DESCRIPTIVE, OPERATION & MAINTENANCE MANUAL FOR AUTOMATIC FIRE DETECTION CUM MANUAL HIGH PRESSURE WATER MIST SUPPRESSION SYSTEM FOR PANTRY CAR & GENERATOR CUM BRAKE VAN OF INDIAN RAILWAY COACHES (ICF AND LHB DESIGN)

As Per RDSO Specification- RDSO/2013/CG-06 Rev 00 Issue June - 2014

SANROK DRAWING NO- 2ED-245-1830(2ED-245-1862 & 2ED-245-1863)

SANROK ENTERPRISES , FARIDABAD

Head Office : E-14, Greater Kailash Enclave-1, New Delhi-110048 Telefax :- +91-11-41731413,	**Works/Unit-1:** FF-11, SCO-35, Distt. Shopping Centre, Sector -16 Market, Faridabad-121002 (Haryana) Tel: 0129-4071553,4179075, Fax: 0129-4071554	**Unit-II :** Behind Bharat DharamKanta , Krishna Colony, Ground Floor, Opp. Plot No. 81, Sec-25 Ballabgarh, Faridabad, Haryana, Tel: 0129-4315197

E-mailsnaveen20@yahoo.com, rail.girish@gmail.com, ns@sanrok.in

www.sanrok.in

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Descriptive & Maintenance Manual Revision Details

Rev. No	Revision Details	Date	Approved By	Signature
01	Part Nos. of Bill of Material for Fire Detection System & Fire Suppression System Revised.	20.11.2015	Girish Kathuria	

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Disclaimer

This Manual is the Property of SANROK ENTERPRISES who claim proprietary rights in the material disposed. It is issued in confidence for information only and may not be copied or used for manufacture without specific written permission from SANROK ENTERPRISES.
SANROK ENTERPRISES Reserves the right to modify details not effecting strength or application as may be necessary to facilitate manufacture , ease maintenance or design.
All care has been taken to put the accurate information in this manual, however if any error or omission is noticed by the user, we would be happy if it is brought to our notice through postal mail or E- mail

SANROK ENTERPRISES

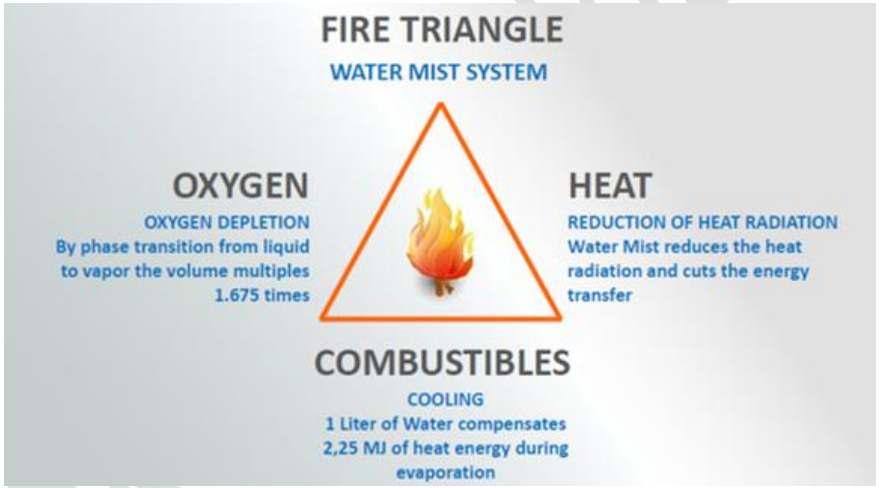
SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Table of Contents

S.NO			Contents	Page No.

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

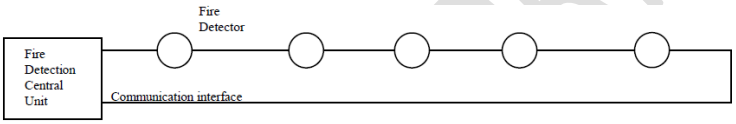
1				**Introduction**
	1.1			**General** This document describes the scope of operation, maintenance and service that is necessary in order to maintain performance and reliability of the SANROK "AUTOMATIC FIRE DETECTION CUM MANUAL HIGH PRESSURE WATER MIST SUPPRESSION SYSTEM FOR PANTRY CAR & GENERATOR CUM BRAKE VAN OF INDIAN RAILWAY COACHES (ICF AND LHB DESIGN).. The following schedules and procedures must be properly accomplished for equipment warranty conditions to apply. This scheduled maintenance shall also assist in maintaining product performance over an extended period of time.
	1.2			**THEORY OF FIRE**  In order that a fire can develop, the following conditions must be present in the correct mixing ratio: - Combustible material - Energy for igniting and maintaining the fire - Oxygen (O2) An effective Fire fighting system should have the two basic sub systems. • Early detection system for Smoke and Heat • Highly reliable Suppression System The Detection System and the Suppression System, may or may not be inter connected. **DETECTION SYSTEM**

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

In order to reach an optimal level of safety for the fire protection onboard rolling stock it is essential to choose the most suitable fire detection system. The selection of system is depending on the formal requirements as well as the fire safety risk assessment which must cover all areas where there is a potential fire risk.

Regarding the risk analysis there are different risks or scenarios to consider e.g. the fire hazardeous combustable material that is used in the area to be protected. The type of material, the expected igniter, humidity, air flow, air pressure etc will have an influence on the smoke, heat or flame generated which in turn gives the guidance on what kind of detection system that is required.



A Point Detection System consists of one or more redundant central unit(s) with one or more addressable communication loops on which several detectors selected depending on the risk analysis are installed.

The sensitivity and type of detector for each detection point is completely independent from the other detection points. If different products of the fire can occur, detectors sensitive to smoke, heat, flame etc can be installed in parallel or integrated in each detector. When smoke, heat or flame is generated by a fire and reaches over the defined level (or a product of several alarm criteria) an alarm is activated.

SUPPRESSION SYSTEM

In order to fight a fire effectively, the above conditions have to be removed – at least in part – from the combustion process. As a rule this is achieved either by means of cooling, and therefore the removal of energy, or by reducing the oxygen that is available.

