

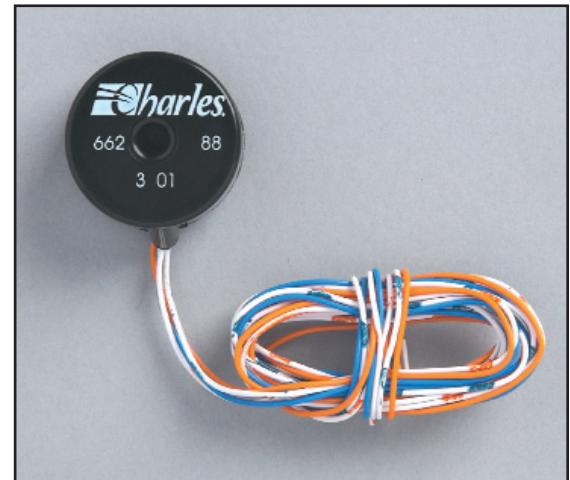
# Load Coils and Load Coil Cases

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**Superior design and performance from the leader in load coil technology**

Charles Industries' contributions to load coil technology are well documented. In 1968, the company's first product introduction was the single entry load coil, an advancement that revolutionized impedance matching across twisted pairs. The single entry load coil greatly improved voice quality on loops longer than 18,000 ft. and quickly became the standard at every major carrier.

The standard Charles load coil is the H88 (88mH inductance/6,000 ft. spacing). Other available inductances include D66 (66mH/4,500 ft. spacing), H44 (44mH/6,000 ft. spacing) and B22 (22mH/3,000 ft. spacing).



## Function and Applications

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Proper impedance termination is vital to absorb extraneous power on a twisted pair POTS circuit. Improperly matched signals and impedance loads will result in terminations that only absorb part of the signal, with the remainder being reflected back on the twisted pair. This reflected signal causes "common mode rejection," the net effect being that the original signal is interfered with by the reflected signal, causing voice quality degradation.

Load coils are placed in the circuit at specific intervals (for example, every 6,000 ft. for 88mH coils). Load coils reduce the effective capacitance of the extended copper loop, adding inductance to cancel high-frequency spectrum capacitance in order to balance the attenuation across the voice band. Loop termination is made more efficient, signal reflection is lowered and voice quality is improved.



## Line Conditioning and ADSL

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Because load coils limit the high-frequency spectrum that is used for high-speed data transmission, ADSL and other broadband connections cannot be effectively deployed on circuits loaded with standard coils. Charles' solution is the Smart Coil™ DSL Line Conditioner. Smart Coils allow loops to carry ADSL and POTS on a single copper pair. For more information on Smart Coils, please see the Smart Coil data sheet, available at [www.charlesindustries.com](http://www.charlesindustries.com).

## Load Coil Deployment

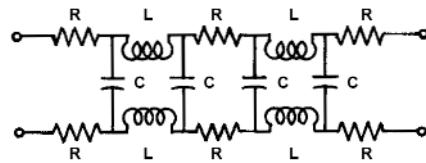
All subscriber and trunk cable facilities consist of resistance and capacitance. The resistance is determined by the length and gauge of the cable conductors. The capacity is determined by the length of the cable conductors and the spacing between the conductors.

The capacitive effect of the cable conductors has a direct relation on the voice band (300 Hz to 3,000 Hz) from any given point: the higher the frequency, the greater the loss or attenuation (i.e. 3,000 Hz would be attenuated more than 300 Hz). Adding inductance via load coils periodically into the cable cancels the capacitive effect, equalizing attenuation across the voice band. Non-loaded subscriber loops should not exceed 18,000' of cable. It is recommended that loops longer than 18,000' be loaded.

Optimum loading can be achieved by selecting the desired loading coil, measured in Millihenries, and placing them in the cable plant at prescribed intervals. An 88mH coil will cancel 6,000' of capacity; therefore the recommended spacing would be 6,000'.

Leads on Charles Load Coils are orange/white pair, blue/white twisted together to form a quad. The white tip with an orange lead are both band striped in contrasting colors to help in tracing. Pair identification is fast and easy. Lead wires used on modular load coils are compatible for use with grease filled cable.

Charles' Technical Services department is available to assist you in determining the proper placement of load coils in your network. Please call 1(800)607-8500 for assistance.



R=Resistance L=Inductance C=Capacitance

Figure 1: A typical loaded facility

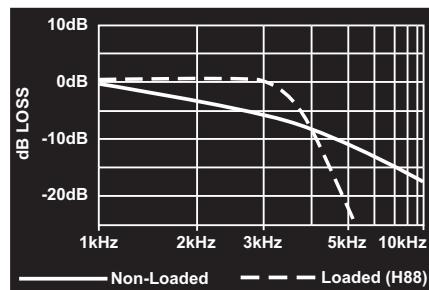


Figure 2: A loaded facility prevents signal roll-off and yields a flattened frequency response between 0 and 3.4kHz, desirable in voice traffic  
(typical response of 15Kft of 26AWG cable)

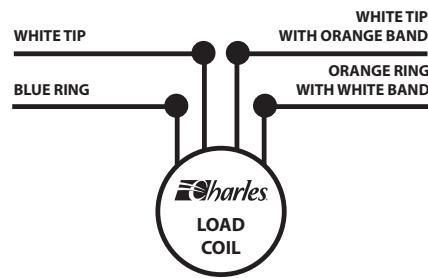


Figure 3: Load coil lead identification

## 770 Universal Load Coil Cases

Charles 770 Universal Load Coil Cases are the most convenient way to deploy large pair count applications (25 to 900 pair) of load coils in the outside plant. Each case houses H88 or D66 coils designed to be used in series with a given cable pair, reducing the capacitive effect of a given length of cable. Rugged, weather-tight polyethylene cases provide superior environmental protection in harsh outside plant conditions. The encapsulated load coils inside each case are protected from moisture, heat, dirt and impact.

