DNV·GL

Certificate No:
TAE000000T

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Constant Voltage Charger

with type designation(s)
TraceNet TCM18 Series

Issued to
Thermon Manufacturing Co.
SAN MARCOS TX, United States

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Heat Tracing Control and Monitoring for installation in hazardous areas.
Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Voltage output	**100-600V (PM6)**
Power	**70W (TCM18)**
Temperature class	**B**
Vibration class	**A**
Humidity class	**A**
Enclosure class	**Up to IP54**

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2015-09-14**

for **DNV GL**

DNV GL local station: **Houston**

Approval Engineer: **Ludovico Gullifa**

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Product description

Type TraceNet TCM18 Series – The TraceNet TCM18 Series control and monitoring system is a modular control and monitoring system designed specifically for use with the manufacturer's heat trace circuits for temperature maintenance and freeze protection applications. The system provides for heat tracing control, alarm/trip for high temperature, high current, high ground leakage current, alarm only for low temperature (alarm only), low current, and damaged temperature sensor monitoring for up to 72 trace heater circuits and up to 144 RTD inputs per control panel. Minimum and maximum temperatures of the heat trace circuits are monitored continuously. Circuit operating information is available - retained at the local display and can be remotely communicated via two RS485 data highway communication ports to a centralized monitoring location.

Type TCM18/TCM18N - The TCM18/TCM18N is a multicircuit microprocessor-based temperature control and monitoring module developed specifically for heat tracing. The unit provides control and monitoring capabilities via digital information display for a maximum of 18 heat tracing circuits. The module can be configured for either process sensing control (with one or two RTDs for each circuit) or ambient sensing control (with a user's choice of one or two RTD inputs). The TCM18 provides circuit information and programming capability through the LCD digital display and its dedicated keypad on the front of the module. As a modular unit, the TCM18/TCM18N is typically located within an enclosure suitable for the application. For maximum versatility, multiple modules can be installed in a common enclosure. Individual six-point sensor modules handle input to and output from the TCM18 via ribbon cable connectors. Up to six input and three output modules can be connected to each TCM18/TCM18N. The TCM18N module is identical to the TCM18 module except for cosmetic differences on the front, including the LED and front membrane colors.

Type PMx – The PMx is a power switching module, provided with up to six solid-state relays mounted to a heat sink, for switching heat tracing circuits. The module may be provided with a circuit board for interconnecting terminals and for mounting of current transformers for monitoring current and ground-fault current. The PM6 single pole relay switching capacity is 30 Amps maximum at 120/240/600 Vac and the PM6DP double pole relay switching capacity is 15 Amps maximum at 280 Vac maximum. The PM3, provided with up to three solid-state relays mounted to the heat sink, includes single pole relays whose switching capacity is limited to 58 Amps maximum at 600 Vac maximum. The PM2, provided with up to two solid-state relays mounted to the heat sink, includes single pole relays whose switching capacity is limited to 73 Amps maximum at 600 Vac maximum. Maximum power consumption for each PMx circuit board (when provided) is 3 Watts. The PMx circuit board is powered at either 12 or 24 Vdc (programmable).

Type RM6 – The RM6 is a relay interface module, typically DIN rail mounted, to connect individual solid state or mechanical relays to ribbon cable(s) typically connected to the TCM18/TCM18N control module. This module permits the linking of individual solid state relays (and also for mechanical relays located in ordinary locations) via ribbon cables to the TCM18 module. The RM6 also is provided with individual terminal strips which allow the interconnection of individually mounted earth/ground leakage and heater operating current sensing transformers as well as the provision for the ground/earth leakage circuit fault test loop.

Type RTB6 – The RTB6 is an RTD interface module, typically DIN rail mounted, to connect up to six 3-wire 100 Ohm platinum RTD inputs to the TraceNet TC Series Heat Tracing Control and Monitoring System. The RTB6 circuit board is a passive device which communicates the discrete temperature inputs into a 26 pin bundled ribbon cable which then interconnects to a TCM18 control and monitoring module.

Type Designation Ref.	Ex Temp Class	ExtD Temp.Class	P Nominal (Watts)	Un (V)
TCM18	T4	N/A	70	100-240 Vac
PM6	T4	N/A	< 3	100-600 Vac
RM6	T4	N/A	< 2	12 or 24 Vdc
RTB6	T4	N/A	0	RTD Inputs Only

Application/Limitation

The installation has to be done in accordance with the installation instructions. Installation of equipment in DNV certified vessels shall comply with class requirements in each case. To be installed in an enclosure with an IP degree in accordance with DNV Rules w.r.t. location.

The Canadian standard CAN/CSA-C22.2 is regarded as similar to IEC 61010-1 (3rd edition).
The information related to EN certification from recognised test institution is taken as information only

Type Approval documentation

Tests carried out

DNV Standard	Release	General description	Limitation
2.4	2006	Environmental Test Specification for Instrumentation and Automation Equipment	

IEC/EN/ANSI/ UL/ISA/NEMA Standards	Release	General description	Limitation
IEC/EN 60079-0	2011/2012	Explosive atmospheres - Part 0: General requirements	
IEC/EN 60079-15	2010	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"	
IEC/EN 60529	2013	Degrees of protection provided by enclosures (IP Code)	
ANSI/UL 60079-0	2013	Explosive atmospheres - Part 0: Equipment - General Requirements	
ANSI/UL 60079-15	2012	Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'	
ANSI/UL 61010	3rd ed.	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements	
ANSI/IEC 60529	2004	Degrees of protection provided by enclosures (IP Code)	

IEC/EN 61000-3-2	2009	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	
IEC/EN 61000-3-3	2008	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection	
IEC/EN 61000-6-2	2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	
EN 55011	2007	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	

CSA Standard	**Release**	**General description**	**Limitation**
CSA C22.2 No.94.2	2007	Enclosures for Electrical Equipment, Environmental Considerations	
CAN/CSA C22.2 No.130-03	2013	Requirements for Resistance Heating Cables and Sets	
CSA/CSA C22.2 No.60079-0	2011	Explosive atmospheres - Part 0: Equipment - General requirements	
CAN/CSA C22.2 No.60079-15	2012	Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection "n" electrical apparatus	
CAN/CSA C22.2 No.60529-05	2010	Degrees of Protection Provided by Enclosures (IP Code)	
CAN/CSA C22.2 No.61010-1	2012	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements	

Marking of product

Thermon – Type designation – Voltage.

Periodical assessment

The scope of the periodical assessments to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE