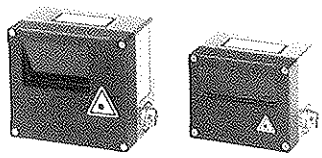
Operating Manual Display Decoder DD 55



OPERATING MANUAL

DISPLAY DECODER

DD 55

Leuze electronic GmbH + Co. Postfach 1111 D-73277 Owen-Teck
Tel. 07021/5730 Telex 7 267 821 Telefax 07021/573199

CONTENTS

1. FIXED BAR CODE READER BCL 5 / BCL 7 WITH DECODER DD 55

1.1 General Description

A bar code reader is a device which can collect and decode data in a bar code form. The device consists of two functional units which are fitted either as a compact unit in one housing (e.g. BCL 10) or in two separate housings connected with data cables (e.g. BCL 5/BCL 7 and DD 55). The two functional units are the read head and the decoder.

With the fixed bar code reader, the read head is firmly mounted on a conveyor belt on which the objects bearing the bar codes pass by the read head.

The laser diode integral with the read head generates a monochrome red light beam. This is focused through a lens system and deflected by a rotating polygon mirror wheel. The reflected signals from the barred background are detected and amplified by a photo diode. This series of electric pulses which reflect the light/dark transitions of the background are passed to an analysis electronics unit, the decoder. The decoder consists of two parts: one fast digital signal preparation unit which prepares the pulse series from the amplifier, and a processor unit which decodes these signals and converts them to ASCII data format. The data are then passed to the serial interface for further processing or analysis.

Leuze BCL bar code readers have an optic beam power of less than 1 mW. They comply with protection class 2. The laser emissions are so low that the bar code reader is totally harmless. Eye protection is normally ensured by the blink reflex and turn away reaction. Safety electronics also ensure that the laser diode is switched off if the polygon wheel has stopped or is turning too slowly. This prevents a "standing laser beam" leaving the device.

1.2 Special Features

The display decoder DD 55 contains all functions of the DD 50 and some more. It can therefore replace the DD 50 and can be used for all its applications. This means:

- the DD 55 is networkable and can be used in master/slave operation
- it has the very powerful Autocontrol functions as standard, which give warning signals on sudden and gradual deterioration in code quality (see Section 6)
- it has a "teach-in" function, whereby a reference code can be read into the decoder memory via the read head and used for comparison with the code currently read (see section 5.5.6)
- the DD 55 can be used as a decoder for the operation of BCL 5 and BCL 7 reading heads.

The DD 55 also has the following additional facilities and improvements:

- It allows simple, service-friendly address coding for operation of several Leuze bar code readers in one network. The actual coding is carried out with a 15 pole sub-D plug by the formation of bridges. Using the specified binary pattern (see Appendix 10.2.2, Fig. H), 0-31 addressing is possible. The subscriber addresses selected in this way are stored in the connection wiring of the decoder and will be retained when it is changed. When the decoder is changed, simply remove the connection plate (including PG screws) with the sub-D plug and insert in the new decoder.

- All connections for mains power and data transmission are plug-type.

- The high processing speed allows up to 9 different code information sets to be read in one action and processed in real-time.

1.3 Technical Data

Power Supply

Operating voltage:	90 - 260 V AC, 50 - 60 Hz (standard design) 24 V optional Further voltages on request
Power consumption:	Approx. 15 Watt

Housing

Material:	cast aluminium
Dimensions:	245 x 165 x 140 mm
Weight:	4.8 kg
Method of protection:	IP 65
Operating temperature:	0°C to +50°C
Storage temperature:	-20°C to +60°C

Computer

Memory:	80C166 64 K RAM 128 K EPROM 512 Byte EEPROM

Interfaces

	RS232, 20 mA (TTY) standard Optional RS485
Baud rates:	110 to 19200; for RS485, up to 57600

Code types:

Code 2/5 interleaved	code 39
Pharma code	code 128
EAN	EAN Addendum
Codabar	
Other codes on request	

Device setting:
(SETUP)

Via hand terminal on site or
by PC or PG 675/685/750

Peripherals:

Connection to Siemens S5 via CP 525

Connection to other SPS units on request

Inputs/outputs:

Galvanically separated by opto-couplers

2. COMMISSIONING

2.1 Mounting and Electrical Connections

The scope of supply of a complete bar code reader system includes a read head (e.g. BCL 5 or BCL 7) with 3 m cable (optional 6 m or 10 m) and the decoder DD 55. The fixing parts BT 50 (for BCL 5), BT 52 (for BCL 7) and BT 51 for mounting and adjustment of the read head are also provided (see data sheet "Leuze Bar Code Reader BCL 5" or BCL 7). The external connections such as mains connection, data interfaces, inputs for sensors to trigger the bar code reader and other switch outputs are shown in the Appendix, section 10-2.

Decoder

The connections for the read head and sensors are in the decoder. The connection cable is passed through the corresponding PG screws and connected (see Appendix 10, Fig. 10.2.1). Right next to the data socket for address coding is the plug connection for the read head. The associated circuit diagrams are shown in Appendix 10.2.2.

The decoder should be mounted such that the decoder display is clearly visible.

Read Head

The read head should be mounted on the conveyor belt such that the bar code or code label passes by the read head within the read area when the goods (e.g. packages) are transported (see data sheet "Leuze Bar Code Reader BCL 5" or BCL 7).

Power Supply

The bar code reader is designed for operating voltages between 90 and 260 Volt AC, 50/60 Hz as standard.

For 24 V DC, a special design (24 V Version) is required with a DC/DC converter for galvanic separation of the input voltage.

Other special voltages available on request.

Switching On

When the voltage is applied, the text display (LCD) shows the main interface parameters. This information consists of the transmission protocol of the serial interfaces (see Section 4, Data Communication) and the software version with date of production. The messages are displayed until the system is activated, e.g. via a sensor signal.

Sensor

Depending on application or function type, the use of external sensors (e.g. initiator or limit switch) may be necessary. When mounting the read head, note that the bar code must have passed fully through the read area before a sensor can signal the end of an object (e.g. package).

The sensor signal for detection of an object or data carrier does not have to come from a sensor emitter or relay contact; it can also come via a serial interface from a stored-programmable control (SPS) or be generated by a computer (see Section 3.1, Control Facilities).

The voltage supply for the sensor is integrated into the bar code reader. Voltage supply, sensor input and sensor outputs are galvanically separated by the logic circuits (see circuit diagrams, Appendix 10.2.2).

2.2 Notes on Commissioning

After application of the voltage, the drive motor of the polygon wheel starts immediately. When the wheel reaches a nominal rotation speed, the laser diode is released for control. This begins to work as soon as the read head is actively connected (e.g. by a sensor). The laser diode goes out automatically when the bar code has been successfully read or the read head is deactivated. The switch on information (see Switch On) appears again on the decoder text display.

The bar code reader has several galvanically separated 24 V sensor inputs. An external sensor signal (max. 30 V) can also be supplied. Flank adaptation or extension is carried out in SETUP (see Section 5.5.5 DIGITAL IN/OUT).

Diagnosis Program

Whenever the unit is switched on, the diagnosis program runs; this tests the individual components of the bar code reader for function. This test essentially comprises the memory module and processor tests.

After completion of the test, the switch on information appears in the text display.

When a fault is detected, an error message appears on the text display. The processor then receives a STOP command to prevent incorrect function.

3. METHOD OF OPERATION OF BAR CODE READER

3.1 Control Facilities

Before each read process, the bar code reader must be activated as its laser diode is switched off automatically after each read process in normal operation. As stated in Section 2, the control signal required for this can be generated either by an external sensor or via the external interface or software.

3.1.1 Control by an External Sensor

The sensor signals to the bar code reader that a code-bearing object is in the read area. When sensor 1 is active, the red "SENSOR" LED lights, and when sensor 2 is active, the yellow "ERROR" LED lights. If this is not the case, this signal should be inverted in SETUP (SENSOR LEVEL HIGH = Y, see Section 5.5.5).

The bar code reader is active only when the external sensor is also active, i.e. when the bar code reader is told that a code-bearing object is in the read area. Failure of the sensor signal trips the message "NO LABEL FOUND" when the read is rejected (bar code could not be decoded).

3.1.2 Control by Software or Interface

When controlled via the interface, the sensor signal can be generated either by the opto-coupler for sensor inputs 1 or 2 or via the serial interfaces (see Section 4.3 and Appendix 10.2.2).

When controlled by software, the following two alternatives are possible:

a) On system setting "CALIBRATE=Y [YES]", an active software sensor signal is sent to the decoder. After decoding the bar code, the code information is automatically output. The read gate is deactivated during the information output, and activated again immediately after the end of the output. This process is repeated continuously; the laser diode remains connected throughout.

b) On system setting "DECODE INTERVAL" (SELECTED: <>0 [not equal to 0], continuously recurring pulses are generated in the decoder, each of which opens a read gate for a specified time (less a fixed pause of 200 ms). If a bar code is detected and decoded before expiry of this time, the read gate is closed and the laser diode switched off. If decoding was not possible within the read gate, an error message is sent. The time between the pulses can be set in steps of 3 to 100, where each step corresponds to 100 ms.

   Example: setting "5" corresponds to a pulse duration of 500 ms. The read gate would be open for 300 ms (500 ms pulse duration less 200 ms pause time).

   After decoding, the laser diode is switched off automatically.

3.1.3 Recognition and Reading of a Bar Code

Before detecting a bar code, the bar code reader must know what code types are being read and how much data information (number of digits) make up the bar code concerned. This information can be entered in the bar code reader by parameterization in SETUP (see Section 5). The bar code reader can then calculate from the structure of the defined code and its number of digits, the exact number of bars and gaps a code to be read must have in order to be complete.

The high processing speed of the decoder DD 55 allows up to 9 different code information items to be read in one scan and processed real-time. The code information is thus decoded in the decoder even during the read process and the result passed to the serial interface. This allows almost continuous processing even if the bar codes are in close succession (e.g. on the endless label tape of a printer).

When the sensor tells the bar code reader that the code-carrying object has left the read field, two alternatives are possible:

a) If no bar code information has been read, the text display shows the message "NO LABEL FOUND" and the specified code character (CODE-ERROR CHAR) appears at the serial interface.

b) If the bar code has been decoded, the bar code information is output immediately.

Note: A bar code can appear good quality and legible to the human eye. The lens system of the bar code reader can find inadequacies in the same code which would lead to read rejections. To give maximum protection against such occurrences, the code should be checked first.

Leuze Electronic and the sales offices offer the following service for this:

On request, we will check your code patterns or bar code labels and carry out a legibility test under practical conditions.

If no bar code is used at present for a task, we will be pleased to advise you during the designing of your bar code labels and selection of the bar code reader.

3.2 System and Read Parameters

3.2.1 Parameters for Bar Code Detection

To ensure optimum read security for each bar code, depending on its composition (module width, bar length, code size etc.) and the characteristic features of the bar code reader (read area, opening angle of the read field etc.), certain key values must be observed. With the same lens system, a bar code reader cannot for example read both a bar code with module width 1 mm at 10 cm distance and a bar code with module width 0.5 mm at 100 cm distance (see "Read Field Size" in data sheets "Leuze Bar Code Reader BCL 5" or BCL 7).

The bar code reader must therefore be selected for the specific "application parameters" such as bar code features, read distance, read angle etc.

The main parameters such as read angle, read field height, bar length and code length are explained in the data sheet "Leuze Bar Code Reader BCL 5" (or BCL 7) under "Application Parameters for a Conveyor Belt".

When the code-carrying object (e.g. package) is "tipped", the bar code also passes the bar code reader at an oblique angle. This weakens the reflection signals of the code pattern scanned by the laser beam; the scan width and depth sharpness of the bar code reader are reduced.

Skewing the code-carrying object, or a bar code applied at an angle (tilt), indirectly reduce the bar code height (bar height) and hence the number of scans possible within a read gate. This affects the permitted transport speed of the code-carrying object (see Section 3.3.2).

For secure detection of the bar code, there must be a "quiet zone" before the start character and after the stop character. This zone must be at least 10 times the width of a narrow element, but at least 2.5 mm. In many tests, it has been found useful to change this parameter and make it dependent on the print size of the code and the read distance. This setting is accessible in SETUP.

In principle, no bar code can be analysed if its module width is considerably smaller than the diameter of the laser beam. This has its smallest diameter at the focal point. When the read distance is reduced or increased, the beam diameter becomes larger (see data sheet "Leuze Bar Code Reader BCL 5" or BCL 7).

3.2.2 Transport Speed

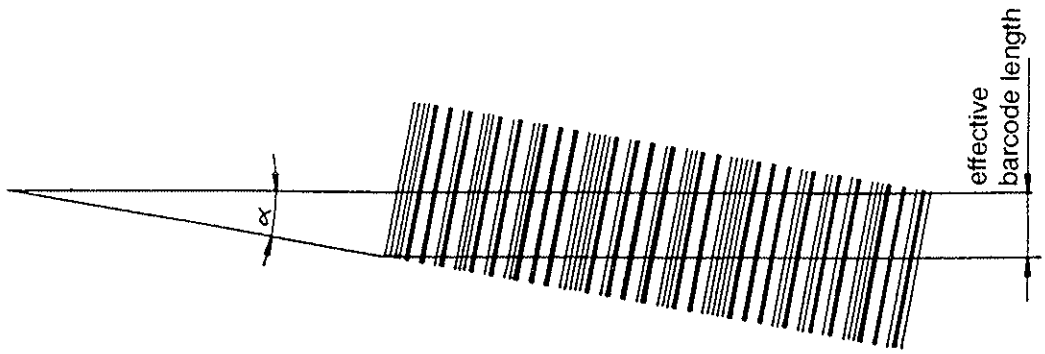
To increase the read security, each bar code is read several times within a read gate and the number of scans per code previously established are stored in the computer memory and compared. The number of decodable scans depends on the quality, bar length and transport speed of the code, and on the scanning rate of the bar code reader. It is also affected by the position of the bar code to the sensor beam of the bar code reader (tilt and skew angle) (see "Leuze Bar Code Reader BCL 5" or BCL 7).

