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REVISION HISTORY

LTR	DESCRIPTION	CLASS	DWN	ENGR	
A	---------- INITIAL RELEASE ----------	E			SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.
B	CHANGED TO IP64+ RATED CONNECTORS.	E	D PALMER	D PALMER	
C	UPDATES FOR PRODUCTION RELEASE.	E	D PALMER	D PALMER	
D	CHANGED TO IPC/WHMA-A-620C STANDARD. UPDATED LABELING.	E	D PALMER	D PALMER	

NOTES:

1. LASER MARK ON BACK SIDE OF P1 BACKSHELL (NOT THE COVERPLATE) WITH 1.0 mm MINIMUM HIGH CHARACTERS THE TEXT SHOWN IN TABLE 1. (THE VENDOR DESIGNATION AND THE STARTING SERIAL NUMBER SHALL BE IN ACCORDANCE WITH THE VALUES PROVIDED IN THE PURCHASE ORDER). LABEL INDIVIDUAL CABLE ENDS AS SHOWN.
2. ALL DIMENSIONS IN mm.
3. LENGTH TOLERANCE IS ±10 mm EXCEPT AS NOTED.
4. ON J1-J7, USE AN 8mm ±1mm LENGTH OF 1.2mm I.D. HEATSHRINK, ITEM 7, ON THE INSULATION OF EACH INDIVIDUAL WIRE TO ENSURE A GOOD SEAL WITH THE CONNECTOR HOUSING.
5. USE MANUFACTURER SPECIFIED TOOLING FOR ITEMS 1, 4, AND 5.
6. STRIP WIRE INSULATION PER IPC/WHMA-A-620C, SECTION 3.
7. USE ADHESIVE-LINED HEAT SHRINK TUBING, ITEM 9 ON BOTH ENDS OF EACH CABLE TO SEAL IT.
8. CRIMP ITEM 1 CONTACTS AND ITEM 5 PER IPC/WHMA-A-620C, SECTION 5.
9. DELETED.
10. WIRE PULLOUT TEST: VALIDATE CRIMPING PROCESSES PER IPC/WHMA-A-620C, SECTION 19.6.1, and 19.7.2.1
11. CONTACT RETENTION VERIFICATION: 100% OF CONTACTS SHALL BE TESTED FOR SEATING PER IPC/WHMA-A-620C, SECTION 19.7.5.
12. SPOT TIE CABLE BUNDLE TOGETHER UNDER BLACK HEAT SHRINK AS NEEDED USING ITEM 12.
13. USE FUSION WRAP, ITEM 11, AS NEEDED TO BUILD UP DIAMETER OF THE WIRE BUNDLE FOR THE STRAIN RELIEF INSIDE OF THE P1 CABLE CLAMP, ITEM 3.
14. EACH CABLE SHALL BE 100% ELECTRICALLY TESTED PER IPC/WHMA-A-620C, SECTIONS 19.4 AND 19.5.
    - CONNECTION RESISTANCE LESS THAN 0.5 OHMS (19.5.1).
    - INSULATION RESISTANCE MORE THAN 100 MOHMS WHEN MEASURED AT 500 VDC (19.5.4).
15. P1 BACKSHELL SUPPORTS CABLE EGRESS FROM EITHER SIDE. ASSEMBLE AS SHOWN.
16. ALTERNATE JST CONTACT SWPR-001T-P025 (TIN FINISH) CAN BE USED WITH TMT PERMISSION.
17. SILICONE INTERFACIAL SEAL (INCLUDED WITH ITEM 1) TO BE INSTALLED ON MATING FACE OF CONNECTOR P1.
18. ALL CONNECTOR PINS SHALL BE FITTED TO CONNECTOR P1 EVEN IF NOT USED FOR CONNECTIVITY.
19. INSTALL SEALING PLUGS, ITEM 13, IN CONNECTOR P1, ITEM 1, IN ALL UNUSED LOCATIONS (1, 6, 11, 16, 19, 24, 29, 36, AND 37).
20. FABRICATE AND INSPECT CABLE PER IPC/WHMA-A-620C, CLASS 3.

