www.westermo.com

MD-12

Short Haul Modem

General information

Legal information

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Under no circumstances shall Westermo be responsible for any loss of data or income or any special, incidental, and consequential or indirect damages howsoever caused.

More information about Westermo can be found at **www.westermo.com**.

Safety and Regulations

Warning signs are provided to prevent personal injuries and/or damages to the product.

The following levels are used:

Level of warning	Description	Consequence personal injury	Consequence material damage
 WARNING	Indicates a potentially hazardous situation	Possible death or major injury	Major damage to the product
 CAUTION	Indicates a potentially hazardous situation	Minor or moderate injury	Moderate damage to the product
 NOTICE	Provides information in order to avoid misuse of the product, confusion or misunderstanding	No personal injury	Minor damage to the product
 NOTE	Used for highlighting general, but important information	No personal injury	Minor damage to the product

Safety Information

Before installation:

Read this manual completely and gather all information on the product. Make sure that you understand it fully. Check that your application does not exceed the safe operating specifications for this product.

SAFETY DURING INSTALLATION

The product must be installed and operated by qualified service personnel and installed into an apparatus cabinet or similar, where access is restricted to service personnel only.

During installation, ensure a protective earthing conductor is first connected to the protective earthing terminal (only valid for metallic housings). Westermo recommends a crosssectional area of at least 4 mm2.

If the product does not have a protective earthing terminal, then the DIN-rail must be connected to protective earth. Upon removal of the product, ensure that the protective earthing conductor, or the connection to earth via the DIN-rail, is disconnected last.

HAZARDOUS VOLTAGE

Do not open an energized product. Hazardous voltage may occur when connected to a power supply.

PROTECTIVE FUSE

The power supply wiring must be sufficiently fused. It must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations.

Replacing the internal fuse must only be performed by Westermo qualified personell.

ELECTROSTATIC DISCHARGE (ESD)

Prevent electrostatic discharge damages to internal electronic parts by discharging your body to a grounding point (e.g. use a wrist strap).

Care recommendations

Follow the care recommendations below to maintain full operation of product and to fulfil the warranty obligations:

• Do not drop, knock or shake the product. Rough handling above the specification may cause damage to internal circuit boards.

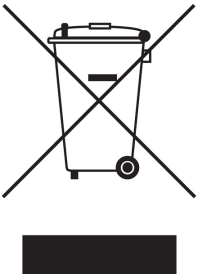
• Use a dry or slightly water-damp cloth to clean the product. Do not use harsh chemicals, cleaning solvents or strong detergents.

• Do not paint the product. Paint can clog the product and prevent proper operation.

If the product is used in a manner not according to specification, the protection provided by the equipment may be impaired.

If the product is not working properly, contact the place of purchase, nearest Westermo distributor office or Westermo technical support.

Product disposal



This symbol means that the product shall not be treated as unsorted municipal waste when disposing of it. It needs to be handed over to an applicable collection point for recycling electrical and electronic equipment.

By ensuring this product is disposed of correctly, you will help to reduce hazardous substances and prevent potential negative consequences to both environment and human health, which could be caused by inappropriate disposal.

Simplified EU declaration of conformity

Hereby, Westermo declares that the equipment is in compliance with EU directives. The full EU declaration of conformity and other detailed information are available at the respective product page at www.westermo.com.

Specifikationer

Överföring	Asynkront, full/halv duplex eller simplex
Gränssnitt 1	EIA RS-232-C/CCITT V.24/V.28 9-polig D-sub hylsdon / skruvplint
Gränssnitt 2	±10mA tri-state balanserad strömslinga
Överföringshastighet	0-38400 bit/s
Lysdioder	Power, TD, RD, RTS, DCD
Isolation	Fullständig galvanisk isolation med optokopplare (data) resp. transformator (matning)
Isolationsspänning	1500V
Överspänningsskydd	**Nät:** Genombrottsspänning 430V vid 230V AC och 220V vid 115V AC* **Gränssnitt 2:** Genombrottsspänning sändare 15V, mottagare 5,8V. Avledningsförmåga 0,6 kW under 1ms
Strömförsörjning	115V*/230V AC +15/–10% 48–62Hz
Säkring	100 mA snabb 5x20 mm
Effektförbrukning	Max 4VA vid 230V
Temperaturområde	5–50°C, omgivningstemperatur
Fuktighetsområde	0–95% RH, utan kondensation
Mått	55x100x128 mm
Vikt	0,4 kg
Montering	På 35 mm DIN-skena