The number of scans can be calculated approximately with the following function:]

$$A = \frac{l * f}{v} - 1$$

A =	number of scans
l =	effective barcode length [mm]
f =	scanning frequency of bar code reader [scan/s]
v =	transport speed of bar code [mm/s]

As the sketch below shows, the effective bar length is smaller with larger angles. Successful scanning is possible only while the laser beam can scan over the entire code pattern.



3.3 Display

3.3.1 Bar Display - LEDs

The bar code reader has 4 coloured display lights. Depending on the operating mode, one or more of these displays are used. The list on the pages below describes the significance of these displays. For your information, it gives the name of the display, its colour and display form.

Name	Colour
ERROR	yellow
READ	red
PROC	green
SENSOR	red

BASIC FUNCTIONS

"PROC" -> flashes regularly
Indicates that the microprocessor is carrying out the program and is not in a wait loop. If the flashing frequency is reduced, this indicates that the microprocessor is heavily loaded (e.g. by the multi-net)

"READ" -> flickers when reading a bar code
Whenever the bar code reader detects the reflection signals of a scan, the LED is activated for a short time. If several reflection signals are detected, the light intensity appears stronger for the observer.

"SENSOR" -> on
This LED is on for each read activation. A read activation can be given either via sensor input 1 or via a corresponding system setting in the "DECODE INTERVAL" or "CALIBRATE MODE" (see Section 3.1.2).

"ERROR" -> on
Sensor input 2 is activated.

SPECIAL FUNCTIONS

"SENSOR" -> flashes quickly
The microprocessor has discovered an error. The error cause is shown on the text display (LCD)

"PROC" -> flashes quickly
An error is detected during the EEPROM test. The cause of the error is shown on the LCD display.

"PROC and SENSOR" -> flash quickly
An error has been discovered during the RAM test. The error cause is shown on the LCD display.

"READ" -> flashes quickly
An error is detected during the EEPROM test. The cause of the error is shown on the LCD display.

"SENSOR and READ" -> flash quickly
The function of the integral LCD display is faulty.

"ERROR" -> flashes slowly
The Autocontrol function has given a warning.

3.3.2 Messages on Text Display - LCD

The LCD display also shows further information apart from the decoding results. This information is divided into three classes:

Error messages
Warning messages
General messages

When error or warning messages are given, the error type is given in the 1st LCD line and the error number in the second LCD line.

The error numbers range from 0 to 255. Using the error list, the fault can be defined more closely from the number. The messages remain on display until the next message is given.

Error Messages

The program is interrupted when an error occurs.

PROCESSOR ERROR error number (130)	Invalid processor command performed
PROCESSOR ERROR error number (131)	Protected processor command performed
PROCESSOR ERROR error number (132)	Word data access to incorrect memory address
PROCESSOR ERROR error number (133)	Invalid processor command performed
PROCESSOR ERROR error number (134)	Illegal access to external memory
STACK ERROR error number (128)	STACK overflow
STACK ERROR error number (129)	STACK underflow
RAM ERROR error number (12)	Error on external memory test
RAM ERROR error number (13)	Error on external memory test (rotating BIT sample)
ERROR ERROR error number (10)	The calculated EEPROM checksum does not agree with the stored checksum
EEPROM VERIFY ERROR error number (18)	The calculated EEPROM checksum does not agree with the stored checksum

Note: If an error message occurs, note the error number displayed and inform Technical Service.

Warnings

These ensure early detection of faults. If a warning message appears, the program is continued and the system remains in operation.

V24 TRANSMIT TIMEOUT warning number (40)	A character could not be sent on the RS232/TTY within the specified send time
V24 RECEIVE TIMEOUT warning number (41)	The specified time interval between two characters for reception on the RS232/TTY interface has been exceeded
V24 RECEIVE ERROR warning number (42)	On reception on the RS232/TTY interface, a PARITY fault was detected
V24 RECEIVE ERROR warning number (43)	On reception on the RS232/TTY interface, a STOPBIT fault was detected
V24 RECEIVE ERROR warning number (44)	The reception register at the RS232/TTY interface has overflowed
V24 RECEIVE ERROR warning number (45)	A false PREFIX 2 was received at the RS232/TTY interface
V24 RECEIVE ERROR warning number (46)	A false TERMINATOR was received at the RS232/TTY interface
V24 RECEIVE ERROR warning number (47)	A false checksum character was received at the RS232/TTY interface
V24 RECEIVE ERROR warning number (48)	On reception at the RS232/TTY interface, an ACKnowledge error was detected
RS485 TRANSMIT TIMEOUT warning number (60)	A character could not be sent on the RS485 within the specified send time
RS485 RECEIVE TIMEOUT warning number (61)	The specified time interval between two characters for reception on the RS485 interface has been exceeded
RS485 RECEIVE ERROR warning number (62)	On reception at the RS485 interface, a PARITY fault was detected
RS485 RECEIVE ERROR warning number (63)	On reception at the RS485 interface, a STOPBIT fault was detected
RS485 RECEIVE ERROR warning number (64)	On reception at the RS485 interface, the reception register has overflowed
RS485 RECEIVE ERROR warning number (65)	A false PREFIX 2 was received at the RS485 interface
RS485 RECEIVE ERROR warning number (66)	A false TERMINATOR was received at the RS485 interface
RS485 RECEIVE ERROR warning number (67)	A false checksum character was received at the RS485 interface
RS485 RECEIVE ERROR warning number (68)	On reception at the RS485 interface, an ACKnowledge error was detected

General Messages

These messages give general information on the operating condition or the performance of certain functions during the program.

XXX SCAN/SECOND	Shows the number of scans per second
MOTOR NOT RUNNING	The motor in the read head is not running
RESET STILL ACTIVE	The RESET switch on the motherboard is connected
HARDWARE ADDRESS XX	The address XX on the motherboard is hard-wired
INITIALISE SLAVE!	The decoder in the multi-Net network is parameterized as slave and is waiting for initialization
SLAVE INITIALISED	The decoder in the multi-Net network is parameterized as slave and is already initialized
XXXXX DECODED XXXXX NOT DECODED	Display of successfully and unsuccessfully decoded patterns
STATISTIC CLEARED	All functions (counters) used for statistics are set to their initial value (deleted)
PARAMETER BLOCK (XX) TRANSMITTED	The decoder has sent parameter block xx properly
PARAMETER BLOCK (XX) RECEIVED	The decoder has received parameter block xx properly
PARAMETERS SAVED	The decoder has stored the parameter blocks previously received
TEACH IN ACTIVATED!	The TEACH IN function of the decoder for entry of a reference code is activated
TEACH IN ABORTED!	The TEACH IN function of the decoder for entry of a reference code is aborted
TEACH IN READY!	The TEACH IN function of the decoder for entry of a reference code was successfully terminated
NEW REFERENCE CODE:	Shows new reference code
NO LABEL FOUND	During the read process, no bar code patterns could be decoded
NO DECODE RESULT	During the read process, a bar code pattern was detected but no valid decoding result was achieved
TOO LESS RESULTS	During the read process, a bar code pattern was detected and decoded. The necessary number of agreements (equal scans) was not however achieved.
INVALID COMMAND: xxh	An invalid character (command) with HEX value xx has been received.

4. DATA COMMUNICATION

4.1 Data Transmission Format - Output Format

Data protocol and data format of the serial interfaces (RS232/TTY and RS485).

4.1.1 Data Protocol

The Leuze bar code reader communicates with the connected controls or displays by means of a data protocol. In order for the bar code reader and connected unit to communicate, they must all "speak the same language", i.e. they must use the same data transmission protocol.

The basic structure of such a protocol is shown below. The actual data are enclosed by a prefix and a terminator.

Example

Prefix	Scanner address	Scanner address	Data bytes	Messageterminator 1 and 2	
[STX]	[ASCII-ADR HIGH]	[ASCII-ADR LOW]	BS23	[CR]	[LF]
02h	30h	31h	42h, 53h,32h, 33h	0Dh	0Ah

Significance of the individual parameters:

Prefix:
The participants can detect the start of a message from this character.

Scanner Address:
If several bar code readers are connected to a system, each message is clearly allocated to the device concerned via the scanner address.

Data:
This is the data information in the message.

Message Terminator 1, Message Terminator 2:
These characters form the conclusion of the message (MESSAGE TERMINATOR).

The free configurability of the bar code reader (SETUP) allows rapid and flexible adaptation to the various control systems. All prefix and terminator characters are freely selectable and all ASCII characters are permitted. Also, some or all of these characters can be omitted (see SETUP description, Section 5).

4.1.2 Data Format

All characters of a data protocol have the same format. In serial data transmission, each character is transmitted "bit by bit". As with the data protocol, the actual information has a prefix and a terminator. This is essential so that every participant in the network (bar code reader, control units etc.) know how to separate the individual characters.

Ex. 1:

a DATA CHARACTER with 8 databits, 1 stopbit, parity = even

startbit	D0	D1	D2	D3	D4	D5	D6	D7	parity	stopbit
0	0	1	1	0	0	0	0	1	1	1

0 + 1 + 1 + 0 + 0 + 0 + 0 + 1 = 3 (odd total)

+ 1

4 => (even total)

Ex. 2:

a DATA CHARACTER with 7 databits, 2 stopbit, parity = odd

startbit	D0	D1	D2	D3	D4	D5	D6	parity	stopbit
0	0	1	1	0	0	0	0	1	1

0 + 1 + 1 + 0 + 0 + 0 + 0 = 2 (even total)

+ 1

3 => (odd total)

Significance of the individual parameters:

Startbit:
This is the first bit of a character. It has a level opposite to the stopbit.

D0 - D7:
The information bits (databits) are transmitted between the startbit and the parity bit (optional: 7 or 8 databits)

Parity:
This bit is used to check whether an error has occurred in the data transmission (checksum either: none, odd or even).

Stopbit 1, Stopbit 2:
These bits form the end of the character (corresponds to the rest level of the data line). They have a level opposite to the startbit (either 1 or 2 stopbits).

SETUP offers the facility of setting the data format as required. Further information is given in the SETUP description, Section 5.

4.2 Online Commands

Online commands are control commands which are sent by a control unit to the bar code reader via the serial interface. These commands are performed by the decoder immediately on reception.

The following online commands are available from software version 41.00:

<A> Displays previously decoded bar codes and bar codes not yet decoded on the text display.

<B> Sends the next command to all slaves connected.

<C> The counters for decoded and undecoded bar codes are set to zero.

<D> Displays current configuration of the interface, the software version and the production date on the text display.

<E> Calls SETUP.

<F> Resends last serial output via the serial interfaces.

<G> All activated Autocontrol functions are set to rest (as when switched on), and the yellow "ERROR" LED goes out. The online command "G" is used only in exceptional cases as the Autocontrol function is automatically reset when the next read gate is released.

<H> Software reset (warm start).

<I> Displays scan rate (scans per second) on the display.

*<L> Output of hex dump of the scan read to the interface.

*<O> Displays how often the bar code read is identical or not identical to the reference code.

<R> Displays the number scans read in the lower right corner of the text display. Reactivation deletes this function again.

<V> Output of software version via the serial interface.

<CTRL+T> This function disconnects the "framing" at the serial interface RS232 of the bar code reader in transmission and reception. Thus no prefix or terminator and no addresses are used.
Restrictions: after reception of the <CTRL+T> character in the decoder, for the next 3 seconds no character can be sent via the interface. After these 3 seconds, the bar code reader sends a ">" character to the interface. A character must now be sent to the bar code reader within 2 seconds, else the <CTRL+T> command is ignored and a "?" given at the interface. Acknowledging with the character "E" retrieves the SETUP menu.

<+>	Activate sensor 1
<->	Deactivate sensor 1
<,>	Activate sensor 2
<.>	Deactivate sensor 2
[05h]	Confirmed reception with 06h (ACKnowledge)
*[07h]	Activate beeper
[14h]	Same function as <CTRL+T>
{ESC}<L><data>	Display "information" on the LCD display {ESC=1Bh}
{ESC}<E>	Retrieve error code

Explanations

<R>	Corresponds to the "R" key of the PC or terminal
{ESC}	Input value of ESC in hexadecimal is [1Bh]
[05h]...[07h]	Hexadecimal values (indicated by the added "h")
<data>	Data information

Functions marked "*" are available from Version 42.00.

4.3 Connections for Data Transmission

4.3.1 Pin Allocation of 25 Pole Sub-D Socket

Pin No.	IN/OUT	Function	
2	OUT	TxD transmit data	RS232/V24
3	IN	RxD receive data	RS232/V24
4	OUT	RTS control line	RS232/V24
5	IN	CTS control line	RS232/V24
7		Signal ground	RS232/V24
22	OUT	Tx+ TTY passive	
23	OUT	Tx- TTY passive	
24	IN	Rx+ TTY passive	
25	IN	Rx- TTY passive	

Power source for TTY active switching:

6	OUT	20 mA power source 1
8	OUT	20 mA power source 2
7		GND power source

Connections for sensor for package detection:

11	OUT	VDD sensor (max. 100 mA)
12	OUT	GND sensor
13	IN	IN 1 sensor (12 - 30 V)
9	IN	IN 2 sensor (12 - 30 V)

Connections for switched outputs:

17	OUT	VCC switched output (12 - 30 V)
19	IN	GND switched output
18	OUT	OUT 1 switched output (max. 100 mA)
14	OUT	OUT 2 switched output (max. 100 mA)

Connections for RESET function:

10	IN	RESET input (12 - 30 V)[1]
20	OUT	RESET input (12 - 30 V)[1]

Connections for RS485:

15	IN/OUT	RS485	Line A
16	IN/OUT	RS485	Line B

Use of internal DIP switch:

1	RESET	See footnote[1]
2	RS232/TTY	Switch for reception line RS232 to TTY

1) When switch 1 closes or a voltage is applied over PIN 10 and PIN 20 in voltage-free state, and the supply voltage is then applied, the "RESET" function is activated. The original programming is then permanently lost.

4.3.2 Pin Allocation of 15 Pole Sub-D Socket

Connections for RS485:

Pin No.	IN/OUT	Function
1		GNDD (screen)
2	IN/OUT	Line A
3	IN/OUT	Line B
4	INTERNAL	ADDR. 16
5	INTERNAL	ADDR. 8
6	INTERNAL	ADDR. 4
7	INTERNAL	ADDR. 2
8	INTERNAL	ADDR. 1
9	IN/OUT	Line A
10	IN/OUT	Line B
11	INTERNAL	GND ADDR.
12	INTERNAL	GND ADDR.
13	INTERNAL	GND ADDR.
14	INTERNAL	GND ADDR.
15	INTERNAL	GND ADDR.