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Pair Count:

- 0025 = 25 Pair
- 0050 = 50 Pair
- 0100 = 100 Pair
- 0200 = 200 Pair
- 0300 = 300 Pair
- 0400 = 400 Pair
- 0450 = 450 Pair
- 0600 = 600 Pair
- 0900 = 900 Pair

Coil Type

- 656-66 = 66mH
- 662-88 = 88mH

Cable Stub Length

- 10 = 10 ft.
- 15 = 15 ft.
- 20 = 20 ft.
- 25 = 25 ft.
- 30 = 30 ft.

Cable Stub Fill

- A = Air Core
- D = Filled (D-encapsulant)



## Features & Benefits of 770 Cases

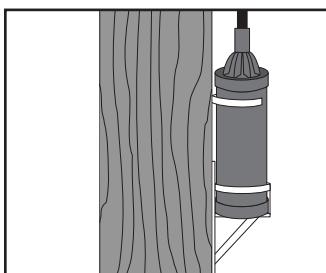
- 770 Universal Load Coil Cases are manufactured with high-grade permalloy magnetic cores. The positive rating of the core guarantees high magnetic stability assuring uniform inductance shift with varying loop current.
- High-grade, triple insulated magnet wire ensures high dielectric strength between windings. The coils are bifilar wound to ensure a balanced network.
- The rugged polyethylene case enclosure provides optimal protection against all weather conditions, ground acids and corrosive atmospheres.
- A physical bond between the stub and case provides a weather resistant seal and strain relief.
- Unitized all-molded construction provides stub strain relief.
- Positive moisture and pressure dam is effected in the neck of the case by a unique vacuum process, drawing the damming compound into the stub. This eliminates moisture migration into the case.
- Internal encapsulation of the entire case with a non-hygroscopic compound provides dielectric integrity, moisture resistance, thermal shock resistance and impact shock resistance.
- The cable stub provided is PASP type plastic insulated color coded conductors. Cable lengths may be selected in 5' increments from 10' to 30'. Stubs are 24 GA through 300 pair cases and 26 GA above 300 pair cases.
- Cases are available with H88 (88mH) and D66 (66mH) inductance coils.

## Physical Specifications of 770 Cases

Capacity	Length (in)	Diameter (in)	Weight (lb)
25 pair	5	4	9
50 pair	9	4	16
100 pair	13	4	25
200 pair	24	4	50
300 pair	12	8	75
400 pair	14	8	95
450 pair	15	8	110
600 pair	20	8	135
900 pair	28	8	189

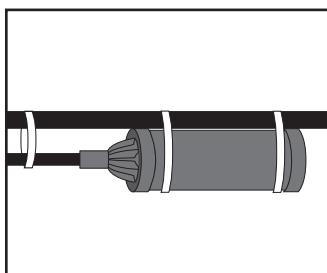
## Mounting Options of 770 Cases

Pole Mount



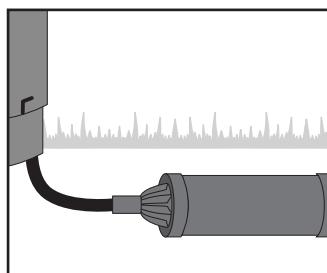
Use with polemount mounting bracket for one-man installation.

Strand Mount



Strap to cable and splice.

Direct Burial



Case may be buried with no additional preparation or hardware.

### Mounting Brackets

Part Number	Description
260027	Polemount Mounting Bracket for 4" diameter cases, aluminum
039828	Polemount Mounting Bracket for 4" diameter cases, steel
260004	Polemount Mounting Bracket for 8" diameter cases, aluminum
039829	Polemount Mounting Bracket for 8" diameter cases, steel

## Kwik Kase® Load Coil Tubes

Single load coils can be conveniently and neatly installed in terminals and pedestals with the compact Kwik Kase coil tube. The U-shaped design (a 2/3 enclosed ABS plastic tube) allows technicians to mount the tubes easily with provided bolting hardware, then add only the amount of load coils needed. Order cases and coils separately.

Kwik Kase/Charles Part #	Single Load Coils/Charles Part #
6 Pair #010091	88 mH #010053
12 Pair #010088	66 mH #010054
18 Pair #010089	44 mH #010056
25 Pair #010090	22 mH #010055



## Ready Access Load Coil Cases

Ready Access Load Coil Cases are designed for use in splice cases, buried plant housings and ready access closures. Load coils are assembled in an ABS plastic tube and totally encapsulated with a polyurethane compound. Tie straps are included for convenient mounting to enclosure backboards.

Each case is provided with fully color coded, band stripped, 36" long plastic insulated copper conductors which are compatible with filled cable. The leads are grouped IN and OUT with matching pair colors in the IN and OUT groups corresponding to the same coil. Ready Access Load Coil Cases come equipped with H88 (88mH) coils. For other inductances, please utilize Charles' Kwik Kase load coil tubes.

### Ready Access Case/Charles Part #

3 Pair #050065	12 Pair #050067
5 Pair #042376	16 Pair #050071
6 Pair #050066	18 Pair #050068
10 Pair #034226	25 Pair #050069

### Ready Access Case/Charles Part #

12 Pair #050067
16 Pair #050071
18 Pair #050068
25 Pair #050069



## Additional Information

For assistance in determining the right load coils for your application, please call Charles Industries' Technical Support Group at 1(800)607-8500. Our technical support team can assist you in determining spacing, placement, inductances and other variables for load coils, Smart Coils™, build-out capacitors (**BOC**) and build-out lattice networks (**BOLN**). For sales information, please contact your authorized Charles distributor or call 1(847)806-6300.



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