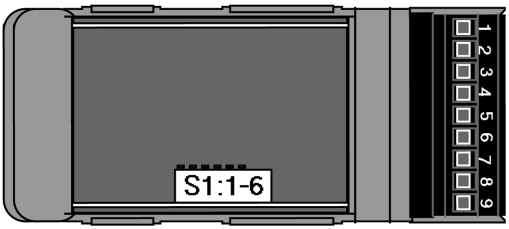
** Gäller endast MD-12 115V*

Inställningar

MD-12 kan genom switchinställningar anpassas till ett flertal olika driftförhållanden. Samtliga omkopplare i MD-12 görs åtkomliga genom att lådans lock avlägsnas.

VARNING. Öppna aldrig spänningssatt enhet!

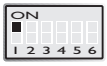
S1 Val av kontrollsignal för aktivering av sändare (bärvåg)
Val av signal för styrning av CTS



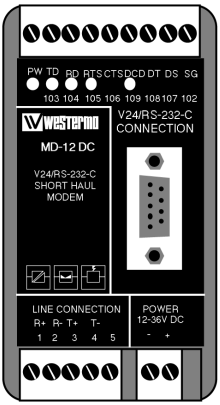
Sändare (bärvåg) aktiverad av

S1  Alltid aktiv

S1  RTS

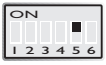
S1  DTR

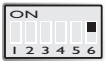
S1  DTR och RTS



CTS-styrning

S1  RTS

S1  Alltid hög

S1  DCD

Fabriksinställning

S1 

Anslutningar MD-12

Linjeanslutning
(5-polig skruvplint)

Riktning	Ansl. nr.	Benämning
Mottagare	1	R+
Mottagare	2	R–
Sändare	3	T+
Sändare	4	T–
	5	Skärm

Matningsanslutning (AC)
(3-polig skruvplint)

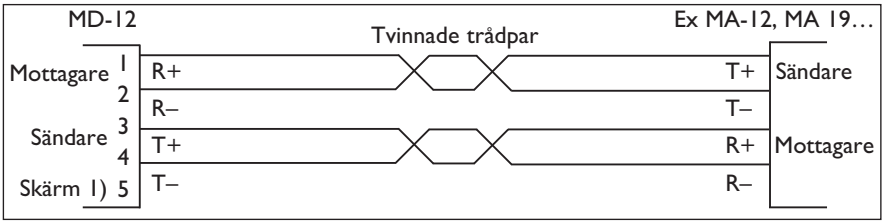
Ansl. nr.	Spännings-anslutning
N	230V
L	AC matning
⏚	Skyddsjord

Terminalanslutning (DCE)
(RS-232-C/V.24, 9-polig D-sub, hylsdon)

Riktning 1)	Stift nr.	Skruvplint nr.	CCITT V.24 Benämning	Beskrivning
I	3	8	103	TD/Transmitted Data
O	2	7	104	RD/Received Data
I	7	6	105	RTS/Request To Send
O	8	5	106	CTS/Clear To Send
O	6	2	107	DSR/Data Set Ready
–	5	9 & 1	102	SG/Signal Ground
O	1	4	109	DCD/Data Carrier Detect
I	4	3	108/2	DTR/Data Terminal Ready

I=ingång O=utgång. MD-12

Linjekoppling MD-12



1) Om skärmad kabel används, anslut skärmen endast i en ände för att undvika jordströmmar.

Överföringsavstånd (gränssnitt 2)

Kabel	Överföringshastighet bit/s						
42pF/m	600	1200	2400	4800	9600	19200	38400
0,3 mm^2	18000 m	12000 m	8000 m	5000 m	2500 m	1000 m	500 m

MD-12 DC

Specifikationer

Inspänningsområde: 12-36V DC*
Effektförbrukning: Max 3W
Isolationsspänning: 500V
Säkring F1 1,6A snabb 5x20 mm
I övrigt gäller MD-12 AC specifikationerna

