

# PRODUCT INFORMATION

Ref.: I.P. 231E

Date: 23<sup>rd</sup> of December 2003

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## *AR60D rail connection Performance enhancements*



Cembre is enhancing the performance of its market leading rail connection type AR 60D, by replacing the AR60-3 high resistance steel screw with the new AR60-3X screw made from galvanised stainless steel.

The purpose of this change is to increase resistance to the effects of chemical-environmental agents which may cause difficulties when disassembling and reassembling established connections in particularly aggressive situations, for instance in close proximity to the sea.

Following extensive and severe testing in its own laboratories, Cembre has begun serial production of the new stainless steel screws, which are expected to be available as part of the standard AR 60D kit during the early months of 2004.

The AR 60D kit will then comprise:

- AR60-1 type bush for M12 screw, made from electrolytically tin plated copper.
- AR60-3X type M12 screw with hollow head, made from galvanised stainless steel grade A4-80.
- Flat washer Ø10,5 x 21 UNI6592 ISO4759/P.3 made from stainless steel
- Self locking nut M12x1,5 DIN 982, made from stainless steel grade A2-70 with polyamide insert.

Note: the typical application range of AR 60D will be unchanged, that is:  
Ø19÷20mm holes in rail webs with 14÷16,5mm thickness.



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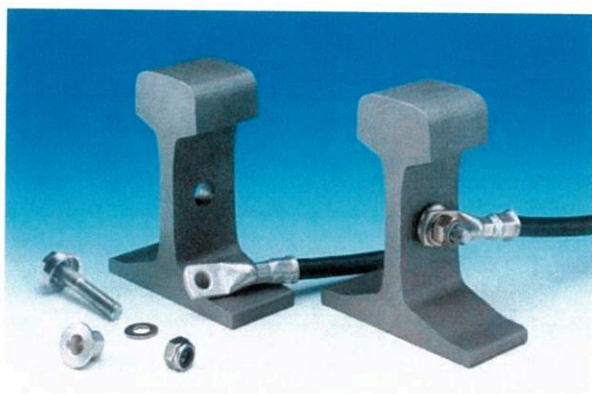
# PRODUCT INFORMATION

Ref.: I.P. 243E

Date: 23<sup>rd</sup> of August 2004

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## ***TYPE AR 60D ELECTRICAL PERMANENT CONTACT SYSTEM FOR RAIL WEB & TRACK EQUIPMENT***



**AR 60D bush kit**

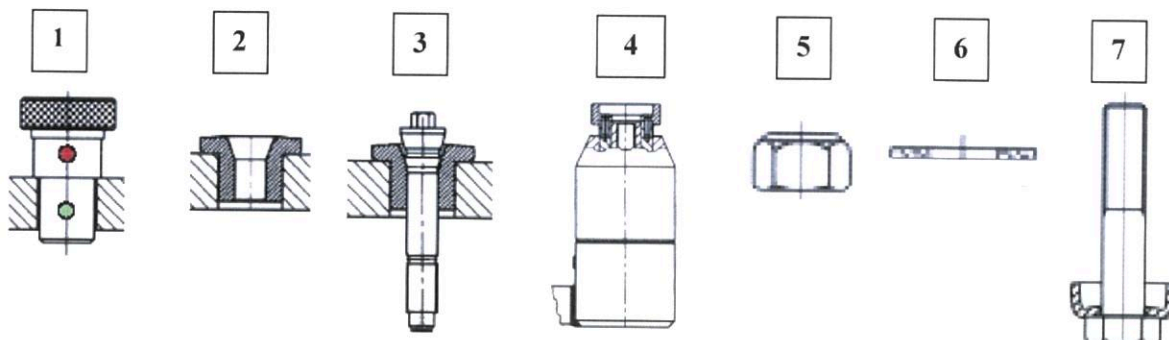


**HTEP installation tool**

### **TABLE OF COMPONENT & PART Nos.**

<b>PART No.</b>	<b>COMPONENTS</b>
AR 60D	<b>BUSH KIT</b> <ul style="list-style-type: none"> <li>- TYPE AR60-1 COPPER BUSH FOR M12 STUD</li> <li>- TYPE AR 60-3X STAINLESS STEEL STUD WITH HOLLOW HEAD (M12)</li> <li>- FLAT WASHER</li> <li>- SELF LOCKING NUT (DIN 982)</li> </ul>
HTEP	<b>INSTALLATION TOOL</b> <ul style="list-style-type: none"> <li>- TYPE HTEP-S HEAD CONNECTED BY 900MM FLEXIBLE HOSE TO HAND OPERATED HYDRAULIC PUMP BODY</li> <li>- 2 OFF – TYPE OG 13.2 CALIBRATED PLUNGERS</li> <li>- TYPE CAL 19.20 GO – NO GO GAUGE</li> <li>- TYPE VAL HTEP STEEL CASE</li> </ul>

