can be applied to precisely test the functionality of several optical arc detection loops, including photo detector, fiber optic cables, arc viewport, and arc test port.
Given its modularity and flexibility, ARC4 provides a high degree of customizing and allows an easy system upgrade and replacement.
As an option to be ordered separately, the **USB Interface Access** opens a serial terminal connection and enables an adjustment of light sensitivity (threshold level) and auto-reset time for customized needs.
The high-end software option is our **LAN Web Interface**. A web server provides computer access to ARC4 via a web browser using a local Ethernet or LAN connection. The web interface allows (1) complete system configuration and parameter settings, (2) scanning the system, component and signal status, (3) remote control of the system, (4) photo voltage monitoring as well as (5) alarm, event and status logging.
Low-loss fiber optic cables are used to transmit/send light to/from the ARC4 system unit.
Cables are available in different standard length as accessories.

2. Product Features	Description
2.1 Arc Detector Module (ADM)	16 per system max.
■ Optical arc input	1x FSMA
■ Optical arc output (digital)	1x FSMA
■ Electrical arc output (digital)	1x TTL and 1x Open Collector
■ Electrical arc output (analog)	1x photo voltage of detector (for monitoring)
■ Visual arc/status indication	LEDs (red/ green)
■ Optical self-test/ reset function	via keypad or remote control
■ Reset options	manual or auto-reset
■ Signal polarity setting	high/low signal for arc
■ Power failure signal	1x open collector
■ Support of external test function	via relay output
■ System OK and Alarm signal	2x Relay
2.2 System Interface Module (SIM)	2 per system max.
■ Global arc output signal (GLBARC)	2x GLBARC system interlock signal per module
■ Programmable GLBARC logic	for each interlock signal
■ Reset options	manual or auto-reset
2.3 Optical Test Module (OTM)	uses slots of the ADMs
■ Optical Test Output	2x FSMA
■ Trigger Options	remote control or via keypad

3. Optional Product Features	Description
3.1 USB Interface Access (USB)	serial terminal connection
■ Adjustable light sensitivity	variable threshold voltage for trigger stage
■ Adjustable auto-reset time	0.1 ms to 2 s
3.2 LAN Web Interface (LAN)	
■ Web browser access	via Ethernet
■ Network connection	via Ethernet
■ System configuration	via Ethernet
■ Parameter settings	via Ethernet
■ System, component & signal status	via Ethernet
■ Remote control	via Ethernet
■ Photo voltage monitoring	via Ethernet
■ Alarm, event and status logging	via Ethernet

4. Main Characteristics		Description
Wavelength of optical input detector		400 nm to 1000 nm
Wavelength of optical output signal		880 nm
Light intensity for detection		< 1 Lux (corresponds to < 25mV photo voltage)
Light sensitivity level (threshold)		20 mV (default)
		adjustable with software option from 20mV to 500mW (nominal)
Response time		< 2 µs, for typical arc light
		< 3 µs, factory tested with an LED light source at 880 nm
Auto reset time		100 µs by default, if activated. Auto reset is off by default.
		Configurable with software option from 0.1 ms to 2 s (nominal)
Electrical signal ratings		
	TTL	> 2.4 V (high), < 0.7 V (low)
	Open Collector	50 V, 100 mA max.
	Remote inputs	5 V, 10 mA, 0.5 s
Mains power supply		220-240 VAC / 50 Hz and 100-120 VAC / 60 Hz, universal
		internal fuse 1A, time delay
Power consumption		< 30 VA
Temperature range (ambient)		
	Operating	0°C to +50°C
	Storage	-40°C to +85°C
Relative humidity		<75%, no condensation
Dimensions		19” case, 3 HE, 485 x 145 x 320 mm^3
Weight		5 kg approximately, when fully equipped
Safety Class		IP40

5. Interfaces		Description
5.1 Arc Detector Module (ADM)		
Optical arc input		
	ARC IN	FSMA, ¼”-36 UNS 2A male thread
Optical arc outputs		LED 880 nm
	ARC OUT	FSMA, ¼”-36 UNS 2A male thread
CONTROL SIGNALS I/O		DB-15 female connector

Pin No.:	Signal description:	Signal level:
1	Arc Out Open Collector	Open collector
2	-	-
3	Power Fail Out	Open collector
4	Arc Out TTL	TTL
5	Relay - Test external, output	Relay contact 30 VDC / 1 A
6	Relay - Test external, output	Relay contact 30 VDC / 1 A
7	Photo-detector voltage +UFD	mV voltage (saturates at about 4 V)
8	-	-
9	VCC out	+5 VDC, 100 mA

10	Test internal, remote input	5 V, 10 mA (opto-input)
11	-	-
12	Test external, remote input	5 V, 10 mA (opto-input)
13	Reset, remote input	5 V, 10 mA (opto-input)
14	0 V out	0 V ref. for input and output signals
15	GND photo voltage	GND

