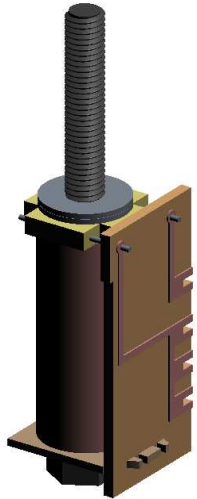


THE DINGHAM ELECTROMAGNET MK2

12V DC. For remote uncoupling of
DINGHAM Autocouplers



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INSTRUCTIONS

DINGHAM electromagnets are produced by modifying industrial quality solenoids. The modification consists of making provision for an extended pole piece (an M5 x 55mm hex-head bolt), long enough to reach through the baseboard to the level of the sleeper tops of proprietary track.

The **DINGHAM** electromagnets have approximately twice the resistance of other electromagnets offered by the model railway trade and they take half the current (slightly more than 1A when connected to the recommended 12V DC supply). This means they are less likely to burn out under heavy use and cause less arcing between the switch contacts, so the contacts stay cleaner longer.

Parts Supplied (see diagram overleaf)

- (a) Solenoid body with central 5mm diameter hole for pole piece.
- (b) Pole piece (an M5 x 55mm hex-head bolt).
- (c) Three M5 washers.

Electrical Supply – The **DINGHAM** electromagnets should be operated on a nominal 12V DC supply (usually obtained by rectification of 16V AC). Switching **MUST** be via a non-locking push-to-make switch (e.g. All Components Code SMT6 or Maplin Code FH59P) or a non-locking biased-to-off toggle switch (e.g. All Components SPB1 series or Maplin Code FH03D). The electromagnets will **NOT** operate on AC.

Positioning the Magnets on the Layout – The importance of positioning the magnets cannot be over-emphasised. It requires careful thought and experimentation if the most railwaylike (and enjoyable) operation is to be obtained. The positioning of magnets on *Lofthouse*, the Skipton & District Railway Society's 0 Gauge exhibition layout, will be used as an example.

All passenger trains enter *Lofthouse* from the left in the diagram below and are reversed. Magnet 2 is positioned to release the loco from an incoming train of three 4-wheel coaches, perhaps with a tail load (horsebox, etc). The train is stopped with the coupler over Magnet 2 and the

loco is reversed about 3mm, buffering up to the train. Magnet 2 is energised and the loco is released.

Magnet 1 is positioned so that the rear coupler on the rake of three coaches is directly over it when the front coupler is over Magnet 2. Thus, if a tail load is present, the loco can run round, buffer up to the tail load and move it forwards about 3mm to slacken the coupling between the coaches and the tail load. Magnet 1 is then energised to uncouple the trailing load from the coaches and the tail load can be shunted into the yard. The three coaches are not moved during detachment of the loco or the tail load.

Goods trains running left-to-right through *Lofthouse* use the loop road. They stop at *Lofthouse* to have the brake van detached and a banker attached to the rear for the steep climb to the right of *Lofthouse* station. Trains are stopped with the brake van front coupler over Magnet 3. The banking loco, stabled in the short spur next to the home signal (A) then moves forward and pushes the brake van forwards about 3mm to slacken the coupling between the van and the train. Magnet 3 is then energised to uncouple the brake van, which is drawn backwards from the train. The train then moves forwards to clear the turnout leading to the yard and the banker shunts the van into the yard, uncoupling the van as it passes over Magnet 3. The banker is then attached to the rear of the train.

Shunting the yard could be done using

Magnet 3 only, but Magnets 5 and 6 are provided to allow more realistic operation (i.e. wagons do not have to be withdrawn as far as Magnet 3 if this would be unnecessary in reality).

Goods trains running right-to-left through *Lofthouse* use the platform road and are double-headed for braking purposes on the steep bank leading down to *Lofthouse*. In *Lofthouse* station, the pilot engine is detached and the train picks up a brake van from the yard before departing leftwards. The incoming train is stopped just short of the starting signal (B) with the coupler between pilot engine and train engine over Magnet 1. A section break coincides with the position of Magnet 1. The power to the train engine is switched off, the pilot engine reverses about 3mm to slacken the coupling. Magnet 1 is energised and the pilot engine is released and parked in the spur. The train then pulls forwards and reverses onto a brake van in the yard, couples up and departs. Magnet 4, is hardly used and is probably unnecessary.

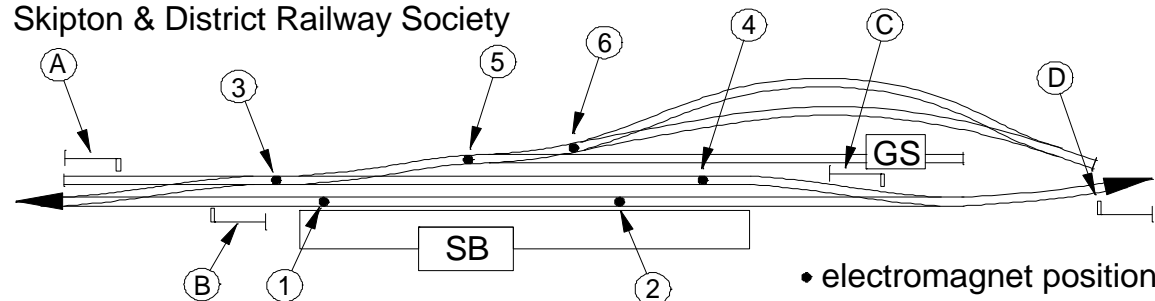
The above illustrates how careful positioning of magnets can play an important role in realistic operation. For example, Magnet 1 must be positioned just over a loco's length in rear of starter signal B, to allow uncoupling of the pilot engine from right-to-left goods trains.

