

NOTE:  
THIS WIRING ARRANGEMENT IS  
REPEATED FOR EACH M2  
ACTUATOR

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PRINTED 12/8/2009 3:59:41 PM  
TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF M2 Actuator**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

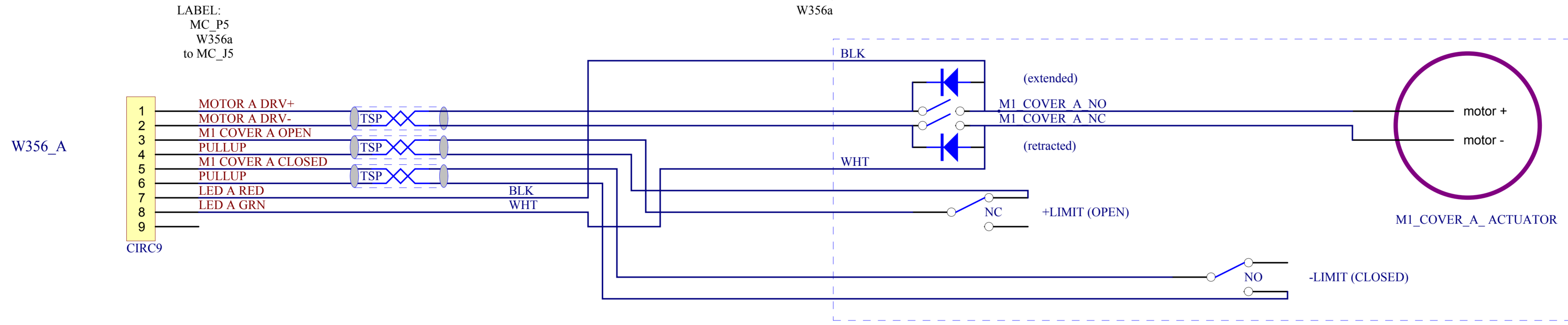
EastConfig

SCH-5376-2

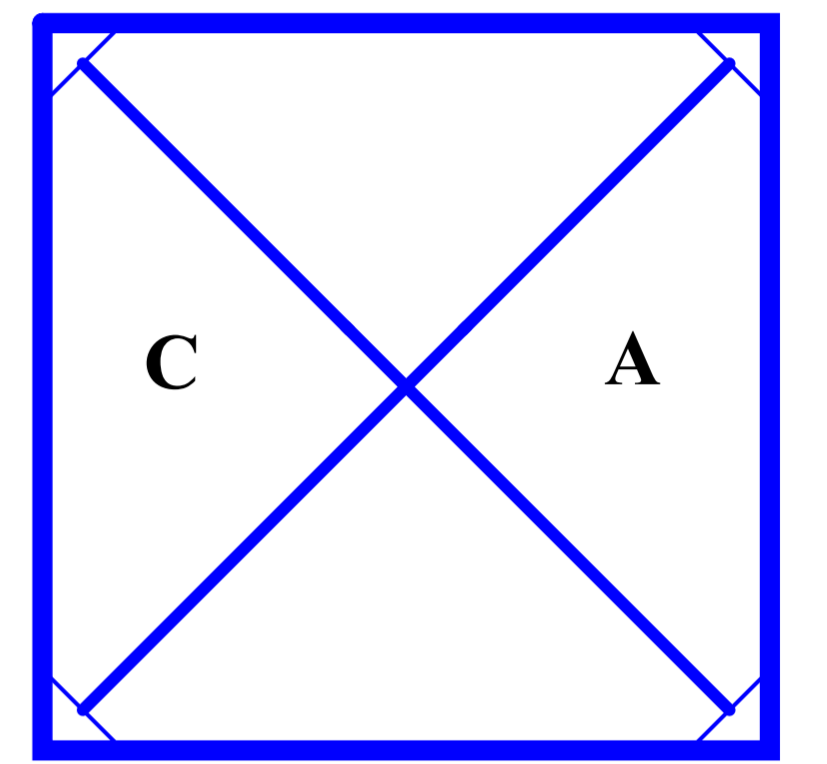
SHEET 45

OF

47

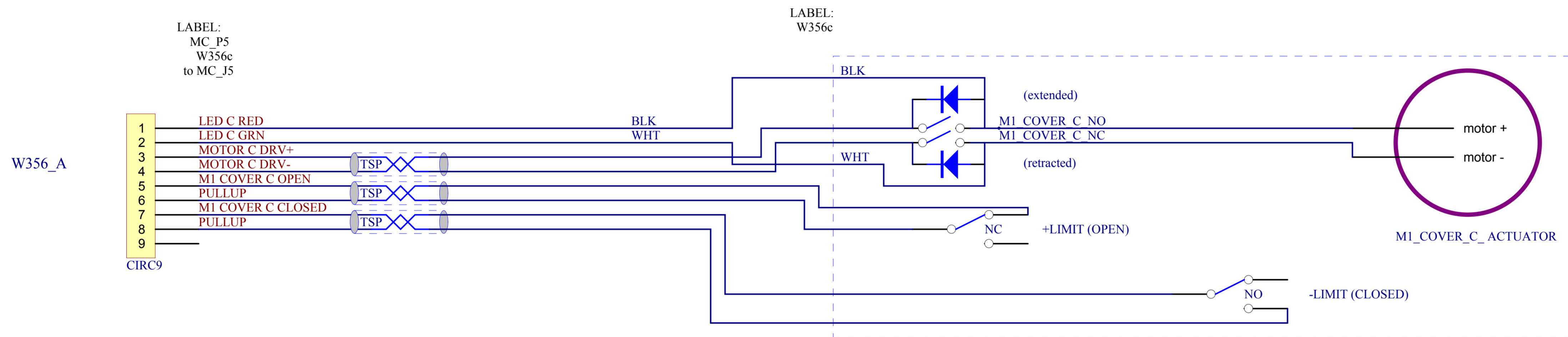


Note:



Looking from M1 towards M2  
(horizon pointing)

Note:  
Mirror covers A and C close first and open last,  
operating as a pair.  
Mirror covers B and D close last and open first,  
operating as a pair.



WIRE TYPE: Raychem TSP

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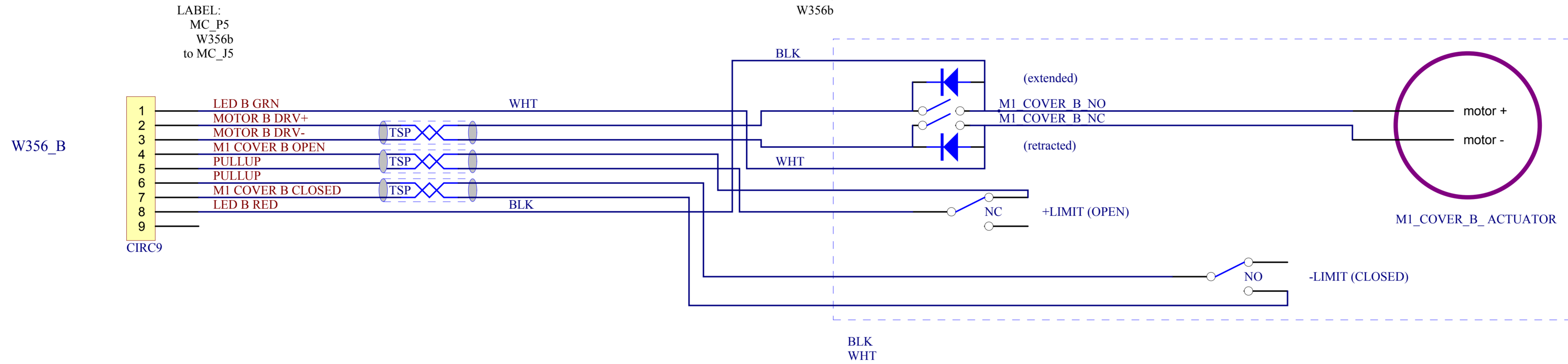
**EOS Technologies, Inc.**  
3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE  
**APF Mirror Cover Actuators A\_C**

