

MODULARIZED DIGITAL DISTRIBUTION PANEL

BACKGROUND OF THE INVENTION

The present invention relates to a distribution panel, and more particularly to a modularized digital distribution panel for
5 circuit distribution which has replaceable card modules for connecting electric wires to a terminal panels.

Regular digital distribution panels are commonly of fixed structure. These digital distribution panels are functional, however when a particular circuit is damaged, the whole assembly
10 must be dismounted for a repair work, or wholly replaced.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a modularized digital distribution panel which can be conveniently assembled. It is another object of the present invention to provide
15 a modularized digital distribution panel which makes the maintenance work easy. To achieve these and other objects of the present invention, there is provided a modularized digital distribution panel which comprises: a base frame having rows of pin holes, a top cover frame having rows of pin holes corresponding
20 to the pin holes on said base frame, and a row of retaining holes along a front side thereof; a terminal panel connected between the base frame and the top cover frame at a rear side, the terminal panel comprising a plurality of longitudinal insertion slots arranged in

parallel, and a plurality of terminals respectively fastened to the insertion slots, the terminals each having a retaining portion respectively fastened to the insertion slots and an elongated lead wire connecting portion extended from the retaining portion for the connection of a respective lead wire; two sets of guide rails respectively fastened to the base frame at a top side and the top cover frame at a bottom side and symmetrically arranged in parallel, the guide rails each comprising a front side wall, a back side wall, a plurality of locating pins raised from the back side wall and respectively fastened to the pin holes on the base frame and the top cover frame, and a longitudinal groove at the front side wall; and a plurality of card modules respectively inserted into the insertion slots on the terminal panel between the base frame and the top cover frame, the card modules each comprising a circuit board respectively inserted through the longitudinal grooves on the guide rails into the insertion slots on the terminal panel, the circuit board having a row of contacts forced into engagement with the retaining portions of the terminals in the corresponding insertion slot on the terminal panel, a plurality of vertically spaced lead wire pins at a front side thereof electrically connected to the circuit board for mounting lead wires, a plurality of vertically spaced terminal holes provided at the front side above said lead wire pins and electrically connected to the circuit board for receiving a respective lead wire

terminal, and a springy coupling plate suspended at a top side thereof, the springy coupling plate having a raised portion for engaging into one retaining hole on the top cover frame.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Figure 1 is a perspective view of a part of a modularized digital distribution panel according to the present invention.

Figure 2 is an exploded view of the modularized digital distribution panel shown in Figure 1.

10 Figure 3 is a sectional assembly view of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures 1 and 2, a modularized digital distribution panel in accordance with the present invention is generally comprised of a base frame 1, a top cover frame 2, a terminal panel 3, a plurality of card modules 4, a plurality of guide rails 5, and a plurality of angled lead wire holder plates 6.

20 The base frame 1 comprises pairs of pin holes 10 arranged in lines the top side wall thereof near the rear side, two screw holes 11;14 respectively provided at vertically extended front and rear side walls thereof on the middle, two pairs of through holes 12;15 respectively provided at the vertically extended front and rear side walls and bilaterally spaced from the screw holes 11;14, a front

4

extension frame 13 forwardly extended from the bottom side of the vertically extended front side wall for holding lead wires.

The top cover frame 2 comprises pairs of pin holes 21 arranged in lines near the rear side thereof corresponding to the pin holes 10 on the base frame 1, a transverse row of retaining holes 22 arranged along the front side thereof, a screw hole 24 on the middle of the downwardly extended vertical rear flange thereof, and two through holes 23 bilaterally equally spaced from the screw hole 24.

The terminal panel 3 comprises two screw holes 33 respectively provided near top and bottom sides thereof on the middle, two pairs of through holes 34 respectively equally spaced from the screw holes 33, a plurality of longitudinal insertion slots 31, and a plurality of terminals 32 respectively inserted into the insertion slots 31. The terminals 32 each comprise a retaining portion 321 respectively fastened to the insertion slots 31 and an elongated lead wire connecting portion 322 extended from the retaining portion 321 for the connection of a respective lead wire.

Each card module 4 comprises a circuit board 45 for insertion into one insertion slot 31 on the terminal panel 3, the circuit board 45 having a row of contacts 46 forced into engagement with the retaining portions 321 of the terminals 32 in the corresponding insertion slot 31, a plurality of vertically spaced

lead wire pins 44 provided at the front side thereof and electrically connected to the circuit board 45 to which lead wires may be fastened, a plurality of vertically spaced terminal holes 43 provided at the front side above the lead wire pins 44 and electrically connected to the circuit board 45 for receiving a respective lead wire terminal, and a springy coupling plate 41 suspended at the top, the springy coupling plate 41 having a raised portion 42 for engaging into one retaining hole 22 on the top cover frame 2.

Each guide rail 5 comprises two locating pins 52 raised from the back side wall thereof, and a longitudinal coupling groove 51 extended through the front side wall thereof for receiving the circuit board 45 of one card module.

Each angled lead wire holder plate 6 comprises a screw hole 62 on the middle of the vertically extended half thereof, two locating pins 63 provided at the vertically extended half and bilaterally equally spaced from the screw hole 62, and a row of lead wire slots 61 at the horizontally extended half thereof for holding lead wires.