### **SYSTEM COMPONENTS**



- 1) **GO - NO GO gauge type CAL 19.20** for checking correct rail drilling.
- 2) **Copper bush type AR 60 -1** forms the permanent electrical contact with the rail web and provides an ideal seating for cable lugs.
- 3) **Calibrated expansion plunger type OG 13.2** in high tensile treated steel.
- 4) **Manual hydraulic installation head type HTEP-S**  
The compact HTEP-S head is ideally suited for use in restricted spaces.
- 5) **Self locking nut (DIN 982)**
- 6) **Flat steel washer**
- 7) **AR60-3X** hollow head galvanised stainless steel M12 screw

## COMPONENT SPECIFICATIONS

The tin plated copper bush and the hollow head stainless steel screw provide particularly good protection against electro-chemical degradation of the metals due to humidity, saline atmosphere, acid rain, etc.

The copper bush has a recess which both, avoids undesired distortion of its flanged part during installation and may be greased to facilitate insertion of the calibrated plunger through the copper bush.

The hollow head stainless steel screw allows connection of cable lug to the copper bush, directly transferring the necessary force to the rail web.

The system is designed for use on sizes and types of commonly used rail.

## INSTALLATION

Drill rail web with diameter 19mm drill (fig. 1) or if already drilled ream hole and insert GO -NO GO gauge.

If the green part passes and the red part does not (fig. 2) the hole may be used for subsequent operations.

If the green part does not pass, redrill the hole with a 19mm drill.

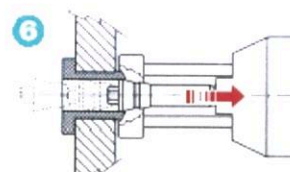
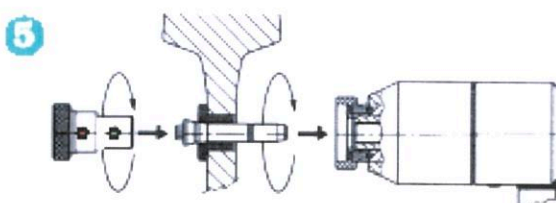
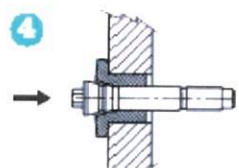
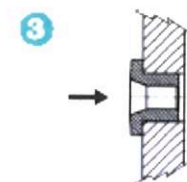
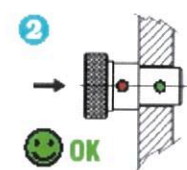
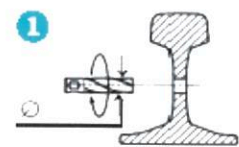
If the red part passes re-drill the rail web in a different place.

Insert the copper bush into the rail web hole (fig. 3).

Insert the calibrated plunger into the flanged side of the bush ensuring the threaded end projects on the other side (fig. 4).

Depress the tool pressure discharge lever to ensure that the piston is fully retracted. Tighten the plunger using the relevant gauge in the threaded tool seating (fig. 5).

Actuate the tool (fig. 6). The calibrated plunger passes through the bush applying a tensile force to shape it into the hole, ensuring close contact with the rail.





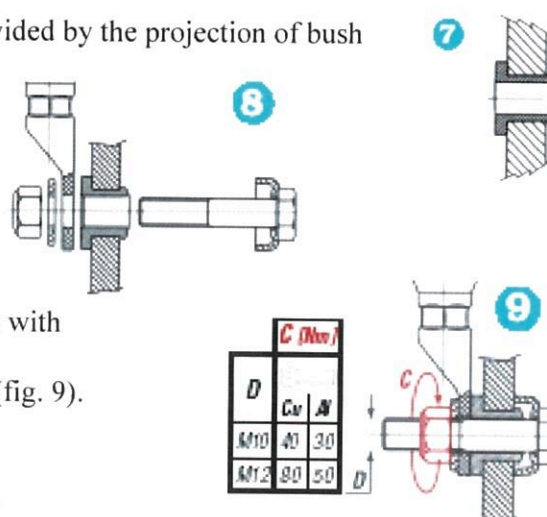
Additional stability and contact with the rail is provided by the projection of bush through the rail (fig. 7).

Insert the hollow head stainless steel screw into the bush so its thread projects from the flanged side.

The hollow head will surround the projecting part of the bush (fig. 8) without touching it.

Crimp the lug on the cable and locate it on the bush with the stud in the palm hole.

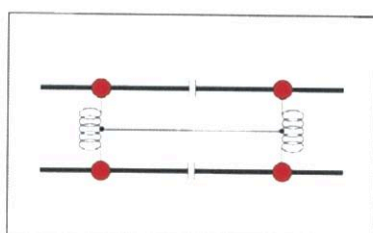
Insert the flat washer and tighten the auto-lock nut (fig. 9).



