

DRS-LTS

Technical Manual



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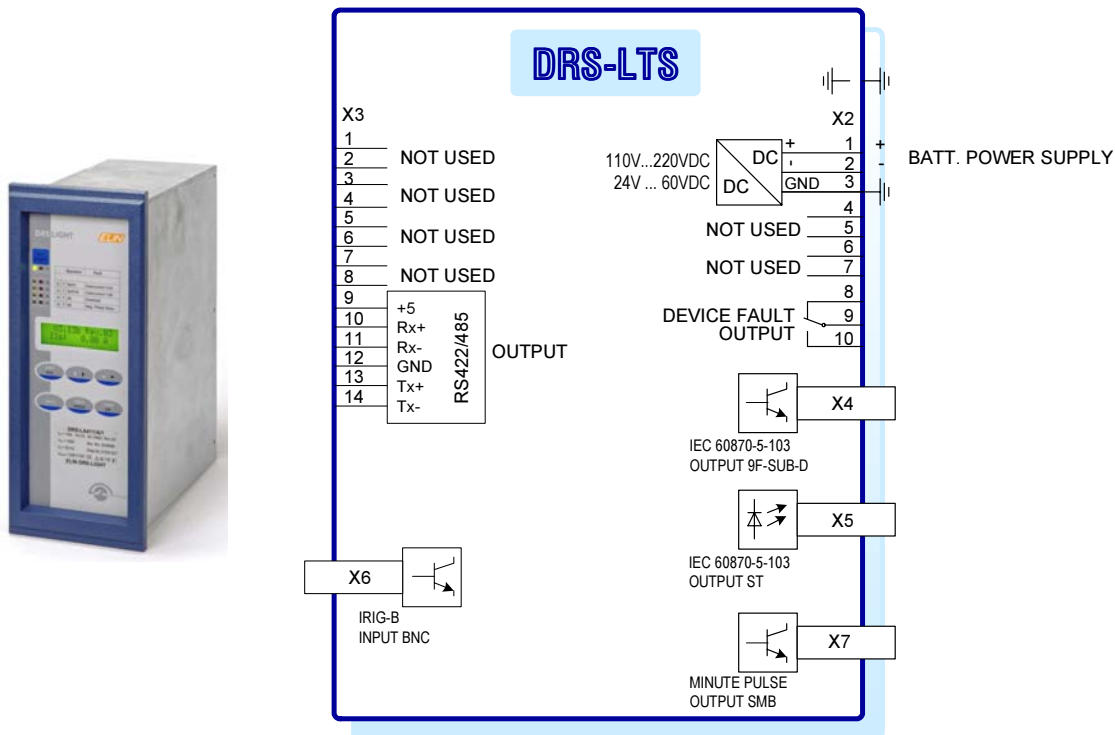
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1 Introduction

DRS-LTS stands for Digital Relay System – Light Time Server.

DRS is the digital, self supervising and comfortable modern product line for power plant protection since the year 1992.

LTS is mechanically based on the smallest member of the product line: DRS-LIGHT



2 Switching on

After switching on the DRS-LTS it will scan all chain addresses with a frequency of 9 devices per second. For 254 possible addresses this task may take 30 seconds. Time setting telegrams can only be sent to such devices, which answered properly to the first identification request. (Expected DRS-LIGHT's, which also can interpret broadcast telegrams.)

3 During Operation

Each two seconds a version request is transmitted. The address gets counted up. A total scan of all chain devices may take approx. 8.5 minutes.

Each full second respective twice per minute (second 15 and 45) – depending on setting "Sync-Interval" – a time setting telegram is being sent to one device, also thereby the address is being counted up. Not used addresses get skipped. After the last valid chain address a broadcast telegram will be inserted. Each full minute a minute pulse with 200ms length is transmitted.

If the DRS-LTS gets no time signal longer than 5 minutes, the alarm contact is activated and the message "Signal Timeout!" is displayed on LCD. Thereby the time setting telegrams and the minute pulse get disabled. The chain gets scanned further on. After approx. 20 seconds the quartz calibration gets enabled.

