ASCO Power Technologies
6255 Halle Drive
Cleveland, OH 44125

T (216) 573 7600
F (216) 573 5953

www.emersonnetworkpower.com/loadbank

SUBMITTAL BILL OF MATERIAL

Pub 5500	**Avtron K711 Radiator Mounted, Resistive Load Bank**
SB2203	**Avtron K711 Radiator Mounted Load Bank Outline**
SB2196	**Avtron K711 Remote Control Panel Enclosure with ADMS**
C21399	**Avtron Control Power Transformer**
D36481	**Avtron K711 Load Bank Control Schematic & Interconnect**
C21408 Diagram	**Avtron K711 Radiator Load Bank Power Schematic & Wiring**

BOM# 1195729

Qty (1)

AVTRON Series 1100 K711 UL/ULc Listed Radiator/Duct Mounted Load Bank,

Generator Rating: 1500 KW

Load Bank Rating: 550 KW at 480 Volts AC, 3 Phase, 60 Hertz, 361 Amps per Phase

Tolerance: -0 to +5% overall Load Tolerance at rated Voltage.

Duty Cycle: Rated for continuous operation.

Load Steps: 50, 100, 200, 200 KW

Cooling Air: The load bank is designed to utilize the engine cooling air.

Control Power: 120 VAC, 1 Phase, 60 Hertz. An Integral Control Power Transformer is provided for control circuit operation.

Operator Controls: Remote Control Panel housed in a NEMA-4 wall mount enclosure.

Auto Load Dump Circuit: drops load bank from external contact control.

Load Elements: Avtron Helidyne™ Resistor Load Elements, No cool down period required!

Safety Features: Branch circuit fuses and an over-temperature switch is provided.

AVTRON

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Construction: The load bank is open frame construction designed for installation and operation indoors.

Load Connections: Copper bus bars with NEMA pattern or a single 3-phase power distribution block.

Mounting Features: The duct adapters or the 2” top/bottom mounting flanges can be utilized for mounting.

ASCO Avtron 1100, 1200 Load Banks

The ASCO Model 1100, 1200 (formerly Avtron K711, K711A) Load Banks are resistive, radiator AC load bank designed for duct or radiator mounting when up to 1250 kW of load is required.

1100, 1200 Load Banks

The ASCO Avtron 1100, 1200 load banks *(part of the 1000 SERIES radiator load bank product range)* are designed for duct or radiator mounting and are available in a variety of frame dimensions. The load banks are permanently mounted to the front of the engine generator and sized to match the radiator or exhaust duct opening. The 1100, 1200 load banks utilize the engine cooling air rather than an internal cooling fan found on conventional load banks.

The primary cause of premature diesel engine failure is "wet-stacking" which is literally "wet" unburned fuel accumulating in the engine exhaust ("stack"), due to under-loading of the generator. Diesel engines that are lightly loaded or allowed to idle for long periods never reach their recommended full operating temperature. Over time, this unburned fuel coats the combustion chamber and pistons with a thick coating of tar and carbon build-up, reducing efficiency and life span of the engine considerably. A supplemental radiator load bank helps to "burn-off" these harmful carbon deposits, greatly increasing engine life.

These units are offered in 208, 240, 480 or 600 volt versions (at 60 Hz) or 380, 400, or 416 volt versions (at 50 Hz). Load rating varies and ranges between 5 and 1250 kW. Most engine manufacturers recommend sizing the radiator load bank to 40-60% of engine nameplate rating to eliminate "wet-stacking" problems.

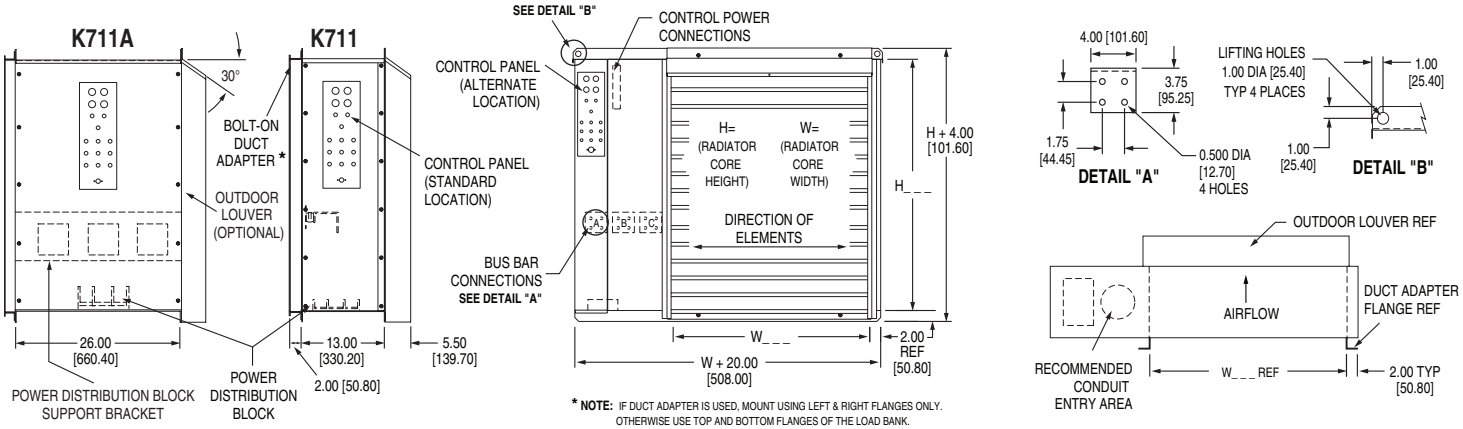
The 1100, 1200 load banks are controlled from a built-in control panel which contains the individual load-step toggle switches. The control panel is also available sized for standard 19" [482.6] rack mounting when remote installation of the panel is desired.

Features

- Economical - Uses Engine Air for Cooling
- Reduces "Wet-Stacking" Problems
- Provides Load for Routine Generator Testing
- Corrosion Resistant Aluminized Steel Frame
- Includes Lifting Eyes and Duct Flange for Easy Installation

ASCO®

For more information on the 1100, 1200 or any other 1000 SERIES load bank please contact a member of our sales team at LBsales@VertivCo.com or 216-573-7600.



All dimensions are in inches [millimeters].
Specifications subject to change without notice.

Specifications

Construction

Formed aluminized steel frame provides a rigid enclosure to match the height and width of the engine radiator or duct. Lifting eyes and a radiator duct flange are included to simplify installation. The standard 1100 depth is 13" [330.2]. For applications where the amount of load element kW required exceeds the available 13" depth, then a "double-deep" 1200 can be used instead, with a 26" [660.4] depth. Designed for NEMA-1 indoor installation, the 1100, 1200 are also available in NEMA-3R outdoor construction as an option.

Control Power

The 1100, 1200 requires external control power of 120 VAC, single phase, 50/60 Hz. A control power transformer is available as an option for sites where 120 VAC is not readily available.

Cooling

The 1100, 1200 does not have its own cooling system. Instead, it relies on cooling air from the engine driven radiator fan or separately powered duct blowers. A built-in thermal switch drops all load if an overtemperature condition is detected.

Controls

The local control panel contains a POWER ON -OFF switch, a MASTER LOAD ON-OFF switch, and individual load step toggle switches for application of individual load sections. A MANUAL/AUTO switch is also provided (if the optional automatic load step controller is included). A remote rack-mounted control panel with wall-mounted enclosure is available as an option.

Resistor Elements

The fully supported Avtron Helidyne resistive load elements are made of corrosion resistant chromium alloy wire and are engineered to operate at conservative temperature ratings. This provides more stable loading, extends resistance element operating life, and eliminates the need for a cool down period after load bank operation.

Ordering Details

Superior ASCO quality combined with simple operation and maintenance will provide years of trouble free service.

ASCO's extensive line of Load Bank and Industrial Resistor Products are solid performers used throughout the world.

For total technical support or additional information, please contact us at (216) 573-7600 or LBsales@VertivCo.com.

Quality System Certified to ISO 9001

Load Capacity Ratings

Load Step Resolution kW varies based upon capacity

Rated kW	60 Hz	50 Hz
Customer Specified	208, 240, 480, or 600 V available	380, 400, or 416 V available

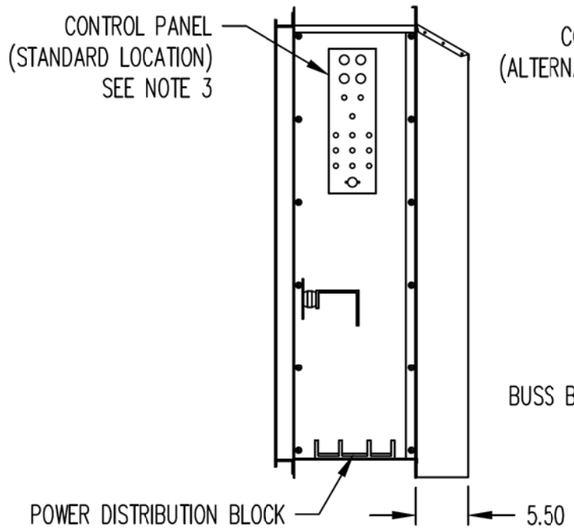
Load Bank Weight (approx.)
varies based on capacity and frame size