Inställningar

Enligt MD-12 AC

Anslutning

Enligt MD-12 AC förutom matning

Ansl. nr.	Spännings-anslutning
1	– Spänning
2	+ Spänning

**) 36–55V DC option*

Specifications

Transmission	Asyncronous, full/half duplex or simplex
Interface 1	EIA RS-232-C/CCITT V.24/V.28 9-polig D-sub female / screw-terminal
Interface 2	±10mA tri-state balansed current loop
Data rate	0-38400 bit/s
Indicators	Power, TD, RD, RTS, DCD
Insulation	Galvanic isolation with opto-couplers (data transmission) and transformer (supply)
Insulation voltage	1500V
Overvoltage protection	**Mains:** Breakdown voltage 430V at 230V AC and 220V at 115V AC* **Interface 2:** Breakdown voltage transmitter 15V, and receiver 5,8V. Surge capacity 0,6 kW for 1ms
Power supply	115V*/230V AC +15/–10% 48–62Hz
Fuse	100 mA fast 5x20 mm
Power consumption	Max 4VA at 230V
Temperature range	5–50° C, ambient temperature
Humidity	0–95% RH, non-condension
Dimensions	55x100x128 mm
Weight	0.4 kg
Mounting	At 35 mm DIN-rail

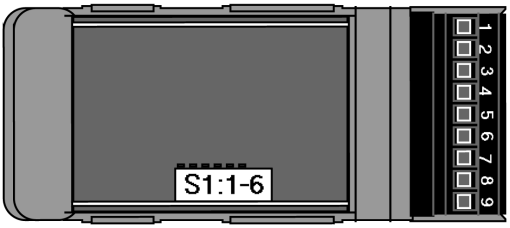
** Only MD-12 115V*

Switch settings

The MD-12 can through different switch settings be adapted to a variety of operating conditions. To set the switches, open the plastic case by removing the top cover.

ATTENTION. Never open live unit!

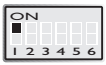
S1 Selection of signal activating transmitter (carrier)
Selection of signal controlling CTS



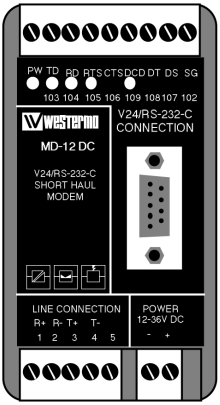
Transmitter (carrier) activated by

S1  Always active

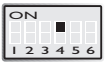
S1  RTS

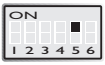
S1  DTR

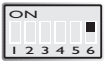
S1  DTR and RTS



CTS-control

S1  RTS

S1  Always high

S1  DCD

Factory settings

S1 

Connections MD-12

Line connections
(5-position screw-terminal)

Riktning	No.	Description
Receiver	1	R+
Receiver	2	R–
Transmitter	3	T+
Transmitter	4	T–
	5	Shield

Power connection (AC)
(3-position screw-terminal)

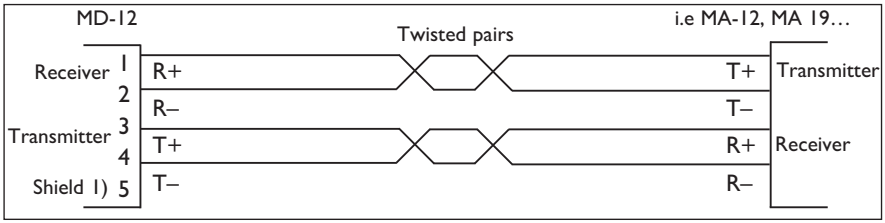
Screw no.	Power supply
N L	230V AC power
⏚	PE/Protective Earth

Terminal connection (DCE)
(RS-232-C/V.24/V.28, 9-position D-sub, female)

Direction 1)	Pin no.	Screw no.	CCITT V.24 Circuit no.	Description
I	3	8	103	TD/Transmitted Data
O	2	7	104	RD/Received Data
I	7	6	105	RTS/Request To Send
O	8	5	106	CTS/Clear To Send
O	6	2	107	DSR/Data Set Ready
–	5	9 & I	102	SG/Signal Ground
O	I	4	109	DCD/Data Carrier Detect
I	4	3	108/2	DTR/Data Terminal Ready

I=Input and O=Output on MD-12

Line connection MD-12



1) If shielded cable is used, connect the shield only at one end to avoid ground currents.

