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Spider™ Carousel Systems

Applicable Part Numbers:
200-406-00
200-407-00
200-408-00
200-409-00
200-410-00
200-411-00

Owner's Manual

Document number 120-204-00
Revision 4
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RECORD OF REVISIONS

Revision	*Date*	*Page(s)*	*Reason for Revision*
0	10/10/11	All	Initial Release
1	12/14/11	All	Updates to BOM's and part numbering throughout.
2	06/04/12	Section 2	Added additional details to installation instructions.
3	06/14/12	3-1 & 4-3	Removed all references to drop all functionality.
4	11/13/13	2-4	Corrected installation wiring schematic.

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Section 1
General Information

Introduction

This Owner's Manual contains instructions for installation, operation and maintenance for Spider™ Carousel Systems, P/N 200-411-00, 200-410-00, and 200-409-00 which represent complete 4, 6, and 8-hook Carousel Systems respectively.

The Owner's Manual also contains instructions for Spider™ Carousel Systems, P/N 200-408-00, 200-407-00, and 200-406-00 which represent 4, 6, and 8-hook Carousel Systems *without cargo hooks supplied*. These systems are intended for customers who have available Onboard Systems 528-021-XX series of carousel cargo hooks in their inventory.

The Carousel System is suspended from a long line which is attached to the helicopter's primary cargo hook in order to provide multiple independently releasable load points.

The aircraft side electrical components and wiring required for operation of the carousel controller are not included with the carousel system, see section 2 for additional detail including a possible aircraft installation. The customer is responsible for the aircraft installation and for obtaining appropriate civil aviation authority approval of the modification to the aircraft.

Explanation of Signal Words and Symbols

The following definitions apply to the symbols used throughout this manual to draw the reader's attention to safety instructions as well as other important messages.

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Draws the reader's attention to important or unusual information not directly related to safety.

Used to address practices not related to personal injury.

Bill of Materials

Carousel systems are supplied partially assembled and require final assembly by the customer. The items in Table 1.1 are included *separately* and must be assembled to the Carousel System before use. If shortages are found, contact the company from whom the system was purchased. Assembly instructions are located in Section 4 of this manual.

NOTICE

The following Bill of Materials show only the parts which are shipped unassembled with each Carousel System. Refer to section 4 for a complete list of parts.

Table 1.1 Bill of Materials, 8-Hook Systems

8-Hook Carousel Systems			
Kit Part No.	Part No.	Description	Quantity
200-409-00 8-Hook Carousel System w/Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-257-00	8-Hook Carousel Assembly	1
	232-577-00	8-Hook Cable Assembly	1
	510-102-00	Nut	2
	510-105-00	Washer	8
	510-370-00	Nut	8
	510-659-00	Bolt	2
	510-953-00	Bolt	8
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2
200-406-00 8-Hook Carousel System w/o Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-267-00	8-Hook Carousel Assembly w/o Hooks	1
	232-577-00	8-Hook Cable Assembly	1
	410-349-00	Snap Plug Receptacle	8
	410-350-00	Bullet Snap Plug	8
	510-102-00	Nut	2
	510-105-00	Washer	24
	510-342-00	Bolt	8
	510-370-00	Nut	24
	510-659-00	Bolt	2
	510-953-00	Bolt	24
	512-005-00	Adel Clamp	8
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2

Bill of Materials continued

Table 1.2 Bill of Materials, 6-Hook Systems

6-Hook Carousel Systems			
Kit Part No.	Part No.	Description	Quantity
200-410-00 6-Hook Carousel System w/ Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-256-00	6-Hook Carousel Assembly	1
	232-578-00	6-Hook Cable Assembly	1
	510-102-00	Nut	2
	510-105-00	Washer	6
	510-370-00	Nut	6
	510-659-00	Bolt	2
	510-953-00	Bolt	6
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2
200-407-00 6-Hook Carousel System w/o Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-266-00	6-Hook Carousel Assembly w/o Hooks	1
	232-578-00	6-Hook Cable Assembly	1
	410-349-00	Snap Plug Receptacle	6
	410-350-00	Bullet Snap Plug	6
	510-102-00	Nut	2
	510-105-00	Washer	18
	510-342-00	Bolt	6
	510-370-00	Nut	18
	510-659-00	Bolt	2
	510-953-00	Bolt	18
	512-005-00	Adel Clamp	6
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2

Bill of Materials continued

Table 1.3 Bill of Materials, 4-Hook Systems

4-Hook Carousel Systems			
Kit Part No.	Part No.	Description	Quantity
200-411-00 4-Hook Carousel System w/Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-255-00	4-Hook Carousel Assembly	1
	232-579-00	4-Hook Cable Assembly	1
	510-102-00	Nut	2
	510-105-00	Washer	4
	510-370-00	Nut	4
	510-659-00	Bolt	2
	510-953-00	Bolt	4
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2
200-408-00 4-Hook Carousel System w/o Hooks	120-204-00	Owners Manual-Carousel Systems	1
	210-265-00	4-Hook Carousel Assembly w/o Hooks	1
	232-579-00	4-Hook Cable Assembly	1
	410-349-00	Snap Plug Receptacle	4
	410-350-00	Bullet Snap Plug	4
	510-102-00	Nut	2
	510-105-00	Washer	12
	510-342-00	Bolt	4
	510-370-00	Nut	12
	510-659-00	Bolt	2
	510-953-00	Bolt	12
	512-005-00	Adel Clamp	4
	512-024-00	Adel Clamp	2
	512-026-00	Adel Clamp	2

Specifications

Table 1.4 Carousel System Specifications

Carousel System	4-Hook Systems	6-Hook Systems	8-Hook Systems
Max Single Hook Load	650 lbs. (295 kg)	650 lbs. (295 kg)	650 lbs. (295 kg)
Max Combined load*	1,600 lbs. (726 kg)	2,400 lbs. (1,089 kg)	3,200 lbs. (1,452 kg)
Limit Load	4,000 lbs. (1,814 kg)	6,000 lbs. (2,722 kg)	8,000 lbs. (3,629 kg)
Combined Ultimate Strength	6,000 lbs. (2,722 kg)	8,000 lbs. (3,629 kg)	12,000 lbs. (5,443 kg)
Unit weight	49 lbs. (22.3 kg)	63 lbs. (28.6 kg)	76 lbs. (34.5 kg)
Compatible Electrical Connector (long line side):	Leviton 5259-VY or equivalent	Leviton 5259-VY or equivalent	Leviton 5259-VY or equivalent

*Max combined load = 400 lbs x number of hooks

Load capacities given are for the equipment described only. Load limits for the remainder of the external load lifting system and your particular helicopter model still apply.