This in turn sets the position of Magnet 2, which must be three 4-wheel coach lengths to the right of Magnet 1 to allow the release of locos from incoming passenger trains and detachment of tail loads without moving the passenger coaches.

Fitting Magnets to the Layout

The magnets are fitted to the layout as shown in diagrams 1 and 2 below. The pole-piece/bolt may be secured in the baseboard either by drilling a 4.5mm hole and self-

Lofthouse-in-Nidderdale Skipton & District Railway Society



• electromagnet position

tapping the M5 bolt into this or by gluing the bolt into a 5mm hole. If tapping the bolt into the baseboard, use a driver fitted with an 8mm hex socket.

Magnetic force falls off very rapidly with increasing distance from the magnet. In fitting magnets to the layout, the aims should be to have (a) the coil of the magnet and (b) the pole piece as close to the coupler as possible. **ON NO ACCOUNT SHOULD THE TOP OF THE POLE-PIECE BE BELOW THE TOPS OF THE SLEEPERS** and if it can be arranged to be a little higher, and disguised, so much the better. Diagrams 1 and 2 show how the magnet should be fitted to the baseboards, depending on their thickness. After deciding the set-up, the pole-piece should be shortened to suit before the magnets are fitted to the layout. Do not be tempted to use a bolt longer than the one supplied. It must not project more than 20mm above the two upper washers.

If recesses have to be made in thick baseboards before scenic work has started, they may be made with a chisel or with a spade-type drill (diagram 3). However, after scenic work has been done then great care must be taken and the only type of drill that can be recommended is a Forstner bit used for drilling recesses in kitchen cabinet doors to take hinges (see diagram 4). These bits produce a flat-bottomed hole 35mm in diameter and are

easily controllable, so may be used with confidence on scenic boards.

Troubleshooting – If the DINGHAM

system of electromagnets and autocouplers appears not to work perfectly, check the following –
 (1) 12V DC is actually reaching the electromagnet, i.e. there is no serious voltage drop between the supply and the magnet. The most likely cause of unacceptable voltage drop is a switch with carbon deposits on the contacts, caused by arcing.

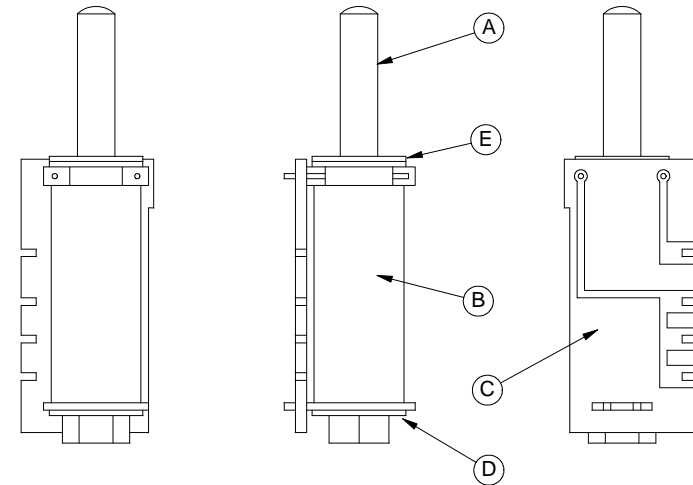
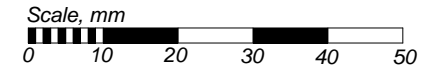
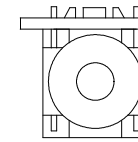
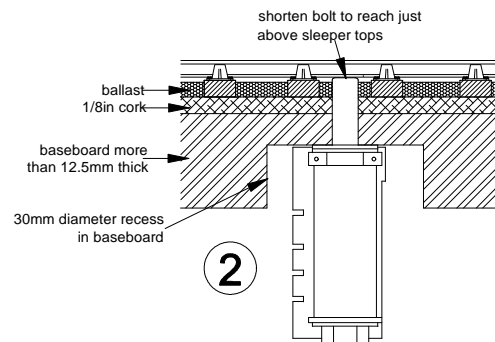
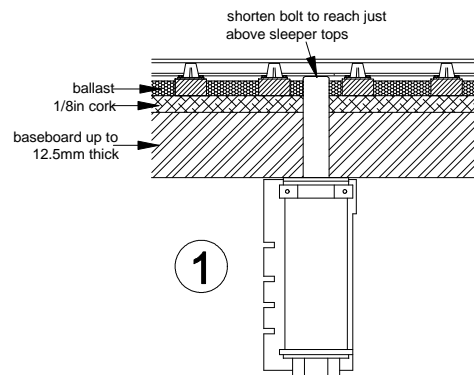
(2) The top of the electromagnet pole piece extension is at least level with the tops of the sleepers.

(3) The droppers on the couplers are not too short (they should barely clear the rail top) and are free to swing longitudinally.

(4) There is no stiffness in the couplers. The loops and latches should fall readily under their own weight.

(5) There are no obstructions such as vacuum pipes preventing the couplers working.

(6) Buffer and coupler lengths are correctly adjusted (see autocoupler instructions) and uncoupling is not prevented by the loop pushing against the back of the slot in the opposing hook (happens on straight track if buffers are too short) or by catching under the tip of the hook (happens on curves if buffers are too long).



- A: Pole piece (M5 x 55 bolt)
- B: Coil
- C: Printed circuit board
- D: One M5 washer
- E: Two M5 washers

