

ES-817

Rev D

SPECIAL INSTRUCTIONS FOR INSTALLING MASONEILAN
SVI3 IN AREAS WHERE THERE IS A POTENTIAL FOR EXPLOSIVE GAS AND
DUST ATMOSPHERES



1	INTRODUCTION	3
2	MODEL CODES COVERED BY THIS DOCUMENT:	3
3	REQUIREMENTS FOR ALL INSTALLATIONS.....	4
4	FLAME PROOF AND DUST IGNITION PROOF REQUIREMENTS:	5
4.1	GENERAL	5
4.2	ENTRIES AND CABLE GLANDS	5
4.3	MAIN COVER INSTALLATION	5
5	INCREASED SAFETY/NON-INCENDIVE EQUIPMENT	6
5.1	GENERAL	6
5.2	INCREASED SAFETY WIRING INSTRUCTIONS.....	6
6	INTRINSICALLY SAFE REQUIREMENTS:	6
6.1	I.S. BARRIERS	6
6.2	INSTALLED MODULE BASED TEMPERATURE RATINGS ADJUSTMENTS:	6
7	AGENCY MARKINGS.....	7
7.1	AGENCY APPROVALS	7
7.2	US AND CANADIAN STANDARDS.....	9
7.3	ENCLOSURE RATINGS	9
7.4	OPERATING RANGES	9
8	INTRINSICALLY SAFE INSTALLATION WIRING REQUIREMENTS	10
8.1	HAZARDOUS LOCATION	11
8.2	FIELD WIRING.....	11
8.3	ENTITY REQUIREMENT.....	12
8.4	INSTALLATION RESTRICTION.....	12
9	MAINTENANCE & REPAIR	13
	OPTIONS MODULE.....	13
	USER INTERFACE MODULE.....	13
	BLIND USER INTERFACE COVER.....	13
	MAIN ELECTRONICS MODULE	13
	THREADED END COVER	13
	CONDUIT ENTRY PLUG.....	13
	PNEUMATICS MODULE	13
10	MAINTENANCE CONNECTION	13
11	REVISION HISTORY	13

1 Introduction

This document covers the requirements for safe installation, repair and operation of the SVI3 valve positioner as it relates to operation in areas where there is a potential for explosive atmosphere or inflammable dust. Adherence to these requirements assures that the SVI3 will not cause ignition of the surrounding atmosphere. Hazards related to control of the process are beyond the scope of this manual.

For mounting instructions on specific valves refer to the mounting instructions supplied with the mounting kit. Mounting does not affect the suitability of the SVI3 for use in a potentially hazardous gas or dust atmospheres.

For language translation assistance contact your local representative or email svisupport@bakerhughes.com.

Pour assistance avec la traduction, contactez votre représentant local ou envoyez un e-mail à svisupport@bakerhughes.com.

The SVI3 positioner is designed by:

Dresser LLC
12970 Normandy Blvd.
Jacksonville FL 32221 USA

The SVI3 Positioner is manufactured in India

2 Model Codes Covered by this Document:

Model Code: SVI3-ABCDEFGH – Not all combinations are available

Identifier	Option	Description
A	1-3	Indicates internal Firmware Style: 1-Standard 2-Advanced 3-Online Valve Diagnostics
B	1	Indicates Pneumatic Train/Capacity/Fault State 1. Single Acting, STD Flow (Cv >=0.4), De-energize on fault
C	1-2	Indicates Instrument Air/ Gas Capture / Temperature: 1. Compressed Air or Natural Gas, Direct Bleed, Std Temp (-40°C to 85°C), Nitrile Diaphragm 2. Compressed Air Only, Direct Bleed, Extreme Temp (-55°C to 85°C), Silicone Diaphragms
D	1-2	Indicates Construction/Display: 1. Aluminum / No Display 2. Aluminum / Display with local interface
E	1	Communication: 1. 4-20 mA HART Communication Protocol
F	1-2	Indicates Input/ Output Options: 1. None 2. 4-20mA Analog Output (Position Retransmit) Qty (1) -Config Switched Outputs Qty (2) -Config Switched Input Qty (1) -Analog Remote Mount Capable Qty (1)
G	0-1	Indicates Agency Approvals: 0. None 1. Hazardous Area Uni-label (NEC/CEC {US, Canada}, ATEX, IECEx)
H	X	Indicates Other Agency Approvals: X. Any Single Character

! WARNING!

