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Introduction

With the fully automated, remote-controlled H0 coupling TC-H0 (Train Connection-H0) you have purchased a product that enriches the operation of the digitally controlled model railroad with functions that extend the reliability and enthusiasm considerably.

In order to enjoy the use of this high-quality product for many years, please read the installation and operations instructions carefully and keep for future reference.

Important Notice:

This item is not for use by persons under 14 years of age.

It must be installed only by competent persons.

The couplings can be damaged through improper installation or improper use.

Keep away from children under 14 years!

Some background information regarding the application of future standards for model trains, can not be covered in this installation and operating manual. For further details, please use the links on our website. T4T accepts no liability for the content in these sites!

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Basic Features

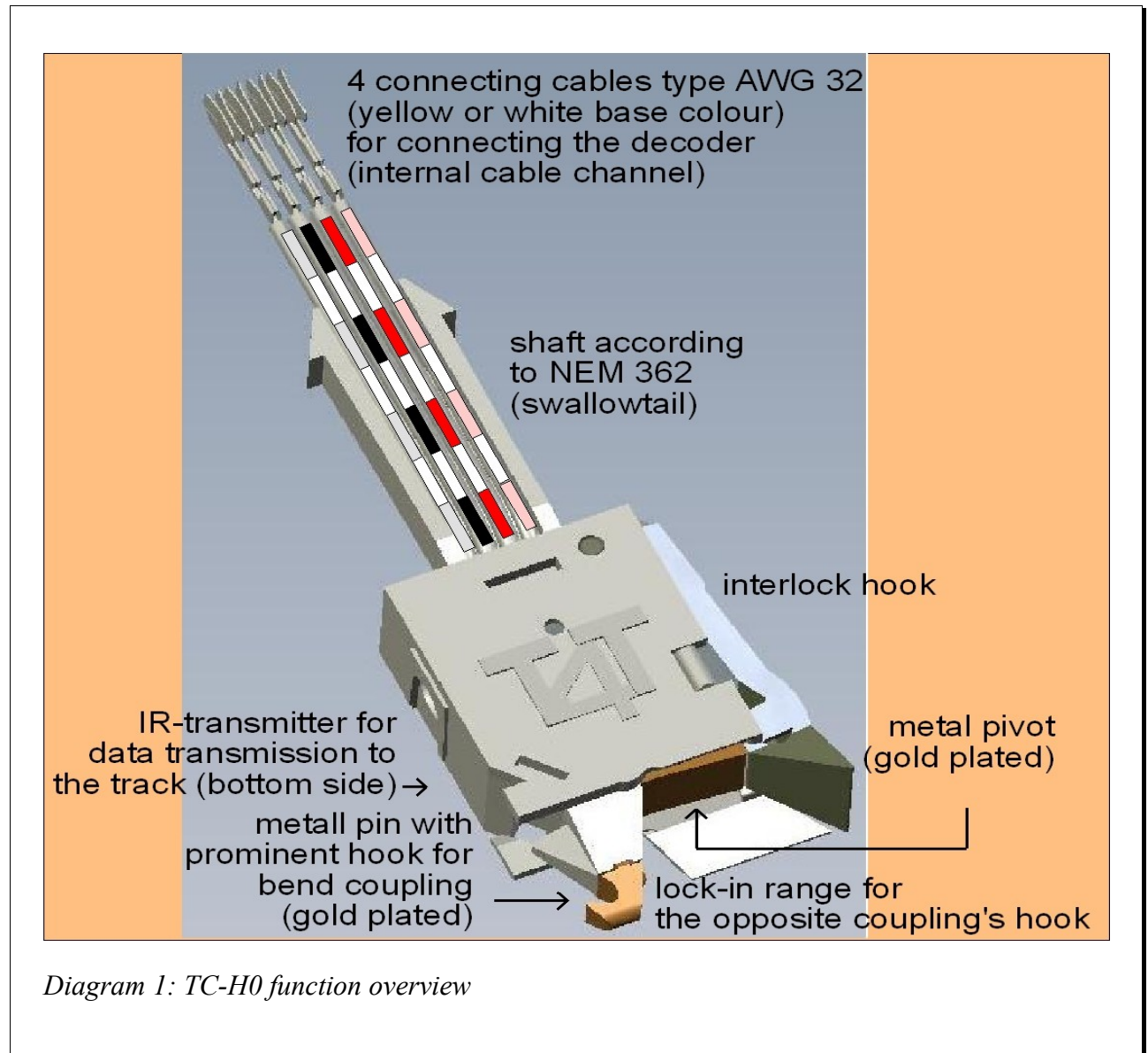
The fully automatic, close coupled model train coupling for H0-locomotives with a NEM 362 connection is an integral part of the T4T Train automation TCCS (Train Coupling and Communication System). The aim of TCCS is the inclusion of all wagons of the entire train in the available remote-control functions provided by the digital DCC protocol. In other words, each wagon coupled to the locomotive can be remotely uncoupled using the DCC protocol function.

