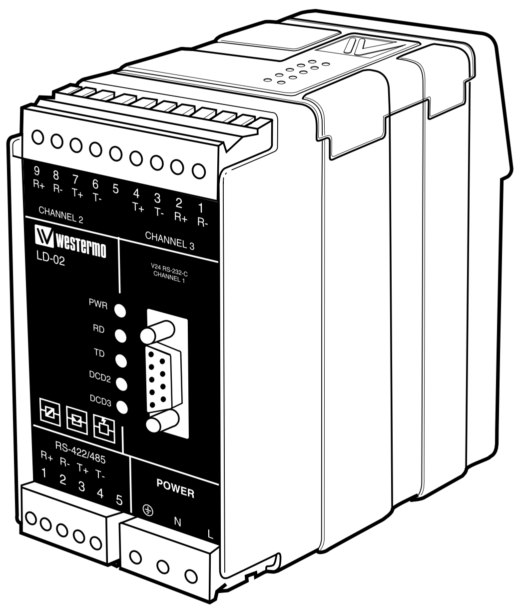
LD-02 AC
LD-02 DC

INSTALLATIONSANVISNING
INSTALLATION MANUAL
INSTALLATIONS ANLEITUNG

6156-2002

Galvanic Isolation | Transient Protection | Balanced Transmission | CE Approved



Linjedelare
Line split unit
Leitungsteiler

www.westermo.se

AUDIN - 8, avenue de la malle - 51370 Saint Brice Courcelles
Tel : 03.26.04.20.21 - Fax : 03.26.04.28.20 - Web : http: www.audin.fr - Email : info@audin.fr

Specifikationer LD-02 AC

Överföring	Asynkron full/halv duplex eller simplex
Gränssnitt 1	EIA RS-232-C/CCITT V.24 på kanal 1
Gränssnitt 2	10mA balanserad strömslinga på kanal 2 och 3
Gränssnitt 3	EIA RS-422/485/CCITT V.11 på kanal 4.
Anslutningar	**Kanal 1:** 9-polig D-sub hylskontakt **Kanal 4:** 5-polig skruvplint **Kanal 2 och 3:** 9-polig skruvplint
Max rekommendrat antal i serie	14 st
Hastighet	Hastigheter upp till 38 400 bit/s
Lysdioder	Power, RD, TD, DCD2, DCD3
Isolation	Fullständig galvanisk isolation med optokopplare (data) resp. transformator (matning)
Isolationsspänning	1500V
Överspänningsskydd	**Nät:** Genombrottsspänning 430V vid 230V AC **Gränssnitt 2, 3:** Genombrottsspänning sändare 15V, mottagare 5,8V. Avledningsförmåga 0,6 kW under 1 ms **Gränssnitt 4:** Genombrottsspänning sändare och mottagare 7V. Avledningsförmåga 0,6 kW under 1 ms
Strömförsörjning	230V +15/–10% 48-62Hz
Säkring	100mA snabb 5x20 mm
Effektförbrukning**	Max 25mA vid 230V
Temperaturområde	5-50° C, omgivningstemperatur
Fuktighetsområde	0-95% RH, utan kondesation
Mått	55x100x128 mm
Vikt	0,4 kg
Montering	På 35 mm DIN-skena

Specifikationer LD-02 AC 115V*

Överspänningsskydd	**Nät:** Genombrottsspänning 220V vid 115V AC
Strömförsörjning	115V AC +15/–10% 48-62Hz
Effektförbrukning	Max 50mA vid 115V

Specifikationer LD-02 DC*

Inspänningsområde	12-36V DC
Effektförbrukning	Max 3W
Isolationsspänning	500V
Säkring F1	1,6A snabb 5x20 mm

** I övrigt gäller LD-02 AC specifikationerna*

*** För andra matningspänningar kontakta Westermo*

Funktionsbeskrivning LD-02

LD-02 är först och främst en linjedelare med följande gränssnitt. Westermos 10 mA balanserade strömslinga W1, RS-232 och RS-485/422. De sistnämnda gränssnitten är parallellkopplade och kan därför inte användas samtidigt.

LD-02 fungerar även utmärkt som omvandlare W1 – RS232 eller W1 – RS485/422 med fullständig galvanisk isolation mellan gränssnitten.

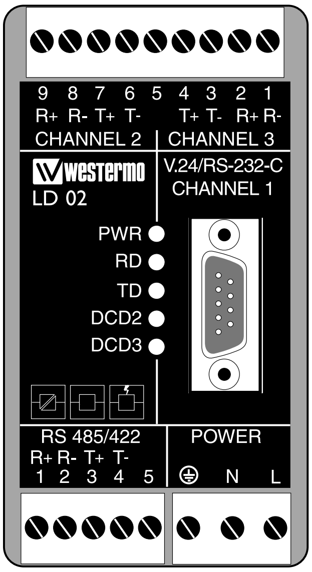
LD-02 kan även användas för att förlänga RS485/422 multidropslinga t.ex. kan slingan förlängas med 2 500 m vid en dataöverföringhastighet på 9 600 bit/s.

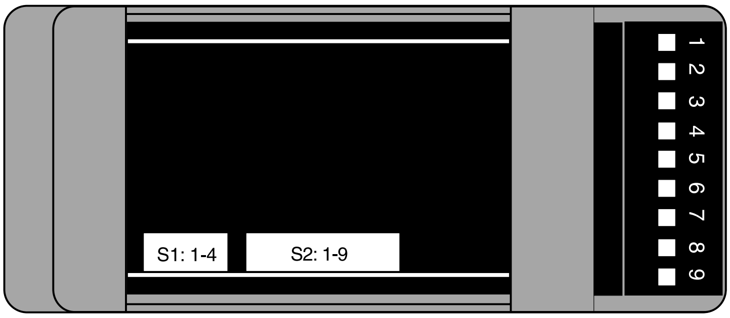
Linjedelaren har fyra kanaler där kanal 1 är RS-232, kanal 2 och 3 är W1. Kanal 4 har RS485/422 gränssnitt. I och med att LD-02 delar upp och förstärker signalen (repeaterfunktion) kan ett multidroppnät med upp till 14 st LD-02 i serie byggas. Antal LD-02 i serie är begränsat beroende av överföringslängd och datahastighet mellan enheterna.