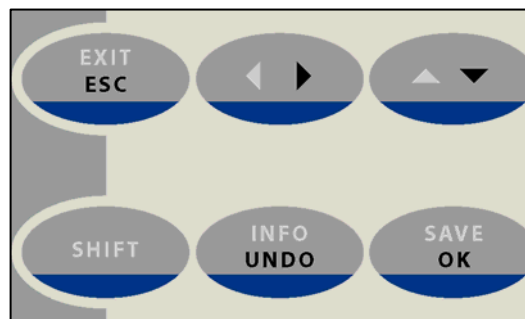
The yellow LED of the second row indicates it with an extended light duration (0.9 sec. in stead of 0.3 sec. at every valid time telegram). An error message and the alarm relay contact will come 2 hours after missing time signal.

In calibrated operation the aberration is approx. 1ppm, (equals 3 sec. per month).

The DRS-LTS automatically detects data communication with DRS-WIN and blocks the own time setting and request telegrams for 5 seconds. Minute pulses are transmitted during blocking as long as internal DRS-LTS time is valid.

4 Local operation

The local user operation is possible with keypad and LCD.



4.1 Device information

The device information is displayed with the key combination SHIFT + UNDO (=INFO).

4.2 Setting Menu

The setting menu is shown with the key combination SHIFT + ESC (=EXIT).

For scrolling within the menu bar please use the keys "<" and ">"; thereby you can also scroll without the key "SHIFT" through the whole menu.

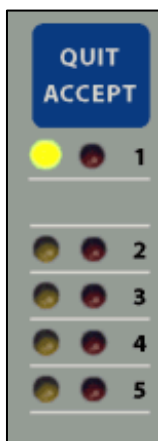
Timeout: If no key is typed for more than 3 minutes the default display text will be shown again.

- **Sending time**
Sending time instantly to all recognized VEs
- **Setting Date and Time**
Manually setting (valid for 10 minutes)
- **Blocking On/Off**
Manual Blocking: Sending time and chain addr. request are blocked for 3 hours
- **LED's On/Off**
All LED's of rows 2-5 are disabled *)
- **Request Chain**
Scans instantly all 254 addresses for active devices. (Can be escaped with ESC)
Shows identified device identifications on LCD.

- **Date Format**
Select 5 display formats of date *)
- **Time Format**
Select 4 display formats of time *)
- **Sync-Interval**
Select time interval of time setting telegram (1 sec or 30 sec *)
- **Time source**
Select IRIG-A or IRIG-B *)
- **Language**
Select English or German *)

*) The settings have to be confirmed with OK. They get saved permanently in flash memory.

5 Meaning of LED indication



Row 1 – Green	DRS-LTS gets valid time signal
Row 1 – Red	Device fault
Row 2 – Yellow	Receiving time signal
Row 2 – Red	Timeout time signal
Row 3 – Yellow	Manual blocking
Row 3 – Red	Automatic blocking
Row 4 – Yellow	Device identification request
Row 4 – Red	Valid answer of a device
Row 5 – Yellow	Sending time setting telegram to devices
Row 5 – Red	Minute pulse (3 sec)

The blue key QUIT above the LEDs has the same functions like in all DRS devices:

- Short pressing: LED test
- Long pressing: flashing of LEDs alternating → accepting of device faults, LED reset

6 Technical data

6.1 Electrical Data

Binary outputs	1 Change over contact for internal fault 8 LEDs, 2 for internal status
Interfaces	Input: IRIG-A or IRIG-B on X6 (BNC-female) Output: Minute pulse on X7 (SMB-female) 5V/30mA RS485 on X3 / 9-14
Auxiliary Supply	240/220/110/60/24/VDC, approx. 10W
Local operation	6 keys, 2 x 16 digit LCD
Contact data	Continuous current 16A Contact material: AgSnO ₂ 5x10 ⁷ switching cycles Open contact: 1000 V _{RMS} Contact-coil: 5000 V _{RMS}
Screw type terminals	Cross section 2.5 mm ²

