



HID

HIGH INTENSITY DISCHARGE BALLASTS

Core & Coil Ballasts

(60 Hz., Minimum Starting Temperature -20°F or -30°C)

Metal Halide



NOM

LL

Input Volts	Catalog † Number	Circuit Type	Watts Input	Max Input Current	Nom Open Circuit Voltage	Fuse Rating (Amps)	Wiring Dia	Dimensions			Non-PCB Capacitor (Page 5-44 to 5-45)				Total Weight (lbs)	Ignitor †† (Page 5-46 to 5-50)		U.L. Bench Top Rise Code 1029 (pg 5-3)	
								Fig	A	B	Mfd	Min Volt	Cap Catalog Number	Dry or Oil		Part Number	Max Dist To Lamp (ft)		
320 Watt Lamp, ANSI Code M132 or M154 or M170 (Pulse-Start)																			
277	71A5837-BP † 71A5837-001D †	Linear Reactor HPF	342	1.9	277	5	H	10	1.7	3.8	17.5	280	7C175M30RA	D	9.5	Integral Ignitor	15	A	
480/120T	71A5842-T 71A5842-001DT	Super CWA	368	.8	270	5	M	2	1.8	3.7	21	345	7C210P40-R	D	11.0	LI533-H4	2	D	
120/208/240/277	71A5892 71A5892-001D	Super CWA	368	3.3/1.9/1.7/1.4	270	8/6/5/3	M	2	1.8	3.7	21	345	7C210P40-R	D	11.0	LI533-H4	2	B/B/B/B	
120/277/347	71A58A2	Super CWA	368	3.3/1.4/1.1	270	8/4/3	M	2	1.8	3.7	21	345	7C210P40-R	D	11.0	LI533-H4	2	C/C/C/C	
127/220	71A58H2	Super CWA	365	3.0/1.7	270	8/6	M	2	1.8	3.7	21	340	7C210P40-R	D	11.0	LI533-H4	2	B/B	
120/208/240/270	71A5892-LL	Super CWA	350	3.0/1.7/1.5/1.3	275	8/6/5/3	M	2	2.3	4.1	21	345	7C210P40-R	D	14.5	LI533-H4	2	A/A/A/A	
350 Watt Lamp, ANSI Code M131 or M171 (Pulse-Start)																			
277	71A5937-BP † 71A5937-001D †	Linear Reactor HPF	375	2.1	277	5	H	10	1.9	4.0	20	280	7C200P30RA	D	10.0	Integral Ignitor	15	A	
480/120T	71A5943-T	Super CWA	400	.9	275	3	M	2	1.8	3.7	22.5	345	7C225P40-R	D	11.0	LI533-H4	2	D	
120/208/240/277	71A5993 71A5993-001D	Super CWA	400	3.4/2.0/1.7/1.5	270	10/7/5/5	M	2	1.8	3.7	22.5	345	7C225P40-R	D	11.0	LI533-H4	2	D/C/C/C/C	
120/277/347	71A59A3	Super CWA	400	3.4/1.5/1.2	275	10/5/3	M	2	1.8	3.7	22.5	345	7C225P40-R	D	11.0	LI533-H4	2	D/C/C	
277/120T	71A5934-T	Regulated Lag	403	1.5	280	4	N	3	3.1	4.8	21	480	MD2100-030	O	21.0	LI533-H4	20	B	

† Ordering information:

Replacement/retrofit ballast kits indicated by **bold type** with suffix **-001D**. 71A5837-001D and 71A5937-001D kits also include welded angle bracket. Refer to pages 5-5 to 5-9.

Original equipment ballasts - add proper suffix to catalog number:

- 500D includes core & coil with dry-film capacitor
- 510D includes core & coil with welded bracket and dry-film capacitor
- 540D includes core & coil with welded angle bracket and dry-film capacitor (Available for 71A5837-B, 71A5937-B only)
- 600 core & coil only (no capacitor)
- 610 core & coil with welded bracket (no capacitor)

†† Each ballast requiring an ignitor is furnished standard with the **Short Range** ignitor model shown for use within fixtures. If a **Long Range** ignitor is required for remote mounting, specify on order. See pages 5-46 to 5-50 for additional information.