Referring to Figure 3 and Figures 1 and 2 again, the terminal panel 3 is vertically connected between the base frame 1 and the top cover frame 2 at the rear side, the guide rails 5 are respectively fastened to the top cover frame 2 at the bottom and the

base frame 1 at the top and arranged in parallel, the card modules 4 are respectively inserted through the longitudinal grooves 51 on the guide rails 5 into the insertion slots 31 on the terminal panel 3, and the terminal holder plates 6 are respectively fastened to the terminal panel 3 at top and bottom sides and the vertically extended front side wall of the base frame 1 within the front extension frame 13. By plugging the locating pins 52 of the guide rails 5 into the pin holes 10;21 on the base frame 1 and the top cover frame 2, the guide rails 5 are respectively fastened to the base frame 1 and the top cover frame 2. One terminal holder plate 6 is fastened to the vertically extended front side wall of the base frame 1 within the front extension frame 13 by plugging the respective locating pins 63 into the respective through holes 12 and threading a screw 7 into the respective screw holes 61;11. The other two terminal holder plates 6 are respectively fastened to terminal panel 3 at different elevations by plugging the respective locating pins 63 into the respective through holes 34 on the terminal panel 3 and the corresponding through holes 23 on the top cover frame 2 and the corresponding through holes 15 on the base frame 1 and threading respective screws 7 into the respective screw holes 33 on the terminal panel 3 and the corresponding screw holes 24;14 on the top cover frame 2 and the base frame 1. When the circuit boards

45 of the card modules 4⁷ are respectively inserted into the longitudinal grooves 51 of the guide rails 5, the contacts 46 of the circuit board 45 are respectively inserted into the longitudinal terminal slots 31 on the terminal panel 3 and forced into engagement with the retaining portions 321 of the terminals 32, and at the same time the raised portions 42 of the springy coupling plates 4 of the card modules 4 are respectively forced into engagement with the retaining holes 22 on the top cover frame 2. When one card module 4 is installed, the curved front end of the respective springy coupling plate 4 is extended out of the front edge of the top cover frame 2.

Referring to Figure 3 again, an indication plate 18 is hinged to the vertical front side wall of the front extension frame 13 by hinge means 16, and locked by a lock device 17. The indication plate 18 is marked with directions for use.

Referring to Figures 1 and 3 again, when the circuit of one card module 4 is damaged, the card module 4 can be removed from the modularized digital distribution panel for a repair work. By pulling the curved front end of the springy coupling plate 41 downwards, the raised portion 42 of the springy coupling plate 4 is disengaged from the corresponding retaining hole 22 on the top cover frame 2, and therefore the respective card module 4 can be conveniently removed from the modularized digital distribution

panel.



What the invention claimed is:

1. A modularized digital distribution panel comprising:
 - a base frame having rows of pin holes,
 - a top cover frame having rows of pin holes corresponding to
 - 5 the pin holes on said base frame, and a row of retaining holes along a front side thereof;
 - a terminal panel connected between said base frame and said top cover frame at a rear side, said terminal panel comprising a plurality of longitudinal insertion slots arranged in parallel, and a
 - 10 plurality of terminals respectively fastened to said insertion slots, said terminals each having a retaining portion respectively fastened to said insertion slots and an elongated lead wire connecting portion extended from said retaining portion for the connection of a respective lead wire;
 - 15 two sets of guide rails respectively fastened to said base frame at a top side and said top cover frame at a bottom side and symmetrically arranged in parallel, said guide rails each comprising a front side wall, a back side wall, a plurality of locating pins raised from the back side wall and respectively
 - 20 fastened to the pin holes on said base frame and said top cover frame, and a longitudinal groove at the front side wall; and
 - a plurality of card modules respectively inserted into the insertion slots on said terminal panel between said base frame and



10

said top cover frame, said card modules each comprising a circuit board respectively inserted through the longitudinal grooves on said guide rails into the insertion slots on said terminal panel, said circuit board having a row of contacts forced into engagement with

5 the retaining portions of the terminals in the corresponding insertion slot on said terminal panel, a plurality of vertically spaced lead wire pins at a front side thereof electrically connected to said circuit board for mounting lead wires, a plurality of vertically spaced terminal holes provided at the front side above

10 said lead wire pins and electrically connected to said circuit board for receiving a respective lead wire terminal, and a springy coupling plate suspended at a top side thereof, said springy coupling plate having a raised portion for engaging into one retaining hole on said top cover frame.

15 2. The modularized digital distribution panel of claim 1 wherein said base frame comprises a front extension frame for receiving lead wires being connected to the terminal pins and terminal holes of said card modules.

 3. The modularized digital distribution panel of claim 1

20 further comprising a plurality of lead wire holder plates respectively fastened to said terminal panels at top and bottom sides and said base frame at a front side by screws for holding lead wires in place.



4. The modularized digital distribution panel of claim 2 wherein an indication plate is hinged to a vertical front side wall of said front extension frame by hinge means, and locked by lock means, said indication plate being marked with directions for use.