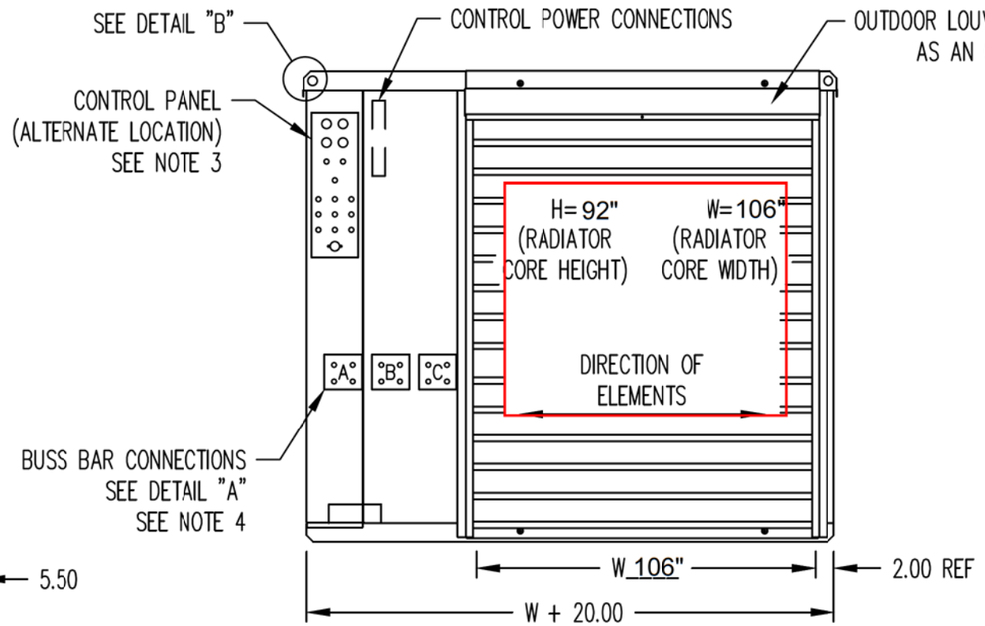
Load Bank Options

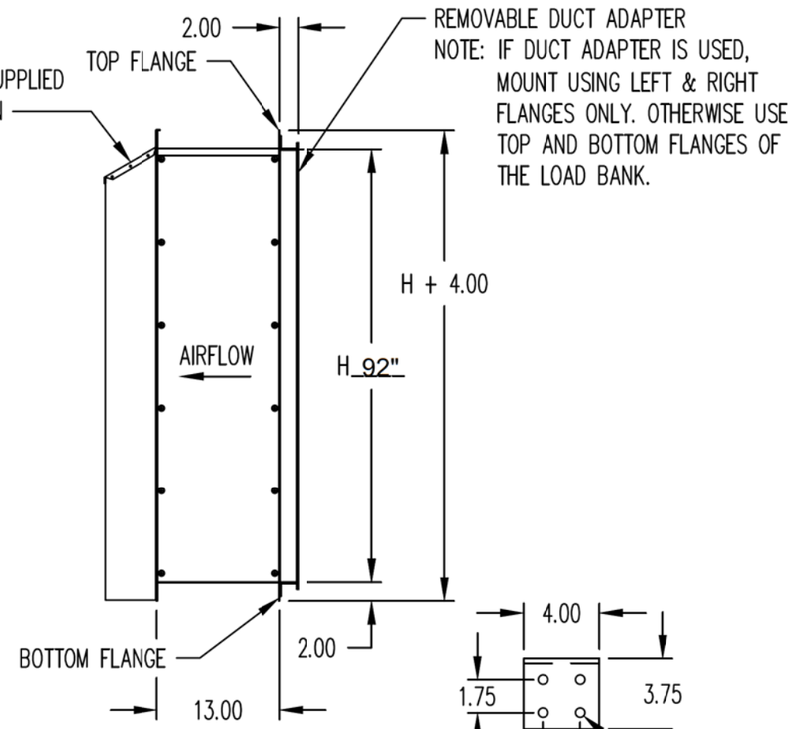
- ADMS Digital Metering (V, A, kW, Hz) with Communicator EXT Data Logging Software, Remote Mounted
- Control Power Transformer
- Remote Control Panel with Enclosure
- Automatic Load Step Controller
- Outdoor Construction with Bolt-On Louver Assembly
- Remote IO for Interface with Switch Gear

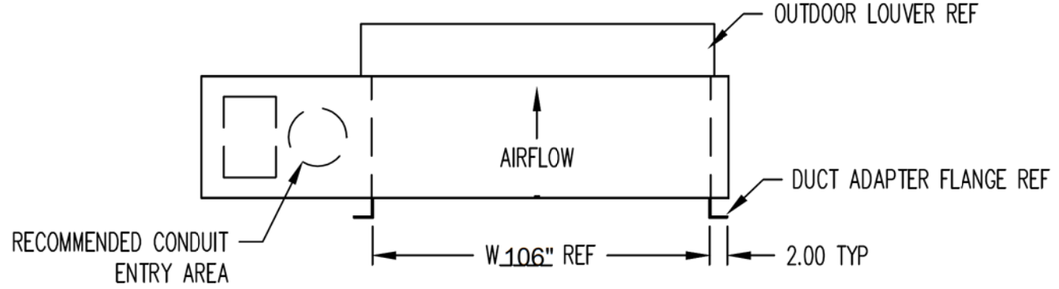
Avtron is a brand of ASCO Power Technologies
6255 Halle Drive, Cleveland, Ohio 44125, U.S.A.
www.avtronloadbank.com • 1-216-573-7600

 Publication 5500 • Rev. -









BOTTOM VIEW

FOR APPLICATION ENGINEERING USAGE ONLY

4. POWER DISTRIBUTION BLOCK OR BUSS BARS SUPPLIED DEPENDING ON LOAD BANK VOLTAGE AND KW.
3. THE CONTROL PANEL IS NOT AT THIS LOCATION IF IT IS SUPPLIED OPTIONALLY AS A REMOTE 19" RACK MOUNT COMPONENT OR IF IT'S MOUNTED ON THE EXHAUST SIDE OF THE LOAD BANK AS SHOWN ALTERNATELY.
2. ALL DIMENSIONS ARE APPROX.
1. WEIGHT:

NOTES:

REV. TO SHEET	ECN NO.	BY	APP.	DATE
H	LA2191	JRF	JPH	9/15/15
	REVISED TITLEBLOCK			
G	CE640	JJF	DWS	11/13/06
	ADDED BOTTOM VIEW			
F	CD980	JAF	JWE	3/15/05
	REVISED PER ECN			
E	CD734	JAF	KAK	6/28/04
	REVISED & REDRAWN PER ECN			

PROJECT NAME:

LOAD BANK, 711 (OUTLINE)

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	EJ	5/13/92
CHECKED		
PROJECT APPROVAL		
FINAL APPROVAL	DTB	5/13/92

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

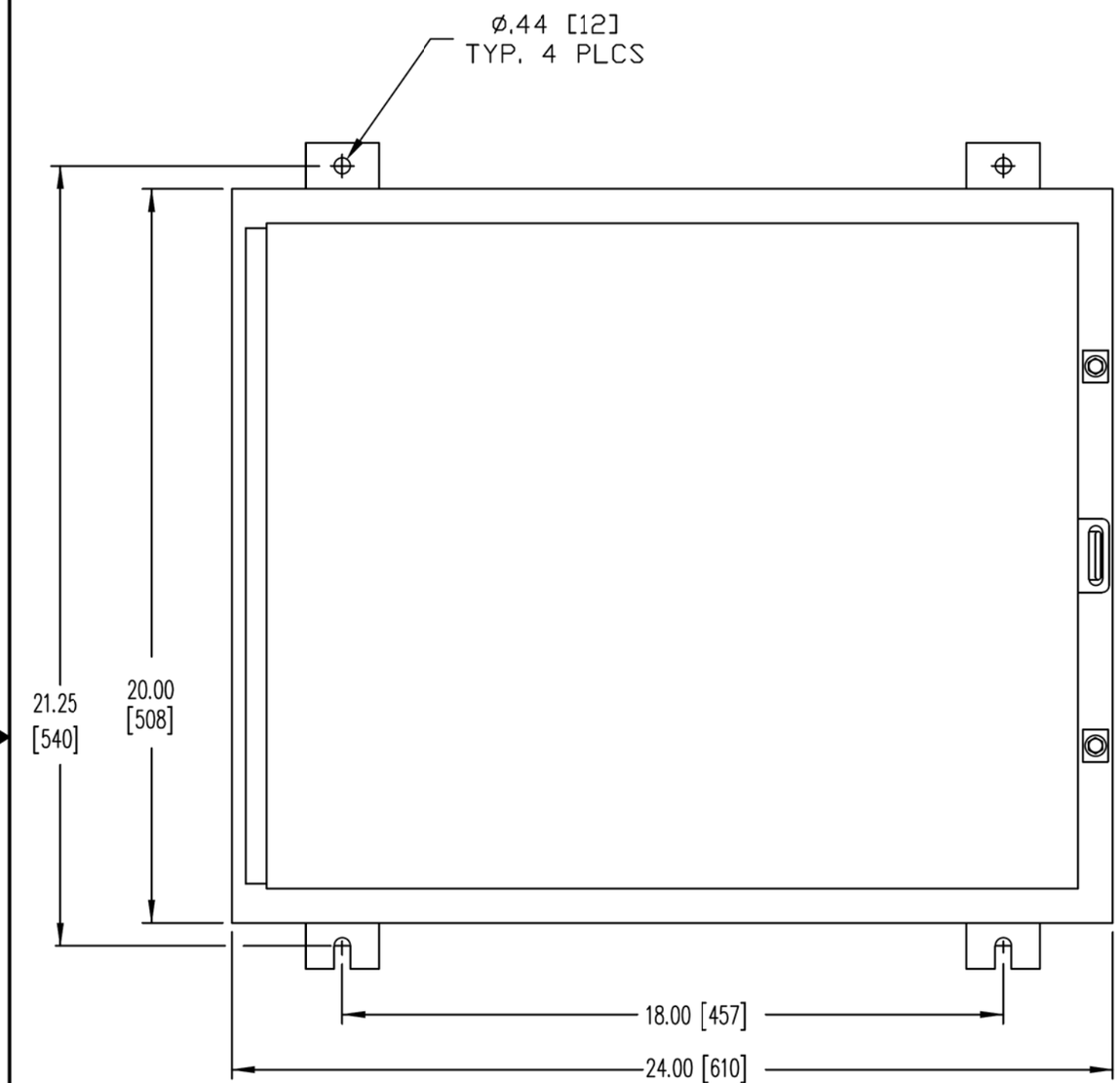
ASCO® ASCO Power Technologies, L.P.
FLORHAM PARK, NEW JERSEY 07932 U.S.A.