Key Feature TC-H0:

- Compatible with NEM362 and suitable for wagons with short coupling mechanisms.
- All wagons are powered via the 2-pin electrical contact. It is necessary to avoid wheel pickups which can negatively affect the running of the wagons.
- Maximum power output of TC-H0 is 1Amp.
- Couplings between two wagons can be activated/deactivated at any point on the track.
- The force required to couple or uncouple are so low that light wagons are not pushed away when coupled/uncoupled.
- The coupling can also be activated when the locomotive is on an incline and the couplings are slightly lower than the train. This is important for humps!

- In each coupling is a built-in IR-LED which can transmit data in various formats. The type of format (**TRAM (T4T)**, **TrainNavigation (Fleischmann)**, **Lissy (Uhlenbrock)**) can be set in all T4T decoders (e.g. LD-1L, LD-1M, WD-GWx, WD-PWxxx etc.).
- The coupling is small in size.
- The coupling can be coupled by short coupled locomotives in curves. This feature is applicable for radii of 800mm, dependent of the features of the coupled wagon.
- The ground clearance between the coupling's underside and the track bed is high. In this way the coupling cannot be caught on the track bed or in the points.
- Slim, unobtrusive appearance. The TC-H0 is smaller than conventional mechanical couplings!
- The contact zones are made from modern, high quality solid metal alloys, coated with gold plating. This ensures long life and low susceptibility to corrosion.

The coupling in detail (diagram)



Handling the Coupling TC-H0

The coupling should be handled in such a way that only the thumb and index finger hold the coupling by the top and bottom.