Failure to adhere to the requirements listed in this document may cause loss of life and

3 Requirements for All Installations

Installation and maintenance must be performed only by qualified personnel. Area Classification, Protection Type, Temperature Class, Gas Group, and Ingress protection must conform to the data indicated on the label as well as within this document.

Wiring and conduit must conform to all local and national codes governing the installation. Wiring must be rated for at least 5°C above the highest expected ambient temperature.

(ATTENTION – LE CABLAGE D'ALIMENTATION DOIT ETRE ÉVALUÉ POUR UNE TEMPERATURE AU MOINS 5°C PLUS QUE LA TEMPERATURE AMBIANTE MAXIMALE)

SVI3 has been certified to a minimum ambient temperature of -55 °C, however, there are two temperature models available, standard (-40 °C) and extended temperature range (-55 °C). For optimal performance, the minimum ambient as marked on the label should be followed.

Where the protection type depends on wiring glands, the glands must be certified for the type of protection required.

Under normal operation compressed supply gas is vented from the SVI3 to the surrounding area. If natural gas is used as the supply gas additional precautions or specialized installations may be required. Hazardous area consideration is the responsibility of the end-user. Area ventilation and other safety measures may be required to maintain a safe environment.

Verify that the markings on the label are consistent with the application.

Verify that the air supply pressure cannot exceed the marking on the label.

The end-user shall permanently mark the serial plate as appropriate based on the protection type chosen for the installation. The small circles next to the various groupings of protection types are provided for this purpose. Once the type has been marked, it cannot be changed.

It must be ensured the thermal effect of the process temperature does not result in exceeding the SVI3 specified ambient temperature.

"X" Marking - the SVI3 enclosure contains greater than 10% aluminum; care must be taken during installation to avoid impacts or friction that could create an ignition source.

"X" Marking - Potential Electrostatic Charge Hazard – For safe operation use only wet cloth when cleaning or wiping device, and only when local conditions around the device are free of potentially explosive atmospheres. Do not use dry cloth. Do not use solvent.

"X" Marking - Instruments installed in dusty hazardous areas, Zones 20, 21 and 22; must be cleaned regularly to prevent the buildup of dust layers on any surface. To avoid the risk from electrostatic discharge, you must follow the guidance as detailed in IEC/TS 60079-32-1.

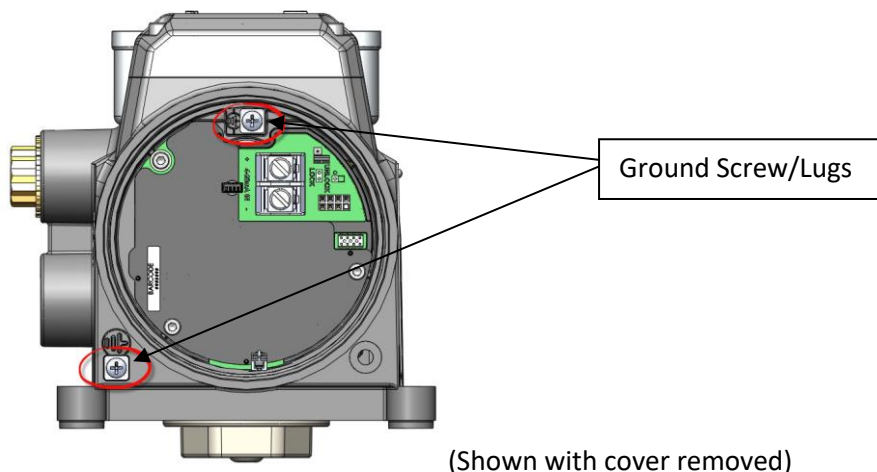
Before putting into service, all of the SVI3 covers should be securely fastened to the housing to maintain ingress protection.

4 Flame Proof and Dust Ignition Proof Requirements:

4.1 General

The 1/2-inch NPT fittings must be torqued until they are wrench tight. The main housing cover must be clean and free of corrosive products.

The SVI3 chassis must be securely electrically connected to earth ground. Ground screws/lugs are provided on the enclosure in the following two locations as shown:



4.2 Entries and Cable Glands

Certified cable glands are required based on the hazardous area the device is installed in. The 1/2" NPT conduit plug supplied with the SVI3 was certified as part of the product.

