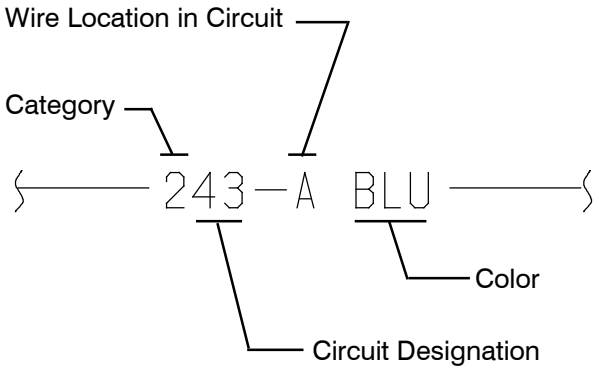
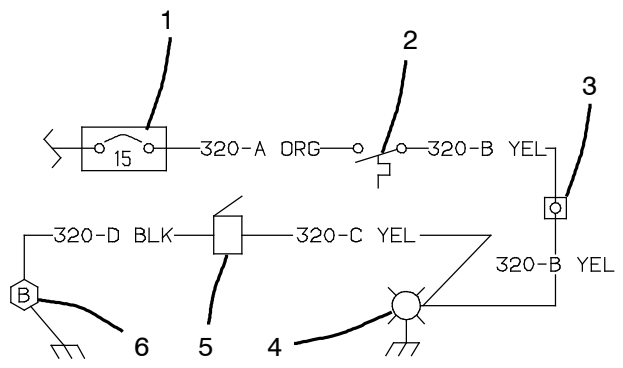


Example: Wire number 243–A BLU indicates: Category 2, circuit 43, conductor A, blue wire.

Figure 1
Wire Number Explanation



1. Circuit Breaker
2. Thermal Switch
3. Wire Connector
4. Indicator Light
5. Buzzer
6. Ground Bolt

Figure 2
Wire Number Suffix Sequence

Electrical System Wire Identification Code

In order to simplify electrical troubleshooting techniques, the electrical system of this crane uses a “Wire Identification Code”. The following information outlines the “Code” used to identify the wires in a crane’s electrical system.

Wire Harness

Each wire, in any given wire harness within the electrical system, has a colored insulating coating. This coating is labeled with a wire number. The color and wire number, when fully understood, will allow the positive identification of a wire and its specific use in the circuit. Each wire has four basic identifying elements. Refer to Figure 1.

Category

The first character of each wire number corresponds to a general category. Seven basic categories exist and are described as follows:

1. Category 1: Primary Power (Red or Orange) 100 series numbers are used to identify wires which are used to provide the originating source of power to all circuits within the electrical system.
2. Category 2: Engine and Transmission Control (Blue) 200 Series numbers are used to identify wires in circuits used in the operation and control of the engine and transmission.
3. Category 3: Monitoring Group (Yellow) 300 series numbers are used to identify wires in circuits used in monitoring crane operation. Circuits that contain gauges or instrumentation are included in this category. (See Category 8 also.)
4. Category 4: Lighting and Horns (Green) 400 Series numbers are used to identify wires in the interior and exterior lighting circuits of the crane, as well as the horn and back up alarm circuits.
5. Category 5: Equipment Control (Brown) 500 Series numbers are used to identify wires in circuits concerned with the operation and control of functions that are unique to the crane. (See Category 7 also.)
6. Category 6: Accessories (Violet) 600 series numbers are used to identify wires in circuits concerned with the operation and control of operator accessory equipment such as heaters, defrosters, windshield wipers, etc.
7. Category 7: Equipment Control (Brown) 700 series numbers are simply an extension of Category 5. (See Category 5 also.)
8. Category 8: Monitoring Group (Yellow) 800 series numbers are simply an extension of Category 3. (See Category 3 also.)

Wire Location In Circuit

The fourth character of the wire number is a letter suffix which is used to relate a particular wire's location relative to the rest of the circuit. The letter suffix, which is assigned sequentially, generally starts from the circuits power source, changes at each of the circuits working components, and ends once a wire reaches ground potential. Refer to Figure 2.

Note: The letter suffix does not change when two wires are joined by a wire connector.

