

Certificate of Compliance

Certificate: 1399690 (LR 28549)

Master Contract: 152564

Project: 1399690 (Edition 1)

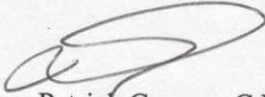
Date Issued: January 14, 2003

Issued to: **Moore Industries International Inc.**
16650 Schoenborn St.
Sepulveda, CA 91343-6196
USA

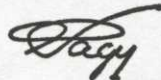
The products listed below are eligible to bear the CSA Mark shown



Issued by:


Patrick Conway C.E.T.
Certification Specialist

Authorized by:


Terry Nagy
Operations Manager

PRODUCTS

CLASS 2258-02 Process Control Equipment – For Hazardous Locations

Class I, Division 2 Groups A, B, C and D

Model HIM “Smart HART Loop Interface and Monitor” Rated input: 27Vdc(max), 190mA(max). Alarm output relays are capable of switching up to 5A (resistive) @ 250Vac. Signal outputs rated at 4-20mA
Ambient Temperature Range: -25°C to 70°C. Temperature Code T5

Note: Model HIM is of open type construction Certified as a component for use only in other equipment where the suitability of the combination is to be determined by the authority having jurisdiction.

APPLICABLE REQUIREMENTS

- | | | |
|-----------------------|---|--|
| C22.2 No. 0 – M91 | - | General Requirements – Canadian Electrical Code Part II |
| C22.2 No. 0.4 – M1982 | - | Bonding and Grounding of Electrical Equipment (Protective Grounding) |
| C22.2 No. 142 – M1987 | - | Process Control Equipment |
| C22.2 No. 213 – M1987 | - | Non-Incendive Electrical Equipment for Use in Class I Division 2 Hazardous Locations |



Supplement to Certificate of Compliance

Certificate: 1399690 (LR 28549)

Master Contract: 152564

*The products listed, including the latest revision described below,
are eligible to be marked in accordance with the referenced Certificate.*

Product Certification History

Project	Date	Description
1399690	January 14, 2003	Original Certification of Hazardous Locations Version of Model HIM "Smart HART Loop Interface and Monitor".

MASTER CONTRACT: 152564

REPORT: 1399690

PROJECT: 1399690

Edition 1: January 14, 2003; Project 1399690 - Edmonton
Issued by Patrick Conway C.E.T.; Reviewed by Andrew Redeker C.E.T.

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PRODUCTS

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- C22.2 No. 213 – M1987 - Non-Incendive Electrical Equipment for Use in Class I Division 2 Hazardous Locations

The test report shall not be reproduced, except in full, without the approval of CSA International.

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MARKINGS

- Submitter's Identification
- Model designation or equivalent
- Complete electrical ratings (27Vdc, 190mA input. Signal Output 4-20mA, Alarm Relay Output 5A (resistive) @ 250Vac) - Output ratings may appear in the user's/instruction manual.
- Ambient Temperature Range.
- Date Code or equivalent (minimum month and year of manufacture)
- CSA Monogram
- Hazardous Locations Class, Division and Gas Group.
- Temperature Code T5 (Optional)
- Caution Markings
 - (i) CAUTION: USE SUPPLY WIRES SUITABLE FOR 22°C ABOVE SURROUNDING AMBIENT. (or equivalent)
and
ATTENTION : UTILISER DES FILS D'ALIMENTATION QUI CONVIENNENT À UNE TEMPÉRATURE DE 22°C AU-DESSUS DE LA TEMPÉRATURE AMBIANTE.
 - (ii) CAUTION: SIGNAL WIRING CONNECTED TO THIS PRODUCT MUST BE RATED AT LEAST 250V (or equivalent)
and
ATTENTION: LE CÂBLAGE DE SIGNAL S'EST RELIÉ À CE PRODUIT DOIT ÊTRE AU MOINS 250V ÉVALUÉ
 - (iii) WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
and
AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2;
 - (iv) WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS;
and
AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DÉCONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX

ALTERATIONS

- Markings as noted above.

FACTORY TESTS

The equipment at the conclusion of manufacture and before shipment shall withstand for one minute, without breakdown the application of 500 Vac between extra-low voltage live parts and exposed non-current carrying metal parts, if such circuits leave or enter the enclosure.

DESCRIPTION

Model HIM is a HART interface module which allows up to three analog process variable measurements from a smart device with no additional process penetrations or wiring. Model HIM is designed to be installed transparently across a 4-20mA-instrument loop, the HIM will read the HART digital process signal that rides upon the loop wires. It converts the digital information to up to three isolated analog (4-20mA) process signals that are fed to control systems such as a DCS or a PLC.

Input/Output Options:

<u>Option Code</u>	<u>Description</u>
2AO	HART Input, 2 Analog Outputs
3AO	HART Input, 3 Analog Outputs
-2PRG	Dual Alarm Feature

1. **ENCLOSURE**

The enclosure is constructed of 1.17mm thick aluminum sheets secured to an extruded aluminum frame.

