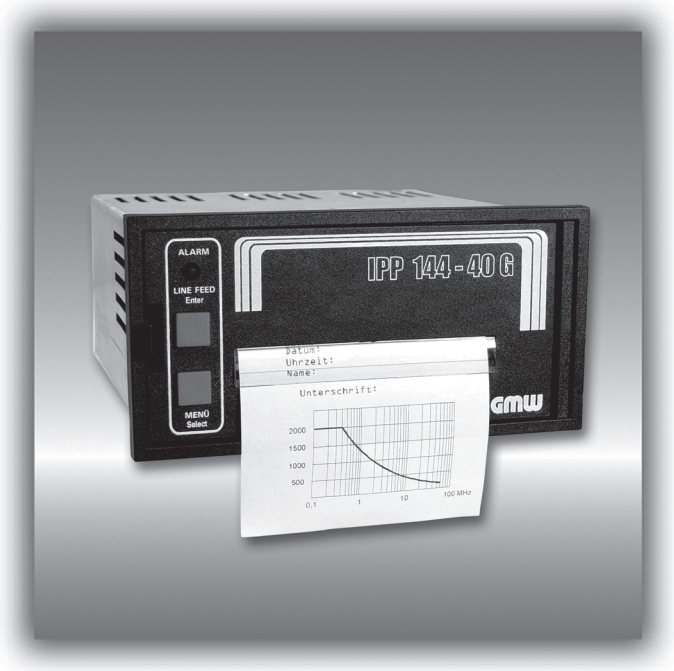
USER`S MANUAL

Version 6.10.12 or higher



Thermal Graphics Printers
IPP 144 - 40 GS

Safety instructions (EN 61010-1)

In order to preclude any danger to the operator, the following instructions should be followed:

a) In case any damage or malfunction is detected, take the unit out of operation without delay.

b) Before disassembling the unit, disconnect all inputs / outputs and the supply voltage. When mounting the unit and the connections, make sure all live components are protected from being touched directly.

c) Comply with the usual regulations and safety provisions for low and high current systems, in particular country-specific safety provisions (e.g. VDE 0100).

d) The maximum admissible potential existing between the pin groups as well as to the external protective conductor must not be exceeded. Refer to the unit´s identification label.

e) When connecting the unit to other devices (e.g. PCs), the connection must be carefully planned. Internal connections in external units (e.g. GND connected to protective earth) may cause excessive voltage potential.

f) This device must be grounded! For low voltage $12V_{DC}$ and $24V_{DC}$ systems use screened cable. Units with a.c. supply voltage must be connected the protective conductor.

g) Make sure that the unit is property mounted before connection and power on !

In order to preclude any damage to the unit, the following items must be taken into account:

The maximum admissible potential between the pin groups must not be exceeded.
This applies in particular to high voltage tests.

Refer to the instruction manual !

Warning: Hazardous live voltage !

WARNING:

There is always hazardous voltage present in certain parts during the operation of electrical equipment.
Non-observance of the safety instructions can result in severe personal injury or damage to property. Only qualified personnel should work on this equipment. The successful and safe operation of this equipment is dependant on proper transport, storage, set-up, installation and careful operation and maintenance.

QUALIFIED PERSONNEL

Are personnel who are familiar with the set-up, installation, commissioning and operation of the product and have the qualifications corresponding to their activities, e.g.:

- Are trained and authorised to energise, de-energise, clear, ground and tag circuits and equipment / systems in accordance with established safety standards.
- Are trained in the proper care and use of protective equipment in accordance with established safety practices.
- Are trained in first aid.

Safety according to EN 61010-1, VDE 0411

CAT III > 150 V ≤ 300 V
Pollution degree : 2; indoor use; altitude <2000 m; relative humidity <80 % up to 31 °C;
Temperature: 5 °C to 40 °C;

SUMMARY

Introduction

The IPP 144-40 GS is an industry-standard panel mounting printer designed for outputting data, text and graphics. It is utilised in many fields of application to give:

fault signals
machine / process status reports
test reports
production data / statistics

The thermal printing process requires no maintenance and uses commercial documentgrade thermo paper. The 80 mm width provides the optimum width-length ratio. This paper conforms to the PTB standards.

The printer prints max. 48 characters (normal font) per line. At least 4600 lines can be printed on a paper roll.

The shelf-life of a printed document is 10 years when stored in an ambient temperature of under 60 °C and a relative humidity of under 80 %.

Transmission is serial by means of an RS 232 (V24) or TTY (20 mA current loop) interface. A 16 kByte data buffer allows rapid transmission.

To format the text, IPP 144-40 GS supports the most important control characters of the siemens desktop printer PT88, e.g. bold, expanded.

A paper re-roll mechanism (optional) may be installed under the printer. A plexiglass cover allows IP64 protection.

First steps

Supplied with the printer:

intruction manual, part no.: 27866 88176
mounting kit
adapter cable for connection compatibility with Siemens desktop printer PT88, part no.: 27866 79461

- Connect printer to the supply voltage indicated by a cross on the sticker. (see pin assignment page 6)
- Establish appropriate data connection (cable description: appendix D)
- Initiate a data transmission, e.g. hardcopy via message display, or a PC

Function description

The printout is invented and right justified, which gives the correct order after the paper has been torn off.

The IPP 144-40 GS starts the printing immediately after reception of <CR>. The control characters <CR>, <LF> and <FF> are print triggering characters. Unrecognized control characters are always ignored (Characters used: appendix E).

If a larger amount of data (more than 100 lines) must be printed at the same time, a socalled handshake controls the transmission. If the receive buffer is almost full, the printer transmits the character XOFF and activates the RTS line (neg. voltage). If the buffer contents are reduced, the printer transmits the character XON and switches the RTS line back to passive. This is also the case when:

- the printer door is open
- the printer is in menu mode
- the paper feed is empty

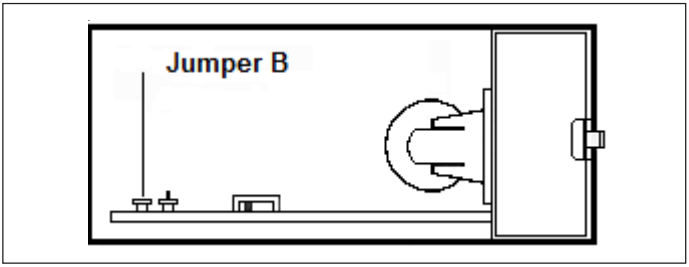
Pagination is possible via an internal line counter. At the end of a page the printer adds 3 blank lines. The page length is adjustable (appendix E). The character <FF> enables a form feed.