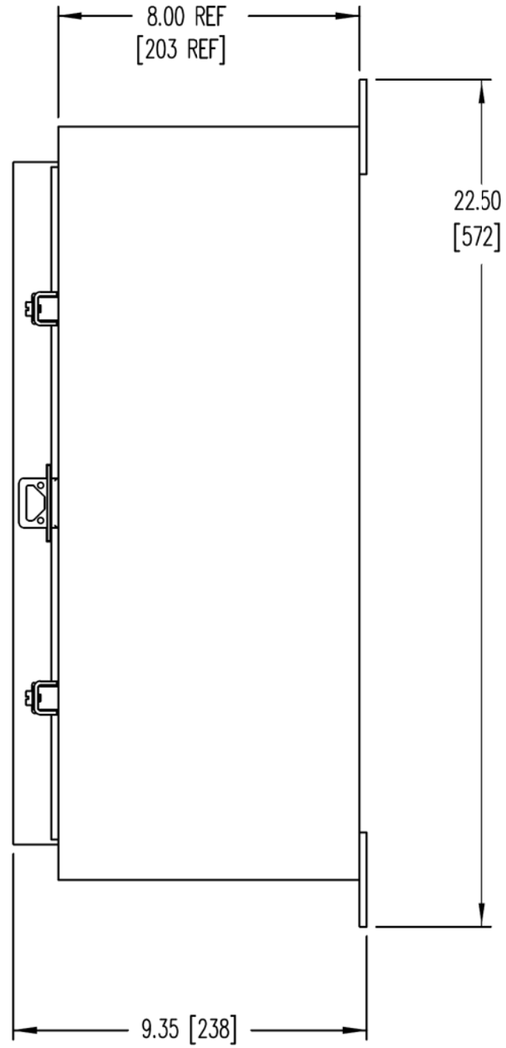
COMPUTER GENERATED DRAWING

SCALE 1/16" = 1" | SIZE BS

DWG. NO. SB2203

DRAWING REV. H | ECN NO. LA2191 | SHEET 1 OF 1





FOR APPLICATION ENGINEERING USAGE ONLY

REV. TO SHEET	ECN NO.	BY	APP.	DATE
B	LA2849	AVC	JPH	6/2/17
	ADD METRIC DIMENSIONS			
A	CF709	RGR	DK	4/22/09
	ADD METRIC DIMENSIONS			

PROJECT NAME:

ENCLOSURE,
WALL MOUNT, TYPE NEMA 4

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	BH	4/27/92
CHECKED		
PROJECT APPROVAL	AM	4/27/92
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-I-003. FOR PLASTIC PARTS SEE MP-I-055

ASSEM. REF. NO.

ASCO® ASCO POWER TECHNOLOGIES, L.P.
FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

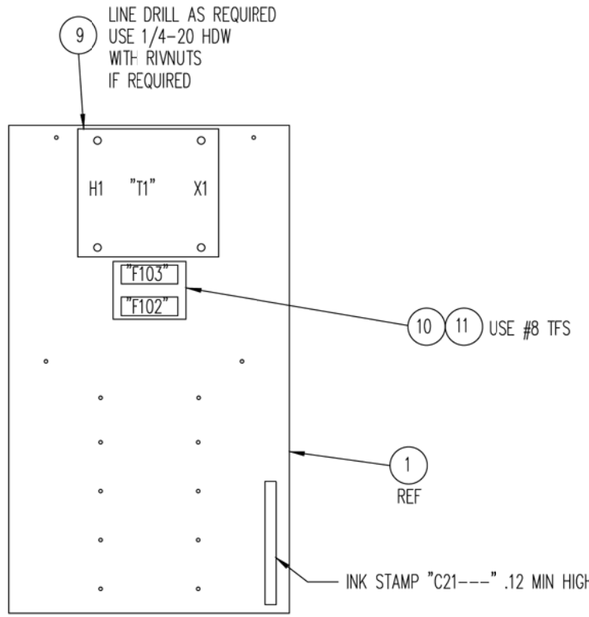
SCALE 1:1 | SIZE BS

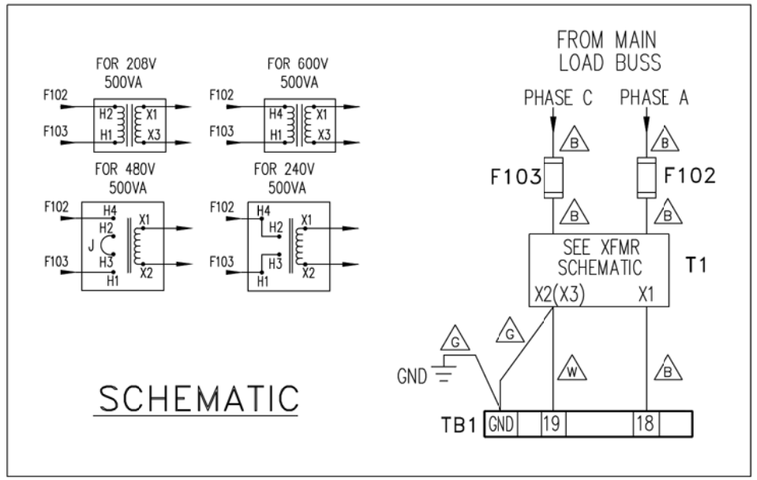
DWG. NO. SB2196

DRAWING REV. B | ECN NO. LA2849 | SHEET 1 OF 1

3. DIMENSION ARE IN INCHES [mm].
2. ALL DIMENSIONS ARE APPROX.
1. WEIGHT: 60 LBS [27.2 KG]

NOTES:





600 VOLT			480 VOLT			240 VOLT			208 VOLT		
F102,103	324452	2	F102,103	324453	2	F102,103	324762	2	F102,103	324454	2
XF102,103	324615	1	XF102,103	324615	1	XF102,103	324615	1	XF102,103	324615	1
T1	371032	1	T1	370984	1	T1	370984	1	T1	371524	1
	C21390	1REF		C21390	1REF		C21390	1REF		C21390	1REF
DESIG	PART NO.	NO. REQD	DESIG	PART NO.	NO. REQD	DESIG	PART NO.	NO. REQD	DESIG	PART NO.	NO. REQD
C21400			C21399			C21398			C21397		

ITEM NO.	NO. REQD	PART NO.	DESCRIPTION	MATERIAL	DISPOSITION
12					
11			FUSE		
10			FUSEBLOCK		
9			TRANSFORMER		
8					
7					
6					
5					
4					
3					
2					
1			PANEL, OPTIONS	PART OF FRAME ASSY	

LIST OF MATERIAL

WIRE CODE:

(B) – INDICATES WIRE TO BE BLACK #16 AWG (PN 390008)

(W) – INDICATES WIRE TO BE WHITE #16 AWG (PN 390008)

(G) – INDICATES WIRE TO BE GREEN #16 AWG (PN 390008)

1 – FOR K711A, ITEM 1 IS A D24798 PANEL.

REV. TO SHEET	ECN NO.	BY	APP.	DATE
M	LA2191	JRF	JPH	9/15/15
	REVISED PER ECN			
L	LA1428	JRF	DK	11/5/13
	REVISED TRANSFORMER RATINGS			
K	LA0632	JAF	CMK	4/18/11
	REVISED PER ECN			
J	CE420	JAF	PPP	4/14/06
	REVISED PER ECN			

PROJECT NAME:

OPTIONS, CONTROL TRANSFORMER

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	JZ	6/22/92
CHECKED		
PROJECT APPROVAL	DTB	9/9/92
FINAL APPROVAL	GW	9/10/92

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-I-003. FOR PLASTIC PARTS SEE MP-I-055

ASSEM. REF. NO.

ASCO® ASCO POWER TECHNOLOGIES, L.P.
FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE 1:1 SIZE CS