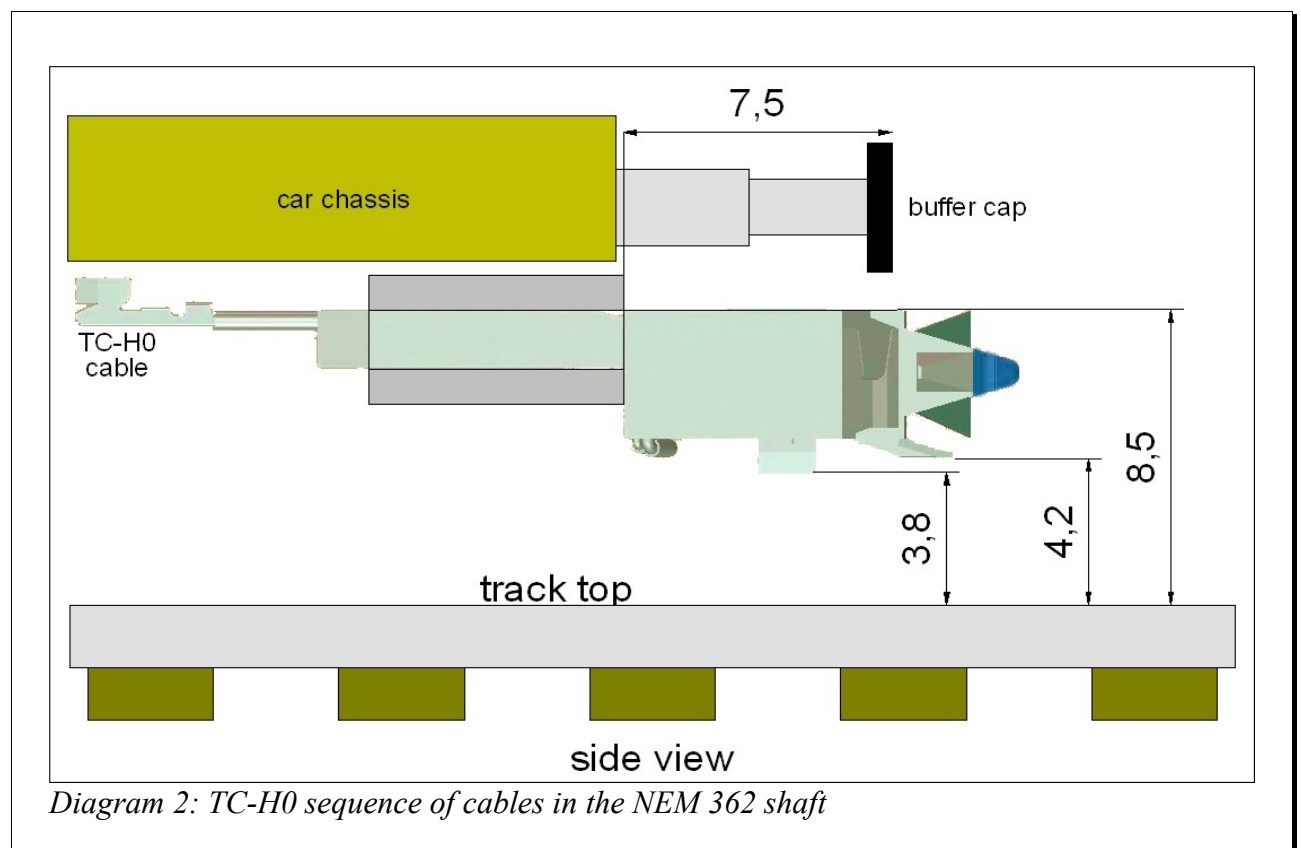
Should the coupling be held by the side, this can lead to damage of the release hook support, especially then the release hook is in the open position!

Before assembly it is advisable to push the rotary contact inwards until the release hook is fully in the housing.

The coupling layout according to NEM 362

For more than 10 years, all leading manufactures have used a standard coupling layout according to the NEM 362 standard (See www.morop.org and the next pages). This standard allows for an easy way of exchanging or converting to the preferred coupling system, including the installation of the TC-H0 coupling.


In order for the TC-H0 to operate correctly, the following measurements should be checked according to the diagram below.



The dimensions are valid for locomotives with a close coupling mechanism and are respected by all manufacturers. For locomotives without a close coupling mechanism the distance between the coupling take up and the buffer (7.5 mm) is reduced by a few mm depending on loco design, so that the coupling is further from the front buffer beam. Again, this dimensional change is taken into account by the locomotive manufacturers. Otherwise, the buffers between two locomotives would interfere with each other in curves.

Unfortunately, the quality of the coupling take out suffers with many manufacturers often because the shaft is tilted and therefore making the coupling action more difficult or preventing coupling. This quality characteristic should be checked on the acquisition of locomotives regardless of the coupling system.

In addition, it is important to check that the return force to the neutral position is sufficient. Only centred couplings can be coupled with minimal force. There is no suitable standard for the regulation of force output.

	<p>European Model Railroad Norm</p> <p>Mounting Socket for Interchangeable Couplers on OO Stock</p>	<p>NEM</p> <p>362</p> <p>1 page</p>
Mandatory regulation	All dimensions in mm	Issue 2004 (replaces NEM 364 issues 1997 and 1998)