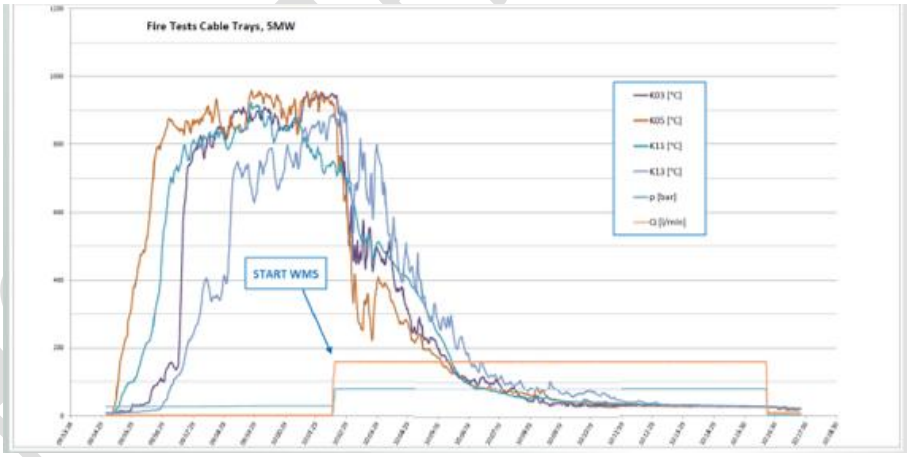
PRINCPLE OF HIGH PRESSURE WATER MIST SYSTEM- The most important effects of fire fighting with water mist are

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

the cooling and oxygen displacement effect.

COOLING EFFECT

Through the atomization of water under high-pressure, the reaction surface available for the cooling process is significantly enlarged in comparison to conventional low pressure systems. As a result, SANROK systems can remove energy from the fire considerably faster and more effectively. As a result of the high cooling effect, the fire is effectively fought and people and materials are protected against the effects of heat. The high cooling effect is mainly achieved by vaporisation of the fine water droplets in the vicinity of the fire. This effect is supported by the shielding effect of the small droplets against heat radiation. In this way it is also possible to create effective water mist partitions (curtains) for building elements, wall openings, facades etc.



OXYGEN DISPLACEMENT

Due to the high temperature levels in the immediate vicinity of the fire, the small droplets evaporate very quickly and thereby remove energy from the fire. In the neighboring areas to the fire no steam is produced by vaporisation, ensuring safe evacuation of the area. As a result of the evaporation of the water in the direct vicinity of the fire its volume is increased 1640-fold, so that part of the oxygen is displaced locally at the seat of the fire. As a consequence, an inerting effect is produced at the seat of the fire, similar to that of an inert gas system.

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

However, in contrast to the use of inert gases, the oxygen concentration is not reduced throughout the room. In comparison to low pressure water mist systems or other conventional water fire fighting systems, the extinguishing effect is far more effective due to the small droplets used with the high-pressure technology, so that a much smaller quantity of water is required. The system pressure of 50 to 200 bar is required to create the small droplets and convey these with the required energy to the seat of the fire.

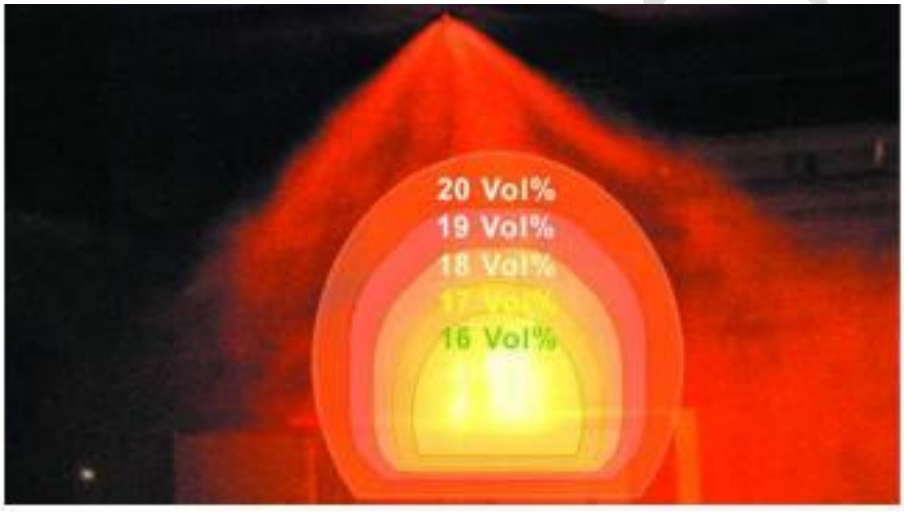


Fig.- Local displacement of the oxygen by evaporation of the water droplets at the seat of the fire

2 **The system generally consists of the following**

S.No	Description	Drawing No
01	Fire Detection System	2ED-245-1863
02	Fire Suppression System	2ED-245-1862

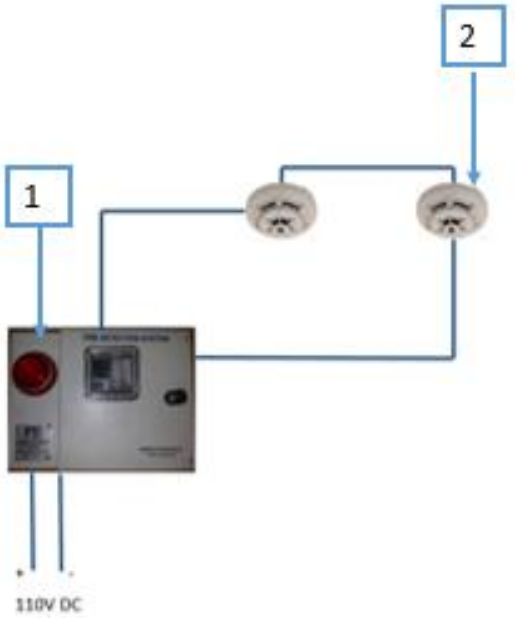
3 **Fire Detection System**

The fire detection system consists of 2 Nos Fire and Smoke Detectors placed suitably inside the Generator area. The Detectors are connected in a redundant loop to the control module.

The Control module is connected to an Audio Visual Sounder beacon for Alarm in case of a fire.