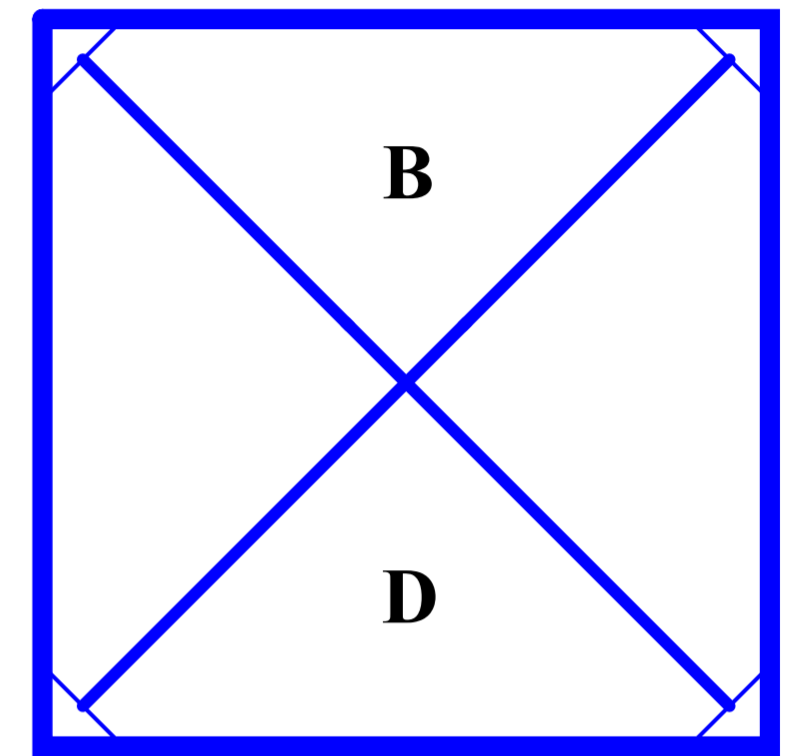
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SIZE  
**A3**

EastConfig SCH-5376-2 SHEET 21 OF 47

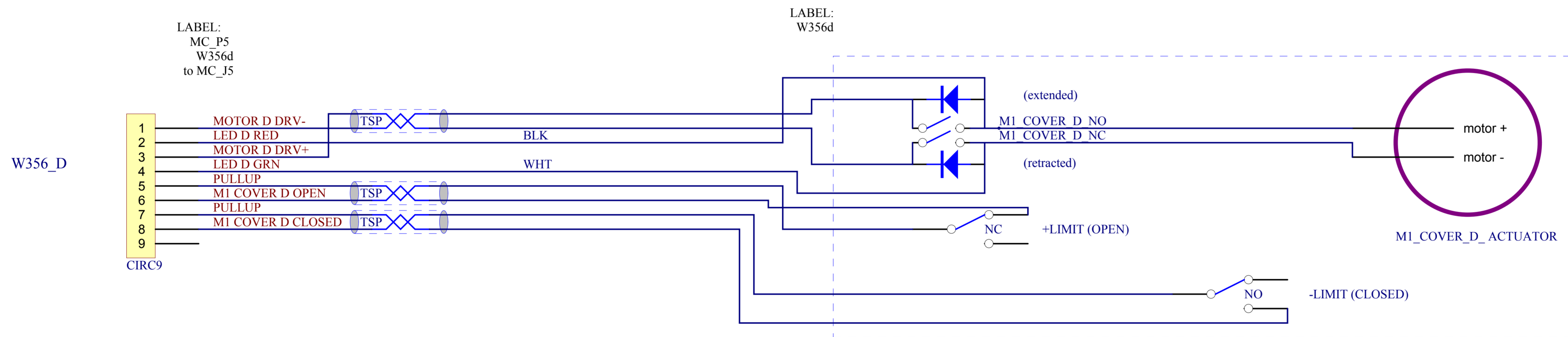


Note:



Looking from M1 towards M2  
(horizon pointing)

Note:  
Mirror covers A and C close first and open last,  
operating as a pair.  
Mirror covers B and D close last and open first,  
operating as a pair.



WIRE TYPE: Raychem TSP

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TITLE

**APF Mirror Cover Actuators B\_D**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

SHEET 21

OF 47

Label:  
CP12  
W156  
to CJ12  
CAB\_PNL

Label:  
W156

Label:  
YP16  
W156  
to YJ16  
YOKE PNL

CP12				YP22
1	BC IN 0	BLK/RED/GRN		1 BC IN 0
2	BC IN 1	BLU/RED		2 BC IN 1
3	BC IN 2	RED/GRN/BLK		3 BC IN 2
4	BC IN 3	WHT/GRN/RED		4 BC IN 3
5	BC IN 4	ORN/WHT/BLK		5 BC IN 4
6	BC IN 5	GRN/BLK/ORN		6 BC IN 5
7	BC IN 6	ORN/RED		7 BC IN 6
8	BC IN 7	RED/BLK		8 BC IN 7
9	BC IN 8	GRN/BLK		9 BC IN 8
10	BC OUT 0	ORN/BLK		10 BC OUT 0
11	BC OUT 1	ORN/BLK/GRN		11 BC OUT 1
12	BC OUT 2	WHT/BLK		12 BC OUT 2
13	BC OUT 3	BLU		13 BC OUT 3
14	GND	BLK		14 GND
15	GND	WHT		15 GND
16	GND	BLK/WHT/ORN		16 GND
17	GND	WHT/RED		17 GND
18	GND	BLU/WHT/BLK		18 GND
19	GND	RED/WHT/BLK		19 GND
20	BC IN PULLUP 0	GRN/WHT/BLK		20 BC IN PULLUP 0
21	BC IN PULLUP 1	BLK/RED		21 BC IN PULLUP 1
22	BC IN PULLUP 2	ORN		22 BC IN PULLUP 2
23	BC IN PULLUP 3	RED		23 BC IN PULLUP 3
24	BC IN PULLUP 4	BLU/WHT/ORN		24 BC IN PULLUP 4
25	BC IN PULLUP 5	BLU/BLK		25 BC IN PULLUP 5
26	BC IN PULLUP 6	GRN		26 BC IN PULLUP 6
27	BC IN PULLUP 7	WHT/BLK/RED		27 BC IN PULLUP 7
28	BC IN PULLUP 8	RED/WHT		28 BC IN PULLUP 8
29	+24 V	GRN/WHT		29 +24 V
30	+24 V	BLK/WHT		30 +24 V
31	+24 V	BLU/WHT		31 +24 V
32	+24 V	WHT/ORN/RED		32 +24 V
33	+24 V	ORN/WHT/BLU		33 +24 V
34	+24 V	WHT/BLU/RED		34 +24 V
35	+24 V	ORN/GRN		35 +24 V
36	+24 V	RED/GRN		36 +24 V
37	+24 V	BLK/WHT/RED		37 +24 V
38				38
39				39
40				40
41				41
42				42
43				43
44				44
45				45
46				46
47				47
48				48
49				49
50				50
51				51
52				52
53				53
54				54
55				55
56				56
57				57
				58
				59
				60
				61
				62
				63

MIRROR COVER FAILSAFE I/O

KEY: PIN 56

206437-1  
B.S. 207774-1

KEY: PIN 56

205842-1  
B.S. 207774-1

WIRE TYPE: ALPHA 6349  
LENGTHS: 7.5 Meters

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TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF Mirror Cover Interface**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

