

Herstellererklärung Manufacturer`s Declaration of Conformity

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erklärt in alleiniger Verantwortung, dass das/die Produkt(e)
declares in sole responsibility, that the product(s)

MACH 1000 Ruggedized Switch Family

(Bezeichnung / Product description)

MACH1020 MACH1022, MACH1030, MACH1032, MACH1120, MACH1122, MACH1130, MACH1132

with the following possible product codes:

- MAR[10|11]20-[99] 12x[99|TTJJ|NN|VV|FF|RR|BB] [F] [C|G|L|M] [9|C|G|L|M]
[T] [n] [H] [H] [nn.n.nn]
- MAR[10|11]30-[CC|4O|4T|OT] 12x[99|TT|JJ|NN|VV|FF|RR|BB] [F] [C|G|L|M] [9|C|G|L|M]
[T] [n] [H] [H] [nn.n.nn]
- MAR1022-[MAR1122-] 99 2x[TT|RR] 10x[99|TT|JJ|NN|VV|FF|RR|BB]
[F] [G|M] [G|M] [T] [n] [H] [H] [nn.n.nn]
- MAR1032-[MAR1132-] [CC|4O|4T|OT] 2x[TT|RR] 10x[99|TT|JJ|NN|VV|FF|RR|BB]
[F] [G|M] [G|M] [T] [n] [H] [H] [nn.n.nn]

assembled with the transceivers M-Fast SFP-x, M-SFP-x.

(Typ, Erzeugnisnummer / Type, reference number)

mit den folgenden Normen oder normativen Dokumenten übereinstimmt
has been designed and manufactured in accordance with the following standards

**EN 50155:2017 – Bahnanwendungen – Umweltaforderungen
– Railway Applications – Environmental conditions**

Prüfung <i>Test description</i>	EN 50155 Kapitel / Section	Prüfstandard <i>Test Reference</i>	Anforderungen <i>Requirement</i>
Umgebungstemperatur <i>Operating temperature</i>	4.3.2	EN 60068-2-1, Ad EN 60068-2-2, Bd	Class OT4 -40 °C to +70 °C in rack
Einschalttemperatur <i>Start-up temperature</i>	4.3.3		Class ST1 OT over +15 K, 10 min.
Versorgungsspannung aus Batterie <i>Power supply from battery</i>	5.1.1	-	24 V, 36 V, 48 V 110 V
Überspannungstest <i>Over voltage test</i>	13.4.3.2	-	1.4 x UN during 1.0 s
Umschalten zwischen Spannungsversorgungen	13.4.3.3	-	Class C1 0.6 x UN during 100 ms

Switching between power supplies

(Total PoE load max. 15W)

Spannungsunterbrechungen 13.4.3.4
Power supply interrupts

Class S2
<= 10 ms

Prüfung
Test description

EN 50155
Kapitel / Section

Prüfstandard
Test Reference

Anforderungen
Requirement

Kälteprüfung
Low air temperature

13.4.4

EN 60068-2-1

Test Ad, -40 °C

Trockene Wärme
High air temperature

13.4.5

EN 60068-2-2

Test Be, +70 °C in rack
Cycle B: T start-up +15 K, 10 min.

Feuchte Wärme
Humidity

13.4.7

EN 60068-2-30

Test Db, 95 %

Low Temperature storage
Low Temperature storage

13.4.8

EN 60068-2-1

Test Ab, -40 °C

Elektromagnetische
Verträglichkeit
Electromagnetic compatibility

13.4.8

EN 50121-3-2:2016

Stehspannungsprüfung
Dielectric test

13.4.9

-

U_{rated} < 72 VDC: 750 VDC
U_{rated} ≥ 72 VDC ≤125 VDC: 1500 VDC

Isolationswiderstand
Insulation test

13.4.9

-

Test voltage: 500 VDC
Insulation resistance: > 20 MΩ *1)

Vibrationsprüfung
Vibration test

13.4.11

IEC 61373

Category 1, Class B
broadband noise 5-150 Hz
vertical axis:
1,0 m/s², life test: 5,72 m/s²
longitudinal / transverse axis:
0,7 m/s², life test: 3,96 m/s²

Schock
Shock

13.4.11

IEC 61373

Category 1, Class B
vertical axis:
30 m/s², 30 ms
longitudinal / transverse axis:
50 m/s², 30 ms