Configuration

The printer is adaptable to many different applications. the default settings are appropriate for most of them.

The set parameters are permanently stored (requires no maintenance). To avoid changing the menu parameters by accident, link jumper B, accessible from the front. This jumper is not linked at delivery. Jumper A must remain open all the times.

Locking the Menu / Select key

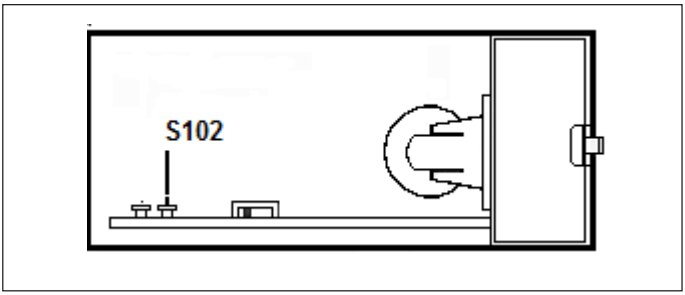


If the jumper B is connected, the „MENU / SELECT“ key is locked; menu parameters can neither be printed or modified.

In order to print or modify parameters:
remove **jumper B** !

RESET -key

The key S102 resets the printer to the standby mode. The menu parameters will not to be changed.



Menu program

All functions of the IPP 144 are set via menu program using the „ENTER“ and „SELECT“ keys and are saved when the user quits the program.
From then the IPP 144 automatically uses these parameters.
The print format for the printout of the parameters is always NORMAL with 48 character per line, so that the parameters can be read during printing.

Entering the menu program

Press the „Menu / SELECT“ key for approx. 3 s
The IPP 144 reacts by printing
„ACTUAL PARAMETERS ? PRESS ENTER“

Print current parameters

Press the „ENTER“ key,
the IPP 144 prints the currently set parameters.

The final printout says
„CHANGE PARAMETERS ?“

The menu program „Change Parameters“

Press „ENTER“ and „SELECT“ simultaneously for approx. 4 s; the IPP 144brings up the first function which can be modified
(see changing parameters)

The menu program „Change Parameters“ can be called in one of two ways:

- **Without** prior printing of the current parameters:
  Press both keys following
  „ACTUAL PARAMETERS ?“.

- **With** prior printing of the current parameters:
  Press both keys following
  „CHANGE PARAMETERS ?“.

Changing parameters

The IPP 144 prints one of the changeable parameters

- Press „ENTER“ to accept the parameter and to move to the next function

- Press „SELECT“ to display the next parameter option

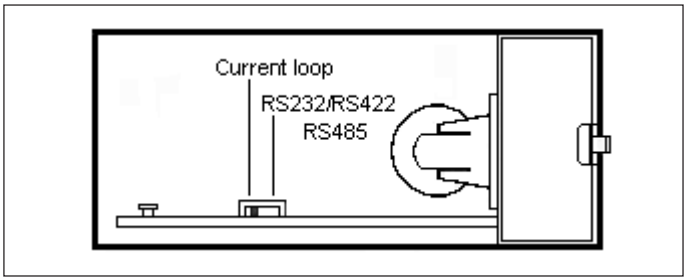
Quitting the menu program

The program is terminated by simultaneously pressing „ENTER“ and „SELECT“.
Following the printout
„END“
all modified functions are saved.

If there are no keys pressed over a period of approximately 2 minutes, the program is terminated automatically and any **modifications** made **are not saved**.

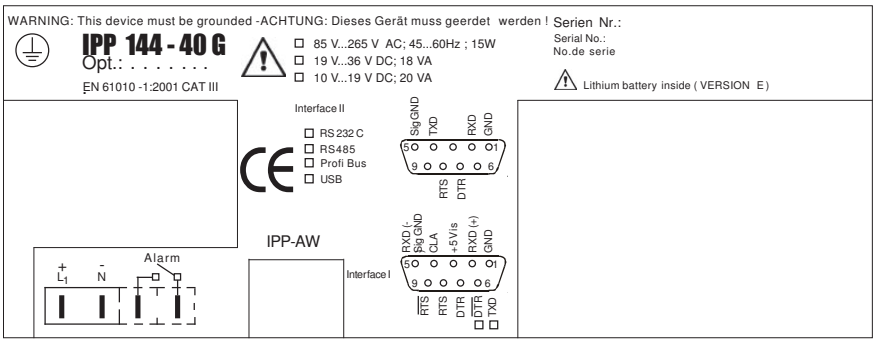
Setting TTY (20 mA current loop)

If the transmission to the printer must be executed by means of the TTY interface, the selection switch must be positioned to the left. Default position is right: RS 232. Slide snap lock to the right hand side, swivel front door out. Now you can see the switch S 101 on the printed circuit board.



- For RS 232 C, RS 422 and RS 485 set switch S 101 to the **right** hand side.
- For Current loop, set switch S 101 to the **left** hand side.

Pin assignment



Connect the unit as shown in the connection diagramms.
Observe all national safety regulations, especially for supply power connections.

Menu program / Complete selection

SET INTERVAL	NO ?
	YES ?
SET INTERVAL	00 h 00 min 00 sec
	00 h 00 min _0 sec
	00 h 0_ min 50 sec
	00 h _4 min 50 sec
	0_ h 34 min 50 sec
	_2 h 34 min 50 sec
>>>	12 h 34 min 50 sec
SET MODE	ON LINE
	OFF LINE
	ON LINE
>>>	ON LINE
SET PRINT STRENGHT	NO ?
	YES ?
PRINT STRENGTH	LEVEL1
	LEVEL1
	LEVEL2
	LEVEL3
	LEVEL4
>>>	LEVEL4
SET BAUDRATE	NO ?
	YES ?
BAUDRATE	19200
	38400
	110
	150
	300
	600
	1200
	2400
	4800
	9600
>>>	9600
SET DATA FORMAT	NO ?
	YES ?
DATA FORMAT	8
	7
>>>	7
SET PARITY	NO ?
	YES ?
PARITY	NO PARITY
	PARITY
	EVEN
	ODD
	MARK
	SPACE
	NO PARITY
>>>	NO PARITY
PRINTER ADDRESS	NO ?
	YES ?
PRINTER ADDRESS	00
	_0
	10
	20
	30
	00
	0_
	01
	.
	.
	09
	00
>>>	00
SET PRINT FORMAT	NO ?
	YES ?
PRINT FORMAT	INVERSE
	NORMAL
>>>	NORMAL
SET CHARACTER/LINE	NO ?
	YES ?
CHARACTER/LINE	48 CHARACTERS
	48 CHARACTERS
	40 CHARACTERS
	24 CHARACTERS
	20 CHARACTERS
>>>	20 CHARACTERS
CHARACTER SET	NO ?
	YES ?
CHARACTER	ASCII
	GERMAN
	FRENCH
	DANISH
	NORWEGIAN
	SPANISH
	UK
	CYRILLIC
	ASCII
>>>	ASCII
SET INTERFACE	NO ?
	YES ?
INTERFACE	SERIAL
	SERIAL
	USB - SERIAL IF 2
	SERIAL
>>>	SERIAL
	*** END ***