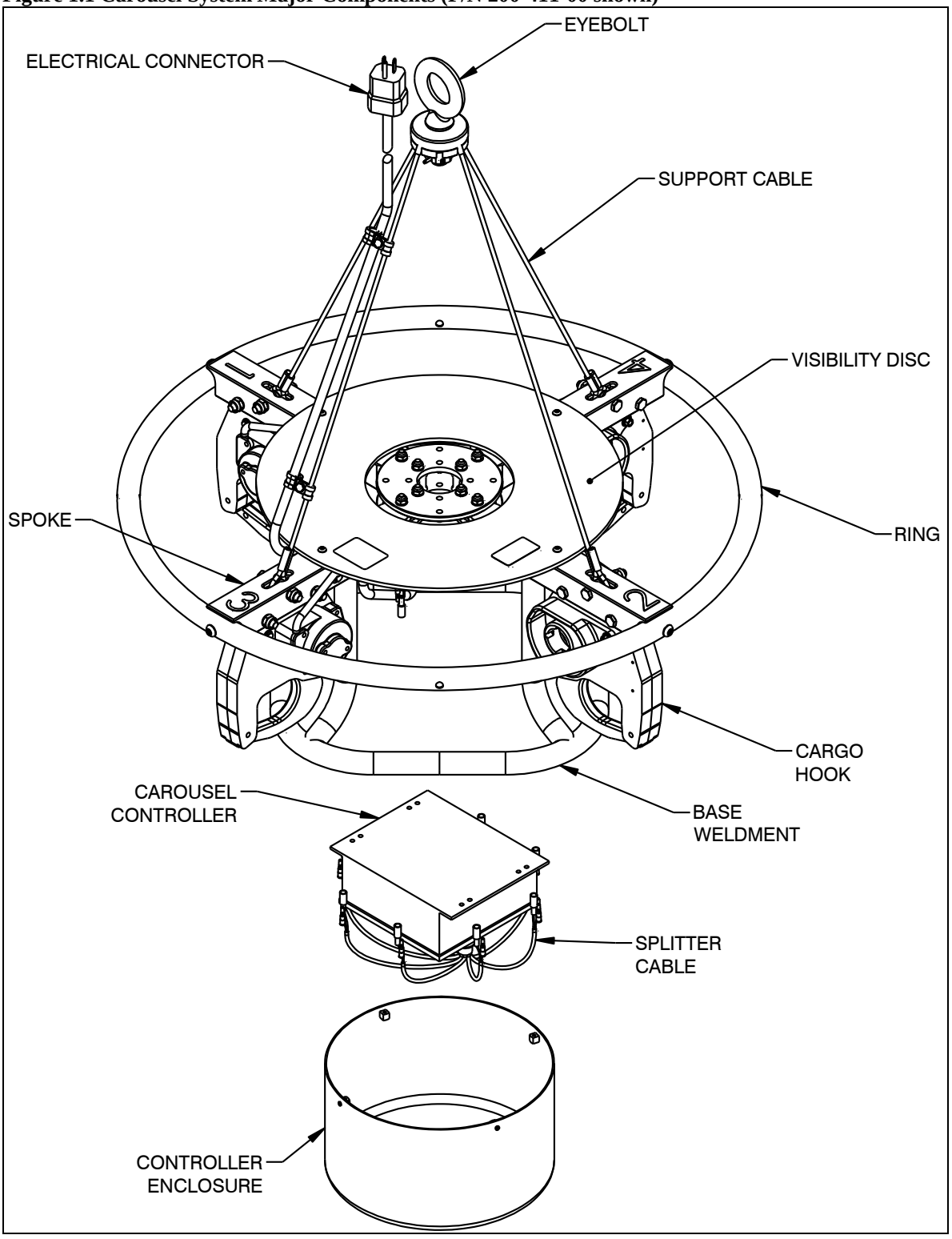
Theory of Operation

Carousel Systems are designed to be hung from a helicopter long line. The principal function is to provide a means of connecting and individually releasing multiple cargo loads.

The cargo hooks are controlled through two momentary switches mounted in the cockpit (these switches are not included with these kits). These switches connect to a controller installed in the carousel system which controls the release of the cargo hooks. The cargo hooks are released individually in sequence. Figure 1.1 shows the major components of the Carousel Systems.

Theory of Operation continued

Figure 1.1 Carousel System Major Components (P/N 200-411-00 shown)



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Section 2
Installation Instructions

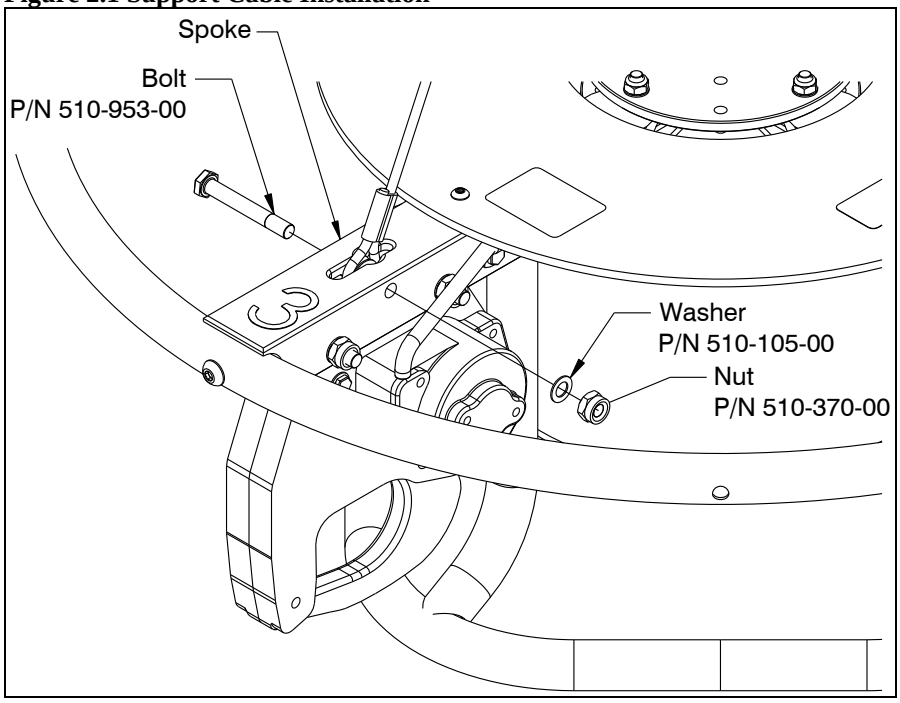
Carousel System Installation

Carousel systems are shipped with the support cables detached from the main frame assembly. The support cables are supplied partially assembled as a subassembly. It is necessary to install these cables onto the carousel frame after receiving the system. The necessary hardware and fasteners used to install the support cables are supplied (see Table 1.1).

To install the support cables remove the protective netting from the cable assembly. Place the thimble end of a support cable in the slot in one of the spokes and secure with the provided bolt, washer and nut (see Figure 2.1). Torque nut to 60-85 in-lbs (7-9.5 Nm). Repeat for each support cable.

If the bolt does not pass through the attach hole in the spoke it may be necessary to loosen the attach bolts securing the cargo hook to the spoke. Loosen as needed and re-torque when the cable is installed.