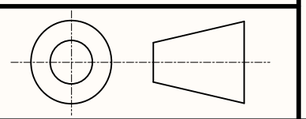
FOR PRODUCTION

	TMT
NEXT ASSEMBLY	USED ON
APPLICATION	

MATERIAL:

PER SPECIFICATION

THIRD ANGLE PROJECTION



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

LINEAR TOLERANCES:

.XX ± .03
.XXX ± .010

ANGULAR TOLERANCE: ± 0.5°

SURFACE ROUGHNESS (MICROMETERS) √

DO NOT SCALE DRAWING
INTERPRET DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009
INTERPRET DWG PER ASME Y14.100

CONTRACT NO _____

APPD _____ DATE _____

DWN	D. PALMER
ENGR	D. PALMER

SEE JPL DATA MANAGEMENT SYSTEM FOR APPROVAL SIGNATURES AND DATES.

TMT CROSS-REFERENCE M1CS-400-01201
TMT.CTR.DWG.16.018.REL04

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CA 91109

CABLE ASSEMBLY, WARPING HARNESS MOTOR HYDRA

SIZE	CAGE CODE		REV
B	23835	10398530	D

SCALE: 1/1 | UNCLASSIFIED | SHEET 1 OF 6

REV 09/2016

ALTIUM GENERATED

JPL_B_SH1

LEGEND

AL = ADHESIVE LINED
AR = AS REQUIRED
EQUIV. = EQUIVALENT
PBT = POLYBUTYLENE TEREPHTHALATE
PTFE = POLYTETRAFLUOROETHYLENE
POS = POSITION
QL = QUICK LOCK
REC = RECEPTACLE
SOC = SOCKET
UJ = UNSHIELDED JACKETED

TABLE 1: CABLE MARKING TEXT	
LINE 1	WARPING HARNESS MOTOR HYDRA-**L**
LINE 2	M1CS-400-01201 A**L** Rev **M**
LINE 3	S/N **NNN**-XXXXX

WHERE **L** IS THE DASH NUMBER FROM THE PARTS LIST, **M** IS THE CURRENT REVISION, **NNN** IS A 3-LETTER VENDOR DESIGNATION (ASSIGNED BY TMT) AND XXXXX IS A UNIQUE SERIAL NUMBER FOR EACH CABLE ASSEMBLY.

PARTS LIST