DWG. NO. C21397

DRAWING REV. M ECN NO. LA2191 SHEET 1 OF 1

K711 LOAD BANK

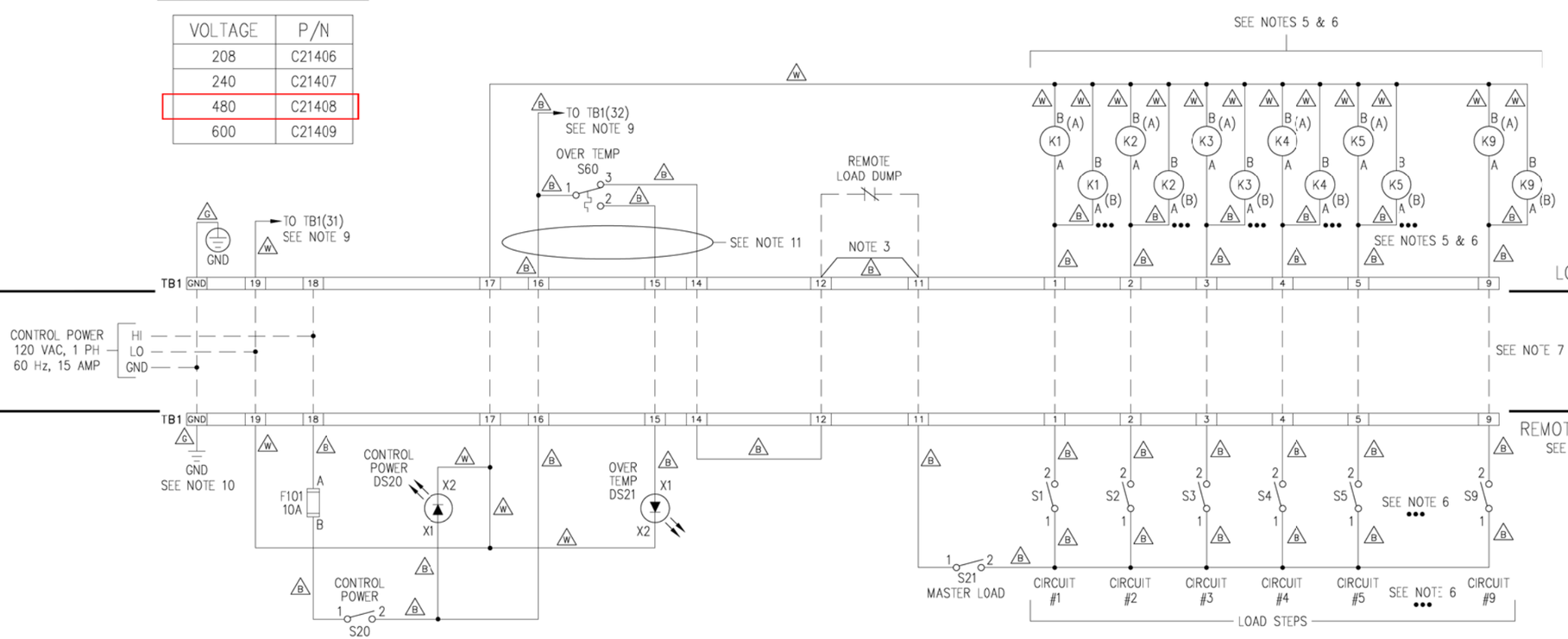
LOAD INPUT
3 PH, 60 HZ
USE COPPER CONDUCTORS ONLY RATED AT 75°C MINIMUM

A
B
C
TO LOAD STEPS SEE NOTE 4

GROUND STUD

TABLE, POWER SCHEMATIC

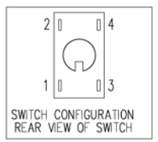
VOLTAGE	P/N
208	C21406
240	C21407
480	C21408
600	C21409



CONTROL PANEL

6. THE NUMBER OF CIRCUITS AND SWITCHES IS DEPENDENT ON THE NUMBER OF LOAD STEPS.
5. IF MORE THAN QTY(1) RELAY PER LOAD CIRCUIT USE A,B,••• TO DIFFERENTIATE THE RELAYS WITHIN THE LOAD CIRCUIT.
4. RESISTIVE ELEMENTS, RELAY CONTACTS, AND LOAD STEP FUSING SHOWN ON THE POWER SCHEMATIC. (SEE TABLE) FOR K711B REF ITEMS (35–38) OF K711B DRAWING.
3. FOR REMOTE LOAD DUMP IN THE MANUAL MODE REMOVE JUMPER AND INSTALL N/C CONTACT.
2. ---- DASH LINES REPRESENT CUSTOMER WIRING.
   ——— SOLID LINES REPRESENT AVTRON WIRING.
1. WIRE CODE:
   (B) – INDICATES WIRE TO BE BLACK #16 AWG (PN 390008)
   (W) – INDICATES WIRE TO BE WHITE #16 AWG (PN 390008)
   (G) – INDICATES WIRE TO BE GREEN #16 AWG (PN 390008)

11. FOR K711B ONLY– WIRES TO BE INSTALLED BY CUSTOMER, MIN #14 AWG. OTHERWISE AVTRON TO WIRE.
10. RUN GROUND WIRE TO BOLT OF F101 MOUNTING.
9. WIRE ONLY IF METERING IS SPECIFIED, (SEE TOP ASSY).
8. ON LOAD BANKS WITH A REMOTE CONTROL PANEL, (SEE TOP ASSY), SEE NOTE 7. IF THE CONTROL PANEL IS LOCAL THE 2 TB1'S ARE THE SAME PART.
7. ON LOAD BANKS WITH A REMOTE CONTROL PANEL, (SEE TOP ASSY), THERE WILL BE A "TB1" ON THE REMOTE CONTROL PANEL AND ON THE LOAD BANK, CUSTOMER IS TO WIRE "TB1" ON THE LOAD BANK TO "TB1" ON THE REMOTE CONTROL PANEL.



SWITCHES S1–S9,S20 & S21

REV. TO SHEET	ECN NO.	BY	APP.	DATE	REVISED PER ECN
D	LA2191	JRF	JPH	9/15/15	REVISED PER ECN
C	CE730	JAF	DWS	1/30/07	REVISE NOTE 4, ADD NOTE 11
B	CE345	JAF	DWS	3/7/06	REVISED PER ECN
A	CD850	JJF	KAK	11/9/04	REVISED PER ECN

PROJECT NAME:

SCHEMATIC/INTERCONNECTION DIAGRAM

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	JAF	5/19/04
CHECKED	JJF	6/3/04
PROJECT APPROVAL	KAK	6/2/04
FINAL APPROVAL	AV	6/16/04

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

COMPUTER GENERATED DRAWING

SCALE 1:1 SIZE DS

DWG. NO. D36481

DRAWING REV. D ECN NO. LA2191 SHEET 1 OF 1

ASCO® ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

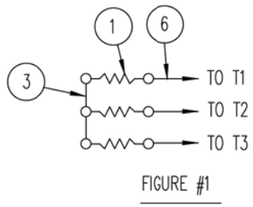
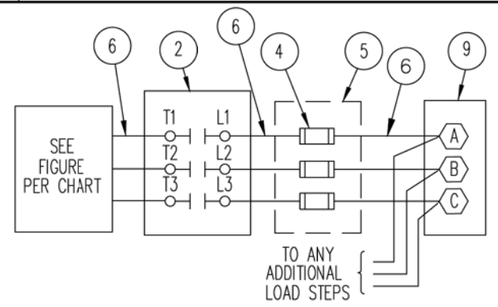


FIGURE #1



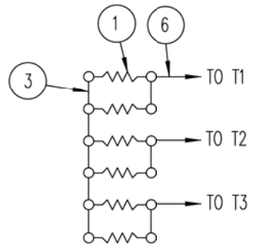


FIGURE #2

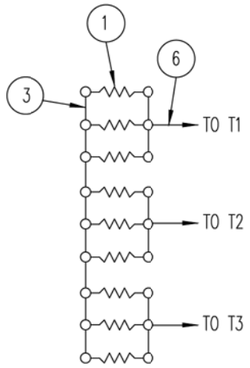


FIGURE #3

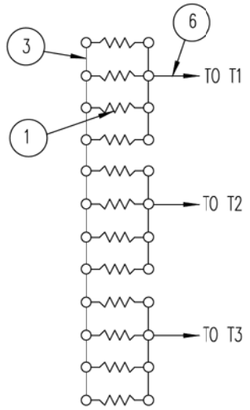


FIGURE #4

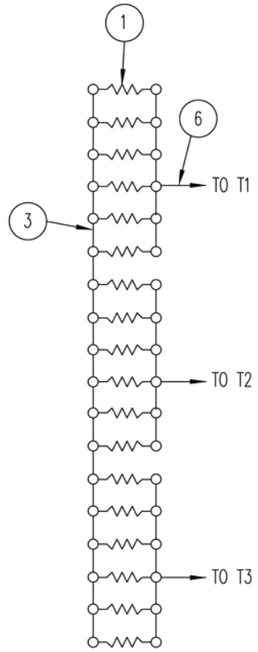


FIGURE #5

LOAD STEP CONFIGURATION GUIDE

EXAMPLE PART NO:

K711-26-30-480F-A2BC-A,B

THIS DEFINES THE LOAD STEP CONFIGURATION AS

A = 1 LOAD STEP OF 5KW
2B = 2 LOAD STEPS OF 10KW
C = 1 LOAD STEP OF 15KW

PER KEY BELOW

APPLY THE ABOVE EXAMPLE TO ACTUAL PART NO. OF ANY MODEL K711 LOAD BANK. REFER TO MATERIAL TABULATION AND THE APPLICABLE LOAD STEP DIAGRAM FIGURE.

KEY	
LETTER	LOAD STEPS
A	5KW
B	10KW
C	15KW
D	20KW
E	25KW
F	50KW
G	100KW
H	200KW
J	400KW

THIS IS REFERENCE INFORMATION, PARTS AND TOTAL QUANTITIES ARE SPECIFIED ON THE MFG TOP ASSEMBLY DRAWING.

