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1 Programming and user manual, Poltech signs LD and TT.

1.1 Wiring of LD and TT Signs.

POLTECH LD is ready to be connected to the power. Models which are delivered in Sweden do have an internal power supply. The models that are delivered outside Sweden are equipped with a power supply connected between the sign and the power outlet. The power supplies are approved for indoor use. The approvals are valid in all the Nordic countries.

1.2 Keyboard

The keyboard to Poltech signs LD and TT contains an infrared (IR) transmitter, there is because of that not necessary to use a cable between the sign and the keyboard. When programming the sign, direct the IR light towards the left side of the sign. When a key is stroke on the keyboard a LED starts to flash at the bottom left side of the sign at the same time the character you have pressed are being written on the right side of the sign.

The character is now in the input position, this expression will be used ahead in the manual.

The keyboard basically functions as a typewriter.

If you press an "A" the letter A is showed on the sign.

The commands printed in yellow above the keys on the keyboard can be used by pressing down the CONTROL key and then the command that you wish to perform.

The commands printed in white above the keys on the keyboard can be used by pressing down the SHIFT key and then the command that you wish to perform.

In normal mode the characters will be printed in capital letters. If you wish to use lower-case on the sign, keep the SHIFT pressed down and then press the character to show on the sign. The text will be printed with lower-case as long as the SHIFT key is pressed down.

You may mix capital letters and lower-case just as in the case of using a typewriter

1.3 In / Output of text

POLTECH LD/TT signs are working in two different phases during operation.

Input mode, this is where you type the messages and decide what kind of appearance and look the text will have on the sign.

It is in the Input mode that you are "writing the program".

Output mode, here is the text showed as you ordered it in the *Input mode*.

If you have not given any commands in the Input mode, just printed text, the text will scroll from right to left on the sign. When the sign is connected it will always start in *Output mode*.

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1.4 Commands for Input

When Poltech LD are connected there will show a test message on the sign, "POLTECH". When this message is showed the sign are performing a self-diagnostic test of the software.

If there is a message in the memory this will also be showed on the sign.

Erasing of messages are made as follows:

Stop the message by pressing STOP.

Keep then CONTROL pressed down and press CLEAR ALL.

The sign will now show a question, ERASE TEXT??

If you are sure that all the text shall be erased then press the CONTROL and CLEAR ALL keys again and all the text will be erased.

If you do not wish to erase all text then you just type the letter that you perhaps wanted to type when you accidentally press CLEAR ALL.

If you only wish to erase individual characters then press CE. It is always the character that is in the Input position that is erased with the CE key.

In the right hand corner there is a key with a arrow pointing right, by pressing this key you will move the marker forward in the text. If you keep the CONTROL key pressed down and then use the "arrow key" you will move back in the text.

The dotted arrows above key L and U used with CONTROL will move 10 characters back / forward.

The arrows above O and P used with CONTROL will take you to the end and start of the text.

When doing this, an arrow will show in the Input position on the sign. This is the symbol for "starting point" of a message. Before the arrow there will show a number, this is the message number that you currently a editing.

The technique with different messages will be described later.

By using the command described above to move around the text you will easy reach the words or letters that you want to edit or erase. You have the possibility to erase or move entire sentences in a text with these commands.

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1.5 Summery of input commands

| Commands | Action |
|------------|--|
| STOP/START | Start/Stop of text on sign. With this command you will go from Input mode to Output mode and the other way around. |
| CLEAR ALL | Erase the entire message. |
| CE | Erase character at Input position. |
| → | Movement in text, character by character in the direction of the arrow. |
| ← | Movement in text, character by character in the direction of the arrow. |
| →→ | Movement in text, 10 characters at the time. |
| ←← | Movement in text, 10 characters at the time. |
| → | Moving to the end of the text. |
| ← | Moving to the start of the text. |
| | |
| | |

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1.6 Commands for output of text

How to write text in to the sign (Input) was described in previous chapter. In this chapter we will describe how to use commands to give the message different looks.

The commands for the output function are programmed in the input function in the same way, and at the same time, as the text that shows on the sign.

The chosen commands are showed on the sign as characters in the text message.

