

Reference marks at incremental linear encoders

With the incremental measuring method, the graduation consists of a periodic grating structure.

The position information is obtained by counting the individual increments (measuring steps) from some point of origin. Since an absolute reference is required at a certain position, the scale tape is provided

with an additional track that bears a reference mark. The absolute position on the scale, established by the reference mark, is gated with exactly one measuring step.

The reference mark must therefore be scanned to establish an absolute reference or to find the last selected datum.

To speed and simplify such “reference runs”, many AMO encoders feature distance-coded reference marks – multiple reference marks that are individually spaced according to a mathematical algorithm.

Individual reference marks

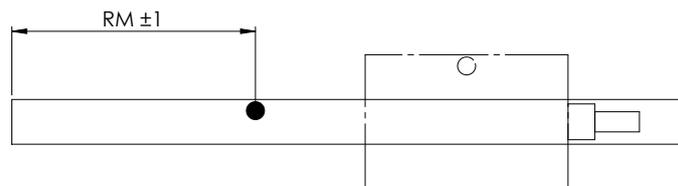
As a standard, a single reference mark is positioned centered on the scale tape related to the total scale length. The reference mark position on the scale tape is marked with a black dot.

A single reference mark can also be placed on a custom-designed position on the scale. Therefore the reference mark position has to be defined in the ordering code of

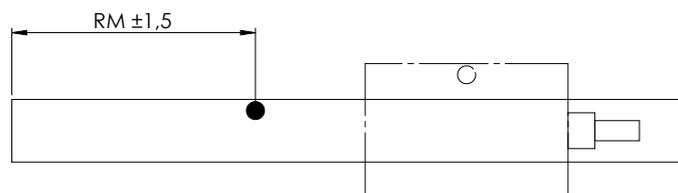
the scale as the distance from one end of the scale to the reference mark.

The position of the scanning unit for the reference mark in the scanning head is centrally arranged.

Reference mark position LMB 1005/LMB 1010

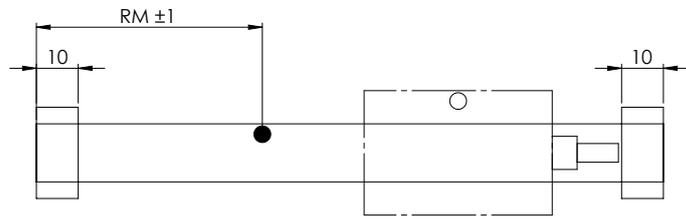


Reference mark position LMB 1030

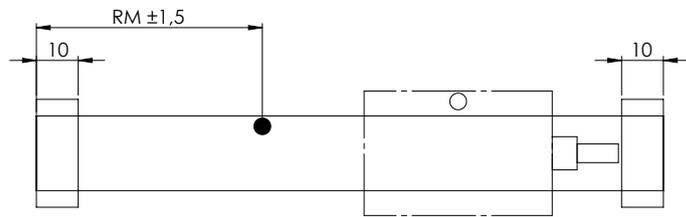


RM = Reference mark position

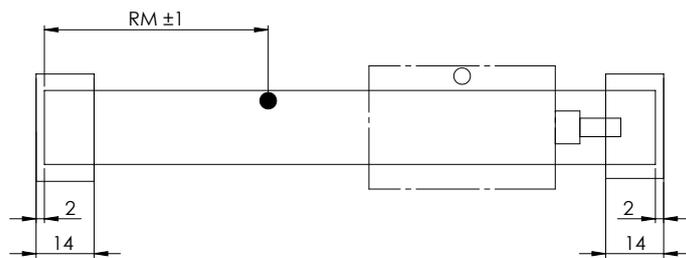
Reference mark position LMT 4005/LMT 4010



Reference mark position LMT 4030



Reference mark position LMF 3010



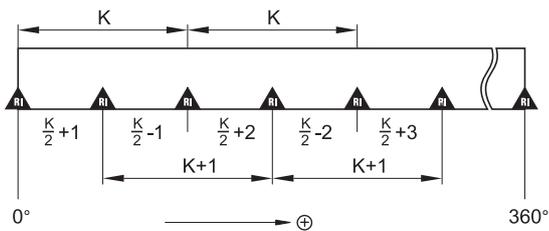
RM = Reference mark position

Distance-coded reference marks

AMO offers for all incremental scales distance-coded reference marks – multiple reference marks that are individually spaced according to a mathematical algorithm.

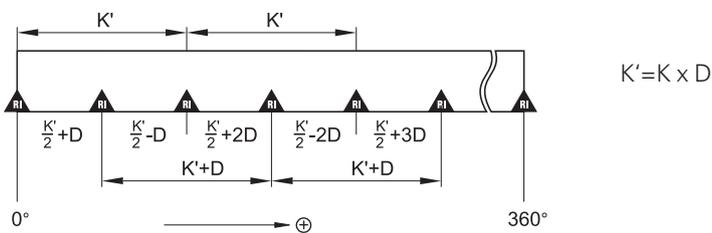
The subsequent electronics find the absolute reference after traversing two successive reference marks.

Arrangement of distance coded reference marks for encoders with non divided 1Vpp output signals



K ... number of 1Vpp signal periods at the output of the encoder.

Arrangement of distance coded reference marks for encoders with divided 1Vpp output signals



K' ... number of divided 1Vpp signal periods at the output of the encoder.
 D ... dividing factor