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**TECHNICAL JOB
SPECIFICATION**

994/1

REVISION 0

DATE 05/04/2011

HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

MARKER AND MEASURING POSTS

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QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

0	05-04-2011	FIRST ISSUE	PQ DPT	VG
Rev. No	Rev. Date	REASON FOR CHANGE	Made By	Approved By

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REFERENCE DOCUMENTS

Job Spec. No. 799/2
[Installation of Cathodic Protection System]
Job Spec. No. 970/2
[Shop Inspection of Equipment and Materials for NGT Project]

Std Drawing No. STD-00-78-14
[Cathodic Protection for Pipelines - Measuring Posts K3 / A&B]
Std Drawing No. STD-00-78-15
[Cathodic Protection for Pipelines - Measuring Posts K3S]
Std Drawing No. STD-00-78-16
[Cathodic Protection for Pipelines - Measuring Posts K3J, K3G / A&B]
Std Drawing No. STD-00-78-17
[Cathodic Protection for Pipelines - Measuring Posts K4 / A&B]
Std Drawing No. STD-00-78-18
[Cathodic Protection for Pipelines - Measuring Posts K4J, K4G / A&B]
Std Drawing No. STD-00-78-19
[Cathodic Protection for Pipelines - Measuring Posts K5]
Std Drawing No. STD-00-78-20
[Cathodic Protection for Pipelines - Measuring Posts K6]
Std Drawing No. STD-00-78-22
[Cathodic Protection for Pipelines - M/R Station Measuring Posts K8 at Vent Stacks]
Std Drawing No. STD-00-78-23
[Cathodic Protection for Pipelines - Measuring Posts K9]

DIN 4065
[Gas Pipelines Indicating Labels]

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1.0 SCOPE

This specification specifies Marker posts, complete with text plate for marking the route of natural gas of pipelines. Also covers Measuring posts for measuring and control of the cathodic protection of natural gas pipelines. Measuring posts are also used as Marker posts.

2.0 GENERAL REQUIREMENTS

2.1 MATERIAL

Marker and Measuring posts shall consist of a hot deep galvanized steel post with an orange (RAL 2000) polycarbonate top (aerial marker).

Measuring posts will be equipped with polycarbonate, or Polyester, or Aluminium Alloy (color grey RAL 7035) housing for the terminal board.

Material shall be frost resistant, shall withstand crushing strength of the frozen soil, and shall have fatigue strength. Material will maintain its properties being subject to sun's radiation, humidity and to temperature variations between -20°C to +60°C.

2.2 TEXT PLATE

Both Measuring and Marker posts shall be prepared for mounting of an orange (RAL 2000) background text plate, as shown on **FIGURE 4** and **FIGURE 5** respectively.

The plate shall be permanently fixed to the post so that no unauthorized personnel can move or change the orientation of the plate in respect with the pipeline's direction.

Text plates shall have provisions for inserting Owner's Telephone Number, Km position indication on the field and position of cable/pipe connections also with distance of pipeline axis in accordance with **DIN 4065**.

Insertion method must secure durability and changeability in the future.

The top of the post (aerial marker) must also indicate a 40m zone for safety purposes as it is shown on **FIGURE 2**.

2.3 DIMENSIONS

Total height of the post over the ground level shall be 160 cm (see **FIGURE 3**). Cross section of the post shall be sized so that the post can bear a horizontal load of 50 kg at its top.

The projected surface of the top head (aerial marker) of the post shall be sized so that the post can be identified from 1000m away, from all directions (proposed approximately dimension 250mm x 350mm from each side) as it is shown on **FIGURE 3**.

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3.0 **MEASURING POSTS - SPECIFIC REQUIREMENTS**

3.1 **TERMINAL BOARD'S HOUSING**

Terminal boards housing shall have enough space for convenient measurements and easy maintenance. The housing must satisfy protection IP 54 IK 08 against water, dust and impact energy.

Terminal board's housing shall be supplied with a triangular head lockscrew common for all posts.

Also the housing shall be equipped with support for terminal board predrilled and mounted with threaded plugs ready for mounting of terminal board.

The housing shall have provision for mounting of a surge arrester, cylindrical shape, approx.

Dimensions 1=120mm, d=50mm, weight=0,5 kg and flexible copper connections of 50 mm² to the terminal board.

3.2 **TERMINAL BOARD**

The board shall be 4mm clear polycarbonate, predrilled and suitable to fit to the post according to 3.1.