5. SETTING PARAMETERS ON BAR CODE READER - SETUP

5.1 General

To ensure maximum flexibility of the Leuze bar code readers, an adjustment facility known as "parameterization" has been provided. This is done via the SETUP. Here the bar code reader is adapted to the conditions of the task and code. SETUP is best carried out via a PC or a VDU. The parameters set during SETUP are stored in the decoder memory (EEPROM). All adjustment parameters in the decoder DD 55 can be transferred en bloc via the interface and stored externally. Using this stored data, a replacement or additional decoder can quickly and easily be programmed for its task. Changes can be made at any time to settings already made through further SETUP process.

5.2 Setting Bar Code Reader - Standard SETUP

Leuze bar code readers are factory-set to the customer's required plant- and code-specific parameters. For orders given without parameters, the following standard SETUP is supplied.

CODE

CODE TYPE:	1 (2 of 5 INT.)	
DIGITS:	10	
CODE CONFIGURATION		
QUIET ZONE:	3	
EQUAL SCANS:	2	
NUMBER OF LABELS:	1	
CODE ERROR CHAR.:	18h	(Hex.)
DECODE INTERVAL:	0	(not active)
CALIBRATE MODE:	N	(NO)

AUTOCONTROL

DECODE QUALITY		
QUALITY LEVEL:	0	(not active)
WARNING CHAR:	07h	(Hex.)
SWITCH ON PORT 1:	N	(NO)
SWITCH ON PORT 2:	Y	(YES)
BAD READ		
BAD READ LEVEL:	0	(not active)
WARNING CHAR:	07h	(Hex.)
SWITCH ON PORT 1:	N	(NO)
SWITCH ON PORT 2:	Y	(YES)

SERIAL PORTS

PROT. STRUCTURE		
STARTCODE CHAR:	53h	(Hex.)
MESSAGE SEPARATOR:	00h	(Hex.)
HARDW. WARN. CHAR:	40h	(Hex.)
DECODER ADDRESS:	0	
LAST SLAVE ADDR:	1	(max. 4 slaves)

RS232/TTY

DATA FORMAT:	6	(8-NONE-1)
BAUD RATE:	7	(9600 BAUD)
PROTOCOL:	4	(T+R FRAME)
PREFIX:	02H	(STX)
ADDRESS TYPE:	1	(NO ADDRESS)
TERMINATOR 1:	0Dh	(CR)
TERMINATOR 2:	0Ah	(LF)
HANDSHAKE MODE	2	

RS485

DATA FORMAT:	0Ch	(MultiNet)
BAUD RATE:	Ah	(57600 baud)
PROTOCOL:	4	(T+R FRAME)
PREFIX:	02h	(STX)
ADDRESS TYPE:	1	(NO ADDRESS)
TERMINATOR 1:	0Dh	(CR)
TERMINATOR 2:	0Ah	(LF)
MULTINET PRIORITY:	10	

DIGITAL IN/OUT

SENSOR PORT 1

SENSOR LEVEL HIGH:	N	(NO)
DEBOUNCE TIME:	5	(ms)
SENSOR LOGIC:	1	(OUT = S1)

SENSOR PORT 2

SENSOR LEVEL HIGH:	N	(NO)
DEBOUNCE TIME:	5	(ms)
SENSOR LOGIC:	1	(OUT = S1)

SWITCH PORT 1

BASE LEVEL HIGH:	N	(NO)
SWITCH GOOD READ:	N	(NO)
SWITCH BAD READ:	N	(NO)

SWITCH PORT 2

BASE LEVEL HIGH:	N	(NO)
SWITCH GOOD READ:	N	(NO)
SWITCH BAD READ:	Y	(YES)

REFERENCE CODE

ENTER REF. CODE:	*	
DON'T CARE CHAR:	2Ah	(Hex.)
TEACH IN SOURCE:	1	(NO TEACH IN)

These individual parameters are explained in Section 5.5.

5.3 SETUP Menus

For simple and rapid processing, the SETUP is divided into four menu levels. When SETUP is retrieved using the ONLINE command "E", the main menu "SETUP" appears on the decoder display. By keying in the corresponding item number or making a selection from the menu and activating the "RETURN" key (enter), the required menu for the next level can be retrieved. At the lowest level, after selection of a function, the following menu point is retrieved (scroll function) by pressing the SPACE bar or the "RETURN" key.

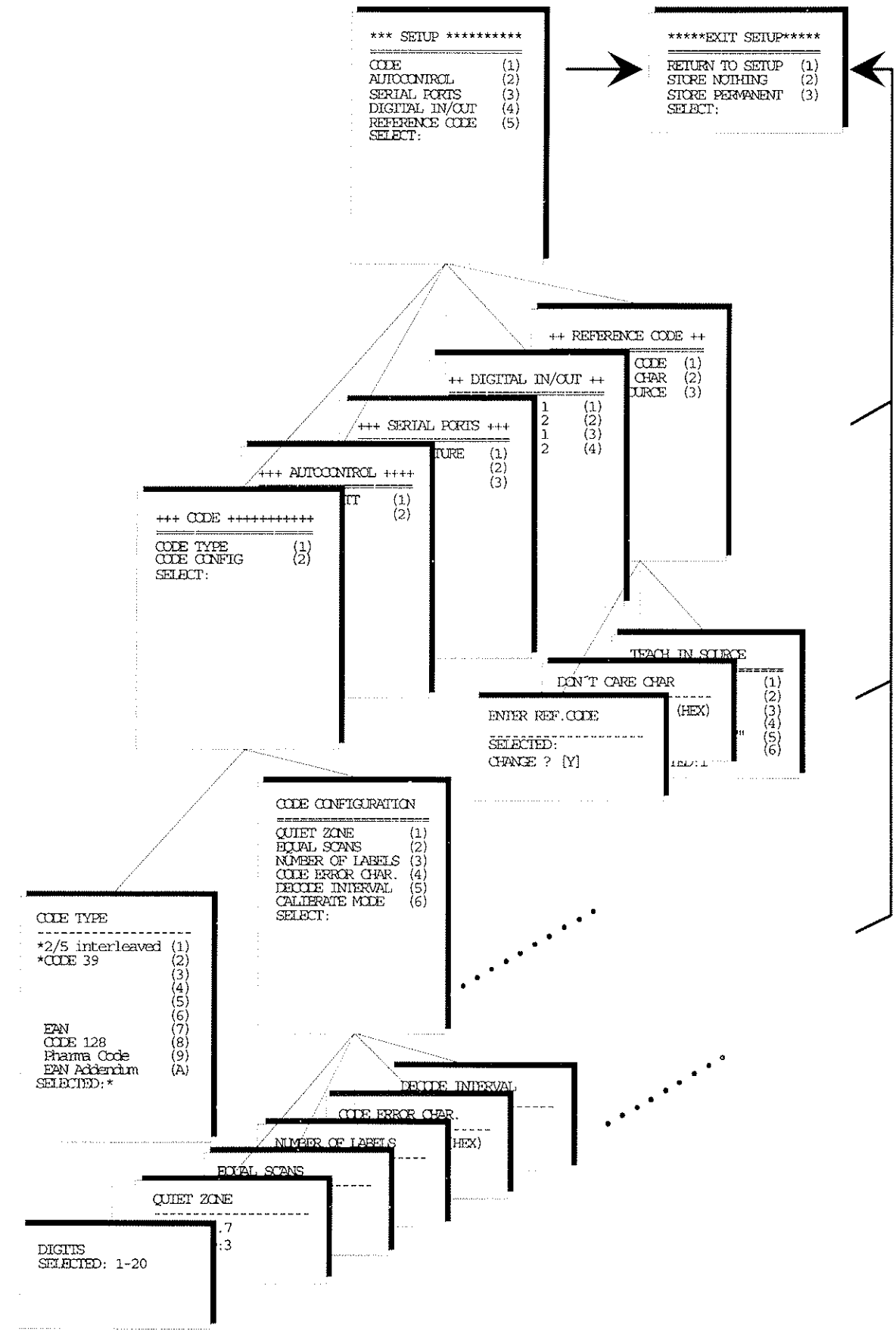
Pressing key Q or ESC takes you to the next highest menu, and "X" direct to the main menu.

After changing a setting, confirming the entry by pressing "RETURN" automatically takes you back to the higher level.

Important: Settings are only accepted after pressing the "RETURN" key. Returning to the main menu using ONLINE command "X" (see Section 4.2) without first pressing the return key means the new parameters have **not** been accepted.

Recommendation: For ease of orientation during SETUP, follow the graphic representation on page 5-4.

Graphic Representation of SETUP



5.4 Performance of SETUP

Notes on the performance of SETUP are given below.

[1] Retrieve SETUP

SETUP is retrieved via the ONLINE command "E". During SETUP, the bar code reader must not carry out any other tasks.

[2] Change a Setting

To change a specified setting, the corresponding menu point is selected. The word "SELECTED:" appears in the bottom line, with the current setting. This setting is overwritten when a new value is entered. The entry must be confirmed with the "RETURN" key. The new setting is now stored and the next highest menu level appears on the display. The input can be interrupted at any time with the "ESC" key, in which case the old settings are retained. If an invalid value is entered, or if the value is too great or too small, the messages "VALUE TOO GREAT" or "VALUE TOO SMALL" appear for approx. 1 second. A new value can then be entered.

[3] Scroll Function

Using the space bar, you can scroll to the lowest menu level. Every time the space bar is pressed, the next menu point is retrieved. From the last menu point of a level, pressing the space bar automatically returns you to the first menu point of the same level. All other key functions remain unchanged. So for example you can jump back with ESC or Q at any point in the menu.

[4] End SETUP

The SETUP can only be exited from the menu "EXIT SETUP". If the SETUP is not exited properly via this menu (e.g. by pulling the power plug), the parameters already changed are ignored. The "EXIT SETUP" menu can be reached by repeated pressing of the "ESC" key or directly with the online command "X". There you can choose between "Return to SETUP menu" (RETURN TO SETUP), "Quit SETUP without storing" (STORE NOTHING) or "Quit SETUP with EEPROM storage of new settings" (STORE PERMANENT).

[5] SETUP by Leuze Terminal Emulation (Term 90, Term 92)

After retrieving the Terminal Emulation (C:\TERM) on the PC, there are two options for data communication:

1. Unframed operating mode (NO FRAMING)
2. Framed operating mode (FRAMING)

1. To work with operating mode "unframed", both framing modes - both on the PC and on the decoder DD 55 - must be switched off.

On the PC, this is achieved by <ALT-F6>. The command <ALT-F6> has a toggle function, i.e. the framing can be switched on and off (cf. F1 Help).

The current state is shown at the bottom right of the screen. When framing is on, prefix and

terminators are shown. When framing is off, these fields remain empty as does the lower left address field (see F1, Help).

The DD 55 framing is also switched off via the PC keyboard. The key combination <CTRL+T> + character (see Section 4.2 Online Commands) switches the framing off. After the sign ">" appears, an "E" must be entered within 2 seconds in order to enter SETUP. In this operating mode, neither prefix nor terminators nor the addresses are analysed. On exiting SETUP, decoder DD 55 automatically restores the framing. Note that in this mode, certain settings, e.g. those which require an address range, cannot be made.

2. In framed mode, check that both the PC and the decoder are using the same operating mode. This can be done by <ALT-F6> on the PC. Decoder DD 55 is automatically in this operating mode after switching on. SETUP is now retrieved direct via the online command "E".

For further settings see F1, Help.

Important Note

The values listed after the word "SELECTED:" in the following menu points correspond to the standard SETUP settings.

5.5 Explanation of Menus and SETUP Options

The following explanations of SETUP begin with the main menu. Each individual point of the main menu (from "CODE" to "REFERENCE CODE") forms a separate group which is covered in stages down to its lowest level, before switching to the next menu point.

5.5.1 Main SETUP Menu

```
SETUP                                    1st level
==========================
CODE                        (1)
AUTOCONTROL                 (2)
SERIAL PORTS                (3)
DIGITAL IN/OUT              (4)
REFERENCE CODE              (5)
SELECT:
```

The main menu shows the first level menus available. By entering the item number or selecting the required menu and pressing "RETURN", you retrieve the menu. The "ESC" key returns you to this menu.

5.5.2. Menu 1: CODE

```
CODE                                        2nd level
==========================
CODE TYPE                   (1)
CODE CONFIG                 (2)
SELECT:
```

In this menu, the codes can be selected and code-specific settings made.

```
CODE TYPE                                   3rd level
==========================
*2/5 interleaved            (1)
CODE 39                     (2)
                            (3)
                            (4)
                            (5)
                            (6)
EAN                         (7)
CODE 128                    (8)
Pharma Code                 (9)
EAN Addendum                (A)
CODABAR                     (B)
SELECTED:*
```

The code types listed are implemented as standard. Other code types are available on request. The asterisk (*) denotes the code type selected in SETUP and hence activated which the bar code reader can read. (In the example, this is code type 2/5 interleaved).

```
DIGITS                                      4th level
--------------
SELECTED: 1-20
```

After selecting the code type, SETUP automatically asks for input of the possible number of digits. For each code type, various code lengths can be defined. Up to three single-digit or two-digit figures (e.g. 8,10,14) are acceptable entries. For variable numbers of digits, ranges can be defined, even mixed with a fixed code length (e.g. 4,6-12). The different values must be separated by a comma and the "from-to" range (e.g. 5-14) by a hyphen.

The maximum permitted number of digits is code-dependent, but should not exceed 40.

Entering the number of digits as "0" means that this code is deactivated and cannot be read; the asterisk in front of the code name disappears in the menu "CODE TYPE".

On completion of the digits entry, the decoder again shows the "CODE TYPE" selection menu.

CODE CONFIGURATION 3rd level

```
==========================
QUIET ZONE          (1)
EQUAL SCANS         (2)
NUMBER OF LABELS    (3)
CODE ERROR CHAR.    (4)
DECODE INTERVAL     (5)
CALIBRATE MODE      (6)
SELECT:
```

This menu specifies the bar codes to be read.

