

# TYPE APPROVAL CERTIFICATE

DNV·GL

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the DNV GL Type Approval System.

Certificate No. **14 666 - 15 HH**

Company **Reichle & De-Massari AG**  
**Binzstrasse 32**  
**8620 Wetzikon, SWITZERLAND**

Product Description **Fibre optic interconnecting devices and passive components for the optical data transmission**

Type **LC / SC Connectors and Adapter; FO Field connectors LC / SC; SC-RJ Patch Cord IP 67; 19" Cabinets UniRack/Fibereasy Rack ; DIN Rail Adapter/Divider; Fiber Outlet; Mounting Frame IP54**

Environmental Category **A**

Technical Data / Range of Application **according Page 2 to 7 of this certificate**

Test Standard **IEC 61753-1:2008, 61300-3-1/4/6/15/16/17/22/23/33/34/35, 62150-3, 61300-2-1/2/4/5/6/7/9/12/17/18/22/26/35/42/44/46/47, 61200-3-4, 60529, 60068-2-30, EN 605529, EN 60068-2-6/27,**

Documents **Test report : R&M LC Connector Nov. 2011, SC Connector Aug. 2012, FO Field connector LC/SC May 2015, SC-RJ IP67 11/04 9/07, Mounting Frames IP54 9/08**

Remarks **This certificate is issued on the basis of GL Guidelines for the Performance of Type Approvals, Chapter 1 - Procedure (VI-7-1), Edition 2007.**

**Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**

Valid until **2020-09-27**

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File No. **I.N.02**

**Hamburg, 2015-09-28**

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## LC Connector / Adapter

**Connector / Adapter body: Composite**  
Temperature in operation: -25°C to +70°C

### Performance Connector according IEC 61753-1 / IEC 61300-3-34

Optical performance, IL	Grade A	Grade B	Grade C	Grade D
Insertion loss (IL) 97%	≤ 0.15dB	≤ 0.25dB	≤ 0.50dB	≤ 1.00dB
Insertion loss (IL) typical value	≤ 0.07dB	≤ 0.12dB	≤ 0.25dB	≤ 0.50dB

Optical performance, IL	Grade Am	Grade Bm*
Insertion loss (IL) 100%	≤ 0.25dB	≤ 0.50dB
Insertion loss (IL) 95%	≤ 0.15dB	≤ 0.25dB
Insertion loss (IL) typical value	≤ 0.10dB	≤ 0.15dB

Optical performance, RL	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Return loss (RL)	≥ 60dB mated	≥ 45dB	≥ 35dB	≥ 26dB	≥ 20dB
IEC 61300-3-6	≥ 55dB unmated				

### Performance Adapter according IEC 61753-1 / IEC 61300-3-4

Optical performance, IL	Grade C	Grade D	Grade M	Grade N
Sleeve material	Ceramic	Phosphor bronze	Ceramic	Phosphor bronze
Insertion loss (IL) delta	0.2dB	0.3dB	0.2dB	0.3dB

### Technical data in detail according data sheet:

R&M LC, LC-Duplex Connector VWL 064.478 23.01.2013 / V3.1 / Dei

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## SC Connector / Adapter

Connector / Adapter body: Composite  
Temperature in operation: -25°C to +70°C

### Performance Connector according IEC 61753-1 / IEC 61300-3-34

Optical performance, IL	Grade A	Grade B	Grade C	Grade D
Insertion loss (IL) 97%	≤ 0.15dB	≤ 0.25dB	≤ 0.50dB	≤ 1.00dB
Insertion loss (IL) typical value	≤ 0.07dB	≤ 0.12dB	≤ 0.25dB	≤ 0.50dB

Optical performance, IL	Grade Am	Grade Bm*
Insertion loss (IL) 100%	≤ 0.25dB	≤ 0.50dB
Insertion loss (IL) 95%	≤ 0.15dB	≤ 0.25dB
Insertion loss (IL) typical value	≤ 0.10dB	≤ 0.15dB

Optical performance, RL	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Return loss (RL)	≥ 60dB mated	≥ 45dB	≥ 35dB	≥ 26dB	≥ 20dB
IEC 61300-3-6	≥ 55dB unmated				

### Performance Adapter according IEC 61753-1 / IEC 61300-3-4

Optical performance, IL	Grade B	Grade C	Grade D	Grade M	Grade N
Sleeve material	Ceramic	Ceramic	Phosphor bronze	Ceramic	Phosphor bronze
Insertion loss (IL) delta	0.1dB	0.2dB	0.3dB	0.2dB	0.3dB

Technical data in detail according data sheet:  
R&M SC Connector VWL 064.208 12.02.2013 / V3.1 / Dei