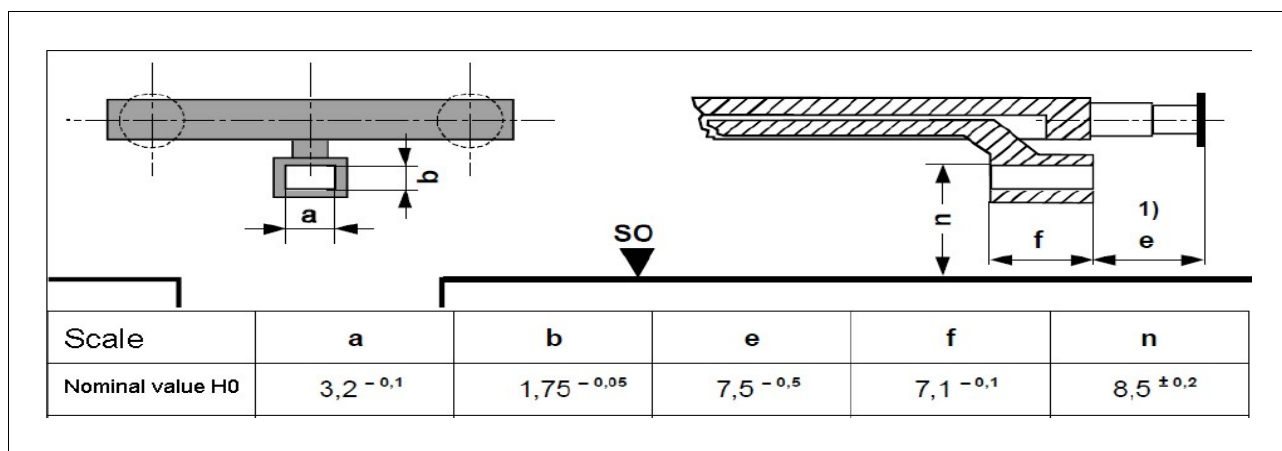
NEM-362 (H0-Extract from the Standard)

Aim

The coupling take-up is such that it will accept exchangeable coupling heads, providing they have the corresponding shaped approach.

Installation

The coupling take-up is installed as follows, either with a kinematik or pivot:



Note 1): This measurement is only relevant when the coupling shaft is steered via a close-coupling kinematik. For other types of mounting, an appropriate distance is to be taken into account for the free movement of other vehicles.

If there are components on the models which are in front of the buffer level, e.g. rubber bead, then the position of the front surface must be such that these components are taken into account.

Coupling Heads

The coupling heads generally have a dovetail-shaped approach with the cam behind the inner edge. For larger scales (S, O) an approach locator is necessary. The H0 and S coupling approaches are identical and therefore allow the use of common coupling heads for H0.

Installation of TC-H0 into H0 locomotives (NEM 362)

The mechanical coupling, e.g. kaydee or tension lock coupling, can be removed from the locomotive/carriage by gently squeezing the ‘swallowtail’ (see manufacturer’s instructions). The coupling removal process can also be found in the locomotive/carriage instruction manual.

With the mechanical coupling removed, all four cables from TC-H0 are set according to NEM 362 sequentially via the 4-edged adapter of the coupling take-up from the outside, i.e. from the buffer side. It is important to ensure that all four cables lie parallel in the hollow of the TC-H0 dovetail and are do not cross over! It is preferable that the cables lie next to each other in the shaft from left to right, according to the diagram:

Colour sequence with white base colour	Colour sequence with yellow base colour
White/grey, white/black, white/red, white/pink	Yellow/grey, yellow/black, yellow/red, yellow/pink