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

3.1 Schematic of the Detection System .

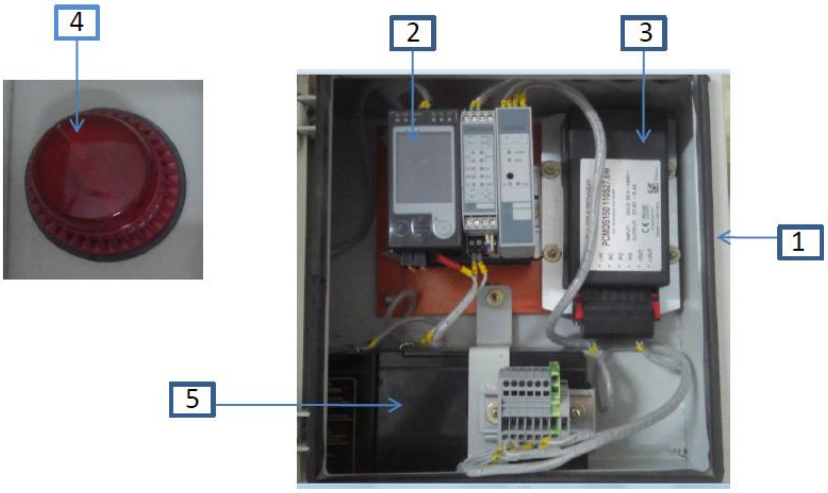


S. NO	Part Name	Part No	No off
01	Main Control Module	2ED-245-1908	01
02	Combined Smoke & Heat Detectors EV-PP, UB 6 Base. 040200,044445 and Anti Pilferage Cover (Sourced from Consilium Sweden)	2ED-245-1909	02

3.2 Details of the Main Control Module. (2ED-245-1908)

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times



S. NO	Part Name	Part No	No off
01	Panel Box	2ED-245-1917	01
02	Main Control Unit TS1000/ CM.2.2 5831171-00A Consisting of CM2.2 Control Unit, Loop Mx. And Charger M (Sourced from Consilium Sweden)	2ED-245-1902	01
03	DC-DC convertor 110V-27.5V and power supply Module as per EN-54-7 PCMDS150 110S27,6W/6W-VT	2ED-245-1905	01
04	Sound Beacon IP 54,32 N1545	2ED-245-1906	01
05	Maintenance Free 7Ah 12V battery Unit	2ED-245-1907	02

3.2.1 **Main Controller –CM.2.2**

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Control M 2.2

General Description

The Control M 2.2 is a Control Panel with a 2.2" graphical colour display used to manage and supervise a system.

Control M 2.2 is equipped with communication buses for connecting to the system, and it provides the following features:

- A backlit 2.2" graphical colour display
- Alarm buzzer
- LED status indicators
- Backbone Bus Interface
- Ethernet connection
- RS-422/RS-485 interface (Isolated)
- RS-485 interface (not isolated)
- USB interface for service
- Two configurable powered I/Os
- Two programmable relay outputs

Refer to the User Guide for more information on operating Control M 2.2.

For details on assembling a system and definitions of common system terms, refer to the Installation Manual.

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Data

Nominal supply voltage	24 VDC
Operating voltage range	19-30 VDC
Current consumption (at 24V)	105 mA
Ingress protection	IP20
Operating temperature range	-40°C to +85°C (Tx)
Weight	260g
Display	2.2", 240x320 pixels, TFT
Ethernet	10/100 Mbit, autosense
USB	USB 2.0 1 underneath
Relays rating	Max. 30 VDC, 500 mA
I/O 70 (as input)	24 VDC 5-70 mA
I/O 70 (as output)	24 VDC Max. 70 mA
Cable terminals	2.5 mm^2
SD Memory	(Needed to save history when restarting)
Spare part no. (without housing)	5100036-01A
Certified according to	CE ROHS EN 54-2 (1999/A1:2006) EN 60945 EN 50155 CE 0845-CPD-232.1686

Settings

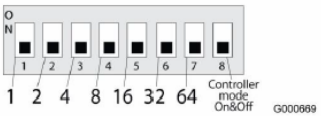
The module is identified by a physical address on the Backbone Bus. The address is set with an 8-pole DIP switch.

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Address Switch

This switch identifies modules in the system and sets the function. Control modules can serve as Bus Masters, i.e., operate in Controller Mode or in Managed Mode, for example repeaters and protocol converters. Address 1 and 2 are dedicated for control modules in Controller Mode. One control module per central shall be set in Controller Mode. If the system shall be redundant it is required to have a second control module, also set in Controller Mode. Modes for Managed and Controller are set with DIP switches as described in the following table:



	Managed Mode	Controller Mode
DIP 8	Controller Mode (off)	Controller Mode (on)
DIP 7	Module Address (0-127)	Spare
DIP 6		Master (on/off)
DIP 5		Central Address (0-31)
DIP 4		
DIP 3		
DIP 2		
DIP 1		

Control Modules have two different modes of operation, as determined by their DIP settings (normally pre- set from factory):

Controller Mode

Single Central System:

Central 1 Primary (automatically module address 1)

Central 1 Secondary (optional) (automatically module address 2)

Multi Central System:

Central 1 Primary (automatically module address 1)

Central 1 Secondary (optional) (automatically module address 2)

Central 30 Primary (automatically module address 1)

Central 30 Secondary (optional) (automatically module address 2)

Managed Mode

Module Address 3-125

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Connections

	Connector No.	Function	Description
A	15	D+	RS485 in/out Isolated/not isolated
	16	D-	
	17	D+	RS422 Isolated/not isolated
	18	D-	
B	11	DIN1A	Digital In 1 (Type 2)
	12	DIN1B	
	13	DIN2A	Digital In 2 (Type 2)
	14	DIN2B	
E	6	D+	RS485 in/out Isolated/not isolated
	7	D-	
	8	SG	
E	1	C	Programmable output 1 Max. 32V/1A
	2	NO	
	3	NC	Programmable output 2 Max. 32V/1A
	4	C	
	5	NO	

3.2.2 Charger Module

Charger

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

General Description

Charger M provides power to the system through the Backbone Bus.
It connects to either a change-over module or directly to a power supply, supervises change-over and connects the power supply units.
By using dual Charger M modules, it is possible to replace one Charger M module without powering down the system.
For details on assembling a system and definitions of common system terms, refer to the Installation Manual.

Data

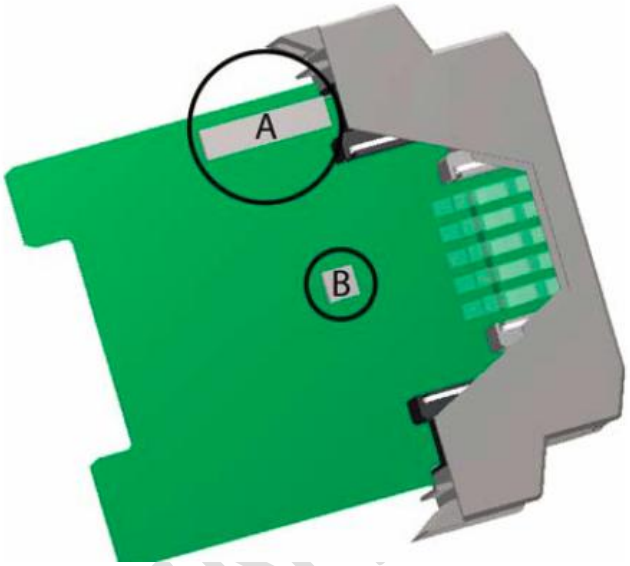
PSU input	28 VDC
Operating voltage range	19-30 VDC
Current consumption (at 24 V, battery supply only)	43 mA
Max. output current	8 A
Cable terminals	2,5 mm^2
Internal NTC resistor	10 kΩ 2%, B=3977, 3x3
Operating temperature range	-40°C to +85°C (Tx)
Weight (with housing)	140g
Spare part no. (without housing)	5100061-01A
Certified according to	EN 50155

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Settings

The module is identified by a physical address on the Backbone Bus. The address is set with a 10-pole DIP switch (A).
The charging characteristic can be set on the Charger M using a second DIP-switch (B).



SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Address switch

The DIP switch (A) value follows the binary system. The address no. can be set from 1 to 126 using the DIP-switch pole 1 to 7.

DIP Switch No.	Description	ON	OFF
8	Power to Backbone Bus channel 1	De-activated	Active
9	Power to Backbone Bus channel 2	De-activated	Active
10	Power output	Default active *	Programmable

* When switch pole 10 is set to On power output O/P is constantly active as long as Module is powered.

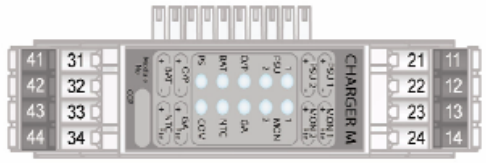
Example 1: One Charger M in the system = 8 + 9 OFF

Example 2: Two Charger M in the system
Charger M no. 1 = 8 OFF, 9 ON
Charger M no. 2 = 8 ON, 9 OFF

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Connections



CHARGER M X
ADDRESS: NUMBER

1	2	3	4	5	6	7	8
PSU 1	MONITORING PSU 1/MAINS	PSU 2	MONITORING PSU 2/EMCY	POWER OUTPUT	GENERAL ALARM (MORSE)	BAT	NTC
+ -	+ Rtn	+ -	+ Rtn	24V 8A + -	+ Rtn	+ -	+ Rtn
11 12	13 14	21 22	23 24	31 32	33 34	41 42	43 44

G002250

G003223

Technical Information

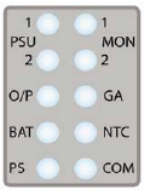
- The battery charging is automatically optimized by compensation for ambient temperature between -5°C and 40°C, when NTC is connected.
- Batteries connected to the Charger M must be of the type Valve regulated lead acid batteries (AGM).
- The Charger M outputs will be shut off if the battery level for any reason falls below 18VDC (+/- 0,5V).

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Indicators

Charger M indicators display input and output status.



Indicator	Indicator Colour	Status
PSU 1	Green Yellow None	OK Fault* Input not in use
PSU 2		
MON 1		
MON 2		
O/P	Green	Output is ON
	Yellow	Fault*
	None	Output is OFF or not in use
GA	Green	General Alarm Active
	Yellow	Fault*
	None	OK
BAT	Green	OK
	Yellow	Fault*
	None	Input not in use
NTC	Green	OK
	Yellow	Fault (NTC out of range)
	None	Input not in use
PS (Power Supply)	Green	OK
	Yellow, steady	Power Fault
	Yellow, flashing	Boot loadermode
COM (Communication)	Green, steady	OK
	Green, flashing	Unconfigured
	Yellow, steady	Faulty communication
	Yellow, flashing	Major fault
	None	No communication
PS + COM (both flashing)	PS Yellow, flashing	Transferring software
	COM Green, flashing	

* E.g. battery absent, broken fuse, low battery capacity

3.2.3 Loop MX

Loop M X H

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

General Description

Loop M X enables the connection of one addressable detector loop. Two Loop M X can also be used as a redundant loop when connector together.
For details on assembling a system and definitions of common system terms, refer to the Installation Manual.

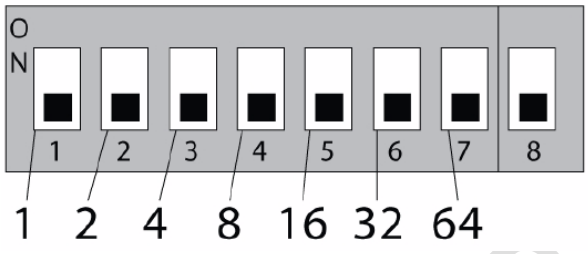
Data

Operating voltage range	19-30 VDC
Voltage range loop	29-38 VDC
Current consumption (at 24 V)	55 mA
Max. output current	500 mA (< 15 minutes)
Continuous output current	250 mA
Max no. of loop units	254
Communication parameters for the detector loops	FSK keying*
Cable terminals	2,5 mm^2
Operating temperature range	-40°C to +85°C (Tx)
Weight (with housing)	140g
Spare part no. (without housing)	5100025-01A
Certified according to	EN 50155

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

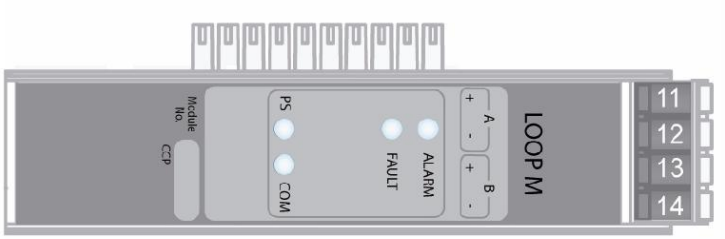
Address switch

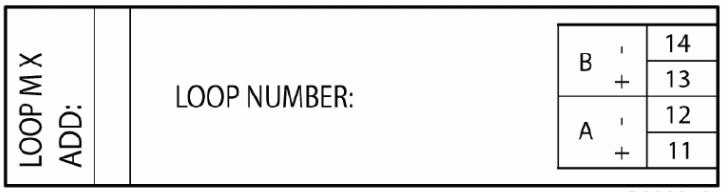
The DIP switch value follows the binary system. The address no. can be set from 1 to 126 using DIP-switch poles 1 to 7.



G000668

Connections

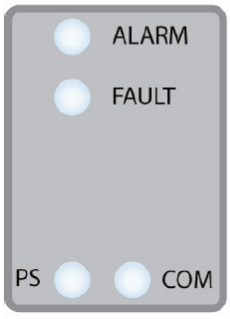




G002249

Indicators

Loop M X indicators display output and alarm status.