-3	-2	-1	ITEM NO	REF DES	CAGE CODE	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	MATERIAL OR NOTE
	QTY REQD								
AR	AR	-	16		92194	F2213/16 YL	HEAT SHRINK, 4.8mm I.D. YELLOW	ALPHA WIRE	POLYOLEFIN
-	AR	AR	15		92194	F2213/16 GR	HEAT SHRINK, 4.8mm I.D. GREEN	ALPHA WIRE	POLYOLEFIN
AR	-	AR	14		92194	F2213/16 RD	HEAT SHRINK, 4.8mm I.D. RED	ALPHA WIRE	POLYOLEFIN
9	9	9	13	P1	28198	4737-37-0-0	SEALING PLUG	POSITRONIC	PTFE 19
AR	AR	AR	12		92194	LTN-4C	LACING TAPE, 0.05" WIDE	ALPHA WIRE	NYLON
AR	AR	AR	11	P1	62081	P36728 OR EQUIV.	SEAL-TITE FUSION WRAP	LAWSON PROD.	
AR	AR	AR	10	P1	92194	F2213/4 BK105	HEAT SHRINK, 19mm I.D. BLACK	ALPHA WIRE	POLYOLEFIN
AR	AR	AR	9		92194	F3211/4 BK103	HEAT SHRINK, 6.4mm I.D. BLACK	ALPHA WIRE	POLYOLEFIN
AR	AR	AR	8		92194	F221B3/16 CL100	HEAT SHRINK, 4.8mm I.D. CLEAR	ALPHA WIRE	POLYOLEFIN
AR	AR	AR	7	J1-J7	92194	F221B3/64 CL100	HEAT SHRINK, 1.2mm I.D. CLEAR	ALPHA WIRE	POLYOLEFIN
AR	AR	AR	6		92194	78062	CABLE, UJ, 2 PAIR, 26AWG	ALPHA WIRE	
28	28	28	5	J1-J7	67D17	SWPR-001GH-P025	TERMINAL, SOCKET, 22-26 AWG	JST SALES AMER.	GOLD FINISH 18
7	7	7	4	J1-J7	67D17	04R-JWPF-VSLE-S	HOUSING, 4 POS, REC, 2mm	JST SALES AMER.	PBT
1	1	1	3	P1	00779	1-2308272-4	CABLE CLAMP, SIZE 1-4, 11-14 mm	TE CONNECTIVITY	ZINC ALLOY
1	1	1	2	P1	00779	1-2308330-1	BACKSHELL, 37 POSITION DSUB, QL	TE CONNECTIVITY	ZINC ALLOY
1	1	1	1	P1	28198	EVD37P00000/AA-1289.2	PLUG, D-SUB 37 PIN MALE CRIMP	POSITRONIC	INCLUDES PINS