QUIET ZONE 4th level

```
-----------
RANGE = 2..7
SELECTED: 3
```

A power to base 2 is formed from the figure selected, where the figure is used as an exponent. The result (factor) is used to calculate the rest zone (quiet zone).

For example: Figure "3" gives factor $2^3 = 8$

Input value	Power of two	Factor
2	1×2^2	4
3	1×2^3	8

etc.

The quiet zone is calculated separately for the start and end of the bar code. For the start of the bar code, the width of the first bar is used for calculation. This width is multiplied by the calculated "factor" and gives the length of the quiet zone before the start of the bar code. The same applies to the last bar of the code, and hence the quiet zone at the end of the bar code.

The quiet zone should not be less than 10 times the value of the module width, but at least 2.5 mm.

EQUAL SCANS 4th level

```
----------------
RANGE = 1..255
SELECTED: 2
```

The bar code reader offers the facility of detecting and decoding a greater number of scans during the "activation time" of the read head (laser beam on). To increase the decoding safety, the setting "EQUAL SCANS" specifies how many scans must agree before the decoded code can be output. If this number is not reached, the display "TOO LESS RESULTS" appears.

NUMBER OF LABELS 4th level

RANGE = 1..9
SELECTED: 1

Within an activation period (read gate open), up to 9 different bar code types or bar code information (same code type, different number of digits) can be read and decoded. The figure required must be set here. If, during an activation time, fewer codes are detected than specified, the corresponding "CODE ERROR CHARACTER" is sent on output for each missing code.

CODE ERROR CHAR: 4th level

RANGE: 00h..7Fh (HEX)
SELECTED: 18h

This freely selectable control character is sent when a detection and decoding is negative. The decoder display gives a reason why decoding is negative. (Setting "00"h means that the character was not sent).

DECODE INTERVAL 4th level

RANGE = 0.3..99
SELECTED: 0

As explained in Section 3.1.2, this determines the interval for activation of a read gate. The set value times 100 ms corresponds to the interval time; subtraction of a fixed set pause time of 200 ms gives the opening time for the read gate.

Example: value 5 corresponds to an interval time of 500 ms and hence a read gate activation time of 300 ms (500 ms interval time minus 200 ms pause = 300 ms read gate). Because of the 200 ms pause time, the values "1" and "2" are invalid.

After decoding a result, the laser diode is switched off. After the interval time, the read gate is closed and then re-opened.

CALIBRATE MODE 4th level

YES - NO
SELECTED: N

This function is used as a setting aid for installation or an assessment aid for a bar code pattern. The bar code reader is set in a work mode in which it continuously tries to detect bar codes, analyze and output these. Even if there is no bar code to read, the laser diode remains permanently on. The decoder remains in wait mode.

5.5.3 Menu 2: AUTOCONTROL

2nd level

```
AUTOCONTROL
==========================
DECODE QUALITY          (1)
BAD READ                (2)
SELECT:
```

Using this "Autocontrol" function, warnings can be given when the legibility of a bar code deteriorates. The warning can be given via the interface or the switched outputs. The threshold values should be set such that the display begins even at an uncritical deterioration in legibility, as long as the read accuracy is not affected. This gives the user sufficient reaction time to determine the reason for the deterioration (e.g. dirty lens window, dirty labels, loss of contrast) and take countermeasures.

3rd level

```
DECODE QUALITY
==========================
QUALITY LEVEL           (1)
WARNING CHAR            (2)
SWITCH ON PORT 1        (3)
SWITCH ON PORT 2        (4)
SELECT:
```

Here the threshold value for a gradual loss of legibility is established, together with the warning criteria which become effective when values fall below this level.

4th level

```
QUALITY LEVEL
-------------
RANGE = 0..99
SELECTED: 0
```

With this function, a gradual reduction in legibility of a bar code is detected. The specified value gives the required ratio (in %) of successfully decoded scans to the total number of possible scans within a "bar code range". (The bar code range is the zone within a read gate in which the scanner detects a bar code pattern, see Sections 6.1.1 and Graph 6.2.1).

4th level

```
WARNING CHAR
------------
RANGE = 00h..7Fh  {HEX}
SELECTED: 07H
```

This determines the warning character which indicates a fall below the specified threshold value. It is given in hexadecimal form; the character can be freely selected (setting "00"h means that the character was not sent).

4th level

```
SWITCH ON PORT 1
----------------
YES- NO             (Y) - (N)
SELECTED: N
```

This function determines whether the switched output of "SWITCH PORT 1" is to be activated when values fall below the warning threshold. The pulse duration is 300 ms.

SWITCH ON PORT 2 4th level

YES- NO (Y) - (N)
SELECTED: Y

This function determines whether the switched output of "SWITCH PORT 2" is to be activated when values fall below the warning threshold. The pulse duration is 300 ms.

BAD READ 3rd level

==========

BAD READ LEVEL (1)
WARNING CHAR (2)
SWITCH PORT 1 (3)
SWITCH PORT 2 (4)
SELECT

This menu is used for early detection and warning in the event of a rapid loss of legibility. This determines the threshold values and warning criteria to be active if this value is exceeded.

BAD READ LEVEL 4th level

RANGE = 0..99
SELECTED: 0

This function determines whether the message output should be delayed in the event of sudden loss of legibility. The required delay (number of successive non-decodable bar codes) is stored in an adjustable sum counter. A message is given only when the specified threshold is exceeded (see Sections 6.1.2 and Graph 6.2.2).

WARNING CHAR 4th level

RANGE = 00h..7Fh (HEX)
SELECTED: 07h

This sets the warning character for exceeding the specified threshold value. (Setting "00"h means that the character was not sent).

SWITCH ON PORT 1 4th level

YES- NO (Y) - (N)
SELECTED: N

This function determines whether the switched output of "SWITCH PORT 1" is to be activated when values fall below the warning threshold. The pulse duration is 300 ms.

SWITCH ON PORT 2 4th level

YES - NO (Y) - (N)
SELECTED: Y

This function determines whether the switched output of "SWITCH PORT 2" is to be activated when values fall below the warning threshold. The pulse duration is 300 ms.

5.5.4 Menu 3: SERIAL PORTS

2nd level

```
SERIAL PORTS
============================
PROT. STRUCTURE        (1)
RS232/TTY              (2)
RS485                  (3)
MULTISCAN              (4)
RK512/3964             (5)
SELECT:
```

In this menu, the format of the data protocol and transmission procedures for the control and data information are established.

3rd level

```
PROT. STRUCTURE
============================
STARTCODE CHAR         (1)
MESSAGE SEPARATOR      (2)
HARDW. WARN. CHAR      (3)
DECODER ADDRESS        (4)
LAST SLAVE ADDR:       (5)
SELECT:
```

This menu is used to determine the start, monitor and control characters for the data sets to be transferred, and for addressing the various participants (bar code reader, controls etc.) in a network.

4th level

```
STARTCODE CHAR
----------------------
RANGE = 00h..7Fh {HEX}
SELECTED: 53h
```

With this selectable character, the decoder signals its readiness to the connected system. (Setting "00"h means that the character was not sent).

4th level

```
MESSAGE SEPARATOR
----------------------
RANGE = 00h..7Fh {HEX}
SELECTED: 00h
```

This freely selectable control character adds the data sets from several bar codes together into a block and separates the various sets with the control character. The control character set in SETUP (e.g. PREFIX, ASCII-ADR, TERMINATORS etc.) are sent before and after the data block. (Setting "00"h means that the character was not sent).

HARDW. WARN. CHAR 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 40h

With this character, the decoder signals a technical fault in the hardware. This freely selectable character is transferred to the attached system. (Setting "00"h means that the character was not sent).

DECODER ADDRESS 4th level

RANGE = 0..31
SELECTED: 0

For applications in which several bar code readers are operated on a common control unit, each bar code reader should be identifiable with a code (e.g. 2-byte ASCII address). This code is transferred immediately after the PREFIX (see Serial Interface).

LAST SLAVE ADDR. 4th level

RANGE = 1..31
SELECTED: 1

If the bar code reader is used as "MASTER" in a "Multi-Net", it must know how many "SLAVES" are connected to the network (up to 4 slaves can be connected to a master which has address "0").

On initialization, it can be checked whether all "SLAVES" set on SETUP of the "MASTER" are on the network. The missing "SLAVES" are detected automatically by the "MASTER" on connection and are linked to the "Leuze MultiNet" network. Missing "SLAVES" are sought by the "MASTER". If a "SLAVE" is not found, the "MASTER" sends an error message to the system.

RS232/TTY 3rd level

==========

DATA FORMAT	(1)
BAUD RATE	(2)
PROTOCOL	(3)
PREFIX	(4)
ADDRESS TYPE	(5)
TERMINATOR 1	(6)
TERMINATOR 2	(7)
HANDSHAKE MODE	(8)

SELECT:

This menu defines the transmission procedures and parameters for the interface RS232/TTY.

DATA FORMAT 4th level

7-NONE-2	(1)
7-EVEN-1	(2)
7-EVEN-2	(3)
7-ODD-1	(4)
7-ODD-2	(5)
8-NONE-1	(6)
8-NONE-2	(7)
8-EVEN-1	(8)
8-EVEN-2	(9)
8-ODD-1	(A)
8-ODD-2	(B)

SELECTED: 6

The databits, parity bits and stopbits for the RS232 (V24)/TTY interface can be selected from the combination above (see Section 4.1.2).

BAUD RATE 4th level

300	(2)
600	(3)
1200	(4)
2400	(5)
4800	(6)
9600	(7)
19200	(8)

SELECTED: 7

The above transmission speeds (baud rates) are available for the RS232/TTY interface.

PROTOCOL 4th level

NO FRAME	(1)
T FRAME	(2)
R FRAME	(3)
T + R FRAME	(4)
ACK/NAK	(5)
RK512/3964	(6)

SELECTED: 4

With this function, the reception and transmission protocol for the RS232/TTY interface are set. "FRAME" means that the information character in each data set is framed by the control character specified (Prefix, Terminator).

With "R" (for Receive FRAME), "T" (for Transmit FRAME) and "T+R" (for Receive + Transmit FRAME), the decoder is informed whether a communication is required for receive ("R"), transmit ("T") or receive and transmit ("T+R"). If menu point "ACK/NAK" is selected, the decoder sends its data up to three times unless an "ACK" (acknowledge = 06h) is sent first. The transmission of the last data set can be repeated by sending "NAK" (or with online command "F").

PREFIX 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 02h

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 1st control character (02h=>STX, Start of TeXt) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

ADDRESS TYPE 4th level

NO ADDRESS	(1)
1 BYTE BINARY	(2)
2 BYTE ASCII	(3)
RK512/3964	(4)

SELECTED:1

This selection determines whether the address is included in the data protocol and in which form it is transmitted. If (4) is selected, the coded address of the bar code reader is sent in the telegram header.

NOTE: Many SPSs interpret the binary address as a control character.

TERMINATOR 1 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 0Dh

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 1st end character (0Dh=>CR, Carriage Return) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

TERMINATOR 2 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 0Ah

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 2nd end character (0Ah=>LF, Line Feed) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

HANDSHAKE MODE — 4th level

```
RANGE = 1..9
SELECTED: 2
```

Using the RTS and CTS control lines, a "handshake" (monitoring of data exchange between 2 devices via hardware) can be carried out for the RS232. The parameters 1 - 9 have the following significance:

1.	RTS inactive	CTS for transmit unused
2.	RTS active	CTS for transmit unused
3.	RTS inactive	transmit only if CTS active
4.	RTS active	transmit only if CTS active
5.	RTS active during transmit	CTS for transmit unused
6.	RTS active during transmit	transmit only if CTS active
7.	RTS = CTS	CTS for transmit unused
8.	Half duplex	CTS must be inactive before transmit
9.	XON/XOFF	RTS active - CTS unused

RS485 — 3rd level

```
DATA FORMAT                (1)
BAUD RATE                  (2)
PROTOCOL                   (3)
PREFIX                     (4)
ADDRESS TYPE               (5)
TERMINATOR 1               (6)
TERMINATOR 2               (7)
HANDSHAKE MODE             (8)
SELECT:
```

This menu defines the transmission procedures and parameters for the interface RS485.

DATA FORMAT — 4th level

```
7-NONE-2                   (1)
7-EVEN-1                   (2)
7-EVEN-2                   (3)
7-ODD-1                    (4)
7-ODD-2                    (5)
8-NONE-1                   (6)
8-NONE-2                   (7)
8-EVEN-1                   (8)
8-EVEN-2                   (9)
8-ODD-1                    (A)
8-ODD-2                    (B)
MultiNet                   (C)
SELECTED: C
```

This determines the data format for operation of the RS485 (standard setting: "Leuze MultiNet").

BAUD RATE 4th level

110	(1)
300	(2)
600	(3)
1200	(4)
2400	(5)
4800	(6)
9600	(7)
19200	(8)
38400	(9)
57600	(A)

SELECTED: A

The standard transmission rate (baud rate) on RS485 (Standard: "Leuze MultiNet") is 57600 baud.

PROTOCOL 4th level

NO FRAME	(1)
T FRAME	(2)
R FRAME	(3)
T + R FRAME	(4)
ACK/NAK	(5)
	(6)
MULTINET SLAVE	(7)
MULTINET MASTER	(8)

SELECTED: 4

With this function, the reception and transmission protocol for the RS485 interface are set.

"FRAME" means that the information character in each data set is framed by the control character specified (Prefix, Terminator).

With "R" (for Receive FRAME), "T" (for Transmit FRAME) and "T+R" (for Receive + Transmit FRAME), the decoder is informed whether a communication is required for receive ("R"), transmit ("T") or receive and transmit ("T+R").

If menu point "ACK/NAK" is selected, a confirmation is awaited (acknowledge = 06h) after each data transmission. If no "ACK" is received by the decoder after a waiting period, the data transmission is repeated and a further confirmation awaited. After the third unsuccessful attempt, the data is rejected. The last data transmission can be repeated by sending "NAK" (or with online command "F").

In the setting "MULTINET MASTER" or "MULTINET SLAVE", master and slave are connected via the RS485. In this configuration however, each decoder functions as a separate unit. All data, even that from "SLAVES", is collected by the "MASTER" and output on its RS232/TTY interface. To distinguish the individual scanners, each device must be given a code (address). Thus each individual decoder can be contacted via the "MASTER" using its address. The SETUP for all scanners for example can be changed using such addressing.

