BMR0 Modbus Plus
BMR1 S908 Remote I/O

Optical Link Modules
And Protocol Repeater

User Manual

BMR01MT
BMR01ST
BMR04MT
BMR04ST
BMR06RE

BMR11MT
BMR11ST
BMR14MT
BMR14ST

Introduction

BMRs are designed to be used in Modicon field bus optical repeater. They enable electrical MB+ or Remote I/O interfaces to be converted into optical interfaces.And BMR06s are designed to be used in Modbus Plus field bus cable segments.

- Model BMR04 provides a Fiber Optic Point-to-Point link between two Modb Plus connections. The Repeater contains one Fiber Optic Transceiver and one electrical interface for Modbus Plus.
- Model BMR01 provide Fiber Optic Bus and electrical Line -Drop links between Modbus Plus nodes or network segments. Each Repeater contains two Fiber Optic Transceivers and one electrical Modbus Plus interface.
- Model BMR14 provide Fiber Optic Point-to-Point link for Remote I/O connections. Each Repeater contains one Fiber Optic Transceivers and one electrical Remote I/O interface.
- Model BMR11 provide Fiber Optic Bus and electrical Line -Drop links between Remote I/O nodes or network segments. Each Repeater contains two Fiber Optic Transceivers and one electrical Remote I/O interface.
- Model BMR06 provide a link connection between two Modbus Plus segments. The Repeater contains two electrical interface for Modbus Plus.

Shows the different methods for connecting the modules, and the optical ranges of port

	Number of opticale ports	Fiber types	Connector type	distance
BMR04MT	1	Multimode	ST	0 - 3Km
BMR04ST	1	Singlemode	ST	0 - 20Km
BMR01MT	2	Multimode	ST	0 - 3Km
BMR01ST	2	Singlemode	ST	0 - 20Km
BMR14MT	1	Multimode	ST	0 - 3Km
BMR14ST	1	Singlemode	ST	0 - 20Km
BMR11MT	2	Multimode	ST	0 - 3Km
BMR11ST	2	Singlemode	ST	0 - 20Km

Shows the cable repeater productus list:

	Number of ports	Isolate Votage	Connector type
BMR06RP	2	>1500V	DB9(MB+)

Electrical connection to the Modbus Plus network is through the standard Modbus Plus 9–pin “D” connector. Connection to the Remote I/O network is through an “F”–style connector and external Modicon Remote I/O 14 db tap. The electrical port of the Repeater has the same network connections, specifications and restrictions as other Modbus Plus or Remote I/O devices, and must be treated accordingly.

For BMRs,by profiting from the familiar advantages of optical transmission technology, the modules can be integrated into existing Modbus Plus or Remote I/O bus networks. A complete modbus Plus or S908 Remote I/O field bus network with modules in point to point, line, star or ring topology, and an arbitrary combination of these, can also be built up.

The redundant ring is also supported, thereby increasing the fail-safety of the field bus network.

The device is powered by 24V DC voltage. A redundant feed increases operational safety.

For BMR06RE using protocol repeater transmission technology, the modules can be connect MB+ cable segments ,You require a repeater in the following situations:

When there are more than 32 stations (including repeaters) connected to the bus

When electrically isolated bus segments are required or

When the maximum cable length of a segment is exceeded

The optical fibers are connected using ST connectors.

6 multicolored LED indicate the current operating status

Segment monitoring at the optical line

Each receiver monitors the optical line port connected to it for recive framesand status. If faulty status are received by the receiver, or no single for recived, forwarding of the received signals is blocked until the port status is ok,frames can be received again correctly.