- For CWA circuits, figure is operating current. For Linear Reactor circuits, figure is highest starting, operating, or open circuit currents.

‡ Includes auto-reset thermal protection

NOM Certified ballast available for Mexican market

LL Special High Efficiency/Low Loss Magnetic Ballast

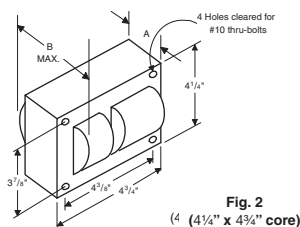


Fig. 2
(4 1/4" x 3 3/4" core)

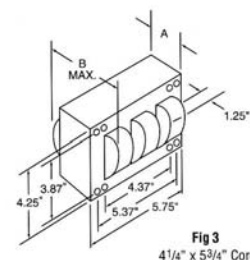


Fig. 3
4 1/4" x 5 3/4" Core

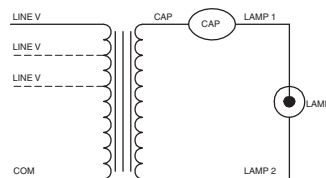


Fig. P

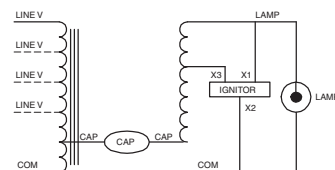


Fig. M

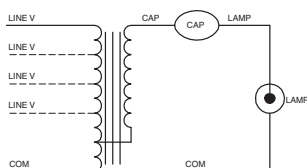


Fig. A

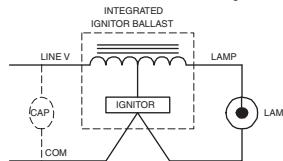


Fig. H

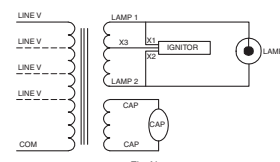


Fig. N





HID

HIGH INTENSITY DISCHARGE BALLASTS

Core & Coil Ballasts

(60 Hz., Minimum Starting Temperature -20°F or -30°C)

Metal Halide



NOM

Input Volts	Catalog † Number	Circuit Type	Watts Input	Max* Input Current	Nom Open Circuit Voltage	Fuse Rating (Amps)	Wiring Dia	Dimensions			Non-PCB Capacitor (Page 5-44 to 5-45)				Total Weight (lbs)	Ignitor †† (Page 5-46 to 5-50)		U.L. Bench Top Rise Code 1029 (pg 5-3)	
								Fig	A	B	Mfd	Min Volt	Cap Catalog Number	Dry or Oil		Part Number	Max Dist To Lamp (ft)		
35/39 Watt Lamp, ANSI Code M130																			
120	71A5005-P❖	HX-NPF HX-HPF	55	1.5 1.1	230	4 3	F	6	.9	1.8	28	120	7C280M12RA	D	2.0 2.2	LI533-H4	15	A	
120/277	71A5081	HX-NPF HX-HPF	56	1.6/.7 .9/.4	230	4/2 3/1	K	1	.8	2.1	5	280	7C050L30A	D	3.3 3.5	LI533-H4	15	B/A	
277	71A5037-P❖	R-NPF R-HPF	48	.7 .6	277	2	G	9	.8	1.9	5	280	7C050L30A	D	1.6 1.8	LI533-H4	10	A	
277	71A5037-BP❖	R-NPF R-HPF	48	.7 .6	277	2	H	9	1.0	2.7	5	280	7C050L30A	D	1.7 1.9	Integral Ignitor	2	A	
277	71A5037-J❖	R-NPF R-HPF	48	.7 .6	277	2	J	11	1.0	3.0	5	280	7C050L30A	D	1.9 2.0	J-Box with Integral Ignitor	2	A	
50 Watt Lamp, ANSI Code M110 or M148																			
120	71A5105-P❖	HX-NPF HX-HPF	69	2.0 1.1	260	5 3	F	6	1.0	1.9	28	120	7C280M12RA	D	2.3	LI533-H4	15	A	
120/277	71A5181 71A5181-001D	HX-HPF	72	1.0/.5	260	3/2	K	1	1.2	2.1	6	280	7C060L30RA	D	4.0	LI533-H4	10	A/A	
120/208/ 240/277	71A5191	HX-HPF	67	1.2/.68/ .59/.51	254	3/3/ 2/2	K	1	1.2	2.3	6	280	7C060L30RA	D	4.0	LI533-H4	10	A/A A/A	
277	71A5137-P❖	R-NPF R-HPF	62	.7 .6	277	2	G	9	1.1	2.2	5	280	7C050L30A	D	2.0 2.2	LI533-H4	2	A	
277	71A5137-BP❖	R-NPF R-HPF	62	.7 .6	277	2	H	9	1.1	2.6	5	280	7C050L30A	D	2.0 2.2	Integral Ignitor	2	A	
277	71A5137-J❖	R-NPF R-HPF	62	.7 .6	277	2	J	11	1.1	3.3	5	280	7C050L30A	D	2.3 2.5	J-Box with Integral Ignitor	2	C	