Transmission range (interface 2)

Cable	Transmission rate bit/s						
42pF/m	600	1200	2400	4800	9600	19200	38400
0.3 mm^2	18000 m	12000 m	8000 m	5000 m	2500 m	1000 m	500 m

MD-12 DC

Specifications

Power supply: 12–36V DC*
Power consumption: Max 3W
Insulation: 500V
Fuse F1 1.6A snabb 5x20 mm
All other specifications according to MD-12 AC

Switch settings

According to MD-12 AC

Connections

According to MD-12 AC, except power supply

Screw no.	Power Supply
1	– Voltage
2	+ Voltage

*) *36-55V DC option*

Technische Daten

Übertragunsarten:	Asynchron, Voll-/Halbduplex oder Simplex
Schnittstelle 1	EIA RS-232-C/CCITT V.24/V.28 9 polige Sub-D-Buchse, Schraubklemme
Schnittstelle 2	±10mA Tri-State Symmetrische Stromschleife
Übertragungsraten	0–38400Bit/s
Leuchtdioden	Betrieb, RD, DCD, RTS, TD
Isolation	Galvanisch Isoliert mittels Optokoppler (Datenübertragung) und Transformator (Spannungsversorgung)
Isolationsspannung	1500V
Überspannungsschutz	**Netz:** Durchbruchspannung 440V bei 230V AC und 220V bei 115V AC **Schnittstelle 2:** Durchbruchspannung Sender 15V und Empfänger 5,8V
Spannungsversorgung	230V +15/–10% 48–62 Hz
Sicherung	100mA 5x20 mm flink
Leistungsaufnahme	max. 4VA bei 230V
Umgebungstemperatur	5–50°C
Luftfeuchtigkeit	0–95%, nicht kondensierend
Abmessungen	55x100x128 mm
Gewicht	0,4 kg
Installation	auf 35 mm DIN-Schiene

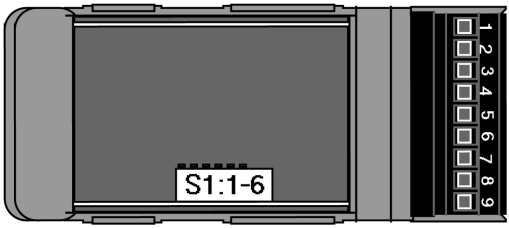
DIP-Schalter Einstellung

Das MD-12 bietet verschiedene Einstellmöglichkeiten zur Abstimmung auf verschiedenste Betriebsverhälnisse. Um die DIP-Schalter einzustellen muß die Gehäuseabdeckung z.B. mit Hilfe eines Schraubendrehers abgenommen werden.

S1 Auswahl des Aktivierungssignal des Senders (Träger)
Auswahl des Signals welches CTS steuert

S2 Auswahl der Spannungsversorgung 115/230V AC

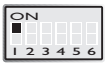
Achtung! Angeschlossene Geräte nicht öffnen



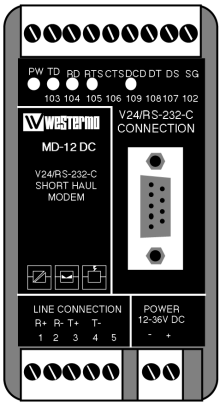
Sender (Träger) aktiviert durch

S1  Immer Aktiv

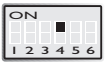
S1  RTS

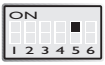
S1  DTR

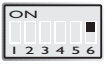
S1  DTR und RTS



CTS gesteuert von

S1  RTS

S1  Immer aktiv

S1  DCD

Werkseinstellung

S1 

Anschluß MD-12

Leitungsanschluß
(5-polige Schraubklemme)

Richtung	Nr.	Beschreibung
Empfänger	1	R+
Empfänger	2	R–
Sender	3	T+
Sender	4	T–
	5	Schirmung

Spannungsversorgung (AC)
(2-polige Schraubklemme)

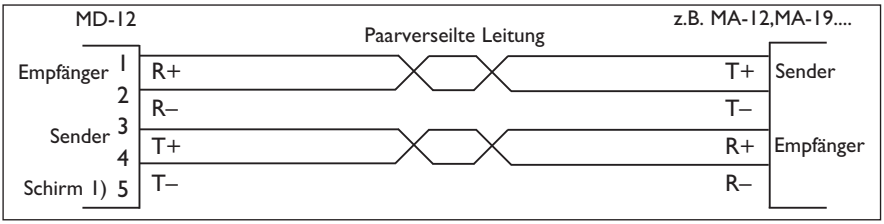
Klemme Nr.	Spg.-Versorgung
1 2	230 Volt AC Anschluß
⏚	PE/Schutzerde

Terminalanschluß (DÜE)
(RS-232-c/V.24/V.28, 9-polige Sub-D Buchse)