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SIZE	CAGE CODE		REV
B	23835	10398530	D
SCALE: 1/1	UNCLASSIFIED	SHEET 2 OF 6	

REV 09/2016

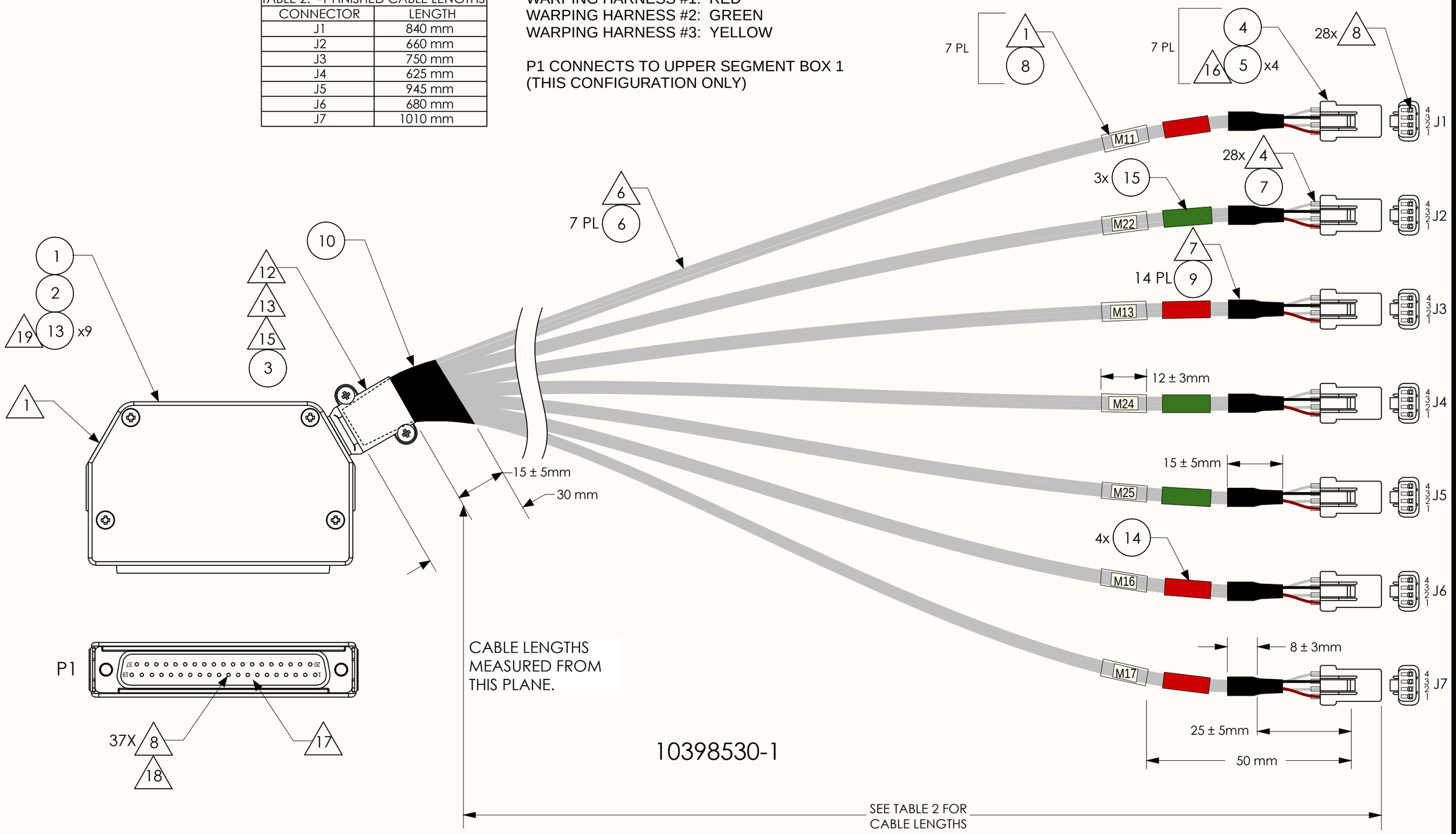
ALTIUM GENERATED

JPL_B_SH2

TABLE 2: -1 FINISHED CABLE LENGTHS	
CONNECTOR	LENGTH
J1	840 mm
J2	660 mm
J3	750 mm
J4	625 mm
J5	945 mm
J6	680 mm
J7	1010 mm

WARPING HARNESS #1: RED
WARPING HARNESS #2: GREEN
WARPING HARNESS #3: YELLOW

P1 CONNECTS TO UPPER SEGMENT BOX 1
(THIS CONFIGURATION ONLY)



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TMT CROSS-REFERENCE
M1CS-400-01201
TMT.CTR.DWG.16.018.REL04