† Ordering information:

Replacement/retrofit ballast kits indicated by **bold type** with suffix **-001D**.

Refer to pages 5-5 to 5-9.

Original equipment ballasts - add proper suffix to catalog number:

- 500D includes core & coil with dry-film capacitor
- 510D includes core & coil with welded bracket and dry-film capacitor
- 600 core & coil only (no capacitor)
- 610 core & coil with welded bracket (no capacitor)

• For HX and R circuits, figure is highest of starting, operating or open circuit current.

†† Each ballast requiring an ignitor is furnished standard with the **Short Range** ignitor model shown for use within fixtures. If a **Long Range** ignitor is required for remote mounting, specify on order. See pages 5-46 to 5-50 for additional information.

❖ Includes auto-reset thermal protection

NOM Certified ballast available for Mexican market

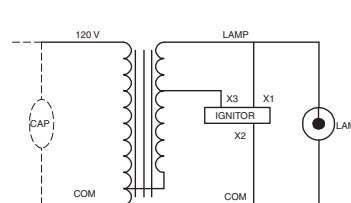


Fig. F

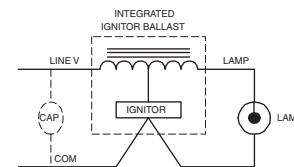


Fig. H

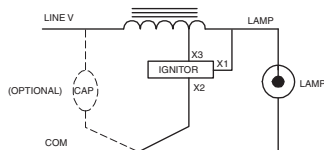


Fig. G

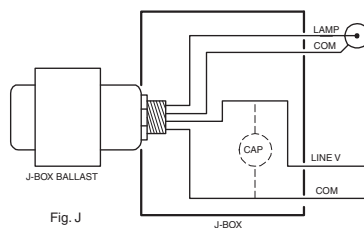


Fig. J

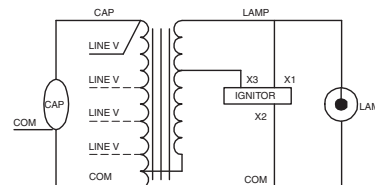


Fig. K



ADVANCE® HID Lamp Ballasts are available to operate the wide variety of mercury, metal halide, high pressure sodium and low pressure sodium lamps available in today's marketplace.

Like fluorescent, HID lamps are electric discharge lamps. Light is produced by an arc discharge between two electrodes located at opposite ends of an arc tube within the lamp's outer glass envelope. The ballast is the lamp's power supply; its purpose is to provide proper starting and operating voltage and current to initiate and sustain this arc.

LAMP STARTING Mercury and Probe-Start Metal Halide Lamps

Mercury and the "traditional" probe-start metal halide lamps (175 through 1500 watt) have an additional electrode located at one end of the arc tube to assist in lamp starting. These types of lamps require an open circuit voltage (OCV) approximately two times the lamp's operating voltage to initiate the arc.