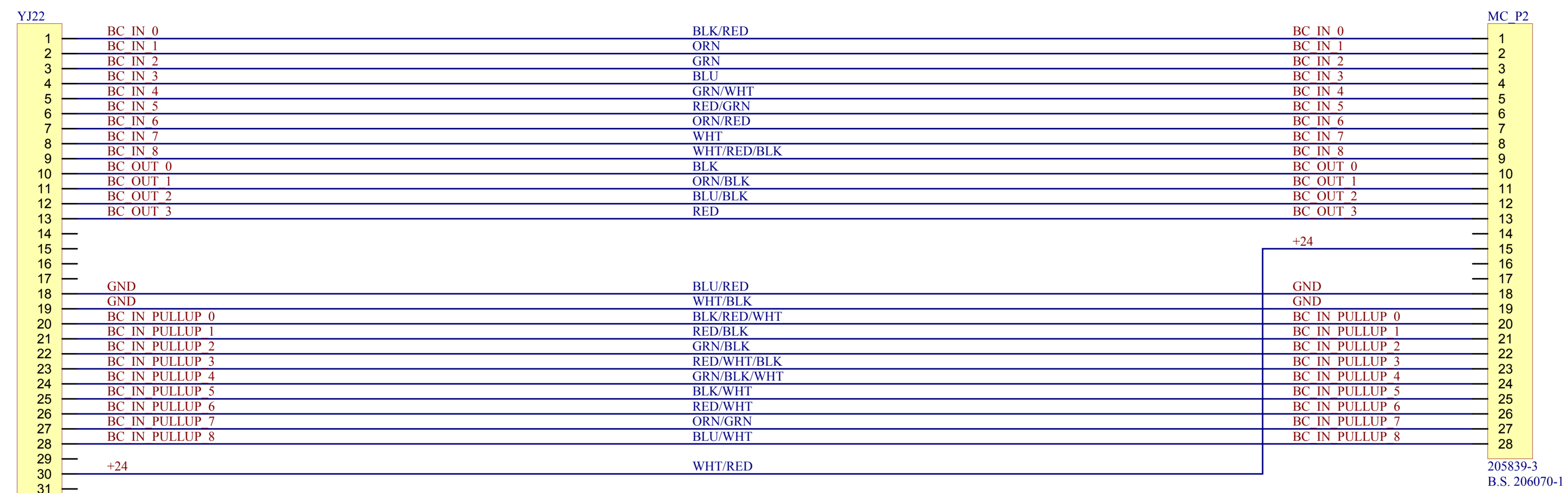
SHEET 16

OF 47

Label:  
YJ16  
W256  
to  
YOKE PNL

Label:  
W256

Label:  
P\_MIRCVR  
W256  
to  
MIR\_CVR  
CTRL BOX



MIRROR COVER I/O

KEY: PIN 56

205843-1  
B.S. 207774-1

WIRE TYPE: ALPHA 6348  
LENGTH: 12.1M

205839-3  
B.S. 206070-1

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TUCSON, ARIZONA 85706 USA

TITLE  
**APF Mirror Cover Interface**

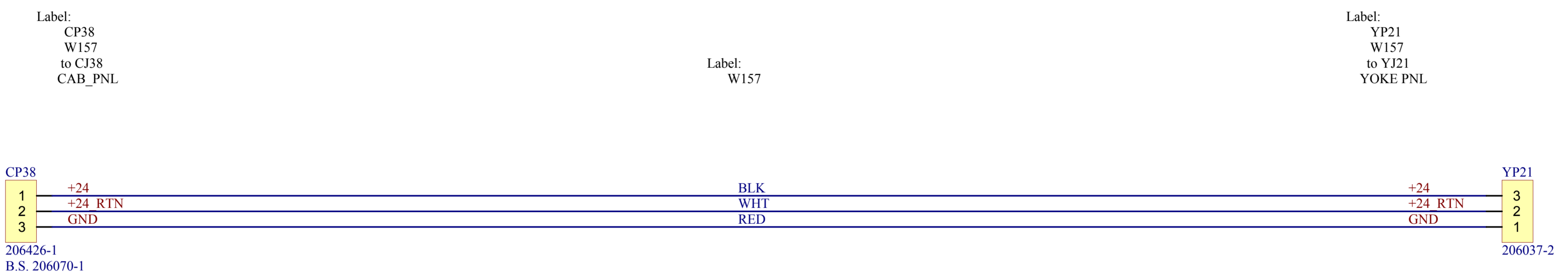
DOCUMENT NUMBER  
**SCH-5389-2**

SIZE  
**A3**

EastConfig SCH-5376-2 SHEET 17 OF 47

APF Mirror Cover Interface  
SCH-5389-2

### M1 MIRROR COVER POWER



WIRE TYPE: BELDEN 3 COND. 12 GA.  
LENGTHS: 7.5 Meters

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TITLE

**APF Mirror Cover Power**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

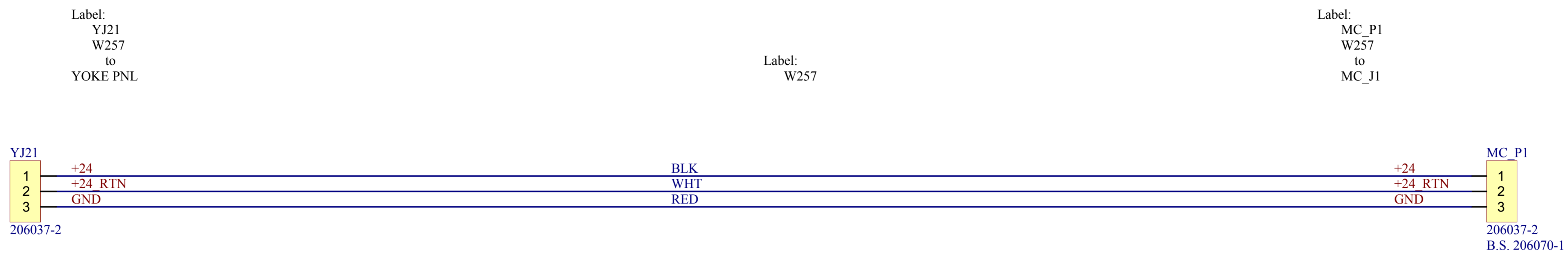
**A3**

EastConfig

SCH-5376-2

SHEET 18 OF 47

### M1 MIRROR COVER POWER



WIRE TYPE: ALPHA 1892  
LENGTH: 12.1M

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TITLE

**APF Mirror Cover Power**

DOCUMENT NUMBER

**SCH-5389-2**

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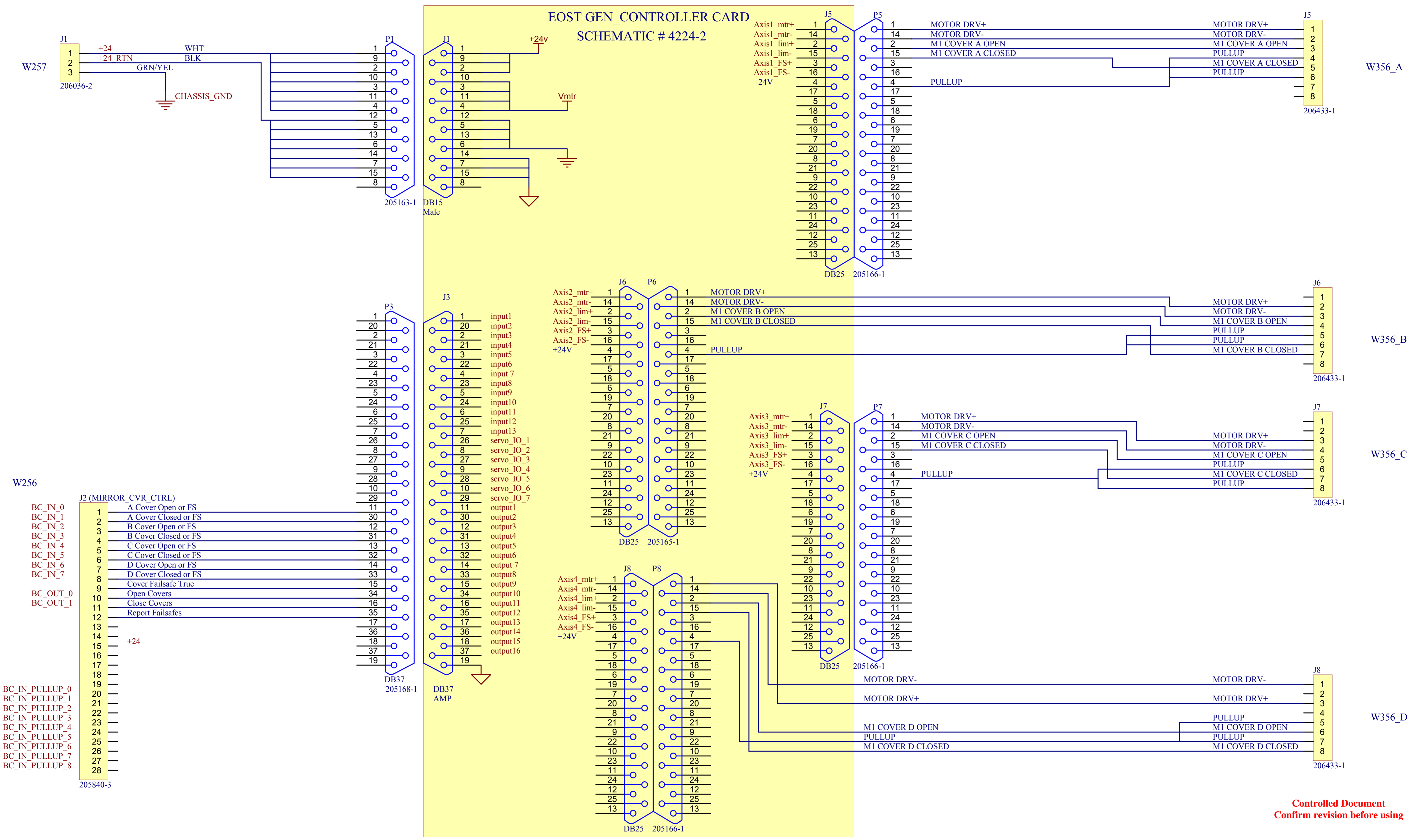
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SCH-5376-2