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1.7 Summery of output commands

| Command | Action |
|----------------|---|
| WIDE | Makes the following text wide . It is not possible to show wide and normal font on the sign at the same time. The command is an On/Off command. This means that the command always start with a wide command and have to Stop with a wide command at the end of the desired text that are to be showed with wide font. |
| FLASH | Makes the following text flash in a rapid speed on the sign. This sign is also an On/Off command (See above). |
| CENTER | This command effects previous text of 15 characters in normal font and 7 characters in wide font. The command will centre the text on the sign. The words that are to be centred will have to be preceded by a BLOCk-command (a command that effects 16 characters in normal font), i.e. JUMP, UP, BLINK, OPEN, WIPE or DOWN. |
| JUMP | The following 16 characters in normal font or 8 characters in wide font, jumps in at the same time on the sign. The text will appear for 2 seconds and then jump out again. |
| UP | The following 16 characters in normal font or 8 characters in wide font, rolls up vertically on the sign. The text will appear for 2 seconds and then roll up again. |
| BLINK | The following 16 characters in normal font or 8 characters in wide font, Will grow horizontally from the centre of the sign to full size. The text will appear for 2 seconds and then shrink back towards the centre again. |
| OPEN | The following 16 characters in normal font or 8 characters in wide font, grows from the centre towards the sides. The text will appear for 2 seconds and then shrink back towards the centre again. |
| WIPE | The following 16 characters in normal font or 8 characters in wide font, Will build up from left to right, appears for 2 seconds and then sweep out to the right. |
| DOWN | The following 16 characters in normal font or 8 characters in wide font, rolls down vertically on the sign, appears for 2 seconds and roll down vertically |
| PAUSE | With scrolling text the message makes a pause when the command position reach the input position. The effect will be that the previous 16 characters will make a pause. |
| PAUSE | When a PAUSE command is used on text in a BLOCK command, a PAUSE shall be used directly after such a command, for the text that you wish to make a pause on. The pause will be for 2 seconds. The pause length can be longer by adding more PAUSE command after another. |

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1.8 Special commands

1.8.1 Time and temperature

There is an internal clock in the sign for showing the time and control of scheduled messages. If the sign have been disconnected from the power for some time, the clock has to adjust.

Procedure to follow;

Press START so that the sign goes into INPUT mode. If there were now previous message the sign will now turn black.

Press TIME.

The sign will say SET.

The TIME is set by stating Hours, minutes and seconds with two digits on each position.

Ex The time is thirty-seven minutes and forty-eight seconds past three, then type 03:37:48. As the second digit in the seconds at typed the clock starts.

If the wrong time is entered, start all over by pressing TIME again.

The TIME can be used in a message or as a stand-alone message.

1.8.2 Big Ben

It is possible to connect a speaker to the sign that are activated from a message.

This is made by using the BIG BEN command in the message were you wish to use an acoustic signal.

BIG BEN can be started manually when the sign is in Output mode by giving the BIG BEN command.

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1.9 Memory management

POLTECH LD is able to handle 7000 characters divided over 99 separate text memories. Each memory handles one individual message. The individual text memory do not have any fixed size, it is the total amount of characters that are the only limit.

The sign always starts in memory one (1) after a power loss, regardless of what message was chosen before.

Dividing the messages on memory is made as follows.

Erase the text in the sign with CLEAR ALL

Press command MESSAGE.

Now a question will appear: TEXT NR? 01.

01 is the number of the latest message that was showed.

You are now able to choose which memory you wish to save your message in.

If you wish to save your message in memory three, press 03.

Programming of text is then made as described in previous chapters.

Transition from a text memory to another is made by command MESSAGE in Input mode and then the memory number to reach for. Then press START or STOP.

When START is pressed the messages will start and if STOP is pressed you are able to type text. At the start of all messages the message number that you presently is editing is showed.

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1.10 Time control

The messages can be displayed at previous set time schedules with help of the internal clock. Use the MESSAGE command and type 00. Press STOP, and you are in the Input mode and are able to choose which message you want to control by a time schedule.

This is controlled by typing the time and then the number of the messages to display and then a new time and number for the next message.

Ex:
STOP
Press CONTROL
Type 00
STOP
12:10=03, 15:30=15, 18:35=09
Press START

This will make message number 03 to display on the sign at 12:10. Provided that the clock is set to a correct time, if not the sign will display SET TIME.

If this is the case, press TIME and set the time according to chapter 1.8.1.

Message 03 will be displayed between 12:10 and 15:30 when message number 15 will be displayed followed by message 09 that will be displayed until 12:10 and so on.

Messages with the same start time will be displayed in order of memory number, during the same schedule time.

The possibility to type information between the commands for time control is very useful. Use message number 00 and type the information for each message.

Ex:
12:10=03 Item info 15:30=15 Braking news 18:35=09 Production info

If you discover an error when reading the messages on the sign, press STOP when the message is displayed. The information on the sign is the position that was latest updated. Press MESSAGE.