SIZE	CAGE CODE		REV
B	23835	10398530	D
SCALE: 1/1	UNCLASSIFIED	SHEET 3 OF 6	

REV 09/2016

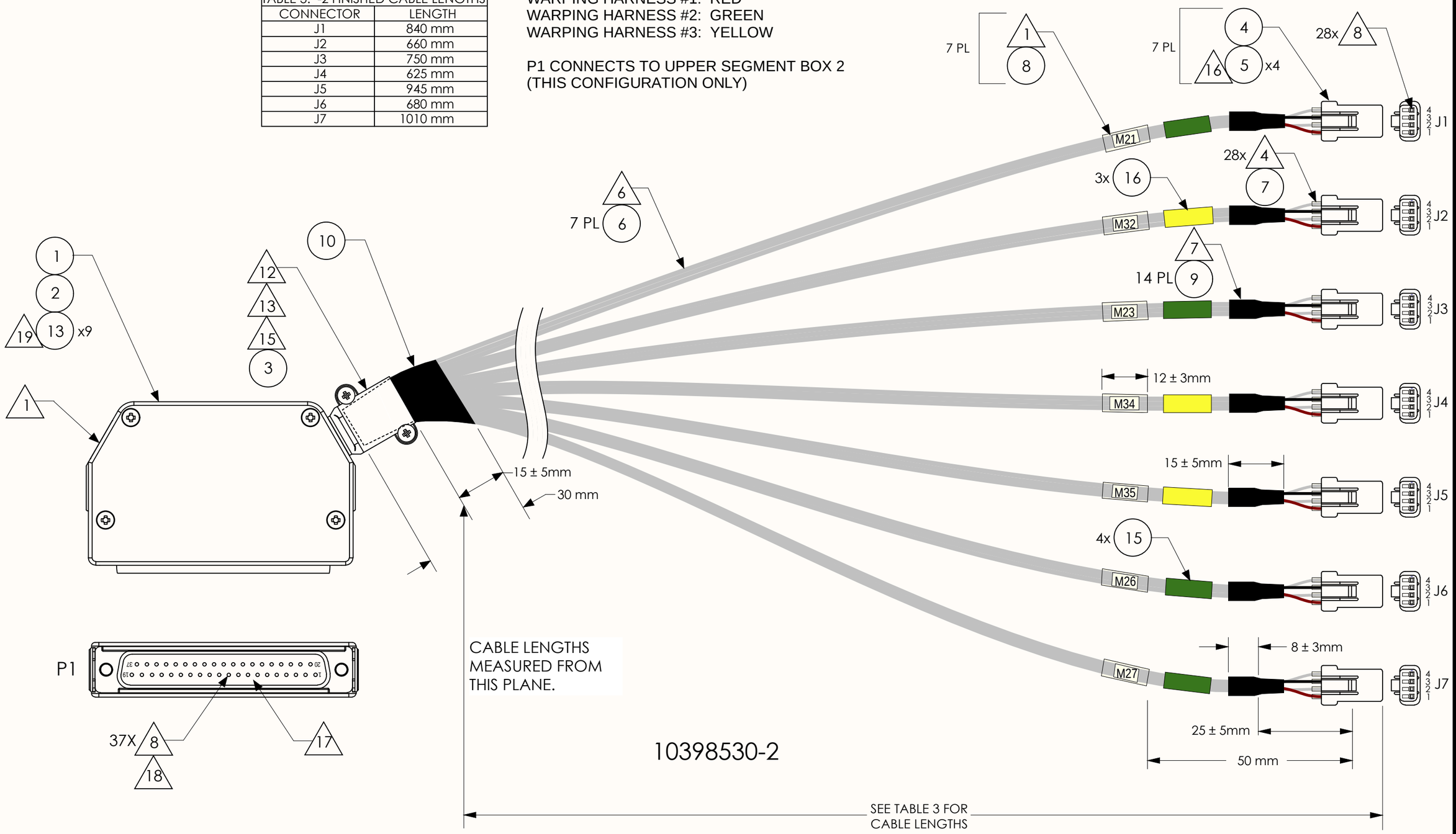
ALTIUM GENERATED

JPL_B_SH2

TABLE 3: -2 FINISHED CABLE LENGTHS	
CONNECTOR	LENGTH
J1	840 mm
J2	660 mm
J3	750 mm
J4	625 mm
J5	945 mm
J6	680 mm
J7	1010 mm

WARPING HARNESS #1: RED
WARPING HARNESS #2: GREEN
WARPING HARNESS #3: YELLOW

P1 CONNECTS TO UPPER SEGMENT BOX 2
(THIS CONFIGURATION ONLY)