Inställningar

LD-02 kan genom inställningar anpassas till ett flertal olika driftförhållanden. Samtliga omkopplare i LD-02 görs åtkomliga genom att lådans lock avlägsnas.

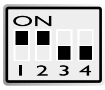
VARNING! ÖPPNA EJ ANSLUTEN ENHET



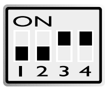


Switchinställningar

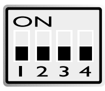
Terminering med fail-safe

S1 

Terminering 4-tråd (RS-422)

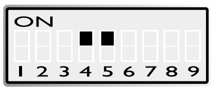
S1 

Terminering 2-tråd (RS-485)

S1 

Ingen terminering

Val av antal bitar

S2 

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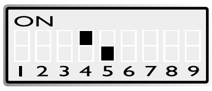
S2 

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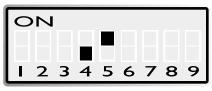
S2 

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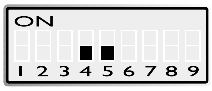
S2 

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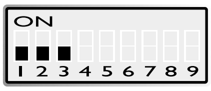
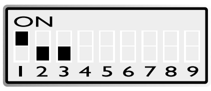
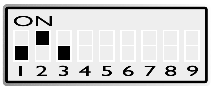
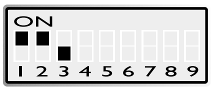
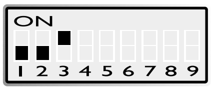
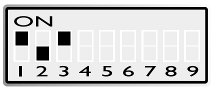
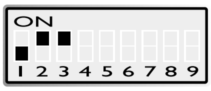
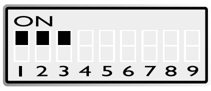
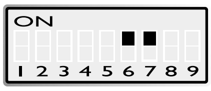
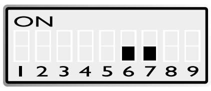
Hastighet

		Val av hastighet	Vänd tid (max)
S2		300	3,33 ms
S2		600	1,67 ms
S2		1200	833 µs
S2		2400	417 µs
S2		4800	208 µs
S2		9600	104 µs
S2		19200	52 µs
S2		38400	26 µs

Val av 2/4 tråd

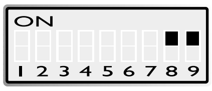
S2 

2-tråd

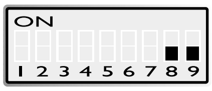
S2 

4-tråd

V eller Y funktion

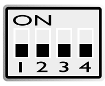
S2 

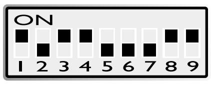
Y

S2 

V

Fabriksinställning

S1 

S2 

Hjälpmedel för inställning av databitar								
7 bitar	●	●	●		●			
8 bitar				●		●	●	●
Ingen paritet	●	●		●		●		
Paritet			●		●		●	●
1 stoppbit	●		●	●			●	
2 stoppbit		●			●	●		●
antal bitar	9	10	10	10	11	11	11	12

Anslutningar

RS-232 (kanal 1)

Riktning DCE	Ansl. nr 9-pol D-sub	CCITT V.24 Benämning	Signal beskrivning
O	1	109	DCD/Data Carier Detect
O	2	104	RD/Received Data
I	3	103	TD/Transmitted Data
I	4	108/2	DTR/Data Terminal Ready
–	5	102	SG/Signal Ground
O	6	107	DSR/Data Set Ready
I	7	105	RTS/Request To Send
O	8	106	CTS/Clear To Send
NC	9		

I=ingång O=utgång. LD-02 är konfigurerad som en DCE. NC=ej inkopplad.

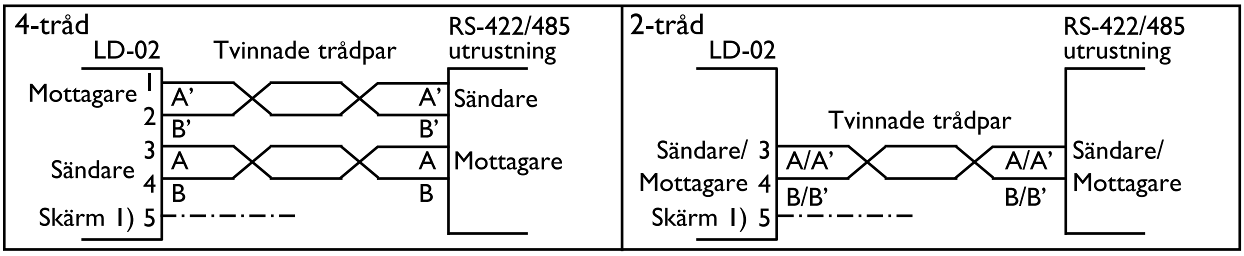
W1, balanserad 10mA (kanal 2 och 3)

Riktning	Ansl. nr Kanal 2	Ansl. nr Kanal 3	Benämning
Mottagare	9	2	R+
Mottagare	8	1	R-
Sändare	7	4	T+
Sändare	6	3	T-
	5	5	1) Skärm

RS-485/422 (kanal 4)