Print graphics directly from WINDOWS®

It is possible to print graphics, such as bmp-, jpg- or tif-, directly from WINDOWS® programs. Use a 24-pin type WINDOWS® printer.
The following configurations have been verified:
INTERFACE: EMUL.EPS.LQ580 ESC/P2
WINDOWS® printer driver: Epson Compatible 24 PIN and Epson LQ560
Details:
If the width of the graphic exceeds the paper print width, then the excess is discarded. It is recommended to use the auto-sizing print option in WINDOWS® programs, where possible.

Replacing the paper Roll

Proceed as descibed below:

1. For devices with a.c. powersupply be very careul.

Warning: Dangerous voltage
is accessible if replacing the paper roll after opening of the front panel !

2. Push the snap lock to the right hand side and open the front panel.

3. Tilt the wire frame upwards and remove the old paper roll.

4. Insert new paper roll and make sure that it rotates clockwise during printing (see figure 1).

5. Cut a straight edge at the start of the roll using scissors (figure 2) and fold approx. 2cm of this edge opposite to the roll direction. Fold this section until it is about 90 degrees to the rest of the paper (figure 3). Insert the folded start of the roll into the paper feed slot as shown in figure 1.

6. Press the „LINE FEED / ENTER“ key until the paper appears at paper cutting edge.

7. If you have fed too much paper, carefully rewind the roll. Push the wire frame back over the roll.

8. Close the front panel (snap lock must lock). The Alarm LED extinguishes and the printer is ready.

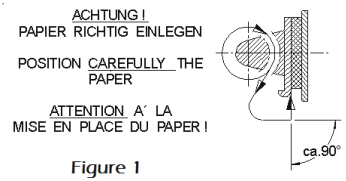


Figure 1

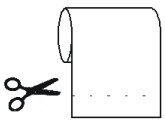


Figure 2

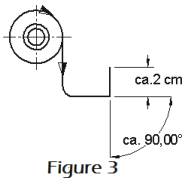


Figure 3

Possible errors

If there is no printout or if the printout is incorrect, verify the following:

- Has the paper run out? The end of paper is indicated by the „Alarm“ LED.
- Did you insert the paper properly?
- Do the baud rate, parity and word length of both units correspond?
- Is the data cable disconnected? Does the pin assignment correspond to the description?
- Is the setting „RS232/TTY“ correct?
- Is the transmitter transmitting? It can be tested electically on the printer line RxD by means of a measuring device.

The menu cannot be printed:

- Is the voltage supply correct? By pressing the „Line Feed“ key, the paper scroll one line.

Blank lines appear without any reason:

- Text coming from the transmitter has more than 48 characters per line (24 in wide font). Blank characters are probably presnet between the text and character <CR>. The number of characters must be restricted to 48 (or 20) characters per line.

Accessories

Spare paper:

- 80mm document grade: item munber 49234 86910
  Contains: 10 rolls.

Cable:

-The Printer can be connected to all cable of the PT 88 (Siemens desktop printer) via the screw-in adapter. The appropriate designation can be found in the Siemens catalogue.
item number 27866 79461

Paper re-roll mechanism:
Item number 57200 00000

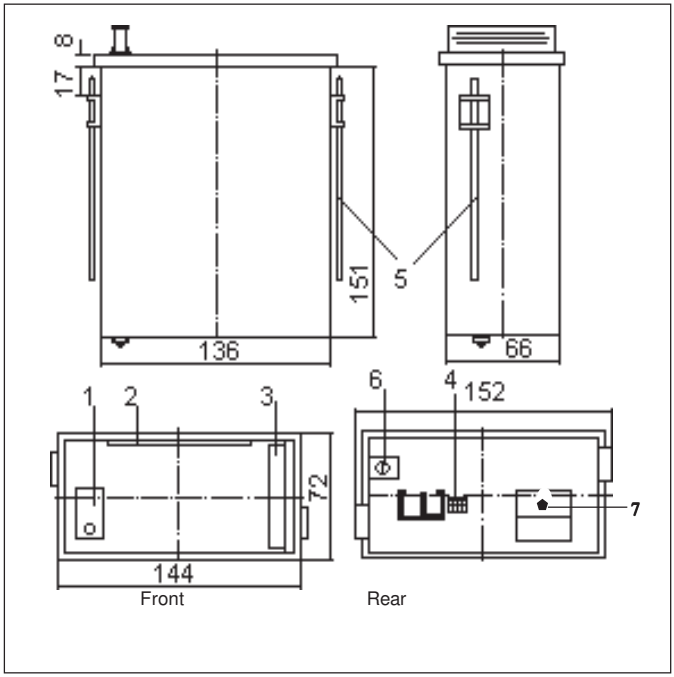
The IPP-AW is a paper re-roll device specially designed for use with the IPP 144-40 GS. It can be installed directly underneath the printer. The printed paper is automatically wound onto a drum by a motor. All pull-out front panel allows easy paper handling (insertion, removing).

The paper re-roll device is a DIN-specifiction panel mounting unit. It is supplied with power and controlled via the connector cable which comes with the unit. An LED indicates ready status. Depending on the distance between the two units at least the last 9 lines printed remain visible.

The paper re-roll device is inserted into the panel cut-out from the front and is clamped against the rear side of the switchborad using the lateral mounting bolts.The switchboard thickness must not exceed 12mm.
Operational principle: electromotor with friction clutch, electronically controlled.

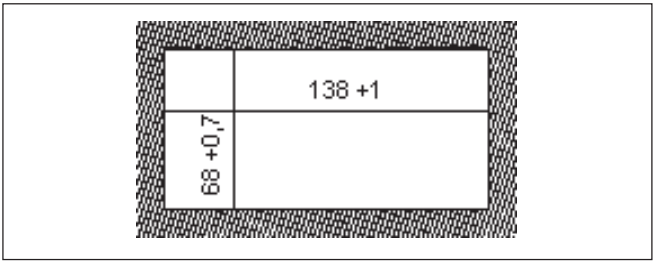
Protective conductor connection must be connected (to ground).