4.3 Main Cover Installation

Verify that cover seal (o-ring) is properly installed into the groove in the cover. The cover must be screwed into the housing until it contacts the top-surface of the housing (i.e. it is "metal to metal" with the housing). Once the cover is installed, ensure that the cover lock screw is secured. This maintains the ingress protection level and integrity of the flameproof enclosure.

5 Increased Safety/Non-Incendive Equipment

5.1 General

Check to ensure all electrical connections are made to approved circuits which meet local and national installation codes.

Div 2 (Zone 1) non-incendive installations require that electrical connections be performed in accordance with and meet all local and national electrical codes.

5.2 Increased Safety Wiring Instructions

DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED

Required Terminal Torque Values:

- 4-20 mA Input Terminals:
 - Nominal: 1.13 N-m
- Options Terminal Connections:
 - Min: 0.5 N-m
 - Max: 0.6 N-m

Conductor Size Range:

- 4-20 mA Input Terminals: 22 AWG to 12 AWG
- Options Terminal Connections: 26 AWG to 14 AWG

6 Intrinsically Safe Requirements:

6.1 I.S. Barriers

Ensure that proper I.S. barriers are installed, and the field wiring meets local and national codes for an I.S. installation. Never install a device which has previously been installed without an IS barrier in an intrinsically safe system.

6.2 Installed Module Based Temperature Ratings Adjustments:

The SVI3 positioner has different ratings depending on the configuration of the unit. By using inspection, in conjunction with the unit's model code, a user will be able to determine if an Options Module is installed. See applicable temperature ratings designated in Section 7.1.

7 Agency Markings

7.1 Agency Approvals

Agency testing, and approval process was performed by Intertek Testing Group.

Flameproof/ExplosionProof) for Gas

IEC	Ex db ia IIC T6...T4 Gb
ATEX	II 2G Ex db ia IIC T6...T4 Gb
US/NEC	Class I, Division I, Groups A, B, C, D T6...T4 Class I, Zone 1, AEx db ia IIC T6...T4 Gb
Can/CEC	Class I, Division I, Groups, A, B, C, D T6...T4 Class I Zone 1, Ex db ia IIC T6...T4 Gb

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 75°C
T6 Ta= -55°C to 60°C

Protection by Enclosure (Explosive Dust)

IEC	Ex ia tb IIIC T ₂₀₀ 91°C Db
ATEX	II 2D Ex ia tb IIIC T ₂₀₀ 91°C Db
US/NEC	Class II Division 1 Groups E, F, G T6...T4 Class III Zone 21, AEx ia tb IIIC T ₂₀₀ 91°C Db
Can/CEC	Class II Division 1 Groups E, F, G T6...T4 Class III Zone 21, Ex ia tb IIIC T ₂₀₀ 91°C Db

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 75°C
T6 Ta= -55°C to 60°C

Intrinsically Safe (Explosive Gas) – Base Positioner

IEC	Ex ia IIC T6...T4 Ga
ATEX	II 1G Ex ia IIC T6...T4 Ga
US/NEC	Class I, Division I, Groups A, B, C, D T6...T4 Class I, Zone 0, AEx ia IIC T6...T4 Ga
Can/CEC	Class I, Division 1, Groups A, B, C, D T6...T4 Class I, Zone 0, Ex ia IIC T6...T4 Ga

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 75°C
T6 Ta= -55°C to 60°C

Intrinsically Safe (Explosive Gas) – Options Module Installed

IEC	Ex ia IIC T6...T4 Ga
ATEX	II 1G Ex ia IIC T6...T4 Ga
US/NEC	Class I, Division I, Groups A, B, C, D T6...T4 Class I, Zone 0, AEx ia IIC T6...T4 Ga
Can/CEC	Class I, Division 1, Groups A, B, C, D T6...T4 Class I, Zone 0, Ex ia IIC T6...T4 Ga