6.2 Case data

Protection type	IP51
Mounting	Panel flush or projection mounting
Dimensions in mm	19", 6U height / 21U width H x W x D: 243 x 96 x 208
Weight	Approx. 3 kg

6.3 Tests

Type tests	EN 50263
Interference emission	IEC 60255 part 25;
1MHz burst test	IEC 60255 part 22-1, Class 3
ESD test	IEC 60255 part 22-2, Class 4
Radiated Electromagnetic Field	IEC 60255 part 22-3;
EI. Fast Transient Burst	IEC 60255 part 22-4, Class 4
Surge test	IEC 61000-4-5; Class 3
Vibration test	IEC 60255 part 21-1,-2
Conducted Interference	IEC 61000-4-6;
Power frequency magnetic fields	IEC 61000-4-8; Class 4
Insulation test	IEC 60255-5; 5kV

CE Plaque 2007

7 About IRIG Time Code Format

In 1956 the **TeleCommunication Working Group (TCWG)** of the American **Inter Range Instrumentation Group (IRIG)** was mandated to standardize the different time code formats. IRIG document 104-60 had defined the original IRIG formats, was revised in 1970 to IRIG Document 104-70, and published later as IRIG Standard 200-70. The latest publication is 200-98.

The name of an IRIG code format consists of a single letter plus 3 subsequent digits. Each letter or digit reflects an attribute of the corresponding IRIG code.

First letter: Rate Designation	A	1000 PPS
	B	100 PPS
	D	1 PPM
	E	10 PPS
	G	10000 PPS
	H	1 PPS
1st Digit: Form Designation	0	DC Level Shift (DCLS), width coded, no carrier
	1	Sine wave carrier, amplitude modulated
2nd Digit: Carrier Resolution	0	No carrier(DCLS)
	1	100 Hz / 10 millisecond resolution
	2	1 kHz / 1 millisecond resolution
	3	10 kHz / 100 microsecond resolution
	4	100 kHz / 10 microsecond resolution
3rd Digit: Coded Expressions	0	BCD, CF, SBS
	1	BCD, CF
	2	BCD
	3	BCD, SBS

Abbreviations used in the table above:

- BCD - Binary Coded Decimal, coding of time (HH,MM,SS,DDD)
- SBS - Straight Binary Second of day (0...86400)
- CF - Control Functions depending on the user application

The DRS-LTS device supports following signal formats:

IRIG-A000	IRIG-A120	IRIG-B000	IRIG-B120
IRIG-A001	IRIG-A121	IRIG-B001	IRIG-B121
IRIG-A002	IRIG-A122	IRIG-B002	IRIG-B122
IRIG-A003	IRIG-A123	IRIG-B003	IRIG-B123
(1000 Pulses per sec.,	(1000 Pulses per sec.,	(100 Pulses per sec.,	(100 Pulses per sec.,
DC Level Shift (DCLS),	1kHz Sine wave carrier,	DC Level Shift (DCLS),	1kHz Sine wave carrier,
width coded, no carrier)	amplitude modulated)	width coded, no carrier)	amplitude modulated)

