

Government of India
Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar, Lucknow - 226011

MAINTENANCE INSTRUCTION No. TI/MI/00045

1. **TITLE** : Auto Tensioning Device (ATD) /Regulating Equipment.
2. **APPLICATION:** Gas Auto Tensioning Devices
- 3.0 **OBJECTIVE:**
 - 3.1 ATDs are meant for regulation of tension in OHE conductors & one of the important equipment, which need special attention in respect of installation **as well as maintenance**, as improper installation & maintenance may lead to disturbed OHE profile, resulting in poor dynamic behavior of OHE, which may on occasion, cause panto entanglements at turnouts/cross-overs, neutral section etc. If installation and maintenance is carried out properly, performance of ATD can be improved to a large extent.
 - 3.2 Southern Rly. reported problems with Gas ATDs erected on MRTS section Chennai, after rendering four to seven years service life. These failures were mainly due to leakage of nitrogen gas from high pressure end seal, leakage of gas and oil from the point of interface between pressure gauge & cylinder and pit marks on the surface of RAM. To arrest these failures, following maintenance instructions may be strictly followed.
4. **DETAILS OF SPECIAL MAINTENANCE INSTRUCTIONS:**
 - 4.1 **CHECKS BEFORE INSTALLATION**
 - 4.1.1 **Check for cylinders:** The cylinders are normally supplied fully retracted and uncharged and are supplied with the charging and installation kit comprising of ancillary items i.e tie bar assembly, crosshead, earthing strap etc.
 - 4.1.2 **Check for the position of ram:** The ram is normally restrained in the retracted position with temporary straps.
 - 4.1.3 Check for the serial number plate on the cylinder body. Serial number plate indicates the followings:
 - Tension length & stroke for which the unit is designed i.e (CT1500-tension length/500-stroke)
 - Number of filler rods inside the cylinder i.e (234)
 - Cylinder identification number i.e (2336)
 - 4.1.4 On receipt of equipment, the serial no. on data sheet and serial number of gas tensioner should be cross checked. Data sheet (supplied by the supplier) contains necessary gas charging and adjusting information required for correct installation. Cylinder identification number marked on the serial number plate & data sheet should be referred to ensure correct charging of the cylinder.

4.1.5 Cylinders should be handled carefully being bulky. While unpacking the unit, no damage to the paint finish on the cylinder body should be there. Most critical component of the cylinder being gas charging port & pressure gauge, these should be protected from accidental damage.

4.2 MONTHLY CHECKS AFTER INSTALLATION

4.2.1 Check for the earthing strap position, to allow unimpeded cylinder motion.

4.2.2 A faulty unit can be identified by visualizing the position of ram extension. As the temperature of the contact wire varies, the ram will move in and out of the cylinder. At low temperatures, the cylinder movement shall be away from mast, the extension(X) shall be more and the ram extension will be near to fully retracted position. However, at maximum temperature, the cylinder movement shall be towards mast, the extension (X) shall be less and ram extension will be near to fully extended position. Ram extension with respect to temperature is indicated at **annexure-A**. In product data sheet, detailed table of ram extension/extension viz-a-viz temperature shall be given by the supplier.

Cylinder tie bar may be painted to indicate different temperature as per data sheet for checking of abnormal variation in ram extension by foot patrolling staff from ground.

- (a) If Ram extension is more than normal, it may be due to wire discontinuity, cable creep, displacement of anti creep point anchor or failure of the tensioner terminating the other end of the section.
- (b) If Ram appears retracted more than normal , it may be due to :
 - 1) Improper installation of unit. Check for installed pressure and ram extension with the installation data sheet. Adjust to suit.
 - 2) Installation of unit at incorrect tension length. To use correct tension & stroke length, check these from the details indicated on serial number plate.
 - 3) Unit may have gradual loss of pressure. In such case, tensioner's installed pressure should be topped up by a portable gas cylinder, readjust to the correct extension and recheck the cylinder pressure (as per data sheet). If the cylinder is retracted completely, it should be removed and replaced with an identical unit containing the same number of PVC rods.
- (c) If Ram is fully retracted other than at low temperature, it indicates less pressure i.e. a failure of the tensioner, hence tensioner should be replaced with the identical unit having same number of filler rods and designed for same tension length and stroke.

4.2.3 If Ram is damaged in transit or as a result of severe corrosion, it will cause abrasion in service, the rubber seals in the oil seal area may also get damaged, leading to a leakage of oil from the seal area. Leakage of oil leads to damage of the main gas seal and leakage of gas, which will cause the ram to get fully retracted.

This can be noticed by the foot patrolling staff from the oil patch on the ground directly under the unit. Such failure of the gas tensioner calls for replacement with identical unit. Bellows may be provided to cover the extended portion of RAM such that it does not restrict the RAM movement caused by temperature variation.

