Cobalt iP Digital turnover motor.

IP stands for “Intelligent power.”

The DCCConcepts Cobalt iP Digital turnover motor includes a clever internal electronic control system that adapts itself to a wide range of power supply voltages and will only draw power as needed. Cobalt iP Digital is usable with all scales, from the tiny “T” scale to Z, N, TT, HO, OO, EM, P4, S, O & G.

Cobalt iP Digital has two versatile in-built SPDT switches - Switch 1 is linked to the drive power inputs for control of frog power. Switch 2 is fully independent with high (5A) power handling for any other switching needs you have.

Cobalt iP Digital can be powered by any voltage between 9 and 23v DCC or DC and can be changed by DCC accessory decoder commands from a DCC system or computer, momentary switches or by interaction with other devices.

Interactive power management ensures that your Cobalt iP Digital is very comfortable with larger scales with higher accessory voltage power supplies or when used with DCC control systems with higher output / track voltages.

Please read all of this manual before you wire or install Cobalt iP Digital.

Cobalt iP Digital comes with its throw-bar pre-centred & has a built-in software structure for automatic centering that makes installation easy. (This process uses address 198 and 199 for activation/deactivation).

**Installing Cobalt iP Digital**

First, assemble your Cobalt iP Digital turnout motor: The throw arm is already pre-centred to make this easy for you.

1. Insert the fulcrum bar into the slides (The horizontal part of the bracket with the holes can be either at the top or bottom. We usually have it at the bottom).
2. Now add the throw wire, passing it upwards through the centre hole of the fulcrum bar and then inserting the bent end of the wire into the smaller top hole on the end of the throw arm. Secure it in place with the washer head screw provided.
3. Add the pre-cut self-adhesive foam pad to the top of the motor.

Now we are ready for the installation.

As well as the self adhesive foam pad, we include the required mounting screws with every Cobalt iP analog turnout motor so all you will need are basic tools.

You will need a screwdriver and drill, plus both a 1.5mm (for pilot holes) and a 10mm drill for the throw-wire installation. (The exact drill size used is not critical so a close sized drill is OK). If the baseboard is over 20mm thick, increase drill size.

1. Mark the position of the hole in the turnout tie-bar with the turnout blades held at their mid-way position. This hole may be at the centre or end of the tie-bar.
2. Make a pilot hole at that mark, then drill right through the baseboard using the larger drill bit. Be sure to keep the drill vertical. (It is also good practice to use a countersink bit to clean up the hole top and bottom a little after drilling)
3. (Remove the top layer from the self adhesive pad & from below the baseboard, insert the throw wire into the Tie-bar hole. When sure that your Cobalt iP analog is positioned correctly, return the switch to the Run position. (This process uses address 197 for activation or deactivation)

To swap over the direction of throw:

1. Put the switch into the “Set” position then set your Cobalt address to 199 (Then use the same procedure as for activation)

Cobalt iP Digital has a convenient “Swap direction” command that will change over “normal / reverse” commands to synchronise with software. (This process uses address 197 for activation or deactivation)

**Setting the Address of your Cobalt iP Digital:**

After following the instructions to deactivate “Automatic Centering” cycle power (disconnect/reconnect) then set your chosen address.

Put the switch into the “Set” position * Set your chosen address between 1 and 200 (but not using 197/198/199 of course). To do this use your DCC system instructions for changing an accessory or a turnout * Repeat twice to be sure * Now return the switch to the Run position * Cobalt iP Digital now automatically self-centre every time power is connected.

De-activate self-Centering once installation is done: Put the switch into the “Set” position * Set address to 198 (Then use the same procedure as for activation)

**Control:**

Cobalt iP Digital has a simple learn/Run switch at the left hand side of the terminal PCB. Connect to DCC track bus and set to Learn mode. Act as if already changing at the address you wish it to be. Return switch to run mode.

**Power:**

9-23v DCC or DC. static <5mA, active average <40mA

**Connection:**

9-way spring terminals. Wire diameter up to 32x.2 or 16g, ideal .16x.2 or 26g. Minimum 7x.2 or 24g

**Dimensions:**

Body only: 28mm x 38mm x 52mm deep
Top overall inc Fulcrum and tabs: 40mm x 45mm
Depth inc soldering-free connectors: 68mm

**Power:**

9-23v DCC or DC. static <5mA, active average <40mA

**Connection:**

9-way spring terminals. Wire diameter up to 32x.2 or 16g, ideal .16x.2 or 26g. Minimum 7x.2 or 24g

**Control:**

Change turnout via DCC or with momentary switches.

DCCConcepts offer an economical switch pack for Cobalt Digital and our ADfx decoders (DCP-CMS-D) which includes 6 switches and a wide chrome-mounted LED selection.

**Addressing:**

Cobalt iP Digital has a simple learn/Run switch at the left hand side of the terminal PCB. Connect to DCC track bus and set to Learn mode. Act as if already changing at the address you wish it to be. Return switch to run mode.
Wiring your Cobalt iP Digital turnout motor

Important: Cobalt iP Digital has a different range of connections to original digital, Classic Ω or iP analog.

There are 9 spring terminals on the motor. These terminals will accept a wide range of wire sizes. Use the heaviest convenient wire size. The wire should be stripped carefully exposing about 10mm of bare wire. The best method is to “ring-strip” the insulation and then twist it as it is removed. This ensures that there are no free copper strands.

Note: The wire will always be more secure if it is NOT tinned.

This drawing shows the label that is applied to each Cobalt iP digital turnout motor. Please read it carefully before connecting.

Please note: Wiring info is also printed under the connector PCB.

Basic wiring diagram for analog control of Cobalt iP Digital using a DC power source

Regulated DC (12v DC Recommended)

It may seem strange showing use of DC connection for a Digital motor, but because Cobalt iP Digital works just as well on DC, it is also able to offer you a very simple way to wire & install a DC layout that has live frog turnouts.

Basic wiring diagram for DIGITAL control of Cobalt iP Digital and adding Panel LEDs

Even when LEDs or Pushbutton switches have been added you will still have one SPDT switch free and available for signals, interlocking or any other purpose that you choose.

Some ideas for interlocking Cobalt iP Digital and triggering turnout change using simple methods

Connection for Digital + Analog control is very simple with Cobalt iP Digital. Adding LEDs & Frog power are quite simple too, as the Frog and the LEDs can both share the same switch.

With built-in onboard switching, interlocking and similar things are easy. Adding LEDs & Frog power are quite simple too, as the Frog and the LEDs can both share the same switch.

In this example:
Cobalt A interlocks the drive power for Cobalt B. Cobalt A must therefore be in the “Left” position or Cobalt B will not work. The red LED we've added will only glow if Cobalt B is locked by Cobalt A.

The Red & Green wires are shown with switches, but Cobalt can just as easily be controlled by a hall trigger, a reed switch, as detector or other device.

Once the ability to “share” switches for more than one purpose is understood, almost anything becomes possible when you use Cobalt iP Digital to control your turnouts!