PREFIX 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 02h

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 1st control character (02h=>STX, Start of TeXt) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

ADDRESS TYPE 4th level

NO ADDRESS	(1)
1 BYTE BINARY	(2)
2 BYTE ASCII	(3)

SELECTED: 1

This selection determines whether the address is included in the data protocol and in which form it is transmitted.

NOTE: Many SPSs interpret the binary address as a control character.

TERMINATOR 1 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 0Dh

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 1st end character (0Dh=>CR, Carriage Return) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

TERMINATOR 2 4th level

RANGE = 00h..7Fh {HEX}
SELECTED: 0Ah

If the interface protocol is set to "FRAME", this freely selectable character is received and/or transmitted as the 2nd end character (0Ah=>LF, Line Feed) of the code information. The input must take the form of a 2-digit hexadecimal character. (Setting "00"h means that the character was not sent).

MULTINET PRIORITY 4th level

RANGE = 1..99
SELECTED: 10

In a network, it may be useful to interrogate the participants at varying frequencies depending on priority. Here the number "1" refers to the highest and "99" to the lowest priority.

Example: The two participants A and B are given priority figures A = 1 and B = 10. Then participant A is interrogated 10 times more often than participant B.

MULTISCAN 3rd level

```
==========================
SERIAL PORT RS485     (1)
MODE                  (2)
SELECT:
```

The function "MULTISCAN" is used for detection of bar codes by several bar code readers. For activation of a common read gate, the MultiScan Master (MSM) needs a sensor signal. On conclusion of the decoding, the common read result is output via the MSM.

SERIAL PORT RS 485 4th level

```
------------------
YES - NO              (Y) - (N)
SELECTED: Y
```

With "Y", the Multiscan function is controlled via the RS485 interface of the Master.
With "N", the Multiscan function is controlled via the RS232/TTY.

MODE 4th level

```
------------
RANGE = 0..3
SELECTED: 0
```

MODE establishes how the serial ports are operated under Multiscan RS485. Here:

SELECTED: 0 = Multiscan inactive

SELECTED: 1 = Multiscan slave

SELECTED: 2 = The data is output as soon as a Multiscan participant has achieved the specified Equal Scan value. All Multiscan participants must have the same Equal Scan setting. If the total achieved sum of equal scans at the end of decoding ≥ the set value, the result is output on the LCD display of the master.

SELECTED: 3 = The decoding is terminated only when the sensor signal fails (read gate closed).

RK512-3964 PROTOCOL 3rd level

```
==========================
3964R ACTIVE          (1)
ZVZ TIMEOUT           (2)
QVZ TIMEOUT           (3)
RK512 ACTIVE          (4)
RK512 REAC. TELE      (5)
RK512 ADDRESS         (6)
RK512 OFFSET          (7)
PRIORITY HIGH         (8)
SELECT:
```

This menu is used solely for the interface protocol 3964 of the Siemens control unit "SIMATIC S5".

3964R ACTIVE 4th level

YES - NO (Y) - (N)
SELECTED: N

"Y" selects the standard Siemens protocol 3964.
"N" selects Siemens protocol 3964R with check figure calculation.

ZVZ TIMEOUT 4th level

RANGE = 0..3000
SELECTED: 220

Character delay time. The standard value specified by Siemens is 220 ms (see SIMATIC S5 handbook).

QVZ TIMEOUT 4th level

RANGE = 0..3000
SELECTED: 550

Acknowledgement time. The standard values recommended by Siemens are:
for 3964 protocol = 550 ms
for 3964R protocol = 2000 ms.

RK512 ACTIVE 4th level

YES - NO (Y) - (N)
SELECTED: N

Between the start character and the protocol data, a telegram header is inserted (see Siemens handbook SIMATIC S5).

NOTE: The settings below for menu "RK512-3964 PROTOCOL" (3rd level) are only effective if RS512 ACTIVE, SELECTED: "Y" was selected.

RK512 REAC. TELE. 4th level

YES - NO (Y) - (N)
SELECTED: N

With "Y", a reaction telegram is sent which confirms the reception and the data content (see Siemens handbook SIMATIC S5).

RK512 ADDRESS 4th level

RANGE = 0.65535
SELECTED: 0

This defines the basic memory address for storage of data information in the Siemens SIMATIC S5 (see Siemens handbook SIMATIC S5).

RK512 OFFSET 4th level

RANGE = 0..255
SELECTED: 64

This is used to allocate a separate memory area for each bar code reader. The basic memory address is incremented by the number of bytes (offset) given above for each scanner. This gives: RK512 ADDRESS + Scanner Address x RK512 Offset = data target for scanner (see Siemens handbook SIMATIC S5).

PRIORITY HIGH 4th level

YES - NO (Y) - (N)
SELECTED: N

Here the priority of the bar code reader for the SPS is established.

Important: SPS and scanner must be given different priorities on setup!

5.5.5 Menu 4: DIGITAL IN/OUT

```
DIGITAL IN/OUT                                    2nd level
==========================
SENSOR PORT 1          (1)
SENSOR PORT 2          (2)
SWITCH PORT 1          (3)
SWITCH PORT 2          (4)
SELECT:
```

This menu determines the control of the bar code reader by means of sensors and via switched inputs and switched outputs.

```
SENSOR PORT 1                                     3rd level
==========================
SENSOR LEVEL HIGH      (1)
DEBOUNCE TIME          (2)
SENSOR LOGIC           (3)
SELECT:
```

In the standard software, SENSOR PORT 1 is programmed such that it can only be used for opening and closing the read gate.

```
SENSOR LEVEL HIGH                                 4th level
------------------
YES - NO               (Y) - (N)
SELECTED: N
```

With this function, the input level of the sensor is set. When the signal level changes, the bar code reader is activated and then deactivated again by the input level. If the activation signal is present at "SENSOR PORT 1", the "SENSOR" lamp comes on.

"Yes" means that the scanner is activated at a positive signal level (i.e. under voltage). "No" means activation when the sensor output is free from voltage.
The following 4 variants are available:

SELECTED	Input Level	Scanner Active
NO	0 Volt	No
NO	>11 Volt	Yes
YES	0 Volt	Yes
YES	>11 Volt	No

```
DEBOUNCE TIME                                     4th level
--------------
RANGE = 0..255
SELECTED: 5
```

This function performs a debounce of the sensor input signal via the software. The set value corresponds to an input in ms. The input signal must be constant at least throughout the set time in order to be detected.

```
SENSOR LOGIC                                          4th level
----------------------------
OUT = S1                    (1)
OUT = S2                    (2)
OUT = S1 AND S2             (3)
OUT = S1 OR S2              (4)
OUT = S1 XOR S2             (5)
OUT = S1 BEFORE S2          (6)
OUT= S2 BEFORE S1           (7)
SELECTED: 1
```

The selected function determines which sensor input or combination of sensor inputs 1 and 2 will activate the read gate. The internal switched output described with "OUT" gives an activation signal to the bar code reader corresponding to the logic link or the switch sequence of S1 and S2.

```
Sensor inputs          Internal logic
                                switched output
S1              SENSOR
                                          OUT
S2              LOGIC
```

```
SENSOR PORT 2                                         3rd level
============================
SENSOR LEVEL HIGH           (1)
DEBOUNCE TIME               (2)
SENSOR LOGIC                (3)
SELECT:
```

In the standard software, SENSOR PORT 2 is programmed such that it can only be used for the "TEACH IN" function.

```
SENSOR LEVEL HIGH                                     4th level
---------------------
YES - NO                (Y) - (N)
SELECTED: N
```

With this function, the input level of the sensor is set. When the signal level changes, the bar code reader is activated and then deactivated again by the input level. If the activation signal is present at "SENSOR PORT 2", the "ERROR" lamp comes on.

"Yes" means that TEACH IN is activated at a positive signal level (i.e. under voltage). "No" means activation when the sensor output is free from voltage.
The following 4 variants are available:

SELECTED	Input Level	TEACH IN Active
NO	0 Volt	No
NO	>11 Volt	Yes
YES	0 Volt	Yes
YES	>11 Volt	No

```
DEBOUNCE TIME                                          4th level
--------------
RANGE = 0..255
SELECTED: 5
```

This function performs a debounce of the sensor input signal via the software. The set value corresponds to an input in ms. The input signal must be constant at least throughout the set time in order to be detected.

```
SENSOR LOGIC                                           4th level
--------------------------
OUT = S2                (1)
OUT = S1                (2)
OUT = S1 AND S2         (3)
OUT = S1 OR S2          (4)
OUT = S1 XOR S2         (5)
OUT = S1 BEFORE S2      (6)
OUT = S2 BEFORE S1      (7)
SELECTED: 1
```

The selected function determines which sensor input or combination of sensor inputs 1 and 2 will activate the "TEACH IN". The internal switched output described with "OUT" gives an activation signal to the bar code reader corresponding to the logic link or the switch sequence of S1 and S2 (see Fig. Page 5-24 SENSOR LOGIC).

```
SWITCH PORT 1                                          3rd level
==========================
BASE LEVEL HIGH         (1)
SWITCH GOOD READ        (2)
SWITCH BAD READ         (3)
SELECT:
```

In this menu, the switched state of the output transistor of "SWITCH PORT 1" at rest is determined, together with the decoding results (decoding or read rejection) which switch it.

```
BASE LEVEL HIGH                                        4th level
---------------------
YES - NO        (Y) - (N)
SELECTED: N
```

This selection determines the switched state of the PNP output transistor of "SWITCH PORT 1" at rest (switched [Y] or unswitched [N]).

```
SWITCH GOOD READ                                       4th level
--------------------
YES - NO        (Y) - (N)
SELECTED: N
```

This menu point determines whether the output transistor of "SWITCH PORT 1" is to be switched after a decoding.

SWITCH BAD READ 4th level

YES - NO (Y) - (N)
SELECTED: Y

This menu point determines whether the output transistor of "SWITCH PORT 1" is to be switched after a read rejection.

SWITCH PORT 2 3rd level

==========

BASE LEVEL HIGH (1)
SWITCH GOOD READ (2)
SWITCH BAD READ (3)
SELECT:

In this menu, the switched state of the output transistor of "SWITCH PORT 2" at rest is determined, together with the decoding results (decoding or read rejection) which switch it.

BASE LEVEL HIGH 4th level

YES - NO (Y) - (N)
SELECTED: N

This selection determines the switched state of the PNP output transistor of "SWITCH PORT 2" at rest (switched [Y] or unswitched [N]).

SWITCH GOOD READ 4th level

YES - NO (Y) - (N)
SELECTED: N

This menu point determines whether the output transistor of "SWITCH PORT 2" is to be switched after a decoding.

SWITCH BAD READ 4th level

YES - NO (Y) - (N)
SELECTED: Y

This menu point determines whether the output transistor of "SWITCH PORT 2" is to be switched after a read rejection.

5.5.6 Menu 5: **REFERENCE CODE**

```
REFERENCE CODE                                    2nd level
==========================
ENTER REF: CODE          (1)
DON'T CARE CHAR          (2)
TEACH IN SOURCE          (3)
SELECT:
```

This menu establishes whether a reference code is to be used, for comparison with the currently read bar code. It can also determine which digits of the reference code may be ignored in any comparison. Also, the SETUP settings necessary for reading the reference codes are given.

```
ENTER REF CODE                                    3rd level
--------------
SELECTED:
CHANGE ? (Y)
```

On this enquiry, you must decide whether the set reference code should be changed.

```
DON'T CARE CHAR                                   3rd level
----------------------
RANGE = 00h..7Fh {HEX}
SELECTED: 2Ah
```

This setting establishes the special character (e.g. 2Ah = "*") to be used for marking those digits in the reference code which are not to be compared with the decoded bar code. All digits of the reference code marked with this character are not used in comparison with the read bar code. (Setting "00"h means that the character is not sent).

```
TEACH IN SOURCE                                   3rd level
---------------------------
NO TEACH IN              (1)
                         (2)
SENSOR PORT 1            (3)
SENSOR PORT 2            (4)
SERIAL PORT "T"          (5)
AUTO TEACH IN            (6)
SELECTED: 1
```

With this function, a reference code can be read into the memory of a decoder via the read head of the bar code reader. The activation signal required can be given, depending on setting, either via the "SENSOR PORTS" or one of the serial interfaces (COM1, COM2) or automatically with "AUTO TEACH IN".

On activation via one of the serial interfaces, a "T" must be sent from the keyboard before the reference code is read. The decoder display acknowledges this with "TEACH IN ACTIVATED", after which the reference code can be read in. After reading and storage in the decoder, "TEACH IN READY" appears on the display.

Please note: To send the "T", operating mode "FRAME" must be selected (see Section 5.5.4 "SERIAL PORTS" under "RS232 or RS485 PROTOCOL").

If the "AUTO TEACH IN" function is activated and the bar code read is not identical with the reference code set in the menu "ENTER REF.CODE", the read code is taken as the new reference code.

6. AUTOCONTROL

6.1 Warning Function on Loss of Bar Code Read Accuracy

The smooth detection and processing of a bar code is largely dependent on its quality. The most common cause of read rejections are listed below.

a) The bar code is not present (label missing).

b) The bar code has moved.

c) The bar code reader has moved.

d) There is contamination (dirt flecks, fingerprints etc.) on parts of the bar code.

e) The bar code reader window is dirty.

f) The print contrast has deteriorated (relatively common with matrix printers; can indicate a used ribbon).

g) The print quality has reduced. (Poor maintenance or setting of the print gives a blurred bar code).

h) The speed with which the bar code passes the read device has increased.

In order to guarantee a smooth bar code detection, it is extremely important to become aware of impending deterioration of the read conditions in good time. Only then can corrective measures to eliminate a potential fault be taken.

Leuze bar code readers have an effective, patented device which detects such situations and gives corresponding warnings. The bar code reader has two different processes which can be activated separately or in combination.

When the read accuracy deteriorates, the bar code reader gives a warning. This is shown by a slow flashing of the yellow "ERROR" indicator on the decoder. A signal can also be given at a switched output, or a freely selectable character be sent to a connected participant (via the serial interface) to report the condition. This character is sent once only, at the time of occurrence of the pulse. The entire warning function can then be reset with a computer or terminal (online command "G").