G000751

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Indicator	Indicator Colour	Status
ALARM	Red, steady	One or more alarms are present
	Red, flashing	Pre-alarm
	None	There are no alarms
FAULT	Yellow, steady	One or more faults are present
	Yellow, flashing	Booting
	None	There are no faults
PS (Power Supply)	Green	OK
	Yellow, steady	Power Fault
	Yellow, flashing: 0.5 sec On, 0.5 sec Off.	Boot loader mode
	Yellow, flashing: 1 sec On, 0.5 sec Off.	Safe State
COM (Communication)	Green, steady	OK
	Green, flashing	Unconfigured
	Yellow, steady	Faulty communication
	Yellow, flashing	Major fault
	None	No communication
PS + COM (both flashing)	PS Yellow, flashing	Transferring software
	COM Green, flashing	

3.2.4 DC DC convertor

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Technische Daten Eingang / Technical Data Input

Parameter		Konditionen / Conditions	Werte / Data
U_{in}	Eingangsspannung Input Voltage	Batteriespannung / battery voltage dauerhaft / continuous t ≤ 0,1 s Leerlaufstromaufnahme no load consumption Standby (Remote Control enabled)	24 V_{DC} 24 V_{DC} nom: 16,8...33,6 V_{DC} 14,4...16,8 V_{DC} 63 mA 35 mA
		Batteriespannung / battery voltage dauerhaft / continuous t ≤ 0,1 s Leerlaufstromaufnahme no load consumption Standby (Remote Control enabled)	36 / 48 / 60 V_{DC} 48 V_{DC} nom: 25,2...72 V_{DC} 21,6...25,2 V_{DC} 34 mA 13 mA
		Batteriespannung / battery voltage dauerhaft / continuous t ≤ 0,1 s *Einschränkung für / limitation for UL 60 950-1; t ≤ 1 s (gem./acc. to. EN 50 155) Leerlaufstromaufnahme no load consumption Standby (Remote Control enabled)	72 / 80 / 96 / 110 V_{DC} 110 V_{DC} nom: 50,4...154 V_{DC} * 43,2...50,4 V_{DC} 137,5...154 V_{DC} 28 mA 12 mA
I_{in}	Eingangsstrom / Input Current	24 V_{DC} 36 / 48 / 60 V_{DC} 72 / 80 / 96 / 110 V_{DC}	7,3 A 5,0 / 3,8 / 3,0 A 2,5 / 2,2 / 1,9 / 1,6 A
	Einschaltstrom / Inrush Current	$U_{nom\ min}$ (24, 60, 110 V_{DC})	<7 x $I_{in\ nom}$
f_{sw}	Schaltfrequenz / Switching Frequency		ca. 70 kHz
η	Wirkungsgrad / Efficiency		siehe Tabelle / see table
	Eingangsfilter / Input Filter		zweistufiger / two-step Filter
	Verpolschutz / Reverse Polarity Protection	in Verbindung mit externer Sicherung with external fuse	verpolschutzsicher durch Anschlussstecker mit Codierung reverse polarity protection through plug with coding zusätzliche Querdiode additional cross diode
RC *	Remote Control	RC verbunden mit -Uin RC connected to -Uin RC offen / open	Wandler Stand-by converter stand-by Wandler EIN / converter on

SANROK

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Technische Daten Ausgang / Technical Data Output

Parameter		Konditionen / Conditions	Werte / Data
ΔU_{out}	Spannungstoleranz Voltage Accuracy	Abgleichgenauigkeit ab Werk adjusting accuracy factory set	- 1 %; +2 %
	Rückspeisefestigkeit Back Feeding Protection	bei gleicher Polarität with same polarity	1,45 x U_{out}
ΔU_{LF}	Ripple	U_{in} = min	≤1 % p-p
ΔU_{HF}	Noise	U_{in} = min, BW: 20 MHz	≤2 % p-p
	Line Regulation	U_{in} = min/max	≤0,5 %
	Load Regulation	I_{out} = 10...90...10 % Suffix W / WK Suffix VT	 ≤0,5 % (U_{out} = 5 V: ≤1,5 %) ≤2 % (U_{out} = 5 V: ≤3 %)
I_{max}	Strombegrenzung / Current Limiting		105...130 % Konstantstrom constant current
t_R	Ausregelzeit Lastschwankungen Transient Response Time	I_{out} = nom ohmsche Last / ohmic load Halogenlast / halogenous load	 ≤20 ms ≤200 ms
t_S	Anlaufzeit / Starting Time	I_{out} = nom ohmsche Last / ohmic load	 ≤700 ms
ε	Temperaturkoeffizient Temperature Coefficient		0,01 % / K
	Leerlaufverhalten / No Load Characteristics		leerlauffest / no ground load
P_{over}	Kurzschlussfestigkeit Short Circuit Protection		dauerhaft / Konstantstrom continuous / constant current
	Ausgangsspannungskennlinie Output Voltage Characteristic		U/I; Konstantspannung, Konstantstrom / U/I; constant voltage, constant current
	Parallelbetrieb / Parallel Operation *		ohne interne Entkoppeldiode without internal decouple diode
		Option -VT Redundanz / redundancy -VT	mit interner Entkoppeldiode with internal decouple diode
	Power Good Signal	>0,95 x Uout ±2 % Kontaktbelastung / contact rating	Öffnerkontakt geöffnet, Kontaktbelastung 130 mA opener contact opened, contact rating 130 mA I = 130 mA Dauer / continuous I_{max} = 400 mA / t ≤100 ms U_{max} = 350 V; P_{max} = 5 W

*sternpunktförmige Zusammenschaltung definierter Ausgangsleitungen mit gleicher Länge; exakter Abgleich der Ausgangsspannung erforderlich (nach Rücksprache)

3.2.5 Sounder Beacon

SANROK

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

Technical Specifications | Resources | Part Numbers

Voltage:	9 - 15Vdc (12Vdc version) 18 - 28Vdc (24Vdc version) (*1)
Current:	110mA 12Vdc version (Typical Tone 5) 68mA 24Vdc version (Typical Tone 3)
Sound Output:	103dB(A) 12Vdc version (Typical Tone 5) 101dB(A) 24Vdc version (Typical Tone 3)
Tones:	42
Volume Control:	10dB
Flash Rate:	1Hz
Flash Power:	0.7j
Temperature:	- 10°C to + 55°C
Monitoring	Reverse polarity
Construction:	ABS/PC lens
Protection:	IP54 (s)* IP65 (d)*
Weight:	0.33Kg
Colour:	Red or White
Lens Colour:	Red, Amber, Clear, Green or Blue

(*1) 110 / 230Vac when used with a Deep powered base.

