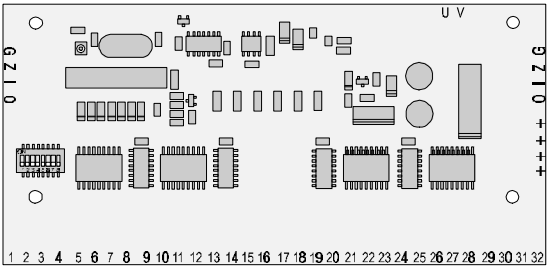
+ LW130 is the interface between tower cab LW100 and displays on your control panel.

+It only works in connection with tower cab LW100

LW130
Output Board for LW100

Art. Nr. 25130
Revised, 12 00

Digital plus by Lenz ™



What is the function of LW130:

The basic purpose of LW130 is to display feedback information. For Example, this can be the position of turnouts, or the display of occupied track blocks.

Prerequisites for displaying feedback information

With LW130 you can display feedback information that comes from feedback capable accessory decoders LS100 or feedback encoder LR100.
If you want to make the position of a turnout (or signal) visible on your control panel, then the drive of that turnout (or signal) must be connected to a LS100. The respective feedback inputs and also the feedback bus (R,S) must be connected as well.
The positions of a device connected to the non-feedback capable LS110 can not be displayed.
Occupancy status can be made visible when you use track occupancy detector LB100 in connection with feedback encoder LR100.

Installation

LW130 has 5 holes for mounting using the enclosed screws. Use the plastic tubes as spacers. Be careful not to damage or bend any components on the module when tightening it down. If you use screws other than those included, please make sure not to exceed the maximum diameter of 3 mm (1/8”). The screw heads must also not touch traces or components on the circuit board.

Connecting to LW100

The terminal row labeled “GZIO” is to be connected with the corresponding terminals on LW100. The **“GZIO”** terminals are present twice on LW130. It does not matter which one you use for connecting to LW100. The other terminal set can then have additional LW130 or LW120 modules connected to it. The order of connection is hereby arbitrary.

Connecting the supply power

LW130 needs a separate power supply of 10-16V AC or DC such as the TR16. This power supply is connected to terminals UV.
Operation with too high voltage will damage LW130! Damage from operation with too high voltage is not covered by the warranty!
You can connect LW100, LW120 and LW130 together to the same transformer, as long as the capacity of that transformer is large enough. The supplying transformer must be able to deliver the sum total of all the connected devices.

Maximum current of the outputs

A maximum current of 50mA may flow at each output of LW130. Ensure that the sum of the current draw of all lights connected to one output is not greater than 50mA.
In an overload from too high current draw, LW130 will be damaged! Damages from overloads are not covered by the warranty!
Light bulbs generally have a current draw of 50mA, so that only one light bulb may be connected per output.
Therefore if you want to use several lights per output (for instance to display track occupancy), then preferably use LEDs with as small of a current draw as possible.

Calculating the current draw of LW130

The current draw of LW130 is determined by the number and type of connected lights. You can use light bulbs or LEDs, and, if you like, in any combination. Simply add up the current draw of all the individual lights. You then get the total current need for the displays. To that is added the no-load current draw of LW130. That is *TBD* mA.
The total current draw determined in this manner must be available from the transformer that supplies your LW130.
Example:
Your LW130 has 6 light bulbs each drawing 50mA and 22 LEDs drawing 5mA each connected to it. All together that makes for a current draw of 410mA. Thus the transformer used to supply power must be able to provide (at least) this current. If you also want to supply additional LW130s with the same transformer, then simply add together the current draws for each LW130 to get the total current the transformer must deliver.

Organization of the feedback information

The DIGITAL plus system at the moment manages 1024 feedback information positions (FP).
For turnout feedback from one turnout, 2 feedback positions are needed; for a track occupancy, one feedback position:

Turnout with address	uses feedback positions
1	1 and 2
2	3 and 4
3	5 and 6
4	7 and 8

An accessory decoder LS100/110 that is programmed for addresses 1 to 4, thus occupies feedback positions 1 to 8. This is independent of whether it is a feedback capable accessory decoder or not!!
The feedback encoder with address 1 also occupies feedback positions 1 to 8. Therefore never use feedback encoder address 1 at the same time as turnout addresses 1 to 4! For more on this, please also refer to the table in the manual for LR100.
Only the lower half of the feedback positions are shared by accessory decoders and feedback encoders. Feedback positions from 513 and up are used exclusively by feedback encoders LR100.

Setting the group address

A LW130 can display information for 32 sequential feedback positions. For the LW130 to know which group it is to show, it needs its own group address. This group address must be set on the DIP-switch. To set this, switches 1 to 5 are used.
Set the address using table 1. A “1” in the column “Switch number”, means that the switch is “ON”, a “0” means that the switch is “OFF”.
Column FP shows you the range of displayed feedback positions, column “FA” corresponding feedback encoder addresses, column “TA” corresponding turnout addresses. Switches 6 to 8 on the DIP-switch are reserved for future use, and must all be set in position “OFF”!