Riktning	Ansl. nr	CCITT V.11 benämning
Mottagare	1	A' (R+)
Mottagare	2	B' (R-)
Sändare	3	A (T+)
Sändare	4	B (T-)
	5	1) Skärm

RS-485/422 anslutning (kanal 4)



1) Om skärmad kabel används, skall skärmen endast anslutas i ena änden för att undvika jordströmmar

Matninganslutning LD-02 AC 3-polig skruvplint

Ansl. nr	Spänningsanslutning
L	115*/230V AC matning
N	
⏚	Skyddsjord

* LD-02 115V

Matninganslutning LD-02 DC 2-polig skruvplint

Ansl. nr	Spänningsanslutning
1	-Spänning
2	+Spänning

Överföringsavstånd (10mA balanserad strömslinga W1)

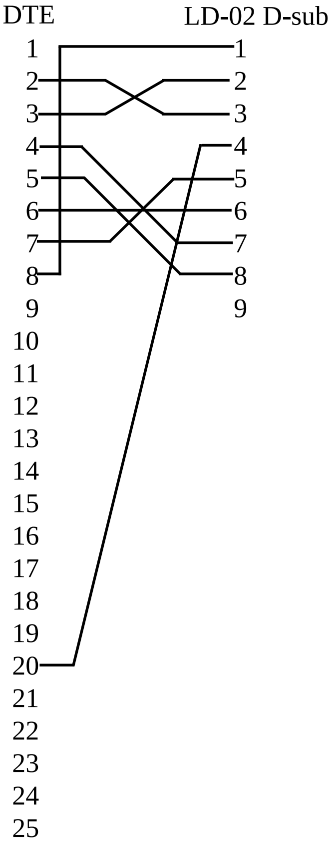
Kabel	Överföringshastighet bit/s						
	600	1200	2400	4800	9600	19200	38400
42pF/m 0,3mm^2	18000m	12000m	8000m	5000m	2500m	1000m	500m

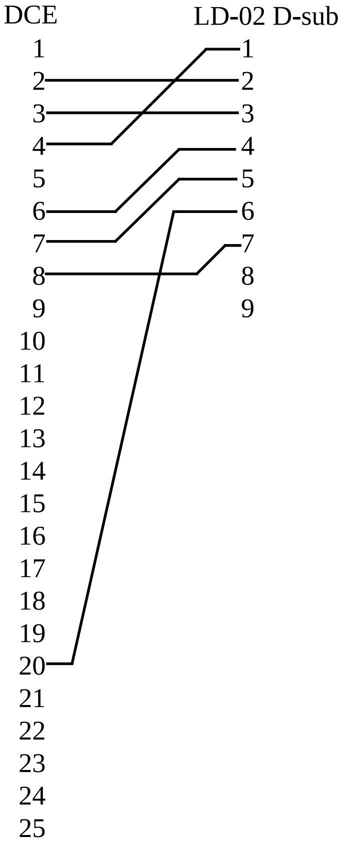
Tips

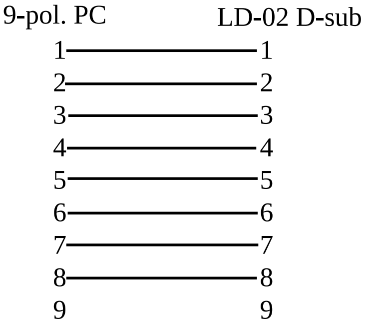
Multidroppkanal 1 är DCE (Data Communication Equipment), vilket är det vanliga i kommunikationsutrustning, t.ex. modem. Andra utrustningar kan vara av typ DTE (Data Terminal Equipment), t.ex. PC, terminaler och skrivare. Nedan visas förslag till standardkablage.

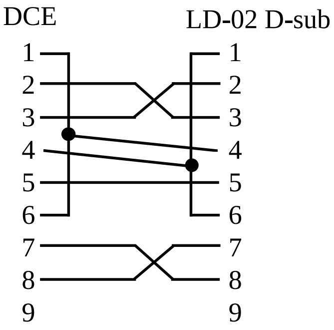
Om det uppkommer något problem vid inkoppling av LD-02 kan lysdiodsindikeringarna vara till värdefull hjälp vid felsökning.

- PWR: Indikerar att enheten är spänningssatt
- RD: Indikerar att data sänds från kanal 1 eller 4
- TD: Indikerar att data tas emot på kanal 1 eller 4
- DCD2: Indikerar bärväg på kanal 2
- DCD3: Indikerar bärväg på kanal 3









NOTERINGAR

Specifications LD-02 AC

Transmission	Asynchronous, full/half duplex or simplex
Interface 1	EIA RS-232-C/V.24 fixed on channel 1
Interface 2	10mA balanced current loop fixed on channel 2 and 3
Interface 3	EIA RS-422/485/CCITT V.11 on channel 4
Connection	**Channel 1:** 9 pin D-sub female **Channel 4:** 5 pos screw-terminal **Channel 2 and 3:** 9 pos screw-terminal
Max. recommended no of LD-02's in series	14 pcs
Transmission rate	Data rates up to 38 400 bit/s
Indicators	Power, RD, TD, DCD2, DCD3
Isolation	Galvanic isolation with opto-coupler (data transmission) and transformer (supply)
Isolation voltage	1500V
Overvoltage protection	**Mains:** Breakdown voltage 430V at 230V AC **Interface 2:** Breakdown voltage transmitter 15V, receiver 5.8 V. Surge capacity 0.6 kW during 1 ms **Interface 3:** Breakdown voltage receiver and transmitter 7V. Surge capacity 0.6 kW during 1 ms
Power supply	230V 48-62Hz +15/–10%
Fuse	100mA fast 5x20 mm
Power consumption**	Max 25mA at 230V
Temperature range	5-50°C, ambient temperature
Humidity	0-95% RH, non-condensing
Dimension	55x100x128 mm
Weight	0.4 kg
Mounting	On 35mm DIN-rail

Specifications LD-02 AC 115V*

Overvoltage protection	**Mains:** Breakdown voltage 220V at 115V AC
Power supply	115V AC +15/–10% 48-62Hz
Power consumption	Max 50mA at 115V

Specifications LD-02 DC*

Power supply	12-36V DC
Power consumtion	Max 3W
Isolation	500V
Fuse F1	1.6A fast acting 5x20 mm

** All other specifications according to LD-02 AC*

*** For other power supply voltages contact Westermo*

Description LD-02

The LD-02 is primarily designed to be used as a line splitter but it can also be used as an interface converter between Westermo's 10 mA balanced current loop (W1) and RS-232 or RS-422/485.