3.2.6

Fire Detectors- Ev-PP

Combined Optical Smoke and Heat Detector

EV-PP/OA130

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

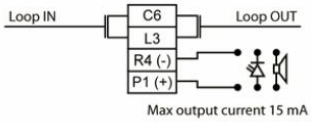
General description

The detector is an analogue addressable optical smoke and heat detector. The smoke and heat detector functions are independent and can be used in any required combination. The detector is equipped with a remote input & output that can be controlled individually by the system.
The detector is designed to give early warning for the presence of heat and smoke in the supervised area. The detector offers a high protection against unwanted alarms.
The low profile combined with the Omniview™ 360° alarm indication makes the detector suitable for sites with high architectural requirements.
The address is set by an 8-way DIP-switch.

Data

Nominal voltage	34 VDC
Working voltage	20–38 VDC
Working current	< 200 µA
Alarm current	< 3 mA
Remote output	Max 15 mA
Alarm temperature	57°C class A1
Ingress protection	Depending on base
Relative humidity	≤ 95% RH non-condensing
Temperature range	-40°C to +85°C (Tx)
Cover material	ABS
Colour	White
Weight	~130 g
Certified according to	EN 54-5 EN 54-7

Connection



SANROK

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

	3.3			**Operation** **HOME SCREEN OF THE CONTROLLER**  **FIRE SCENARIO** 
4				**High Pressure Water Mist Fire Suppression System** **Technical Description of the System**

SANROK ENTERPRISES

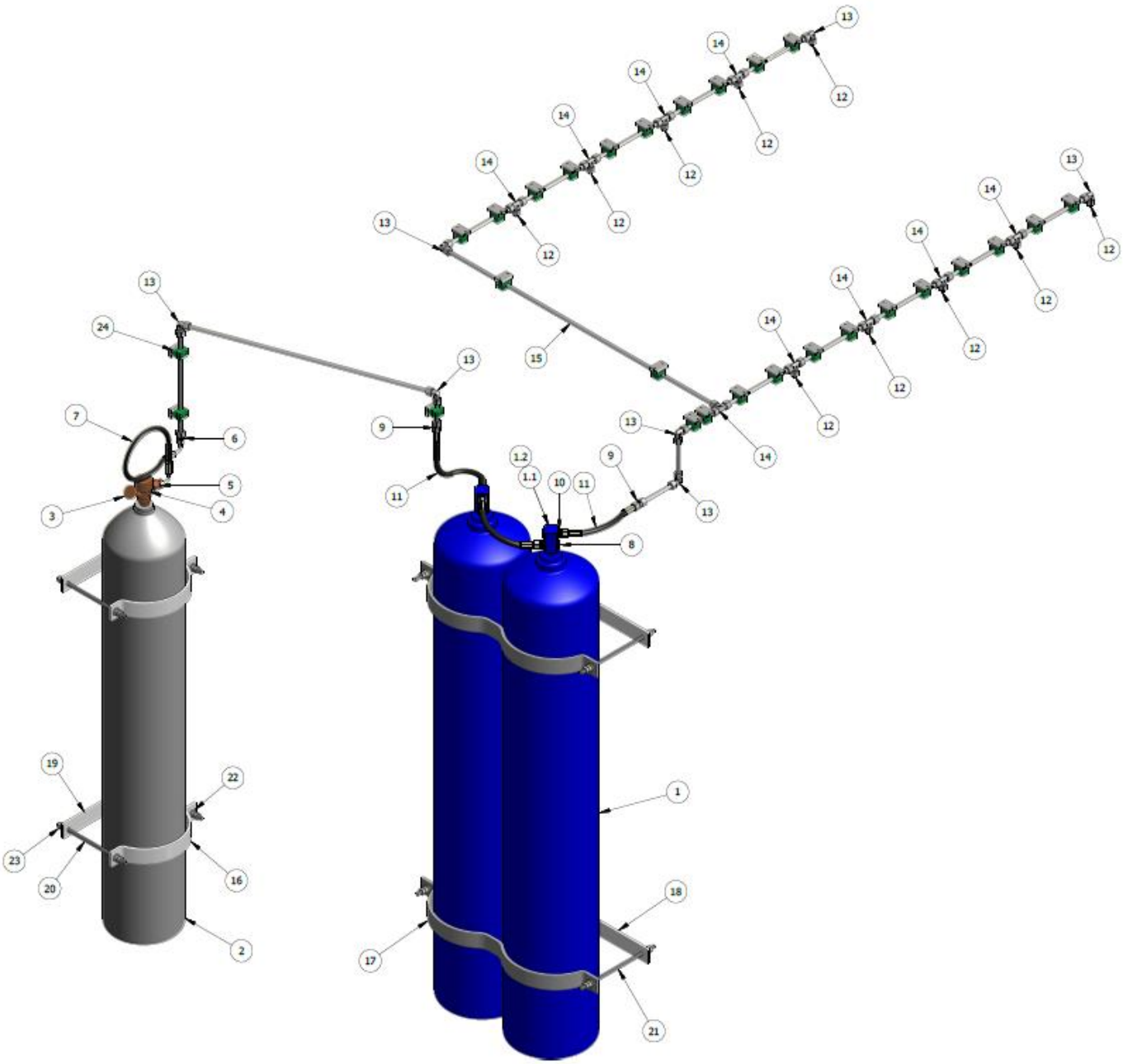
SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

CHARACTERISTIC	Designation	VALUE	Unit
Temperatures:	min. permissible temperature	+5	°C
	max. permissible temperature	+40	°C
Pressure	Propellant medium filling pressure	200 bar at 15°C	
	Operating pressure	200 bar	
	Test pressure (purs. to. EU Directive 1999/36/EC)	300 bar	
Spraying Time	System spraying time, operating time	4 min	
Volume	Volume Nitrogen Cylinder	approx. 50 L	
	Volume Water Cylinder	approx. 160 L	