SHEET 19 OF 47

EOST GEN\_CONTROLLER CARD  
SCHEMATIC # 4224-2



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TITLE

**APF Mirror Cover Controller**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5376-2

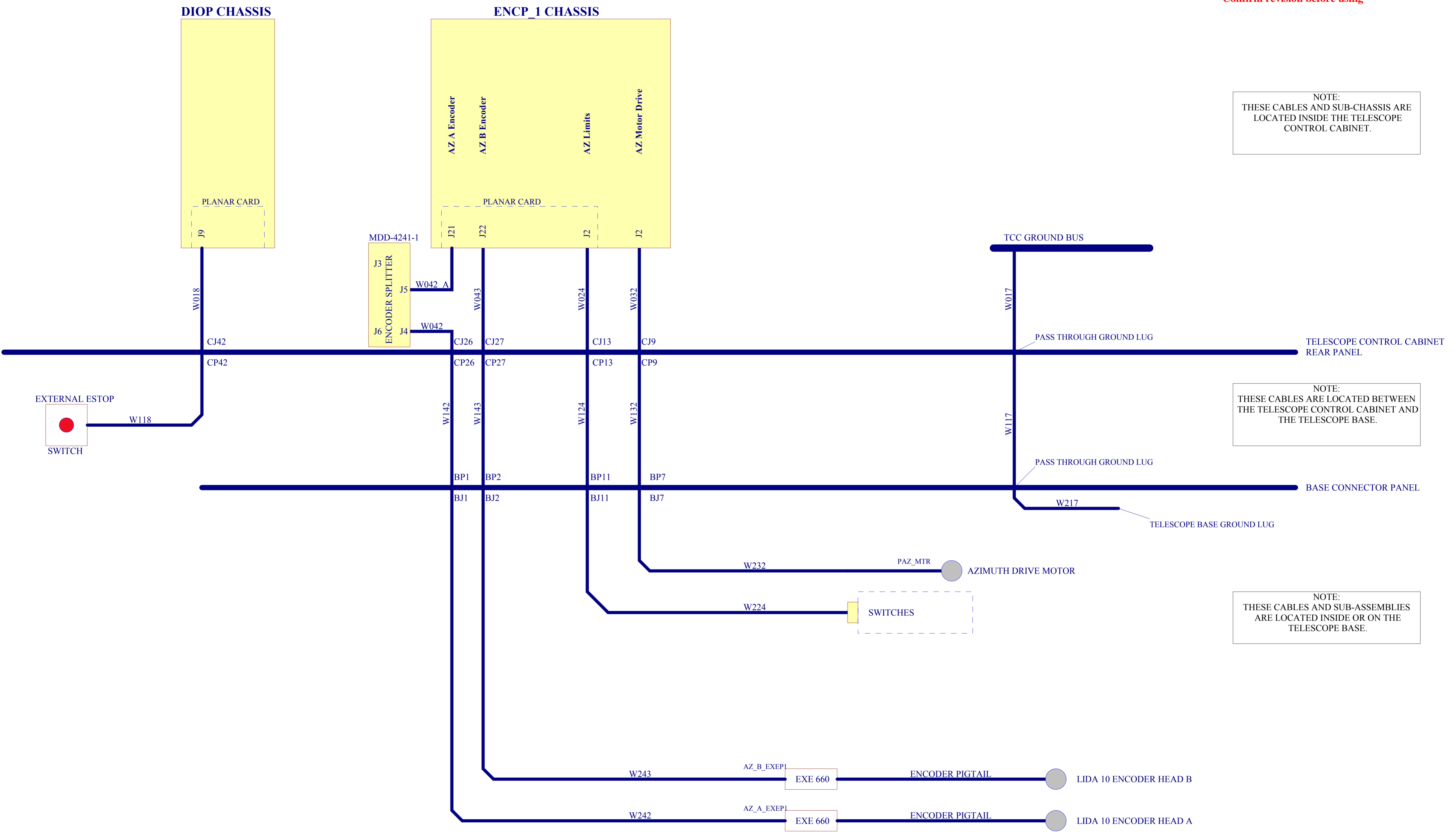
SHEET 20 OF 47



NOTE:  
THESE CABLES AND SUB-CHASSIS ARE  
LOCATED INSIDE THE TELESCOPE  
CONTROL CABINET.

NOTE:  
THESE CABLES ARE LOCATED BETWEEN  
THE TELESCOPE CONTROL CABINET AND  
THE TELESCOPE BASE.

NOTE:  
THESE CABLES AND SUB-ASSEMBLIES  
ARE LOCATED INSIDE OR ON THE  
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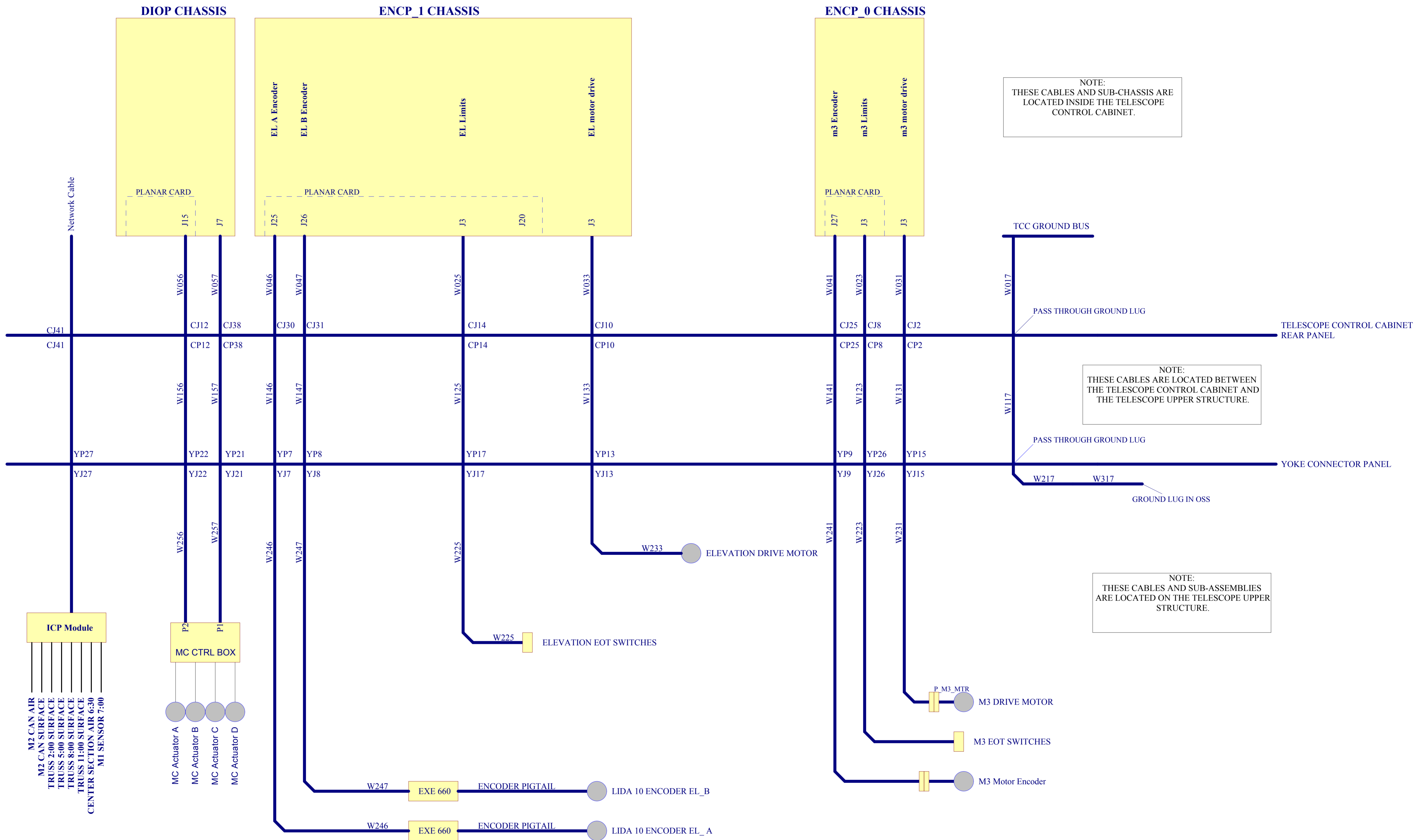
3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE  
**APF Azimuth Block Diagram**