																										10	
SEE POWER DISTRIBUTION BLOCK CHART																										9	POWER DISTR BLOCK
NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	8	RESISTOR
x1	FIG.#2	x1	FIG.#4	x1	FIG.#5	x1	FIG.#1	x1	FIG.#2	x1	FIG.#3	x1	FIG.#1	x1	FIG.#2	x1	FIG. #3	x1	FIG.#1	x1	FIG.#2	x1	FIG.#1	x1	FIG.#2	x1	FIG.#1	7	LOAD STEP DIAGRAM
AR	390323	AR	390323	AR	390323	AR	390322	AR	390322	AR	390322	AR	390321	AR	390321	AR	390321	AR	390735	AR	390735	AR	390736	AR	390736	AR	390736	6	WIRE (BLACK)
1	324967	1	324967	1	324967	1	324660	1	324660	1	324660	1	324977	1	324977	1	324977	1	324977	1	324977	1	324977	1	324977	1	324977	5	FUSEBLOCK
3	324420	3	324420	3	324420	3	324419	3	324419	3	324419	3	324742	3	324742	3	324742	3	324483	3	324483	3	324481	3	324481	3	324480	4	FUSE
8	602050	20	602050	32	602050	2	602050	8	602050	14	602050	2	602050	8	602050	14	602050	2	602050	8	602050	2	602050	8	602050	2	602050	3	BUS LINK
1	B14796	1	B14796	1	B14796	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	1	B14795	2	RELAY
6	606337	12	606344	18	606068	3	606337	6	606344	9	606068	3	606338	6	606346	9	606070	3	606342	6	606069	3	606346	6	606350	3	606350	1	RESISTOR
QTY	P/N 50KW STEP W >39	QTY	P/N 50KW STEP 27<W<39	QTY	P/N 50KW STEP W <27	QTY	P/N 25KW STEP W >39	QTY	P/N 25KW STEP 27<W<39	QTY	P/N 25KW STEP W <27	QTY	P/N 20KW STEP W >35	QTY	P/N 20KW STEP 27<W<35	QTY	P/N 20KW STEP W <27	QTY	P/N 15KW STEP W >33	QTY	P/N 15KW STEP W <33	QTY	P/N 10KW STEP W >27	QTY	P/N 10KW STEP W <27	QTY	P/N 5KW STEP	ITEM NO.	DESCRIPTION

POWER DISTRIBUTION BLOCK

(REF: CHART 3 ON TOP ASSY)

TOTAL RELAYS USED. AS INDICATED IN TOP ASSEMBLY (Y COLUMN)	(ITEM 9) POWER DISTRIBUTION BLOCK	QTY
1 THRU 5	364948	1
6 THRU 11	364973	1
12 THRU 29	364979	3

CONFIGURATION AND QUANTITY OF LOAD STEPS ARE DEFINED BY PART NUMBER CODE.

100KW STEP – USE 50KW COLUMN x 2
200KW STEP – USE 50KW COLUMN x 4
400KW STEP – USE 50KW COLUMN x 8

6 – ITEM 3 MAY BE REPLACED BY #6 AWG JUMPER WIRE (PN 390323).

5 – EACH COLUMN DEFINES MATERIAL REQUIRED FOR ONE LOAD STEP.

4 – ITEMS #4 AND #5 REQD ONLY IF DIGIT #12 OF LOAD BANK PART NUMBER IS F.

3 –

2 –

1 –

REV. TO SHEET	ECN NO.	BY	APP.	DATE
J	LA2191	JRF	JPH	9/15/15
	REVISED TITLEBLOCK			
H	CB109	RAF	KAK	4/1/99
	REVISED PER ECN			
G	AC633	RG	DTB	3/28/96
	ADDED BUBBLE 6			
F	Z9848	DZ	DTB	7/6/94
	REVISED PER ECN			
E	Z8695	JJF	DTB	12/15/93
	REDRAWN, ADDED NOTE 6			

PROJECT NAME:

SCHEMATIC/WIRING DIAGRAM (480V)

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	JZ	6/12/92
CHECKED		
PROJECT APPROVAL	DTB	7/31/92
FINAL APPROVAL	GW	8/27/92

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-I-003. FOR PLASTIC PARTS SEE MP-I-055

ASSEM. REF. NO.

ASCO® ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

SCALE 1:1 SIZE CS

DWG. NO. C21408

DRAWING REV. J ECN NO. LA2191 SHEET 1 OF 1

AVTRON MODEL K711
LOAD BANK, RESISTIVE, DUCT MOUNT
Serial Number 3118 and Above

Cleveland, Ohio

December 29, 2004
Rev. October 4, 2005

AVTRON MODEL K711
LOAD BANK, RESISTIVE, DUCT MOUNT
PROJECT NO.

K711 - - -

TABLE OF CONTENTS

Load Bank Rating:

Total KW	0 KW
Operating Voltage	0 VAC
Phase	3 Phase
Frequency	60 Hz
Current	Amps
Minimum airflow required for full load operation	0 CFM

Load Steps:

Load Steps

Drawings:

SB2203	Outline Drawing, Load Bank
	Schematic/Wiring Diagram, Load Bank
D36481	Schematic/Wiring Diagram, (Controls)

Bulletins:

202	Installation Notes, Engine Generator, Duct or Radiator Type
203	Sample Calculations, Engine Generator, Duct Type Load Banks

SUPPLEMENTAL VENDOR MANUAL

Electro Industries - SHARK100 CD-ROM(E145420) & Quick Start Guide(E145703)
(Provided only when Option M or N is purchased)

K711 Options List

These options are available for Avtron Model K711 Load Banks. Not all options can be installed in the same Load Bank. Installed options are marked on the identification tag.

OPTION DWG. NO.	OPTION	DESCRIPTION
C26165	A	Remote Control Panel
A20712*	B	Control Panel Enclosure
D36631-1	C	Load Shed, Two Step
D36631-2	D	Load Shed, Three Step
D36631-3	E	Load Shed, Four Step
D36631-4	F	Load Shed, Five Step
C21401	G	Outdoor Protection
C21397**	H	Control Transformer, 208:120V
C21398**	J	Control Transformer, 240:120V
C21399**	K	Control Transformer, 480:120V
C21400**	L	Control Transformer, 600:120V
D36494**	M	Digital Metering, Local
D36495**	N	Digital Metering, Remote

* When Option B is installed in Load Bank, Outline Drawing SB1635 is included at the end of the manual to provide dimensional information.

** When these options are installed in Load Bank, the drawing is provided at the end of the manual for electrical schematic wiring information.

K711 Options List (Cont.)

These options are available for Avtron Model K711 Load Banks. Not all options can be installed in the same Load Bank. Installed options are marked on the identification tag.

OPTION DWG. NO.	OPTION	DESCRIPTION
C22177-H	P	Controls on Exhaust Side of Load Bank
B29625***	Q	Control Panel/Meter Enclosure
D36492-1	R	Current Transformers for Metering, 100A
D36492-2	S	Current Transformers for Metering, 200A
D36492-3	T	Current Transformers for Metering, 400A
D36492-4	U	Current Transformers for Metering, 600A
D36492-5	V	Current Transformers for Metering, 800A
D36492-6	W	Current Transformers for Metering, 1000A
D36492-7	X	Current Transformers for Metering, 1200A

*** When Option Q is installed in Load Bank, Outline Drawing SB2196 is provided at the end of the manual for dimensional information.

AVTRON MODEL K711
LOAD BANK, RESISTIVE, DUCT MOUNT
Serial Number 3118 and Above

SECTION I

SAFETY CONSIDERATIONS

Throughout this manual, you will find **WARNING** and **CAUTION** statements. Personal injury to an operator using or repairing the equipment may occur if a **WARNING** statement is ignored. Damage to the equipment and potentially hazardous conditions for personnel may occur if a **CAUTION** statement is ignored.

Each Avtron unit is safety checked for opens and shorts, and the insulation is high potential tested to ensure safe operation. All fuses, safety interlocks, and related safety equipment have been proven reliable as part of the testing procedure of each unit.

As part of your safety program, an initial inspection after receiving the unit(s) and periodic preventive maintenance and safety inspections should be conducted to ensure the reliability and safety built into your Avtron equipment.

The Model K711 Load Bank is an industrial test unit designed to be used indoors safely. However, because of the nature of the Load Bank function (the dissipation of electrical energy), there are inherent dangers to operators and equipment. These dangers are outlined in this section.

The Model K711 Load Bank is designed to be mounted on a duct or on the exhaust side of the radiator of an engine-driven generator set. The Load Bank resistors rely on the exhaust air from the radiator fan for cooling.

At design airflow velocities, the Load Bank exhaust air can reach an average 150°F over ambient with localized parcels of air reaching up to 300°F over ambient. All components of the exhaust air system must be able to handle this high temperature. There can be no combustible or heat sensitive devices or equipment inside or near the exhaust duct, including but not limited to the exhaust louvers and/or shutters.

For supplemental information, refer to Bulletins 202 and 203.

Electrical energy is transformed into heat by the resistors. This heat must be removed from the Load Bank by the cooling blower (not part of Load Bank). If there is any restriction or stoppage of airflow, the Load Bank may overheat and may even start a fire. It is recommended that:

1. The operator should read the manual before using the Load Bank.

2. Run an approved ground wire from the Load Bank ground lug, located inside the load connection area to the generator frame. Run an approved ground wire from the generator frame to a good earth ground.

3. Your unit is equipped with a temperature switch in the load element area. Do not bypass the temperature switch to prevent nuisance tripping. The switch drops out load if insufficient air is reaching the load elements.

4. If the unit is to be installed within existing duct work, leave enough access area to easily remove access covers on each side of the Load Bank. Special consideration should be given to mounting surface material, duct and devices in close proximity due to hot air exhaust.

5. Connections to ducts must be watertight in outdoor applications.

6. Maintenance personnel must always exercise caution when the access panels are removed. Personal injury from electrical shock may result if all sources of power are not disconnected before servicing. Maintenance work must be done only by qualified personnel.

7. Adequate airflow in cubic ft./min. (CFM) must be maintained at all times. (Refer to the DESCRIPTION section for minimum value of required airflow.) Failure to maintain this airflow evenly across the resistor elements may result in element burnout. Indoor and enclosed units may require supplemental cooling air. Full load thermal testing should be conducted on initial run at maximum ambient to verify no cooling/thermal problems exist.

8. If duct work is vented through a screened exhaust or louvered exhaust, ensure that the louvers (if motorized) are fully open when using the Load Bank. If exhausting through a screened opening, check screen periodically for any blockage. Screen needs to be a minimum 75% open area and at least as large as Load Bank core dimensions. The screen will add additional system resistance to airflow.

9. After running a load test, residual heat may be removed from the Load Bank and downstream duct work by allowing the blower to operate for a few minutes after load is removed. This procedure is not required for maintaining Load Bank integrity, but it may guard operating personnel from possible burn injuries.

10. The operator should avoid coming in contact with the resistor elements or surrounding covers during and for some time after operation. These portions of the Load Bank become quite hot and may result in a serious burn should contact be made with them.

11. Operators must not operate the Load Bank with the access panels or screens removed. To do so would expose the operator and other persons to possible personal injury from electrical shock.

