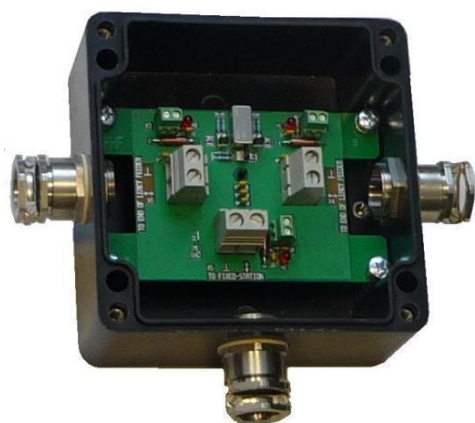


Splitter Type MRSP01

Order information

Name	Type	Part No.
Splitter	MRSP 01	133 822 11 AX



- **Splitting of Leaky-Feeder Cables and Radio Signals**
- **Low coupling/splitting loss**
- **Distribution of Remote Power Voltage**
- **Low Weight**
- **Rugged Construction**
- **I M1 EEx ia I**

Usage

The splitter type MRSP01 is part of the intrinsically safe underground radio system MR90 and is used in hazardous firedamp areas, realized in safety class EEx ia I. The splitter is placed in the cable run of the leaky-feeder RF coaxial cable. It is used to split the leaky-feeder trunk-line at branches and crossings or the like. It splits up the signals transmitted on the leaky-feeder cable in even parts and nearly loss-less to the connected branches. By means of this splitter the supply energy for a remote powering of further line amplifiers can optional be coupled from or to the different branches.

Operation

The electronics of the splitter type MRSP01 is built into a boxed plastic housing with a lid. All electronic parts, indicator elements and connector parts are placed on a printed circuit board mounted in the housing. Three RF screw terminals are used to connect the branches of the leaky-feeder cable. There is one terminal available for the connection of the leaky-feeder cable leading to the base station and two terminals for the branches leading to the leaky-feeder

cable ends. The leaky-feeder cable leading to the base station is connected to the terminal X5 (1, 2), the branches leading to the leaky-feeder cable ends are connected to the terminals X4 (1, 2) and X6 (1, 2). Mainly the electronics consists of a hybrid power splitter, which divides the RF signals of the trunk line nearly loss-less to even parts into both branch lines. The hybrid power splitter leads the RF signals coming from one leaky-feeder end into the direction of the base station with an attenuation of approx. 4 dB. The other leaky-feeder end is strongly decoupled from this signal. The hybrid power splitter splits signals coming from the base station into two even halves leading to the leaky-feeder ends. Here too the attenuation is approx. 4 dB. The leaky-feeder sections are DC isolated/blocked from each other by internal capacitors. The LED's H1 to H3 indicate the availability of a DC remote power supply on the respective leaky-feeder terminal. By appropriate wiring of the terminals X1 (1, 2), X2 (1, 2) and X3 (1, 2) the DC remote power supply available on one leaky-feeder branch can be distributed to one or both of the other leaky-feeder branches.

Splitter Type MRSP01

For measurement purposes a $50\ \Omega$ terminator can be assigned to each of the leaky-feeder terminals or the hybrid coupler output with a jumper. For normal operation the jumpers are set for signal passing, so that the terminators are not activated.

