Choosing an Equipment Rack

Detailing the Basic Physical Differences Between Standard Channel Racks, Unequal Flange Racks and Network Bays

White Paper

The terms “channel”, “network” and “unequal flange” are names for racks and frames that hold electrical, optical and audio panels and shelves used in various modular applications. Various deployments include audio-video studios, computer rooms, telephone company central offices, control rooms and the like. Just about anywhere rack-mounted system components are interconnected and cross-connected.

The terms themselves have long ago lost their connections to their sources. The derivations of the terms have more to do with original manufacturing designs and commercial nomenclature than the applications for which they were intended. The terms are actually somewhat misleading to boot — for example, both network bays and unequal flange racks have unequal flanges, all of them have channeled uprights and all of them apply to network-style installations. Both data center (computer room) and telecommunications applications use all three types to one degree or another. Data centers, audio-visual installations and control rooms use channel racks almost exclusively. But telecommunications central offices rely heavily on network bays and unequal flange racks.

Basic Differences

The simple difference between channel racks versus network bays and unequal flange racks is that the upright vertical supports on channel racks have equal-width mounting-flange openings that face inward toward the center of the channel rack.

Channel racks have a *symmetrical*, standard-industrial footprint so that active and passive operational panels can be mounted to either pair of flanges on the same rack. Although the “front” versus “rear” names of all racks and bays are arbitrary terms, in some cases, front versus rear looses all meaning when applied to channel racks.

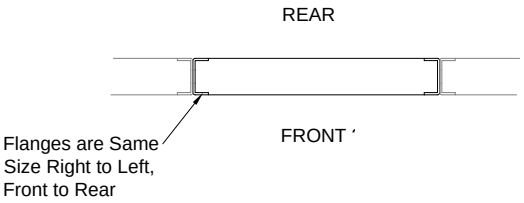


Fig. 2: Top-down view of a channel rack.

Although channel racks are sometimes used alone, all three types of frames can be bolted together to form lineups. With channel rack lineups, there are no open gaps between the racks, but not so with network bays and unequal flange racks. Network bays and unequal flange racks are designed for lining them up, shoulder to shoulder, flange edge to flange edge.

Network bays and uneven flange racks are *asymmetrical* — first off, because of the unequal flanges and also because of their footprints. Unlike the channel racks, those unequal flange openings face outward so that a gap forms between the narrow flanges on adjacent frames in the lineups.

The gaps create cable routing ducts between the frames of the lineup. If the frames support panel and shelf mounting on the narrow flange, then the lineup is said to consist of *open duct frames*. Here the duct access and panel faces are on the same side of the frame. In other words, the front of the lineup shows a gap or opening between frames.

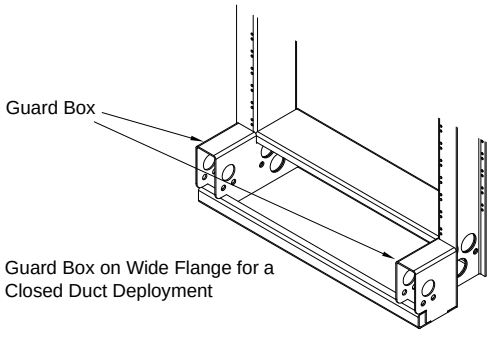


Fig. 1: Base of a channel rack.

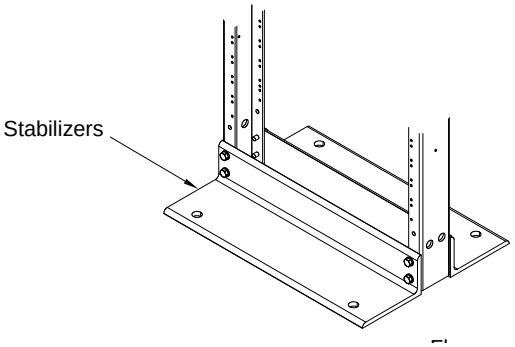


Fig. 3: Base of an unequal flange rack.