Now you are able to see what message number (TEXT NR? XX) the message have that was displayed when you pressed STOP.

By pressing STOP now you will be able to edit the message according to previous descriptions.

By pressing START, only the edited message will be displayed.

To start time-controlled messages, always use message 00.

If you wish to continue showing the time controlled messages, press MESSAGE and 00 as an answer to the question TEXT NR?, then press START.

Time control is now in use.

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1.11 Error messages

| | |
|-------------|---|
| SET TIME | Appear when trying to start time-controlled messages and the clock is not set. <u>Action:</u> Set time and start time-control with message 00 again. |
| TIME ERROR | Appears when the time-controlled messages is incorrectly programmed. <u>Action:</u> Control the message 00. Correct time set up is HH:MM=XX. (Hours: Minutes=Message number) |
| MEMORY FULL | Memory is full. The total amount of characters exceeds the memory capacity of 3000 characters. <u>Action:</u> Reduce the amount of text. (Characters) |

1.12 Summary

All the functions of a POLTECH sign have now been described. The practical functions and combinations of commands is almost unlimited.

Take some time after a while to try out more combinations and explore the possibilities of the sign.

Only your imagination is an obstacle for you to overcome. The sign is a good way for you to communicate to other people.

Use the commands with moderation.

The receiver of your information has to have a good chance to interpret the importance of the message.

Old news is bad news! If you do not have any information that is up to date, use the sign as a time and temperature indicator.

“Blessed be the man, as when he had nothing to tell, he in words avoids confirming that fact. “

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2 Control characters (RS232)

| Characters | EDIT MODE | PC MODE | RUN MODE | TEXT |
|------------|----------------------|----------------------|---|-------------------|
| 00 | | | | |
| ÜA 01 | CURSOR 1 → | SÄTT TID (ÜATTMMSS) | | |
| ÜB 02 | | | | CENTRERA |
| ÜC 03 | | | TILL DATOR MODE & RADERA VID SLUT (KVITTO 06) | |
| ÜD 04 | TILL DAT. M. & SLÄCK | SLÄCK | TILL DATOR MODE & SLÄCK | |
| ÜE 05 | | TILL EDIT MODE | TILL EDIT MODE | |
| ÜF 06 | CURSOR FÖRST | CURSOR FÖRST I TEXT | | |
| ÜG 07 | | AKTIVERA TREKLANG | AKTIVERA TREKLANG | TREKLANG (BELL) |
| ÜH 08 | RADERA I TECKEN | | | |
| ÜI 09 | | | | INHOPP |
| ÜJ 0A | TILL MENY (TEXTNR.) | VÄLJ TEXTNR. (OJNN) | | |
| ÜK 0B | | | | VERTIKALT UPP |
| ÜL 0C | | | | PARARELL UT |
| ÜM 0D | | | | |
| ÜN 0E | | | | VERTIKALT NER |
| ÜO 0F | | | | FLASH (TILL/FRÅN) |
| ÜP 10 | | | | PAUSE (1.8 SEK) |
| ÜQ 11 | CURSOR 10 ← | SLÄCK | | |
| ÜR 12 | TILL RUN MODE | TILL RUN MODE & TÄND | | |
| ÜS 13 | | | TILL DATOR MODE & RADERA | |
| ÜT 14 | CURSOR SIST | TÄND | | |
| ÜU 15 | | | | TEMPERATUR |
| ÜV 16 | | | SÄTT TID/ VISA TID | TID |
| ÜW 17 | CURSOR 10 → | | | |
| ÜX 18 | RADERA TEXT | RADERA TEXT & TÄND | | |
| ÜY 19 | | | | |
| ÜZ 1A | CURSOR 1 ← | | | |
| ÜÄ 1B | | | | FREEZE |
| ÜÖ 1C | | | | WIDE (TILL/FRÅN) |
| ÜÅ 1D | | | | BLINK |
| 1E | | | | OPEN |
| 1F | | | | WIPE |

Not.

In PC mode the sign echoes all the characters back to the CPU. Any possible error codes are sent in format: (7E+nr<I ASCII>=. Error 1=Memory full, Error 3=Clock not Set, Error 4=Wrong string 00 (Time-control) No characters are allowed to the sign before echoing the previous character.