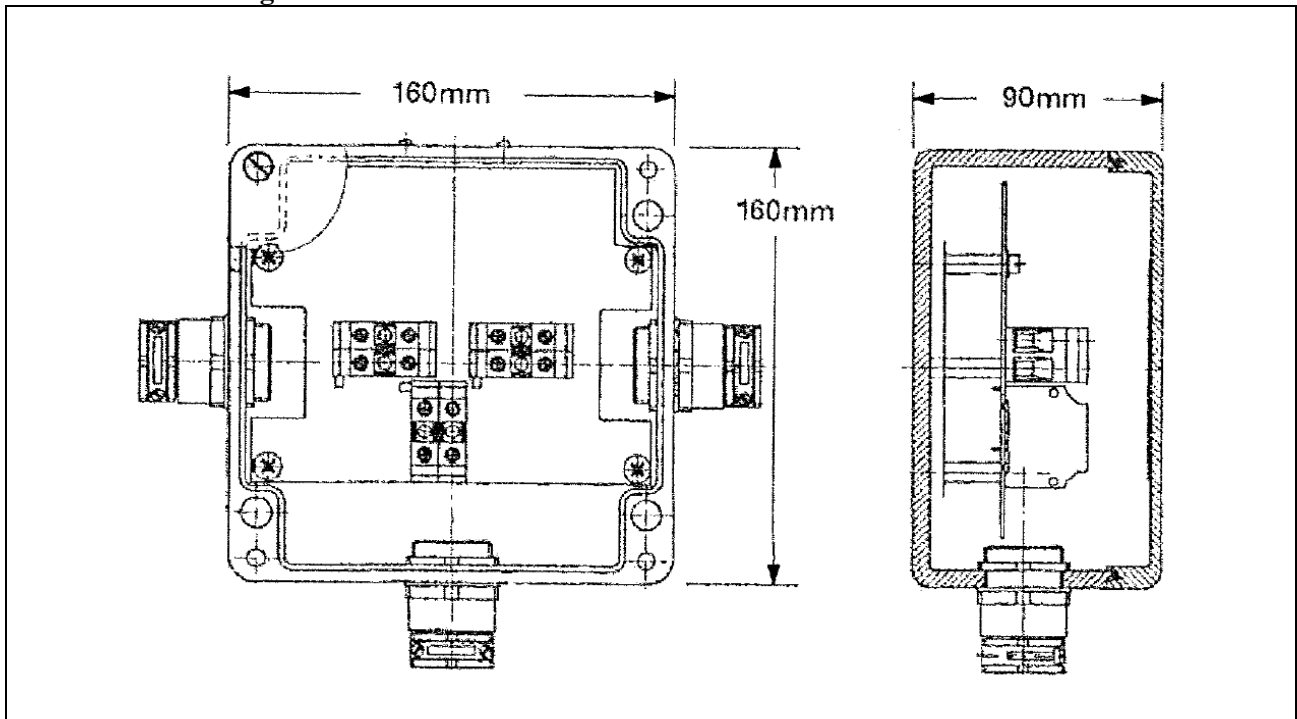
Construction

The electronics of the splitter type MRSP01 is built into a boxed plastic

housing. The material for the lid and the case is fibre-glass-reinforced conductive polyester. The housing lid is fastened to the base with four captive screws. Lid and base are sealed by an elastic rubber seal inserted into the lid. The housing complies with a housing protection of IP 54 according to EN 60529. The type label is fixed to the housings base.

