



Certificate of Compliance

Certificate: 1652720 (LR 65090)

Master Contract: 175818

Project: 2264959

Date Issued: February 25, 2011

Issued to: Joemex Electric Corp.
Lu Dong Industrial Zone
Humen Town
Dongguan City, Guangdong 523935
China
Attention: YanXiao Dong

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Irfan Usmani

Issued by: Irfan Usmani

PRODUCTS

- CLASS 4823 03** - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT -
Motor Protectors
- CLASS 4823 83** - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT -
Motor Protectors-Certified to U.S. Standards

Thermal Protector, 78 Series, rated 125/250V ac, 1 HP, 6000 cycles, max calibration temperature 135°C.

Notes:

1. Above model is Certified as a component of other CSA Certified equipment where the suitability of the combination is to be evaluated by CSA.
2. The device is an inherent overheating protective device, manual reset type, intended to be mounted within motors.
3. The device is calibrated to open at a temperature specified by the model number code.
4. There are two types of terminals, plug-in and welded types. Suitability of terminals is subjected to evaluation in the end application.



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APPLICABLE REQUIREMENTS

CSA C22.2 No. 24 - Temperature-Indicating and - Regulating Equipment

CSA C22.2 No. 77 - Motors with Inherent Overheating Protection

UL 873 - Electrical Temperature Indicating and Regulating Equipment

UL 2111 - Overheating Protection for Motors



Supplement to Certificate of Compliance

Certificate: 1652720

Master Contract: 175818

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
2264959	February 25, 2011	Addition of alternate cover, push, case, fixed contact, and movable contact materials.
1652720	September 21, 2005	Original Certification



Descriptive and Test Report

MASTER CONTRACT: 175818

REPORT: 1652720 (LR 65090)

PROJECT: 2264959

Edition 1: September 21, 2005; Project 1652720 - Toronto
Issued by J. Kwong, P. Eng.

Edition 2: February 25, 2011; Project 2264959 - Toronto
Issued by Irfan Usmani, Reviewed by Jean-Pierre Boivin, Eng.

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Supplement to Certificate of Compliance - Page 1
Description and Tests - Pages 1 to 8
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Att2 Illustrations 1 to 2

PRODUCTS

CLASS 4823 03 - TEMPERATURE INDICATING AND REGULATING EQUIPMENT - Motor Protectors
CLASS 4823 83 - TEMPERATURE INDICATING AND REGULATING EQUIPMENT - Motor Protectors
CERTIFIED TO US STANDARDS

Thermal Protector, 78 Series, rated 125/250V ac, 1 HP, 6000 cycles, max calibration temperature 135°C.

Notes:

1. Above model is Certified as a component of other CSA Certified equipment where the suitability of the combination is to be evaluated by CSA.
2. The device is an inherent overheating protective device, manual reset type, intended to be mounted within motors.
3. The device is calibrated to open at a temperature specified by the model number code.
4. There are two types of terminals, plug-in and welded types. Suitability of terminals is subjected to evaluation in the end application.

APPLICABLE REQUIREMENTS

CSA C22.2 No. 24-93 (R 2003)	-	Temperature-Indicating and -Regulating Equipment
CSA C22.2 No. 77-95 (R 2004)	-	Motors with Inherent Overheating Protection
UL 873 (12 th Ed.)	-	Electrical Temperature Indicating and Regulating Equipment
UL 2111 (1 st Ed.)	-	Overheating Protection for Motors

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MARKINGS

Submittor's name and/or CSA File, model designation, calibration temperature, date code and CSA monogram with the C-US indicator.

ALTERATIONS

(a) Markings as above.

FACTORY TESTS

The equipment at the conclusion of manufacture, before shipment, shall withstand for one min, without breakdown, the application of 1000V ac plus twice the max rated voltage between live parts and exposed non-current-carrying metal parts. The factory test may be made at existing room temperature. As an alternative, a potential 20 percent higher may be applied for one sec.

Warning: The factory test(s) specified may present a hazard of injury to personnel and/or property and should only be performed by persons knowledgeable of such hazards and under conditions designed to minimize the possibility of injury.

DESCRIPTION

Min spacings requirement reference CSA Std C22.2 No 24, Table 3, and UL Std 873, Table.