Each board shall be equipped with brass screws with washers and nuts, ready for mounting on the support, in the post.

Metering Jacks shall have color indication in accordance with the required types of measuring posts, in accordance with **Std Drawings No. STD-00-78-14-23** and **APPENDIX 1**.

The board shall be marked with the terminal numbers as it is also indicated in the above mentioned relevant standard drawings and **APPENDIX 1**.

The terminals to be used in the metering jacks mounted on the terminal board with star lock washers, is shown on **FIGURE 1**.

Cable clamps shall be supplied with Ø 4mm brass screws with washers and nuts for connection to the terminal board.

4.0 **INSTALLATION**

4.1 **FOOTING**

The lowest part of the post shall be embedded in a concrete (grade S220) footing. The footing shall be sized so that the post can transfer the horizontal load of 50 kp kg to the footing, with a safety factor against footing over- turning $V > 1,2$.

4.2 **MARKING OF PIPELINE ROUTE**

In open country, posts will be installed with a spacing of max 1 km so that standing at one post the next one shall be visible. All changes of direction and other characteristic points along the route will also be marked with marker posts. Major crossings shall be marked with pipeline marker at both sides.

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Marker posts shall also be installed at places where the pipeline crosses forest roads.

The exact position of marker posts shall be indicated on field by the Supervision. Generally, the posts will be founded vertically and at distance 1-2 meters at the right side of the pipeline (going from start to end). In case that this is not possible (e.g. when the pipeline is running under and parallel with a road), the post will be positioned at the closest convenient position and the text plate will indicate the exact position of the pipeline in respect to the post.

The posts shall be installed so that the text plate will be facing the pipeline and the aerial marker will be in perpendicular direction with the pipeline.

4.3 SELECTION OF MEASURING POSTS

The type of measuring post to be used in each position shall be in accordance with DESFA Specification **Job Spec. No. 799/2**.

5.0 INSPECTION AND CERTIFICATION

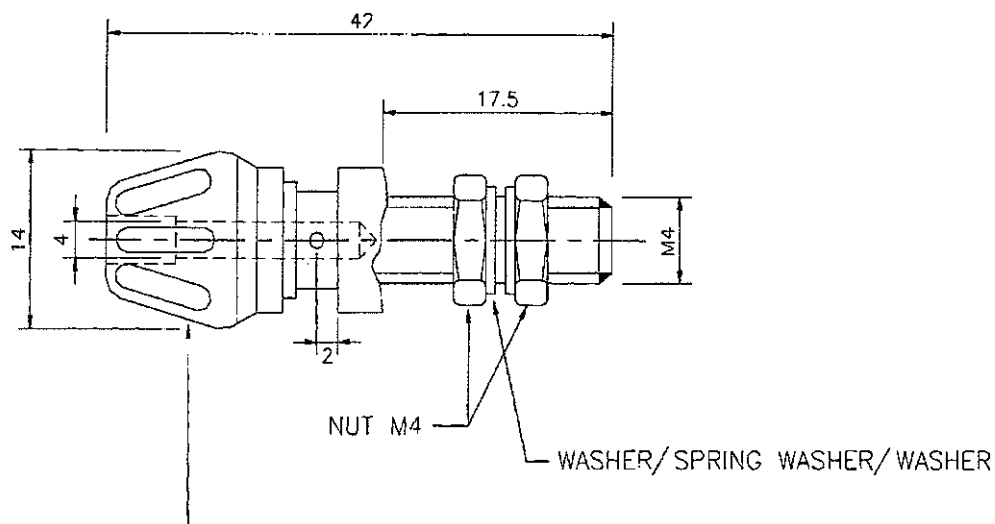
Inspection will be performed by a third party independent inspection company to be appointed by Owner.

Inspection requirements are defined in the following documents.

- a. Material requisition.
- b. DESFA specification **Job Spec. No. 970/2** "Shop inspection of equipment and materials".
- c. Relevant project specifications.
- d. Inspection clauses of applicable Standards.

Inspection procedures to be followed are detailed in Owner's document "Inspection and Test Instructions".