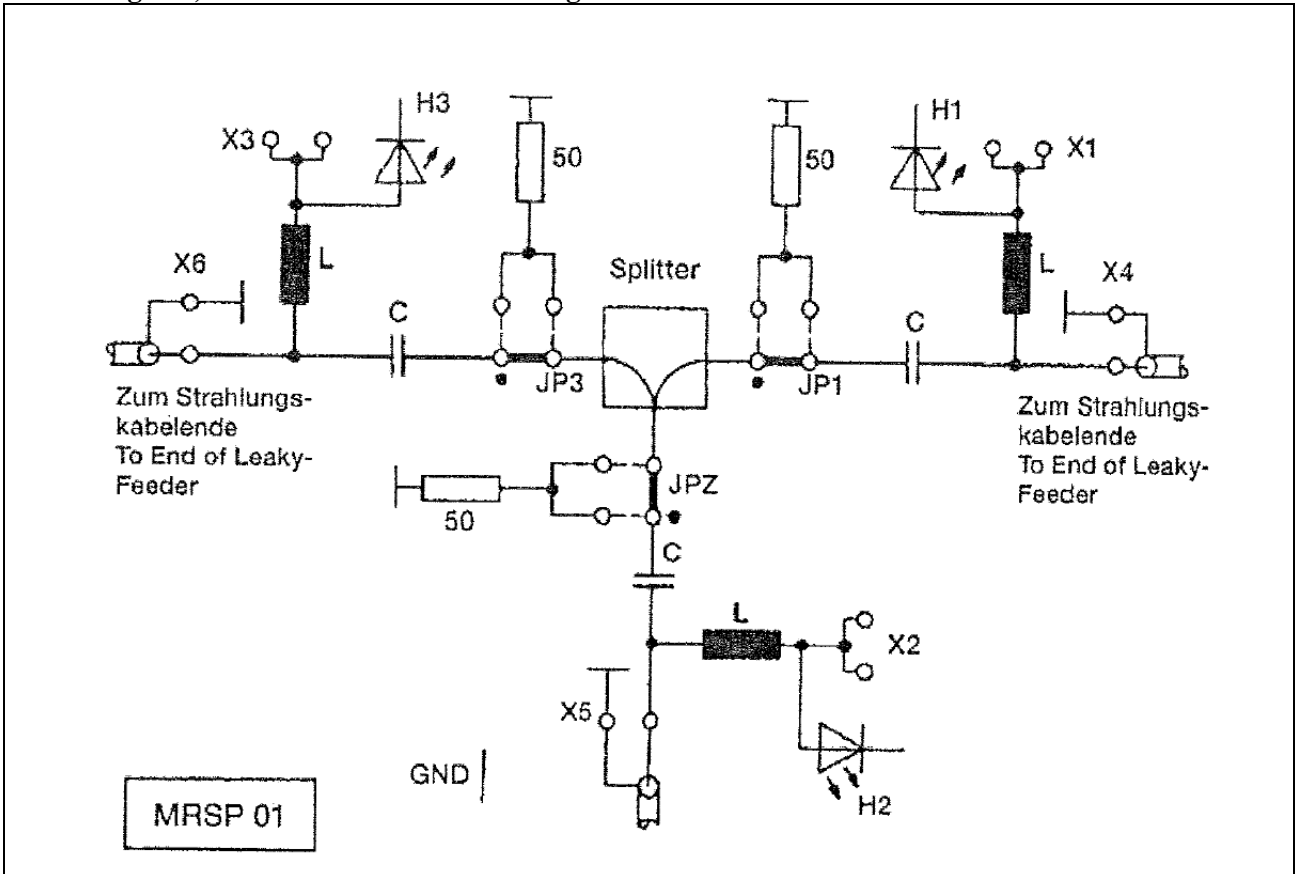
All electronic components, indicator elements and connective parts are placed on a printed circuit board and fixed to the bottom of the base with four studs. For the insertion of the leaky feeder cables, cable glands on three sides of the housing base are provided. On delivery the cable glands are sealed with dust protectors.

Dimensional drawing



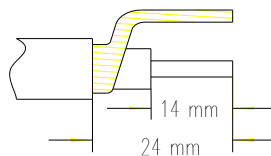
Splitter Type MRSP01

Block Diagram, Terminal connection drawing



Mounting

The splitter type MRSP01 housing provides four drill holes for fastening on mounting rails or mounting plates. The drill holes are accessible after removing the lid and suitable for screws with a diameter of up to 6 mm. It's advantageous to mount the housing in a way that one cable gland is downward-pointing, while the two others are pointing sideways. The leaky-feeder type SK03 is suitable for the connection to the splitter type MRSP01. Before connecting the cable, the cable gland screws must be loosened, the dust protectors must be removed and the moveable part together with the sealing ring must be pushed over the cable end. The cable end should be stripped as shown in the following drawing:



Then the wires of the outer conductor should be combined and twisted, the cable end should be inserted through the cable gland into the housing, the inner conductor should be connected to the terminal with the \ominus label and the outer conductor (shield) to the terminal with the \perp label. The moveable parts of the cable gland should be screwed in, so that the cable entry is sealed properly by the sealing ring. While fastening the cable gland cleat it must be paid attention that on the one hand a proper strain relief is achieved and on the other hand the cable may not be deformed too strong.