12. An approved electrical fire extinguisher should be on hand at all times.

13. It is the responsibility of the customer to take diligent care in installing the Load Bank. The National Electrical Code (NEC), sound local electrical and safety codes, and the Occupational Safety and Health Act (OSHA) should be followed when installing the equipment to reduce hazards to persons and property.

14. Prior to handling the unit, review the INSTALLATION section of this manual.

15. The Load Bank is designed for maximum 120ºF ambient at 3,000 ft. maximum elevation. Consult factory if either of these conditions is not met.

16. Standard K711 units which do not include the outdoor (louver) option must have field installed provisions to protect personnel from coming into contact with load resistor elements.

17. Read and heed all **WARNING** and **CAUTION** statements in the manual.

SECTION II

DESCRIPTION AND SPECIFICATIONS

The Avtron Model K711 is designed to be used as a duct- or radiator-mounted Load Bank providing custom tailored mounting and installation. The K711 provides a resistive load rated as indicated on the Table of Contents. Minimum airflow required to cool the elements operating at full load is as indicated on the Table of Contents and must be maintained to ensure safe operation of the Load Bank.

****

C A U T I O N

To prevent load element burnout, adequate airflow must be maintained over the entire load element area at all times voltage is applied. Insufficient air for even a few seconds will cause element burnout. This unit must have uniform airflow over the entire outlet area. If there are dead spots, damage to the elements may result.

****

CONTROL PANEL

The K711 Load Bank may be provided with a Control Panel as an option or the Control Panel may be customer supplied. The Control Panel may be supplied by Avtron in one of the following ways:

1. Factory installed on the side of the Load Bank without an enclosure.

2. Factory installed on the side of the Load Bank within an enclosure.

3. Factory installed within a remote mountable enclosure, separate from the Load Bank.

4. Factory supplied without an enclosure for remote mounting.

The Control Panel, when provided, serves as the manual control center for Load Bank operation. All load switches, safety indicator lights, and control circuit fuses are mounted on the panel.

When the Control Panel is not factory supplied, load application and safety circuitry are the responsibility of the customer.

Each Load Bank is designed with a relay compartment which contains load contactors, safety circuit components, optional load step fusing, optional control transformer with fuses, and a customer connection bus. If a Control Panel is not factory installed, the components in the relay compartment will require interconnection wiring during field installation of the Load Bank.

Interconnection wiring should conform to the National Electrical Code and any local codes.

DUCT/FLANGE ADAPTERS (K711 ONLY)

Removable duct/flange adapters are provided to assist in the installation of the Load Bank to a ventilation duct or the exhaust end of a radiator.

1. If required, remove the adapter frame from the Load Bank by removing the hardware that attaches the adapter frame to the two vertical walls of the Load Bank radiator core opening. Remove the corner hardware which attaches vertical adapters to horizontal pieces. Also remove the hardware (if provided), attaching the horizontal adapter pieces to the top and bottom flanges.

2. Locate and drill holes on the vertical adapter as required to match the duct/flange mounting holes. (See CAUTION below.) The top and bottom horizontal sections of the adapters are duct/flange extensions only.

****

C A U T I O N

The two vertical sections for the duct/flange adapters are the primary load carrying members. Affix fixture adapters so that load is transmitted through these vertical sections. Add field installed supports between Load Bank and a static point as required on units whenever load carrying capacity of vertical adapters is in question.

****

3. Reattach the adapter frame to the Load Bank.

4. Mount the Load Bank to the duct or radiator.

AUTO TRANSFER SWITCH CAPABILITY

The load control circuitry is factory designed in such a way that remote operation with a customer-supplied transfer switch may be incorporated into the circuit. The factory control circuitry will be wired to a terminal board whereas a transfer switch must be enabled and connects at the terminal board per the schematic.

AUTOMATIC OPERATION

An Automatic Load Shed Controller (Controller) may be integrated into the control circuitry of the K711 Load Bank as an option. The Controller is designed to maintain a minimum load on a power source. A separately supplied current transformer provides the feedback signal required to operate the Controller. This feedback signal drives the Controller, which has field adjustable current setpoints. The Controller also incorporates field adjustable time delays to prevent repetitive load switching or initial overloading of the generator.

The Load Bank manual controls are paralleled by the automatic Controller. Automatic or manual mode may be chosen when the Load Shed option is provided with the Load Bank.

LOUVERS (OPTIONAL)

The exhaust of the Load Bank may be protected by either a stationary or motorized louver assembly. Due to exhaust temperatures, a stationary louver is the preferred option.

The motorized version would be added by end users and must include a limit switch which prevents the application of load steps if the louvers are not fully open. Verify louver and operating device are able to withstand exhaust temperatures before installation.

SECTION III

INSTALLATION

NOTE

The outline drawing needs to be available while reviewing the INSTALLATION section.

The following steps outline general guidelines for the handling and installation of the Model K711 Load Bank. The first portion of Section III describes the handling (rigging) and physical mounting of the Load Bank. It is followed by a brief explanation on installing the unit.

It is the responsibility of the installing contractor to ensure all local laws, rules and regulations are followed for the installation procedure. All laws, rules, and regulations take precedence over this procedure.

****

W A R N I N G

To prevent injury or death to personnel, never place any portion of body under the Load Bank while handling or rigging. These procedures are guidelines only and do not fully detail the scope of work required for complete installation. The rigger (installing contractor) and his equipment must meet all safety and code regulations.

****

PREREQUISITES TO HANDLING

1. The Load Bank must be on a level surface at ground elevation. Inspect for damage at time of arrival. Any damage must be reported to freight carrier prior to acceptance at customer's site.

2. Remove shipping crate sides but leave unit on skid.

3. Verify that all access panels (bolt on panels) are fully secured.

4. There are two methods to handle the Load Bank: Overhead lift using a spreader bar for hoisting the Load Bank into position or base lifting with a forklift. Installation/rigging contractor should obtain equipment for one or the other option:

   a. OVERHEAD LIFT VIA SPREADER BAR: Use a spreader bar with two double leg type slings (minimum 3 ft. long). See recommendations on spreader bar below.

   b. BASE LIFT VIA FORKLIFT: Use a forklift with forks (tines) at least 36" on center and adequate lift capacity.

5. End user to provide all mounting fasteners, any supplemental fabricated components, and supports for installation, if used. Field drilling and or modification to mounting locations are the responsibility of the installing contractor.

HANDLING THE LOAD BANK

A. Overhead Lift via Spreader Bar

NOTE

A crane with sufficient capacity and lifting height will be required to hoist the Load Bank from skid (shipping crate) and to raise the Load Bank for final positioning. Lifting cables, chain slings, and spreader bar are required and shall be supplied by the rigger. It is recommended to use a spread bar equal to or slightly longer than the Load Bank. All rigging equipment should be rated at five times the basic Load Bank weight.

1. Note the orientation of the spreader bar lifting points should be aligned with the four 1" diameter top flange lifting holes in the Load Bank (see outline drawing). Primary spreader bar needs to be in line with the Load Bank resistor element section. Spreader bar is to be parallel to longitudinal direction of the Load Bank frame.

2. Hook up spreader bar to crane and top four lifting points on Load Bank frame.

3. The spreader bar can be used with double leg slings or two cables or chains, each a minimum of three feet long. Slowly lift spreader bar and verify all slack is removed evenly from all four slings/cables/chains. If not, lower and readjust as required until uniform lift is obtained.

4. Test and verify that the unit is level by lifting the Load Bank. Raise unit up no more than 6 inches off the ground. Lower and adjust if required to obtain a level lift (level within 6 inches).

5. The rigger should now attach a guide wire to one corner of the Load Bank for stabilization.

6. Keep the Load Bank close to ground and position near final lift point.

7. After verification of all rigging, hoist Load Bank vertically and position near final mounting.

8. Install a support below the Load Bank frame as a safety support. Refer to the installation notes which follow.

B. Base Lift via Forklift

1. The non-symmetrical design of the Load Bank creates an off-center unbalanced condition. The Load Bank needs to be supported across the entire base for forklift handling. Use the shipping crate skid or erect a support base adequate for the lifting loads encountered.

2. Attach a secondary guide or support bar to boom of forklift.

3. Lift Load Bank less than 3" off ground and check for proper balance. Make any adjustments as required to adequately support the unit.

4. Position Load Bank near final mounting.

5. Install a support below the Load Bank frame as a safety support. Refer to the installation notes which follow.

****

W A R N I N G

When using a forklift, the Load Bank should only be lifted under base with a skid or secondary support base (supplied by others) to prevent frame damage.

****

MOUNTING THE LOAD BANK

****

C A U T I O N

The radiator frame or structural supports and mounting hardware used to permanently mount and anchor the Load Bank must be designed with sufficient safety factors to not yield under static and dynamic loading. These dynamic loads include but are not limited to wind loads, seismic qualification, and any supplemental weight added to equipment.

****

This Load Bank is designed for direct installation in a ventilation duct or on the exhaust end of a radiator. A fabricated Duct/Flange Adapter is provided as noted in Section II. Since radiator designs vary by manufacturer and size, these flange adapters are not universal. In some cases a custom fabricated interface between the duct or radiator and the Load Bank is required. If required, custom fabrication to adapt the Load Bank mounting face to the duct/radiator mounting face is acceptable to aid installation. This custom fabricated section would be designed, fabricated, and installed by the installing contractor. Other than this mounting interface, conventional hand tools are required for installation.

If not using the duct flange adapter provided, the Load Bank should be mounted off the top and bottom flanges. After mounting, verify adequate clearance between any electrical component and mounting hardware.

Bulletin 202 shows the proper positioning of the Load Bank in the air duct.