Richtung	Pin Nr.	Klemme	Nr.CCITT V.24 Bezeichnung	Beschreibung
I	3	8	103	TD/Transmitted Data
O	2	7	104	RD/Received Data
I	7	6	105	RTS/Request To Send
O	8	5	106	CTS/Clear To Send
O	6	2	107	DSR/Data Set Ready
–	5	9 & 1	102	SG/Signal Ground
O	1	4	109	DCD/Data Carrier Detect
I	4	3	108/2	DTR/Data Terminal Ready

I = Eingang O= Ausgang des MD-12

Leitungsanschluß MD-12



1) Bei Verwendung von abgeschirmten Kabeln den Schirm nur auf einer Seite anschließen um Erdströme zu vermeiden

Übertragungsweiten

Kabel	Übertragungsraten Bit/s						
42pF/m	600	1200	2400	4800	9600	19200	38400
0.3 mm^2	18000 m	12000 m	8000 m	5000 m	2500 m	1000 m	500 m

MD-12 DC

Technische Daten

Spannungsversorgung	12-36V DC*
Leistungsaufnahme	max. 3W
Isolationsspannung	1000V
Sicherung F1	1,6A 5x20 mm flink

Alle anderen Merkmale siehe MD-12AC

DIP-Schalter Einstellungen

Siehe MD-12AC

Anschlüsse

Siehe MD-12AC, außer Spannungsversorgung

Anschluß Nr.	Spannungs-versorgung
1	– Pol
2	+ Pol

**) 36-55V DC erhältlich*

Tips

Linjegränssnittet på MD-12 är kompatibelt med MA-12, MA-14, MA-18, MA-19, MM-13, MM-14, LA-01, LD-01 och LD-02.

MD-12 är DCE (Data Communication Equipment), vilket är det vanliga hos kommunikationsutrustning, ex. modem. Andra utrustningar kan vara av typ DTE (Data Terminal Equipment), ex. PC, terminaler och skrivare. Nedan visas förslag till standardkablage.

Om det uppkommer något problem vid inkoppling av MD-12 kan lysdiodsindikeringarna vara till värdefull hjälp vid felsökning.

- PWR: Indikerar att enheten är spänningssatt.
- RD: Indikerar mottagen data på linjesidan.
- TD: Indikerar mottagen data på RS-232 sidan.
- DCD: Indikerar att bärvåg finns mellan modemen vilket är en förutsättning för överföringen.
- RTS: Indikerar den signal som styr bärvågen till eller från.

Ett bra sätt att testa modemet är att ansluta den mot en terminal och samtidigt bygla linjen, T+ byglas till R+ och T– till R–. Det tecken som skickas av terminalen skall nu "ekas" tillbaka.

Hints

The MD-12 has the same line interface as many of Westermo's systems (MA-12, MA-14, MA-18, MA-19, MM-13, MM-14, LA-01, LD-01 and LD-02) and are hence compatible.

The RS-232 interface on the MD-12 is configured as DCE (Data Communication Equipment). Most printers, PC's and terminals are set as DTE (Data Terminal Equipment). Some recomendation of cable configurations are given below.

If any problems do occur on set up of the MD-12, the LED's will be helpful.

- PWR: The unit has power.
- RD: Data received on line interface.
- TD: Data received on RS-232 interface.
- DCD: Carrier indication, must be on for transmission.
- RTS: Indicates the carrier control status.

A good way to check the MD-12 is to carry out a loop back test. Connect T+ to R+ and T– to R–. Connect the RS-232 port to a terminal. When keys are pressed on the terminal you should receive the echo on screen. The TD & RD lights will both flicker simultaneously as you press the keys.