Splitter Type MRSP01

Setup

For normal operation the jumper JP 1, JP 2 and JP 3 must be set for interconnection (as shown on the circuit board shown with the '—' printing). The splitter type MRSP 01 itself uses only passive electronic components but permits the pass-through of remote power DC-energy to supply line amplifiers on one or two of the other leaky-feeder sections. To show the availability of a DC remote power supply the splitter provides light emitting diodes. One LED is assigned to each leaky-feeder terminal. If the LED is on, DC remote power is available on the assigned terminal.

Leaky-feeder terminals leading remote energy from different intrinsically safe power supplies may **never** (!!) be connected each other by inserting a shunt-wire on the terminals X1, X2 and X3 (in other words: If more than one LED lights up while all terminals X1, X2 and X3 are opened, no connection between the two or three jumper terminals may be made in any case).

Otherwise the explosion protection isn't guaranteed anymore!

Before installing the leaky-feeder network it must be planned carefully, which leaky-feeder sections must be supplied by a remote power supply and which shunt must be set to pass-through the energy.

For a power consumption plan, the LED, assigned to each leaky-feeder section, should be considered with a current consumption of 1,5mA, if necessary.

Maintenance

The device doesn't contain any parts to be maintained.

Splitter Type MRSP01

Technical Data MRSP 01

Name	Splitter
Type	MRSP 01
Part No.	133 740 13 AX
Electrical Characteristics	
RF leaky-feeder terminals X4 (1,2), X5 (1,2), X6 (1,2)	
Max. Voltage U_0	max. 22 V _{DC}
Internal Capacity C_i	0.36 μ F
Internal Inductivity	negligible
Current	Intrinsic consumption of approx. 1.5 mA for each LED H1, H2, H3. Otherwise depending on the used power supply and the connected consumers (line amplifiers)
Frequency range	20 MHz to 50 MHz
Max. Input RF Power P_i	< 1W/50 Ω = U _{RF} = 30 dBm (0 dBm = 1 mW on 50 Ω)
Terminal performance	approx. 4 dB terminal for the direction base station --> leaky-feeder end.
Klemmvermögen	10 mm ²
Only the leaky-feeder cable type SK 03 is intended for connection.	
Remote power jumper terminals X1 (1,2), X2 (1,2), X3 (1,2)	
Max. Voltage U_i/U_0	max. 22 V _{DC}
Current	depends on the power supply
Max. internal Capacity C_{int}	negligible
Max. internal Inductivity L_{int}	negligible
Terminal performance	2,5 mm ²
Optical indicators	
LED „H1“	DC power available on the right leaky-feeder branch to the leaky-feeder end
LED „H2“	DC power available on the leaky-feeder branch to the base station
LED „H3“	DC power available on the left leaky-feeder branch to the leaky-feeder end
General characteristics	
Housing	fibre-glass-reinforced polyester, colour: black Surface resistance $\leq 10^9 \Omega$
Housing protection	IP54 acc. to EN 60529
Operation Mode	permanent operation
Operation mounting position	any (preferred: cable gland downwards for leaky- feeder cable to base station)
Operation conditions	usage preferably in hazardous firedamp pit areas
Ambient temperature range	
- Operation	- 20 to + 55 °C
- Storage and transport	- 30 to + 70 °C
Weight	approx. 1.7 kg
Dimensions	160 x 160 x 90 mm
Cable glands	3 cable glands PG21 or M32 x 1.5
Explosion protection category / mode	I M1 EEx ia I
Certificate number	DMT 99 ATEX E 038