6.1.1 Slow Loss of Read Accuracy (DECODE QUALITY, Fig. 1)

The processes described in d), e), f) and g) usually develop slowly, i.e. a reduction in print contrast, dirtying of the read window, or increasing dirt on the bar code to be read only become critical after many codes have been processed. The result is that the number of decodable scans falls steadily as the number of bar codes read increases. This process accelerates as the read period increases. The number of scans detected is however still sufficient for safe decoding, but the critical point is approaching. This process is detected in the bar code reader by the following process:

Using the "Autocontrol" function, the ratio of successfully decoded scans to the total possible scans within a "bar code range" is formed. (The bar code range is the range within a read gate in which the bar code pattern is detected by the scanner). If this percentage falls below the set threshold value, a pulse is generated which is sent with a warning character (WARNING CHAR) and/or one or two switched outputs can be activated. To prevent a warning being triggered every time the threshold value is reached, a mean value is formed from the results of the last 16 read gates.

6.1.2 Sudden Loss of Read Accuracy (BAD READ)

This situation occurs mainly with the points a), b) and c) described under section 6-1. As a result, the number of successful reads falls suddenly. The bar code reader responds to this process as follows:

The "Autocontrol" function analyses the number of non-decodable bar codes. For this a counter is available, which is incremented each time a bar code could not be decoded. The counter is reset to zero on each successful decoding.

If the counter exceeds the preset limit (BAD READ LEVEL), a pulse is generated, with which a warning character (WARNING CHAR) is sent and/or one or two switch outputs can be activated.

6.2 Graphic Representation

6.2.1 DECODE QUALITY (Fig. 1)

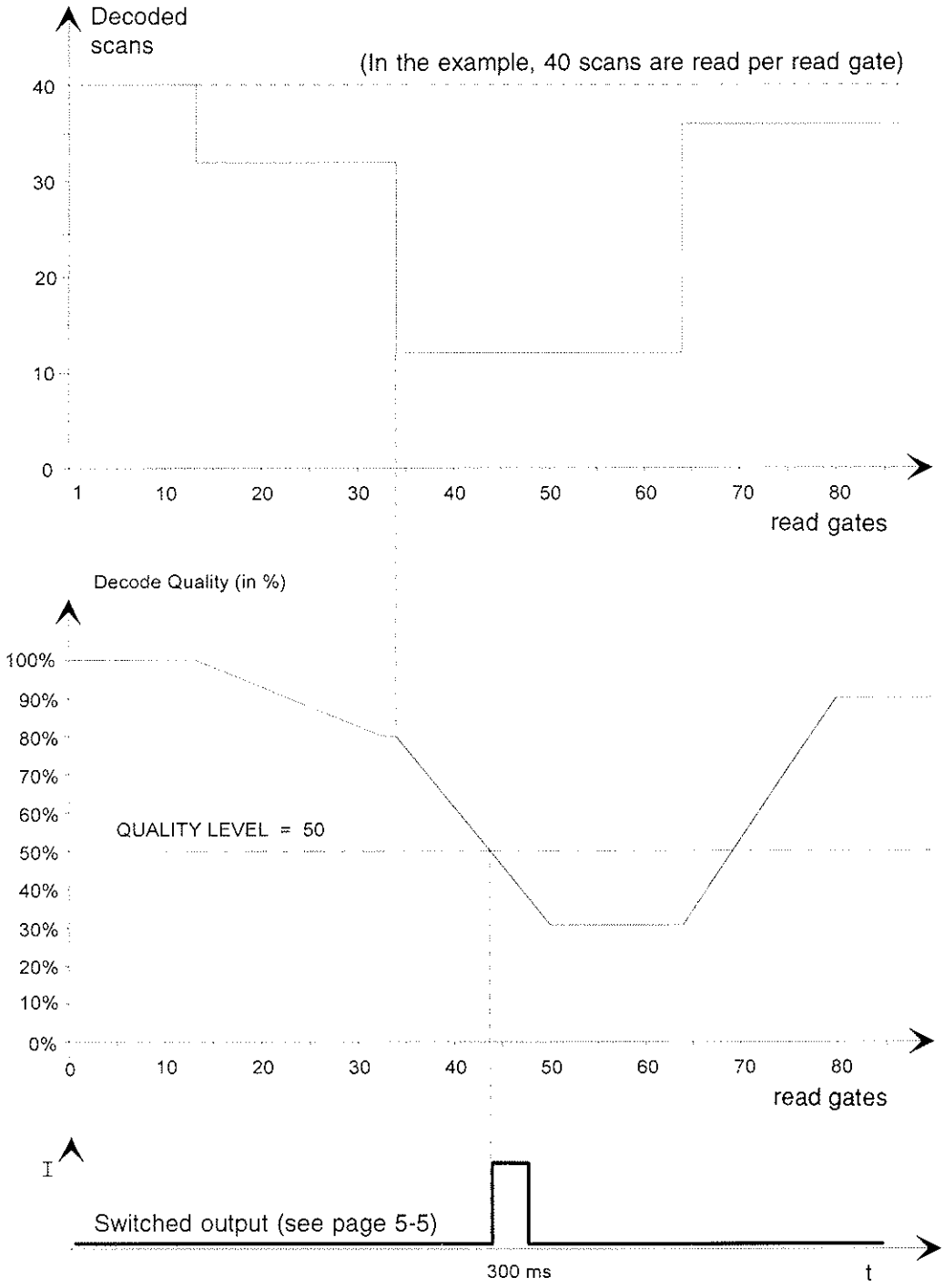


Fig. 1

6.2.2 BAD READ (Fig. 2)

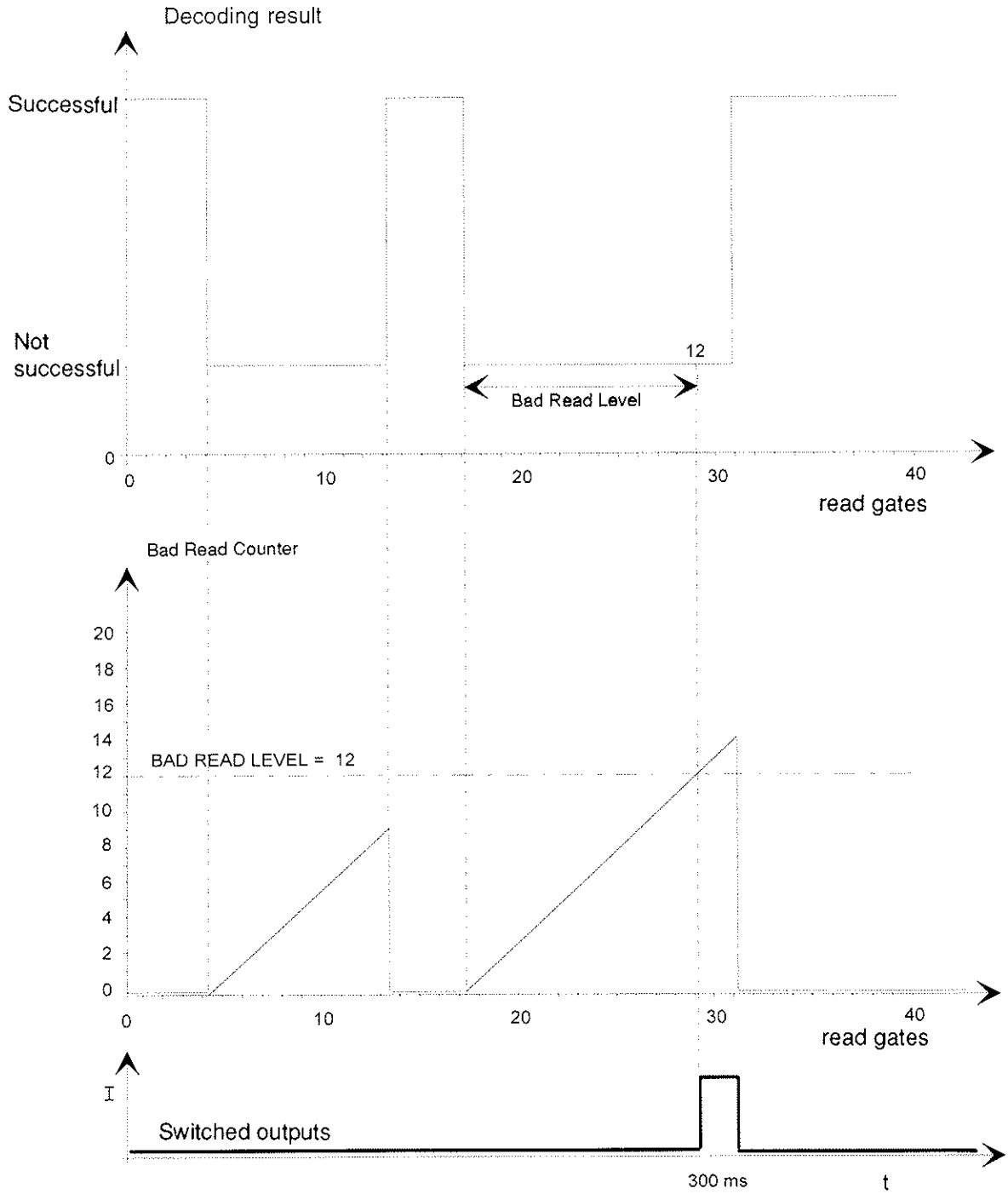


Fig. 2

7. ACCESSORIES

7.1 Photo electric sensors

Leuze Electronic offers a wide selection of light barriers and reflex sensors for package detection. Ask for our catalogue of these products, or talk to our Advisors or our one of our representatives or offices.

7.2 Hand Terminal

Suitable terminals are available to carry out SETUP or test the function of the bar code reader on site.

As an option, program packages for IBM and IBM-compatible PCs, Siemens programming units types PG 675, PG 685, PG 750 and PG 730 are available. The latter are particularly suitable for handling the bar code reader.

8. MAINTENANCE AND CUSTOMER SERVICE

The bar code reader requires no maintenance by the customer. Ensure that the glass panel on the laser output is occasionally cleaned with a **soft** cloth.

Please contact the office if you have any problems with the bar code reader.

9. WARRANTY

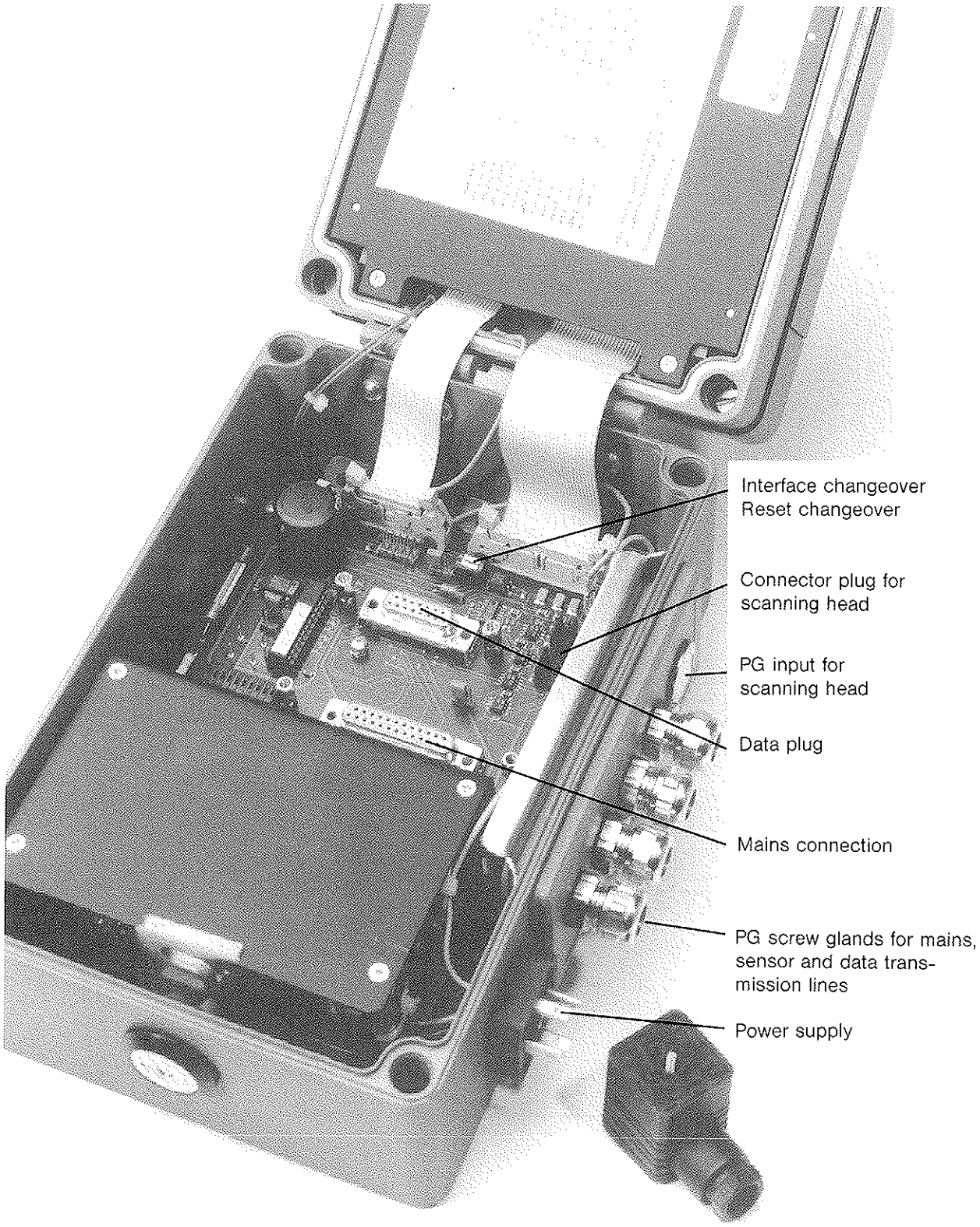
For guarantee claims or repairs, the units should be returned in their original packing and with the relevant protective covers. To ensure a rapid and effective repair, a description of the fault should be enclosed with each unit.

For Warranty our general conditions of supply apply.