****

C A U T I O N

To prevent load element burnout, adequate airflow must be maintained over the entire load element area at all times voltage is applied. Insufficient air for even a few seconds will cause element burnout. This unit must have uniform airflow over the entire outlet area. If there are dead spots, damage to the elements may result. Minimum uniform airflow velocity is 850 feet per minute. Recommended velocity is 1,000 feet per minute across entire load element area.

****

In general, the protection provided external to the Load Bank is determined by the local codes. Since the Load Bank is generally part of an existing electrical installation, it must be protected by a fused disconnect or circuit breaker meeting all local codes.

Before making any electrical connections, the maximum phase current for the Load Bank should be determined. This may be done using the following formula.

$$I_{PHASE(MAX)} = \frac{kW \times 577}{V \text{ (Line-to-Line)}}$$

****

C A U T I O N

When installing the Load Bank, do not drill into side flanges. Use factory provided flange adapters or if not using adapters, use only top and bottom flanges as mounting locations. Compliance with this instruction helps guard against damage to internal wiring.

****

The electrical connections necessary for proper operation of the Load Bank are as follows:

1. Connect the load power source as indicated on the Schematic/ Interconnection Diagram.

2. A ground connection must be made to the Load Bank (GND terminal) to prevent injury to personnel. This may be accomplished by a ground wire connected directly to the Load Bank ground stud provided in the control box. This ground wire should be connected to the frame of the generator under test. The generator frame should be grounded to a good earth ground.

3. Make control circuit connections as required using #14 AWG wire minimum. Refer to the Schematic Diagram found at the end of this manual for the required control voltage. For conduit runs greater than 50 feet, consult the factory.

4. When an automatic Controller is included with the Load Bank, installation of the current transformer on the main power bus as shown in Figure 3-1 is required. Wire the current transformer into the control circuitry as shown on the provided schematic.

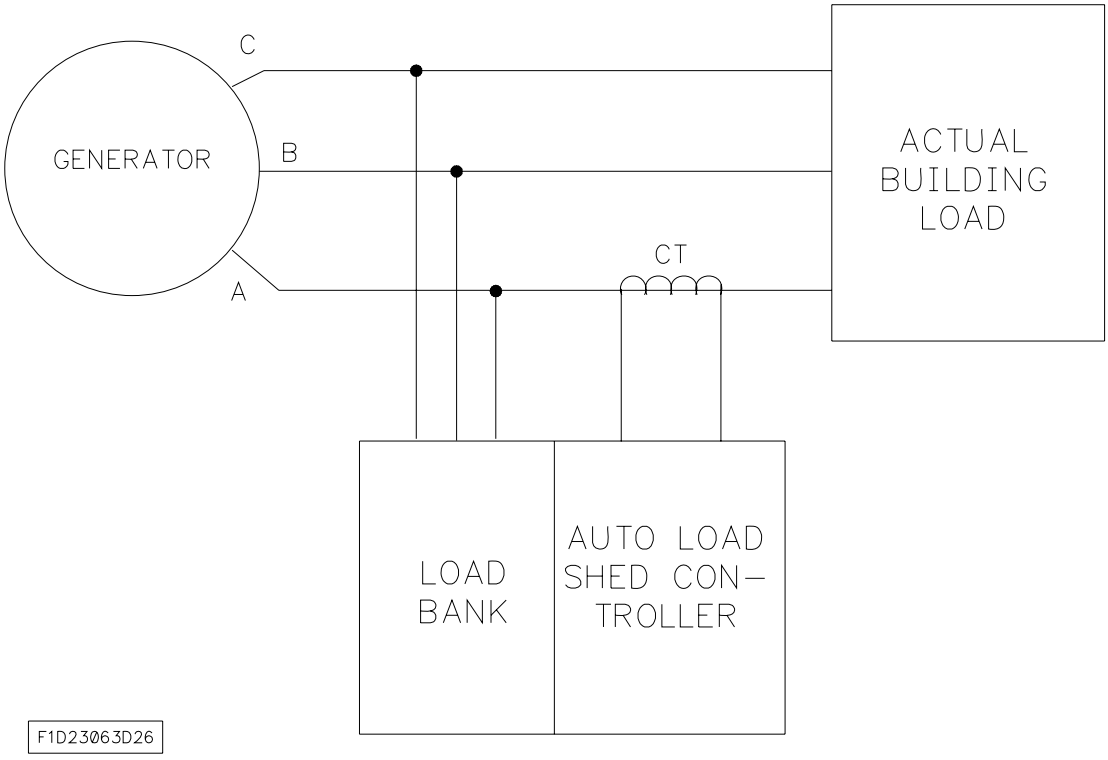


Figure 3-1

****

W A R N I N G

Always put a short or shunt across the current transformer when servicing the Load Bank. Primary current flowing through an unshunted current transformer will destroy the transformer with possible harm to personnel.

****

Never allow the secondary of the current transformer to remain disconnected when primary current is passing through the transformer. If the Load Bank must be disconnected, put a short or shunt across the current transformer.

NOTE

Before placing the system into AUTO, place the Load Bank load step switch(es) to the OFF position.

OPTIONAL CONTROLLER OPERATION AND ADJUSTMENTS

****

W A R N I N G

Always put a short or shunt across the current transformer when servicing the Automatic Load Shed Controller. Primary current flowing through an unshunted current transformer will destroy the transformer with possible harm to personnel.

****

THEORY OF OPERATION

The automatic operation circuitry of the Load Bank allows for a generator to which it is connected to maintain a minimum percentage of its rated output for efficient generator operation. The control range is generally between 60% and 80% of the output rating of the generator.

SYSTEM SETPOINT CALCULATION (Example)

System Ratings

Generator Resistive Rating = 375 kW @ 480 VAC, 3 PH.
Load Bank Shedder Capacity: 225 kW @ 480 VAC, 3 PH.
Load Steps: 25, 50, 50, 50, and 50 kW.
Actual Generator Output = Load Bank Load + Building Load.

Trip Point	BUILDING LOAD	LOAD BANK LOAD	ACTUAL GENERATOR OUTPUT	% OF GENERATOR
TP.1	0-<75 kW	225 kW	225-300 kW	(60%-80%)
TP.2	>,=75-<125 kW	175 kW	225-300 kW	(60%-80%)
TP.3	>,=125-<175 kW	125 kW	225-300 kW	(60%-80%)
TP.4	>,=175-<225 kW	75 kW	225-300 kW	(60%-80%)
TP.5	>,=225-<275 kW	25 kW	225-300 kW	(60%-80%)
	>,=275 kW	0 kW	BUILDING LOAD	(>,=73%)

At 0 kW building load, the Load Bank will provide 225 kW worth of load. Actual generator output will be 225 kW (60%) after a preset time-delayed ramp up period.

As the building load increases and the actual generator output approaches 300 kW (80%), the controller disables one load step; in this example, the last 50 kW load step “sheds”.

This load shed control continues as the building load continues to increase. If the building load decreases, causing the actual generator load to fall below 60%, the controller will add the appropriate load step(s) to maintain the desired range of control.

TRIP POINT ADJUSTMENTS

In the system example detailed above, a current transformer having a ratio of 500:5 will be used to monitor the building load. (Refer to Figure 3-1.) As the actual generator output reached 300 kW, the controller “shed” a load step. The current flowing to the building load at this point will be called the current trip point. This “trip point” value can be determined using the following formula:

LINE CURRENT(I(line)) = (kW * 577)/VOLTAGE(LINE-to-LINE).

In this example I(line) = (75 * 577)/480,
= 90.1 amps

NOTE: FOR SINGLE PHASE SYSTEMS:
I(LINE) = WATTS/VOLTAGE(LINE-to-LINE).

Secondary Current Calculation

The controller senses the current (Isense) delivered from the current transformer that is monitoring the building load. This value can be determined using the following formula:

I(sense) = I(line)/ CT Ratio.

In this example, the CT Ratio = 500/5 or 100.

For TP.1 I(sense) = 90.1/100 or .90 amps (75 kW)
For TP.2 I(sense) = 150 /100 or 1.5 amps (125 kW)
For TP.3 I(sense) = 210 /100 or 2.1 amps (175 kW)
For TP.4 I(sense) = 270 /100 or 2.7 amps (225 kW)
For TP.5 I(sense) = 331 /100 or 3.3 amps (275 kW)

Adjustments can be made to the PC board controller via the adjustable resistor potentiometers found on the PC board. (Reference resistors labeled LEVEL PERCENT, R73, R60, R47, R34, and R21.)

NOTE

R73 controls the last load step circuit. (i.e., if the Load Bank has five load steps, R73 controls the fifth load step.)

The potentiometers should be adjusted such that the last load step is the first step to be "shed". On the Controller, there is an LED indicator for each channel (Output). When lit, the channel is energized.

In this example,	R73 = TP.1	Channel 5 (LED CR29)
	R60 = TP.2	Channel 4 (LED CR25)
	R47 = TP.3	Channel 3 (LED CR21)
	R34 = TP.4	Channel 2 (LED CR17)
	R21 = TP.5	Channel 1 (LED CR13)

The "trip point" value = I(sense) can be applied to the controller terminals J1 and J2 using a separate current source.

There are two methods of field adjusting the trip point of the current sensing relays:

Method 1 - Using a separate (0-5 amp) current source without the current transformer

Method 2 - Rough adjustment (Approximation Method)

Method 1 - Using a separate (0-5 amp) Current Source without Current Transformer

1. Disconnect all sources of power to the Automatic Load Shed Controller (control voltage and current sense input).

****

W A R N I N G

When disconnecting the current transformer, the secondary terminals must be shorted. The secondary of an unshorted current transformer can exceed several thousand volts.

****

2. Apply 120 VAC, 60 Hz control power J1(10-12) (see schematic).

****

W A R N I N G

There is lethal high voltage within the control enclosure.

****

3. Using a controlled current source, apply the setpoint current (from secondary current calculation) to Controller terminals J1(1) and J1(2).