3 Character codes

TECKENKODER FÖR VISNINGSBARA
TECKEN
(HEXADECIMAL KODNING)

| | | MSB | | | | | |
|-----|---|-----|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 | 7 |
| LSB | 0 | 0 | É | P | é | p | |
| | 1 | ! | 1 | A | Q | a | q |
| | 2 | · | 2 | B | R | b | r |
| | 3 | # | 3 | C | S | c | s |
| | 4 | \$ | 4 | D | T | d | t |
| | 5 | % | 5 | E | U | e | u |
| | 6 | & | 6 | F | V | f | v |
| | 7 | · | 7 | G | W | g | w |
| | 8 | [| 8 | H | X | h | x |
| | 9 |] | 9 | I | Y | i | y |
| | A | * | : | J | Z | j | z |
| | B | + | : | K | Ä | k | ä |
| | C | , | < | L | Ö | l | ö |
| | D | - | = | M | Å | m | å |
| | E | · | > | N | Ü | n | ü |
| | F | / | ? | O | | o | |

TECKENFORMAT VID KOMMUNIKATION VIA RS 232 : 8 BITAR DATA INGEN PARITET.
ÖVERFÖRINGSHASTIGHET 600 BAUD (300 - 19200) FULL DUPLEX.

TECKENFORMAT VID KOMMUNIKATION VIA POLNET : 8 BITAR DATA INGEN PARITET.
ÖVERFÖRINGSHASTIGHET 4800 BAUD (300 - 4800). HALV DUPLEX.

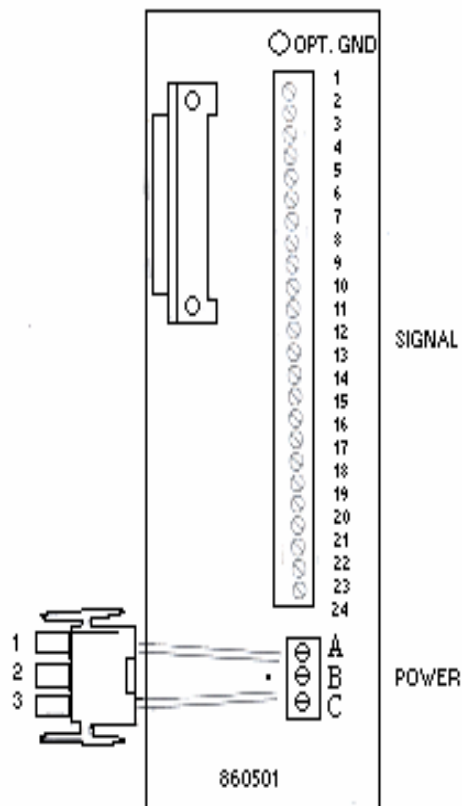
ANSLUTNING : 25 POL D-SUB HONA

| PIN NR. | SIGNAL | |
|---------------------|--------|--|
| ---><--- | 2 | POLNET LINE |
| ---><--- | 15 | POLNET LINE |
| ----- | 3 | SIGNAL JORD |
| ----- | 16 | DATA UT |
| ----- | 17 | DATA IN |
| ----- | 4 | RTS |
| ----- | 5 | DCD |
| ----- | 18 | CTS NÄR DENNA SIGNAL ÄR AKTIV KOPPLAS TANGENTBORDET UR. |
| ----- | 10 | SIGNAL JORD |
| ----- | 11 | TREKLANG UT (.16 W 8 OHM) |
| ----- | 24 | TEMPERATUR SENSOR SIGNAL IN |
| ----- | 23 | MATNING TILL TEMPERATUR SENSOR +3 VOLT |
| ----- | 12 | SIGNAL JORD |
| ----- | 13 | TANGENTBORD SIGNAL IN |
| ----- | 25 | TANGENTBORD VIA IR ELLER TRÅD. JORDAS DÅ KABEL ANVÄNDES. |
| PARALELL I/O OPTION | | |
| ----- | 22 | SIGNAL 1 |
| ----- | 9 | SIGNAL 2 |
| ----- | 21 | SIGNAL 3 |
| ----- | 8 | SIGNAL 4 |
| ----- | 20 | SIGNAL 5 |
| ----- | 7 | SIGNAL 6 |
| ----- | 19 | SIGNAL 7 |
| ----- | 6 | SIGNAL 8 |