Tips

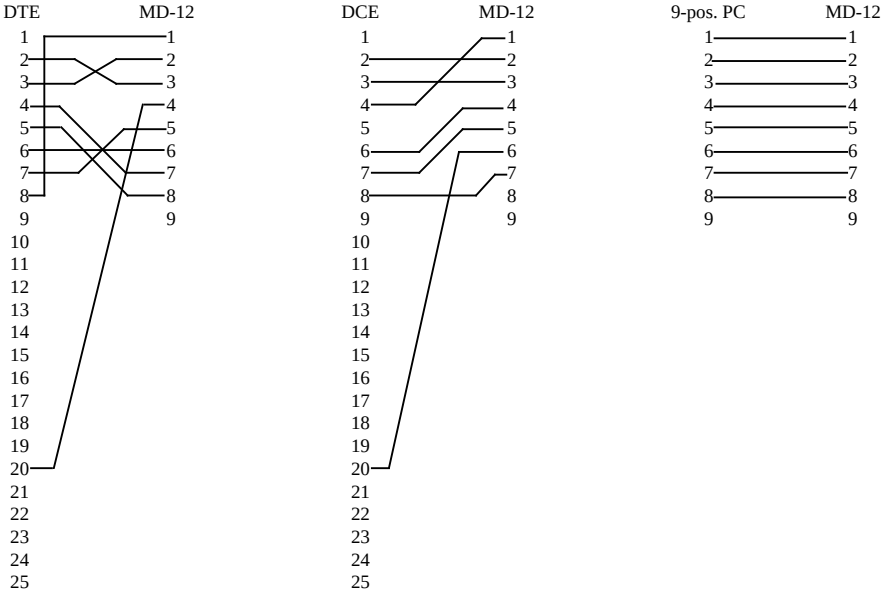
Das MD-12 besitzt die selbe Leitungsschnittstelle wie viel andere Westermo Produkte (MA-12, MA-14, MA-18, MA-19, MM-13, MM-14, LA-01, LD-01 und LD-02.) und sind damit untereinander kompatibel.

Die RS-232 Schnittstelle des MD-12 ist als DÜE(Daten Übertragungs Einheit) konfiguriert. Die meisten Drucker, PC´s und Terminals sind als DEE (Datenendeinrichtung) konfiguriert. Einige Kabelbelegungen sind unten aufgeführt.

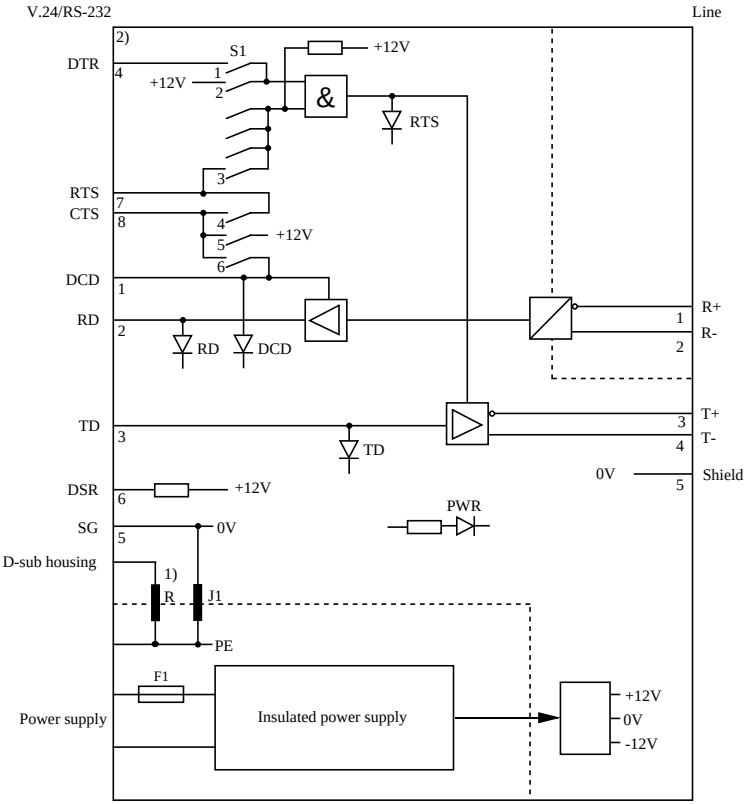
Bei Problemen mit der Einstellung des MD-12 können die LED´s hilfreich sein

- PWR Das Gerät hat Versorgungsspannung
- RD Daten Empfang an der Leitungsschnittstelle
- TD Daten Empfang an der RS-232 Schnittstelle
- DCD Träger Anzeige, muß bei Übertragung ein sein
- RTS zeigt den Träger Kontroll Status an.

Eine gute Testmöglichkeit ist einen Loop-Back Test durchzuführen.
Verbinden sie T+ mit R+ und T– mit R–. Verbinden sie den RS 232 Anschluß mit einem Terminal somit sollten die abgeschickten Daten am Terminal sichtbar werden. Wenn eine Taste am Terminal gedrückt wird, müssen die TD und RD LED´s abwechselnd flackern.



Block diagram



1) Metal housing on D-sub is connected to PE if R is mounted. R = R3 on DC-version and R1 on AC-version.

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