DOCUMENT NUMBER  
**SCH-5389-2**

EastConfig SCH-5389-1 SHEET 2 OF 47

SIZE  
**A3**



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TITLE

**APF Elevation Block Diagram**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

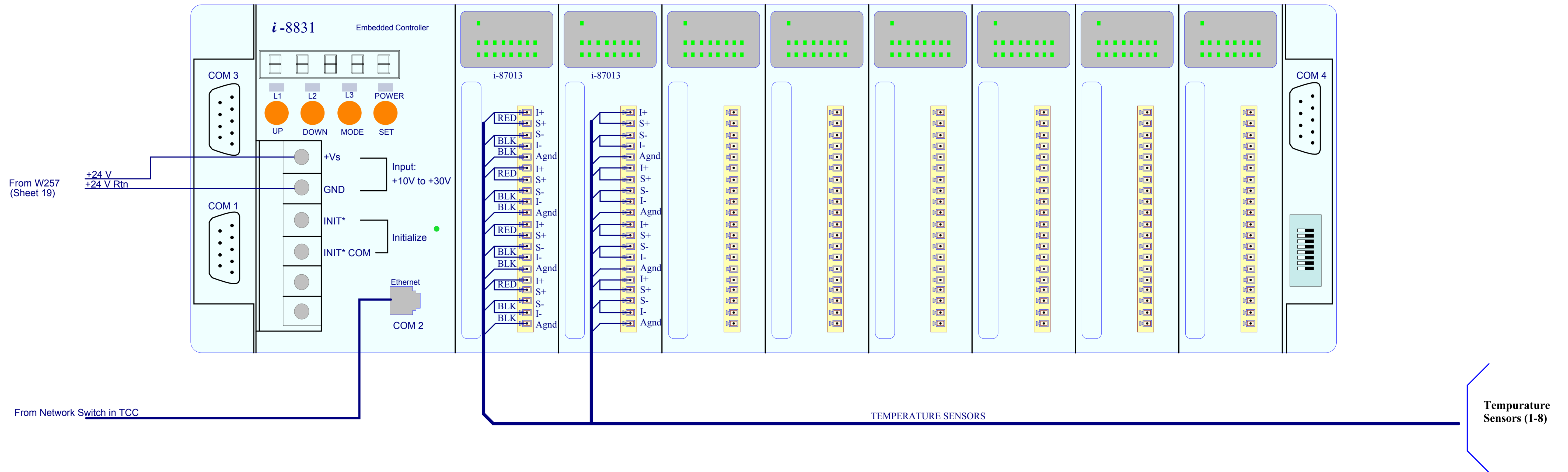
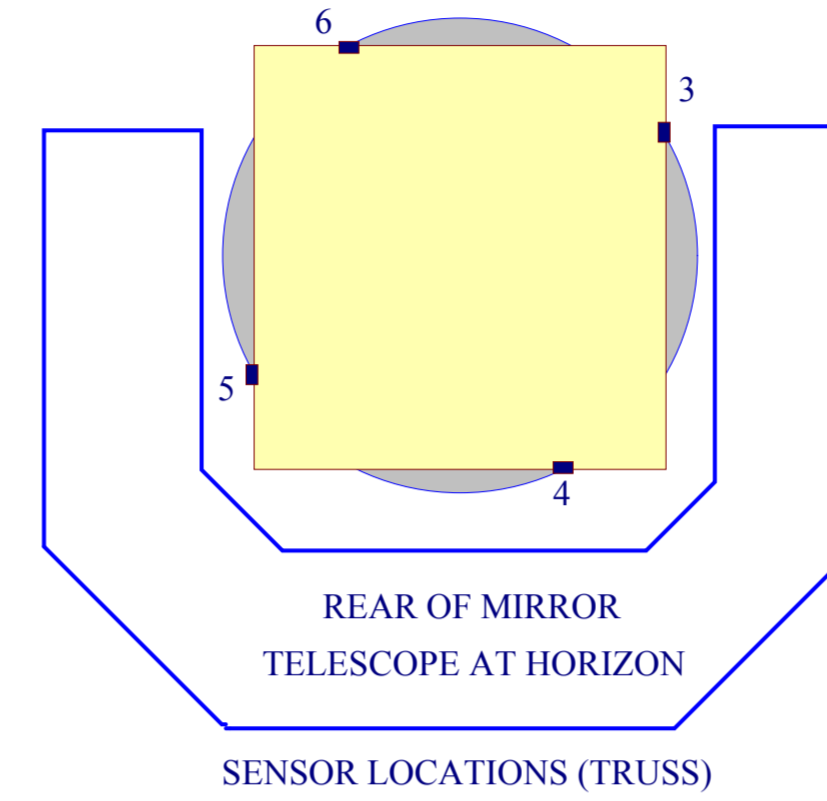
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TITLE

**IPC Com Temperature Module**

DOCUMENT NUMBER

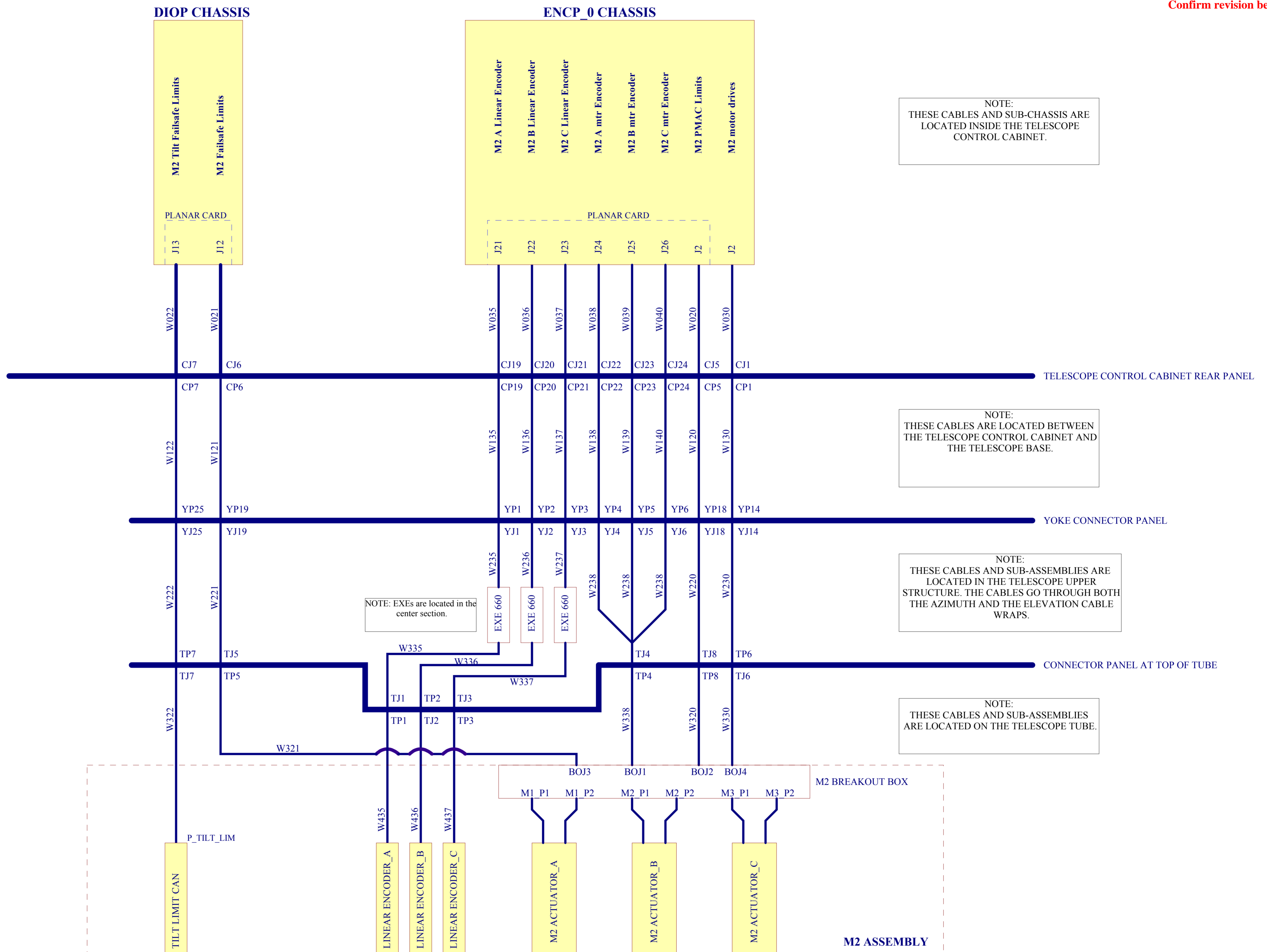
**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5839-2

SHEET 36 OF 47



NOTE:  
THESE CABLES AND SUB-CHASSIS ARE  
LOCATED INSIDE THE TELESCOPE  
CONTROL CABINET.