RS 232

4 Connections

ANSLUTNINGSKORT FÖR SKRUVANSLUTNING

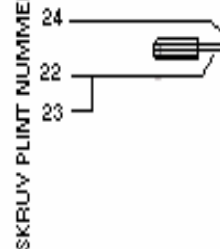


| 25 POLD-SUB | SCREW TERMINAL | C/OPTION | NETWORK |
|-------------|----------------|--------------------------------------|---------|
| 1 | 1 | TX- | |
| 14 | 2 | TX- | |
| 2 | 3 | RX- | LINE |
| 15 | 4 | RX- | LINE |
| 3 | 5 | SIGNAL GROUND | POLNET |
| 16 | 6 | DATA OUT | |
| 4 | 7 | RTS | |
| 17 | 8 | DATA IN | |
| 5 | 9 | DCD | |
| 18 | 10 | CTS | |
| 6 | 11 | 1/08 | |
| 19 | 12 | 1/07 | |
| 7 | 13 | 1/06 | |
| 20 | 14 | 1/05 | |
| 8 | 15 | 1/04 | |
| 21 | 16 | 1/03 | |
| 9 | 17 | 1/02 | |
| 22 | 18 | 1/01 | |
| 10 | | | |
| 23 | 19 | SUPPLY TEMP. SENSOR +9V | |
| 11 | 20 | THREE BELL OUT | |
| 24 | 21 | TEMP. SENSOR | |
| 12 | 22 | SIGNAL GROUND | |
| 25 | 23 | GROUND TO ENABLE WIRE CONN. KEYBOARD | |
| 13 | 24 | SIGNAL FROM KEYBOARD | |

INKOPPLING AV TEMP. SOND. MAX KABELLÄNGD 50 M.



INKOPPLING AV TANGENTBORD. MAX KABELLÄNGD 50 M.



5 Calibrating the temp sensor

Connect the temp sensor to the sign and have the components rest to reach working temperature. (10-15 minutes).

Get a reading of the surrounding temperature. (TEMP)

Measure the voltage (Vtemp) between REF and TP2

Calculate the offset voltage (Ofv) according to

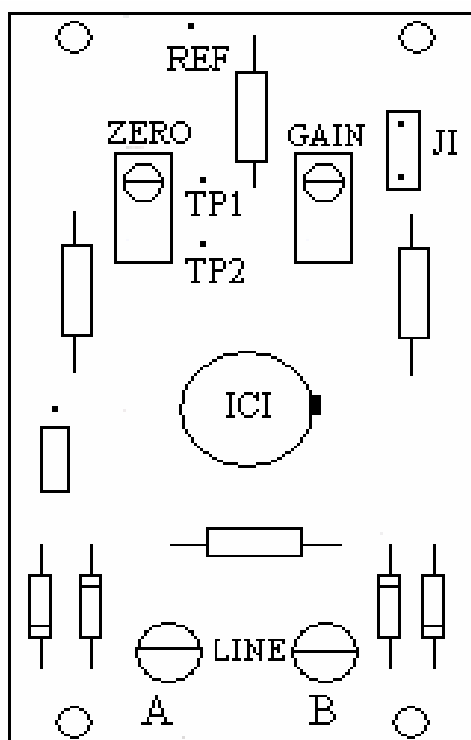
$$\text{Ofv (mV)} = \frac{\text{Vtemp (mV)}}{(\text{Temp} + 273.15)} \times 223$$

Remove jumper JI.

Adjust trim point "ZERO" until voltage between REF and TP1 is same as calculated offset voltage according to above.

Reassemble jumper JI.

Adjust trim point "GAIN" until the right temp is indicated on the sign.



6 Polnet network

There is two version of Polnet, one that are sending all text to all signs without address and the other one possibility to send different texts to different individual signs in the system with address.

No sign have a unique address in the Polnet network without addresses

Each and every sign do have a unique address in the Polnet network with addresses.

At start up of sign in a Polnet network the sign displays POLTECH during 3 second. If the sign do have an address this will also show at the same time.

Ex POLTECH 03

Common for the two systems is that transmitting is possible from every sign in the system.

Transmitting text in the system.

Press SHIFT and STOP at the same time on the keyboard.

The system with addresses answers then with a question, UNIT NR?

Then answer with a two-digit address to which sign the text is supposed to be transmitted to.

Answer 00 and the text will be transmitted to all signs in the system.

Press SHIFT and STOP and the transmitting starts.

The text TRANSMIT will be displayed on the sign during the transmitting time.

When the transmitting is done, the text is displayed on the sign.

Messages that are being sent will be stored in the sign-memory number 1.