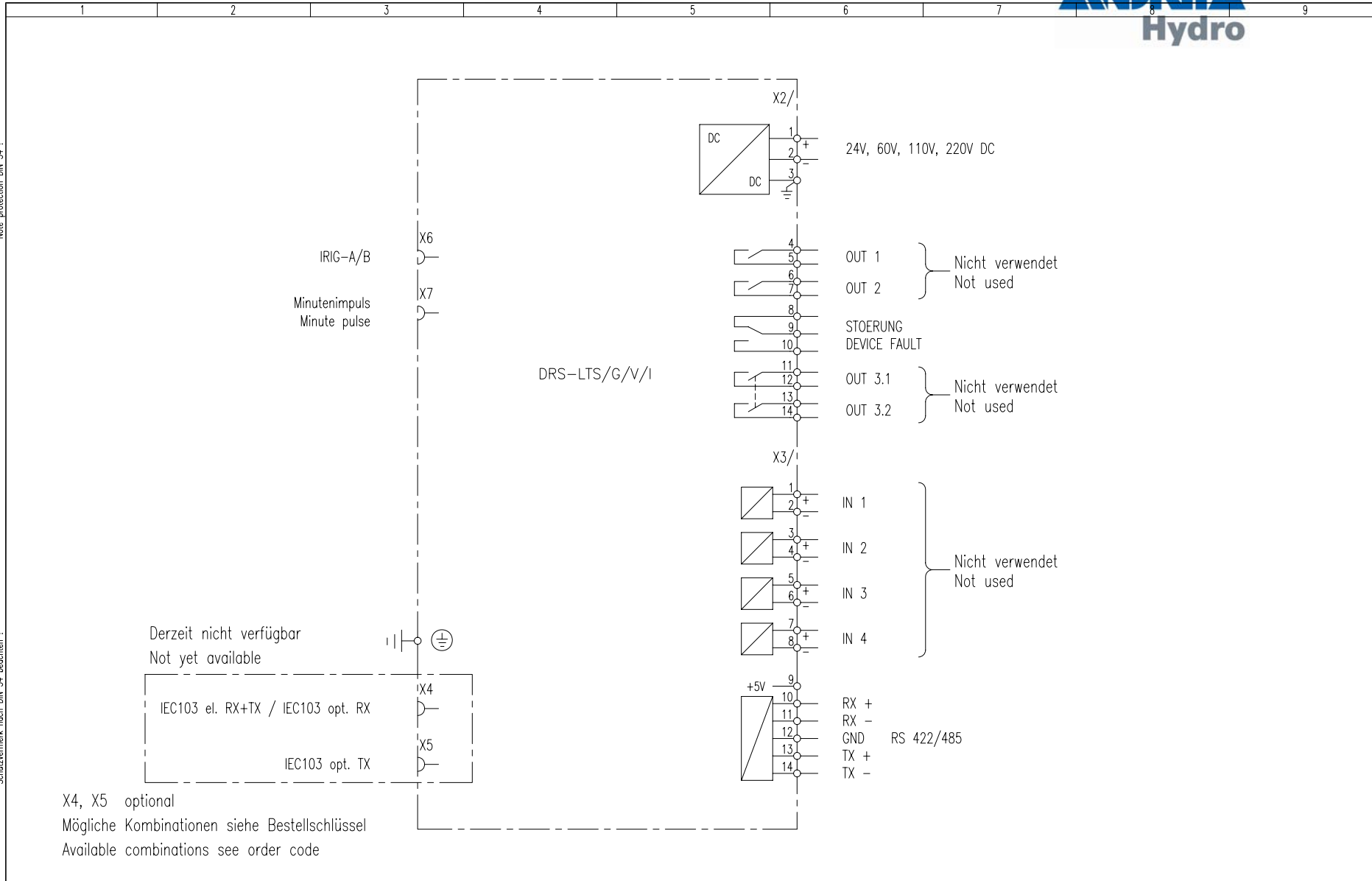
The IRIG-B protocol includes no information about the year. Therefore the date has to be set manually at first commissioning (and also after 5 or more days power down)

After this first setting, the year information is being administrated by the DRS-LTS itself. Each turn of the year results in counting up, also if the device was switched off for max. 5 days in the meantime. As long as the year is not being set, the alarm signal is enabled and the menu for year setting on display remembers to do it.