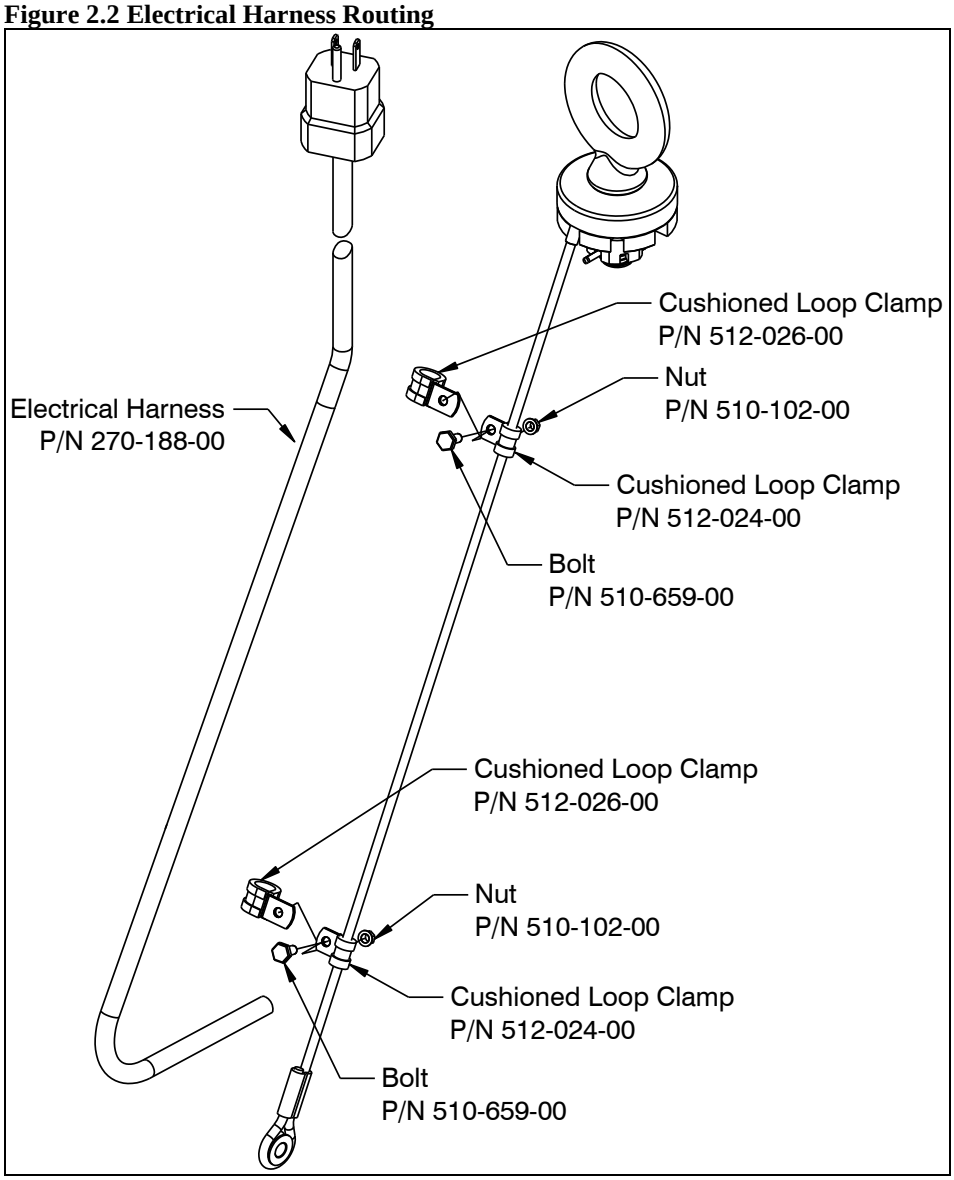
Figure 2.1 Support Cable Installation



Carousel System Installation continued

Once the support cables are assembled onto the spokes, route the electrical harness along the nearest support cable using the supplied cushioned loop clamps and fasteners. See Figure 2.2.

Figure 2.2 Electrical Harness Routing

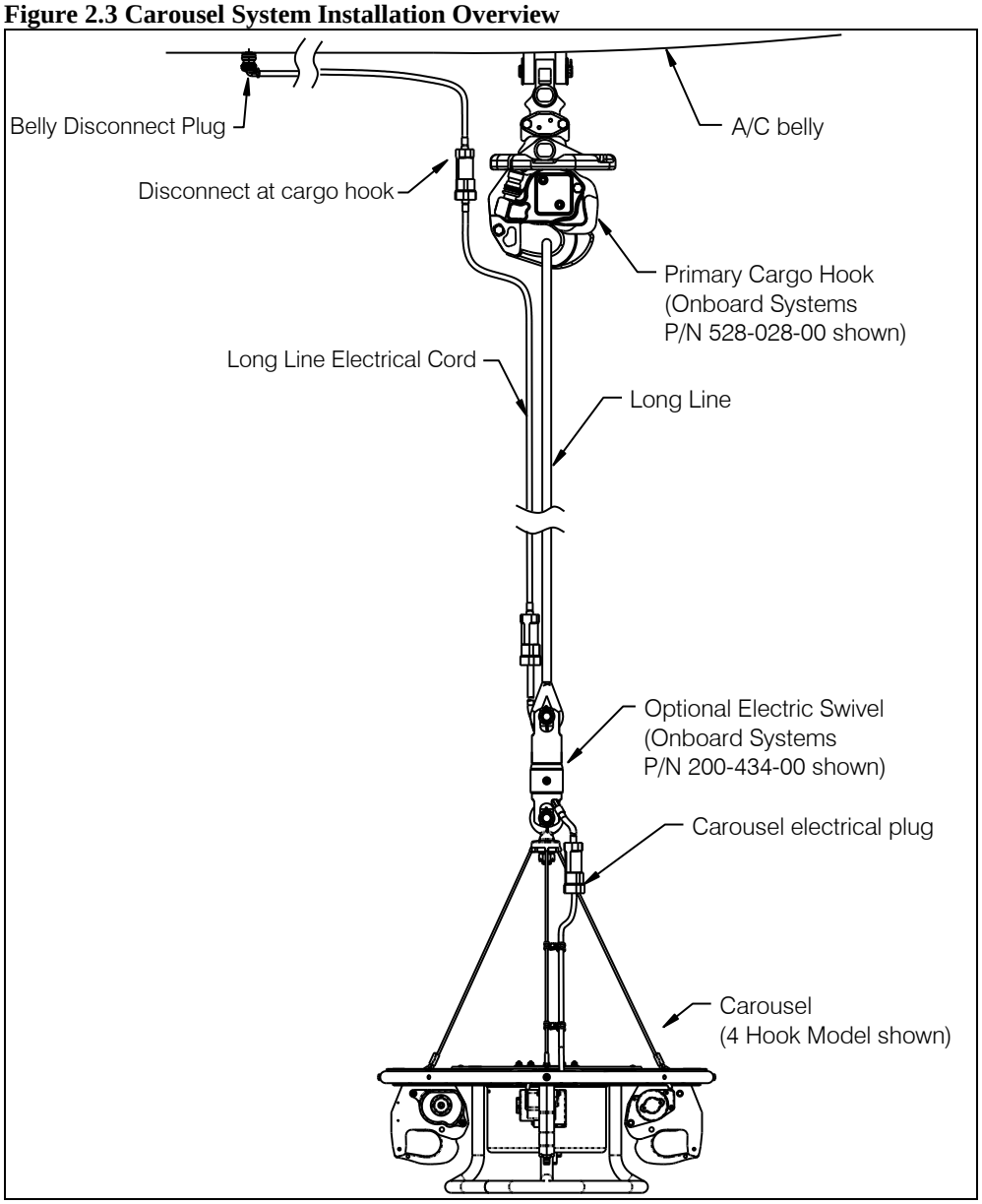


Carousel System Installation continued

Figure 2.3 shows an overview of a typical carousel system installation, see Figure 2.4 for a system wiring schematic including a possible aircraft side wiring configuration. The figure below does not represent all possibilities but is intended as a guide for the installation of the carousel system as a part of a complete external load carrying system.

Attach the Carousel System to a long line using an electric swivel (as shown in Figure 2.3) or anchor shackle or other rigging hardware that is appropriately sized and rated for the Carousel System load rating.

Figure 2.3 Carousel System Installation Overview



The three wire electrical harness on the carousel system is fitted with a standard North American male 3-prong plug.

