

This issue of the Bulletin is designed to answer many of the questions asked by modellers about ModelTorque's Automatic Torque-control Couplings (ATC's) ... What is the product range?; How to I specify what I need?; What will the device(s) drive?; How do I install an ATC in my loco?; How much do they cost?; How do I order an ATC?; . Motors are also discussed, in answer to many queries as to why use a ModelTorque motor?

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1 Automatic Torque-control Couplings (ATC's)

Format (physical arrangement)

ATC's are available in 2 basic formats:

(1) ATC Assemblies : The coupling(s) are assembled integral with a ModelTorque motor.

They are available now as single-ended assemblies (1 ATC assembled to the motor), or as double-ended assemblies (an ATC assembled to each of the front & rear motor extension shafts.

(2) ATC Modules : The couplings are available as separate items, to be fitted by the modeller to motors of the modeller's choice.

Planned availability is 4th qtr, 2003. They will enable modellers to select their choice of drive motor and will have the ability to fit different motor shaft diameters.

Both ATC formats are available in a range of sizes and torque outputs to suit models of different scales, weights and power (drawbar pull) requirements. They are supplied with stub shaft extensions to connect the ATC output(s) with the model's cardan shaft.

Product Codes.

Each available product combination is defined by an individual Product Code. The selected Product Code is used for Ordering, and each product has its Product Code attached after manufacture.

A Product Code Table for ATC Assemblies is shown in Figure 1, and a brief description of this Table follows ... The appropriate Module Product Codes will be issued with the release of ATC Modules.

Size.

ATC's are available in different physical sizes to suit different scales and different applications.

Size 3 is available now.

This size is designed to fit into and drive 3.5 & 4mm scale [HO/OO] locos. It will also fit [S] & [On_] scales, and drive selected stock in these scales.

Sizes 1 & 2 are smaller units suitable for a range of drives including underfloor DMU's and small scale locos. These sizes will be available late 4th qtr 2003.

Size 4 (for 1/4"/7mm [O]) will be available 1st qtr 2004.

Construction Code.

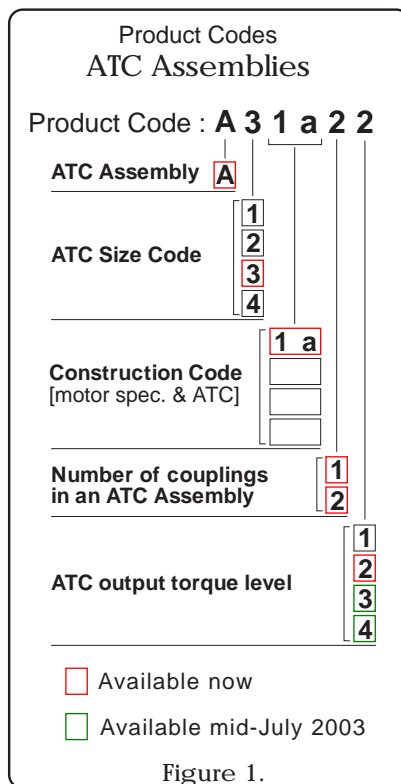
The Construction Codes (CC) define the actual design arrangements of ATC Assemblies and Modules. CC 1a is available now, and comprises a ModelTorque Type 1 flat can motor, supporting integrally-fitted single or dual couplings. The ATC's are constructed to design spec. "a", which provides connection to the cardan shaft by a separately supplied 2mm dia. stub shaft. Figure 2 shows a size 3 ATC Assembly of Construction Code 1a. CC 1a is designed for installation in "open frame" chassis, such as an Athem Part No. 40017. The CC range is being continuously expanded to enable easy ATC Assembly fitting to many of the limited access weighted chassis. More information on Page 2.3 : "ATC Installation".

Number of ATC's in Assembly.

A single set of driving wheels requires a single ATC; 2 sets of driving wheels requires a dual ATC.

ATC output torque level.

Different torque outputs are available in each ATC size. Selection of the best torque level is discussed later in this Bulletin.