Design



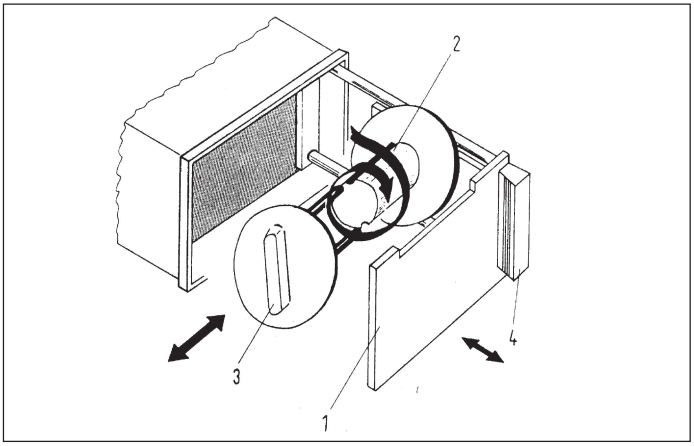
1 Status indicator
2 Opening for paper feed
3 Handle
4 Connector for connection cable IPP 144-40; (pin connections: Motor control, +5V, open, GND)
5 Mounting screws
6 **Protective conductor connection (must be connected to ground)**
7 Brightness LED

Installation



Make sure that the unit is properly mounted before connection and power on.

Operation



Removing the paper

- Use the handle (4) to pull out the front panel (1).
- Remove the holder (3) with the paper from roll body, rotate the notch of the holder as show in the diagram.
- Remove the paper drum from the holder.

Inserting the paper

- Wind the paper once around the drum body (2) in the direction indicated by the arrow.
- Plug in the holder (3) in such a way that the pins fit into the notches of the body.
- Close the front panel.
- Briefly press the „LINE FEED“ key at the IPP 144 - 40 GS until the paper has been straightened out.

Technical Data

Winding	Motor with friction clutch, electronic lag 3 sec	
	Paper width:	max. 80 mm
	Paper length:	max. 15 m
Ambient conditions	Store temperature range:	-20 °C to +80 °C
	Operating temperature range:	0 °C to +70 °C
	Climate:	relative humidity < 80 % up to 31 °C
Standards	Protection type housing:	IP 50 acc. to EN 60528/VDE 0470
	Mech.strength:	To IEC 1010
	Safety:	EN 61010-1:2001 CATIII >150V≤300V Pollution degree 2
	EMC	
	Susceptibility:	DIN EN 610004-1 to EN 610004-4
	Emission:	DIN EN 50081-2 Class B
Miscellaneous	Dimensions (WxHxD):	144 x 72 x 159 mm
Connection	Connector:	MASCON female multi point connector, 4 pin keyed
	Connector cable:	AWG 26, approx. 100mm
	Power supply:	by IPP (5 V DC)

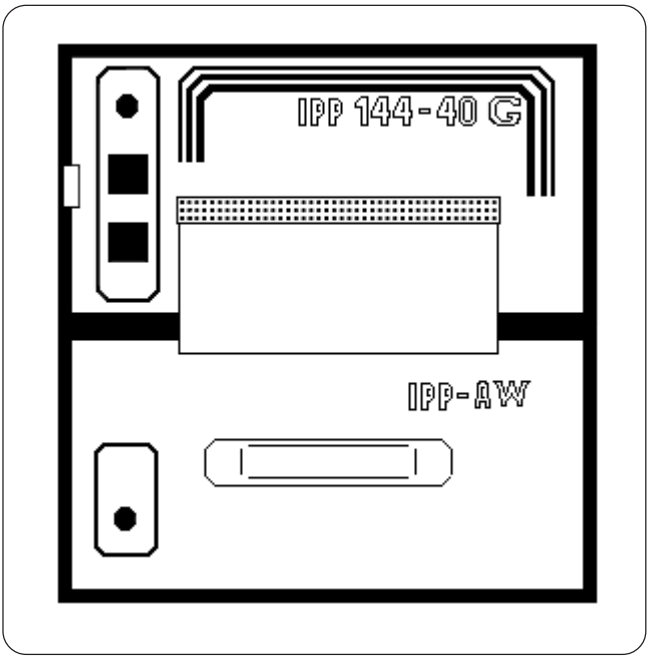
CE

Maintenance friction clutch

The torque of the friction clutch has been factory adjusted and should not require adjustment.

The winding force of the motor can be adjusted by slightly rotating the screw accessible through the left hand side hole in the body:

- **less = turn left**
- **more = turn right**

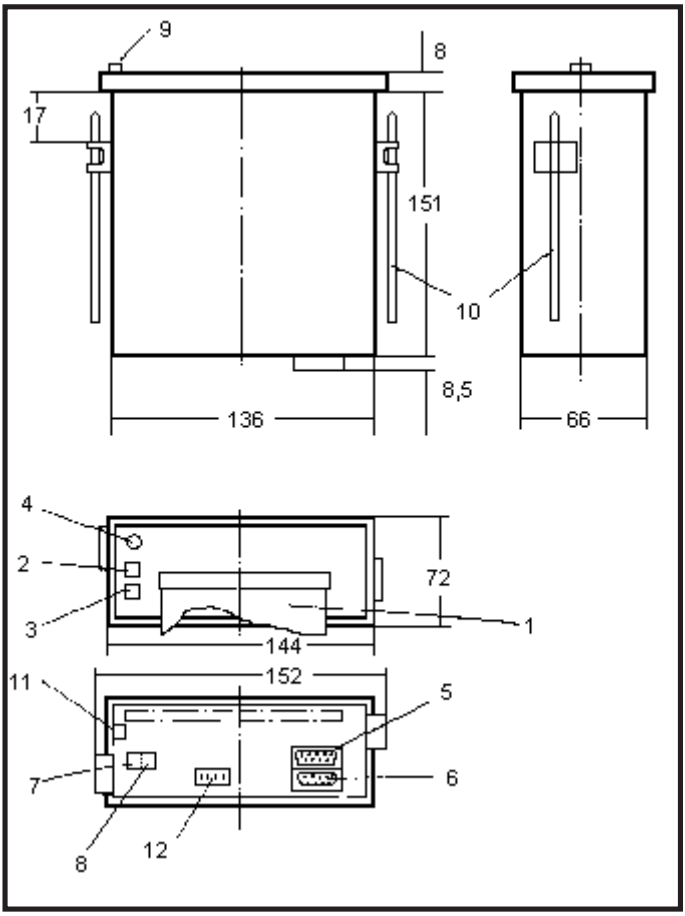


Plexiglass cover

- The plexiglass cover allows IP64 protection. It is latched on the front panel of the device.
  Item number 27863 15940
- Dimensions: 155 x 155 mm
- Material: Plexiglass and Santoprene 101-80 caoutchouc