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TMT.CTR.DWG.16.018.REL04

SIZE	CAGE CODE		REV
B	23835	10398530	D
SCALE: 1/1	UNCLASSIFIED	SHEET 4 OF 6	

REV 09/2016

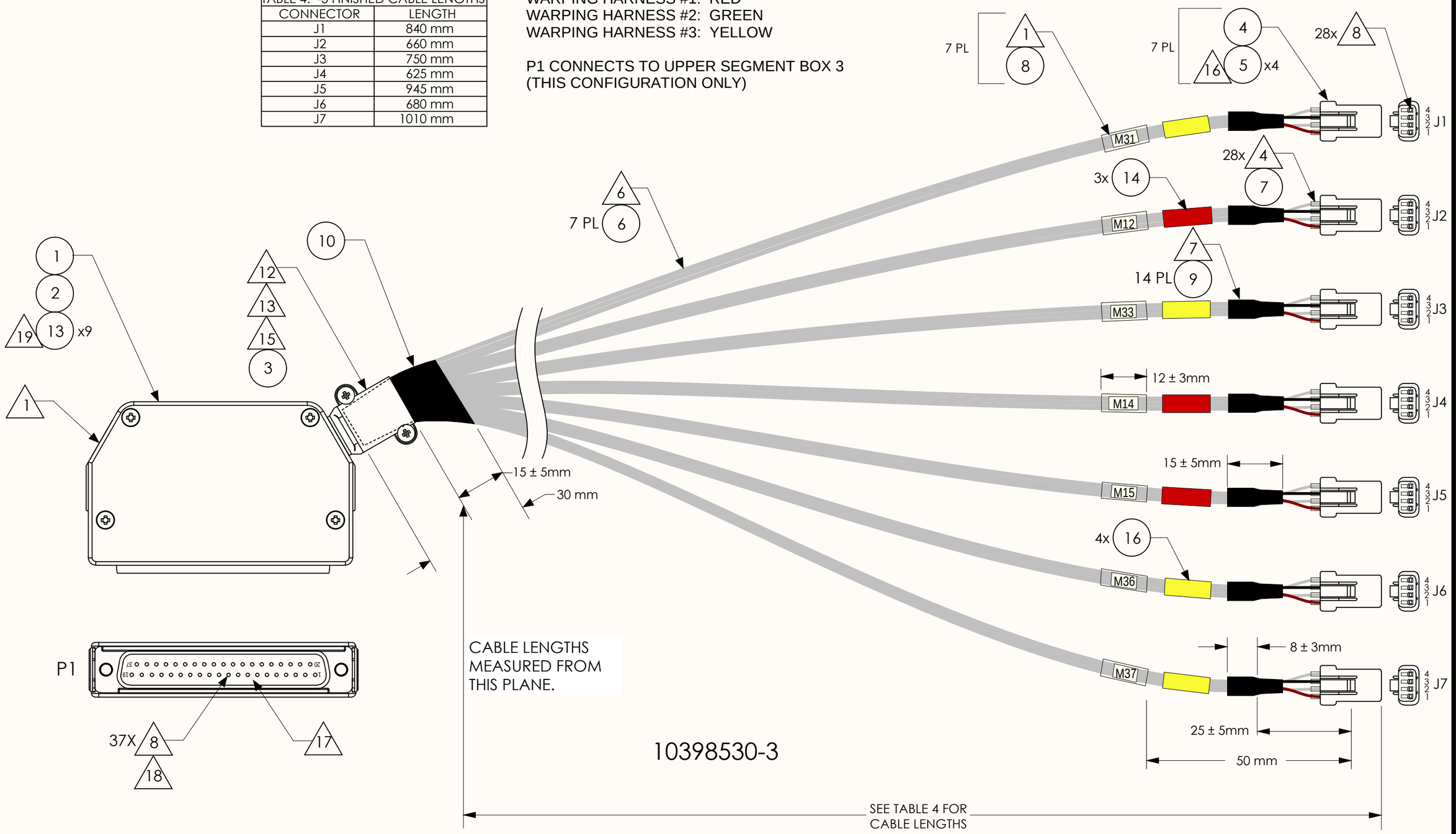
ALTIUM GENERATED

JPL_B_SH2

TABLE 4: -3 FINISHED CABLE LENGTHS	
CONNECTOR	LENGTH
J1	840 mm
J2	660 mm
J3	750 mm
J4	625 mm
J5	945 mm
J6	680 mm
J7	1010 mm

WARPING HARNESS #1: RED
WARPING HARNESS #2: GREEN
WARPING HARNESS #3: YELLOW

P1 CONNECTS TO UPPER SEGMENT BOX 3
(THIS CONFIGURATION ONLY)