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 65°C
T6 Ta= -55°C to 50°C

Intrinsically Safe (Explosive Dust) – Base Positioner

IEC	Ex ia IIIC T ₂₀₀ 91°C Da
ATEX	II 1D Ex ia IIIC T ₂₀₀ 91°C Da
US/NEC	Class II Division 1, Groups E, F, G T6...T4 Class III Zone 20, AEx ia IIIC T ₂₀₀ 91°C Da
Can/CEC	Class II Division 1 Groups E, F, G T6...T4 Class III Zone 20, Ex ia IIIC T ₂₀₀ 91°C Da

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 75°C
T6 Ta= -55°C to 60°C

Intrinsically Safe (Explosive Dust) – Options Module Installed

IEC	Ex ia IIIC T ₂₀₀ 91°C Da
ATEX	II 1D Ex ia IIIC T ₂₀₀ 91°C Da
US/NEC	Class II Division 1, Groups E, F, G T6...T4 Class III Zone 20, AEx ia IIIC T ₂₀₀ 91°C Da
Can/CEC	Class II Division 1 Groups E, F, G T6...T4 Class III Zone 20, Ex ia IIIC T ₂₀₀ 91°C Da

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 65°C
T6 Ta= -55°C to 50°C

Increased Safety/Non-Incendive Marking for Explosive Gas/Dust

IEC	Ex ec ic IIC T6...T4 Gc
ATEX	II 3G Ex ec ic IIC T6...T4 Gc
US/NEC	Class I Division 2 Groups A, B, C, D T6...T4 Class I, Zone 2, AEx ec ic IIC T6...T4 Gc
Can/CEC	Class I Division 2 Groups A, B, C,D T6...T4 Class I, Zone 2, Ex ec ic IIC T6...T4 Gc
US/NEC	Class II Division 2 Groups F, G T6...T4 Class III Zone 22 IIIB T ₂₀₀ 91°C
Can/CEC	Class II Division 2 Groups F, G T6...T4 Class III Zone 22 IIIB T ₂₀₀ 91°C

Temperature Classification

T4 Ta= -55°C to 85°C
T5 Ta= -55°C to 75°C
T6 Ta= -55°C to 60°C

7.2 US and Canadian Standards



5019817

Conforms to UL STDs 50, 50E, 61010-1, 60079-0, 60079-1, 60079-11, 1203, 60079-31, 60079-7, and 121201

Certified to CSA STDs C22.2#94.1, 94.2, 61010-1-12, 60079-0, 60079-1, 60079-11, 30, 60079-31, 25, 60079-7, and 213