Appendix A: Design and installation

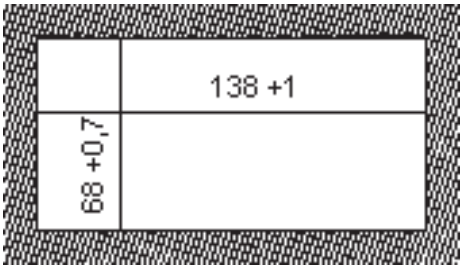
Design



1 Paper and cutting edge
2 Key: LINE / FEED / Enter
3 Key: MENU / Select
4 Alarm LED (paper end indicator)
5 Serial interface
Interface II (only version E)
6 Serial Interface I
7 Voltage supply
8 alarm contact
(paper end only version E)
9 Snap lock
10 Mounting screws
11 Protective conductor
connection. Must be
connected to ground.
12 Connection / paper reroll
mechanism IPP-AW

Make sure that the unit is properly
mounted before connection and power on.

Installation



The IPP 144 - 40 G fits into a DIN standard panel cut out. It is inserted into the switchboard opening from the front side and is fixed against the switchboard rear using mounting screws. The switchboard thickness must not exceed 12 mm.

Appendix B: Technical data

Print mechanism

Type of printing	Fixed head thermal line
Character representation	576 dots/line, 8 dots/mm
Print speed approx.	15 line/s (standard text mode)
Character/line	48 characters 40 characters 24 characters 20 characters
Character height	2,5 mm at 48/40 characters 5 mm at 24/20 characters
Character sets	ASC II, german, french, danish, norwegian, swedish / finnish, spanish, english, cyrillic
Service life	min. $10x10^6$ Impulse or 50 km

Paper	Type	commercial grade, document proof thermal paper
	Width	80 mm (+0 / -1 mm)
	Length	approx. 14 m (approx. 4.600 line up to 48 characters per line)
	Max. outer roll diameter	40 mm
	Min. inner roll diameter	11,5 mm
	Temperature	standard paper: 0 °C to 60 °C
Input buffer	Serial	8 kB
Serial Interface I	Type	RS 232 C; RS 422; RS 485 or Current loop
	Baudrate	110; 150; 300; 600; 1200; 2400; 4800; 9600; 19200; 38400
	Data format	7 bit / 8 bit [1]
	Parity bit	even, odd, mark, space, no [1]
Voltage supply	Safety	acc. to EN 61010-1:2001 CAT III > 150 V ≤ 300 V pollution degree 2
	DC	10 V ... 19 V approx. 20 VA[2] 19 V ... 36 V apprpx. 18 VA[2]
	AC	85 V ... 265 V , 45 - 65 Hz, approx. 15 W switch-mode power supply
Ambient conditions	Temperature ranges:	
	Storage	-20 °C to +60 °C
	Operating	0 °C to +45 °C
	Climate	relative humidity < 80 % up to 31 °C

[1] With 7 bit no parity, the sender must be set to 2 stoppbits.

[2] Starting current approx. 3,5 A (at 12 V) or approx. 1,5 A (at 24 V). This value can be used to rate the external fuse.

Attention! Higher current demand like the predecessor typ IPP 144-40.

Standards

Protection type	acc. to EN 60529/VDE 0470
housing	IP 50
terminals	IP 00
Insulation group	C acc. to VDE 0110
Mech. strength	acc. to IEC 1010
EMC	
Emission	EN 55011, Class A
	EN 55022, Class B
Susceptibility	EN 61000-4-2 B
	EN 61000-4-3 A
CE	EN 61000-4-4 B

Connections

Voltage supply connector	Screw type/terminals
Wire diameters	fixed: 0,2 to 4 mm²
	flexible: 0,2 to 2,5 mm²
	AWG: 24 to 12
Interface I	9pin D-Sub socket
Connection for paper reroll mechanism	4pin MASCON, MLAS
Connection for Alarm relay output	Screw type/terminal
	fixed: 0,2 to 4 mm²
	flexible: 0,2 to 2,5 mm²
	AWG: 24 to 12
	normally open
	50 V AC, 2 A
	30 V DC, 2 A

Miscellaneous

Dimensions (W x H x D)	144 x 72 x 159 mm
Switchboard mounting	screws against rear side of switchboard
Internal fuse (on power supply board)	12V DC : T 3,15 A
	24V DC : T 2 A
	110V - 230V AC : T 2 A

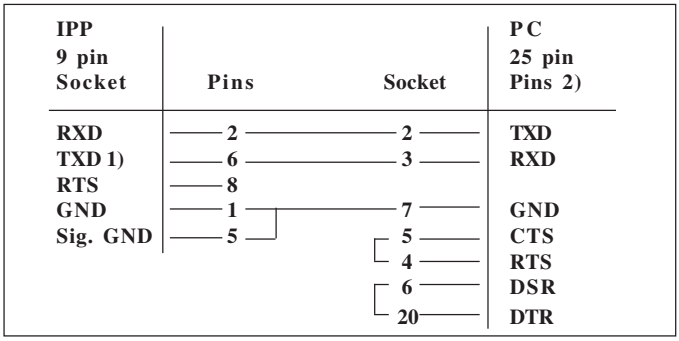
This operating manual applies to software version 6.10.12 and higher

Appendix D: Connections

The support of the XON/XOFF protocol depends on the PC (or PG) software. This handshake is necessary if more than 100 lines are to be transmitted at one time (4k/40) and is not possible with transmission mode TTY.