High Pressure Sodium and Pulse-Start Metal Halide Lamps

High pressure sodium and modern metal halide lamps which include existing lamps, 150 watt and less, as well as the new generation of pulse-start metal halide lamps, 150 watt and greater, have no starting electrodes. In addition to an OCV of approximately two times the lamp voltage, these lamps utilize an "ignitor" to provide a high voltage starting pulse directly across the main electrodes. Once the lamp's arc is established, the ignitor automatically stops delivering pulses, and the lamp comes up to full brightness on its own.

Low Pressure Sodium

Because they have neither a starting electrode nor an ignitor, low pressure sodium lamps require an open circuit voltage approximately three to seven times the lamp voltage to start and sustain the lamp.

LAMP OPERATION

Electric discharge lamps have a negative resistance characteristic which causes them to draw an increasing amount of current leading to immediate destruction if operated directly from the power line. The ballast, therefore, is utilized to limit the current to the correct level for proper operation of the lamp.

Ballast factor is defined as the ratio of light output produced by a lamp operating on a commercial ballast versus the lamp's rated light output. Advance HID ballasts have a nominal ballast factor of 1.0, thus providing full light output.

HID lamps take several minutes to warm-up and reach full lumen output. Additionally, an interruption in the input power or a sudden voltage drop may cause the arc to extinguish. A lamp that is hot will not restart immediately. Before the lamp will relight, it must cool sufficiently to reduce the vapor pressure within the arc tube to a point where the arc will restrike. The approximate warmup and restriking times of the HID lamp groups are as follows:

LIGHT SOURCE	WARM-UP TIME	RESTRIKE TIME
Mercury Vapor	5-7 minutes	3-6 minutes
Metal Halide (Probe-Start)	3-4 minutes	10-20 minutes
Metal Halide (Pulse-Start)	2 minutes	3-4 minutes
High Pressure Sodium	3-4 minutes	1/2-1 minute
Low Pressure Sodium	7-10 minutes	3-12 seconds

BALLAST INPUT VOLTAGES

Unlike fluorescent lighting which is operated on either 120 volt or 277 volt circuits, power for HID lighting in the U.S. is delivered at any one of five voltages: 120V, 208V, 240V, 277V or 480V. While 120V and 277V are the most popular, because of the heavier loads and sometimes longer runs associated with HID lighting (such as shopping mall parking lots), 208V and 240V power is often used instead of 120V, and 480V instead of 277V.

To address this multiplicity of voltages, the HID ballast industry offers ballasts with multiple input voltage taps on the primary coil. Advance's

4-tap design is called a Quadri-Volt® ballast and operates on either 120V, 208V, 240V or 277V power. There is an Advance Quadri-Volt® ballast for virtually every HID lamp on the market. New 5-TAP™ designs, which feature the same input voltages as Quadri-Volt® ballasts plus 480V, are available for 250W, 400W, and 1000W metal halide and high pressure sodium applications.

FIXTURE FUSING

Many HID lighting fixtures are sold with protective fuses. The purpose of the fuse is to isolate a fixture from the lighting circuit in the event of excessive current draw, such as might be caused by a failed ballast. Unfortunately, the fuse will not protect the ballast from failure, as it is often the failed ballast itself that is causing the high current draw.

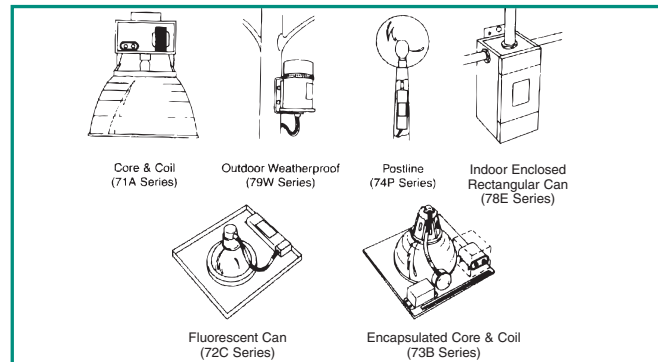
With many fixtures the fuse is physically located in the ballast compartment of the fixture. The air temperature within this compartment can easily reach 80°C and still be within the design limitations of the fixture.