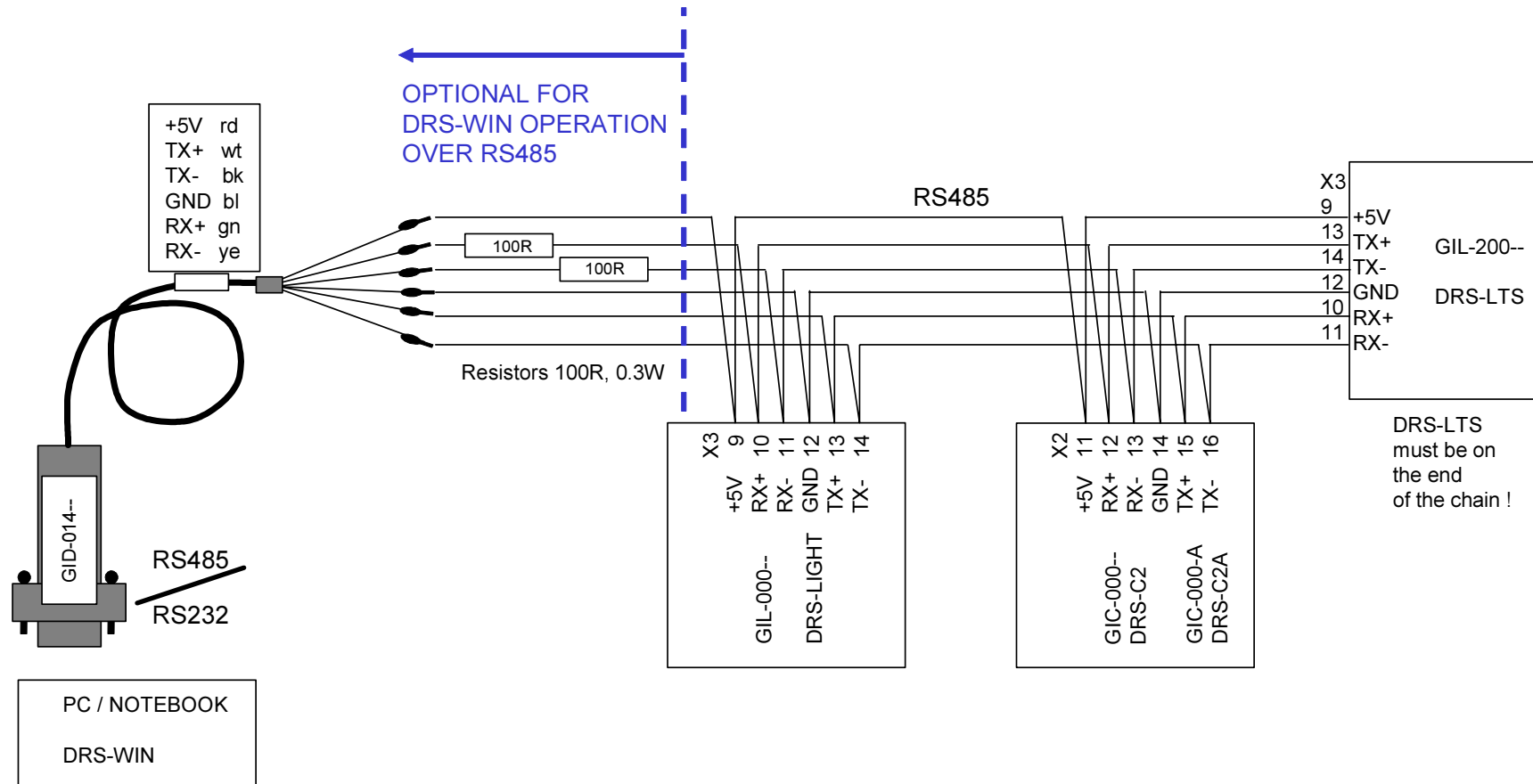
8 Figures with remarks

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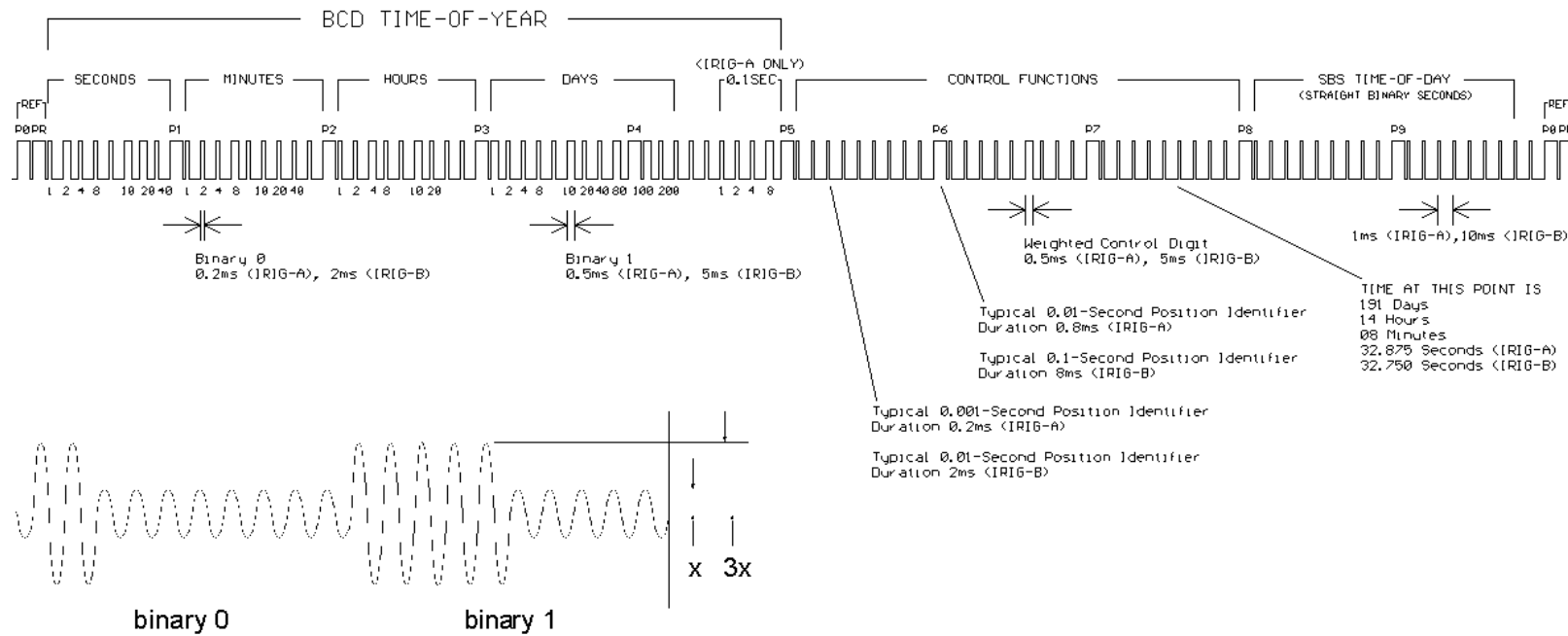
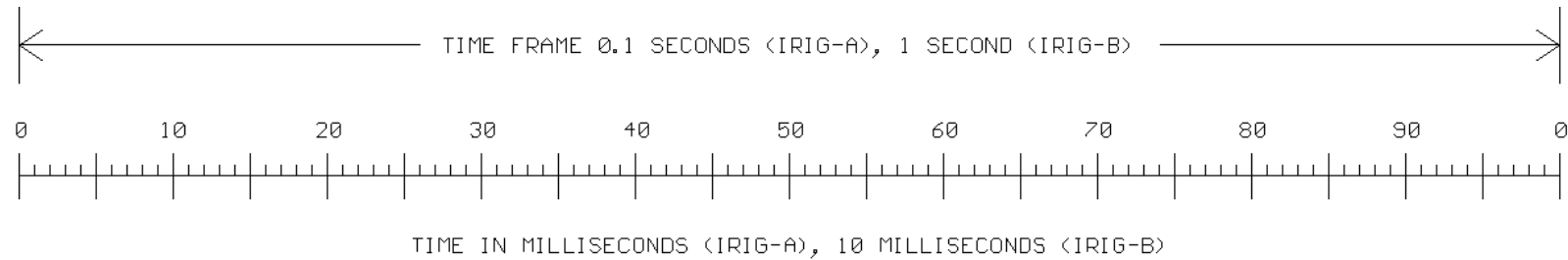


CAD	01	HAT-M024/07	16.08.07	VOLLMER	Gez./Drawn	26.06.07	VOLLMER	Kunde/Client	ALLG.		DRS-LTS Connection DRS-LIGHT Time Server	Int. N°	Index	=		
	00	HAT-M012/07	26.06.07	VOLLMER	Gepr./Check	26.06.07	081	Anl./Proj.				Zeich./Draw. N°	A.C.	Index	Bl./Sht.	1
	A/M	Anderung/Modification	Datum/Date	Bearb./Des.	Maßstab/Scale	DPE	Project-No.	File Date	16.08.07			Model	GIL-200--	GIL-200-- /40	01	von/of



