Troubleshooting - earthing in frame

Background

Several faults relating to poor contact at earthing points have been reported. In order to troubleshoot an earthing point it is important to know how the connection should be made.

Checks

When an earthing point is suspected of being faulty, check the following:

1. That the correct self-tapping screw is fitted. The hole should be of the right size and the threads cut in the metal should be bright. The corresponding part of the screw should also be bright.
2. That no corrosion has occurred between screw head and ring terminal.

Work description

Self-tapping flange screw (taptite screw)

A self-tapping flange screw without chip formation is used at the earthing points on Scania vehicles in frame members and G30 in the cab front. It joins the ring terminal on the cable to the metal via the threads. The screw also conducts current via the threads. It is therefore important for the hole to be of the right size as otherwise the screw will not break through the powder paint and cut a clean thread.

The head of the self-tapping flange screw is marked with a triangular symbol. It also looks triangular when viewed from below.

Earthing connections with these screws are reliable if made correctly. They are also easy to repair.

Note that washers should not be used in conjunction with self-tapping flange screws.

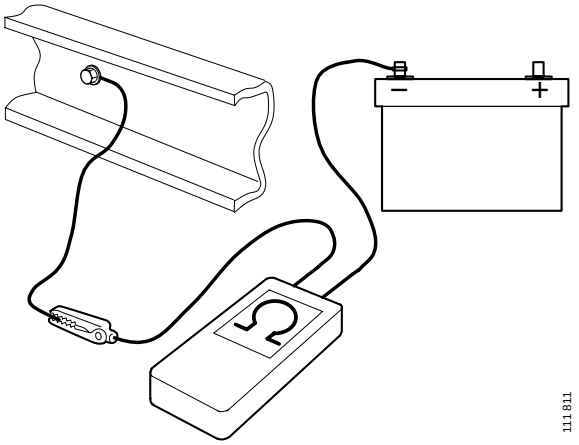
Possible sources of faults

1. Moisture between the screw head and ring terminal gives rise to corrosion. The same trouble occurs if the wrong screw is used.
2. If the hole is too big, the screw may only cut a thread in the hard powder paint. In that case there will be no electrical contact at all. This problem can also arise if the wrong screw is used.
3. If the hole is too small, the screw will not bottom. The result will then be corrosion between screw and ring terminal.

Wrong conclusions

1. Paint between ring terminal and metal is not a fault. Removing the paint and connecting the earthing cable with a nut and bolt can cause trouble later on. Be sure to apply rust inhibitor thoroughly.

2. Readings taken on a screw which has a thin rust-inhibiting coating on its surface may indicate that it does not conduct current. This is perfectly possible as the screw's surface coating consists of a black chromate layer which wears off when the screw is tightened, even if it is not tightened very hard. The screw conducts current just as efficiently as other screws. Take readings on the cable terminal or bare metal instead.



If an earthing fault is suspected, check the following:

1. Unscrew the earthing screw and check that the threads in the hole are bright. When one end of the connection has been disconnected, check the resistance of the cable.

2. Check that the right screw has been used. See parts list.

3. Corrosion, if any, between screw and ring terminal indicates that something is at fault. Check the tightening torque and protection against corrosion.

Alternative remedial measures

Do not try the following methods unless the trouble cannot be cured as described above.

1. Drill another hole and fit a new taptite screw in it.

2. If no taptite screws are available, scrape off the paint and connect the cable using a nut and bolt.

Note: Use method 2 only as a last resort.

Hex nut and bolt

On engine blocks and in G13 the earth connection is an ordinary M bolt and nut. The risk of corrosion is also present here due to incorrect tightening torque or incorrect measurement of the corrosion-inhibiting surface coating. Action, see above.

Quality enhancing action

- Apply corrosion inhibitor (e.g. Tectyle) to the earthing screw connections after tightening.

Hole diameter for self-tapping flange screws (taptite screws)

Screw	Bore diameter, hole depth < 10 mm	Bore diameter, hole depth > 10 mm	Tolerance
M10	9.3 mm	9.4 mm	+0.3 mm (optimum +/- 0.1 mm)
M12	11.1 mm	11.2 mm	as above

Tightening torque for self-tapping flange screws (taptite screws)

Screw	Torque
M10	45 Nm
M12	79 Nm

Parts

Self-tapping flange screws (taptite screws) with hex head:

Size	Length	Part No.
M10	25 mm	813 006
M10	30 mm	813 007
M12	30 mm	815 850