Helvest® Flex UPW400 user manual

1. PRODUCT PRESENTATION

1.1 Turnouts module UPW400

Fig. 1

The UPW400 card operates up to 4 turnouts (or other model actuators) with polarity reversal, i.e. it drives motors for turnouts in which the selection of the two positions is made by reversing the "+" and "-" sign on the two wires that power the motor (see fig. 1).

For example, the "Conrad" motors, the "Tortoise®" motors and the slow motors of Fulgurex® work with this technology.

This is a layout module for the HP100 motherboard. It must be inserted in the appropriate "layout" connectors of the HP100 board and is automatically identified by it.

To insert the module, turn off the HP100 power supply, make sure the connectors are aligned and press lightly until the module is fully inserted into the slot.

1.2 Electrical connections

Fig. 2

All of the following operations must be carried out with the power supply switched off.

The module automatically supplies a 12 V DC voltage, suitable to drive most of the turnout actuators available on the market.

The main power comes from the HP100 motherboard. With some simple modifications the module can be adapted for separate power supply (see section 4 of this manual).
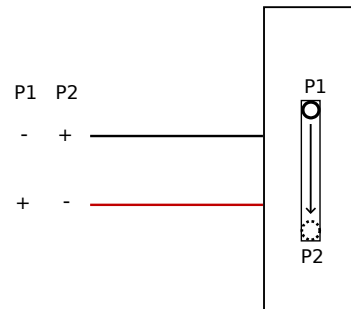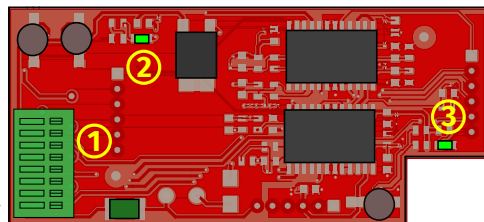
The accessories are controlled through the terminal block 1 (see fig. 2). The wires of a single turnout must be inserted into the two outputs A and B. (example, 1A and 1B, or 2A and 2B). To insert the wire, strip it (about 5 mm), press the terminal block button with a small screwdriver and thread the wire into the corresponding hole (fig.3).

Check the instructions of your motor/drive for the wires or contacts needed to power it.

- If the actuator has two contacts/wires, simply insert each of them into one of the two A/B connections of the terminal block (fig. 4).

- If the actuator has three contacts/wires (often with two opposing diodes, as in fig 5), insert the common wire into one of the two inputs (the red one in the figure) and the two wires with the diodes, together, in the same contact. It is possible to leave the diodes in position or eliminate them by directly connecting the two corresponding cables together, the operation is not altered in any way.
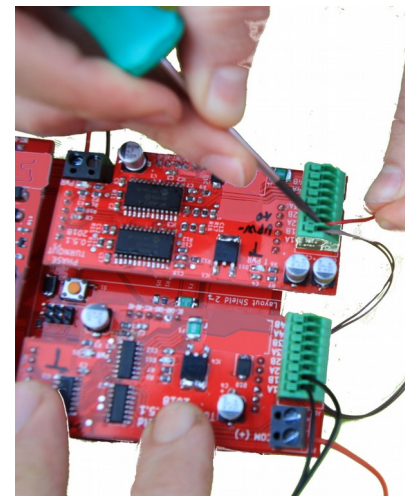
Fig. 3 **Fig. 4** **Fig.5**

1.3 Mounting the PCB on the layout

The complete board must be mounted in such a way that it DOES NOT touch anything during operation. In particular, it must not come into contact with any metallic or flammable material.

For temporary installations, it can be placed on a non-flammable insulating surface (plastic, glass, ceramic floor, etc...).

For fixed layouts, mount it on the structure by screwing the HP-100 onto a wooden surface with the screws and spacers provided. (figure). This operation must be done before inserting the GAW400 module (if additional cards have already been inserted, they can be removed gently without any problems).

2. MODULE OPERATION

2.1 Normal operation

Once all connections have been made, power up the circuit board. Green LEDs 2 and 3 indicate that the power supply is correct.

The operation modes, switching time etc. are adjustable but they depend on the installed "net" module, so check the instructions of your "net" module.