Hex.	Dez.	Okt.	ASCII	Bedeutung / Description	
00	0	0	NUL	NULL	Null
01	1	1	SOH	START OF HEADING	Kopfzeilenbeginn
02	2	2	STX	START OF TEXT	Textanfangszeichen
03	3	3	ETX	END OF TEXT	Textendezeichen
04	4	4	EOT	END OF TRANSMISSION	Ende der Übertragung
05	5	5	ENQ	ENQUIRY	Aufforderung zur Datenübertragung
06	6	6	ACK	ACKNOWLEDGE	Positive Rückmeldung
07	7	7	BEL	BELL	Klingelzeichen
08	8	10	BS	BACKSPACE	Rückwärtsschritt
09	9	11	HT	HORIZONTAL TABULATOR	Horizontal Tabulator
0A	10	12	LF	LINE FEED	Zeilenvorschub
0B	11	13	VT	VERTICAL TABULATOR	Vertikal Tabulator
0C	12	14	FF	FORM FEED	Seitenvorschub
0D	13	15	CR	CARRIAGE RETURN	Wagenrücklauf
0E	14	16	SO	SHIFT OUT	Dauerumschaltungszeichen
0F	15	17	SI	SHIFT IN	Rückschaltungszeichen
10	16	20	DLE	DATA LINK ESCAPE	Datenübertragungsumschaltung
11	17	21	DC1	DEVICE CONTROL 1 (X-ON)	Gerätesteuerzeichen 1
12	18	22	DC2	DEVICE CONTROL 2 (TAPE)	Gerätesteuerzeichen 2
13	19	23	DC3	DEVICE CONTROL 3 (X-OFF)	Gerätesteuerzeichen 3
14	20	24	DC4	DEVICE CONTROL 4	Gerätesteuerzeichen 4
15	21	25	NAK	NEGATIVE (/Tape) ACKNOWLEDGE	Negative Rückmeldung
16	22	26	SYN	SYNCRONOUS IDLE	Synchronisierung
17	23	27	ETB	END OF TRANSMISSION BLOCK	Ende des Datenübertragungsblocks
18	24	30	CAN	CANCEL	Ungültig
19	25	31	EM	END OF MEDIUM	Ende der Aufzeichnung
1A	26	32	SUB	SUBSTITUTE	Substitution
1B	27	33	ESC	ESCAPE	Umschaltung
1C	28	34	FS	FILE SEPARATOR	Hauptgruppentrennzeichen
1D	29	35	GS	GROUP SEPARATOR	Gruppentrennzeichen
1E	30	36	RS	RECORD SEPARATOR	Untergruppentrennzeichen
1F	31	37	US	UNIT SEPARATOR	Teilgruppentrennzeichen
20	32	40	SP	SPACE	Leerzeichen
21	33	41	!	EXCLAMATION POINT	Ausrufungszeichen
22	34	42	"	QUOTATION MARK	Anführungszeichen
23	35	43	#	NUMBER SIGN	Nummerzeichen
24	36	44	$	DOLLAR SIGN	Dollarzeichen
25	37	45	%	PERCENT SIGN	Prozentzeichen
26	38	46	&	AMPERSAND	Kommerzielles UND-Zeichen
27	39	47	'	APOSTROPHE	Apostroph
28	40	50	(	OPENING PARENTHESIS	runde Klammer (offen)
29	41	51	)	CLOSING PARENTHESIS	runde Klammer (geschlossen)
2A	42	52	*	ASTERISK	Stern
2B	43	53	+	PLUS	Pluszeichen
2C	44	54	,	COMMA	Komma
2D	45	55	-	HYPHEN (MINUS)	Bindestrich (Minuszeichen)
2E	46	56	.	PERIOD (DECIMAL)	Punkt
2F	47	57	/	SLANT	Schrägstrich (rechts)
30	48	60	0		
31	49	61	1		
32	50	62	2		
33	51	63	3		
34	52	64	4		
35	53	65	5		
36	54	66	6		
37	55	67	7		
38	56	70	8		
39	57	71	9		
3A	58	72	:	COLON	Doppelpunkt
3B	59	73	;	SEMI-COLON	Semikolon
3C	60	74	<	LESS THEN	Kleiner als
3D	61	75	=	EQUALS	Gleichheitszeichen
3E	62	76	>	GREATER THEN	Größer als
3F	63	77	?	QUESTION MARK	Fragezeichen
40	64	100	@	COMMERCIAL AT	Kommerzielles a-Zeichen
41	65	101	A		
42	66	102	B		
43	67	103	C		
44	68	104	D		
45	69	105	E		
46	70	106	F		
47	71	107	G		
48	72	110	H		
49	73	111	I		
4A	74	112	J		
4B	75	113	K		
4C	76	114	L		
4D	77	115	M		
4E	78	116	N		
4F	79	117	O		
50	80	120	P		
51	81	121	Q		
52	82	122	R		
53	83	123	S		
54	84	124	T		
55	85	125	U		
56	86	126	V		
57	87	127	W		
58	88	130	X		
59	89	131	Y		
5A	90	132	Z		
5B	91	133	[	OPENING BRACKET	eckige Klammer (offen)
5C	92	134	\	REVERSE SLANT	Schrägstrich (links)
5D	93	135	]	CLOSING BRACKET	eckige Klammer (geschlossen)
5E	94	136	^	CIRCUMFLEX	Zirkumflex
5F	95	137	_	UNDERSCORE	Unterstrich
60	96	140	`	GRAVE ACCENT	Gravis
61	97	141	a		
62	98	142	b		
63	99	143	c		
64	100	144	d		
65	101	145	e		
66	102	146	f		
67	103	147	g		
68	104	150	h		
69	105	151	i		
6A	106	152	j		
6B	107	153	k		
6C	108	154	l		
6D	109	155	m		
6E	110	156	n		
6F	111	157	o		
70	112	160	p		
71	113	161	q		
72	114	162	r		
73	115	163	s		
74	116	164	t		
75	117	165	u		
76	118	166	v		
77	119	167	w		
78	120	170	x		
79	121	171	y		
7A	122	172	z		
7B	123	173	{	OPENING BRACE	geschweifte Klammer (offen)
7C	124	174	|	VERTICAL LINE	Vertikalstrich
7D	125	175	}	CLOSING BRACE	geschweifte Klammer (geschlossen)
7E	126	176	~	TILDE	Tilde
7F	127	177	DEL	DELETE (RUBOUT)	Löschen

10.2 Installation and Commissioning

10.2.1 Decoder Connections



10.2.2 Circuit Diagrams for Sub-D Socket

Fig. A: Sensor Inputs

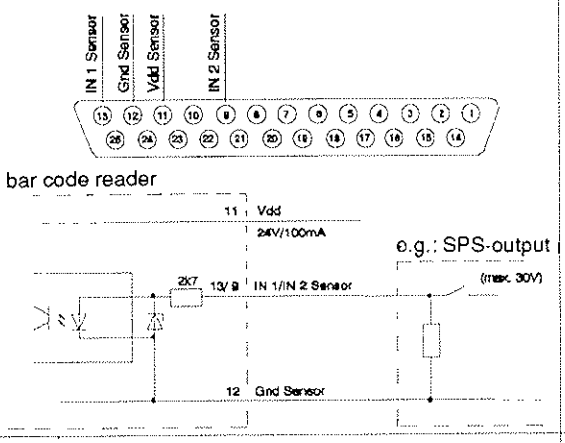


Fig. B: RS 232 connection

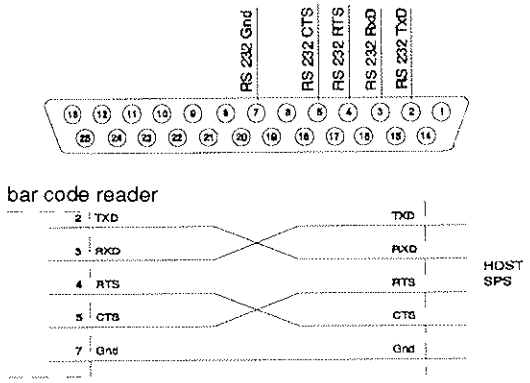


Fig. C: Switched outputs

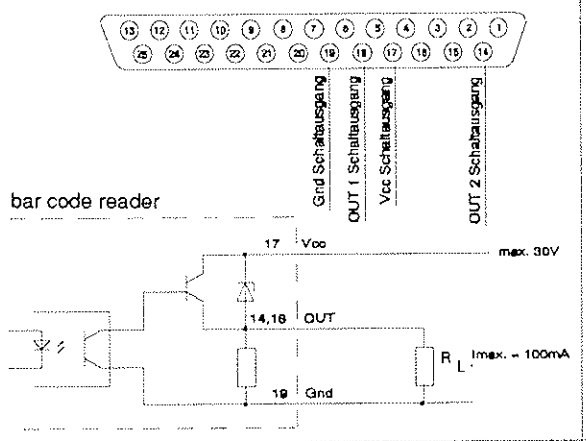


Fig. D: RS 485 connection

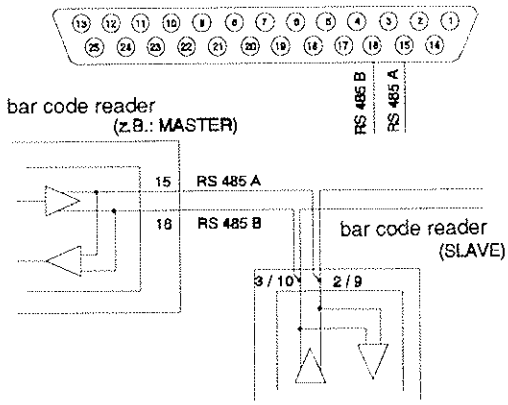


Fig. E: TTY active connection

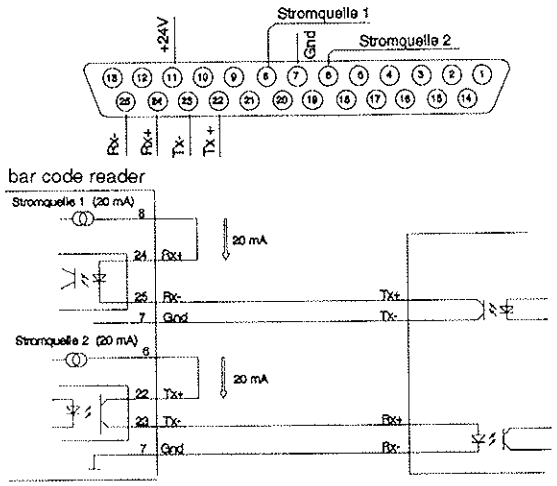


Fig. F: TTY passive connection

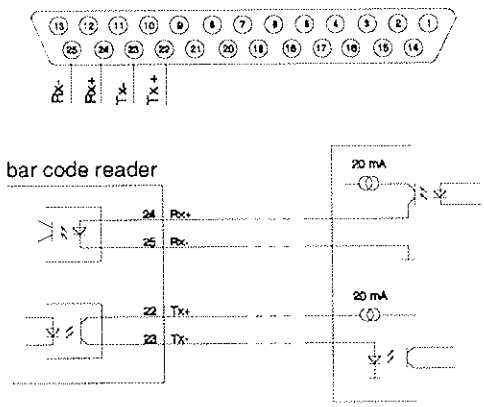


Fig. G: RS 485 connection

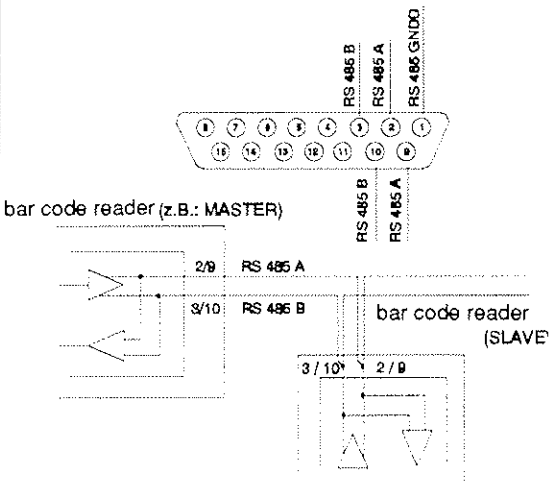
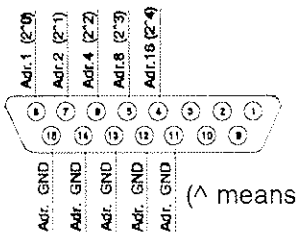
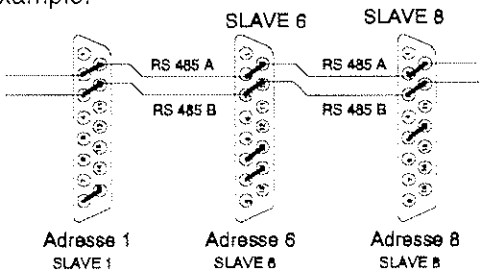


Fig. H: RS 485 Address Coding

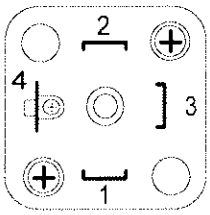


(^ means exponent)

Example:

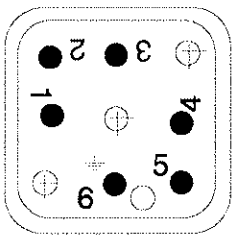


10.2.3 Circuit Diagram for Mains Connection



Pin No.	Signal
1	Phase (L1)
2	Neutral (N)
4	Protected earth (PE)

10.2.4 Circuit Diagrams for DD 55 / 24 V Version



Pin No.	Signal
4	+24V
5	0V (GND)
6	Protected earth

10.3 Explanation of Terms

Activation of bar code reader -> see Read gate

Address - code of a participant in a network, for clear identification.

Analysis unit -> see Decoder

ASCII - American Standard Code for Information Interchange. The ASCII code has 128 characters such as control characters, special characters, the figures 0 to 9, upper and lower case letters (see ASCII table, Appendix 10.1).

Bar - the dark element in a bar code.

Bar code - an arrangement of parallel bars and spaces, composed such that they have a certain numeric or alphanumeric meaning according to the relevant coding guidelines.

Bar code height - corresponds to the height of the bar code, i.e. the length of an element.

Bar code label - a label with a printed bar code.

Bar code reader - a reader device which can detect and decode data in bar code form. This device consists of two units which are either fitted into one housing as a compact device (BCL 10) or in two separate housings connected by data cable (BCL 5/BCL 7 and DD 55). The two units are the read head and the decoder.