ATC Assembly : Product Code A31a22

1 stub shaft fitted, 1 loose.

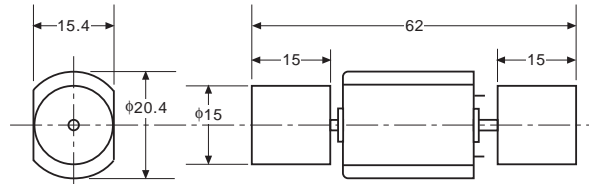


Figure 2.

2 Selecting the right ATC for your 3.5/4mm scale [HO/OO] loco

Effects of weight on model loco performance.

The effective usable power of your loco is usually measured by the draw-bar pull. The right combination of loco weight and drive-motor torque is the main factor generating maximum draw-bar-pull. [This assumes that the drive-shaft to wheel rotation gear ratio remains constant.] Many magazine test results include the drawbar pull in either grams or oz., or lbs for large scale models.

The fitting of an ATC results in at least equal, and in most cases greater, drawbar pull than the original model configuration. One major contributing reason for this is because the ATC is able to generate full output torque at zero speed.

The prototype loco produces its maximum drawbar pull at 5% wheel slip. When operating a model loco with the correctly-sized ATC fitted, maximum drawbar pull (and slip) occurs at about 85% throttle (about 10VDC on the usual 12VDC systems).

HO/OO : Main Line diesels
2 driven wheel sets

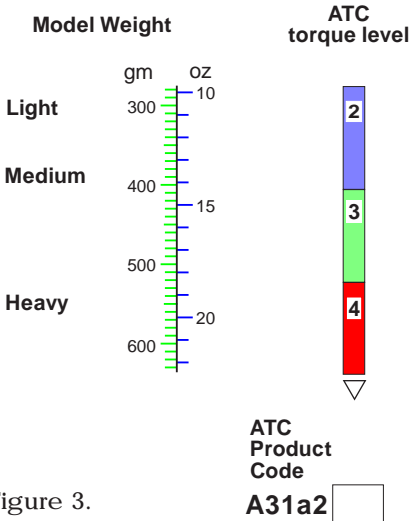


Figure 3.

Torque Level Selection Charts.

ATC's are designed to provide a selection of torque level outputs within each size; 3 or 4 preset torque levels are usually available.

The best ATC torque level selection is determined by the model's weight. This selection may be made by using the tables shown in Figures 3 & 4.

If weighing is inconvenient ... specify Level 2.

HO/OO : Switchers, Shunters, Railcars, RDC's

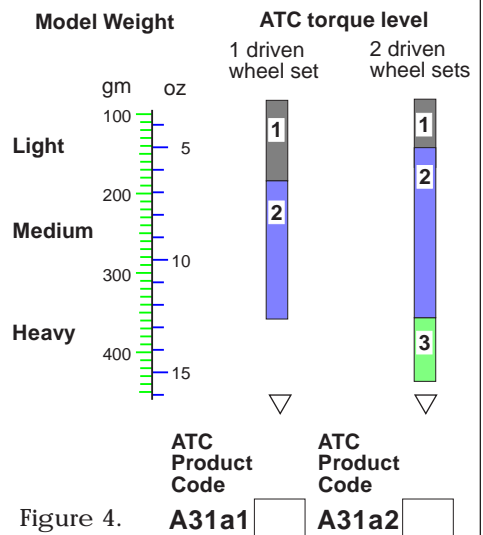


Figure 4.

3 ATC Installation

Preamble.

To make the application of an ATC drive to your loco(s) practical, we believe that the installation must be as close as possible to a “drop-in” replacement for the existing Manufacturers’ motor/flywheel assembly. To achieve this aim we are introducing “Quik-Fit-Kits” tailored to specific Manufacturers’ chassis.

To classify differing chassis constructions, we have divided loco chassis types into 2 broad groups : (i) “Open Frame” (“OF”), and (ii) “Closed Frame” (“CF”). “OF” chassis are typified by the Athern HO chassis 40017, and the Bachmann OO (British outline) chassis 400-001, that provide plenty of space to fit an ATC Assembly.