1	2	3	4	5	FP	FA	TA	1	2	3	4	5	FP	FA
0	0	0	0	0	1-32	1-4	1-16	0	0	0	0	1	513-544	65-68
1	0	0	0	0	33-64	7-8	17-32	1	0	0	0	1	545-576	69-72
0	1	0	0	0	65-96	9-12	33-48	0	1	0	0	1	577-608	73-76
1	1	0	0	0	97-128	13-16	49-64	1	1	0	0	1	609-640	77-80
0	0	1	0	0	129-160	17-20	65-80	0	0	1	0	1	641-672	81-84
1	0	1	0	0	161-192	21-24	81-96	1	0	1	0	1	673-704	85-88
0	1	1	0	0	193-224	27-28	97-112	0	1	1	0	1	705-736	89-92
1	1	1	0	0	225-256	29-32	113-128	1	1	1	0	1	737-768	93-96
0	0	0	1	0	257-288	33-36	129-144	0	0	0	1	1	769-800	97-100
1	0	0	1	0	289-320	37-40	145-160	1	0	0	1	1	801-832	101-104
0	1	0	1	0	321-352	41-44	161-176	0	1	0	1	1	833-864	105-108
1	1	0	1	0	353-384	45-48	177-192	1	1	0	1	1	865-896	109-112
0	0	1	1	0	385-416	49-52	193-208	0	0	1	1	1	896-928	113-116
1	0	1	1	0	417-448	53-56	209-224	1	0	1	1	1	928-960	117-120
0	1	1	1	0	449-480	57-60	225-240	0	1	1	1	1	960-992	121-124
1	1	1	1	0	481-512	61-64	241-256	1	1	1	1	1	993-1024	125-128

Table 1: Setting the group address and division of address ranges

Example 1:

You want to show the position of turnouts 33 to 48 with the display module. To do that, set the DIP-switch as follows:

1	2	3	4	5	FP	FA	TA
0	1	0	0	0	65-96	9-12	33-48

Outputs 1 and 2 now display the position of turnout 33. Output 1 becomes active when the “+” terminal of the corresponding output on the accessory decoder was activated. Output 2 becomes active when the “-” terminal of the corresponding output on the accessory decoder was activated.

Outputs 3 and 4 now show the position of turnout 34, and so on to turnout 48, whose position is displayed by outputs 31 and 32.
Example 2:
You want to display track occupancy status with your LW130. The occupancy detectors have been connected to a feedback encoder LR100 for this purpose and it has address 65.

The correct setting of the DIP-switch according to table 1 is:

1	2	3	4	5	FP	FA
0	0	0	0	1	513-544	65-68

You get the following displays:

LW130 output used to show the status	Input on LR100 at address
1	1 / 65
2	2 / 65
3	3 / 65
4	4 / 65
5	5 / 65
6	6 / 65
7	7 / 65
8	8 / 65

You can use the same LW130 both for displaying turnout positions and for displaying information from feedback encoders, as long as you split up the addresses of accessory decoders and feedback encoders correctly.
For this the following example:

Setting on LW130:

1	2	3	4	5	FP	FA	TA
0	1	0	0	0	65-96	9-12	33-48

From column FA you see that feedback positions 65 to 96 can be displayed by this LW130. As an example, the following division is possible:
On outputs 1 to 16 the positions of turnouts that are connected to 2 LS100 with turnout addresses 33 to 36 (first LS100) and 37 to 40 (second LS100) are displayed and on outputs 17 to 32 you see

the status of occupancy detectors that are connected to a feedback encoder with addresses 11 and 12: Output 17 shows the status at input 1 of address 11, output 32 the status at input 8 of address 12 of the LR100.

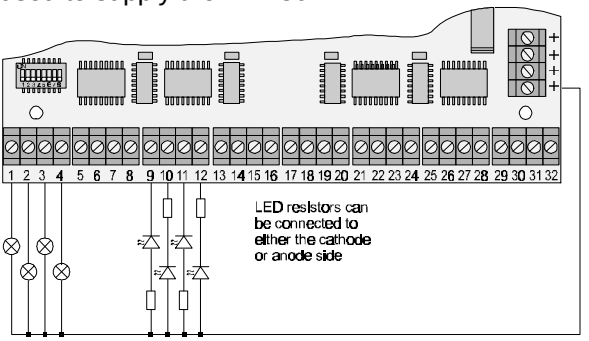
Connecting displays

After the complicated previous chapter now follows the wiring of displays.
Here there are two different options, depending on whether light bulbs or LED's are used. You may connect both light bulbs and LED's to the same LW130.

Version 1, light bulbs:

This is the simplest form of connecting displays. Just connect one lead of the light bulb with the desired output, and the other lead with the "++++" terminals. These 4 terminals are all wired in parallel.

Please note that the maximum current draw allowed is 50mA. The voltage of the light bulbs used must be the same as the voltage used to supply the LW130.



Connecting lightbulbs and LED's

Version 2, LED:

Here you need a current limiting resistor for each LED in addition to the LED, and you must know where the cathode and where the anode of the LED are to be connected.
The common connection for all lights is the "++++" terminal. It is "positive polarity". Outputs 1 to 32 are "negative polarity".

From this follows that a LED must be connected with its cathode to the output (1 to 32) and with its anode to the "++++" terminal. It makes no difference if you install the necessary current limiting resistor on the cathode or anode side; just remember that each LED needs its own resistor.

The following table is a guide for determining the value of the resistor. The values listed apply when using a voltage supply of 16V.

LED current	Resistor
3 mA	5.6 kOhm
5 mA	3.3 kOhm
10 mA	1.5 kOhm

Components for display control panels

If you use ready-made components to build your display control oanel, you must make note of this:
The lights in the components (lightbulbs or LEDs) must not exceed the allowed maximum current of 50mA per output!
If the components have LEDs installed in them, you need to ensure that the required resistors are present as well. If they are not, you must connect them in addition.
Ready-made components often have 2 LEDs connected together. In this case these LEDs must be joined at their anodes, and each LED needs to have its own resistor, or it must be possible to add one afterwards!

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This equipment complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE Please save this manual for future reference!