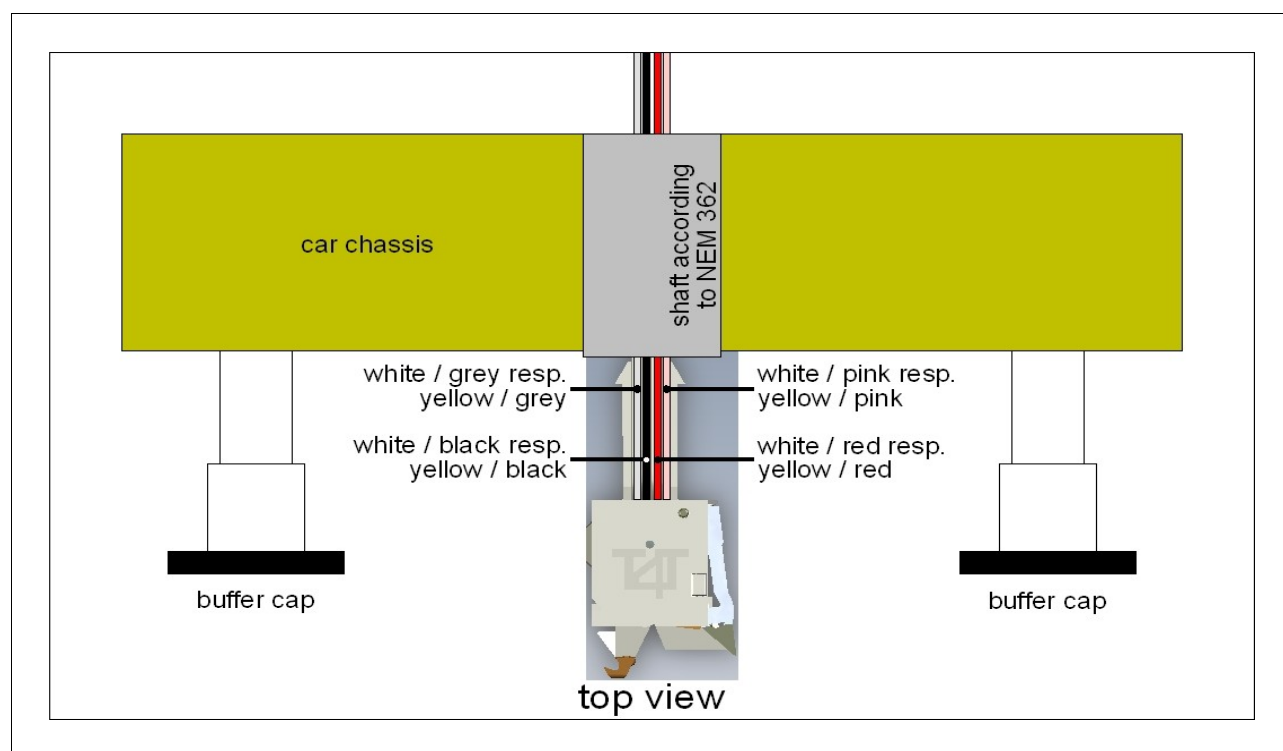


Diagram 4: TC-H0 Cable sequence in NEM 362 Shaft

Do not touch the contacts with pliers or any similar tool! Do not bend the contacts on the end of the cables!