“CF” chassis are typified by Life Like “Proto 2000” HO chassis and Bachmann HO (US outline) chassis H11602. Chassis that typify “OF” & “CF” constructions are shown in Figure 5.

Kits for “OF” Athern and Bachmann chassis to suit ATC Assembly Construction Code 1a are available now. These kits are detailed below.

We are presently developing Kits for Bachmann chassis H11602 and “Proto 2000” chassis, which will also include the release of an additional Construction Code.

Details of each new “Quik-Fit-Kit” will be provided to the railroad modelling ‘Community’ as soon as it becomes available.

We would be pleased to liaise with Modellers who may wish to work with us on the development of new Kits for specific chassis.

“Quik-Fit-Kits”

“Quik-Fit-Kits” (QFK’s) are now available for Athern chassis Part No. 40017 and Bachmann (British outline) chassis Part No. 400-001.

QFK’s are specified and ordered by Product Code. Product Codes for currently available QFK’s are shown in Figure 6.

A table (Figure 7) provides details of the QFK inclusions, exclusions and the ATC size & Construction Code appropriate to the kit.

“Quik-Fit-Kits” ... Specifications.

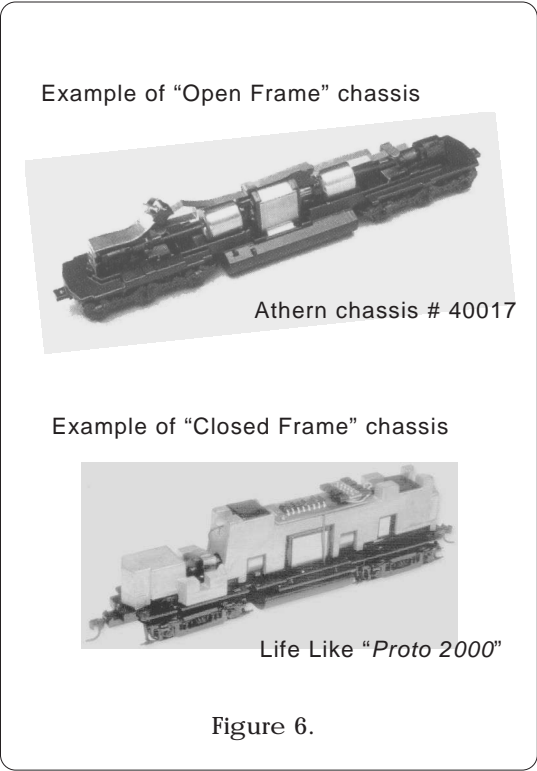


Figure 6.

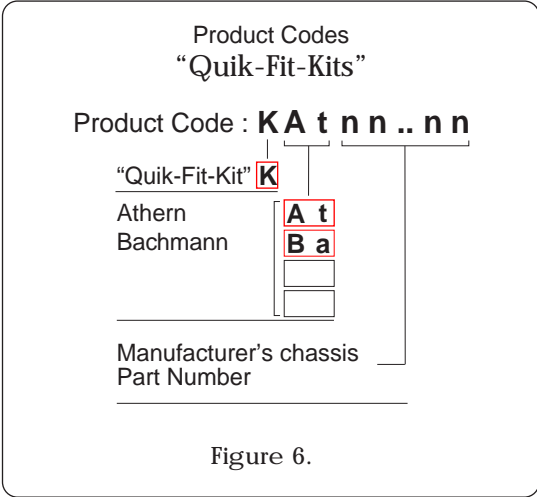


Figure 6.

P= Part(s) included. 0= Part(s) not included.
All miscellaneous hardware included. Detailed fitting instructions included.

Product Code	Motor base plate	Motor support	Drive shaft couplings	ATC size	Construction Code
KAt40017	P	P	P	3	1a
KBa400-001	0	P	0	3	1a

Figure 7.