7.3 Enclosure Ratings

NEMA 4X, IP66, Type 4X

7.4 Operating Ranges

7.4.1 Temperature

-55°C to +85°C

7.4.2 Input Voltage

30 volts

7.4.3 Current

4 to 20mA

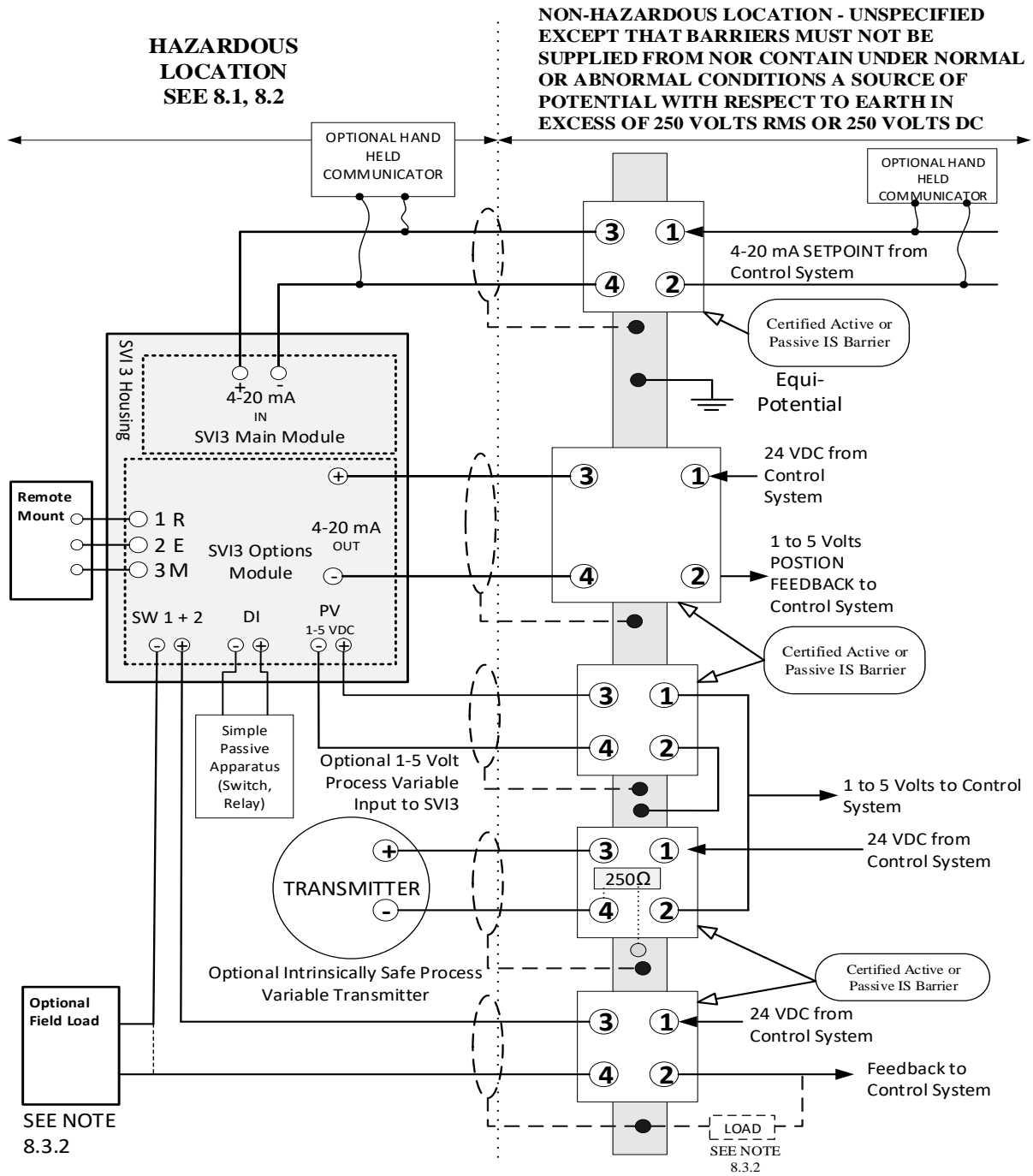
7.4.4 Supply Pressure

20 – 120 PSIG

Clean instrument air or Natural gas shall be used as supply sources.

8 Intrinsically Safe Installation Wiring Requirements

Each intrinsically safe cable must include a grounded shield or be run in a separate metal conduit.



8.1 Hazardous Location

Refer to the device label for the description of the environment in which the device may be installed.

8.2 Field Wiring

Intrinsically Safe wiring must be made with grounded cable or installed in grounded metal conduit. (CHAQUE CABLE A SECURITE INTRINSEQUE DOIT INCLURE UN BLINDAGE MIS A LA TERRE OU DOIT FONCTIONNER DANS UN CONDUIT EN METAL SEPRE) The installation including the barrier earthing requirements must comply with the installation requirements of the country of use.

Requirements:

(USA): ANSI/ISA RP12.6 Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations and the National Electrical Code, ANSI/NFPA 70.

CSA (Canada): Canadian Electrical Code Part 1.

ATEX (EU): Intrinsically safe installations must be installed per EN60079-10 and EN60079-14 as they apply to the specific category.

8.2.1 4 to 20mA Input Terminals

These terminals power the SVI3 and are equipped on the Main Module. This is a standard component within every SVI3 product.

Entity/NIFW Parameters:

Ui	Ii	Pi	Ci	Li
30 Vdc	125 mA	900 mW	6.5 nF	1 μH

8.2.2 Options Module:

All functions listed in this section are included with the Options Module peripheral.

WARNING: Using the Options Module in an I.S. installation will result in reduced T ratings from the base model. Please refer to Section 7.1 for ratings.

8.2.2.1 SW Output Terminals

There are two independent isolated switch contact outputs labeled SW#1 and SW#2. The switches are polarity sensitive, conventional current flows into the plus terminal.

Entity/NIFW Parameters:

Ui	Ii	Pi	Ci	Li
30 Vdc	125 mA	385 mW	5.1 nF	2.4 μH

8.2.2.2 Position Retransmit (0-20mA Output) Terminals

The position retransmit returns the measured position represented by a current value between 0-20mA. A certified active or passive barrier may be used for this connection.