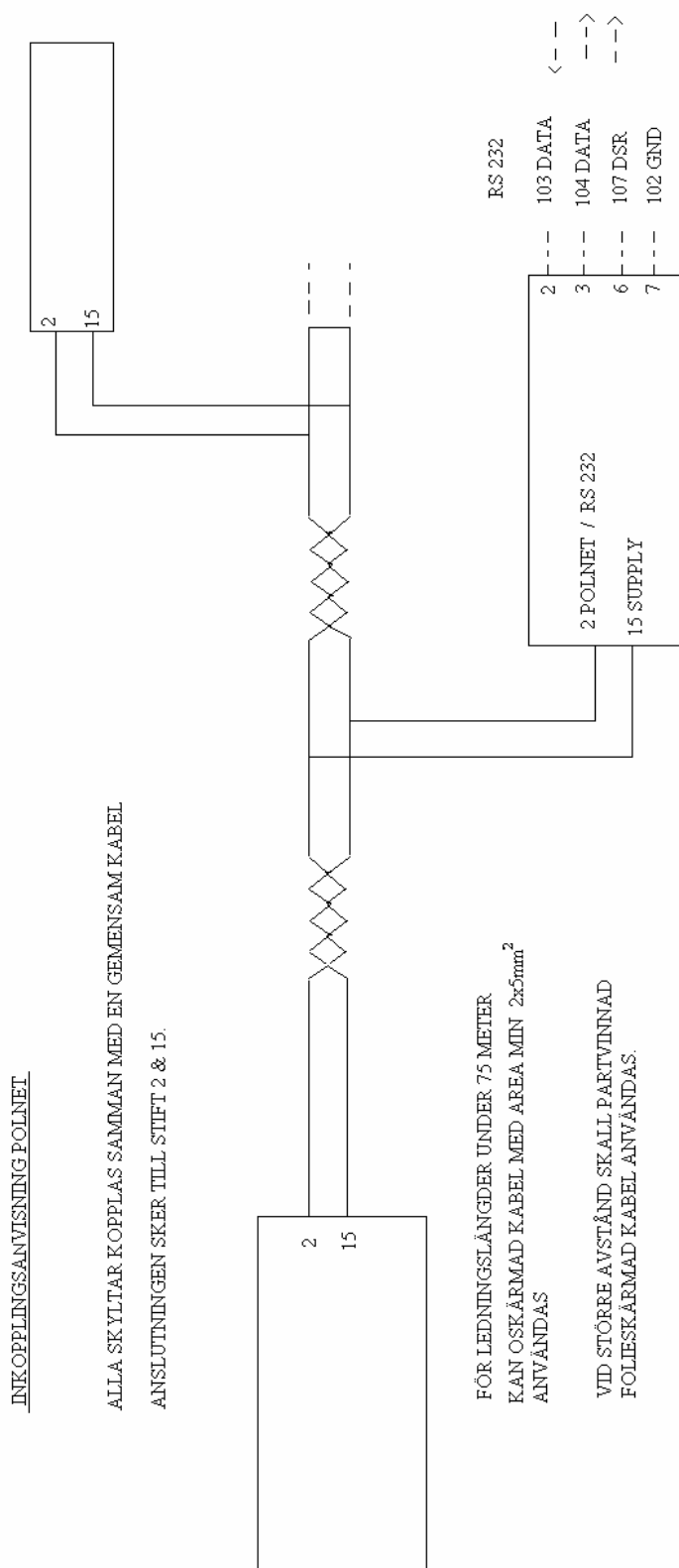
Therefore, avoid storing text in that message number.

Time-control can be used on one or all units within the system.

6.1.1.1 Error messages that can appear

| | |
|----------------|---|
| NET BUSY! | The network is busy with transmitting from other sign or voltage is missing in the system. |
| TIME OUT! | Chosen sign is not answering. Check the connections. |
| LINE ERROR! | Disturbances on the communication line, try again. |
| MEMORY FULL! | Memory full. Transmit a short message to the sign, this way memory space is created. There after, send the correct message. |
| NETWORK ERROR! | General fault is reported from a sign with address, e.g. An empty message has been sent to the sign. |

6.1.2 Wiring Polnet



7 New commands

The following commands have been added.

STOP CONTROL/S Freezes the text on the sign. Wide, normal font, FLASH or Temp is allowed.

COPY CONTROL/I Paste texts from a different text number to the position were you are.

Ex: CONTROL/I (TEXT NR.) CONTROL/I

MEMORY SCAN Possibility to scan the memory. Chose command MESSAGE and press;

→ One number up
← One number down
⇨ 10 numbers up
⇩ 10 numbers down

This shows the beginning of every stored text. It is possible to press START or STOP directly when a text is showed.