4 Motors

General.

" ... I am not in the least concerned with electrical efficiency. What does interest me is how smoothly the engine will start, how it responds to the throttle, and that its speed range should be realistic. ... " [NMRA Bulletin, Nov. 1966]

These sentiments are probably a good starting point for our discussion on model railroad loco drive motors. The operating characteristics of electric drive motors changed little from their inception around the 1920's until during the last 5 years. A typical offering in 1951 is shown in Figure 7, as a reproduction of an advert in "The Model Railway News" of that year. Note also that the motor is 'hard-coupled' via the worm/worm gear set to the wheels.

In latter years, and during the past 5 or so in particular, there have been significant advances in miniature drive motor technologies resulting in some very fine 5 (& 7) pole, skew-wound products. These products have been designed to provide the modeller with the features nominated in the above (1966) quote.

However, no matter how fine a product, these 'new breed' motors applied to driving a model railroad loco still have to provide one very-difficult-to-achieve characteristic ... starting under full load, and operating with that load smoothly at very low speeds. Probably the most significant reason for this is that the motor-to-wheel mechanical connection remains

as it was in 1951 (and earlier).

ModelTorque has approached the powering of electric-motor driven model locos from a new perspective. We are not trying to 'compete' motor-against-motor, rather we are offering a new concept that is designed to change the way motor drives have been to an arrangement that provides truly prototypical model operation.

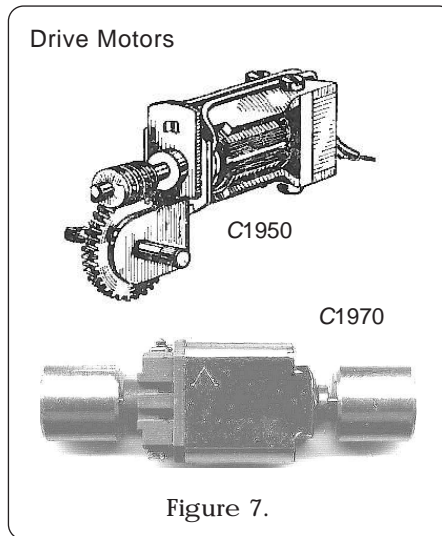
We have done this by breaking the mechanical link between the drive motor and the wheel sets, and inserted into this 'break' a non-contact ATC coupling. This new drive-train arrangement changes the view of what motor type is best for driving the ATC-equipped model.

Our motor selection is therefore based on new and different criteria that is in no way critical of the new sophisticated motor technologies; rather it is a case of these new technologies not being required to

meet ModelTorque's design criteria of a 'prototypical' ATC drive unit.

We conclude this section with another quote .. this time from a Retailer at the recent Hamilton (New Zealand) Model Railway Expo, to our NZ Agent :
 "... There are many excellent high-tech 5 pole/skew wound motors now available on the market and I am not interested at all in the ModelTorque motor ... "

Comment : He's missed the point altogether !



ModelTorque Motors

ModelTorque drive motors are selected to integrate with the ATC's to provide a matched drive package. Motor Type 1 is a small size, high torque (100gmf.cm), high speed (19,000 RPM) of quality manufacture that, when coupled with ATC's, provides a powerful integrated model drive that eliminated the direct coupling between motor and driving wheels yet produces a drawbar pull equal to or greater than existing direct-coupled motors.

Although ATC Modules (see Page 2.1) will be produced for the reasons stated, it is suggested that no perceivable benefit will accrue to the modeller in loco performance by using a motor of his own selection.

When ATC Modules are released, ModelTorque will be prepared to fit them to motors supplied to us by modellers, for the purpose of comparative testing.

5 Prices & Ordering

Order Forms are available with pricing in US\$, CAN\$, AU\$, GBP, and NZ\$. Orders placed directly with ModelTorque should be sent by fax and payment

may be made by Amex, Diners, MasterCard or Visa. We are exploring the costs associated with offering payment through PayPal, but this is not yet available.