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COLOUR ACC. TO STANDARD CP. DRAWINGS
No: STD-00-78-14...23

DIMENSIONS IN mm
MAX CURRENT: 16A

FIGURE 1: METERING JACK FOR MEASURING POSTS

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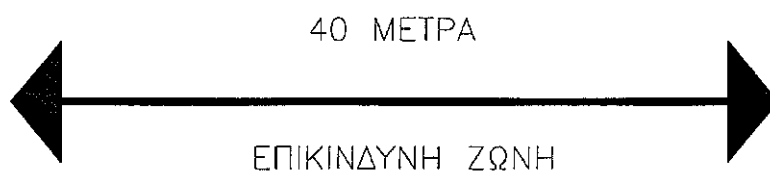
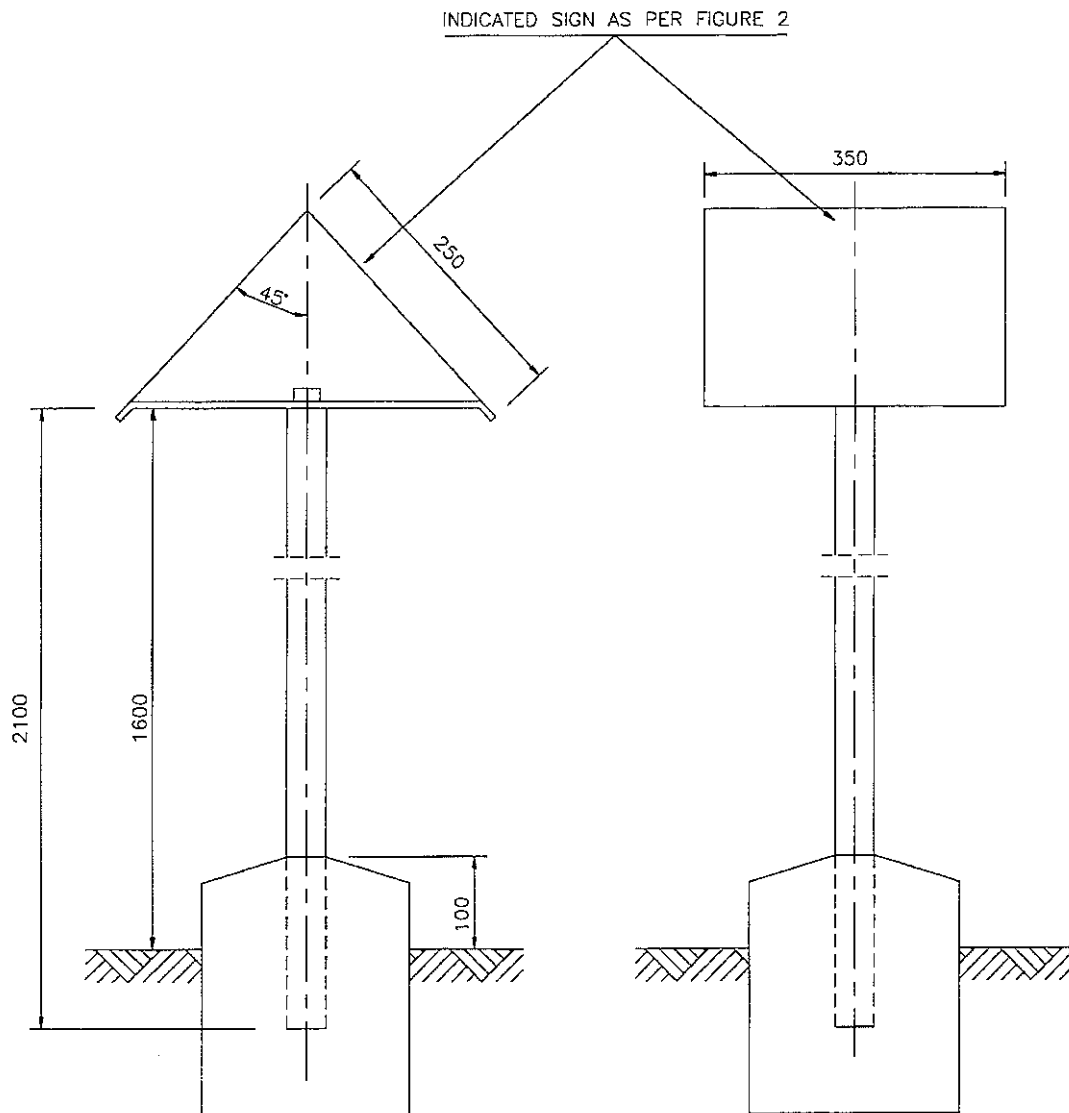