8.2 DRS-LTS - External Wiring Diagram for RS485 communication

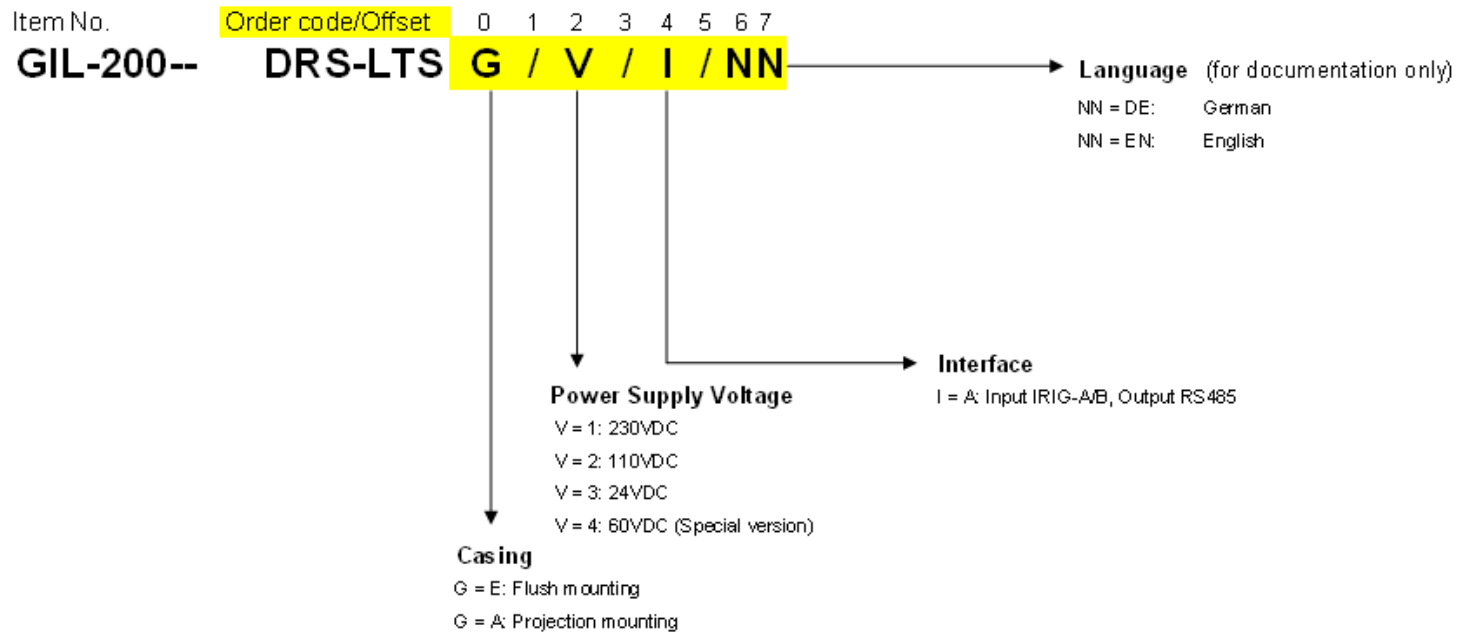
DRS-LTS is a RS485-Master in the chain. If there is used the RS485/RS232 Converter GID-014-- (designed also as master) for communication with PC with DRS-WIN operation software, the transmission lines TX+ and TX- of this converter have to be muted with resistors (100R, 0.3W) because GID-014-- cannot disable its transmitter.



TYPICAL MODULATED CARRIER

IRIG-A : 10000 Hz
IRIB-B : 1000 Hz

8.3 Example of time signal format IRIG-B123 (very similar to the also commonly used French format "AFNOR NFS-87-500")



8.4 DRS-LTS Order code