Color

The color of the wire, like the wire number, has a very specific meaning. It can be used to identify, as well as, describe the function of the wire in a given circuit. All wires are colored according to the category that defines their corresponding circuit, with the following exceptions:

1. Wires which are directly connected to the system power source, and are at constant battery potential, are colored RED. These wires remain "HOT" at all times.
2. Wires that are at battery potential only when the ignition switch is in the "ON" position are colored ORANGE.
3. Wires that are at constant ground potential are colored BLACK.

Circuit Designation

The second and third characters of each wire number specifically identify the circuit within any given category. See the category listings found later in this document for specific wire number designations.

Note: All wire numbers listed in category listings are typical and may not necessarily apply to one given crane.

Jumper Wires

A jumper wire is defined as any wire not included in a wire harness. These wires are not labeled with a wire number. They are labeled however, with the actual wire part number which can be used to order a replacement wire.

All jumper wires will be colored white with the same exceptions, red, orange and black as described for the wire harness.

Category 1
Primary Power Circuits

Wire Number	Description
000	Spare Collector Ring Connection
101	Battery Charge
102–110	Battery Distribution
111–119	Distribution Controlled By Main Switch
120–121	Main Switch Solenoid
122–123	Chassis Ground
124	Wheel Anti-Lock Power Supply
125	Remote Control Power Supply
126–127	Distribution Controlled By Main Switch
128–129	Ground
130	Battery Distribution
131	Distribution Controlled By Upper Switch
132	Controller Power
133–137	Ground
138	24 Volt Power
139–140	Ground
141–143	Distribution Controlled By Transmission
144	Trailer ABS Power Supply

Category 2 Engine And Transmission Control Circuits	
Wire Number	**Description**
201–203	Starter Solenoid
204–205	Starter Motor
206–207	Engine Stop
208–209	Emergency Engine Stop
210	Throttle Lock
211	Throttle Control
212	Engine Torque Limit
213	Fuel Cooler
214	EMP Air Pump
215	Idle Validation
216–229	Other Engine Controls
230	Check/Stop Engine Power
231–240	Transmission Shift Select
241–242	Master Clutch Control
243	Ether Control
244	Outrigger Throttle Control
245	High Idle Solenoid
246–254	Torque Convertor Control
255–256	Speed Limiting
257	Fuel Heater
258–267	Other Transmission Controls
268	Throttle Actuator
269	Other Control
270	Throttle Supply
271	Intake Air Heater
272	Other Control
273–276	Transmission Supply
277	Transmission Cooler Fan
278	J1939 CAN High
279	J1939 CAN Low
280	J1939 CAN Shield
281	RPM Limiting

Category 3 Monitoring Circuits (Also See Category 8)	
Wire Number	**Description**
301–302	Instrument Supply
303–304	Fuel Level
305–306	Engine Oil Pressure
307–308	Engine Coolant Temperature
309	Fuel Pressure
310	Voltmeter
311–312	Tachometer/Engine Speed Indicator
313	Hourmeter
314	Transmission Oil Temperature
315–316	Engine Oil Temperature
317–318	Torque Convertor Oil Pressure
319	Speedometer
320–321	Hydraulic Oil Temperature
322–326	Hydraulic Filter Indicator
327	Low Hydraulic Charge Pressure
328–329	Master Clutch Indicator Light
330	Gear Case Lube Indicator
331–334	Drum Rotation Indicator
335	Swing Lock Indicator
336–338	Low Air Pressure Indicator
339	Auxiliary Steer Indicator
340	Emergency Brake Indicator
341	Skid-Trol Power & Fault Indicator
342	Boom Length Indicator
343	Hoist Brake Alarm
344	Cab Control Shutdown Indicator
345	Dual Function Instrument Supply
346	Load Moment Indicator - Power Supply
347	Load Moment Indicator - Logic Control
348	Load Moment Indicator - Swing Rotation Indicator
349	Load Moment Indicator – Function Interlock & Alarm
350	Wheel Anti-Lock System Fault Indicator
351	Remote Control Brake Pressure Monitoring
352	Bumper Outrigger Overload Alarm
353–356	Drum Rotation Indicator
357	Power “ON” Indicator
358	Anti-Two Block