NOTE:  
THESE CABLES ARE LOCATED BETWEEN  
THE TELESCOPE CONTROL CABINET AND  
THE TELESCOPE BASE.

NOTE:  
THESE CABLES AND SUB-ASSEMBLIES ARE  
LOCATED IN THE TELESCOPE UPPER  
STRUCTURE. THE CABLES GO THROUGH BOTH  
THE AZIMUTH AND THE ELEVATION CABLE  
WRAPS.

NOTE:  
THESE CABLES AND SUB-ASSEMBLIES  
ARE LOCATED ON THE TELESCOPE TUBE.

NOTE: EXEs are located in the  
center section.

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TITLE  
**APF M2 Block Diagram**

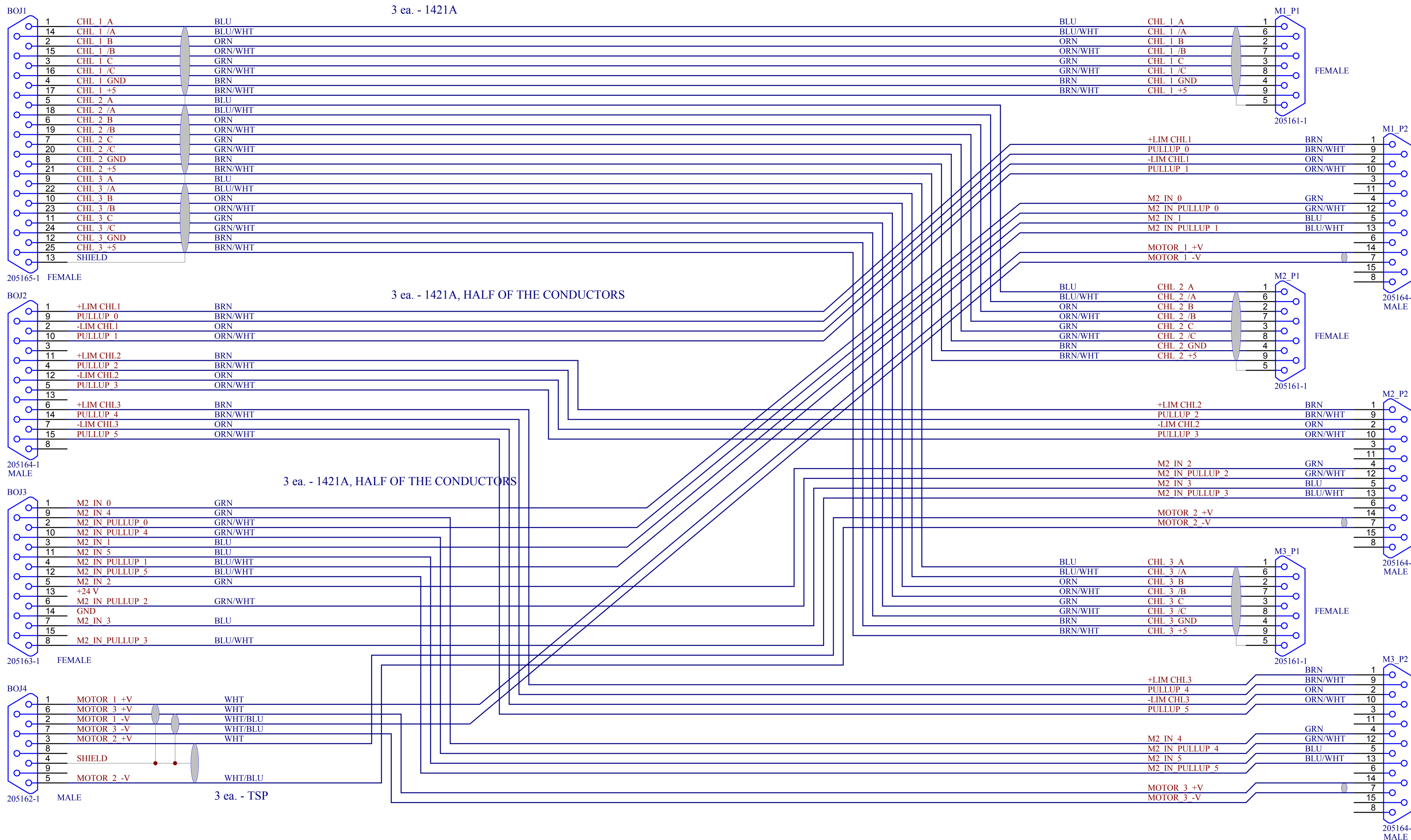
DOCUMENT NUMBER  
**SCH-5389-2**

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SIZE  
**A3**

APF M2 Block Diagram

SCH-5389-2



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TITLE

**APF M2 Electrical Breakout**

DOCUMENT NUMBER

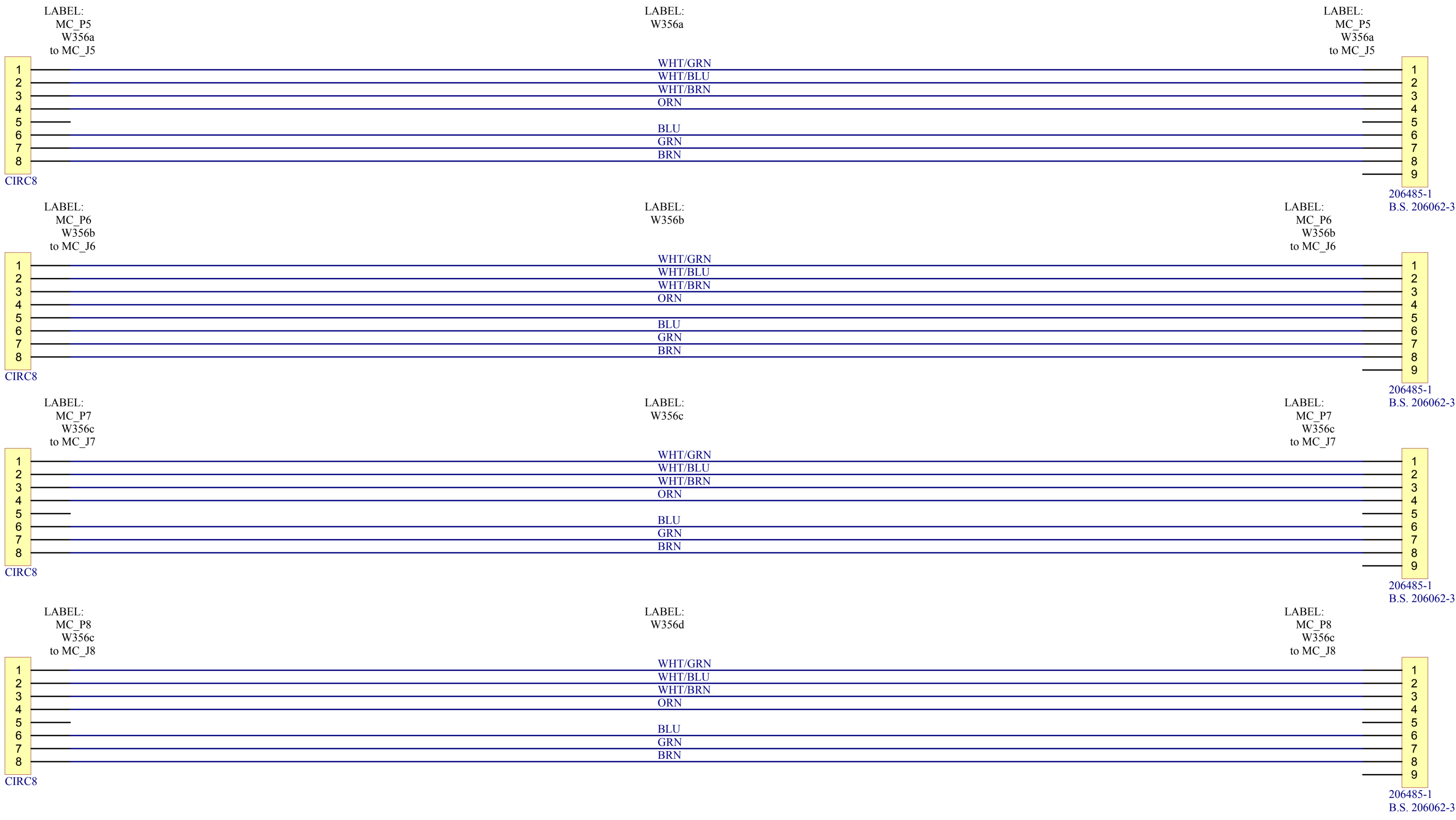
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SIZE