The LD-02 line splitter has four channels where channel no 1 is RS-232, channel 2 and 3 are W1 and Channel 4 is RS-422/485. Each LD-02 will in addition to splitting the W1 in RS-232 or RS-422/485 amplify the W1 signal (repeater function) allowing a multidrop network with a maximum of 14 LD-02's in series.

The LD-02 offers total galvanic isolation between the interfaces.

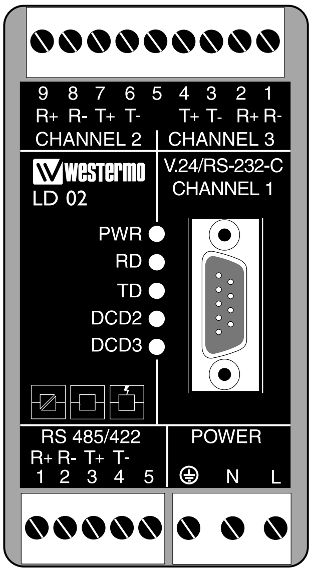
The RS-232 and RS-422/485 interfaces are connected in parallel meaning they can't be used simultaneously.

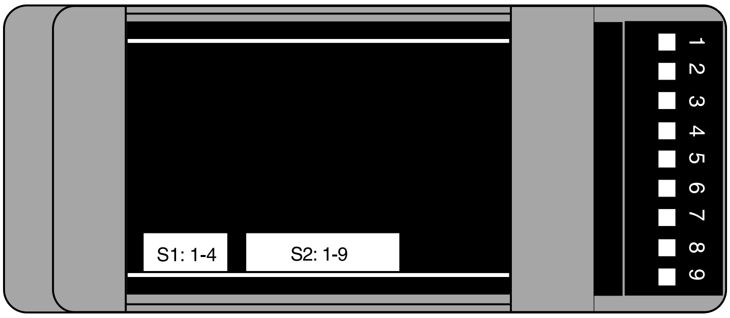
The LD-02 is typically used to extend the RS-422/485 in a multidrop network.
At 9 600 bit/s a maximum distance of 2 500 m can be acheired between each LD-02.

Switch settings

The operating parameters can be set via dip switches located under the lid on top of the plastic case.

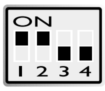
WARNING! DO NOT OPEN CONNECTED UNIT



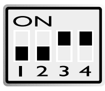


Switch settings

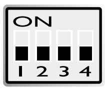
Termination with fail-safe

S1 

Termination 4-wire (RS-422)

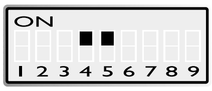
S1 

Termination 2-wire (RS-485)

S1 

No termination

Selection of data bits

S2 

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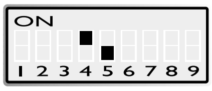
S2 

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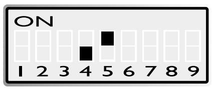
S2 

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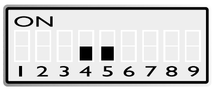
S2 

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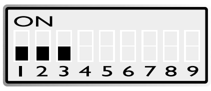
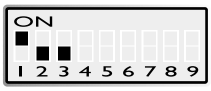
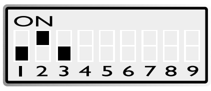
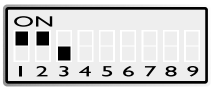
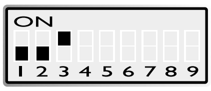
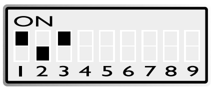
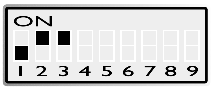
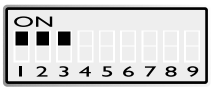
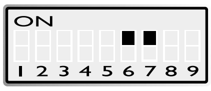
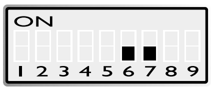
Speed

		Selection of speed	Turn around time (max)
S2		300	3.33 ms
S2		600	1.67 ms
S2		1200	833 µs
S2		2400	417 µs
S2		4800	208 µs
S2		9600	104 µs
S2		19200	52 µs
S2		38400	26 µs

Selection 2/4 wire

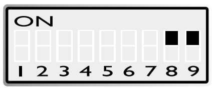
S2 

2-wire

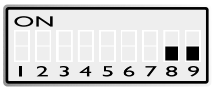
S2 

4-wire

V or Y function

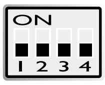
S2 

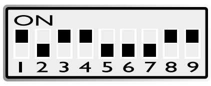
Y

S2 

V

Factory settings

S1 

S2 

Data bit selection table

7 bits	●	●	●		●			
8 bits				●		●	●	●
No parity	●	●		●		●		
Parity			●		●		●	●
1 stop bit	●		●	●			●	
2 stop bit		●			●	●		●
Number of bits	9	10	10	10	11	11	11	12

Connections

RS-232 (channel 1)

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

I=input O=output. The LD-02 is a DCE (Data Communication Equipment).
NC=not connected.