## FO Field Connectors LC / SC

Connector body: Composite  
Temperature in operation: -10°C to +60°C

### Performance Connector according IEC 61753-1 / IEC 61300-3-34

Optical performance	Grade Bm <sub>r</sub> /3	Grade C <sub>r</sub> /2	Grade C <sub>r</sub> /1
Insertion loss (IL) 95%	≤ 0.50dB	≤ 0.50dB	≤ 0.50dB
Insertion loss (IL) typical value	≤ 0.20dB	≤ 0.20dB	≤ 0.20dB
Return loss (RL)	≥ 35dB	≥ 45dB	≥ 60dB
IEC 61300-3-6			(≥ 55dB unmated)

Technical data in detail according data sheet:  
R&M FO Field LC 01.07.2014 / V1.3 / Dei  
R&M FO Field SC 01.07.2014 / V1.0 / Dei

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## SC-RJ Patch Cord IP 67 including Optical Fibre Cable type approved with GL 24 367-04 HH

- SC Duplex connector in RJ45 format
- For Single- and Multimode, POF and PCF
- IP67 dust cap and pulling eye

Connector body: Composite  
Temperature in operation: -10°C to +60°C

Characteristics	Condition	OS1 KI. C (9/125)	OM2 (50/125)	PCF (200/230)	SI-POF (980/1000)
Wavelength	±30 nm	1310 nm	1300 nm	850 nm	660 nm
Type of cable		type approved with GL 24 367-04 HH			
Attenuation	typical	≤ 0,25 dB	≤ 0,35 dB	≤ 0,5 dB	≤ 0,40 dB
	Max.	≤ 0,50 dB	0,75 dB	0,75 dB	0,80 dB
Return loss		≥35 dB	≥20 dB	n.a.	n.a.

Technical data in detail according data sheet:  
R&M FO Connector SC-RJ IP67 VWL 064.459\_E

## 19" Cabinet

- Up to 48 connectors on one height unit (1U)
- Up to 96 connectors on two height unit (2U)
- Simple patch panel mounting and dismounting for splicing
- Little mounting depth of 230 mm
- Cable entry from the rear or from the side

Temperature in operation: -10°C to +60°C

Criteria	Date / value
Rack insert component	19" Cabinets
Connector type	LC-Duplex, SC-Simplex, SC-Duplex SC-RJ, E-2000™-Simplex, E-2000™-Compact, ST, FC
IP protection class	IP20

Technical data in detail according data sheet:  
R&M FO UniRack 1 Generation 10.07.2014 / V5.0 / Zr

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## DIN-Rail Adapter / Divider

### DRM45 DIN Rail Adapter

Mechanical Data	Value
Degree of protection	IP20
Connector interface	RJ45 / SC-RJ
Load ability	≥ 100N
Extraction force	≥ 40N
Ambient temperature (operation)	-10°C to +60°C

### Technical Data

Contact material	Brass (CuSn6) tin-plated
Housing material	PC-GF10

### Electrical Data

Contact resistance	≤ 5 mΩ
Input-output resistance	≤ 20 mΩ

Technical data in detail according data sheet:  
R&M DRM45 DIN Rail Adapter 03.10.2008

## DIN-Rail Divider

Material	AL + Steel Plate
Assembly	4 x LC-Duplex-Coupling OM3 incl. Pigtails

Technical data in detail according data sheet:  
R&M R106460-X Rail Housing 4xLC-Duplex OM3 V.1.1, July 2013

## Fiber Outlet

- Suitable for G.657 fibers
- Integrated, captive dust caps
- Suitable for splice and pre-termination
- Guaranteed bending radius of 15mm

Temperature in operation: -10°C to +60°C

Criteria	Date / value
Capacity of adapters	2
Capacity of fibers	4
Suitable for connectors	LC duplex, SC simplex, E2000 simplex
Suitable for type of splice protection	4x heat shrink protection (2.4 - 2.6mm in shrunk condition) 4x mechanical crimp splice protection

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<b>Material of housing / cover</b>	<b>Polycarbonate (PC-ABS) UL 94 listed</b>
<b>Material of Mounting plate</b>	<b>Aluminum tumble polish, flash-free</b>
<b>IP protection class</b>	<b>IP20 (protection against contact)</b>

Technical data in detail according data sheet:  
R&M WM FiberOutlet 2/1 03.07.2013 / V2.0 / Zr

## Mounting Frames IP54

- Rectangular socket insert for Freenet module
- In combination with Splash Line family
- Degree of protection class IP54
- Round panel cut-out M32 according EN 60423

Mechanical Data	Value
Load ability	≥ 60N
Degree of protection	IP54
Connector interface	RJ45 / SC-RJ
Round panel cut-out	Round cut-out M32
Ambient temperature (operation)	-25°C to +70°C

Technical Data	
Housing material	PA66/6
Cable seal material	NBR

Electrical Data	
Pollution degree	2

Technical data in detail according data sheet:  
R&M IP54 Mounting Frame Freenet 01.10.2008

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