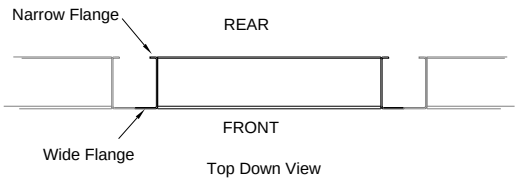


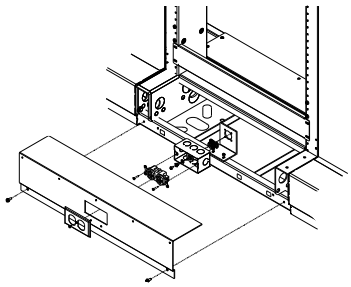
Fig. 4: Top-down view of an unequal flange rack.

Conversely, if the frames support the panels on the wide flange, then *closed duct frames* are said to comprise the lineup. In other words, the front of the lineup shows no gaps between the frames. The fronts of parallel lineups face each other across a maintenance aisle. That's where the maintenance (churning, housekeeping, testing, etc.) takes place, and it's there where ladders, carts and foot traffic are most likely to damage panels. For that reason, floor-level guard boxes are an integral part of network bays and uneven flange racks to protect against such panel damage.

Guard Boxes and Other Details

In some case, where access is frequently required to the cabling aisle at the rear of the panels, then that side too needs guard boxes. Normally, network bays and unequal flange racks come with one guard box near the foot of either the wide or narrow flange. It's at the foot of the wide flange for closed duct frames and at the foot of the narrow for open duct frames. Since optional guard boxes are available for most network bays and uneven flange racks, the designations "front" and "rear" of un-installed bays and racks are arbitrary.

The difference between network bay frames and unequal flange rack frames lies in the shape of the guard box — normally 4 inches tall for the network bay versus 6 inches tall for the unequal flange — and in the way utility power outlets, if required, are mounted to the frames and cabled down the lineup. Guard boxes for network bays are designed for externally mounted molding-style power strips whereas the unequal flange racks use standard electrical boxes mounted to the face of the guard boxes. Power cables for unequal flange racks run within the guard boxes from frame to frame.



Fog. 5: Adding an electrical outlet to an unequal flange rack.

Durability and Seismic Standards

Lastly, network bays and unequal flange racks are built to meet more robust standards than the channel racks used, for examples, in a data center or studio. The network bays and unequal flange racks used in telephony need the extra strength to survive disasters, such as earthquakes. That's not so critical in a data center or studio where you'd expect that the data and media are backed up regularly and safely stored off site to preclude a permanent loss of that information. But telecommunications is another story. In a disaster, lives may be in jeopardy — the telecommunication system *must* continue to work. Adding further reliability in earthquake prone zones, rack and bay manufacturers, like Telect, Inc., for example, offer seismic versions of network bays and unequal flange racks and the anchors for installing them. Telect's seismic frames meet the rigorous testing requirements set forth in Telcordia specification GR-63-CORE and the National Equipment Building Standard (NEBS 3) for deployment in seismic Zone 4 areas.

Seismic frames are more expensive than regular network and unequal flange frames; more gussets, heavier gauges of sheet metal, heavier casting, etc. all add to the cost. Even the cost of installing them is slightly higher because of the seismic anchors. But the cost to RBOC and CLEC telecommunication service providers is well worth the small price compared to lives saved by a telecommunication system that survives a disaster.

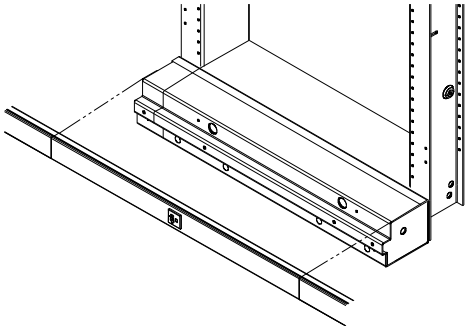


Fig. 6: Adding an electrical strip to a network bay.