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

SYSTEM DESCRIPTION



SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

PART LIST

S. NO		DESCRIPTION	DRG.NO	NO. OFF
1		WATER CYLINDER WITH DIPSTICK ASSY WATER CAPACITY : 80 LITRE	2ED-245-1911	2
	1.1	WATER CYLINDER VALVE	2ED-245-1912	2
	1.2	DIP TUBE	2ED-245-1913	2
2		NITROGEN GAS CYLINDER CAPACITY : 50L,200 BAR	2ED-245-1914	1
3		PRESSURE GAUGE RANGE : 0-250 BAR [ITEM NO-B04420100]	2ED-245-1864	1
4		VALVE FOR NITROGEN GAS CYLINDER 250 BAR [ITEM NO-B04801208]	2ED-245-1865	1
5		SPECIAL FITTING (SUITABLE FOR GAS ACTUATION VALVE) IN:W21.8X1/14" INCLUDING SEAL AND NUT OUT:10-L ACCORDING TO ISO-8434-1 (M16X1.5) INNER PART: V4A (MEDIUM RELATED) OUTER PART: BRASS (NUT) [ITEM NO-352254]	2ED-245-1866	1
6		STRAIGHT CONNECTOR WITH NUT (G-UNION) 12L(M18X1.5) X 10L (M16X1.5) NO-GR12L/10L71 [ITEM NO-1630270]	2ED-245-1867	1
7		HOSE PIPE SUITABLE FOR FITMENT ON ADAPTERS/FITTINGS 10-L ACCORDING TO ISO-08434-1 LENGTH-800 MM END 1: 10-L 90 EN D 2: 10-L 90 STAINLESS STEEL ENDS V4A WORKING PRESSURE: 200 BAR BURST PRESSURE: 500 BAR [ITEM NO-353120]	2ED-245-1868	1
8		END PLUG STAINLESS STEEL G3/8" V4A ELASTING SEALING V5T13/8ED71 [ITEM NO-326761]	2ED-245-1869	4
9		G UNION (STAIGHT CONNECTOR) 12-L(M18X1.5) V4A STAINLESS INCLUDING NUTS G12L71 [ITEM NO-1473249]	2ED-245-1870	2
10		MALE STUD CONNECTOR G3/8" MALE 12-L (M18X1.5) V4A STAINLESS WITH ELASTIC SEALING, X: WITHOUT NUT GE12LRED71X [ITEMNO-249638]	2ED-245-1871	4
11		HOSE FOR INTERCONNECTION SUITABLE FOR ADAPTERS/FITTINGS 12-L ACCRDING ISO-8434-1 LENGTH: 400MM END-1 : 12-L 0 (STRAIGHT) END-2 : 12-L 0 (STRAIGHT) STAINLESS STEEL ENDS V4A WORKING PRESSURE: 200 BAR BURST PRESSURE: 500 BAR [ITEM NO-353119]	2ED-245-1872	3
12		FLAT JET NOZZLE ASSY	2ED-245-1873	----------
	12.1	FILTER CAP [ITEM NO-A2210014]	2ED-245-1874	10
	12.2	NOZZLE CLAMPING RING(CONSISTS OF 2 RINGS) [ITEM NO-A2650024]	2ED-245-1875	10
	12.3	FLAT JET NOZZLE [ITEM NO-A3310457]	2ED-245-1876	10
13		W-FITTING(ELBOW) W12L71 AS PER ISO 8434-1 --EC--L12--SS INCLUDING NUTS & CUTTING RINGS [ITEM NO-1473526]	2ED-245-1877	7
14		T-FITTINGS T12L71 AS PER ISO 8434-1--TC--L12--SS INCLUDING NUTS & CUTTING RINGS [ITEM NO-1296072]	2ED-245-1878	9
15		STAINLESS STEEL PIPE 12 OUTER DIAMETER	DIN 2962 / EN10305-1 OR EQUIVALENT / AISI 316	ASSY. IN STU (TO SUIT FITMENT ON POWER CAR LWRRM) APPROX. LENGTH=17510 AS PER SANROK DRG. 2ED-245-1830 ALT.02
16		CLAMP FOR NITROGEN CYLINDER	2ED-245-1860	2
17		CLAMP FOR WATER CYLINDER	2ED-245-1859	2
18		BACK PLATES FOR WATER CYLINDER CLAMPS	2ED-245-1861	2
19		BACK PLATES FOR NITROGEN CYLINDER CLAMPS	2ED-245-1910	2
20		TIE RODS FOR WATER CYLINDER (M12)	2ED-245-1915	4
21		TIE RODS FOR NITROGEN CYLINDER (M12)	2ED-245-1916	4
22		FLAT WASHER d1=13	DIN 1441	16
23		NYLOCK NUT (M12)	IS:7002	32
24		CLAMPS FOR Ø12 SS TUBE	STANDARD HARDWARE ITEM	27

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

	4.1			**Safety relevant Information- General Information** The operational safety of the gas and water cylinders supplied is only guaranteed if they are used as intended in accordance with Chapter 3 and these operating instructions are complied with. The operator is responsible for compliance with the instructions and safety precautions in accordance with these operating instructions. Breakdown-free operation of the unit is only attained when assembly and maintenance are performed carefully in accordance with the current regulations pertaining to mechanical and electrical engineering. In case you cannot find all of the information you require in these operating instructions, please make an enquiry. The manufacturer refuses to accept liability for the system components if these operating instructions are not heeded. These operating instructions must be carefully retained for future reference. Should these system components be passed on to third parties, they must imperatively be accompanied by these operating instructions and the operating conditions and limitations of usage specified in this document, each in their respective complete forms. These operating instructions do not take into account all construction details and variants nor all possible eventualities and incidents which may occur during assembly, operation and maintenance. Please also heed the information pursuant to ISO 11625:2007-08 – Gas Cylinders – Safe Handling, which is applicable to the cylinders.
	4.2			**Safety** These operating instructions contain important information which must be heeded during assembly, commissioning, operation and maintenance. These operating instructions must therefore imperatively be read by the qualified personnel or system operator concerned prior to assembly and commissioning and must always be readily available at the operating site of the unit.

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				These operating instructions do not take account of general accident prevention regulations and location-specific safety and/or operating regulations. The operator is responsible for compliance with these regulations (and also for ensuring compliance by externally hired assembly personnel).  This symbol accompanies all safety information; therefore, please pay particular attention to these sections. Please pass safety instructions on to your operations personnel. Furthermore, the statutory "General Safety and Accident Prevention Regulations" must be adhered to.
	4.3			**Special Safety Information** Safety takes precedence:  Please note: after the water cylinders have been emptied, the gaseous propellant flows directly via the water cylinders and the downstream piping system to the exterior. It is necessary to take appropriate measures for the safe discharge of the escaping residual gas here (excess current openings, excess pressure safety equipment, evacuation measures etc.). Cf. also the relevant directives for gas extinguishing systems (e.g..VdS 2380 – fire extinguishing systems with non-liquefied inert gases).
	4.4			**Usage in accordance with Regulations**
		4.1.1		**Area of Application** SANROK water cylinders are intended for a system which feeds water mist systems for the purposes of fire fighting. The media described in these operating instructions serve as operating