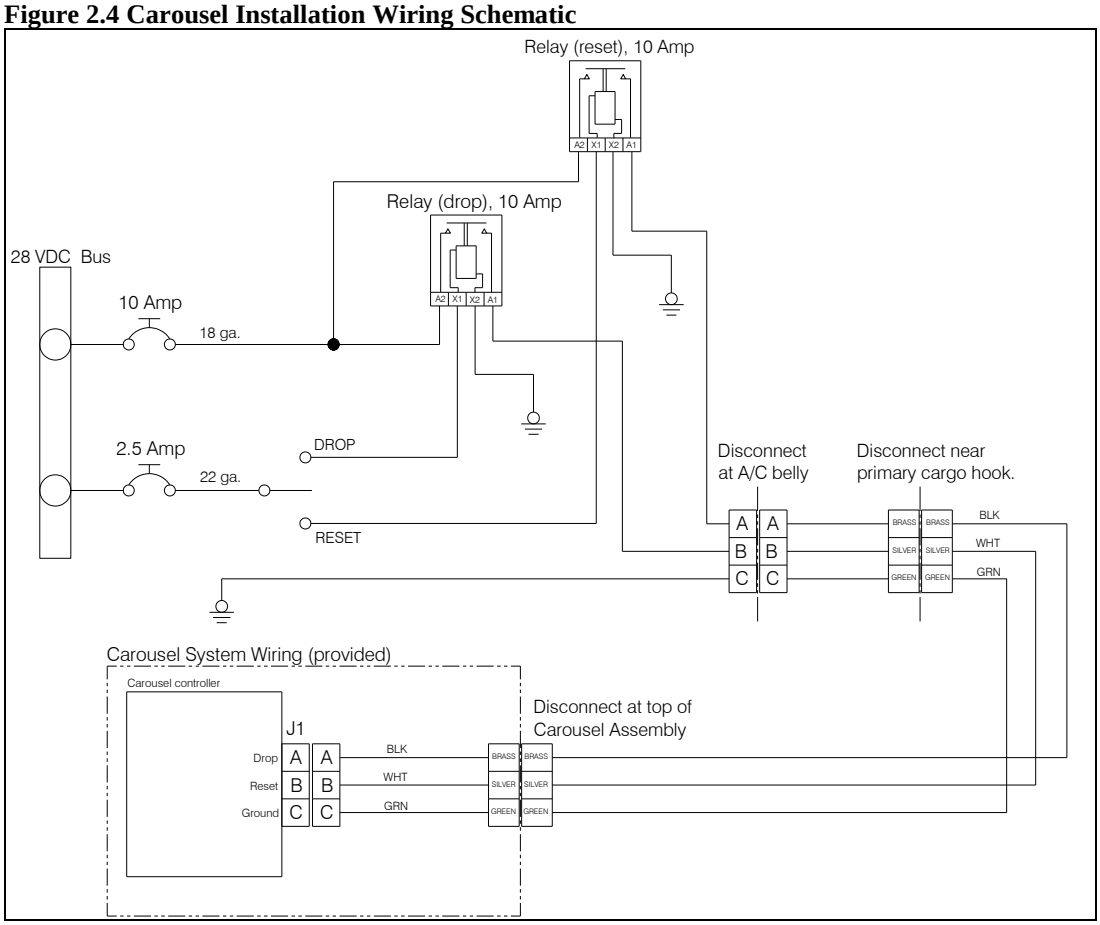
Carousel System Installation continued

To operate the Carousel System controller's drop and reset functions, two momentary switches or a three position momentary toggle switch will need to be installed in the cockpit. Figure 2.4 provides a wiring schematic of a possible aircraft side installation for the electrical controls and how it interfaces with the carousel system wiring. Table 2.1 provides the pin-out of each controller connector.

NOTICE

The drop and reset switches required to operate the carousel controller are not included with the carousel systems. The customer is responsible for installing these and other components (i.e. - wiring, breakers and relays) required for carousel operation. The customer is responsible for appropriate civil aviation authority approval of the installation of these components on the aircraft.

Figure 2.4 Carousel Installation Wiring Schematic



Carousel System Installation continued

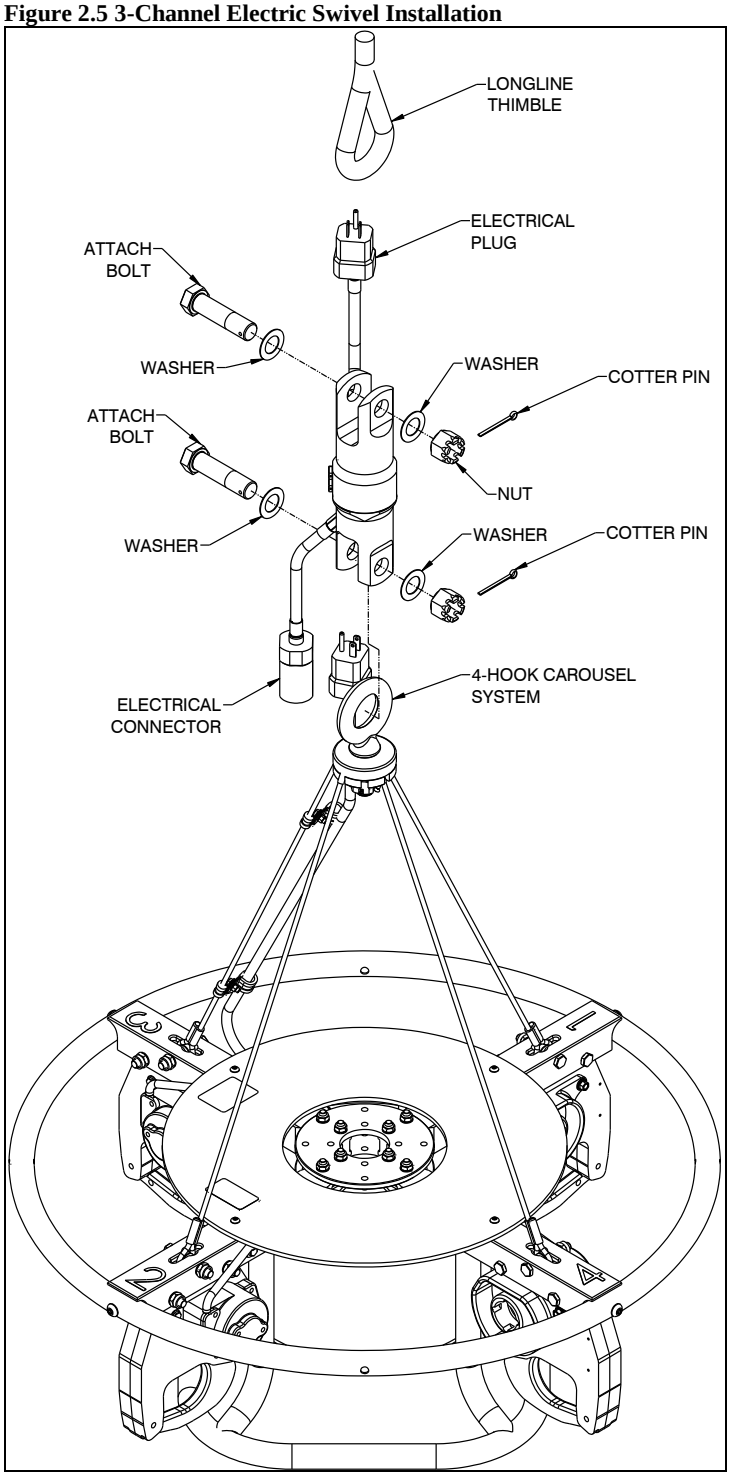
Table 2.1 Carousel Controller Pin-Out

MS3112E18-11S			MS3112E12-3P		
Pin	**Color**	**Function**	**Pin**	**Color**	**Function**
A	**Brown**	**Hook 1**	**A**	**Black**	**Drop**
B	**Red**	**Hook 2**	**B**	**White**	**Reset**
C	**Orange**	**Hook 3**	**C**	**Green**	**Ground**
D	**Yellow**	**Hook 4**			
E	**Green**	**Hook 5**	**MS3112E8-4S**		
F	**Blue**	**Hook 6**	**Pin**	**Color**	**Function**
G	**Violet**	**Hook 7**	**A**	**Brown**	**Red Light +**
H	**Grey**	**Hook 8**	**B**	**Red**	**Red Light -**
J	**Unused**	**Unused**	**C**	**Orange**	**Amber Light -**
K	**Unused**	**Unused**	**D**	**Yellow**	**Amber Light +**
L	**Black**	**Ground**			

Carousel System Installation continued

An optional 3-Channel Electric Swivel Kit, P/N 200-402-00, is available. The 3-Channel Swivel has a 6,000 lbs (2,722 kg) working load limit, and provides a rotating electrical connection between the helicopter long line and the Carousel System.

Figure 2.5 3-Channel Electric Swivel Installation



Carousel System Installation continued

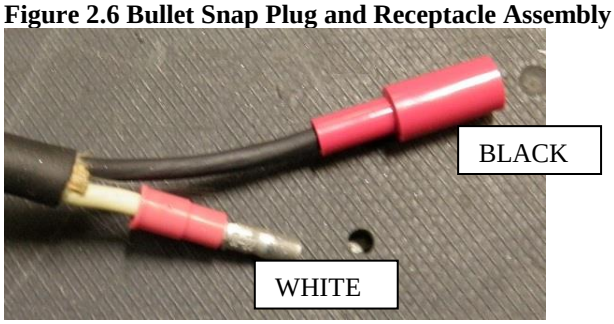
Assembly for Carousel Systems Shipped *without* Hooks

Spider™ Carousel Systems 200-406-00, 200-407-00, and 200-408-00 are supplied *without* cargo hooks. It is intended that the customer install their existing carousel cargo hooks to complete the carousel system. The carousel is designed to interface with the Onboard Systems 528-021-XX series of cargo hooks. To accomplish this, it is necessary to complete the following.