Network Topologies

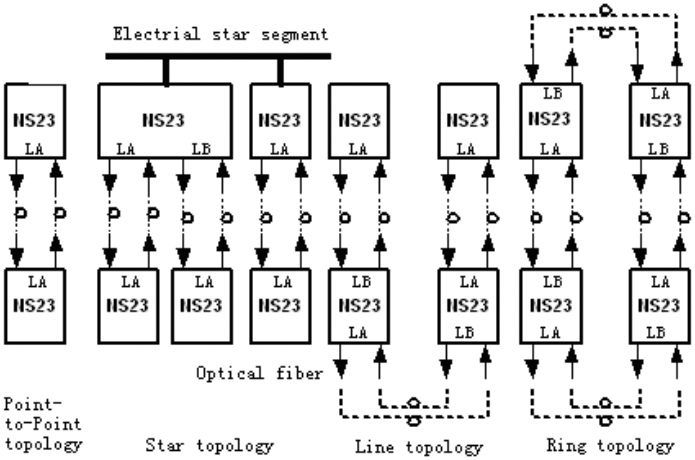
The following network topologies can be realized with the BMRs:

_ Point-to-point topologies

_ Line topologies

_ Star topologies

_ Redundant rings



Combinations of these basic types are also possible. Lines with two optical fibers are used to create the fiber links for these network topologies.If a malfunction – e.g. a break in a fiber line – makes a high degree of field bus network fail-safety necessary, the availability of the network can be increased using a redundant network configuration.

Line topology

In a line structure, the individual BMRs are connected together by dual-fiber optical fibers. Modules with one optical port are sufficient at the beginning and end of a line, between which modules with two optical ports are necessary.

If single point-to-point connections are to be built up, this can be achieved using two modules each with one optical port.

Star topology

Several modules are combined to form an active star coupler. Other modules are connected to this by dual-fiber optical fiber lines. The modules of the star coupler are connected to one another via the electrical port(electrical star segment)..All BMRs types for different fiber types can be combined using the electrical star segment.

Modules with one or two optical ports can be used to create an active star coupler. Modules with one optical port are sufficient for connecting a terminal or an cable bus segment to the active star coupler.

Redundant optical ring

This network topology represents a special form of line topology. A high degree of network perating safety is achieved by ”closing“ the optical line. A redundant optical ring can only be realized with modules with two optical ports of the same type.

An interruption of one or both optical fibers between two modules is detected by the BMRs and the ring is transformed into an optical line.If one module fails only those terminals connected to this module or the cable segment are uncoupled from the ring. The remainder of the network itself continues to function as a line. The error is indicated by the LEDs on the two BMRs connected to the malfunctioning optical fiber and their signaling contacts. The segmentation is lifted automatically as soon as both modules recognize that the segmented field bus network is functioning correctly with the help of test frames.

Setting Up

DANGER: Never connect the BMR to the main power supply.

WARNING: Do not look directly into the aperture of the optical transmitting diode or the optical fiber.The light beam which is emitted could endanger your eyesight.

Select the network topology which is most suitable for your requirements

Check and adjust (if necessary) the Switch Setting

The switch S7..S0 is used to setting the functional of bus alam config.

S0	■=1(default)	-Enabled optical port LB receiver alam
	■=0	-Disenabled optical port LB receiver alam
S1	■=1(default)	-Enabled optical port LA receiver alam
	■=0	-Disenabled optical port LA receiver alam
Others	■=1	- Reserved

Mount the modules

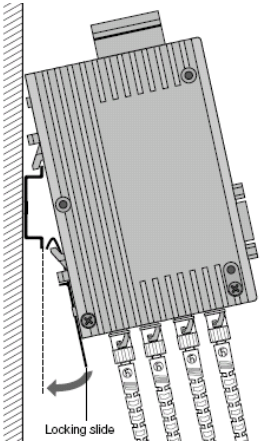
The modules can either be mounted on a 35 mm hat rail in accordance with DIN EN 50022 or directly on to a flat surface.

Connect the optical fiber line before mounting the module. This is easier than connecting it after the module has been installed.

Only mount the module on a low-impedance and low-induction grounded hat rail or base plate. No other grounding measures are required.