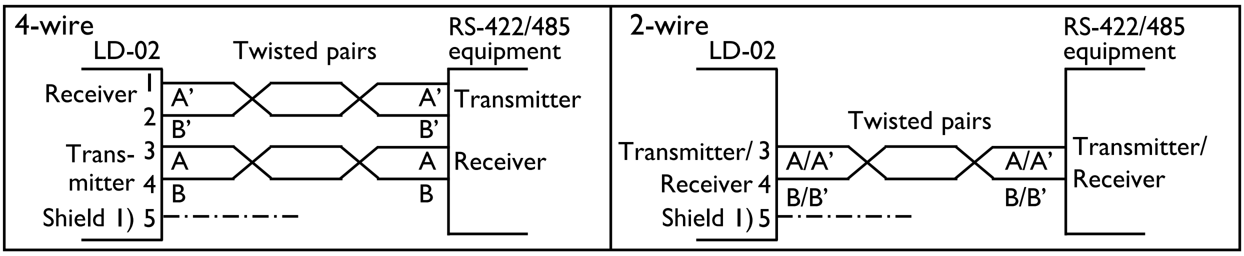
W1, balanced 10mA (channel 2 and 3)

Direction	Circuit no. Channel 2	Circuit no. Channel 3	Description
Receiver	9	2	R+
Receiver	8	1	R-
Transmitter	7	4	T+
Transmitter	6	3	T-
	5	5	1) Shield

RS-485/422 (channel 4)

Direction	Circuit no.	CCITT V.11 Description
Receiver	1	A' (R+)
Receiver	2	B' (R-)
Transmitter	3	A (T+)
Transmitter	4	B (T-)
	5	1) Shield

RS-485/422 connection (channel 4)



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

Power connection LD-02 AC 3 position screw-terminal

Connection no.	Power supply
L	115*/230V
N	AC power
⏚	PE, Protective Earth

* LD-02 115V

Power connection LD-02 DC 2 position screw-terminal

Connection no.	Power supply
1	-Voltage
2	+Voltage

Transmission range (10mA balanced current loop W1)

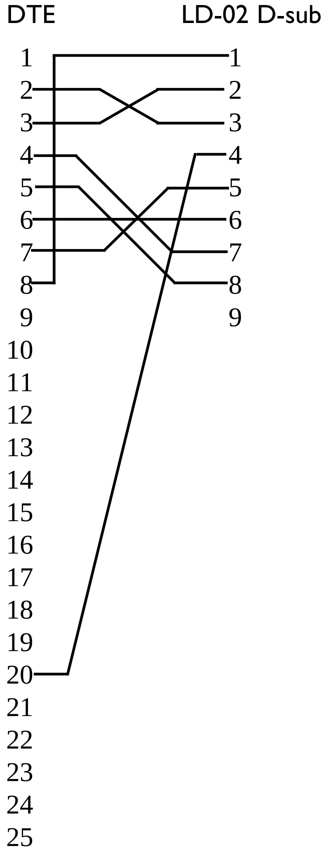
Cable 42pF/m 0,3mm^2	Transmission data rate bit/s						
	600	1200	2400	4800	9600	19200	38400
	18000m	12000m	8000m	5000m	2500m	1000m	500m

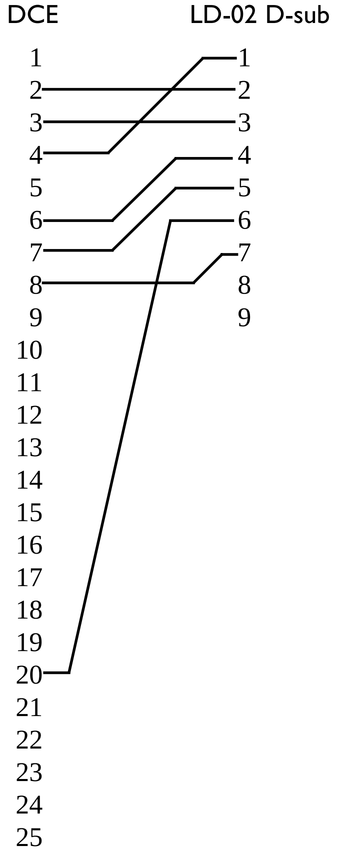
Hints

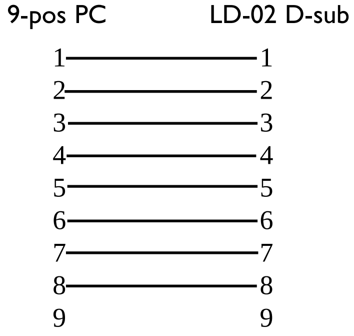
The drop channels (no. 1 and 4) are configured as DCE (Data Communication Equipment). Most printers, PC's and terminals are set as DTE (Data Terminal Equipment).
A recommendation of cable configurations is given below.

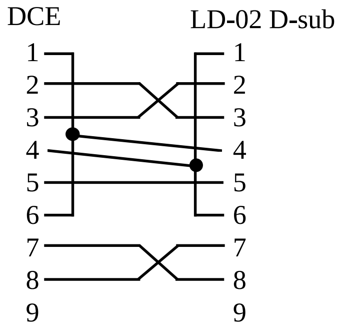
If any problems do occur on set up of the LD-02:s, the LED's will be helpful.