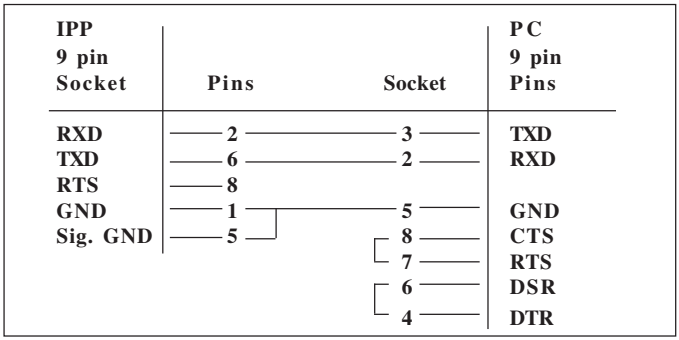
RS232

PC - PG 25 pin and CP 521 B

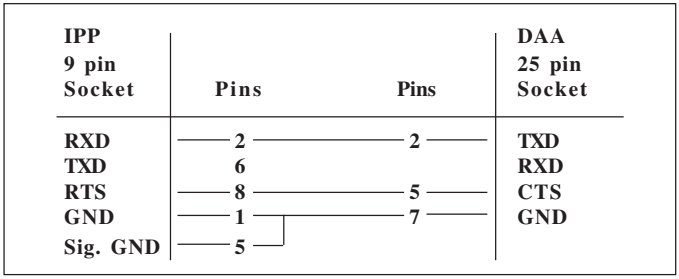


1) With ITT standard cable, this connection is made to pin 4.
2) New series PGs have sockets. Please specify „Gender Changer“ on the order form. Item number: 27866 79500

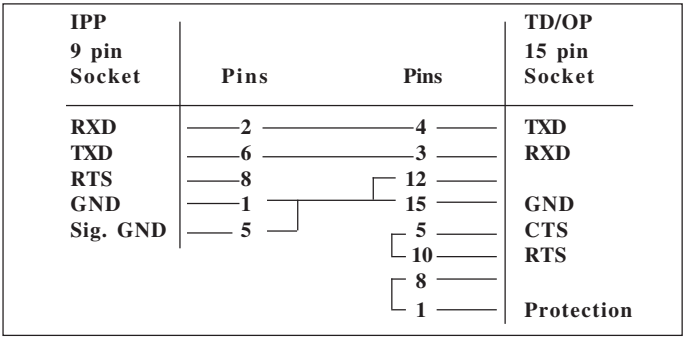
PC - PG 9 pin



DAA 25 pin Item number: 27866 79438

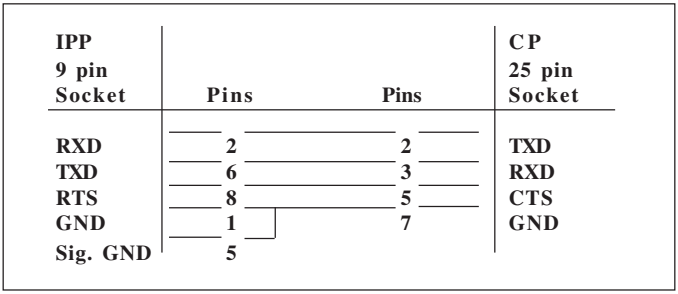


TD/OP 15 pin

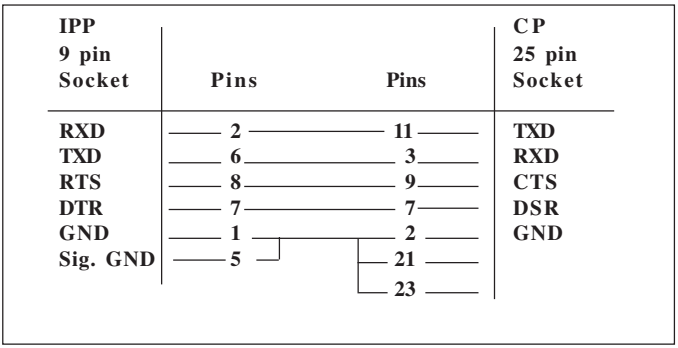


Only with XON/XOFF protocol

CP 524 and CP 525 25 pin



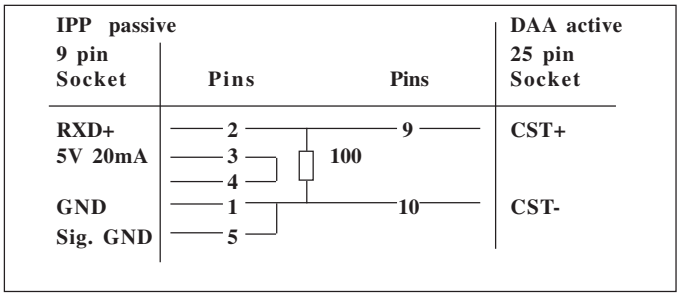
CP 521 25 pin



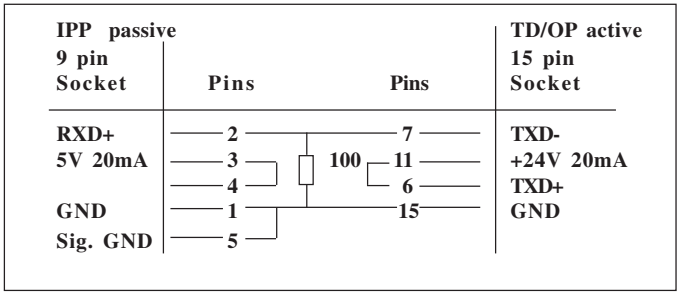
TTY

passive

DAA 25 pin



OP/TD 15 pin



Appendix E: Control characters

Print commands

LF	Line feed
CR	Carriage return
ESC J n	Prints and feeds paper
ESC d n	Prints and feeds paper by n lines

Print character commands

ESC - n	Specifies/clears underline
GS ! n	Specifies character size

Print position commands

ESC $ nL nH	Specifies absolute position

Bitmap image commands

ESC * m nL nH	Specifies column bitmap image
ESC A* nL nH	Specifies raster bitmap image

Line feed commands

ESC 2	Specifies initial line feed
ESC 3 n	Specifies line feed

Barcode commands

GS H n	Selects print position of HRI character
GS h n	Sets barcode height
GS w n	Sets width of barcode
GS k m	Prints barcode

Print commands

Line feed **Command: LF**

<< Code >>

0x0A

<< Function >>

Moves the print position to the start of the next line after execution.

Carriage return

Command: CR
<< Code >>
0x0D
<< Function >>
Executes the same action as (LF: „Line feed“) if auto line feed is effective. This command is ignored if auto line feed is not effective.

Prints and feeds paper

Command: ESC J n
<< Code >>
0x1B , 0x4A , n (0≦n≦255)
<< Function >>
Prints the data in the print buffer and feeds paper by (nx8) dots.

Prints and feeds paper by n lines

Command: ESC d n
<< Code >>
0x1B , 0x64 , n (0≦n≦255)
<< Function >>
Prints the data in the print buffer and feeds paper by n lines.