Column F		
Voltage 0-300V		
Between any uninsulated live part and an uninsulated live part of opposite polarity, an uninsulated grounded dead metal part other than the enclosure, or an exposed dead metal part that is insulated.	Through air or oil	1.6
	Over surface	1.6
Between any uninsulated live part and the walls of a metal enclosure, including fittings for conduit or armoured cable.	Shortest distance	6.4

Series 78 (See Figs 1 & 2; Ills 1)

Nomenclature Breakdown:

78 01 - 01 04

Position I II III IV

- I. Indicates basic Type Number (78).
- II. Terminal Type
- III. Open temperature. See data.
- IV. Open temperature tolerances.

Open temperature data:

No.	Temp. (°C)	No.	Temp. (°C)	No.	Temp. (°C)
00	90	11	116	22	127
01	92	12	117	23	128
02	95	13	118	24	129
03	98	14	119	25	130
04	100	15	120	26	131
05	102	16	121	27	132
06	105	17	122	28	133
07	108	18	123	29	134
08	110	19	124	30	135
09	112	20	125	--	--
10	115	21	126	--	--

General: The thermal protector, 78 Series, is an inherent overheating protective device, manual reset type, intended to be mounted within motors. The device is calibrated to open at a temperature specified by the model number code. There are two types of terminals, Plug-in and Welded Types (See Ill 2).

1. **Cover:** Plastic, "G.E. Plastics Americas" (UL File E121562), Polybutylene terephthalate, Type 420, rated 140°C, 1mm thick, 26mm by 17.5mm by 8.5mm. Secured to case by ultrasonic riveting and fit of integral posts into holes of case.

Cover (alternate): Plastic, "E I Dupont De Nemours & Co Inc", Polyethylene Terephthalate (PET), Type FR530 or FR530L, rated V-0, 155°C. Secured to case by ultrasonic riveting and fit of integral posts into holes of case.

2. **Push:** Plastic, "Chang Chun Plastics Co Ltd" (UL File E59481), Phenolic, Type T308J, rated 150°C, minimum 1mm thick, overall 21mm long, 6mm deep by 2.5mm wide with a 6.5mm by 6mm by 1mm extension for breaking path between contact and terminal No. 1 when circuit is open.

Push (alternate): Plastic, "ChangShu South-East Plastic Co Ltd", Melanine Molding Compound, Type MF1I-5890, rated 150°C, minimum 1mm thick, overall 21mm long, 6mm deep by 2.5mm wide with a 6.5mm by 6mm by 1mm extension for breaking path between contact and terminal No. 1 when circuit is open.

3. **Case:** Plastic, "Chang Chun Plastics Co Ltd" (UL File E59481), Phenolic, Type T355J, rated 150°C, 1mm thick, 26mm by 17.5mm by 6.5mm. Secured to cover by ultrasonic riveting and fit of integral posts into holes of case.

Case (alternate): Plastic, "Chang Chun Plastics Co., Ltd.", Phenolic Molding Compound (PMC), Type T385J, rated 150°C. 1 mm thick, 26 by 17.5 by 6.5 mm. Secured to cover by ultrasonic riveting and fit of integral posts into holes of case.

4. **Spring:** Steel. Uncompressed length 10mm, 2.0mm OD. Fits within ridge of reset button.

5. **Fixed Contact:** Silver Copper Nickel Alloy (AgCuNi, 75% Ag & 25% CuNi), 3.5mm by 4.0mm, 1.5mm thick, welded to upside of terminal.

Fixed Contact (alternate): Silver cadmium oxide (88 % AG, 12 % CdO). 3.5mm by 4 mm, 1.5 mm thick. Welded to upside of terminal.

6. **Terminal No. 1:** Copper alloy, 0.7mm thick, 12.5mm by 5.6mm. Bent 85 degrees. Fits through 6mm by 1mm opening in case.

7. **Terminal No. 2:** Steel or Copper alloy, 0.7mm thick, 14mm by 8mm. Bent 90 degrees and welded to Bimetal. Fits through 6mm by 1mm opening in case.

8. **Terminal No. 3:** Steel or Copper alloy, 0.7mm thick, 14.3mm by 5.5mm. Bent 90 degrees and welded to heat wire. Fits through 6mm by 1mm opening in case.

9. **Bi-metal:** Measures 0.2 mm thick, 21 by 9.5 mm. Spot welded to terminal 2, consists of following materials. The different bi-metal specification match with different heat wire diameter after forming and varies with high expansions and low expansion temperature rating.