Splitter Type MRSP01

Labelling

Company

FHF Bergbautechnik

D-42551 Velbert

Type

MRSP 01

 I M1 EEx ia I

DMT 99 ATEX E 038

 0158

$-20^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$

F. No.: Test: (short sign, month/year)

Splitter Type MRSP01

Warning and safety instructions

This explosion-protected component in safety-class group I is designed for operation outside and inside of hazardous areas. Please pay particular attention to the following warning and safety instructions:

1. Any interconnection with other electric equipment must be especially certified.
2. The equipment must be connected and installed in accordance with the prescribed installation instructions by a trained specialist, taking the specified protection class into account. For operation of the equipment in commercial facilities the local accident prevention regulations for electrical plants and operating equipment have to be observed.
3. The device may be operated only with approved and certified (intrinsically safe) remote power supplies. Polarity signs must be observed.
4. Make sure that the housing is not damaged.
5. The device may be operated only under the specified ambient conditions. Unfavourable ambient conditions may damage the equipment and may possibly result into danger for the users life. Unfavourable ambient conditions could be:
 - Air humidity too high (>75% rel., condensing)
 - Moisture, dust (observe type of protection)
 - inflammable gases, vapours, solvents, not covered by the protection class
 - Ambient temperature too high (> +55°C)
 - Ambient temperature too low (< -20°C).
6. The ambient temperature for this explosion protected component may not fall outside the specified range during operation.
7. The specified operation position for the device must be observed.
8. The device is intended for operation in hazardous firedamp pit areas.
9. Only the certified cable glands specified by the manufacturer may be used.
10. Only the leaky feeder cable specified by the manufacturer may be used.
11. Replace faulty components only by the appropriate genuine spare parts.
12. Mounting and applying of additional parts is forbidden.
13. Corrective maintenance may be executed only by the manufacturer or by a person appointed by the manufacturer concluded with a renewed routine test of the equipment.
14. Make sure the device is protected against damage during transport, storage and when not in use.

The explosion protection is not guaranteed at nonobservance of the above mentioned points. In this case the device may be dangerous for the operator and may cause an explosion in hazardous atmospheres.

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D-42551 Velbert



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EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY

Wir erklären in alleiniger Verantwortung, dass das Produkt auf das sich diese Erklärung bezieht mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt:

Herewith we declare bearing sole responsibility that the product referred in this declaration is in conformity with the following standards or normative documents and regulations of the directive:

Bezeichnung Erzeugnis / Komponente Name of product or component	Leitungsverzweiger Splitter
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Geräte- oder Typenbezeichnung Equipment type or mark of equipment	MRSP01
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Bestimmung der Richtlinie Provisions of the directive	Nr. und Ausgabedatum der Norm(en) No. and date of issue of the standard(s)
94/9/EG: Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres	EN 50014:1992 General requirements EN 50020:1994 Intrinsic safety „i“ Pr EN 50303:1999 Group „I“ Category M1
EG-Baumusterprüfbescheinigung EC-Type-Examination Certificate	BVS 99 ATEX E 038
Benannte Stelle für die Bescheinigung Notified body of the certificate <i>Kennnummer/Inspection number</i>	0158
Benannte Stelle für die Überwachung Notified body of inspection	DEKRA EXAM GmbH Fachstelle für Sicherheit elektrischer Betriebsmittel – BVS Postfach 10 27 048 D 44727 BOCHUM

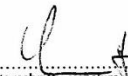
Hersteller / Anschrift Manufacturer / Factory address	FHF Bergbautechnik GmbH & Co. KG Eintrachtstr. 95 D – 42551 Velbert
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Geschäftsführer:
Managing director:

Dr. Opitz, Hans-Peter
.....
(name, prename)

Velbert
.....
(Ort / place)

9.4.09
.....
(Datum / date)


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(Unterschrift / signature)

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