• PWR:	The unit has power.
• RD:	Indicates transmitted data from channel 1 or 4
• TD:	Indicates received data on channel 1 or 4
• DCD2:	Indicates carrier on channel 2
• DCD3:	Indicates carrier on channel 3









OWN COMMENTS

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Technische Daten LD-02AC

Übertragungsarten	Asynchron, Voll-/Halbduplex oder Simplex
Schnittstelle 1	EIA RS-232-C/V.24 auf Kanal1
Schnittstelle 2	10mA Symmetrische Stromschleife auf Kanal 2 und 3
Schnittstelle 3	RS-485/422 auf Kanal 4
Anschlüsse	**Kanal 1:** 9 polige Sub-D Buchse **Kanal 4:** 5 polige Schraubklemme **Kanal 2 und 3:** 9 polige Schraubklemme
Max. Anzahl in Reihe geschalteter Geräte	14 St.
Übertragungsraten	Bis zu 38 400Bit/s
Leuchtdioden	Betrieb, TD, RD, DCD2, DCD3
Isolation	Galvanisch Isoliert mittels Optokoppler (Datenübertragung) und Transformator (Spannungsversorgung)
Isolationsspannung	1500V
Überspannungsschutz	**Netz:** Durchbruchspannung 430V bei 230V AC **Schnittstelle 2:** Durchbruchspannung Sender 15V und Empfänger 5,8V. Stromstoßkapazität 0,6 KW/1mS **Schnittstelle 3:** Durchbruchspannung Empfänger und Sender 7V. Stromstoßkapazität 0,6 KW/1mS
Spannungsversorgung	230V +15/ –10% 48-62 Hz
Sicherung	100mA 5x20 mm flink
Leistungsaufnahme	Max. 25mA bei 230V
Umgebungstemperatur	5–50°C
Luftfeuchtigkeit	0-95%, nicht kondensierend
Abmessungen	55x100x128 mm
Gewicht	0,4 Kg
Installation	auf 35 mm Din-Schiene

Technische Daten LD-02 AC 115V*

Überspannungsschutz	**Netz:** Durchbruchspannung 220V bei 115V AC
Spannungsversorgung	115V AC +15/ –10% 48-62 Hz
Leistungsaufnahme	max. 50mA bei 115V

Technische Daten LD-02 DC

Spannungsversorgung	12-36V DC
Leistungsaufnahme	Max 3W
Isolationsspannung	500V
Sicherung F1	1,6A 5x20 mm flink
Dip-Schalter Einstellungen	Siehe LD-02AC
Anschlüsse	Siehe LD-02AC außer Spannungsversorgung

** Alle anderen Daten siehe LD-02AC   ** Weitere Varianten auf Anfrage*

Beschreibung LD-02

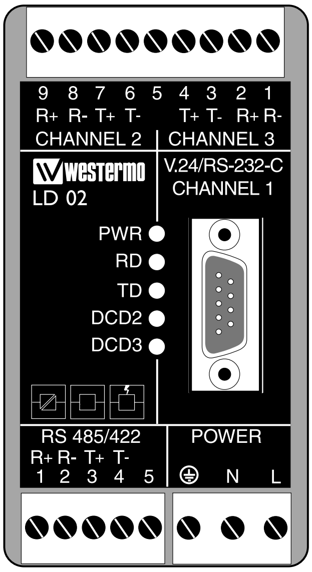
Das LD-02 wurde in erster Linie als Leitungsteiler entwickelt, kann aber auch als Schnittstellen Konverter, von Westermo’s 10mA Stromschleife (W1) auf RS-232 oder RS-422/485, benutzt werden.

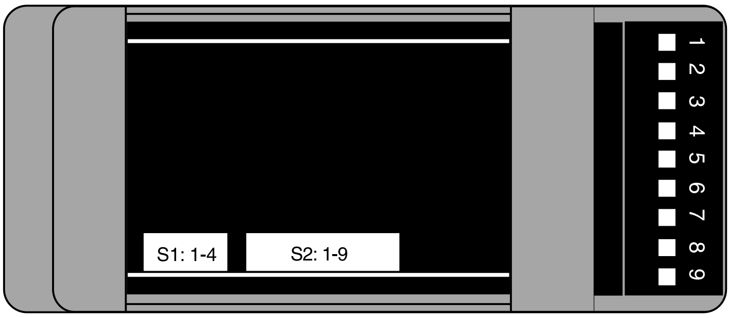
Das LD-02 besitzt 4 Kanäle. Kanal 1 ist eine RS-232 Schnittstelle und Kanal 2 & 3 sind W1 Schnittstellen. Kanal 4 ist eine RS-422/485 Schnittstelle. Jedes LD-02 kann zusätzlich zur W1 Leitungsteilung, in RS-232 und RS-422/485, noch das W1 Signal verstärken (Repeater Funktion) und Mehrpunktnetzwerke mit bis zu 14 in Reihe geschalteten LD-02‘s aufbauen. Das LD-02 ist zwischen den Schnittstellen komplett galvanisch Isoliert. Die RS-232 und RS-422/485 Schnittstellen sind parallel geschaltet, somit ist eine gleichzeitige Nutzung nicht möglich. Das LD-02 wird benutzt um ein RS-422/485 Netzwerk zu erweitern. Bei einer 9600 Bit/s Kommunikation beträgt die maximale Strecke zwischen zwei Geräten 2500m.

DIP-Schalter Einstellung

Das LD-02 bietet verschiedene Einstellmöglichkeiten zur Abstimmung auf verschiedenste Betriebsverhälnisse. Um die DIP-Schalter einzustellen muß die Gehäuseabdeckung z.B. mit Hilfe eines Schraubendrehers abgenommen werden.