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TUCSON, ARIZONA 85706 USA

TITLE

**Mirror Covers Control**

DOCUMENT NUMBER

**SCH-5389-2**

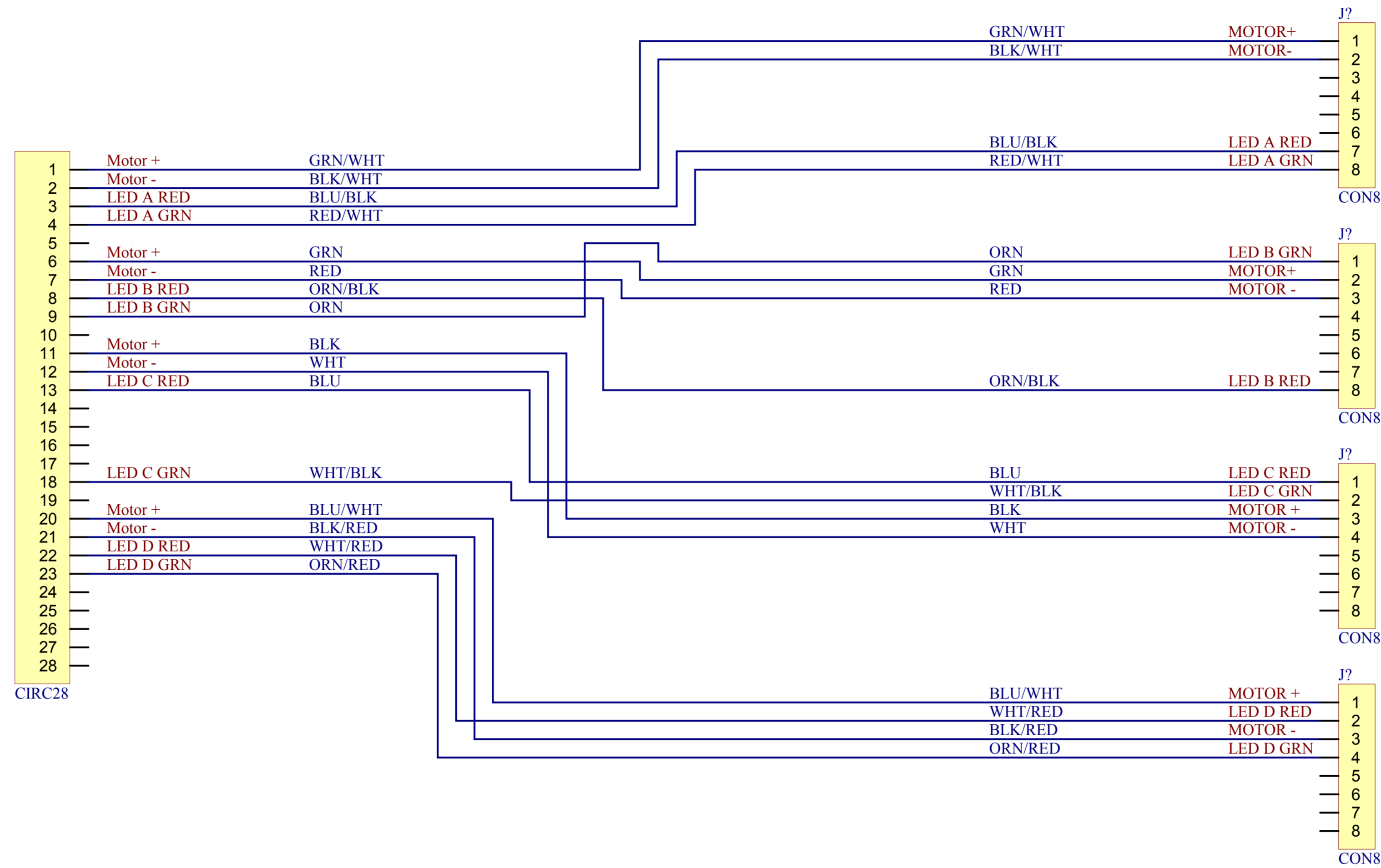
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**A3**

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SHEET 46 OF 47

Mirror Cover Manual Control



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TITLE

**Mirror Covers Manual Control**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5389-2

SHEET 47

OF 47

ISSUE	DATE	DESCRIPTION	CHECKED	APPROVED
1	04/20/04	INITIAL RELEASE		
2	12/08/2009	ECO-0716		

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### AZIMUTH CABLES

Azimuth block diag apf_az_blk_diag.sch	sheet 2
Azimuth limit inputs azlimitsW124.Sch	sheet 6
Azimuth drive azdrvW132.Sch	sheet 5
Azimuth A enc azaencW142.Sch	sheet 3
Azimuth B enc azbencW143.Sch	sheet 4
estopW118 estopW118.Sch	sheet 8

### ELEVATION CABLES

Elevation block diag APF_EL_BLK_DIAG.Sch	sheet 10
Elevation limits ellimitsW125.Sch	sheet 14
Elevation drive eldrvW133.Sch	sheet 13
Elevation A encoder elaencW146.Sch	sheet 11
Elevation B encoder elbencW147.Sch	sheet 12

### M3 CABLES

M3 Limits m3limW123.Sch	sheet 25
M3 Drive m3drvW131.Sch	sheet 24
M3 Encoder m3encW141.Sch	sheet 23

### MIRROR COVER CONTROL

Mirror Cover Power APFmc_powerW157.sch	sheet 18
Mirror Cover Power APFmc_powerW257.sch	sheet 19
Mirror Cover Interface APFmc_interfaceW156.Sch	sheet 16
Mirror Cover Interface APFmc_interfaceW256.sch	sheet 17
Mirror Cover Control Box APFmirror_cover_ctrl_box.sch	sheet 20
Mirror Cover Actuators APFmc_actuators_AandC.sch	sheet 21
Mirror Cover Actuators APFmc_actuators_BandD.sch	sheet 22

### OTHER INTERFACES

Temp Icp Com Module	sheet 36
Gnd gndW117.sch	sheet 9

### SECONDARY FOCUSER CABLES AND DRAWINGS

M2 Block diag APF_M2_BLK_DIAG.Sch	sheet 26	M2 fail safe 1 m2fsW121.Sch	sheet 40	M2 Drive m2drvW130.Sch	sheet 35	M2 A Linear encoder m2alinearW135.Sch	sheet 27	M2 A Motor enc m2amtrencW138.Sch	sheet 28
PMAC limit 14 pmaclim14W120.Sch	sheet 37	M2 fail safe 2 m2fsW221.Sch	sheet 41	M2 Breakout APF_M2_BRKOUT.sch	sheet 44	M2 B Linear encoder m2blinearW136.Sch	sheet 29	M2 B Motor enc m2bmtrencW139.Sch	sheet 30
PMAC limit 14 pmaclim14W220.Sch	sheet 38	M2 fail safe 3 m2fsW321.Sch	sheet 43	M2 Actuator APF_M2_ACTUATOR.sch	sheet 45	M2 C Linear encoder m2clinearW137.Sch	sheet 31	M2 C Motor enc m2cmtrencW140.Sch	sheet 32
PMAC limit 14 pmaclim14W320.Sch	sheet 39	M2 tilt m2tiltW122.Sch	sheet 44			M2 Combined linear enc m2comblinearW238.Sch	sheet 33		
						m2comblinearW338 m2comblinearW338.Sch	sheet 34		

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\APF\_TelescopeCables.SCHDOC  
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TEMPLATE: Eost\_tabloid\_SUBS