Category 3 – Continued Monitoring Circuits (Also See Category 8)	
Wire Number	**Description**
359–360	Drum Limit Light
361	Engine Overheat Alarm
362–363	Air Pressure
364	Free-Fall System Indicator
365	Oil Level Alarm
366	Ladder Rung Alignment Indicator
367	Open Door Indicator
368	Controller Power Indicator - Base
369	Controller Power Indicator - Platform
370	Outrigger Interlock Indicator - Left Side
371	Outrigger Interlock Indicator - Right Side
372	Over Front Indicator And Warning Buzzer
373	Oil Pressure Alarm
374	Load Moment Indicator - Swing Rotation Indicator
375–376	Low Air Pressure Indicator
377–378	Free-Fall System
379	Engine Monitor - Upper
380	Light Test
381	Position Indicator
382–383	Engine Monitor - Carrier
384–388	Swing Potentiometer Indicator
389	Emergency Brake Boost Flow Indicator
390	Counterweight Removed/Attached Indicator
391	Auxiliary Steer Indicator
392	Suspension Lockout Indicator
393–395	Rear Axle Steer Lock Pin Indicator
396	Park Brake Indicator
397–398	Axle Differential Lock Indicator
399	Steer Indicator Gauge
	Monitoring Circuits Continued As Category 8

Category 4 Lighting And Horn Circuits	
Wire Number	**Description**
401	Distribution Controlled By Light Switch
402–403	Headlights
404–405	Clearance Lights
406	Tail And Clearance Lights - Carrier Left Side
407	Tail And Clearance Lights - Carrier Right Side
408	Backup Lights And Alarm
409	Backup Solenoid
410	Brake Light Switch(es)
411–412	Interior Cab Lights
413	Emergency And Turn Flasher
414	Front Turn Light - Carrier Right Side
415	Rear Turn And Stop - Carrier Right Side
416	Front Turn Light - Carrier Left Side
417	Rear Turn And Stop - Carrier Left Side
418–422	Exterior Lights
423	Tower Obstruction Light
424	Interior House Lights
425–426	Horn
427	Instrument Lights
428	Light Solenoid
429–430	Travel Alarm
431	Boom Telescope Override
432	Lift And Tilt Alarm
433	Instrument Lights
434	Rotating Beacon
435	Swing Alarm
436	Backup Light
437	Backup Alarm
438	Brake Light Switch
439	Emergency And Turn Signal Flasher
440	Tail And Clearance Lights - Upper
441	Front Turn Light - Upper Right Side
442	Rear Turn And Stop - Upper Right Side
443	Front Turn Light - Upper Left Side
444	Rear Turn And Stop - Upper Left Side
445	Daytime Running Lights

Category 5 Equipment Control Circuits (Also See Category 7)	
Wire Number	**Description**
501–502	Outrigger Power Supply
503–505	Outrigger Solenoid Control
506	Outrigger Control Circuit - Left Front Jack
507	Outrigger Control Circuit - Left Front Beam
508	Outrigger Control Circuit - Right Front Beam
509	Outrigger Control Circuit - Right Front Jack
510	Outrigger Control Circuit - Right Rear Jack
511	Outrigger Control Circuit - Right Rear Beam
512	Outrigger Control Circuit - Left Rear Beam
513	Outrigger Control Circuit - Left Rear Jack
514	Outrigger Control Circuit - Retract
515	Outrigger Control Circuit - Extend
516–518	Outrigger Directional/Flow Divider Valve Supply
519	Hydraulic Reservoir Pressure/Fine Metering
520	Two-Speed Hoist
521	Free-Fall Valve
522	Axle Oscillator Control
523	Combination Steering Control
524–525	Four-Wheel Drive Control
526	Reserve Air Control
527	Pump Disconnect
528	Oscillation Override
529	Remote Steering Control
530	Remote Steering Control (Rear Winch Up*)
531	Remote Steering Control (Rear Winch Down*)
532	Remote Steer Directional & Diverter Valve Supply (Front Winch Up*)
533	Remote Steer Directional & Diverter Valve Supply (Front Winch Down*)
534	Remote Steer Directional & Diverter Valve Supply (Swing Left*)
535	Telescope Override (Swing Right*)
536	Blocking Valve Control
537	Hydraulic Pin Puller Control (Boom Hoist Up*)
538	Hydraulic Pin Puller Control (Boom Hoist Down*)
539–540	Hydraulic Pin Puller Control
541–542	Hydraulic Pin Puller Power Supply
543	Two-Speed Swing
544	Two-Speed Travel
* Alternate description for some cranes with serial number prefixes J8 or R3 only.	