FIGURE 2: AERIAL MARKER SIGN

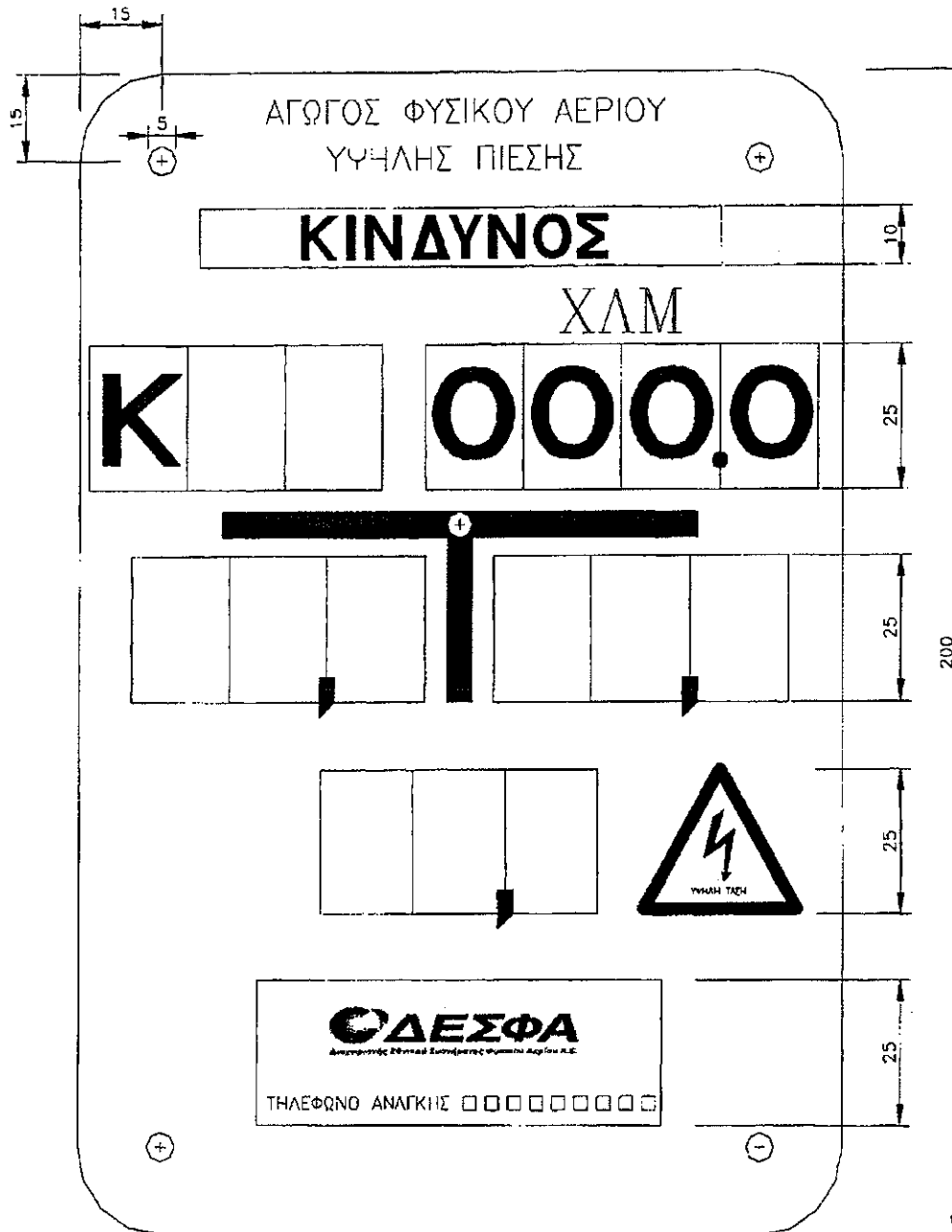
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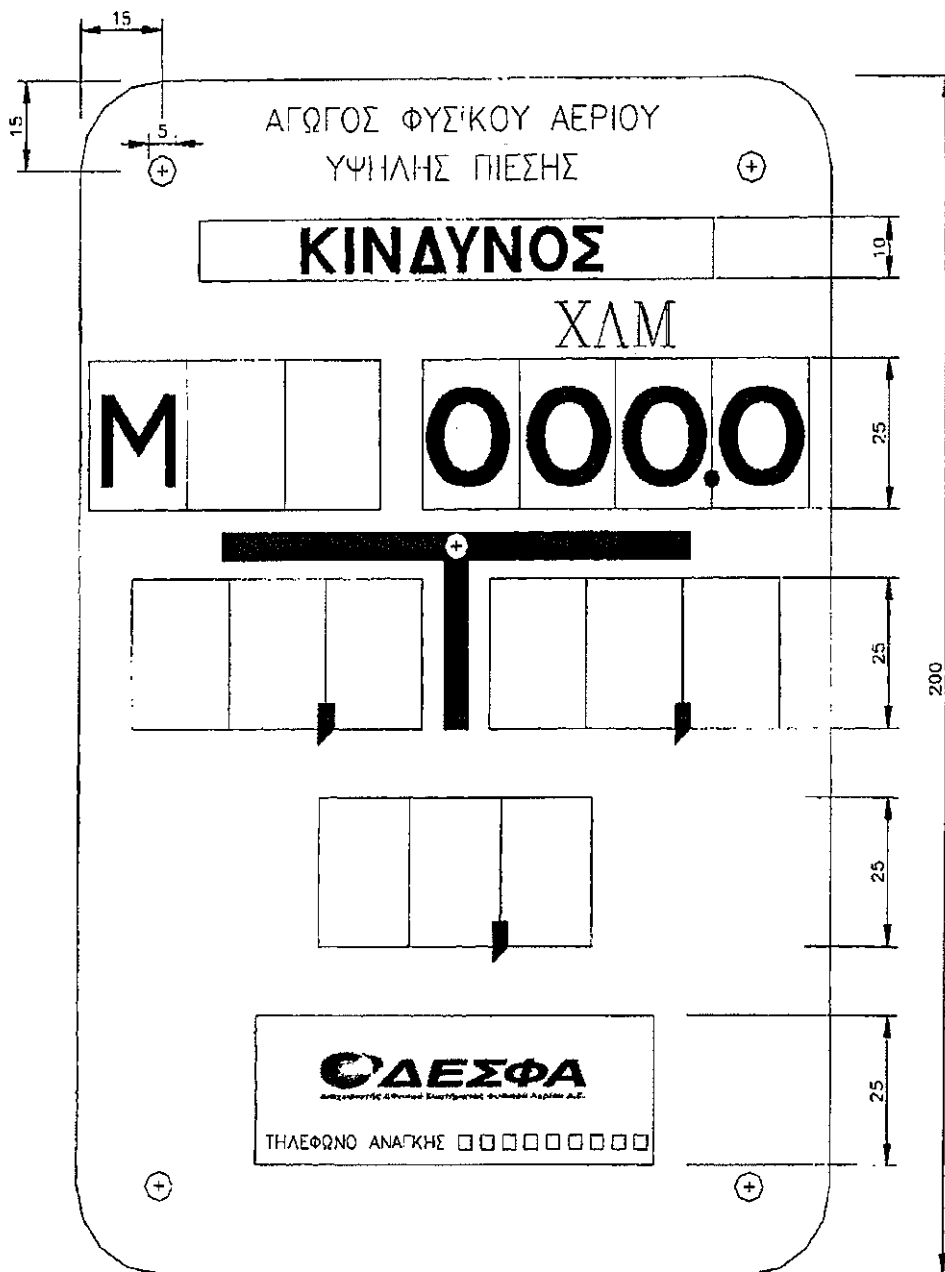
DIMENSIONS IN MM