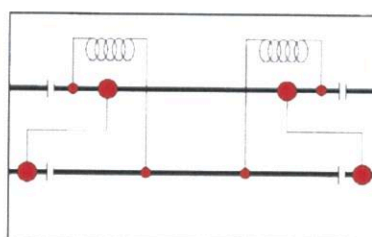
## SYSTEM APPLICATIONS

This patented connection system, designed by Cembre SpA to achieve a permanent electrical contact with a low and constant ohmic resistance, is suitable for rail electrical connections and has many uses in the fields of railway signalling and electrical traction.

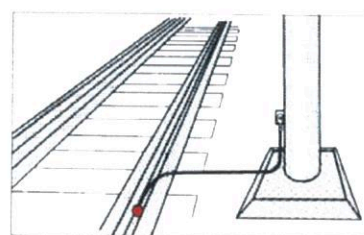
Typical applications within FS (Italian Railway System):



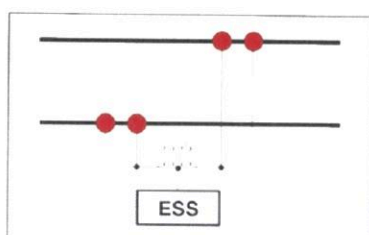
Transmission of coded return current on lines fitted with automatic block



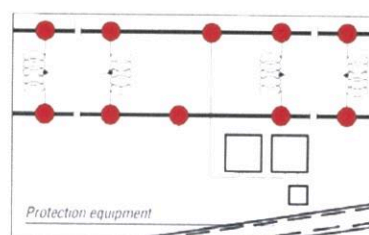
Various connections in train location systems



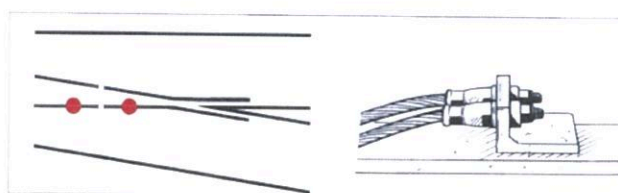
Earthing connections between metallic structures & rails



Return current connections to substations



Electrical connections between underground metal structures & rails

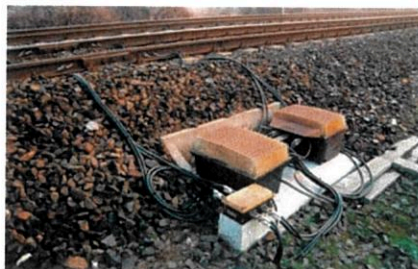
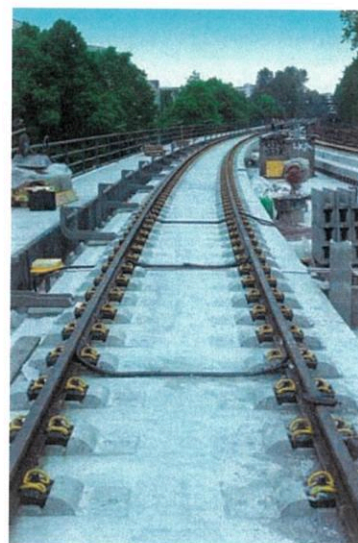


Signalling and traction current connection to manganese steel cast exchanger units

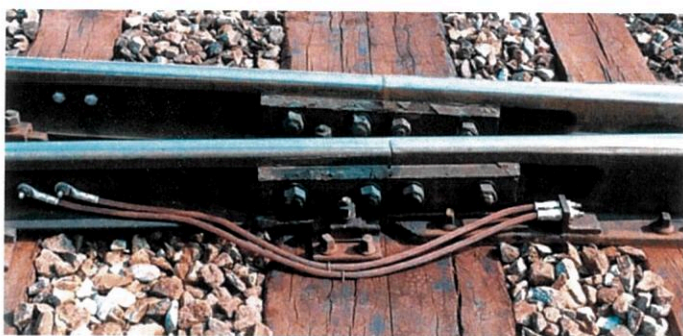
Other general applications:

- 1) Bonding connections
- 2) Continuity leads
- 3) Replacing drifted bushes
- 4) Replacing brazed fitting

## APPLICATION EXAMPLES



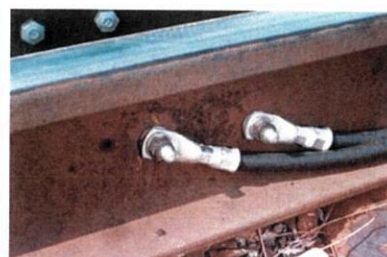
Examples of lines  
fitted with  
automatic block



Example of connections using a low stranded  
conductor to provide electrical continuity on cast  
manganese steel crossovers



Example of connections using a flexible cable to provide  
electrical continuity on cast manganese steel crossovers



AR60D rail web connections - rail side



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