Many fuses are temperature sensitive, meaning that the current rating goes down as the ambient temperature goes up. Fuse current ratings are based on the fuse's performance in a 25°C ambient (77°F). In an 80°C ambient, some fuses will open at half their rating.

As a result, the fuse rating shown in the HID ballast tables is calculated at 2½ to 3 times the highest current draw of the ballast: lamp operating, starting or open circuit conditions. Standard or slow-blow fuses should be used. Fast-blow fuses should be avoided as ballast in-rush currents during power turn-on could cause these fuses to blow unnecessarily. It is not necessary to use current limiting fuses.

BALLAST DESIGN APPLICATIONS

HID lamp ballasts are available in a variety of shapes and sizes for the most popular lighting applications. Six basic designs are in widest use today.



Core & Coil

The basic ballast is the open core & coil which is most often used as a component within a lighting fixture. The core & coil also forms the nucleus of the five other ballast configurations detailed in this section. It consists of either one, two or three copper coils on a core (or "stack") of electrical-grade steel laminations. The coils are assembled to core sections which are then surface-welded together. At Advance Transformer Co. the assembled ballast is vacuum impregnated with a silica-filled polyester varnish to re-enforce the electrical insulation, preclude moisture, inhibit noise, and dissipate heat. Advance utilizes a vacuum-pressure impregnation process. Most other HID ballast manufacturers apply varnish via a preheat-and-dip process which only puts a thin coat of varnish on the outer surface of the ballast. Advance Core & Coil ballasts feature as standard an insulation system rated class H (180°C maximum coil hot spot temp.) for ballasts below 600 watts, and ADVANCE Class N (200°C maximum coil hot spot temp.) for ballasts 600 watts and higher. When performing in-fixture testing, the maximum allowable average coil temperature (measured by the rise-of-resistance method) is 165°C for class H ballasts or 185°C for ADVANCE Class N ballasts. The maximum allowable coil face or lead wire temperature (measured by thermocouple) is 150°C for both class H and ADVANCE Class N ballasts.

Encapsulated Core & Coil

Where quiet performance is required, the standard open core & coil ballasts are encapsulated (potted) in a cube-shaped steel can utilizing Class H (180°C) polyester compound. These ballasts carry a Class A noise rating up through 175 watts and Class B for 250 and 400 watts. As with the open core & coil, the capacitor (and ignitor where included) are mounted separately within the fixture.

Ballasts with Aluminum Secondary Coil

Advance offers a wide range of ballasts that have primary coil made out of copper and secondary coil made out of aluminum. All Advance ballasts including ballasts with aluminum secondary coil adhere to ANSI specifications and are certified by respective agencies (UL, CSA, etc.). Aluminum ballasts are designated by -A after ballast Catalog number and/or "AL" on wiring diagram.

Fluorescent Can (F-Can)

For indoor commercial applications of HID lighting such as offices, schools and retail stores, ballast noise must be minimized. Ballasts for these fixtures are most often encased and potted in fluorescent ballast type cans and utilize Class A (90°C) asphalt insulating materials (the same as used in fluorescent lamp ballasts).

The Advance line of F-can ballasts comes in two dual-voltage configurations: 120/277 volt for the US market, and 120/347 volt for the Canadian market. Each unit has built-in, automatically resetting, thermal protectors which disconnect the ballast from the power line in the event of overheating. All units are high power factor and include the capacitor within the can. All models for high pressure sodium, low-wattage metal halide, and pulse-start metal halide lamps also include the ignitor in the can.

Spacing between ballasts and the mounting surface must be considered when the ballasts are remote-mounted. Twelve inches between ballasts must be maintained and if multiple rows vertically are used, there should be at least 12 inches between rows. In addition to ballast and row spacing, the ballast must not be directly mounted to a non-metallic surface. They must be spaced with mounting brackets (available from Advance) to allow airflow under the ballast base.

Indoor Enclosed

These units are designed for use indoors where the ballast must be mounted remotely from the luminaire. They are most typically used in factories where the luminaire may be mounted in a high-bay where very high ambient temperatures may be experienced. In these instances, the remotely-mounted ballast operates cooler, subsequently providing longer life because it is away from both the heat of the ceiling ambient and lamp heat within the fixture.