4. Turn the adjustment potentiometer labeled LEVEL PERCENT counterclockwise past the trip point; then decrease until the channel trips on, indicated by LED illuminating.

5. Reconnect all wires previously removed.

Method 2 - Rough Adjustment

NOTE

Adjustable potentiometers on the controller board have a % scale reference that directly relates to the current, (Isense), delivered from the current transformer used to monitor the building load. Refer to **Secondary Current Calculation** under **Trip Point Adjustments** earlier in Section III of this manual. The scale is based upon a 5 amp input.

.5	amp	=	10% Dial Setting
1.25	amp	=	25% Dial Setting
2.5	amp	=	50% Dial Setting
3.75	amp	=	75% Dial Setting
5.0	amp	=	100% Dial Setting

With all power removed from the Load Bank, calculate each desired Trip Point and adjust the LEVEL PERCENT potentiometers (R21, R34, R47, R60, R73) in order to achieve a rough adjustment controller setting.

NOTE

The current sense relay settings must be set sequentially. It is extremely important that the sequence be correct because the current sense relays are interlocked by the previous relay. Consult the factory at 216-641-8310 if unsure of proper adjustment.

INSTALLATION CHECKOUT PROCEDURE - TO BE DONE PRIOR TO OPERATION

This Installation Checkout procedure is intended to be used upon initial receipt of equipment and following any relocation of a permanently-mounted Load Bank. These procedures apply to Load Banks in general and may include steps not relevant to the specific unit being installed. Disregard those procedures which do not apply.

****

W A R N I N G

THE FOLLOWING TESTS ARE TO BE ACCOMPLISHED BY A QUALIFIED ELECTRICIAN OR TECHNICIAN USING EXTREME CAUTION AS POTENTIALLY LETHAL VOLTAGES AND DANGEROUS ROTATING COMPONENTS ARE PRESENT. IF ASSISTANCE IS REQUIRED, AVTRON CAN PROVIDE START UP SERVICE AT A NOMINAL CHARGE. AVTRON ALSO WILL PROVIDE TELEPHONE ASSISTANCE IF REQUIRED BY CALLING (216) 641-8310.

****

1. Verify the Load Bank placement meets the installation requirements found in the Installation section of this instruction manual:

   A. Check the clearance from both intake and exhaust to any obstruction.

   B. If the location has a prevailing wind, make the wind aid in the cooling of the resistor elements.

   C. If the Load Bank is elevated, a plate under the Load Bank will be needed to block hot exhaust from returning to the intake.

2. Check the mechanical integrity of all customer-supplied interconnection wiring:

   A. Check lugs that they are properly crimped.

   B. Check terminations that they are properly torqued.

3. Utilize system schematics to ohm out customer-supplied interconnection control wiring and safety circuits:

   A. If control wiring is all the same color, ohm out each individual wire to confirm proper labeling and placement.

> **C A U T I O N**
>
> Control wiring must be a minimum of 14 AWG for wire runs under 50 feet. Consult Avtron factory for wire sizing when wire run exceeds 50 feet.

   B. Confirm the correct wire gauge has been used for interconnection wiring. Control wiring should be a minimum of 14 AWG for control panel to Load Bank lengths of 50 feet or less. For lengths greater than 50 feet, consult the factory.

   C. If a Control Transformer is the source of control power, disconnect the control transformer before proceeding.

> **C A U T I O N**
>
> When control power is supplied by a transformer within the Load Bank, it must be disconnected before running this installation checkout procedure. Failure to disconnect the control transformer may damage the Load Bank.

4. Energize the source of control power only. Check the control voltage and confirm it is within 10% of the required voltage.

****

W A R N I N G

Control power is present on terminal block in steps 4 through 6.

****

5. Verify the proper relays energize with each individual load switch.

   A. Turn on each load step individually and observe that each relay or relays pulls in without chatter or hesitation.

   B. Turn off the master load switch. Turn on all the load steps. Turn the master load on and observe the pull in of all the contactors. If chatter or hesitation is observed, locate the cause of the voltage drop causing the problem.

6. Apply the rated fan voltage. Start blower and verify that air is exiting the resistor assembly end.

This checkout procedure is intended to be a guide to Load Bank installations in general. Special installation considerations not addressed herein may be necessary due to installation site or environment. Any questions or concerns regarding Load Bank installation should be directed to Avtron Field Service at (216) 641-8310.

SECTION IV

OPERATION

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C A U T I O N

DO NOT operate the Load Bank over the rated voltage as this will cause a catastrophic failure in the Load Bank.

DO NOT apply DC voltages to the Load Bank because the contactors do not have arc blowout magnets.

To prevent load element burnout, adequate airflow must be maintained over entire load element area at all times voltage is applied. Insufficient air for even a few seconds will cause element burnout.

It is important to note that if the generator is removed, the control circuit may still be energized if control power is not removed. Therefore, before removing cover, make certain all sources of power to the Load Bank are disconnected.

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The K711 Load Bank may be operated in a manual mode or, if the Load Shedder option is provided, in an automatic mode. Operation instructions for the different modes are as follows:

1. Manual Operation - K711 units without a Control Panel.

2. Manual Operation - K711 units with a Control Panel included as an option.

3. Automatic Operation - K711 units with the Load Shedder option.

Take note that in cases where the K711 Load Bank is provided with the transfer switch option to permit load application, the terminal board terminals referenced on the schematic for this application must be connected either by a hard wired jumper or a closed transfer switch contact.

MANUAL OPERATION (for K711 units without a Control Panel)

After mounting the K711, connecting 120V control power, and running interconnecting control wires per the schematic:

1. Check to confirm that all load contactors will not be energized prematurely.

2. Connect generator or other source to be tested to the Load Bank as described in the INSTALLATION section.

3. Apply power to the control circuit. (If Load Bank has motorized louvers, verify louvers are open prior to the initiation of airflow.)

4. Start power source under test. Be sure air is flowing over resistance elements.

5. Apply load to the power source by energizing load contactors.

6. Shutdown - After running a load test, residual heat may be removed from the Load Bank and downstream duct work by allowing the blower to operate for a few minutes after loads are removed. This procedure is not required for Load Bank integrity, but it may guard operating personnel from possible burn injuries.

MANUAL OPERATION (for K711 units with a Control Panel included as an option)

After mounting the K711, connecting 120V control power, and running interconnecting control wires per the schematic:

1. Place all switches on the Control Panel to the OFF position.

2. Place AUTO/MANUAL switch to MANUAL. (This step only applies to Load Banks with Load Shedder option.)

3. Connect the generator or other power source to be tested to the Load Bank as described in the INSTALLATION section.

4. Place the POWER switch to the ON position. The POWER light will be energized indicating control power is present. (If Load Bank has motorized louvers, verify louvers are open prior to the initiation of airflow.)

5. With the MASTER LOAD switch in the OFF position, start the generator under test. Using a customer-supplied blower, be sure air is flowing over the resistance elements.

6. The resistive loading is selected by load step switches, using any one or a combination to make up a given load.

7. Apply load to the power source by moving the MASTER LOAD switch to the ON position.

8. Any load can be added or removed during MANUAL testing provided the MASTER LOAD switch is on.

9. To remove all loads, move MASTER LOAD switch to the OFF position.

10. Shutdown - Place all switches in the OFF position. After running a load test, residual heat may be removed from the Load Bank and downstream duct work by allowing the blower to operate for a few minutes after loads are removed. This procedure is not required for Load Bank integrity, but it may guard operating personnel from possible burn injuries.

AUTOMATIC OPERATION (for K711 Load Banks with Load Shedder option)

After mounting the K711 and connecting 120V control power per the schematic:

1. Place all switches on the Control Panel to the OFF position.

2. Connect the generator or other power source to be tested to the Load Bank as described in the INSTALLATION section.

3. Place the POWER switch to the ON position. The POWER light (DS1) will be energized, indicating control power is present. (If Load Bank has motorized louvers, verify louvers are open prior to the initiation of airflow.)

4. Place AUTO/MANUAL switch to AUTO.

5. Start the generator under test. Using a customer-supplied blower, be sure air is flowing over the resistance elements.

6. When the Auto Transfer Contact is open, the Auto Load Shedder will be active. As the load on the generator lessens, the Load Shed Controller will automatically apply load steps until the overall generator load exceeds the minimum setpoint. The Load Shed Controller automatically removes load steps when the generator load exceeds the maximum setpoint.

SECTION V
REPLACEMENT PARTS LIST

SCHEMATIC REFERENCE	DESCRIPTION	MANUFACTURER and PART NO.	AVTRON P/N	QTY/ UNIT
F101	FUSE, 10A, 600V	LITTELFUSE KLKR-10	324128	1
XF101	FUSEHOLDER	BUSSMANN HPF-WT	325022	1
DS21	LIGHT, INDICATOR, (RED)	IDEC SYSTEMS AND CONTROLS HW4P-2FQD-R-120V	329048	1
DS20, DS50	LIGHT, INDICATOR, (GREEN)	IDEC SYSTEMS AND CONTROLS HW4P-2FQD-G-120V	329049	*
S60	SWITCH, TEMPERATURE	EMERSON ELECTRIC 60T-13 203546	360379	1
S1-S9, S20, S21, S50	SWITCH, TOGGLE	CARLINGSWITCH 2GK51-73	360589	*
CT2,3	**OPTION R:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBL-101	370537	2
CT2,3	**OPTION S:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBL201	370936	2
CT2,3	**OPTION T:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBL401	370937	2
CT2,3	**OPTION U:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUENT TRANSFORMERS 7RBT601	370932	2
CT2,3	**OPTION V:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBT801	370908	2
CT2,3	**OPTION W:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBT102	370934	2
CT2,3	**OPTION X:** CURRENT TRANSFORMER FOR DIGITAL METERING	INSTRUMENT TRANSFORMERS 7RBT122	370935	2
	* Quantity is dependent on option(s) purchased.			