Bar code reader setting -> see Parameterization

Bar length -> see Bar Code Height

Baud rate - transmission speed (characters per second) with which information can be transmitted via the serial interfaces RS232/TTY or RS485.

Bit - short for "binary digit". A single element (0 or 1) in a binary number. Also the smallest unit for data storage.

Byte - sequence of 8 bits which can be used to represent a letter, a figure or another character.

Character - a character is the smallest unit to be coded in a bar code.

Character set - the characters shown within a bar code. For example, in Codabar, the characters 0 to 9 and the special characters "-,$,:,/,.,+"

Codabar - numerical bar code with the character set 0 to 9 and 6 special characters. Each character consists of 7 elements (4 bars and 3 spaces). The spaces carry no information.

Code -> see Bar Code

Code 2/5 interleaved - numerical code with the character set 0 to 9. Each character consists of 5 elements (bars or spaces). Two of these elements are wide, three narrow. The first figure is shown by 5 bars, the second by the spaces of the first figure, starting after the first bar of the first figure.

Code 39 - alphanumeric bar code with the character set 0 to 9, 26 letters and 7 special characters. Each character consists of 9 elements (5 bars and 4 spaces). The spaces carry no information.

Code 128 - this bar code contains all 128 ASCII characters. Each character consists of 11 modules (3 bar elements and 4 space elements) and up to 4 different module widths.

Decoder - an electronic unit (here DD 55), which interprets the digitalized input signals from the read head of the bar code reader and provides detectable or computer-compatible data at an interface.

Display -> see Text Display

EAN - European Article Numbering. Numerical bar code with the character set 0 to 9. Each character consists of 11 elements (bars and spaces). All bars and spaces carry information. There is an 8-digit and a 13-digit version. The number of digits is therefore defined.

Element - a single bar or a single space in a bar code.

False reading - the decoded information is not identical with the decoded data of the bar code pattern. A character has been replaced by another valid character (substitution error).

Interval time - time period of the interval during which the read head is activated and the read gate open. The activation pulse can be generated via the sensor inputs or the software. The interval time can be specified in SETUP.

Label -> see Bar Code Label

Laser - Light Amplification by Stimulated Emission of Radiation. A source of an optical beam in the ultraviolet, visible and infrared wave ranges of the electromagnetic spectrum. The laser generates bundled, targeted, monochromatic, coherent light. For bar code readers, gas lasers (He-Ne lasers) and semiconductor lasers (diode lasers) are used.

Laser diode - a radiation source in the visible red light range (670 nm) used in the read head of the Leuze bar code readers BCL 5 and BCL 7. It is characterized by low radiation power and long life.

LCD - Liquid Crystal Display. A two-cell liquid crystal text display in the decoder DD 55, used for displaying status information such as error, warning and general messages.

LED - Light Emitting Diode. A semiconductor diode which emits light when activated. LEDs are used in the DD 55 to indicate certain operating modes.

Module - the narrowest line or space in a bar code. Wider bars or spaces are always calculated as multiples of the module.

Module width - gives the width of the narrowest element (in mm) of a bar code.

Parameterization - the bar code reader is adjusted to the features of its task by parameterization, e.g. the code type to be detected, the number of digits, the number of bar codes to be detected per interval, the decoding quality, the interfaces for data input and output, the data format, the baud rate etc. In total, over 140 parameters are available.

Quiet zone - the bright area before the start character and after the stop character of a bar code. The rest zone is necessary to signal the start of the code to the reader.

Read - scan. The single detection of one or more bar codes by the laser beam of the read head, irrespective of whether the code scanned is decodable.

Read area - read field. The focus range of a bar code reader, extending forward and backward of the focal point. The read area is not a constant for the bar code reader; it depends on the bar code composition, such as bar width and contrast.

Read gate - the time interval during which the read head is active and its laser beam can detect one (or more) bar codes. During this interval, the bar codes can be scanned (read) several times. The number of possible scans depends on various factors such as interval time, transport speed of code or bar width, tilt and skew angle of the code to the sensor beam.

Read head - the part of the bar code reader which includes the laser source, the drive mechanism for the beam deflection, the transmission and reception lens systems, and the analog/digital converter for the reflex signals. Often a separate unit connected to the decoder by a signal cable (e.g. BCL 5 and BCL 7).

Read rejection - the decoder was unable to decode the detected bar code information for example because of a damaged code, incorrect code alignment, incorrect scan speed, fault in the bar code reader, or because the number of specified valid scans was not achieved.

Reader -> see Bar Code Reader

Scan - a sensor beam from the bar code reader.

Scanner -> see Bar Code Reader

SETUP - an operating mode for the bar code reader which is reached via a certain command (online command "E"). Within SETUP, the bar code reader is set to its task- and code-specific parameters (parameterization).

Space - the bright element between two bars of the bar code.

Start/stop character - bar code characters which signal the start (start character) and end (stop character) of a code.

Leuze

Leuze electronic GmbH + Co.
Postfach 11 11, D-73277 Owen/Teck
In der Braike 1, D-73277 Owen/Teck
Telefon (07021) 5730
Telefax (07021) 573199
http://www.leuze.de

Sales and Service

A
Ing. Franz Schmachtl KG
Postfach 362
A-4021 Linz/Donau
Tel. Int. + 43 (0) 732/7646-0
Fax Int. + 43 (0) 732/785036

Zweigbüros:
Kolpingstraße 15
A-1232 Wien
Tel. Int. + 43 (0) 1/6162180
Fax Int. + 43 (0) 1/616218099

Theodor-Körner-Straße 54
A-8010 Graz
Tel. Int. + 43 (0) 316/672185
Fax Int. + 43 (0) 316/672439

Arzlerstr. 42 b, A-6020 Innsbruck
Tel. Int. + 43 (0) 512/265060
Fax Int. + 43 (0) 512/266151

AUS
Leuze Australasia Pty. Ltd.
48 Skarratt Street
AUS-Silverwater NSW 2128
Sydney, Australia
Tel. Int. + 61 (0) 2/97483788
Fax Int. + 61 (0) 2/97483817

B
Leuze electronic nv/sa
Steenweg Buda 50
B-1830 Machelen
Tel. Int. + 32 (0) 2/2531600
Fax Int. + 32 (0) 2/2531536

BR
Leuze electronic Ltda.
Av. Juruá, 150-Alphaville
BR-06455-010 Barueri-S. P.
Tel. Int. + 55 (0) 11/72956134
Fax Int. + 55 (0) 11/72956177

CH
Leuze electronic AG
Ruchstuckstrasse 19
CH-8306 Brüttisellen
Tel. Int. + 41 (0) 1/8340204
Fax Int. + 41 (0) 1/8332626

CZ + **SK**
Schmachtl CZ Spol. SR. O.
Hlavni 1150/2
CZ-14100 Praha Spořilov
Tel. Int. + 420 (0) 2/768891
Fax Int. + 420 (0) 2/763609

CO
Componentes Electronicas Ltda.
P.O. Box 478, CO-Medellin
Tel. Int. + 57 (0) 4/3511049
Telex 66922
Fax Int. + 57 (0) 4/3511019

D
Lindner electronic GmbH
Postfach 3860 (PLZ 30038)
Hamburger Allee 43
30161 Hannover
Telefon (0511) 314038
Telefax (0511) 3481857

W+M plantechnik
Dipl.-Ing. Wörtler GmbH + Co.
Tannenbergstraße 62
42103 Wuppertal
Telefon (0202) 37112-0
Telefax (0202) 318495

Leuze electronic GmbH + Co.
Geschäftsstelle Owen
In der Braike 1
73277 Owen/Teck
Telefon (07021) 9850-910
Telefax (07021) 9850-911

Leuze electronic GmbH + Co.
Geschäftsstelle Dresden
Niedersedlitzer Straße 60
01257 Dresden
Telefon (0351) 2809319/20
Telefax (0351) 2809321

Leuze electronic GmbH + Co.
Geschäftsstelle Frankfurt
Moselstraße 50
63452 Hanau
Telefon (06181) 9177-0
Telefax (06181) 917715

Leuze electronic GmbH + Co.
Geschäftsstelle München
Ehrenbreitsteiner Straße 44
80993 München
Telefon (089) 14365-200
Telefax (089) 14365-220

DK
Desim Elektronik APS
Tuasingevej
DK-9500 Hobro
Tel. Int. + 45/98510066
Fax Int. + 45/98512220

E
Leuze electronic S.A.
Gran Via de Las Corts
Catalanes, Nr. 641, Atico 4
E-08010 Barcelona
Tel. Int. + 34 (9) 3/3023080
Fax Int. + 34 (9) 3/3176520

F
Leuze electronic sarl.
Z.I. Nord Torcy, B.P. 62-BAT 4
F-77202 Marne la Vallée Cedex 1
Tel. Int. + 33 (0) 1/60051220
Fax Int. + 33 (0) 1/60050365

FIN
SKS-tekniikka Oy
P.O. Box 122
FIN-01721 Vantaa
Tel. Int. + 358 (0) 9/852661
Fax Int. + 358 (0) 9/8526820

GB
Leuze Mayser electronic Ltd.
Alington Road, Eynesbury,
GB-St. Neots, Cambs., PE19 2RD
Tel. Int. + 44 (0) 1480/408500
Fax Int. + 44 (0) 1480/403808

GR
U.T.E. Co ABEE
16, Mavromichali Street
GR-18538 Piraeus
Tel. Int. + 30 (0) 1/4290710,
4290685, 4290991
Fax Int. + 30 (0) 1/4290770

H
Kvalix Automatika EC.
Postfach 83
H-1327 Budapest
Tel. Int. + 36 (0) 1/3794708
Fax Int. + 36 (0) 1/1698488

HK
CCL Systems Far East Ltd.
14/F Tai Po Commercial Centre
152 Kwong Fuk Road
Tai Po N.T. Hongkong
Tel. Int. + 852/26566323
Fax Int. + 852/26516808

I
IVO Leuze Vogtle Malanca s.r.l.
Via Soperga 54, I-20127 Milano
Tel. Int. + 39 (0) 2/2840493
Fax Int. + 39 (0) 2/6110640

IL
Galoz electronics Ltd.
P.O. Box 35
IL-40850 Rosh Ha'ayin
Tel. Int. + 972 (0) 3/9023456
Fax Int. + 972 (0) 3/9021990

IND
Global Tech Corp.
403, White House
1482 Sadashir Peth, Tilak Road
Pune 411030, India
Tel. Int. + 91 (0) 212/470085
Fax Int. + 91 (0) 212/470086

J
SSR Engineering Co., Ltd.
2-18-3 Shimomeguro
Meguro-Ku. Tokyo
Tel. Int. + 81 (0) 3/34936613
Fax Int. + 81 (0) 3/34904073

MAL
Ingermark (M) SDN.BHD
No. 29 Jalan KPK 1/8
Kawasan Perindustrian Kundang
MAL-48020 Rawang,
Selangor Darul Ehsan
Tel. Int. + 60 (0) 3/6042788
Fax Int. + 60 (0) 3/6042188

N
Elteco A/S
Postboks 96
N-3901 Porsgrunn
Tel. Int. + 47 (0) 35/573800
Fax Int. + 47 (0) 35/573849

NL
Leuze electronic B.V.
Postbus 1276
NL-3430 BG Nieuwegein
Tel. Int. + 31 (0) 30/6066300
Fax Int. + 31 (0) 30/6060970

P
LA2P, Lda.
Rua Almirante Sousa Dias, Loja D
Nova Oeiras, P-2780 Oeiras
Tel. Int. + 351 (0) 1/4422608/58
Fax Int. + 351 (0) 1/4422808

PL
Rotiw Sp.z.o.o.
Ul. Rozdienskiego 188 B
PL-40203 Katowice
Tel. Int. + 48 (0) 32/596031
Fax Int. + 48 (0) 32/1572734

RCH
Imp. Tec. Vignola S.A.I.C.
Plaza Justicia, Sub El Peral 25
Casilla 93-V
RCH-Valparaiso
Tel. Int. + 56 (0) 32/257073,
256521, Telex 330404
Fax Int. + 56 (0) 32/258571

ROC
Great Cofue Technology Co., Ltd.
4F-8, 39, Sec. 4, Chung Hsin Road
San-Chung City
Taipei Hsien, Taiwan, R. O. C.
Tel. Int. + 886 (0) 2/9838077
Fax Int. + 886 (0) 2/9853373

ROK
Useong Electrade Co.
No 222, Jail Electron B/D
63, Changsa Dong, Chongno-Gu
Seoul, Korea
Tel. Int. + 82 (0) 2/2799350
Fax Int. + 82 (0) 2/2656401

RP
JMTI Industrial Corporation
No. 5, Saturn Street
Bricktown, Moonwalk
Paranaque, Metro Manila, Philippines
Tel. Int. + 63 (0) 2/8446326
Fax Int. + 63 (0) 2/8932202

RSA
Countapulse Controls (PTY.) Ltd.
P.O.Box 40393,
RSA-Cleveland 2022
Tel. Int. + 27 (0) 11/6157556-8
Fax Int. + 27 (0) 11/6157513

S
Conrad Ekengren AB
Post Box 4103
S-18104 Lidingö
Tel. Int. + 46 (0) 8/7670185
Fax Int. + 46 (0) 8/7318376

SGP
Pepperl + Fuchs Pte. Ltd.
P + F Building
18, Ayer Rajah Crescent, N. 06-03
SGP-Singapore 139942
Tel. Int. + 65/7751021
Fax Int. + 65/7751141

SLO
Tipteh d.o.o.
Cesta v Gorice 40
SLO-1111 Ljubljana
Tel. Int. + 386 (0) 61/1232397
Fax Int. + 386 (0) 61/1234769

TR
Arslan Elektronik A. S.
Lülecihendek Cod. Nr. 47
Tophane Karaköy
TR-Istanbul
Tel. Int. + 90 (0) 212/2434627
Fax Int. + 90 (0) 212/2518385

USA + **CDN** + **MEX**
Leuze Lumiflex Inc.
300 Roundhill Drive, Unit 4
USA-Rockaway, NJ 07866
Tel. Int. + 1 (0) 973/5860100
Fax Int. + 1 (0) 973/5863230