2.2 Setting the switching time

The switching time must be sufficient for the motor to complete the movement, but it must not be too long not to force the motor itself. Most drives have a limit contact, i.e. they automatically cut off the power supply when the movement is complete.

Carry out some tests to ensure that the movement is complete, if it is not, lengthen the switching times as explained in the instructions on the "net" module.

2.3 Current absorption and protection

The module supports actuators designed for digital operation. Older motors or motors designed for other uses can absorb higher currents and therefore the board does not drive them.

In any case, the module is equipped with protections against excessive current consumption; if you use a motor that requires too much current, the module does not

get damaged but removes or reduces the power supply. After the interruption, the module restores its normal functionality in a few seconds.

2.4 Drive Movement Sequence

The module executes the individual commands in real time, i.e. as soon as they are received. If several commands are sent simultaneously or in rapid succession to the same module, they are executed in sequence (i.e. it drives one motor at a time in the order in which it received the commands). Therefore, take into account that the total switching time of all the motors, if activated in sequence, can be of a few seconds.

On the one hand, this measure increases realism (in the real world, the switches are not operated at the same time) and, on the other hand, it avoids unbalances in the current absorption of the accessories, preventing the electrical system of the layout from being overloaded.

3 . TROUBLESHOOTING

To troubleshoot power/wiring issues, etc., please see troubleshooting of HP100 motherboard.

Problem	Possible causes and solutions
The module is plugged in but not responding, and the power LEDs remain off.	If the HP100 board is powered (green LED on the HP100), the module is inserted incorrectly. Check for correct insertion. The module is in contact with metal parts.
Module is plugged in, power LEDs are lit, but one or more motors do not move	Check the correct connection of the motors and the insertion of the wires in in the connectors. There are problems with the address assigned to the board. See troubleshooting the NET card. The motor is not working properly. If necessary, try removing the contacts and testing it with a separate power supply (battery, modeling AC transformer, etc.). NEVER try the motor with an external power supply while this is connected to the decoder!
The motor works but does not	Check for mechanical obstructions on the turnout

reach the end of its range	blades or moving apparatus in general. Increase the switching time (see "net" tab).

4 . ADVANCED USE (for experienced users)

4.1 External drive power supply

If you prefer to provide a separate power supply instead of the signal from the motherboard (rectified DCC or other HP100 power supply), you can make the power supply input indipendent.

The power supply must be direct current, with a voltage between 12V and 16V and capable of providing sufficient current to drive the motors. In any case, the voltage will be lowered to 12V by the voltage regulator of the board.

The operation implies an irreversible modification of the card, which will invalidate the warranty.

To make the modification, it is necessary:
- cut the pin of connector P1, and that of connector P4 shown by the yellow arrows in the figure.
- Solder a S2A diode in the footprint D10, as shown in the figure.
- Solder a 2-pole terminal clamp with a 5 mm pitch on the pad J4, corresponding to the writing DC IN (blue arrow in the figure).
- Connect the external power supply to this terminal respecting the polarity.

With separate power supply working, LED no. 4 (PWR) indicates the presence of the logic power supply coming from the motherboard, and LED no. 5 (T PWR) indicates the presence of the accessories power supply.

This hacking is valid in special cases where you want to power the HP100 motherboard separately. If you want a separate power supply on an accessory decoder, with any protocol, it is preferable to make the change on the NET module.
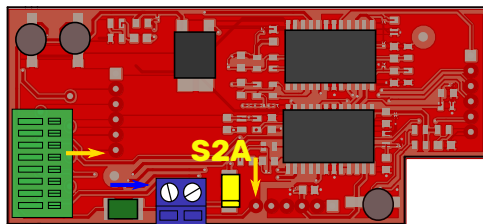
WARNING:
- *this modification will invalidate the warranty and completely relieves the manufacturer of any liability for any malfunction of the accessories or the power supply.*
- *The incorrect or incomplete execution of the modification may cause damage or compromise definitively the module, the digital control unit or the connected accessories.*

5. TECHNICAL SPECIFICATIONS

Board Type:	Power module for polarity inverting accessories, for HP100 motherboard
Power supply:	supplied by the motherboard. Optional external power supply, regulated to 12V.
Signalling LED:	presence of voltage, presence of accessory power supply.
Voltage supplied:	12V DC
Max. rated current:	500 mA for every actuator
Firmware HP100	>1.2