Modify existing 528-021-XX Carousel Hooks by trimming the power cord to length, stripping the ends and crimping on electrical contacts per the following.

1. Trim cable to 12”± .25”.
2. Remove 2” of cable jacket.
3. Cut *only* white wire to 1" from jacket.
4. Strip both black and white wire .25” to expose copper wire.
5. Crimp a bullet snap plug, P/N 410-350-00, to the white wire and a bullet snap receptacle, P/N 410-349-00 to the black wire.

Figure 2.6 Bullet Snap Plug and Receptacle Assembly



Install each cargo hook into the carousel frame with supplied attach hardware. Route the power cord through the cord grip and secure with adel clamp. Connect each hook's power cord to the controller's splitter cable. Power the controller and verify proper operation according to section 3 of this manual.

Figure 2.7 Power Cord Routing

Reference the assembly instructions provided in section 4 of this manual along with the illustrated parts list to complete this process.

When 528-021-XX Cargo Hooks are installed P/N’s 200-408-00, 200-407-00, and 200-406-00 become P/N’s 200-411-00, 200-410-00 and 200-409-00 respectively.

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Section 3
Operation Instructions
Operating Procedures

Before operating the Carousel System be completely familiar with the Rotorcraft Flight Manual Supplement for External Cargo Operation for your helicopter.

Cargo is released electronically through the Carousel Controller. The Carousel Controller is controlled through the drop and reset switches from the cockpit. The following instructions outline the use of the drop and reset controls.

Controller Operation:

- Press “reset” and hold for 2 seconds to reset controller to hook 1.
- Press “drop” and hold for 2 seconds to release hook 1.
- Press “drop” and hold for 2 seconds to release hook 2. Repeat for the remaining hooks.
- Press “reset” and hold for 2 seconds to reset controller to hook 1.

After release, the cargo hooks may be returned to the closed and locked position by manually pushing up on the load beam. The load beam should snap shut. The cargo hooks may also be flown in the open position to facilitate loading by a ground crew. See owner's manual 120-087-00 for complete instructions regarding operation of the 528-021-XX Carousel Hook.

Icing conditions may cause the Cargo Hooks to not release when commanded. It is not recommended to use the Carousel System in freezing conditions without adequate use of an anti-icing compound.

Carousel System Rigging

Extreme care must be exercised in rigging a load to the Carousel System cargo hooks. Steel load rings are recommended to provide consistent release performance and resistance to fouling.

It is the responsibility of the operator to assure the cargo hooks will function properly with each rigging configuration.

If nylon straps or ropes are used, verify that they slide freely from the load beam when the cargo hook is opened. Extremely thin straps (less than a 1/16" thickness) may be capable of sliding off the tip of the load beam when latched. When using steel load rings, verify that the ring will freely slide off the load beam when it is opened.

When loading the Carousel System, load the cargo hooks evenly by following the numbering scheme labeled on the top of the Carousel System (i.e. load the cargo hooks in order 1, 2, 3, 4 etc…). Any other rigging order may result in uneven loading of the Carousel System.

If slinging a single load from multiple cargo hooks, it is recommended that it be released only when the load is on the ground.

Section 4
Maintenance

Storage Instructions

Clean the Carousel System thoroughly before packaging. Apply an anti-corrosion coating such as ACF-50 to all system mechanicals to inhibit rust and prevent corrosion.

Place the Carousel System upright in a suitable fiberboard box and cushion the unit to prevent shifting. Care should be taken to cushion and protect the support cables to prevent kinking. Seal the fiberboard box with tape and mark the box with the contents and date of packaging.

If the unit is to be stored for long periods in a tropical climate it should be packed in a reliable manner to suit local conditions.

Preventive Maintenance

Remove caked-on dirt from the Carousel System with a brush and clean exposed surfaces with a mild solvent. Thoroughly dry all surfaces.

Inspection Schedule

Inspection of the Carousel System is in accordance with the table below. If parts are to be replaced, refer to the disassembly and assembly instructions.

Table 4.1 Inspection

Part Number(s)	**Daily Check**	**Inspection – Annually or 100 hours of external load operations, whichever comes first.**	**Inspection – 5 years or 1000 hours of external load operations, whichever comes first.**
200-409-00 200-410-00 200-411-00	1. Test Carousel Controller operation for Reset and Drop functionality by releasing each hook. 2. Check all fasteners to ensure they are in place and secure. 3. Check the base weldment, spokes and cable hubs for cracks and damage. 4. Check the support cables for damage. 5. Inspect the cargo hook load beams for gouges and cracks.	Same as daily check.	Clean and inspect per the procedures in this manual. If parts are required to be replaced, refer to the disassembly and assembly instructions provided herein. Overhaul each carousel hook per manual 120-087-00.

Carousel System Disassembly

See Figures 4.1, 4.2, 4.3, 4.4, and 4.5 for illustrations and Table 4.2 for complete parts list. Figures show P/N 200-411-00, but construction and assembly is representative of all Carousel Systems.

1. Separate the Carousel System from the long line.
2. Remove the Adel clamps (43) and (44) attaching the Electrical Harness (10) to the Support Cable (4).
3. Remove the bolts (35), washers (25), and nuts (30) securing the Support Cables to the Spokes (3).
4. To detach Support Cables from the Cable Hub (11) remove the cotter pin (22) securing the castellated nut (37). The Cable Hub, Cable Hub Cap (12), eyebolt (13) and Support Cables can now be disassembled.
5. Remove the screws (40) securing the Visibility Disc (15). Remove the Visibility Disc.
6. Remove the screws (24) and washers (36) securing the Enclosure Can (7). Lift the carousel assembly to remove the Enclosure Can.
7. Disconnect the Cargo Hook (48) power cables from the Carousel Splitter Harness (9). Loosen the Cable Glands (49) and carefully pull the power cables out.
8. Remove the Adel clamp (42) and screw (29) securing the Cargo Hook power cable to the Spoke.
9. For each Cargo Hook (48) remove the bolts (35), washers (25), and nuts (30) securing the Cargo Hooks to the Spokes.
10. Remove the Enclosure Cap (8) by removing bolts (39), washers (27) and urethane springs (45) securing it to the Spokes.
11. Remove the screws (33), washers (20) and nuts (21) securing the Carousel Controller (50) to the Enclosure Cap.
12. Remove the Cap Screws (34) securing the Ring Weldment (5) to the Spokes.
13. Remove the bolts (35), washers (25), and nuts (30) securing the Spokes to the Strut Weldment (6).
14. Remove the bolts (28), washers (32), and nuts (26) fastening the Hubs (14) and Spokes together. Note Spoke layout pattern for assembly.

Five Year/1000 hour Inspection

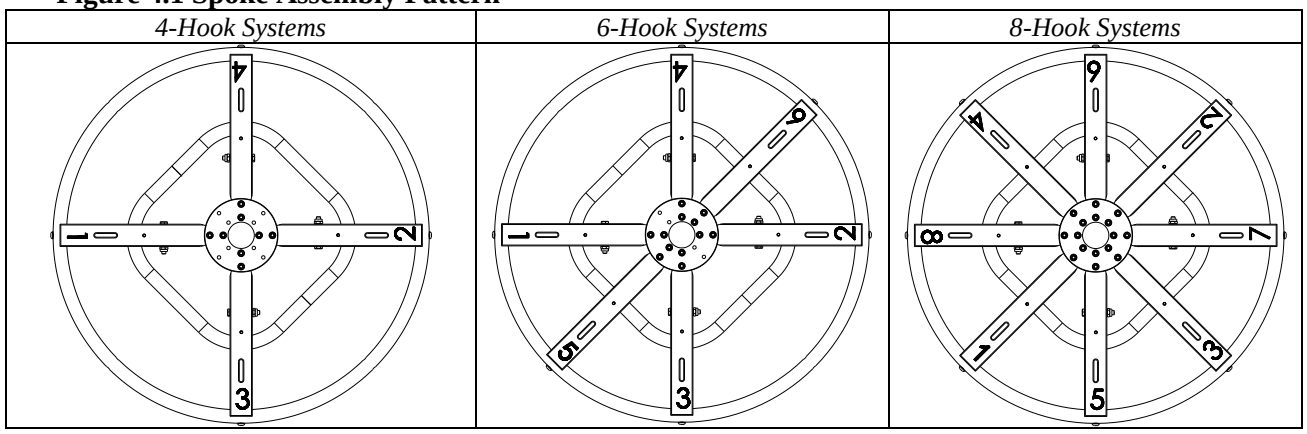
Clean the parts with a mild solvent and carefully inspect the parts in accordance with the instructions below. Inspect the parts in a clean, well-lit room.