 - a. **Insulating Sheets**

2 sheets of Dupont TEIJIN Film is used to insulate the PWB conductors and components from the enclosure
 - b. **Bonding**

A ring-type connector connects the “GND” terminal from the “Power Terminal” Block to the enclosure.

2. **PRINTED WIRING BOARDS**

All printed wiring boards used on Model HIM are rated at 94V0. For Schematic Drawings refer to Illustration 2

 - a. **Terminal Board (PC2) :**
 - i. Terminal Block Headers CSA Certified. PCD Inc Model ELF H rated at 15A, 300V.
 - ii. Terminal Block Terminal CSA Certified. PCD Inc. Model ELF T rated at 15A, 300V
 - b. **Relay Board (PC4) :**
 - i. Relays (K401, K402) CSA Certified Omron p/n G6C-2114P-US with contacts rated at 250 Vac, 8A. Insulation Class B
 - ii. Fuse (F401) CSA Certified glass cartridge type rated at 250V, 0.5A. Not user replicable.
 - c. **Power Supply Board (PC5) :**
 - i. Transformer (T501) Moore Industries p/n 802-835-73 See Illustration 3
 - ii. Transformer (T501) Moore Industries p/n 802-833-73 See Illustration 4 (Included with –3AO Option)

ILLUSTRATIONS

<u>Figure #</u>	<u>Description</u>	<u>Drawing Number</u>	<u>Pages</u>	<u>Revision</u>
1	HIM-DIN Nameplate	200-251-2052	1	A
2	Transformer (T501) –2AO Output Version	802-835-73	1	B
3	Transformer (T501) –3AO Output Version	802-833-73	1	B
4	PWB Layout – PC2 Terminal Board	224-579-00	2	A
5	PWB Layout – PC3 CPU Board	224-580-00	1	A
6	PWB Layout – PC4 Relay Board	224-581-00	1	A
7	PWB Layout – PC5 Power Supply Board	224-582-00	1	A

PHOTOGRAPHS

1	Front View – Partially Disassembled
2	Rear View – Cover Off
3	Printed Wiring Boards

TEST REPORT

Edition 1, Project 1399690:

Model HIM was tested with output option -2A0 (2 analog outputs) and the -2PRG alarm relay option. The -2PRG option uses two Omron G6C-2114P-US relays.

Sealed Component Test C22.2 No. 213-M1987 Clause 6.7

Three samples of the Omron G6C-2114P-US relays were preconditioned for 7 days at 80°C then placed in 25°C water to a depth of 25mm for 1 minute. No bubbles appeared. Acceptable.

The following tests were taken from the General Locations report for model HIM, 152564-1399690:

Electrical Ratings C22.2 No. 142-M1987 Clause 6.3

Model HIM was connected to a source delivering 27Vdc. During normal operation model HIM was supplying two 20mA analog outputs and alarm relay outputs were switching 5A @ 250V. The measured current draw during this period was 135mA.

Temperature Testing C22.2 No. 142-M1987 Clause 6.4

The following temperatures were measured at the 85°C maximum ambient temperature originally requested for model HIM. Since not all components were rated for an 85°C ambient, Moore Industries revised their request. Temperature test results for model HIM were corrected to a 70°C ambient

T-Couple Location	Measured Temperature °C	Temperature Corrected to 70°C	Temperature Rise °C
Ambient	86.2	70	-
Transformer T301	108.7	92.5	22.5
Transformer T501	102.4	86.2	16.2
Output Relay #1	113.1	96.9	26.9
Relay Output Terminal Block	103.4	87.2	17.2
Input Terminal Block	97.9	81.7	11.7
Q505	103.9	87.7	17.7
Enclosure Frame (Top)	96.6	80.4	10.4

Results:

- Terminal Blocks shall be marked in accordance with clause 5.6 of standard C22.2 # 142 to ensure that supply conductors are properly rated.
- Other components are in compliance with Clause 6.4 and Table 5 of Standard C22.2 # 142.

For Class I Division 2 hazardous locations a temperature code of T5 would be applicable based on the maximum recorded ambient temperature of 96.9°C

Dielectric Strength Test
C22.2 No. 142-M1987 Clause 6.8

Immediately following the temperature-testing model HIM was subjected to the following dielectric strength tests:

- Between the 4-20mA input and alarm relay outputs: 1000Vac for 1 minute with no breakdown recorded
- Between the alarm relay output and the enclosure: 1000Vac for 1 minute with no breakdown recorded
- Between the 4-20mA input and the enclosure: 500Vac for 1 minute with no breakdown recorded.

Results: Satisfactory

Printed Wiring Board Conductor Spacing
C22.2 No. 142-M1987; Clause 4.14.1 and Table 4

Conductor Spacing on the printed wiring board were evaluated and determined to comply with the requirements of Clause 4.12.1 and Table 4 of C22.2 No. 142-M1987. Spacing measured on uncoated 250V portion of the circuit were 1.6mm. Conductor Spacing measured on the uncoated 27Vdc portion of the circuits were found to be in excess of the required 0.04mm spacing required for transients limited circuits.