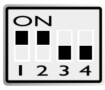
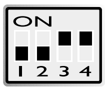
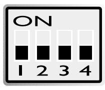
ACHTUNG! ANGESCHLOSSENE GERÄTE NICHT ÖFFNEN



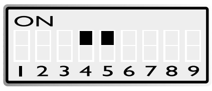
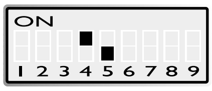
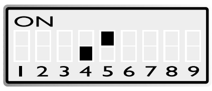
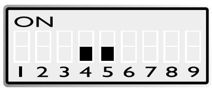


DIP Schalter Einstellung

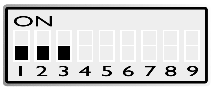
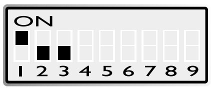
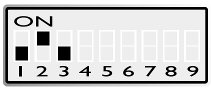
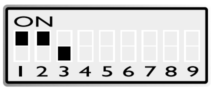
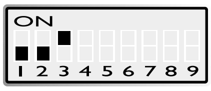
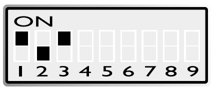
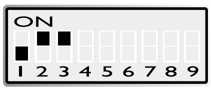
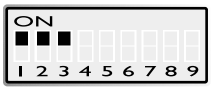
Terminierung mit Fail-Safe

S1		4-Draht Terminierung(RS-422)
S1		2-Draht Terminierung(RS-485)
S1		keine Terminierung

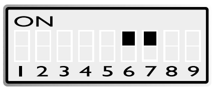
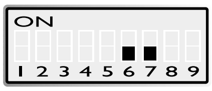
Einstellung der Datenbits

S2		9
S2		10
S2		11
S2		12

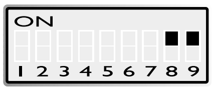
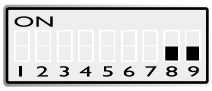
Geschwindigkeit

		Leitungsgeschwindigkeit	Umschatzeit
S2		300	3,33 ms
S2		600	1,67 ms
S2		1200	833 µs
S2		2400	417 µs
S2		4800	208 µs
S2		9600	104 µs
S2		19200	52 µs
S2		38400	26 µs

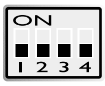
2-/4-Draht Betrieb

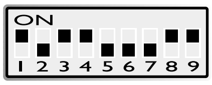
S2		2-Draht
S2		4-Draht

V oder Y Betrieb

S2		Y
S2		V

Werkseinstellung

S1 

S2 

Übersicht für Datenbit Einstellung								
7 Bit	●	●	●		●			
8 bit				●		●	●	●
Keine Parität	●	●		●		●		
Parität			●		●		●	●
1 Stop Bit	●		●	●			●	
2 Stop Bits		●			●	●		●
Anzahl der Bits	9	10	10	10	11	11	11	12

Anschlüsse

RS-232 (kanal 1)

Richtung DCE	PinNr. 9-pol D-sub	CCITT V.24 Bezeichnung	Beschreibung
O	1	109	DCD / Data Carrier Detect
O	2	104	RD / Received Data
I	3	103	TD / Transmitted Data
I	4	108/2	DTR / Data Terminal Ready
–	5	102	SG / Signal Ground
O	6	107	DSR / Data Set Ready
I	7	105	RTS / Request to Send
O	8	106	CTS / Clear to Send
NV	9		

I= I Eingang O= Ausgang. LD-02 ist eine DÜE (Daten Übertragungs Einrichtung).
NV = nicht Verbunden

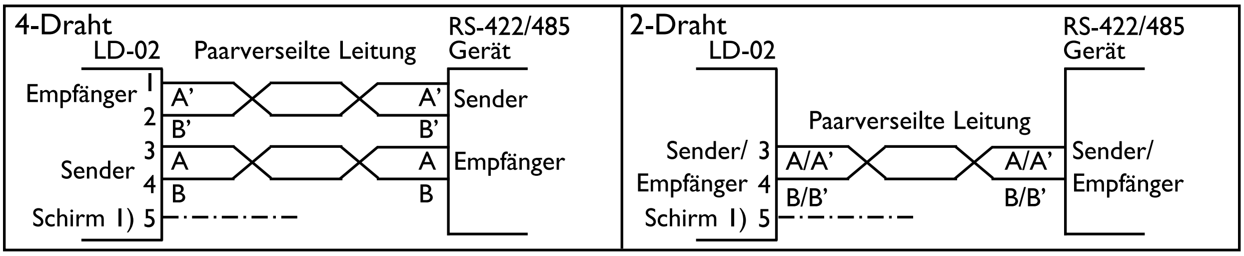
W1, 10mA Stromschleife (Kanal 2 & 3)

Richtung	Klemme Nr. Kanal 2	Kanal 3	Beschreibung
Empfänger	9	2	R+
Empfänger	8	1	R-
Sender	7	4	T+
Sender	6	3	T-
	5	5	[1] Schirm

RS-485/422 (Kanal 4)

Richtung	Klemme Nr.	CCITT V.11 Bezeichnung
Empfänger	1	A' (R+)
Empfänger	2	B' (R-)
Sender	3	A (T+)
Sender	4	B (T-)
	5	[1] Schirm

Leitungsanschluß:



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

Spannungsversorgung LD-02 AC
3-polige Schraubklemme

Klemme Nr.	Spg.-Versorgung
L	115*/230V
N	AC Anschluß
⏚	PE, Schutzerde

* LD-02 115V

Spannungsversorgung LD-02 DC
2-polige Schraubklemme

Klemme Nr.	Spg.-Versorgung
1	-Pol
2	+Pol

Übertragungsweiten 10mA symmetrische Stromschleife W1

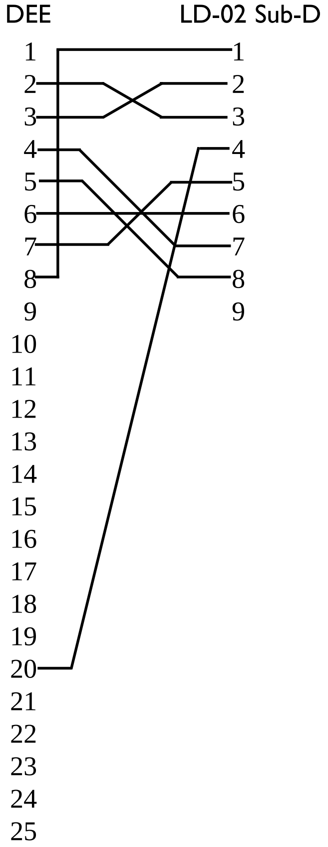
Leitung 42pF/m 0,3mm^2	Übertragungsgeschwindigkeit						
	600	1200	2400	4800	9600	19200	38400
	18000m	12000m	8000m	5000m	2500m	1000m	500m