FIGURE 3: AERIAL MARKER

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APPENDIX 1

NUMBER CODING

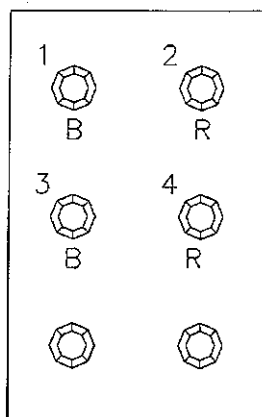
1. Connection with pipeline at a point next to post or before an insulating coupling (for voltage apply).
2. Connection with pipeline at a point away from post (50m away on the pipeline, after an insulating coupling, or foreign structures - for voltage apply).
3. Connection with pipeline at a point next to post (for line current measurement).
4. Connection with pipeline at a point away from post (50m away on the pipeline, after an insulating coupling, or foreign structures for line current measurements).
5. Connection with pipeline at a point next to post for the earthing connection.
6. Connection with earthing wire
7. 1st connection with casing.
8. 2nd connection with casing.
9. Connection with sacrificial anodebed (first connection).
10. Connection with pipeline for sacrificial anodebed (first connection).
11. Connection with sacrificial anodebed (second connection).
12. Connection with pipeline for sacrificial anodebed (second connection).
14. To steel plate probe.
16. To steel plate probe.
18. To calomel electrode.