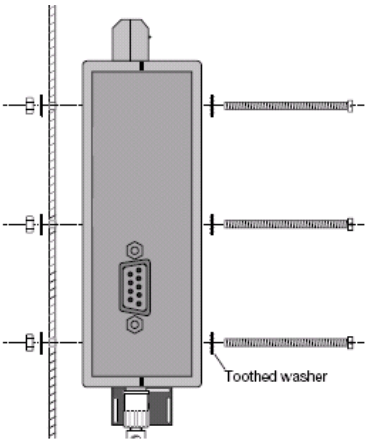
Mounting on a hat rail

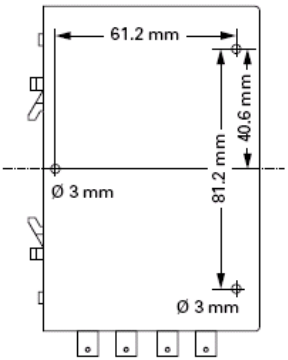
Hang the top snap-in hooks of the module into the hat rail and press the underside onto the rail (as show) until it audibly clicks in.
To remove the module, pull down on the locking slide.



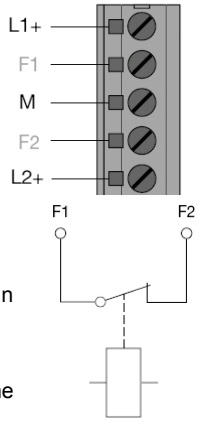
Mounting on a mounting plate

The modules have three through-holes. This allow it to be mounted on any flat surface, e.g. on the mounting plate of a switch cabinet.
Drill three holes in the mounting plate corresponding to the drilling template as show.
Secure the modules with machine bolts (e.g. M 3 x 40).
Ensure that there is a reliable electrical connection between the module housing and the mounting plate.
Place toothed washers under the bolt heads to pierce the varnish.





Connect the power supply and the signaling contacts



The terminal block can be removed from the device to connect the lines.It can be fed in using the 5-pin terminal block on the top of the module.
To increase operational safety, the module can be redundantly supplied via the terminals L2+ and M. In the event of a failure of the regular power supply, the module switches automatically to the redundant power supply. Load distribution between the individual alternative supply sources does not take place.
A relay with unconnected contacts as signaling contacts is fitted to the 5-pin terminal block on the top of the module. This signals faults and interference in the network and modules. The contact is open if a fault occurs. This also signals a total loss of power at the module.
The signaling contact can signal the failure of a single 24 V infeed. Both of the infeeds and the signaling contact must be connected to an input module for monitoring to take place.Clips on the terminal block ensure that it is securely attached to the device, and simultaneously provide polarity reversal protection.

Connect the Modbus Plus electric port with Modbus Plus drop cable

The BMR0s modules are fitted with one or two DB9 electrical port. Only use Modbus Plus drop cable(Modicon part number:990NAD21110 or 990NAD211130) as a bus line connection segment. Do not exceed the segment max lengths.
Each BMR0s connect to Modbus Plus trunk cable segment via an integral Modbus Plus Tap (modicon part number:990NAD23000) and Modbus Plus drop cable

1. One or two sections of network trunk cable should already have been run to the BMR0s Repeater site. Each set of cables should already have a network tap and a drop cable with connector installed. If the cables and connectors are not in place, install them.
2. Each of the cable segments should be labeled to identify the link to which it connects. If you are following a network layout diagram, it should show which cable connector is to be mated to each BMR0s connector.
3. If the cable segments are not labeled, or if you do not have a network layout diagram, you can still connect the cables to the BMR0s and test your installation. The one or two panel ports of the BMR0s operate identically. When you have connected the cables, document your connection to facilitate future maintenance.
4. Connect the one two cable connectors to the BMR0's panel connectors. If the network links are active, the unit's LED indicators should begin flashing.