Category 5 – Continued Equipment Control Circuits (Also See Category 7)	
Wire Number	**Description**
545–548	Two-Speed Planetary
549	House Lock Disengage
550–551	Cab Motion
552	Boom Hoist Cutout
553	Drum Hoist Cutout
554	Boom Lowering Cutout
555	Travel/Third Drum Selector
556	House Lock Engage
557	Cab Motion
558	Drum Cutout Override
559	Boom Cutout Override
560–563	Axle Control
564	Tower Balance Arm Cutout Bypass
565–566	Fairleader Control
567	Cab Pressure Control
568	Hoist Convertor Control
569	Boom Hoist Brake Dump
570	Boom Hoist Cutout
571	Travel/Third Drum Selector
572–573	Drum Bypass
574	Automatic Brake
575	Park Brake
576	Drum Lowering Cutout
577	Two-Speed Hoist
578	Control Override
579	Remote Control
580	Accumulator Charge Pressure
581	Boom Hoist
582	Boom Telescope
583	Swing Lock
584–585	Boom Hoist Auxiliary
586	Swing Auxiliary
587–592	Outrigger Control
593–595	Blocking Valve
596–599	Free-Fall
	Equipment Control Circuits Continued As Category 7

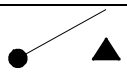
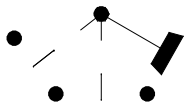
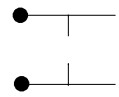
Category 6 Accessories Circuits	
Wire Number	**Description**
601–602	Heater
603–604	Defroster
605–607	Windshield Wiper
608–610	Windshield Washer
611	Cab Vent Fan
612–613	Air Conditioner
614–615	Propane Engine Preheater
616	Air Dryer
617	Cigarette Lighter
618–621	Air Conditioner
622	12 Volt Accessory Outlet
623	Remote Control Mirror
624	Heater
625	Seat Control
626	AM/FM Radio

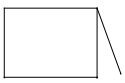
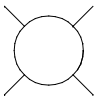
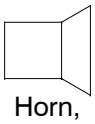
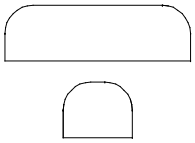
Category 7 Equipment Control Circuits (Also See Category 5)	
Wire Number	**Description**
701	Free-Fall
702	Tow Winch - Out
703	Tow Winch - In
704	Load Sensing
705	Oil Cooler Control
706	Pump Disconnect
707	Rear Axle Steer Lock - Upper Control
708	Rear Axle Steer Unlock - Upper Control
709	Axle Oscillation Control
710–712	Axle Differential Lock
713	Rear Axle Steer Lock - Carrier Control
714	Rear Axle Steer Unlock - Carrier Control
715	Winch Interference Control
716	Steer Reversing
717	Park Brake
718	Tow Winch - Auxiliary
719	Rear Axle Steer Locking
720	Boom Telescope Control Box (Offset Fly Control*)
721	Boom Telescope Control Box (Offset Fly*)
722–723	Boom Telescope Control Box
724	Front Winch Disengage
725	Rear Winch Disengage
726	Steer Lock
727	Boom Hoist Pump Control
728	Winch Pump Control
729	Boom Hoist Winch Disengage
730	Lower Jacking/Upper Pilot Control
731	Counterweight Removal
732	Axle Oscillation Control
733	Anti-Lock Brake System (ABS) Controller
734	J1939 CAN 1 - High
735	J1939 CAN 1 - Low
736	J1939 CAN 1 - Shield
737	Boom Latching Power Supply
738–744	Boom Latching Control
745–746	Axle Oscillation Control
* Alternate description for some cranes with serial number prefixes J8 or R3 only.	