<< Details >>
Moves the print position to the start of the next line after execution.
Has not effect on the number of line feed set by the following commands:
ESC 2:“ Sets initial line feed“
ESC 3: „Sets line feed“

Print character commands

Specifies / clears underline

Command: ESC - n
<< Code >>
0x1B , 0x2D, n (0≤n≤2 , 48≤n≤49 , initial value n=0)

<< Function >>
Specifies or clears an underline

n	Function
0, 48	Clears underline
1, 49	Sets a 1-dot wide underline and specifies an underline

Specifies character size

Command: GS ! n

<< Code >>
0x1D , 0x21, n
(initial value n=0, Value see table)

<< Function >>
Specifies character size (vertical and horizontal magnification)

Bit	Function	Value	
		0	1
0 1	vertical magnification	see Table 2	
4 5	Horizontal magnification	see Table 1	

Table 1

Bit7	Bit6	Bit5	Bit4	Magnification
0	0	0	0	1(Std.)
0	0	0	1	2(horizontal)
0	0	1	1	4(horizontal)

Table 2

Bit3	Bit2	Bit1	Bit0	Magnification
0	0	0	0	1(Std.)
0	0	0	1	2(vertical)
0	0	1	1	4(vertical)

<< Details >>

This command is ignored if either a vertical or horizontal magnification is outside the definable range.
In the standard mode, the vertical direction refers to the direction of paper feed, and the horizontal direction the direction right to the direction of paper feed. If characters are 90-degree right or left are specified, the relationship of the vertical and horizontal directions is reversed.
If characters with different vertical magnifications are contained in the same line, they are aligned to the baseline.

Print position commands

Specifies absolute position

Command: ESC $ nL nH

<< Code >>

0x1B , 0x24, nL , nH (0≤nL≤255 , 0≤nH≤255)

<< Function >>

Specifies the next print start position as an absolute position based on the left margin position.
The next print start position is (nL + nH x 256) dots away from the left margin position.

<< Details >>

A print start position specified outside the print area is ignored.

Bitmap image commands

Prints column bitmap image

Commandl: ESC *m nL nH d1~dk

<< Code >>

0x1B , 0x2A , m , nL , nH , d1~dk

where: m=0, 32, 0≤nL≤255 , 0≤nH≤3, 0≤d≤255

<< Function >>

Specifies a bitmap image in mode m for the number of dots specified by nL and nH.

m	Mode	No. of vertical dots	No. of Data (K)
0	8-dot single density	8 dots	nL+nHx256
1	8-dot double density	8 dots	nL+nHx256
32	24-dot single density	24 dots	(nL+nHx256)x3
33	24-dotdouble density	24 dots	(nL+nHx256)x3

<< Details >>

Processes the data after nL as normal data if m is outside the definable range.

nL and nH denote the number of horizontal dots of the bitmap image to be printed, which is (nL+nHx256).

If bitmap image data exceeding the number of printable dots in a line is entered, the excess data is discarded.

d denotes bitmap image data. The bit for the dot to be printed is „1“ and the bit the dot not to be printed is „0“.

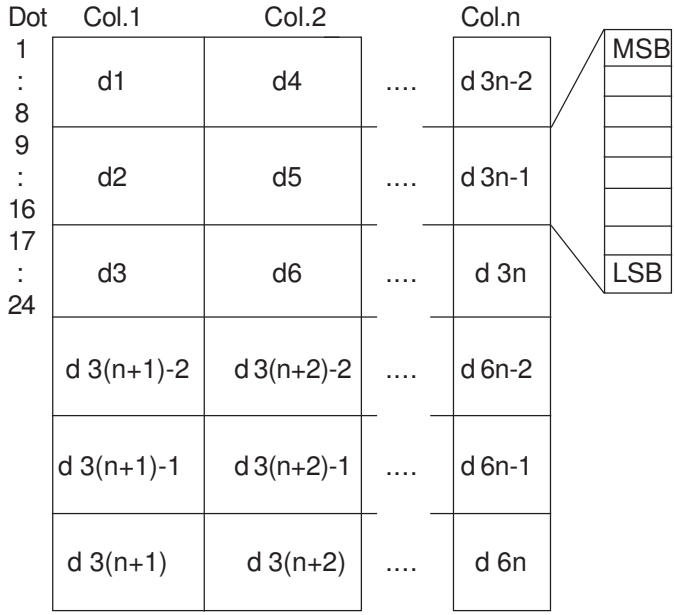
Returns to normal data processing after bitmap image processing.

Has no effect on print modes (underline, character size) excluding NORMAL.

Prints the entered bitmap image magnified three times in the vertical direction if m=0 or 1 (8-dot mode) is specified and two times in the horizontal direction if m=0 or 32 (single density mode) is specified.

The data format of a bitmap is as follows:

Bitmap-Data format



Prints raster bitmap image

Command: ESC A* nL nH d1~ dk

<< Code >>

0x1B , 0x41 , 0x2A , nL , nH , d1~dk

where: 0≤nL≤255 , 0≤nH≤255, 0≤d≤255

<< Function >>

Specifies the raster bitmap image specified with (nL + nH x 256) lines in the vertical direction.

<< Details >>

This command is effective only if this command is entered at the start position of a line in the standard mode.

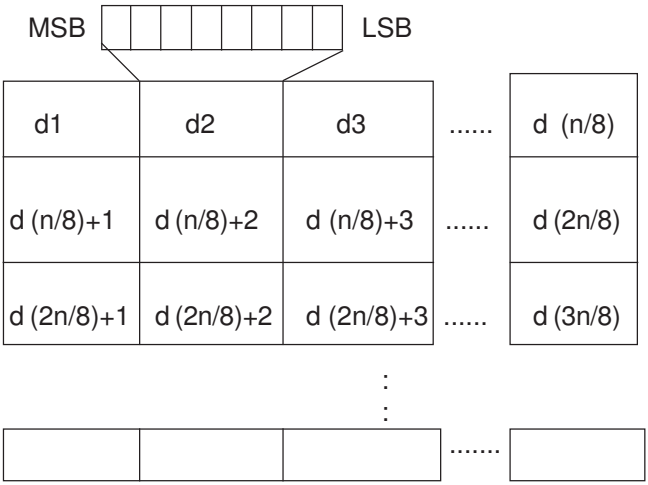
d refers to bitmap image data. The bit for the dot to be printed is „1“ and the bit for the dot not to be printed is „0“.