- Overhaul cargo hooks (48) per five year/1000 hour overhaul criteria found in the Talon Carousel Remote Cargo Hook Owners Manual, 120-087-00.
- Visually inspect Spoke Assemblies (3), Eyebolt (13), Cable Hub (11), Nut (37), and Hubs (14) for cracks or damage.
- Inspect Carousel Cable Assemblies (4) for frayed strands and kinked cables.
- Reassemble the system per instructions below.
- Cycle Carousel Controller (50) to ensure drop and reset functions operate properly.

Carousel System Assembly Procedures

1. Assemble the Hubs (14) and Spoke Assemblies together by using bolts (28), washers (32), and nuts (26). The bolt heads must face down, torque nuts to 50-70 in-lbs (5.5-8 Nm). Follow the Spoke pattern layouts shown in figure 3.1.

Figure 4.1 Spoke Assembly Pattern



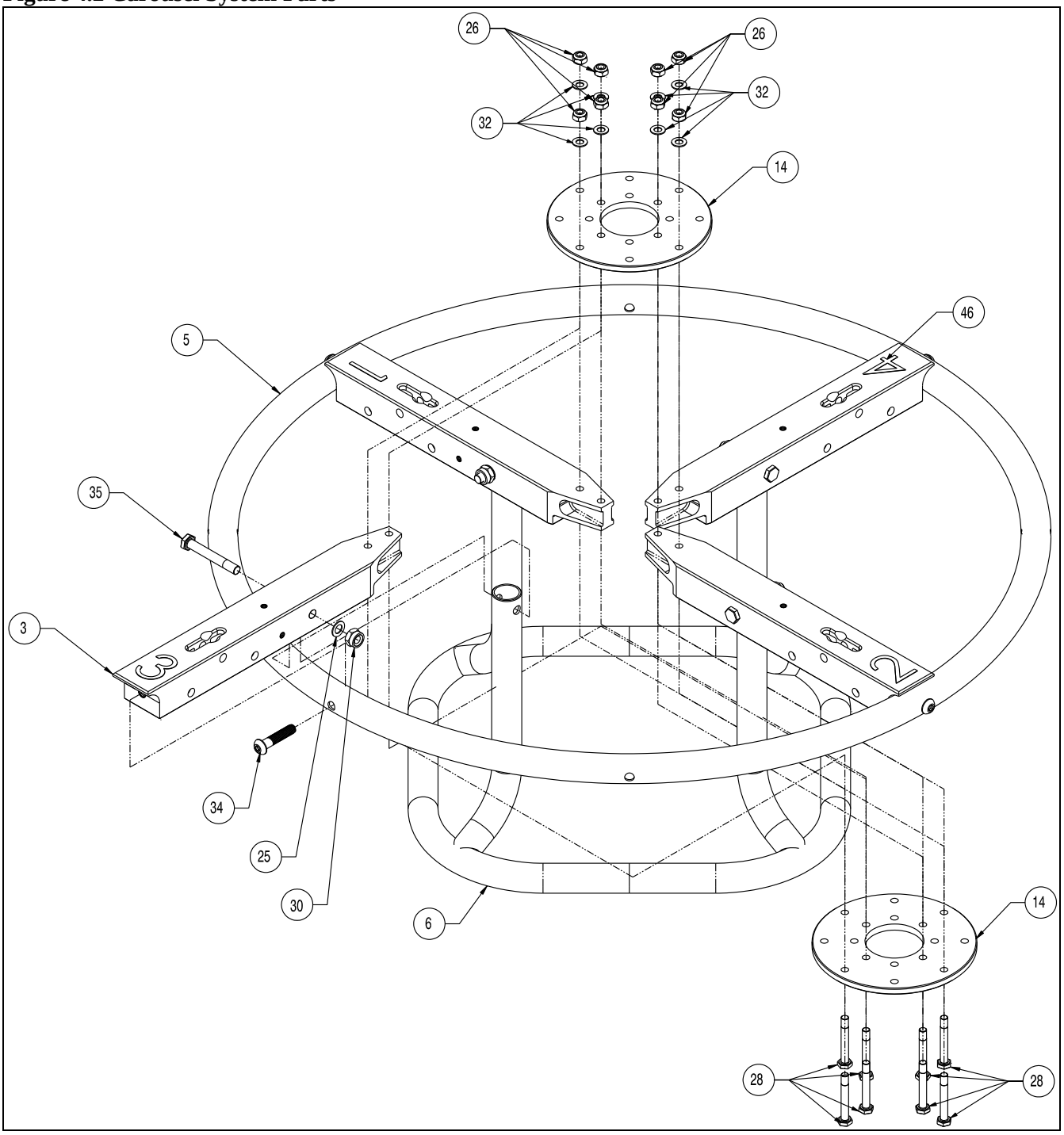
2. Assemble the Ring Weldment (5) onto the Spoke Assemblies using Cap Screws (34).
3. Install the Strut Weldment (6) with four bolts (35), washers (25), and nuts (30).
4. Secure the Carousel Controller (50) to the Enclosure Cap (8) using screws (33), washers (20) and nuts (21).
5. Align the Enclosure Cap with the mounting holes on the underside of the assembled Spokes and secure using bolts (39), washers (27) and urethane springs (45). Torque bolts enough to lightly compress springs.
6. Install Cargo Hooks (48) to Spokes using bolts (35), washers (25), and nuts (30). Torque nuts to 60-85 in-lbs (7-9.5 Nm). When installed the cargo hook load beams should open outwards, away from the Carousel System.

Carousel System Assembly Procedures continued

7. Route the power cord from the Cargo Hook through an Adel clamp (42) and use screw (29) to secure the clamp to the Spoke.
8. Pass the Cargo Hook power cord through the Cable Gland (49) and connect the power cords to the Carousel Splitter Harness (9). Tighten the Cable Gland. When connecting the power cords match the correct Cargo Hook with its mating Splitter Harness (9) lead. (i.e. The power cord from the Cargo Hook attached to the spoke labeled "1" will connect to the harness lead labeled "1" and so on.)
9. Attach the Enclosure Can (7) using screws (24) and washers (36).
10. Install the Visibility Disc (15) and secure with screws (40).
11. In order, place the Cable Hub Cap (12), Cable Hub (11), washer (38) and castellated nut (37) on the Eyebolt (13). Leave enough space between the Cable Hub and Cap and insert the ball end of the Support Cable (4). Follow the same pattern shown in figure 3.1 when installing the Support Cables.
12. Tighten the castellated nut and permanently secure it with a cotter pin (22).
13. Place the thimble end of a support cable in the slot in the spoke and secure with the provided bolt (35), washer (25) and nut (30). Torque nut to 60-85 in-lbs (7-9.5 Nm). If the attach bolt does not pass through the attach hole in the spoke it may be necessary to loosen the attach bolts securing the cargo hook. Loosen as needed and re-torque to 60-85 in-lbs (7-9.5 Nm) when cable is installed.
14. Route the Electrical Harness (10) along the nearest Support Cable and secure with Adel clamps (43) and (44) in two places. Fasten Adel clamps using a bolt (31) and nut (23).