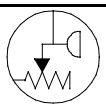
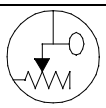
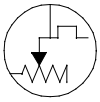
Category 7 – Continued Equipment Control Circuits (Also See Category 5)	
Wire Number	**Description**
747	Side Frame Control
748	J1939 CAN 2 - High
749	J1939 CAN 2 - Low
750	J1939 CAN 2 - Shield (Rear Winch Function Controller*)
751	J1939 CAN 3 - High (Swing Function Controller*)
752	J1939 CAN 3 - Low (Front Winch Function Controller*)
753	J1939 CAN 3 - Shield (Boom Hoist Function Controller*)
754	Auger
755	Boom Hoist Up
756	Boom Hoist Down
757	Swing Left
758	Swing Right
759	Front Winch Up
760	Front Winch Down
761	Rear Winch Up
762	Rear Winch Down
763	Horsepower Dissipation
764	Fly Extend
765	Fly Retract
766	Fan Pump Control
767	Front Winch Controller
768	Rear Winch Controller
769	Swing Controller
770	Steer Assist Circuit
771	Free Swing
772	Greaser
773	Winch, Boom Pressure Relief (Dump)
774	Fan Clutch Control
775	Hill Start Aid
790	IQAN Controller Ground
791	Right Forward Travel
792	Right Reverse Travel
793	Left Forward Travel
794	Left Reverse Travel
* Alternate description for some cranes with serial number prefixes J8 or R3 only.	

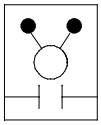
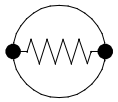
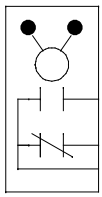
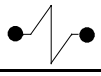
Category 8 Monitoring Circuits (Also See Category 3)	
Wire Number	**Description**
801	Ammeter
802	Pyrometer Temperature
803–804	Instrument Power Supply
805	Throttle Indicator
806	Load Moment Indicator (LMI) External Light Bar - Red
807	Load Moment Indicator (LMI) External Light Bar - Amber
808	Load Moment Indicator (LMI) External Light Bar - Green
809–810	Load Moment Indicator (LMI) External Light Bar Power Supply
811	Load Moment Indicator (LMI) Display Data Signal - $A_A \cong$
812	Load Moment Indicator (LMI) Display Data Signal - $A_B \cong$
813	Load Moment Indicator (LMI) Display Reset Signal
814	Load Moment Indicator (LMI) Display Power Supply
815	Load Moment Indicator (LMI) Display Ground
816	Load Moment Indicator (LMI) Shield
817	Load Moment Indicator (LMI) Reeling Drum & Anti-Two Block (ATB)
818	Four-Wheel Drive Engaged Indicator
819	Load Moment Indicator (LMI) Bypass
820	Load Moment Indicator (LMI) Counterweight Sensing
821	Suspension Height Indicator
822	Anemometer
823	Outrigger Length Reel - Left Front Beam
824	Outrigger Length Reel - Right Front Beam
825	Outrigger Length Reel - Left Rear Beam
826	Outrigger Length Reel - Right Rear Beam
827	Swing Sensor
828	Seat Belt Indicator
829	Primary Steer Indication - Front
830	Secondary Steer Pump Indication - Rear
831	Tilt Sensor
832–833	Display/Monitor Supply
834	USB Port
835	Ground Driven Steer Pump Indication
836	Camera System

Electrical System Schematic Symbols

Switches	
	Maintained Contact Normally Open
	Maintained Contact Normally Closed
	Momentary Contact
	Mechanically Actuated
	Pressure Sensitive Opens As Pressure Rises
	Pressure Sensitive Closes As Pressure Rises
	Momentary Contact Normally Open
	Momentary Contact Normally Closed
	Make Before Break
	Mechanically Linked
	Variable Resistance With Off Position
	Closes With Increase In Flow
	Opens With Increase In Flow

Audible Signals	Lights
 Buzzer	 Gauge
 Horn, Backup Alarm	 Head, Tail, Dome, Brake, Etc.

Senders	
	Pressure Sensitive
	Liquid Level
	Thermal Sensitive
	Speedometer

Relays	Heating Element
 Coil Contacts NO	
 Coil Contacts NO Contacts NC Contacts Common	**Diode**  **Valve Solenoid** 

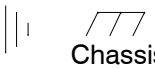
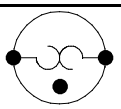
Circuit Protectors	Ground
 Fuse	 Chassis
Circuit Breaker  Manual Reset	**Gauge** 
Circuit Breaker  Thermal Reset	**Flasher** 
Battery 	**Motor** 

Figure 3
Electrical Symbols Legend

Electrical System Schematic Symbols

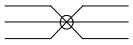
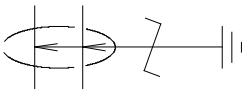
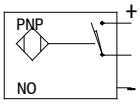
Node	Bus Bar (Fuse Block)	Shielded/Twisted Wire	Thermostat	Sensor
				

Figure 3
Electrical Symbols Legend -- Continued