Connect the Remote I/O electric port with drop cable

The BMR1s modules are fitted with one F connector electrical port. Only use S908 Remote I/O drop cable as a bus line connection segment. Do not exceed the segment max lengths.
Each BMR1s connect to Remote I/O trunk cable segment via an integral Tap (modicon part number:MA-0185-00 or MA-0186-00) and drop cable

Connect the Fiber optical lines

Connect the individual modules using a dual-fiber optical fiber line with ST connectors.
That the end faces of the optical plugs are free of contamination.That respectively one optical

inputaand one optical output are connected to one another (crossover connection). The port sockets which belong to one other are marked on the bottom of the front plate.The optical plugs on the ST socket are securely attached
Please note the maximum length of the optical fiber line and the possible fiber types which are used.

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LED Indicators and Signaling contact

For BMR01xx or BMR04xx or BMR11xx or BMR14xx:

LED	Indicator	Status	Signaling contact
MS	■not lit	-No power	| no signal
	■lights red	-System error; clock error ;hardware error	| signal
	■flashes green(2s)	-System OK	| no signal
LA,LB	■not lit	-No exit or no power	| no signal
	■lights/flashes red	-Opticale error; fiber error;device type error	| signal
	■flashes green	-Remote fiber receive error	| signal
	■lights green	-The opticale port is OK	| no signal
MB+/RIO	■not lit	-no power	| signal
	■lights red	-Bus error; cable error;terminator error	| signal
	■lights green	-The port is OK	| no signal
SD	■not lit	-No Data or no power	| no signal
	■lights/flashes green	-Receive opticale data and sent to bus	| nosignal
RD	■not lit	-No Data or no power	| no signal
	■lights/flashes green	-Receive bus data and sent to opticale	| nosignal

For NS 2306RE: MS.LA.LB is for Modbus Plus PortA, And MB+.SD.RD is for port B.

LED	Indicator	Status	Signaling contact
MS,MB+	■not lit	-no power	| signal
	■lights/flashes red	-Bus error; cable error;terminator error	| signal
	■lights green(4s/0.2s)	-Bus idle	| no signal
	■lights green	-The port is OK	| no signal
LA,SD	■not lit	-No Data or no power	| no signal
	■lights/flashes green	-Receive opticale data and sent to bus	| nosignal
LB,RD	■not lit	-No Data or no power	| no signal
	■lights/flashes green	-Receive bus data and sent to opticale	| nosignal

Technical Data

Voltage/power supply

Operating voltage	9 V to 30 V DC, typ. 24 V,
Current consumption	typ. 120 mA@24V
Signaling contact	Max .switch DC24V@2A or AC125@0.2A

Signal transmission

transmission rate	1 Mbit/sec for Modbus Plus 1.544 Mbit/sec for Remote I/O
Bit error rate	< 10-9

Retimer (Optic port)

Delay Times	About 1 us
Pulse Width Distortion/Jitter	±10ns(Cascade 50 modules)
Cascade modules	50

Electrical port

Input/output signal	Modbus Plus or S908 Remote I/O
Isolate voltage	>= 1500VDC
Connector	Modbus Plus connection via 9–pin “D” connector Remote I/O via “F” Connector

Optical ports

Wavelength	1310 nm
optical power	
– in glass fiber 9/125um	-9dBm – -18 dBm
– in glass fiber G 62.5/125	-13 dBm – -20 dBm
Receiver sensitivity	-34dBm
Transmission distance	
–with glass fiber 9/125um	0 – 20,000 m (0.5 dB/km)
– with glass fiber G 62,5/125	0 – 3,000 m (3.0 dB/km)
Connector	ST

Electromagnetic compatibility (EMC)

Limit class B (EN 55022)
EN 61000-4-2
EN 61000-4-3)
Burst:On power supply lines and Cable lines: ±2 kV (EN 61000-4-4)
Surge:Power lines: ±1 kV symmetrical,Cable lines: ±2 kV asymmetrical (EN 61000-4-5)

Others

Ambient temperature	-25 °C to +75 °C
Storage temperature	–40 °C to +85 °C
Relative humidity	<95 %, non-condensing
Protection class	IP 40
Dimensions (W x H x D)	40 x 110 x 74 mm
Housing material	Die-cast zinc
Weight	approx. 500 g

Support

Email: sales@buenoptic.net
Http: www.buenoptic.net