The case contains the core & coil potted in a Class H (180°C) heat-dissipating resin. The capacitor(s) and ignitor are contained within a separate compartment. Knockouts in both ends of the case facilitate hook-up in the most convenient manner. Wall mounting is accomplished through flanges on the top and bottom of the case. The ballast is a UL Listed product.

Outdoor Weatherproof

Weatherproof ballasts are designed for remote, pole-mounting outdoor applications under all weather conditions. They may also be placed inside of a transformer pole base, but care must be taken to avoid areas prone to flooding because weatherproof ballasts are not water-submersible.

The core & coil with its capacitor and ignitor (where required) are firmly mounted to the heat-sink base. An aluminum cover is placed over the core-&-coil assembly and is bolted with a weather-tight gasket to the base. An integral 1" threaded nipple with locknut facilities hook-up to electrical conduit or to the mounting bracket when used on a pole. The weatherproof ballast may also be placed nipple-up, with a drip loop in the leads, inside a pole base.

Postline

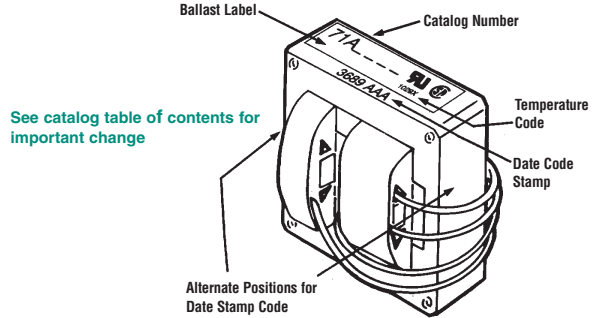
Lantern-type fixtures mounted on slender poles often require ballasts which will fit into these poles. Special, elongated core & coil ballasts are potted in resin in cylindrical cans having a 2.55" outside diameter. All include leads necessary for direct connection to a photocell.

The capacitor and ignitor (where required) are included within this can. A 1/2" threaded nipple is used for vertical mounting, and leads

extend from both ends of the can for ease of installation. The input leads to the ballast also provide for proper connection to the photocell if such is included within the fixture.

To help prevent overheating, one to three feet of air space should be allowed in the pole above the ballast, and the ballast should be positioned against the post interior wall to provide a heat-sink. All units rated 100W and above now include a mounting kit consisting of an 18" chain to hang the ballast within the pole and a spring clip to force the ballast's cylindrical can to make line contact with the pole's interior surface to maximize heat transfer, thus prolonging the ballast life.

BALLAST DATE AND TEMPERATURE CODES



ADVANCE® HID Core & Coil ballasts are date stamped on either the top surface or the side surface of the ballast core. The four-digit number represents the *week* and *year* of manufacture. The first two numbers indicate the *week* and the last two indicate the *year* the ballast was manufactured. The example shows a ballast manufactured during the 36th week of 1989. The three letters are an Advance factory code. The ballast's UL Bench Top Rise Temperature Code is shown on the label (see below).

UL BENCH TOP RISE TEMPERATURE CODE

To facilitate UL inspection, each ballast's UL Bench Top Rise Temperature Code is shown on the Advance Core & Coil ballast label as 1029X, where 1029 is the UL Standard for HID Ballasts, and the X is the temperature code: A, B, C, etc. If a fixture is UL listed for 1029C, then automatically, all ballasts with an A, B, or C temperature classification are acceptable for use within that same fixture.

UL Bench Top Rise Letter Code	Temperature Range for Class H (180°C) Ballasts	Temperature Range for Class N (200°C) Ballasts
A	less than 75°C	less than 95°C
B	75°C < 80°C	95°C < 100°C
C	80°C < 85°C	100°C < 105°C
D	85°C < 90°C	105°C < 110°C
E	90°C < 95°C	110°C < 115°C
F	95°C < 100°C	115°C < 120°C
etc.	etc.	etc.

CERTIFICATIONS



Indicates ballast is listed by Underwriters Laboratories, Inc. in accordance with UL 1029 Standard for HID Ballasts. Each ballast is marked appropriately.