Main Supplier: TI Part NO.	Alternate Supplier: HOOD Part NO.
----------------------------	-----------------------------------

F-60R	HR-60
B-200R	R22-200
B-170R	R22-175
B-150R	R22-150
E-3	42-45

10. Heat Wire: Nickel Chromium alloy, 0.5mm to 1.2mm (varies with temperature rating) diameter. Overall length 25mm. Welded to rivet and terminal No. 3.
11. Washer: Steel or Copper alloy, 0.7mm thick, 4.0mm by 1mm. Riveted through 2mm diameter opening in bi-metal. Welded to heat wire.
12. Movable Contact: Silver/Stannum Oxide Alloy (AgSnO, 90% Ag & 10% SnO), 4.0mm diameter, 1.5mm thick, welded to underside of bi-metal.

Movable Contact (alternate): Silver cadmium oxide (88 % AG, 12 % CdO). 4 mm diameter, 1.5 mm thick. Welded to underside of Bimetal.
13. Screw: Copper alloy, 2.0mm diameter, 6.9mm long.
14. Power Wire: (C, UL) UL Style 3321/CSA Style 1503, No 18 AWG, rated 150°C, 600V. For model code numbers with calibrated open temperature 120°C to 135°C.

Alternate Power Wire: (C, UL) UL Style 3173/CSA Style CL1251, No 18 AWG, rated 125°C, 600V. For model code numbers with calibrated open temperature below 120°C.

Project 1652720: Addition of following alternate materials:

Cover (alternate): Plastic, "E I Dupont De Nemours & Co Inc", Polyethylene Terephthalate (PET), Type FR530 or FR530L, rated V-0, 155°C. Secured to case by ultrasonic riveting and fit of integral posts into holes of case.

Push (alternate): Plastic, "ChangShu South-East Plastic Co Ltd", Melanine Molding Compound, Type MF1I-5890, rated 150°C, minimum 1mm thick, overall 21mm long, 6mm deep by 2.5mm wide with a 6.5mm by 6mm by 1mm extension for breaking path between contact and terminal No. 1 when circuit is open.

Case (alternate): Plastic, "Chang Chun Plastics Co., Ltd.", Phenolic Molding Compound (PMC), Type T385J, rated 150°C. 1 mm thick, 26 by 17.5 by 6.5 mm. Secured to cover by ultrasonic riveting and fit of integral posts into holes of case.

Fixed Contact (alternate): Silver cadmium oxide (88 % AG, 12 % CdO). 3.5mm by 4 mm, 1.5 mm thick. Welded to upside of terminal.

Movable Contact (alternate): Silver cadmium oxide (88 % AG, 12 % CdO). 4 mm diameter, 1.5 mm thick. Welded to underside of Bimetal.

End of description.

TEST REPORT

The following tests were conducted per applicable requirements of CSA Std C22.2 No 24 and UL873.

Device Tested: Model 78 01 - 30 - 05

Marked Rating: 125V/250V ac, 1 HP, 6000 cycles, maximum calibration temperature 135°C.

Calibration: Cl 6.6/sec 44

Marked rating: - 135°C

Before endurance: -134°C

After endurance: -124°C

Overload: Cl 6.7/sec 45

Endurance: Cl 6.9/sec 46

TESTS TO BE CONDUCTED	Overload	Endurance		Overload	Endurance	
VOLTS	120	120	120	240	240	240
FREQUENCY	60	60	60	60	60	60
AMPERES	96	16	--	48	8	--
POWER FACTOR	40-50	70-80	--	40-50	70-80	--
NO. OF OPERATIONS	50	1000	5000	50	1000	5000
TEST RESULTS						
OPEN CIRCUIT VOLT.	118	118	118	241	242	242
CLOSED CIRCUIT VOLT.	118	118	118	241	242	242
AMPERES	96	16	--	48	8	--
WATTS	--	--	--	--	--	--
POWER FACTOR	48	74	--	43	75	--
ON TIME	3	21	21	2	45	58
OFF TIME	33	33	33	460	150	155
ENCLOSURE	Live	Live	Live	Live	Live	Live
METHOD OF OPERATION	Manual	Manual	Manual	Manual	Manual	Manual

Note: Model 78 01 - 00 - 05 was used for overload and endurance tests at 120Vac.

Dielectric Strength: Cl 6.10/sec 47

1480V ac for one minute.

Result: Satisfactory.

The following tests were conducted in requirement to CSA Std C22.2 No 77 and UL 2111.

Limited Short Circuit: Cl 5.8/Sec 18

Test Voltage: 250V ac

Test Current: 1009A

Power Factor: 99.2%

Phase: Single

Series Fuse: 250V ac, 35A, Type NRN manufactured by Ferraz-Shawmut

RESULTS:

Sample #	Series Fuse Opened?	Cotton Ignited?	Device Cycled?	Device Tripped?	Results
1	Yes	No	No	Yes	Acceptable
2	No	No	No	Yes	Acceptable
3	Yes	No	No	Yes	Acceptable

Remarks: Samples 1 and 2 were tested by closing the short circuit on the device. Sample 3 was tested by closing the device on the short circuit.

Device Tested: Model 78 01 - 00 - 05

Calibration: Std C22.2 No. 24-M1993, Cl. 6.6/UL Std. 873, Sec. 44

Marked Calibration Temperature: 90°C Limits: +10°C, -20°C

Sample Open @ 91°C

Device Tested: Model 78 01 - 15 - 05

Calibration: Std C22.2 No. 24-M1993, Cl. 6.6/UL Std. 873, Sec. 44

Marked Calibration Temperature: 120°C Limits: +10°C, -20°C

Sample Open @ 117°C

Device Tested: Model 78 01 - 25 - 05

Calibration: Std C22.2 No. 24-M1993, Cl. 6.6/UL Std. 873, Sec. 44

Marked Calibration Temperature: 130°C Limits: +10°C, -20°C

Sample Open @ 129°C

Edition2 (Project 2264959): The following tests were conducted by CSA International – Toronto.

A summary of the test results are summarized below. The complete Test Report can be found in the Test Data folder in Documentum.

Test Sample information: Thermal protector, 78 Series, rated 125Vac/16A or 250Vac/8A, 50/60Hz, calibration temperature 135°C.

Overload Test: Tested as per CSA C22.2. No. 24-93 (R 2003), Clause 6.7 and UL 873 (12th Ed.), Section 45.

Endurance Test: Tested as per CSA C22.2. No. 24-93 (R 2003), Clause 6.9 and UL 873 (12th Ed.), Section 46.

Test Conditions for model Thermal Protector, 78 Series				
	Endurance	Overload	Endurance	Overload
Voltage [Vac]	121	121	241	243
Frequency [Hz]	60	60	60	60
Amperes [Amps]	16.0	96.0	8.0	48.0
Watts	-	-	-	-
Power Factor	0.77	0.44	0.76	0.43
Number of cycles	6000*	50	6000*	50
ON Time [s]	130	2	135	2
OFF Time [s]	150	150	150	150
Method of Operation	Manual	Manual	Manual	Manual

*test conducted for 1000 cycles under load and 5000 cycles without load

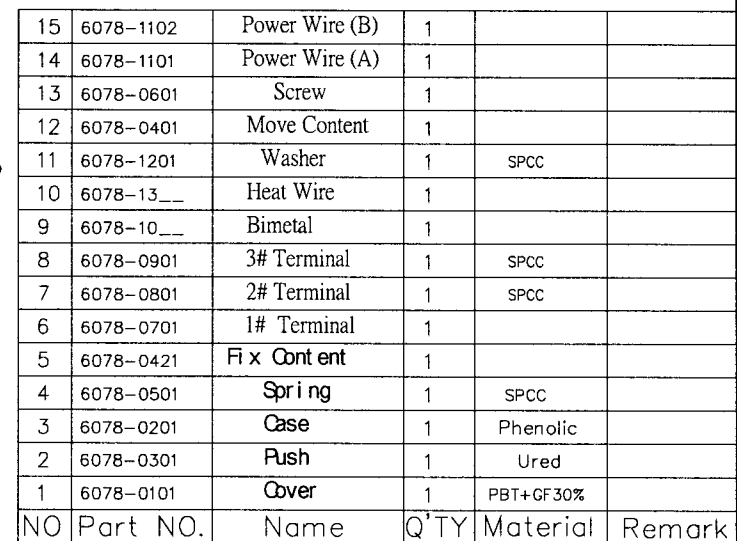
Tests completed successfully

Dielectric Strength Test: Tested as per CSA C22.2. No. 24-93 (R 2003), Clause 6.10 and UL 873 (12th Ed.), Section 47.