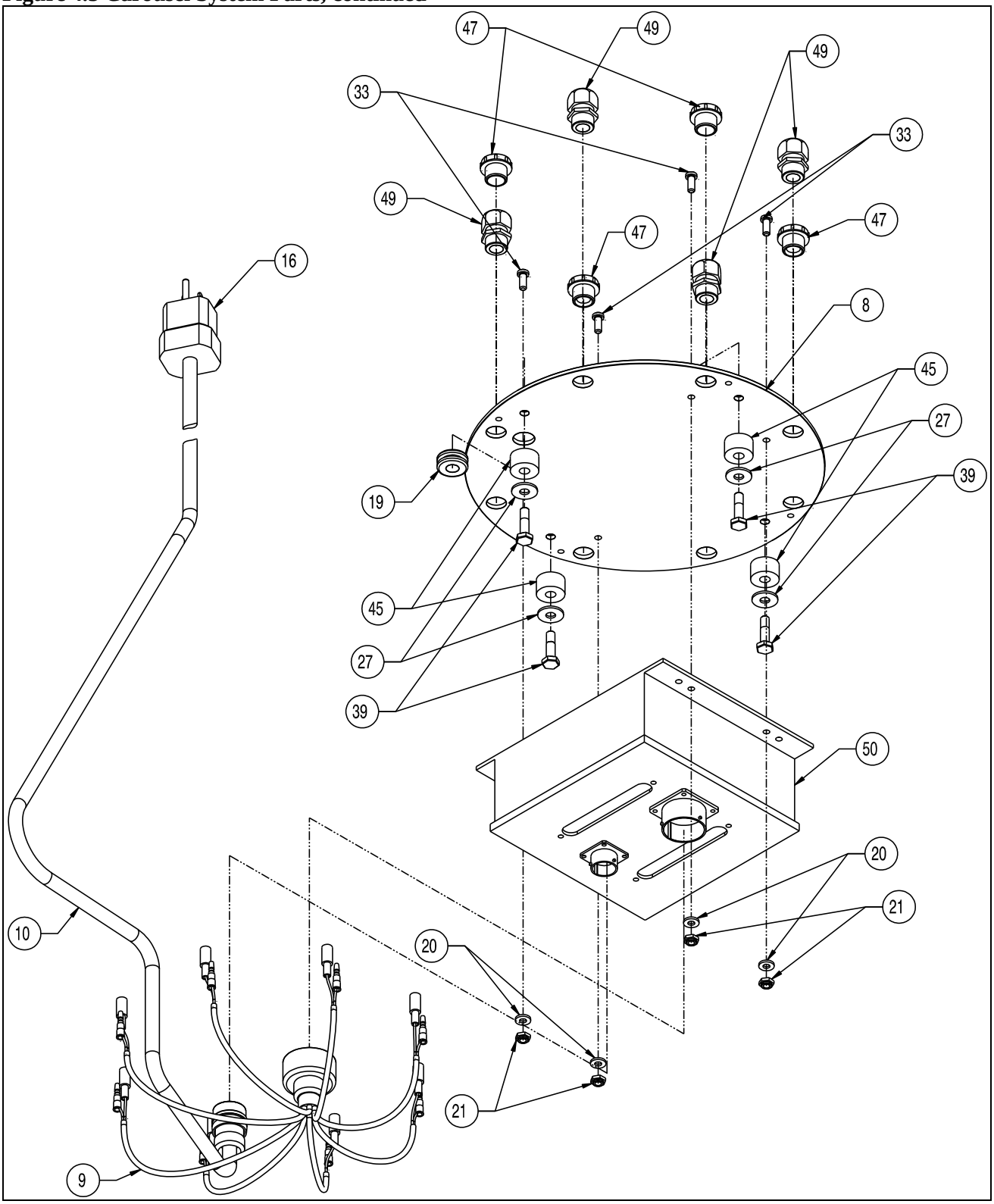
Carousel System Exploded View

Figure 4.2 Carousel System Parts



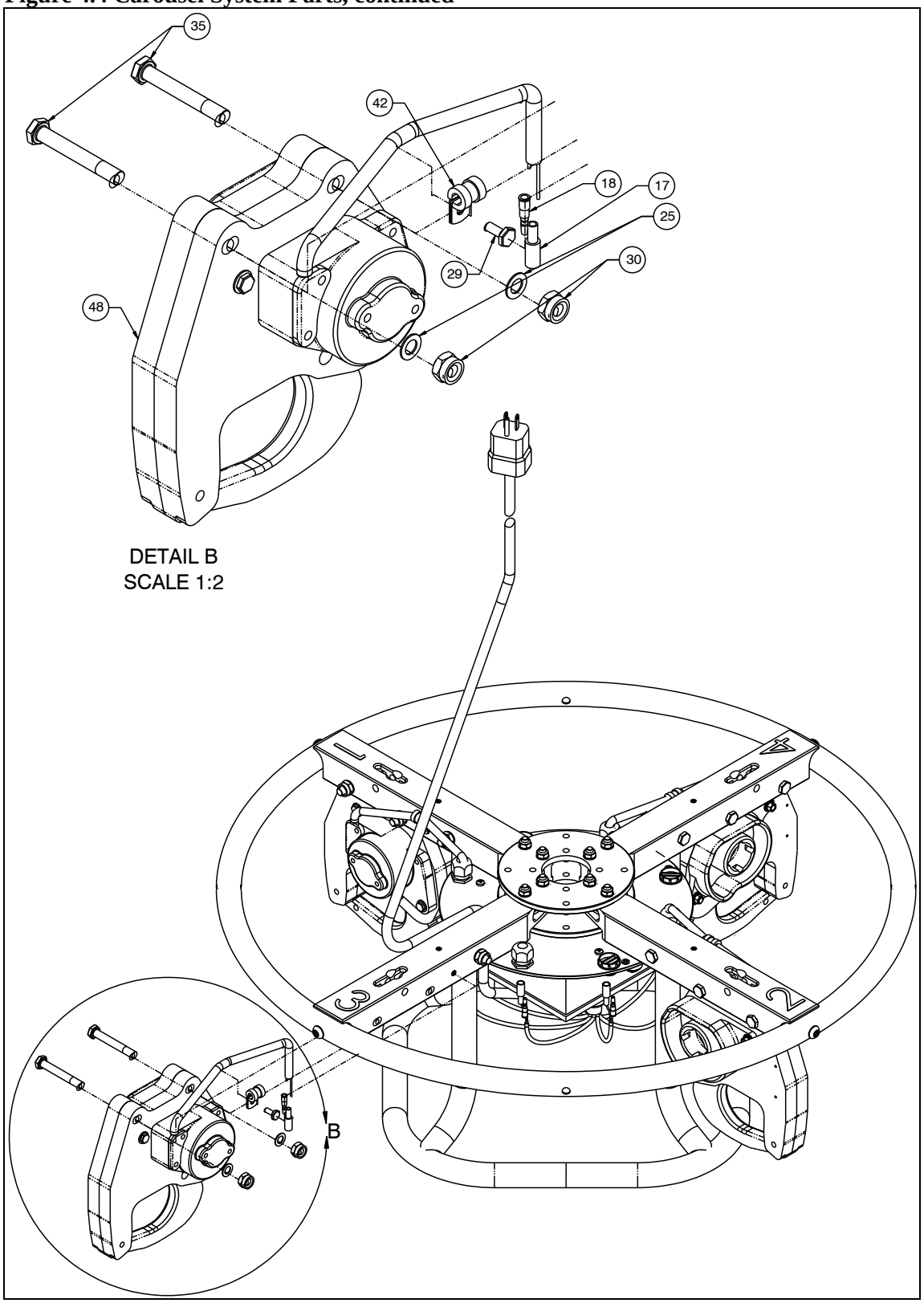
Carousel System Exploded View continued

Figure 4.3 Carousel System Parts, continued



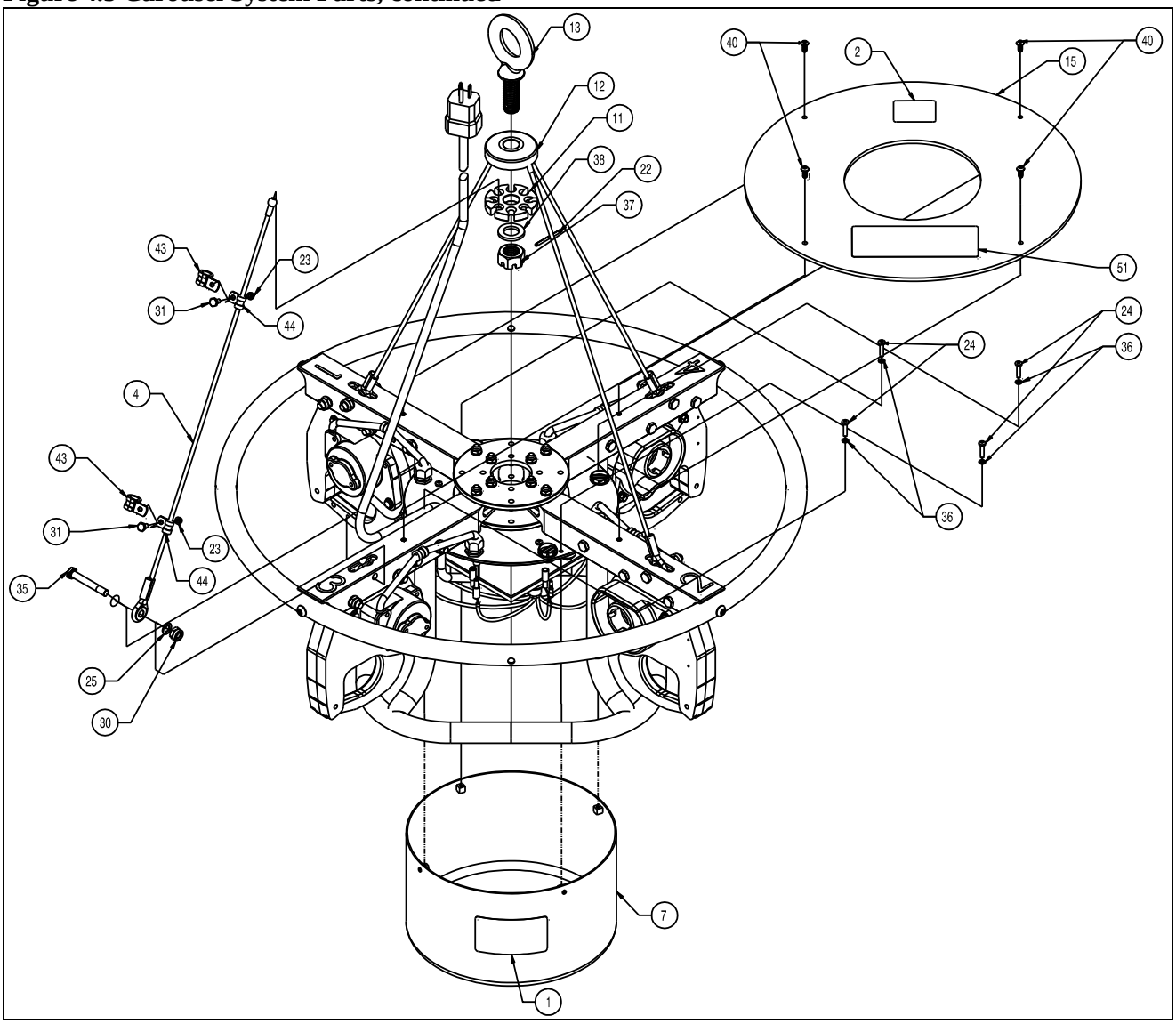
Carousel System Exploded View continued

Figure 4.4 Carousel System Parts, continued



Carousel System Exploded View continued

Figure 4.5 Carousel System Parts, continued



Carousel System Parts

This section describes and lists the assemblies and detail parts of the Carousel Systems.

Table 4.2 Carousel System Parts

ITEM	P/N	DESCRIPTION	Quantity per 200-411-00	Quantity per 200-410-00	Quantity per 200-409-00
1	215-274-00	Serial Number Decal	1	1	1
2	215-275-00	Warning Placard	1	1	1
3	232-470-00	Spoke Sub-Assembly	4	6	8
4	232-471-00	Carousel Cable Assembly	4	6	8
5	235-205-00	Ring, Upper Weldment	1	1	1
6	235-207-00	Strut Weldment	1	1	1
7	235-208-00	Enclosure Can	1	1	1
8	235-209-00	Enclosure Cap	1	1	1
9	270-188-00	Carousel Splitter Harness	1	1	1
10	270-189-00	Carousel Electrical Harness	1	1	1
11	291-588-00	Cable Hub	1	1	1
12	291-589-00	Cable Hub Cap	1	1	1
13	291-598-00	Eyebolt, Modified	1	1	1
14	291-599-00	Hub	2	2	2
15	291-625-00	Visibility Disc	1	1	1
16	410-300-00	Plug, 15a, 125v, 15-5p, 2p, 3w	1	1	1
17	410-349-00	Snap Plug Receptacle	4	6	8
18	410-350-00	Bullet Snap Plug, 18-22 Awg	4	6	8
19	505-018-00	Grommet	1	1	1
20	510-042-00	Washer	4	4	4
21	510-043-00	Nut	4	4	4
22	510-098-00	Cotter Pin	1	1	1
23	510-102-00	Nut	2	2	2
24	510-205-00	Screw	4	4	4
25	510-105-00	Washer	16	22	28
26	510-246-00	Nut	8	12	16
27	510-312-00	Washer	4	4	4
28	510-322-00	Bolt	8	12	16
29	510-342-00	Bolt	4	6	8
30	510-370-00	Nut	16	22	28
31	510-659-00	Bolt	2	2	2
32	510-737-00	Washer	8	12	16

Carousel System Parts, continued

Table 4.2 Carousel System Parts, continued