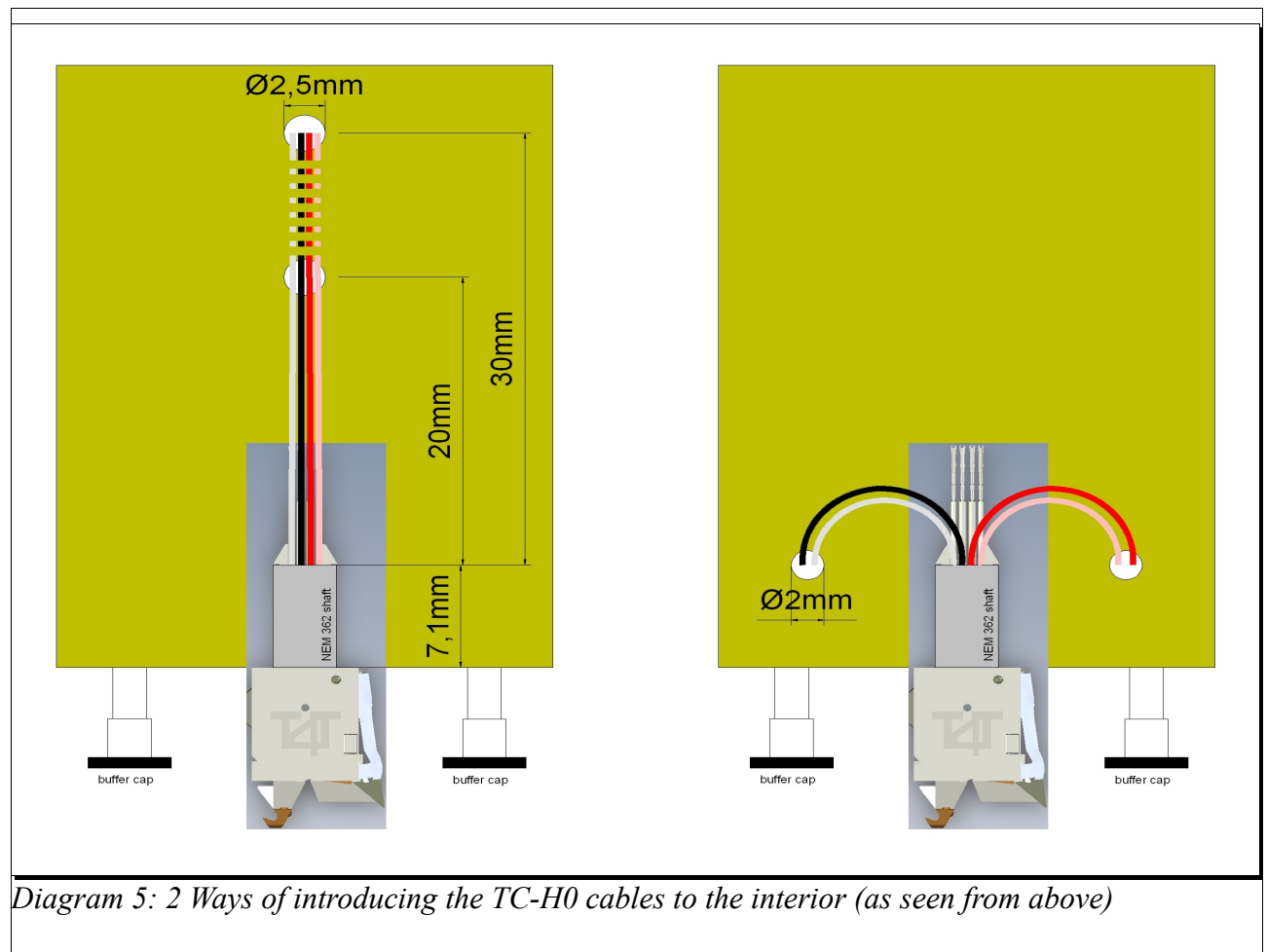
The cables should be pulled one by one for a distance of 20 – 30mm through a hole of about 2.5mm diameter into the interior of the locomotive/carriage. It may be helpful to pull the cables through some heatshrink (as supplied in the start set). The heatshrink can be used between the dovetail and

the entrance hole and inside the locomotive/carriage. This can be useful especially with locomotives, to prevent the cable catching in the motor! Shrink the heatshrink to size.

It is essential to ensure that any drilled holes, especially in locomotives with a close-coupling mechanism, do not disable the mechanics!

If there is no hole within the distance given above, then the cables need to be brought into the locomotive from the side. Since only 2 cables are introduced per hole, the hole can be reduced to 2mm.

In this instance, it is useful to split the cable symmetrical right and left in the pairs gray and black and red and pink. The bending forces of the cable are thus spread symmetrical on both sides.



The ends of the cable are then pushed into connector 2 of the LD-1x or WD-xxx decoder (please note the relevant decoder instructions).

Please read the decoder instructions in addition to this instruction. The TC-H0 coupling cables have either a yellow or white base colour. Per locomotive/carriage you should have one coupling with yellow base colour cables and one with white base colour cables. We recommend using the same colour scheme as for front and rear lighting, i.e. front coupling with white cables and rear coupling with yellow. This makes the correct connection of the cable to the decoder easier and prevents the swapping the front and rear coupling cables. There are no other distinguishing features between the couplings with yellow or white base colours.

If the cables (white and yellow wiring harness) of the two couplings are reversed at the decoder, the locomotive identification will not work correctly. This is especially true for locomotives that need to move in the right direction when uncoupling! For wagons/carriages it does not usually matter which base colour is at which end. In general for the lead wagon the yellow coupling is attached to the end with the headlamps!