Entity/NIFW Parameters:

Ui	Ii	Pi	Ci	Li
30 Vdc	125 mA	650 mW	9 nF	1 μH

8.2.2.3 Analog Input Process Variable Terminals:

The AI PV circuitry is an additional option for providing a transmitter input/signal to the SVI3 positioner.

Entity/NIFW Parameters:

U _i	I _i	P _i	C _i	L _i
30 Vdc	125 mA	900 mW	1 nF	0 μH

8.2.2.4 Digital Input Terminals:

By opening or closing the circuit input to the digital input terminals, the SVI3 can react according to the settings programmed by the customer.

Entity/NIFW Parameters:

U _o	I _o	C _o	L _o	P _o
5.4 Vdc	5.2 mA	64 μF	500 μH	7 mW

8.2.2.5 SVI3 Remote Terminals:

The remote position functionality is designed to be used with the Masoneilan SVI-II Remote Mount Position Sensor. The SVI-II Remote Mount Position Sensor is sold separately from the SVI3 positioner, and allows for a greater level of flexibility during the installation process. The Remote Positioning circuitry is located on the SVI3 Options card add on.

Entity/NIFW Parameters:

U _o	I _o	C _o	L _o	P _o
5.4 Vdc	5.8 mA	64 μF	500 μH	8 mW

8.3 Entity Requirement

Cable capacitance and inductance plus the I.S. apparatus unprotected capacitance (C_i) and inductance (L_i) must not exceed the allowed capacitance (C_a) and inductance (L_a) indicated on the associated apparatus. If the optional Hand-Held Communicator is used on the Hazardous Area side of the barrier, then the capacity and inductance of the communicator must be added, and the communicator must be agency approved for use in the hazardous area. Also, the current output of the Hand-Held Communicator must be included in the current output of the associated equipment.

The barriers may be active or passive and from any certified manufacturer as long as the barriers comply with the listed entity parameters.

8.4 Installation Restriction

A device which has previously been installed without an approved IS barrier must NEVER be used subsequently in an intrinsically safe system. Installing the device without a barrier can permanently damage the safety related components in the device making the device unsuitable for use in an intrinsically safe system.

9 Maintenance & Repair

NOTE: Only qualified service personnel are permitted to make repairs

WARNING: EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN A HAZARDOUS LOCATION.

REPAIR OF THE FLAMEPATHS OF THE EQUIPMENT IS NOT PERMITTED.

The addition or replacement of the any of the spare parts listed below are the only field repairs permitted. Replace ONLY with genuine Baker Hughes Masoneilan branded parts supplied by Baker Hughes. This includes the assemblies mentioned here but also mounting screws and gaskets. No substitutions with non-Masoneilan branded parts are permitted. Detailed replacement procedures are described in the Instruction Manual and within each of the spare parts kits.

For more information contact Masoneilan Dresser LLC/ 12970 Normandy Blvd. Jacksonville FL 32221 USA. Dresser LLC.

For assistance, contact the nearest sales office, your local representative or email svisupport@bakerhughes.com. Visit our web page at <http://valves.bakerhughes.com/>

Approved Spare Parts Modules:

- Options Module
- User Interface Module
- Blind User Interface Cover
- Main Electronics Module
- Threaded End Cover
- Conduit Entry Plug
- Pneumatics Module

10 Maintenance Connection

The Main Module contains a connection point for the installation of new firmware to the unit during its lifecycle. It is not intended for field use and has been designed to prevent connection to field wiring. This connection is not intended for customer use.

11 Revision history

The table below describes the revision history of this document.

A - Added M - Modified D - Deleted

Rev.	Changed figure, table, chapter	A M D	Title or brief description	Date
-	-	-	Initial Release	6/14/18
A	§8.2.2.1	M	Modify Entity Parameter Ci from 9 nF to 5.1 nF to match Rev. B Design	8/16/18

B	§2 & 4.1	M	Modify Model Code Identifier "G" and "H", added statement on replacement of NPT's	12/10/20
C	§2 & 4.1	D,M	ECO-0043804 - Removed note on use of Teflon tape, changed Model Code Identifier "H" such that any single character can be used, updated markings.	2/5/21
D	§8.2.2	M	Revision to entity parameters after final IS review by Intertek	2/26/21