ITEM	P/N	DESCRIPTION	Quantity per 200-411-00*	Quantity per 200-410-00*	Quantity per 200-409-00*
33	510-926-00	Screw	4	4	4
34	510-952-00	Screw	4	6	8
35	510-953-00	Bolt	16	22	28
36	510-955-00	Lock Washer	4	4	4
37	510-956-00	Nut	1	1	1
38	510-962-00	Washer	1	1	1
39	510-977-00	Bolt	4	4	4
40	510-988-00	Screw	4	4	4
42	512-005-00	Adel Clamp	4	6	8
43	512-026-00	Adel Clamp	2	2	2
44	512-024-00	Adel Clamp	2	2	2
45	514-099-00	Spring	4	4	4
46	520-112-00	Numbering Set	1	1	1
47	526-021-00	Plug	4	2	N/A
48	528-021-01	2k Carousel Keeperless With Brush Guard	4	6	8
49	558-047-00	Cable Gland	4	6	8
50	660-003-00	Carousel Controller	1	1	1
51	215-285-00	Load Limit Decal	1	-	-
51	215-286-00	Load Limit Decal	-	1	-
51	215-287-00	Load Limit Decal	-	-	1

* When 528-021-XX Cargo Hooks are installed P/N's 200-408-00, 200-407-00, and 200-406-00 become P/N's 200-411-00, 200-410-00 and 200-409-00 respectively.

Instructions for Returning Equipment to the Factory

If an Onboard Systems product must be returned to the factory for any reason (including returns, service, repairs, overhaul, etc.) obtain an RMA number before shipping your return.

An RMA number is required for all equipment returns.

To obtain an RMA, please use one of the listed methods.

- Contact Technical Support by phone or e-mail (Techhelp@OnboardSystems.com).
- Generate an RMA number at our website: http://www.onboardsystems.com/rma.php

After you have obtained the RMA number, please be sure to:

- Package the component carefully to ensure safe transit.
- Write the RMA number on the outside of the box or on the mailing label.
- Include the RMA number and reason for the return on your purchase or work order.
- Include your name, address, phone and fax number and email (as applicable).
- Return the components freight, cartage, insurance and customs prepaid to:

  Onboard Systems
  13915 NW 3rd Court
  Vancouver, Washington 98685
  USA
  Phone: 360-546-3072