EN 50121-3-2: 2016 – Bahnanwendungen – EMV – Bahnfahrzeuge
– Railway Applications – EMC – Rolling stock

Prüfung
Test description

EN 50121-3-2
Kapitel / Section

Prüfstandard
Test Reference

Anforderungen
Requirement

Elektromagnetisches
HF-Feld
Radiated
electromagnetic field

table 5.1
table 5.2

IEC 61000-4-3
IEC 61000-4-3

80...1000 MHz, 20 V/m
1400...2000 MHz, 10 V/m
2000...2700 MHz, 5 V/m
5100...6000 MHz, 3 V/m

Statische Entladung
Electrostatic discharge

table 5.3

IEC 61000-4-2

±6 kV contact discharge
±8 kV air discharge

Leitungsgeführte HF-Störgrößen <i>Conducted disturbances</i>	table 3.1/ 4.1	IEC 61000-4-6	Signal ports, power ports: 10 V
Schnelle Transienten <i>Fast transient / burst</i>	table 3.2/ 4.2	IEC 61000-4-4	Signal ports, power ports: ±2 kV
Stoßspannungen <i>Surges 1,2/50µs</i>	table 3.3	IEC 61000-4-5	Signal ports, power ports: CM ±2 kV DM ±1 kV
Gestrahlte HF-Störaussendungen <i>Radiated Emission</i>	7	EN 61000-6-4	30...230 MHz: 40 dBµV/m (10m) 230...1000 MHz: 47 dBµV/m (10m) 1...3 GHz: 76 dBµV/m peak (3m) 56 dBµV/m av. (3m) 3...6 GHz: 80 dBµV/m peak (3m) 60 dBµV/m av. (3m)
Leitungsgebundene HF-Störaussendungen <i>Conducted Emission</i>	table 2.1	EN 55016-2-1	AC or DC power ports: 150...500 kHz: 99 dBµV qp. 500 kHz...30 MHz: 93 dBµV qp.

EN 50121-4:2016 – Bahnanwendungen / Railway Applications
– EMV – Signal und Telekommunikationseinrichtungen
– EMC – Signalling and telecommunication apparatus

Prüfung Test description	EN 50121-4 Kapitel / Section	Prüfstandard Test Reference	Anforderungen Requirement
Elektromagnetisches HF-Feld <i>Radiated electromagnetic field</i>	table 2.1 table 2.2	IEC 61000-4-3 IEC 61000-4-3	80...800 MHz, 10 V/m 800...1000 MHz, 20 V/m 1400...2000 MHz, 10 V/m 2000...2700 MHz, 5 V/m 5100...6000 MHz, 3 V/m
Magnetfelder mit energietechnischen Frequenzen <i>Power frequency magnetic field</i>	table 2.3	IEC 61000-4-8	16,7 Hz, 100 A/m 50 Hz, 100 A/m 0 Hz, 100 A/m No test required
Statische Entladung <i>Electrostatic Discharge</i>	table 2.4	IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge
Leitungsgeführte HF-Störgrößen <i>Conducted disturbances</i>	table 3.1/ 4.1/ 5.1/ 6.1	IEC 61000-4-6	Signal ports, power ports: 10 V
Schnelle Transiente <i>Burst</i>	table 3.2/ 4.2/ 5.2/ 6.2	IEC 61000-4-4	Signal ports, power ports: ±2kV

Prüfung Test description	EN 50121-4 Kapitel / Section	Prüfstandard Test Reference	Anforderungen Requirement
Stoßspannungen <i>Surges</i> 1,2/50µs	table 3.3/ 4.3/ 5.3	IEC 61000-4-5	Signal ports, power ports: CM ±2kV DM ±1kV
Gestahlte HF-Störaussendungen <i>Radiated Emission</i>	5	EN 61000-6-4	30...230 MHz: 40 dBµV/m (10m) 230...1000 MHz: 47 dBµV/m (10m) 1...3 GHz: 76 dBµV/m peak (3m) 56 dBµV/m av. (3m) 3...6 GHz: 80 dBµV/m peak (3m) 60 dBµV/m av. (3m)
Leitungsgebundene HF-Störaussendungen <i>Conducted Emission on AC or DC power ports</i>	table 1.1	EN 55016-2-1	Power ports: 150...500 kHz: 79 dBµV qp. 66 dBµV av. 500 kHz...30 MHz: 73 dBµV qp. 60 dBµV av.



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(i.V. Peter Schumacher
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(Ort und Datum / Issue place and date)