Test performed at the conclusion of the overload and endurance tests. 1500 Vac applied between primary and enclosure wrapped in foil for 1 minute. Test completed successfully.

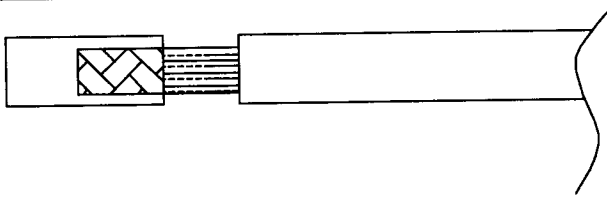
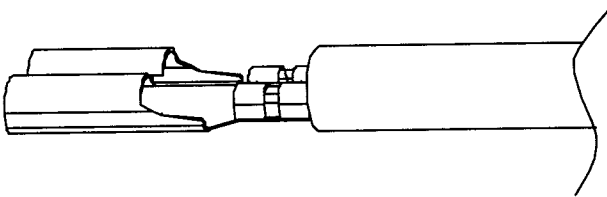
End of Test Report.

End of Report



Report: 1652720 ILL. 1
Project: 1652720

78 Series connected type

Sloder/Welded Type	
Plug In Type	

Report: 1652720 ILL. 2
Project: 1652720



FIG: 1: Model 78 01-15 05

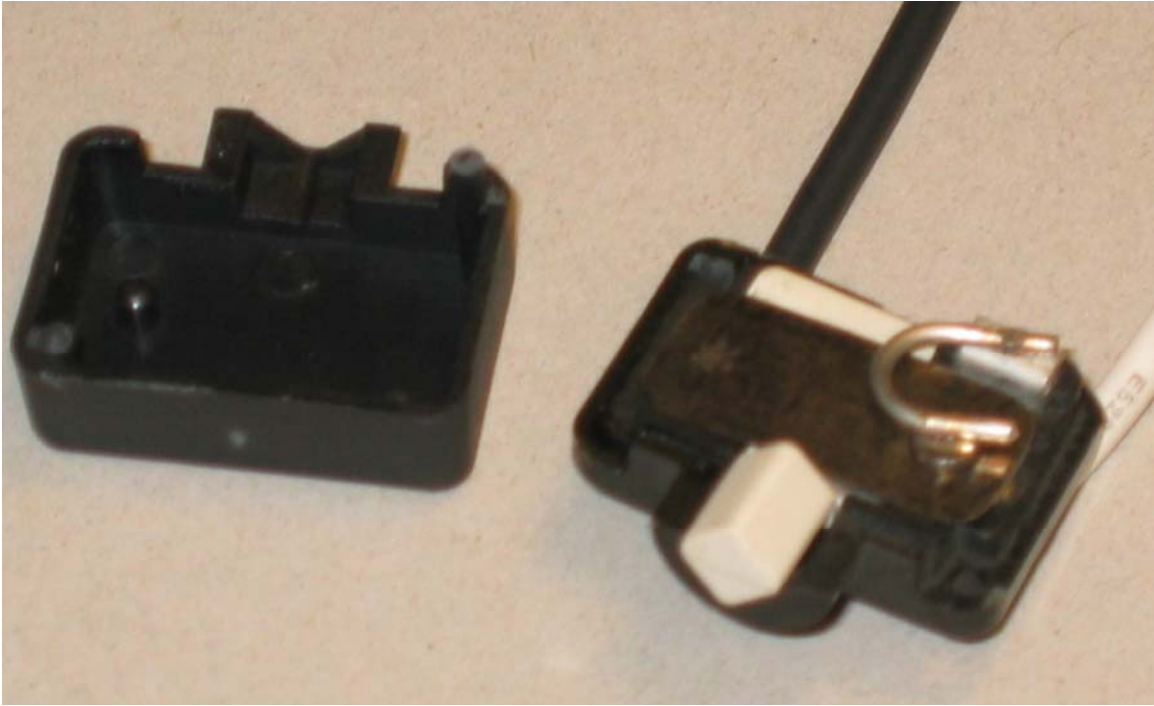


FIG: 2: Model 78 01-15 05 (Inside View)