Indicates ballast is component recognized by Underwriters Laboratories, Inc. in accordance with UL 1029 Standard for HID Ballasts. Each ballast is marked appropriately.



Indicates ballast is certified by Canadian Standards Association in accordance with CAN/GSA-22.2 No. 74-92. Each ballast is marked appropriately.



All HID Ballasts are designed and manufactured in accordance with the American National Standards Institute Standard for HID Ballasts, ANSI C82.4.



Indicates ballast is certified and compliant with "Norma Obligatoria Mexicana" (NOM) requirements



HIGH INTENSITY DISCHARGE BALLASTS

Core & Coil Replacement Kits

HIGH POWER FACTOR SOUND RATED A

Distributor Kits and Replacement Ignitors

Advance furnishes 120/208/240/277 Quadri-Volt® core & coil ballasts to allow the stocking distributor to conveniently meet the replacement and retrofit needs of customers. In addition, Advance now offers 120/208/240/277/480 volt 5-TAP™ core & coil ballasts for the most popular applications. 5-TAP™ ballasts add the 480 volt input lead to the Quadri-volt designs. A Quadri-Volt or 5-TAP™ core & coil, along with the appropriate capacitor, ignitor (where required), mounting bracket & hardware and installation instructions are packed in a space-saving shipping carton. These “kits” eliminate the need for distributors or end-users to stock loose components of single voltage ballasts for 120, 208, 240, 277, and even some 480 volt applications, though single voltage kits for 480 volt applications will also be available.

Ignitors are also packaged in individual cartons for replacement needs. There are several different ignitors to meet the needs of the many different lamps. The appropriate ignitor for each ballast is shown in the far right column on the page in this Atlas where the ballast is listed. Additionally, this information is summarized in the tables on pages 5-46 through 5-50.



Dry Capacitors

We have extended the operating voltage range of our dry capacitors from 330 to 400 volts. This means that our most popular HID replacement kits for 175, 250, and 400-watt metal halide lamps now contain dry capacitors and offer the additional benefits available only with a dry capacitor.

Those benefits are:

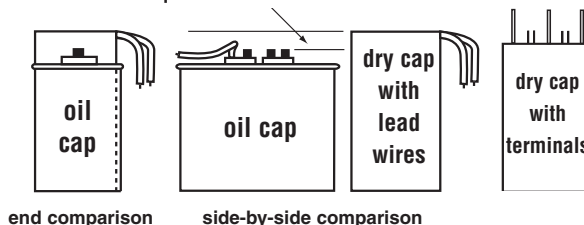
- Dry capacitors are typically 25 to 50% smaller than their oil-filled counterparts, assuring that the Advance ballast kit will fit existing fixtures.
- Dry capacitors are rated 105°C, 15°C higher than 90°C oil-filled capacitors, thus assuring longer component life.
- Dry capacitors are built using a thermoplastic case, thus eliminating the need for grounding and insuring a faster, easier replacement.
- Unlike oil-filled capacitors with exposed tab terminals, dry capacitors have no exposed live parts and thus protect end-users from hazardous voltages.
- For customers who prefer connecting dry capacitors via flag terminals (similar to oil-filled capacitors) a new line of dry capacitors with terminals is available. See page 5-45 for a full line of offerings.

The bottom line is that our expanded use of dry capacitors makes the contractor's job faster and easier. **Look for the “D” at the end of our catalog number, it identifies the ballast kit as one that contains a dry capacitor!**

Capacitor Size Comparison

Oil-Filled vs. Advance Dry Type

5/8" required clearance for terminals



Kit Options

HID Replacement Ballast Kit	Pages	Includes Core & Coil, Capacitor, Ignitor (where required), and Complete Mounting Hardware for ALL Components	Includes 5-TAP Ballast Where Available	Carton Has Space for A Distributor-Supplied Lamp	Premium-Grade Clear Lamp Included	Easy-Carry Handle On Carton
71A (standard)	5-5,6,7,8,9	✓	✓			
77K (Val-U-Pak)	5-10	✓		✓		✓
77L (Val-U-Pak PLUS)	5-11	✓	✓		✓	✓

HID