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				media.  Any usage which does not fall within this framework is considered to be otherwise than in accordance with the regulations. The manufacturer is not liable for resulting damages. The user uses the equipment at his own risk. Strict compliance with the operating, maintenance and servicing requirements provided for by the manufacturer also pertains to usage in accordance with the regulations. The water cylinders may only be used, maintained and serviced by persons who are familiar with therticular characteristics and have been informed of relevant safety regulations (accident prevention). A conformity assessment of the assembly in accordance with IS directives Directives has been performed by SANROK.
		4.1.2		**Modification to the system** Any modifications or add-on's to the supplied execution of the SANROK scope of delivery is expressly forbidden without our prior written consent. Furthermore, only original components may be used during maintenance and servicing. Any unauthorised modifications compel the organisation or person responsible to assume the manufacturer's liability. Particularly any modifications at the gas and water cylinder fittings (e.g. dismantling and reinstallation) are strictly forbidden. In such cases, SANROK refuses to accept any liability with regard to the thus modified scope of delivery in its entirety.
		4.1.3		**TRANSPORT STORAGE DISPOSAL**
				Transport

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				 The Nitrogen cylinder is filled with Nitrogen at 200bar, thus **PRESSURISED** The water cylinders are dispatched in a filled state and are in pressure less condition. Shock loads must be prevented due to the risk of damage to the internal coating. All cylinders must be transported to the construction site using appropriate means of transport (e.g. cylinder trolleys) in order to prevent undesirable damage to the internal coating or the valve eads.
		4.1.4		**Storage** The cylinders must be stored in a frost proof room at min. +5°C and max. 40°C and in a virtually dust-free atmosphere. Failing that, they must be protected from dust. All openings must be sealed.
		4.1.5		**Disposal** The cylinders must be disposed of in accordance with current regulations. All cylinders must be in a pressure less state at the time of disposal. Improper usage of the cylinders must be prevented (e.g. the pressureless cylinders must be cut up and scrapped).
5				**ASSEMBLY** Assembly must be performed by trained personnel. A particular requirement is adequate hydraulic knowledge in the high pressure sector.
	5.1			**Required space/environmental conditions** The fundamental aspect to consider when assessing required space is serviceability. The environmental temperature in accordance with Point 4.3 must also prevail at the installation site of the unit during assembly.

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

	5.2			**Mounting**  The cylinders must be arranged vertically and stably and adequately safeguarded from non-permissible movement or falling over. The cylinders must be fixed to the carrying structure by using all foreseen brackets respectively bracket holes for proper fixing of the system. The water cylinder additionally have to be supported on its bottom side. Please note: The base or the installation site must be designed for the max. operating weight. The subsurface must be dry and must not have a corrosive effect on the cylinders.
	5.3			**Assembly** The cylinders must be appropriately mounted and connected to pipework. Notice: if there are more cylinders combined then we are talking about communication vessels. For a simultaneous draining of the water cylinders is the design of the hydraulic very important (for example: same pipe resistance of all water- or propellant cylinders).
	5.4			**Filling and ventilation of the water cylinder** Filling of the water cylinder can be done with help of a water pump through inlet port of the Dip tube.  For safety reasons, we recommend only connecting the propellant medium when the system has been completely set up and filled with water.
	5.5			**Filling of Nitrogen Cylinder** 

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				NO ATTEMPT SHOULD BE MADE OT FILL THE NIRTOGEN CYLINDER LOCALLY. WHEN EMPTY IT SHOULD BE REPLACED WITH CHARGED CYLINDER SUPPLIED BY SANROK ENTERPRISES. **Filling of Water Cylinder** Filling of Water cylinder can be done with the help of a water pump as shown in the figure below.  Only drinking water with the following specifications should be used to fill/ charge the water cylinders. SANROK water cylinders may only be operated with drinking water in accordance with the EU 98/83/EC COUNCIL DIRECTIVE/INDIAN STANDARDIS: 10500on the quality of water intended for human consumption. However, the following maximum values of ingredients which cause corrosion and pollution must be adhered to. Filtering <100 µm PH value 7 to 8 Chloride content < 20 mg/l Free chloride < 2 mg/l SO42- < 200 mg/l Water temperature +5 to max +40°C • No chemical additives such as foaming agents may be added to the water.
	5.6			**Hazard warnings**

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				 • As for all hydraulic systems, there is a risk to personal safety during operation due to broken pipelines and pipes or burst hoses. • ATTENTION: The water cylinder components are sensitive to frost! The user must ensure that the components are not exposed to frost in any circumstances, as otherwise the full functionality of the unit can no longer be guaranteed. • The water cylinders must be assembled in an appropriately stable manner and protected from external environmental influences. Possible mechanical damage must be precluded using suitable measures
	5.7			**DE/RECOMMISSIONING**
		5.7.1		**De/recommissioning** For safety reasons, water cylinders must be disconnected from the propellant medium feed in principle in the event of any handling.
		5.7.2		**Emptying** Once it has been ensured that the water cylinders are pressureless and have been disconnected from the propellant medium feed, the water cylinders can be emptied by opening the filling connections and connecting compressed air (max. 10 bar) to the ventilation connection. The residues can be emptied by swinging the cylinders with the filling and ventilation connections open.
		5.7.3		**Dismantling** Dismantling of system components for maintenance purposes may be necessary. The system must be taken out of service before these activities occur. CAUTION If system components are not reassembled properly, this may lead to a breakdown of the entire system. You should therefore proceed with the utmost caution.
		5.7.4		**MAINTENANCE**

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

				The water cylinders must be tested for perfect functioning by the operator at the prescribed intervals in accordance with the maintenance works specified in this chapter. <u>3-monthlychecks (3MC)</u> • Visual inspection of the water cylinders for irregularities, external leaks, soiling, corrosion or similar. <u>Annual maintenance (AM)</u> • Detailed visual inspection of the WSU for irregularities, external leaks, soiling, or similar. <u>2-yearly maintenance (2AM)</u> • Pressure testing of water cylinder with water with test pressure in accordance with Table 1. <u>10-yearly maintenance (10 AM)</u> • Dismantling and recurrent testing of the water cylinder in accordance with EN1968 (EU-Directive 1999/36/EC) or As per Relevant Indian Standards

SANROK ENTERPRISES

NOTES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times

SANROK ENTERPRISES

SANROK ENTERPRISES © - All Rights Reserved. Any unauthorised printing and publishing will be treated as an offence. Is to be used by the person or group intended at all times