

File E175531  
Project 10CA12264

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REPORT

on

PROGRAMMABLE CONTROLLERS

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## DESCRIPTION

## PRODUCT COVERED:

USL, CNL - Programmable controller, open type, Industrial Ethernet switch, cat. no. MACH104-20TX-F, followed by R or -4PoE, may be followed by additional suffixes.

## GENERAL

These devices are Ethernet network communication switches intended for use in industrial applications. They are microcontroller-based and communicate via interfaces through wire.

## RATINGS:

Cat. no.		Input 1	Input 2	Input/output communication
MACH104-20-TX-	F	100-240Vac, 0.4-0.2A	N/A	24 communication ports
	FR	100-240Vac, 0.4-0.2A	100-240Vac, 0.4-0.2A	
	F-4PoE	100-240Vac, 1.1-0.5A	N/A	

Relay contact ratings: 30 Vac 0.5A resistive load  
60 Vdc 0.3A resistive load

Max. surrounding air temperature: +50°C.

## TECHNICAL CONSIDERATIONS (NOT FOR UL REPRESENTATIVE'S USE):

CNL - Indicates investigation to Canadian National Standard(s) for Process Control Equipment, C22.2 No. 142-M1987.

USL - Indicates investigation to United States Standard for Safety for Industrial Control Equipment UL 508, Seventeenth Edition.

Note: CNL = Canadian National Standards - Listed.  
USL = United States Standards - Listed.

## NOMENCLATURE:

The significance of the alphanumeric marking system is explained as follows:

MACH104	-	20TX	-	F	-	4PoE
I		II		III		IV

## I: Switch type:

MACH104 Ethernet Switch, 4 x Gigabit ETHERNET combo port, MACH 100 Family

## II: Number of Gigabit ETHERNET ports:

20TX 20 x 10/100/1000 Mbit

## III: Switch type and redundant power supply:

F compact switch

FR compact switch, redundant power supply

## IV: Switch type

4PoE 4 x Power over Ethernet port

## CONSTRUCTION DETAILS:

The product shall be constructed in accordance with the following descriptive pages and accompanying photographs and illustrations.

Printed Wiring Board (ZPMV2) - rated min. 94V-2, suitable for direct support in accordance with UL 796, min. 125°C unless specified otherwise. Printed wiring boards may be optionally coated with a recognized conformal coating (QMJU2), rated minimum 125°C.

Internal Wiring - Unless otherwise specified, all internal wiring is Recognized Component Appliance Wiring Material (AVLV2/8) 90°C min., minimum size of 24AWG on the primary of the power supply unit(s).

Additional insulation - Recognized Component tubing (YDPU2/8), rated 105°C min. and suitable for the applicable voltage.

Spacings (including Power Supply Units), including spacings in primary circuits, including spacings between isolated secondary circuits and between isolated secondary circuits and primary circuits and including spacings between limited energy secondary circuit and ground, were evaluated according to following requirements:

## Clearances -

Standard	Voltage	Requirement
UL508, Table 36.1 Column B	51-300 V	1.6 mm
CAN/CSA C22-2 NO.142, Table 3, Item 2	31-150 V	1.2 mm
	151-300 V	1.6 mm

## Creepages -

Standard	Voltage	Requirement
UL508, Table 36.1, Column B	51-300 v	3.2 mm
CAN/CSA C22-2 NO.142, Table 3, Item 2	31-150 V	1.2 mm
	151-300 V	1.6 mm

## Spacings on Printed Wiring Boards -

Standard	Voltage	Requirement
UL508, Table 180.1, Transient voltages not Limited, Uncoated.	50 V	0.85 mm
	230 V	1.65 mm
CAN/CSA C22-2 NO.142, Table 4, Transients not limited, Uncoated.		

## CONSTRUCTION DETAILS (continued):

Spacings are not specified within isolated secondary circuits with respect to Table 32.0 of UL 508 and Clause 4.14.4b of CAN/CSA C22-2 NO.142.

Spacings at field wiring terminals were evaluated according to following requirements:

Standard	Voltage	Requirement
UL508, Table 36.1 Column B	31-300 V	6.3 mm
CAN/CSA C22-2 NO.142, Table 3, Item 2		

Grounding - grounding terminals are plainly identified and marked with "G", "GR", "GRD", "Ground", "Grounding" or equivalent.

Thermally Conductive Material - R/C (QMFZ2/8.E59150) designated Gap Pad VO Ultra Soft, manufactured by BERGQUIST CO., minimum 1.7 mm thick. Pieces of this material are placed between heat-generating semiconductors (IC2201, IC3501, IC3601) and housing. Used in order to heat dissipation into to the housing.

## MARKING:

Marking - Markings may be provided in French or English for Canadian markets. Ink-stamped label permanently secured to the device, including Listee's name or file number, device catalog number, month and year of manufacture, the electrical ratings and max. surrounding air temperature. In addition diagrams and instructions for installation shall be provided. Markings in the instruction manual:

- "Use 60/75 deg.C conductors only"
- "Use Copper Conductors only"
- "Maximum surrounding air temperature 50 deg. C"
- "For use in Pollution Degree 2 Environment"
- Tightening torque for field wiring terminals.