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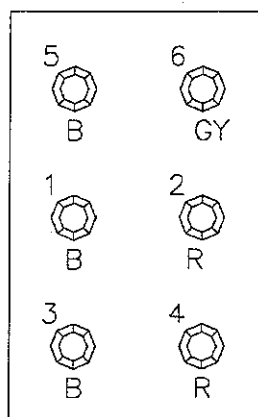
COLOR CODING

B	:	Black	Connection next to post for pipeline.
R	:	Red	Connection 50m away on the pipeline or other section (at insulating couplings).
GY	:	Green / Yellow	Connection with earthing electrode.
Y	:	Yellow	Connection with sacrificial, or calomel electrode of the polarization probe.
G	:	Green	Connection with casing.
BE	:	Blue	Connection to Foreign structures, steel plate of polarization probes.

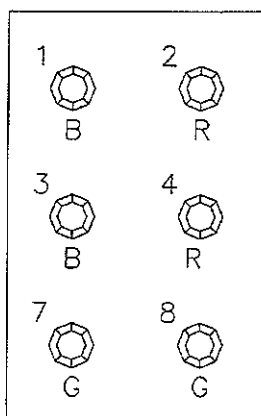
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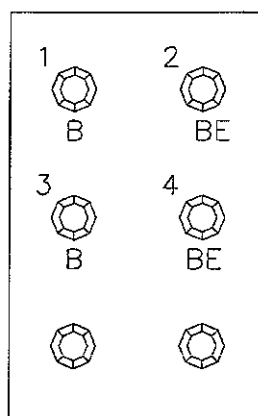
MEASURING POST TYPE K3



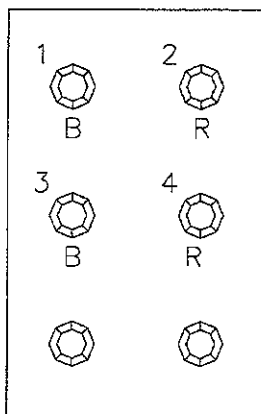
MEASURING POST TYPE K3G



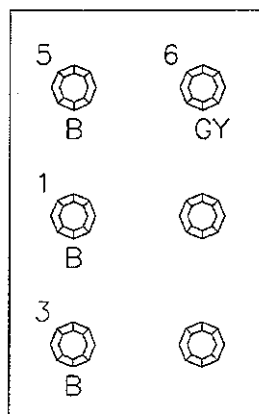
MEASURING POST TYPE K4



MEASURING POST TYPE K5



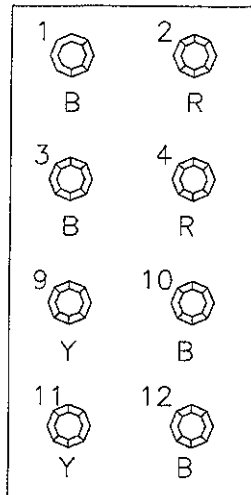
MEASURING POST TYPE K6



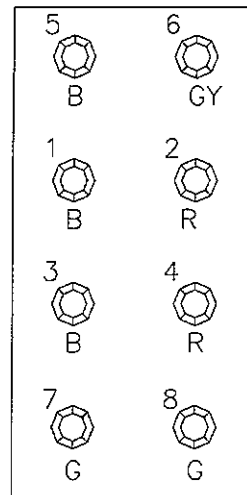
MEASURING POST TYPE K1G

TERMINAL BOARD CODING

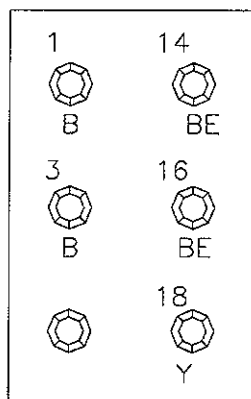
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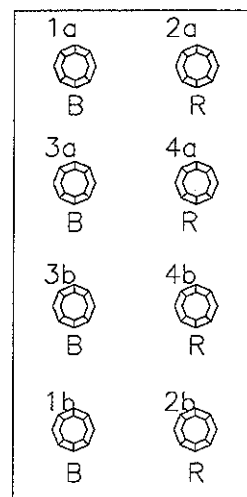
MEASURING POST TYPE K3S



MEASURING POST TYPE K4G



MEASURING POST TYPE K9



MEASURING POST TYPE K8

TERMINAL BOARD CODING