5.2 System Interface Module (SIM)

CONTROL SIGNALS X1		DB-9 female connector
Pin No.:	Signal description:	Signal level:
1	GLBARC 1 Open Collector	Open collector
2	Power Fail Out	Open collector
3	Relay - Test ext. 1, output	Relay contact 30 VDC / 1 A
4	Reset 1, remote input	5 V, 10 mA (opto-input)
5	0 V out	0 V ref. for input and output signals
6	Relay - Test ext. 1, output	Relay contact 30 VDC / 1 A
7	GLBARC 1 TTL	TTL
8	VCC out	+5 VDC, 100 mA
9	Test external 1, remote input	5 V, 10 mA (opto-input)

CONTROL SIGNALS X2		DB-9 female connector
Pin No.:	Signal description:	Signal level:
1	GLBARC 2 Open Collector	Open collector
2	Power Fail Out	Open collector
3	Relay - Test ext. 2, output	Relay contact 30 VDC / 1 A
4	Reset 2, remote input	5 V, 10 mA (opto-input)
5	0 V out	0 V ref. for input and output signals
6	Relay - Test ext. 2, output	Relay contact 30 VDC / 1 A
7	GLBARC 2 TTL	TTL
8	VCC out	+5 VDC, 100 mA
9	Test external 2, remote input	5 V, 10 mA (opto-input)

5.3 Optical Test Module (OTM)

Optical test signal outputs		LED 600 nm, 100µs pulse length
	ARC Test 1	FSMA, ¼”-36 UNS 2A male thread
	ARC Test 2	FSMA, ¼”-36 UNS 2A male thread

Remote Control		DB-9 female connector
Pin No.:	Signal description:	Signal level:
1	ARC Test 1 (Trigger)	TTL, 5 V, 10 mA (opto-input)
2	ARC Test 2 (Trigger)	TTL, 5 V, 10 mA (opto-input)
5	0 V out	0 V ref. for test signals
8	VCC out	+5 VDC, 100 mA

5.4 CPU Module	
USB	USB Type B, USB 2.0
LAN (Ethernet)	RJ45, 10/100MBit

5.5 Power Supply Module		
MAINS		IEC-60320-C14, male
RELAYS		M8 connector
Pin No.:	Signal Description:	Signal Level:
1	REL1 - System OK	Relay contact 30 VDC / 1 A
2	REL1 - System OK	Relay contact 30 VDC / 1 A
3	REL2 - Arc Alarm	Relay contact 30 VDC / 1 A
4	REL2 - Arc Alarm	Relay contact 30 VDC / 1 A

6. Conformity		Description
■ CE Directives		
	2014/35/EC	Low Voltage
	2014/30/EC	EMC
	2011/65/EC	RoHS

7. Ordering Code for System Configuration

A4-2-SYS-00 - X_D - X_I - X_T

Variable	Description		Value Options
X_D	No. of arc detector modules	A4-2-ADM-00	16 max.
X_I	No. of system interface modules	A4-2-SIM-00	2 max.
X_T	No. of optical test modules	A4-2-OTM-00	16 - X_D max.

8. Module Options	Description
A4-2-ADM-00	ARC4 - Arc Detector Module 2.0
A4-2-SIM-00	ARC4 - System Interface Module 2.0
A4-2-OTM-00	ARC4 - Optical Test Module 2.0

9. Software Options	Description
A4-2-USB-00	ARC4 - USB Interface Access 2.0
A4-2-LAN-00	ARC4 - LAN Web Interface 2.0

10. Accessories (included)	Description
A4-2-MAC-00	ARC4 - Mains cable 3m, IEC-60320-C13 to CE7/7 plug
A4-2-M8C-00	ARC4 - M8 Connector
A4-2-DCK-00	ARC4 - Detector Module Connector DB-15
A4-2-ICK-00	ARC4 - Interface Module Connector Kit DB-9
A4-2-TCK-00	ARC4 - Test Module Connector Kit DB-9

11. Spare Parts	Description
A4-2-SYS-00-0-0-0	ARC4 - System Base Unit 2.0, 19”, with CPU & power supply
A4-2-CPU-00	ARC4 - CPU Module 2.0
A4-2-PS-00	ARC4 - Power Supply Module 2.0
A4-2-BCP-00	ARC4 - Blind Cover Plate 2.0

Rev.	Remark	Date	Name
00	Initial	14.11.2017	C. Weil
	Software options	31.01.2018	C. Weil
01	Optical test module 2.3, 5.3. Module options 8.	28.08.2018	C. Weil
02	Details added	20.09.2018	C. Weil
03	Autoreset time	16.11.2018	C. Weil
04	Details on options: range for light sensitivity and auto reset time	09.01.2019	C. Weil
05	USB Interface Access, mains cable 3m	18.02.2019	C. Weil