

Operating instructions for the PICtroller

Note the PICtroller is not suitable for use with some DCC fitted locomotives.

1. Description

The PICtroller is suitable for operating with any type of motor, including coreless motors such as the Portescap range. The PICtroller automatically senses the motor type and adjusts the operating parameters to suit cored or coreless motors. To do this the PICtroller generates a short pulse as the locomotive starts which also serves to overcome the initial resistance to movement and start the locomotive more easily.

Three driving modes are provided on the PICtroller – Direct, Inertia & Brake and Coast & Brake. Braking rate, acceleration rate, creep speed (see below for an explanation of creep mode) and maximum speed can be preset.

Optional external inputs are provided to allow for various forms of automatic or semi-automatic operation, including initiation of braking action and forced reduction to creep speed. An external voltage can also be used to control the PICtroller in any of the three driving modes.



2. Front panel controls

The main controls are: Regulator, Brake switch, Reversing switch, Mode switch and Int/Ext switch. Preset potentiometers (screwdriver operated through the front panel) are provided for: Brake rate, Acceleration rate, Creep speed and Max speed limit. LEDs indicate: Output on (Green), Overload (Red), Load drawing current (Yellow), Creep (Yellow) and Ext brake (Red).

3. Connecting the PICtroller

For basic operation connect a 14-18V AC or 20-24V DC supply (capable of supplying at least 1.5A) to the AC terminals and connect the track output to the track.

4. Operation

In all modes of operation the brake switch can be used to stop the train. To allow the train to run this switch must be in the Off position. Switching to the Brake 1 position causes the train to reduce speed and stop at a rate determined by the Brake rate preset. Switching to Brake 2 reduces the speed at a higher rate and switching to Emergency Stop brings the train to a stop quickly. The Brake control overrides the regulator setting, so the train will be brought to a halt regardless of the setting of the Regulator

The reversing switch controls the direction of movement of the train.

With the Brake off turning the Regulator control up starts the train. A brief Start pulse is generated to determine the type of motor. At this point the Output LED flashes briefly. If the motor is a cored one the Overload LED also flashes if the motor is coreless the Ext Brk LED flashes briefly.

Depending on the mode the train will then start to move according to the setting of the Regulator, as follows:

- In Direct mode the Regulator controls the speed directly with a slight delay.
- In Inertia & Brake mode the Regulator controls the speed but with inertia, so that the train accelerates and decelerates at a pre-determined rate set by the Acceleration rate preset control.
- In Coast & Brake mode, opening the Regulator control causes the speed to increase at a rate determined by the Regulator setting. When the Regulator is set to zero, the speed is maintained.

The Maximum speed preset adjusts the range of the Regulator to give finer control over speed (acceleration in Coast & Brake mode).

5. Safety features

To prevent trains starting prematurely when switching on, the PICtroller is held off, after powering up until either the brake is applied or the regulator is at zero.

If an overload is detected the PICtroller switches off the output and generates short test pulses until the overload is cleared. If the overload is cleared quickly, eg an intermittent short, the PICtroller resumes at the previous setting. If the overload was sustained the PICtroller resets to zero output and then reverts to normal operation. The overload setting is lower for coreless motors to provide better protection of the motor.

If the PICtroller detects that the output is open circuit, eg if the loco has stopped on dirty track, the PICtroller limits the output to prevent the loco surging forward when the connection is restored. If the open circuit is cleared quickly the PICtroller resumes control normally, if the open circuit is sustained, the PICtroller resets to zero output and then resumes normal operation.

As a further safety feature, if an open circuit or short circuit condition persists for more than one minute, the PICtroller shuts down and turns the output off. To restart the brake must be applied or the regulator returned to zero.

6. External inputs

The PICtroller has a number of external inputs that override the actions of the manual controls on the front panel. These can be used to provide automatic control functions or can be used with the hand-held controller (available separately) for walkabout operation.

One external analogue input and four external logic inputs are provided: brake 1, brake 2, release brake and creep. Switching to external mode drives the regulator input in any of the driving modes from the external analogue input (a voltage in the range 0-5V). The external logic inputs are active low, ie they must be held down to 0V to activate the function. The brake and release brake inputs only need momentary signals, the creep input must be held low.

The brake 1 and brake 2 external inputs trigger braking as if the brake control had been set to the brake 1 or brake 2 position respectively (both together trigger an emergency brake). This could be used to force braking action at a stop signal showing danger, station platform or at the end of a siding. These inputs could be driven from a reed switch or hall effect device (operated by a magnet on the train). Once set, the brakes can be released manually by setting the brake control to one of the brake positions and then returning to off or by driving the external release brake input low.

The creep input forces the controller to reduce speed to the pre-determined rate set by the creep preset control. Creep speed is maintained as long as the creep input is low. When the creep input returns to the high (or open circuit) state the speed is controlled by the manual controls according to the driving mode. Note this means that if the driving mode is coast and brake and the regulator is closed, then the creep speed will be maintained until the regulator is opened or the brake is applied. Creep could be used to reduce speed on the approach to a station or when passing a distant signal at danger.

7. External connections

Track - connect these terminals to the track.

AC - connect a 14-18V AC or 20-24V DC supply capable of delivering at least 1.5A to these terminals

0V - common rail for all external signals.

5V - supply for external logic and controls

Creep

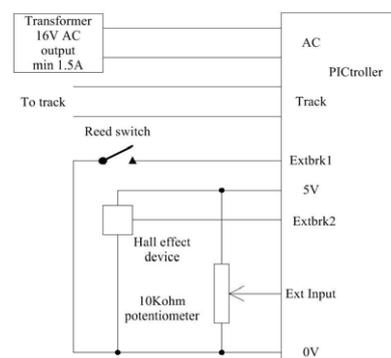
External Brake 1

External Brake 2

External Release brake

Ext - external speed control input a 0-5V DC signal connected to this terminal will control the PICtroller when the Int/Ext switch is set to the Ext position.

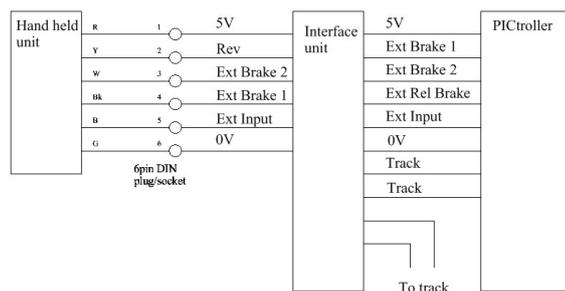
The diagram shows how to connect the PICtroller. Inputs to the logic inputs can be driven from a reed switch or a hall effect device (such as the SS443A - available separately as an assembled unit) connected as shown. The inputs could also be driven from standard CMOS logic chips operating on a 5V supply.



8. Handheld add-on unit



A separate handheld control unit is available for use with the PICtroller. This unit has a regulator, brake and reversing switch and is connected as shown. The interface unit may be connected to a number of 6 pin DIN (or equivalent) connectors wired in parallel so that the hand held unit may be plugged into various locations around the layout.



The PICtroller is guaranteed against faults in manufacture for 1 year from purchase.