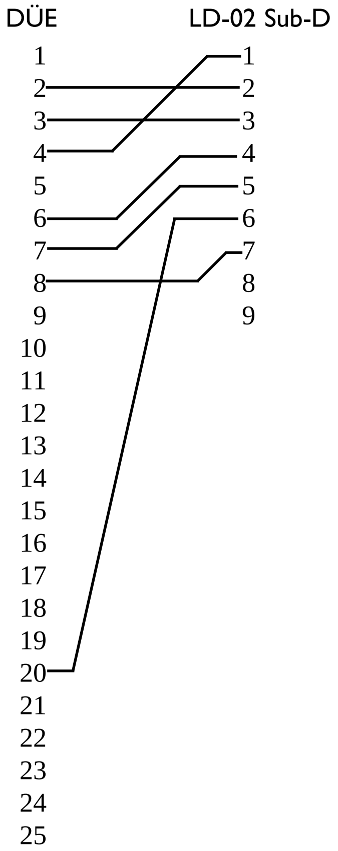
Tips

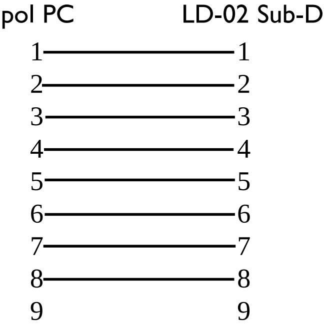
Die Schnittstellen 1 & 4 sind als DÜE (Daten Übertragungs Einheit) konfiguriert. Die meisten Drucker, PC´s und Terminals sind DEE´s (Daten Endeinrichtungen). Beispiele für Kabelbelegungen werden unten aufgeführt.

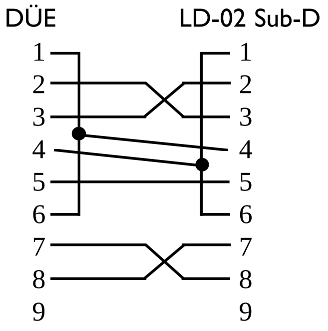
Bei Problemen mit der Einstellung des LD-02 können die LED´s hilfreich sein

• PWR	Das Gerät hat Versorgungsspannung
• RD	Daten Sendung an Kanal 1 oder 4
• TD	Daten Empfang an Kanal 1 oder 4
• DCD2	Träger Anzeige für Kanal 2
• DCD3	Träger Anzeige für Kanal 3









EIGENE KOMMENTARE

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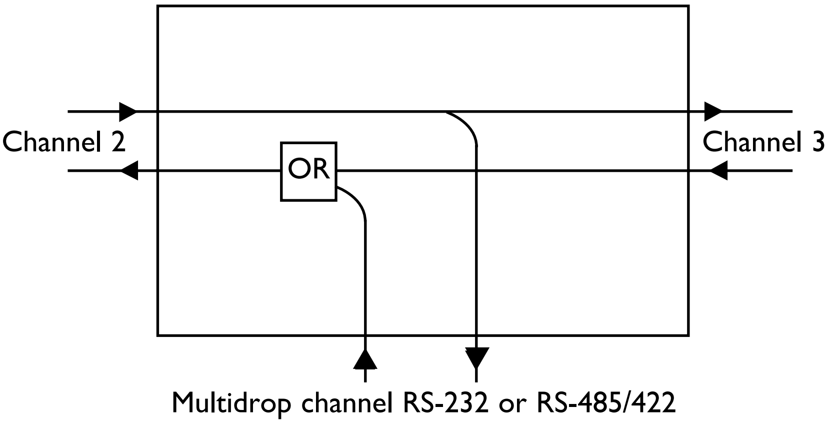
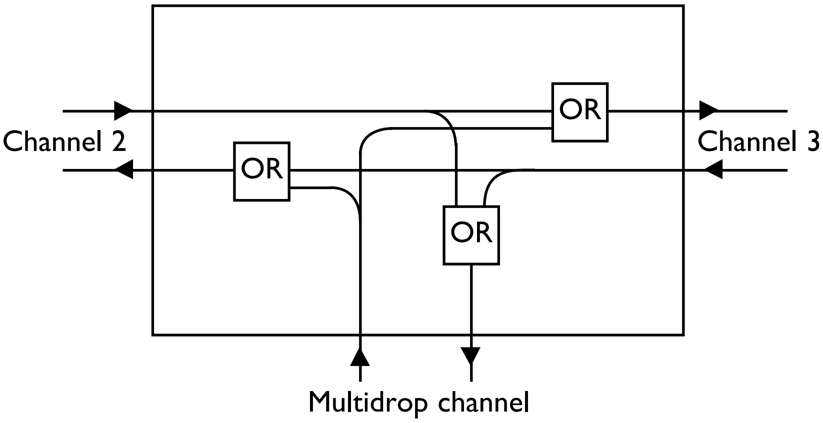
Block diagram



Line split unit LD-02 set for V-function



Line split unit LD-02 set for Y-function

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