The required number of image data per line is as follows depending on the number of heating elements in the head:

dots of heating element	192 dots	288 dots	384 dots	576 dots
No. data per line	24 bytes	36 bytes	48 bytes	72 bytes

The required total number of bitmap image data is ((nL + nH x 256) x no. of data per line) bytes.

The format of bitmap data for a printer with n heating elements in the head is as follows:



Line feed commands

Sets initial line feed

Command: ESC 2

<< Code >>
0x1B , 0x32

<< Function >>
Sets the amount of the initial line feed per line to 30 dots.

<< Details >>:
The amount of the initial line feed can be set separately for the standard mode.

Sets line feed

Command: ESC 3n

<< Code >>
0x1B , 0x33 , n (0≤n≤25 , initial value n=60)

<< Function >>
Sets the amount of line feed per line to n dot.

<< Details >>
Line feed can be set separately for the standard mode.

Barcode commands

Selects printing position of HRI character

Command: GS H n
<< Code >>
0x1D , 0x48 , n (0≤n≤3, initial value n=0)

<< Function >>
Selects the print position of HRI characters when printing a barcode.

<< Details >>
HRI refers to Human Readable Interpretation.

n	PRINTING POSITION
0	Not printed (Default)
1	Above bar code
2	Under bar code
3	Above and under bar code

Sets barcode height

Command: GS h n
<< Code >>
0x1D , 0x68 , n (1≤n≤255 , initial value n=128)

<< Function >>
Sets barcode height to n dots.

Sets width of barcode

Command: GS w n
<< Code >>
0 x 1D , 0 x 77 , n (2≤n≤6 , initial value n=3)

<< Function >>
Specifies barcode width.

Prints barcode

Command: GS k n (Start) <data>NUL
<< Code >>
0x1D , 0x6B , n,(Start)<data> 00H (0≤n≤7)

<< Function >>
Selects a barcode system and prints barcodes.

In the case of GS k n:

n	START BYTE	BAR CODE TYPE
0	No Start-Byte	UPC-A
1	No Start-Byte	UPC-E
2	No Start-Byte	EAN 13
3	No Start-Byte	EAN 8
4	No Start-Byte	Code 39
5	No Start-Byte	Interleaved 2/5(ITF)
6	No Start-Byte	Codabar
7	135	Code 128A
7	136	Code 128B
7	137	Code 128 C

General purpose characters

Character	HEX	Significance	Name
Ctrl D	04	End of transmission	EOT
Ctrl E	05	Set address	ENQ
Ctrl J	0A	Line feed	LF
Ctrl M	0D	Carriage return	CR
Ctrl Q	11	Ready to receive	XON
Ctrl S	13	Busy	XOFF

Additional characters used by the printer

Ctrl F	06	48 character / line
Ctrl R	12	24 character / line
Ctrl T	14	Inverted printing
Ctrl U	15	Normal printing
Ctrl W	17	transmit request: date / timet
Ctrl^	1E	Print: date / time in protocol
Ctrl C	03	Text call
Ctrl X	18	Sart of text block
Ctrl Y	19	End of text block
Ctrl V	16	Reserve space for measure variable (6 Digits)

More printer commands [1)]

ASCII	HEX	Significance
FF	0C	Print in page mode and return
ESC FF	1B, 0C	Print data in page mode
ESC E n	1B, 45	Specifies emphasized character
ESC G n	1B, 47	Clears emphasized character
ESC T n	1B, 54	Selects character print direction in page mode
ESC W...	1B, 57	Specifies Printing area in page mode
ESC a n	1B, 61	Alignment
GS W...	1D, 57	Sets width of printing area

[1)] aks for more informationspleace seperatly

Appendix F: Character sets

Character set - various languages

Hex-Code	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
ASCII	#	$	@	[	\	]	^	`	{	¦	}	~
German	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
S / SF	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
French	#	$	à	°	ç	§	^	`	é	ù	è	¨
Danish	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Norwegian	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spanish	#	$	à	Í	Ñ	¿	é	`	□	ñ	ó	ú
English	£	$	@	[	\	]	^	`	{	|	}	~

The following character set is used:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	¦	}	~	⌂
8	€	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	₧	ƒ
A	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	¬	½	¼	¡	«	»
B	▒	▓	▓	|	┤	Á	Â	À	©	╣	║	╗	╝	¢	¥	┐
C	└	┴	┬	├	─	┼	ã	Ã	╚	╔	╩	╦	╠	=	╬	¤
D	ð	Ð	Ê	Ë	È	'	Í	Î	Ï	┘	┌	▉	▄	¦	Ì	▀
E	Ó	ß	Ô	Ò	õ	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	¯	´
F	-	±	‗	¾	¶	§	÷	¸	°	¨	·	¹	³	²	■	€

Character set: ASCII and cyrillic

it means:

1.Column = ASCII / 2. Column = cyrillic / 3. Column = Hexadecimal

		20
!	!	21
"	"	22
#	#	23
$	$	24
%	%	25
&	&	26
/	ю	27
(	(	28
)	)	29
*	ь	2A
+	+	2B
,	,	2C
-	-	2D
.	.	2E
/	/	2F
0	0	30
1	1	31
2	2	32
3	3	33
4	4	34
5	5	35
6	6	36
7	7	37
8	8	38
9	9	39
:	:	3A
;	;	3B
<	<	3C
=	=	3D
>	>	3E
?	Б	3F

@	@	40
A	Ф	41
B	И	42
C	С	43
D	В	44
E	У	45
F	А	46
G	Ч	47
H	П	48
I	Ш	49
J	О	4A
K	Л	4B
L	Д	4C
M	Ё	4D
N	Т	4E
O	Щ	4F
P	З	50
Q	Й	51
R	К	52
S	Ы	53
T	Е	54
U	Г	55
V	М	56
W	Ц	57
X	Р	58
Y	Я	59
Z	Н	5A
[	Э	5B
\	Ж	5C
]	Х	5D
^		5E
_	ь	5F

	Ю	60
a	Ф	61
b	И	62
c	С	63
d	В	64
e	У	65
f	а	66
g	ч	67
h	п	68
i	ш	69
j	о	6A
k	л	6B
l	д	6C
m	ё	6D
n	т	6E
o	щ	6F
p	з	70
q	й	71
r	к	72
s	ы	73
t	е	74
u	г	75
v	м	76
w	ц	77
x	р	78
y	я	79
z	н	7A
{	э	7B
`	ж	7C
}	х	7D
~	б	7E
■	■	7F

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