4.3 ANNUAL CHECKS AFTER INSTALLATION

- 4.3.1** Tensioner pressure, should be checked and if found less, topped up with a portable gas cylinder as per the procedure laid down in installation & operating manual supplied by the manufacturer. Gas tensioner which do not have pressure gauge, shall be checked for loss of pressure annually under power block.
- 4.3.2** Check the length of ram against tension length and ambient temperature with the reference data sheet. If Ram Extension is not as per data sheet, fine adjustment can be made by tightening or slackening the nine tone adjuster in front of the crosshead indicated on the picture at **annexure-B**.
- 4.3.3** Extreme temperature conditions (Maximum), may cause the gas pressure to rise above the nominal and lead the pressure gauge, moving into the red zone(right of green). Extreme temperature conditions (Minimum) may cause the gas pressure to fall below the nominal and result in shifting of pressure gauge into the red zone (left of green).

Both these are temporary situations and the needle returns to the green area as and when the ambient temperature retunes to normal.

- 4.3.3** In summers, when ram extension is maximum, ram should be cleaned with dirt free soft cloth.
- 4.3.6** Ensure that the tie bar assembly, crosshead, and spacer are correctly fitted to the cylinder and that the earthing strap is fitted between the two support assemblies, allowing adequate freedom of motion over the complete cylinder stroke.

5.0 MAINTENANCE OF ATD RECORDS

The regulating equipment (ATD) should be maintained as per the maintenance instruction. OHE depot should keep up to date, records of all GATD's in their sections, as per the format given at **Annexure –C**. Storage instruction, Installation instructions , charging & discharging procedures shall be followed strictly as per the installation and operating manual supplied with the unit by the manufacturer.

6.0 AGENCY FOR IMPLEMENTATION

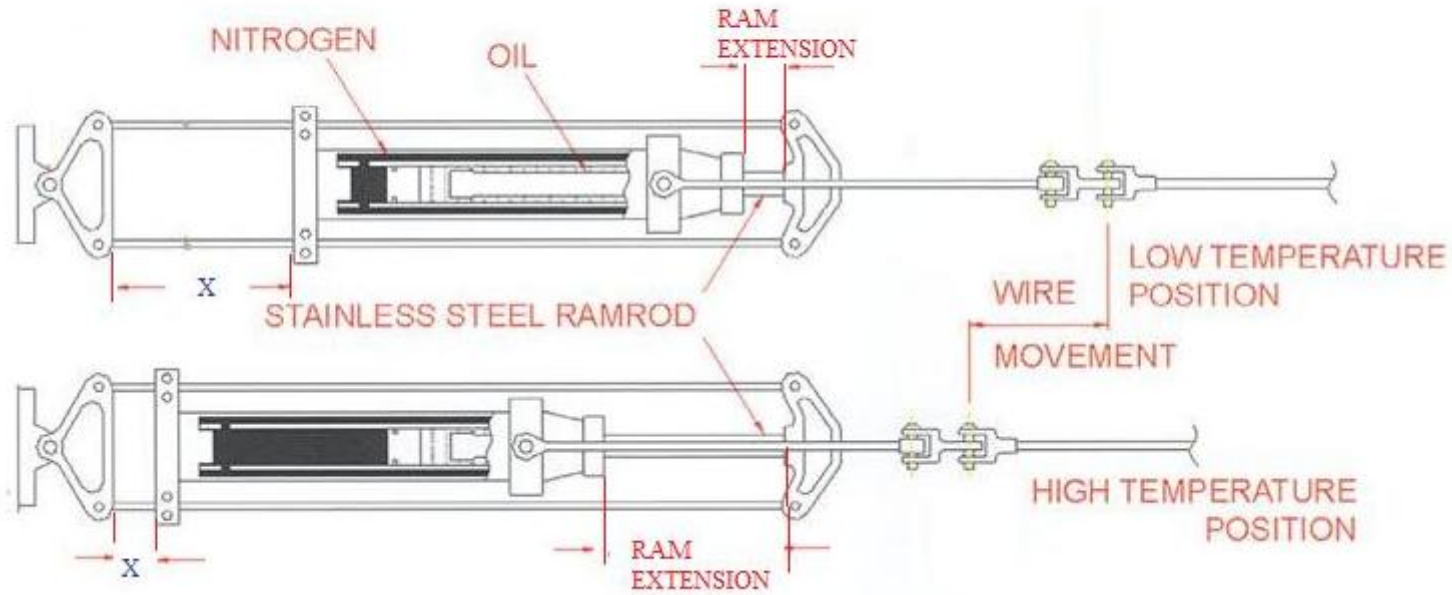
Railways and RE project units.

7.0 REFERENCE SPECIFICATION:

SPECIFICATION No. TI/SPC/OHE/GATD/ 0080(09/2008)

RAM EXTENSION & EXTENSION(X) WITH RESPECT TO TEMPERATURE

ANNEXURE-A



ANNEXURE-B