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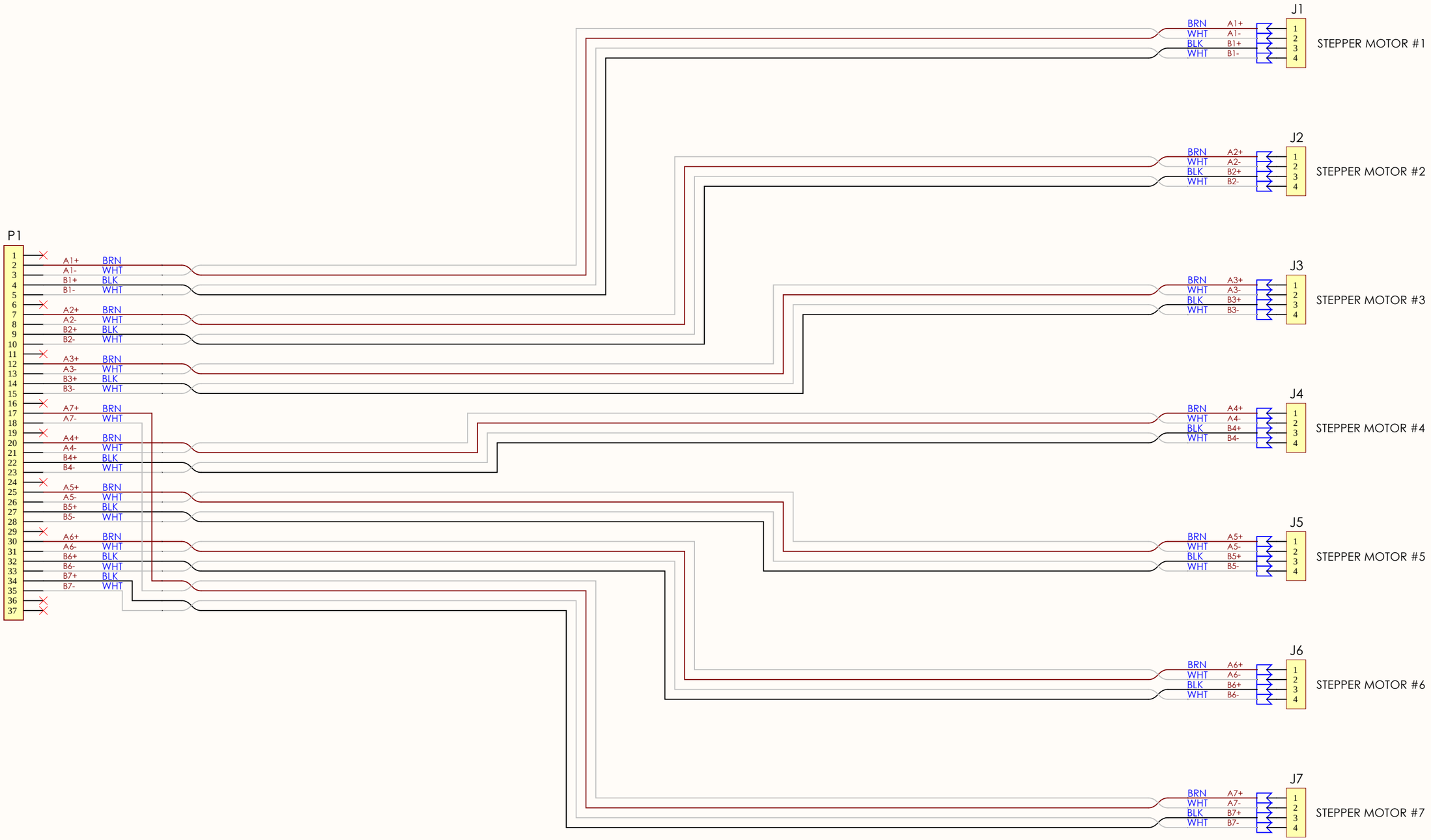
SIZE	CAGE CODE		REV
B	23835	10398530	D
SCALE: 1/1	UNCLASSIFIED	SHEET 5 OF 6	

REV 09/2016

ALTIUM GENERATED

JPL_B_SH2



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SIZE	CAGE CODE		REV
B	23835	10398530	D

SCALE: 1/1	UNCLASSIFIED	SHEET 6 OF 6

REV 09/2016

ALTIUM GENERATED

JPL_B_SH2