If a wagon has TC-H0 installed, then it is best to run with a locomotive weighing 80g or more. Each T4T decoder has its own instruction on connecting the four cables. Please read these instructions carefully. Incorrect connections can result in the destruction of the decoder and / or the coupling!

Check the correct cabling

To prevent damage to the coupling, the correct electrical installation of the coupling should be checked. For this reason, the "Decoder Manager" device is available which has an appropriate test system. Further details can be found in the "Decoder Manager" manual.

If you are using Lissy feedback system, before testing the locomotive bus, it is best to drive the locomotive with the coupling over a feedback section. Activate the TC-H0 IR transmitter using the relevant CVs (see the manual for LD-1x or WD-xxx respectively). The Lissy receiver should receive and show the signal.

Should you wish to test the coupling function with a decoder, then you will require a multimeter and power supply. The following values should show on the multimeter:

Between the white/yellow and black cable and the metal pivot contact: 0 – 2 Ohm

Between the white/yellow and red cable and the metal: 0 - 2 Ohm

Between the white/yellow and pink cable (- pole/ground) and the white/yellow and grey cable (+ pole) apply 3VDC: 30 – 40mA (maximum 10 seconds)

The coupling should not be directly powered by a current source (transformer or power supply)!

Couplings with different cable lengths and colours

As the cable length required between the coupling and the decoder can differ from locomotive to locomotive, T4T offers each coupling with 4 different cable lengths - 50mm, 100mm, 150mm and 250mm. It is advisable to order the couplings with the required cable lengths rather than modifying them by attaching further cable (loss of warranty!). The cable length is measured from the crimp to the solder pad on the coupling! If the cable length is measured from the internal rear end of the coupling, then you will need to take off about 10mm from the nominal length, i.e. a cable with a nominal length of 50mm will measure about 40mm from the end of the dovetail!

As the cable is very fine (0.5mm diameter), it is often very tricky to have a clear distinction of the marking. For this reason the white/black and yellow/black cables have an additional black mark on the end. For the white/red and yellow/red cables there is an additional red mark on the end!

Removing the Coupling

In principle, removing the coupling is the reverse order of the installation instructions. However, it is imperative not to grip and pull the coupling by the coupling head, but to push the coupling out from the dovetail end!

Care and maintenance of the Coupling

The coupling is made from high quality materials. Much attention has been paid in particular to ensuring that the contact zones, which are also subject to a mechanical load, are maintenance free. All contact areas are gold plated to a high quality!

We must emphasise that the coupling does not require contact with any cleaning material nor oil.

Application of any of these substances will lead to an impairment of the coupling, destruction of the coupling and loss of warranty!

Control of the Coupling

The electrical properties of the TC-H0 coupling have been set for the control via T4T decoders. Control via other products, which do not fall under the T4T seal of approval - "T4T TCCS compatible", is strongly discouraged. The control of the TC-H0 couplings using anything other than T4T or TCCS compatible decoders will lead to loss of warranty.

Warranty

If the coupling does not work properly, it can be returned to T4T. Please do not send the decoder.

The warranty is void if there is physical damage, improper installation or improper use.

The warranty period is 2 years from date of purchase.

Technical Data for the TC-H0

	Technical Data
Load	max. 0.5 A continuous (according to decoder type) / 1 A stall (dependent on decoder output)
Cable contact resistance	max. 1.5 Ohm between 2 wagons
Coupling strength	approx. 40 mN
Holding force between 2 wagons	10 N / short-term 20 N
IR-Diode	850nm Peak Wave length
Plug receptacle	NEM 362 for H0 models; close-coupling capable
Supply voltage actuator	~20 Volt PWM- controlled
Contact surface	PIM-copper /gold plated
Connectors	Type: JST SSH-003T-P0.2
Cable	4 x AWG 32
Dimension (L x W x H)	approx. 16.3 (without coupling pins) x 6.5 x 4.7 mm

Specifications are subject to change. All values are approximate and may change without prior notice!