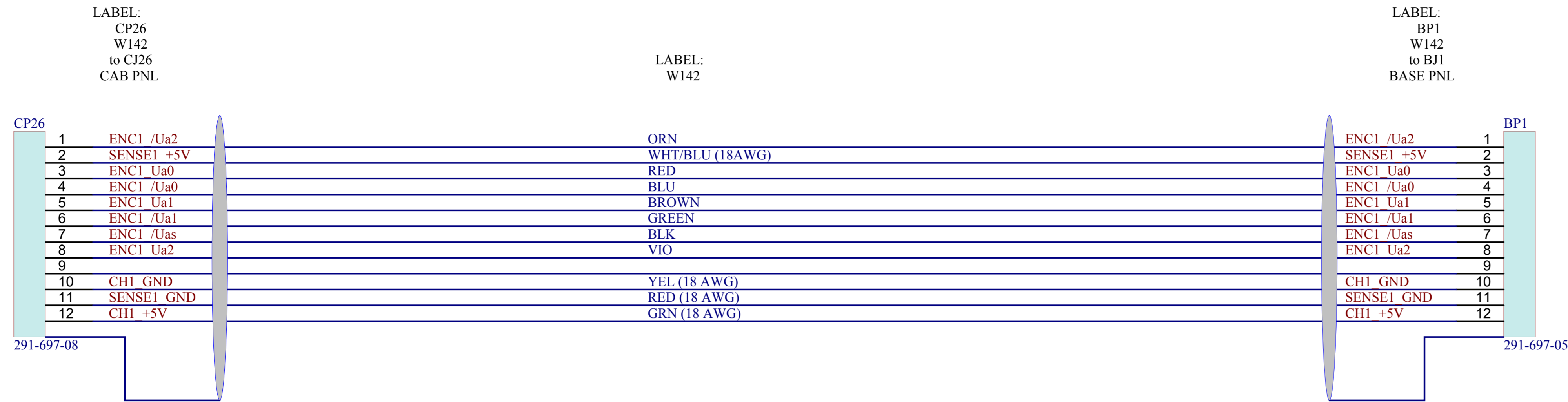
DESIGN	DATE	<b>Eos Technologies, Inc</b> 3160 E. TRANSCON WAY, Suite 180 TUCSON, ARIZONA 85706 USA <b>APF Azimuth Block Diagram</b>
CHECKED	DATE	
APPROVED	DATE	
CONFIGURED	DATE	
DOCUMENT NUMBER		SIZE
<b>SCH-5389-2</b>		<b>A3</b>
EastConfig: <b>SCH-5389-2</b>	SHEET 1 OF 47	

APF Azimuth Block Diagram  
SCH-5389-2



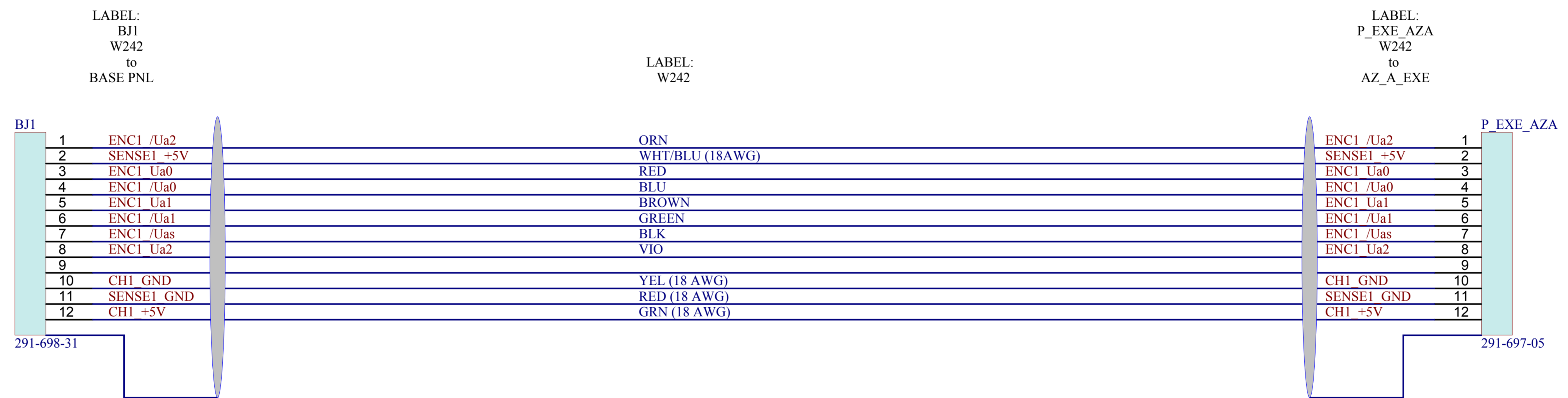
# AZIMUTH A MOTOR ENCODER INPUTS

**Controlled Document**  
Confirm revision before using

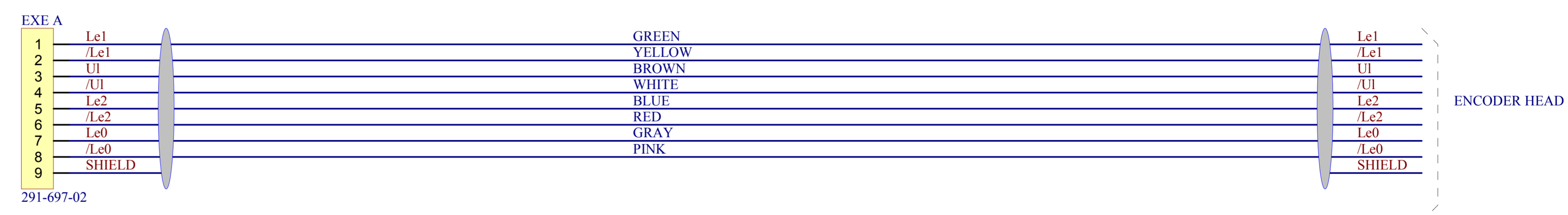


WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 19 Meters

WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 6 Meters



1 METER Pigtail on Encoder



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3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE  
**APF Azimuth Encoder A**

DOCUMENT NUMBER <b>SCH-5389-2</b>	SIZE <b>A3</b>
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EastConfig SCH-5389-1 SHEET 3 OF 47

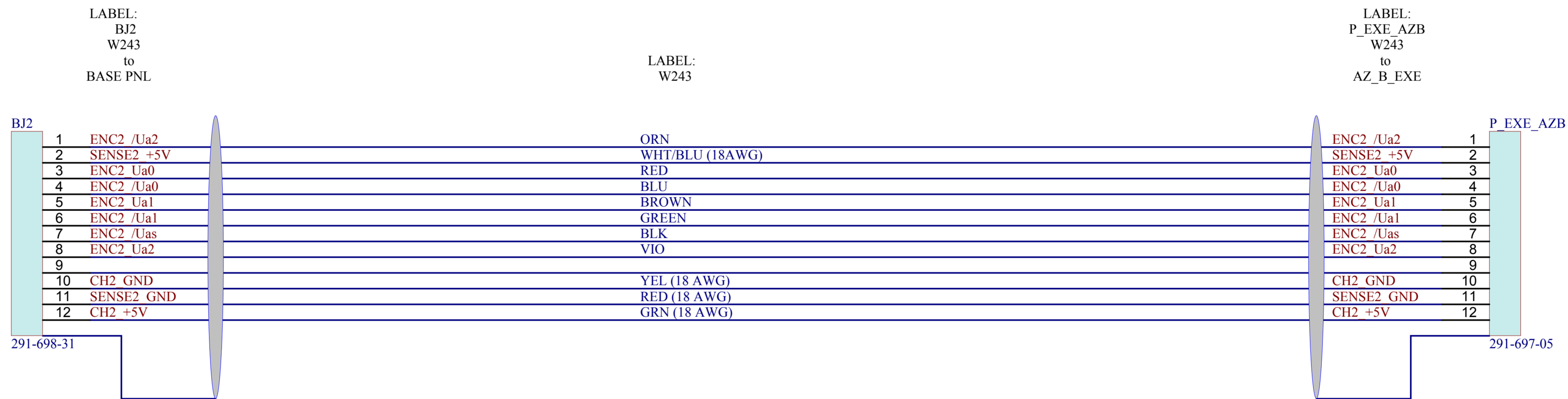
APF Azimuth Encoder A  
SCH-5389-2

# AZIMUTH B ENCODER INPUTS

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Confirm revision before using



WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 19 Meters



WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 6 Meters



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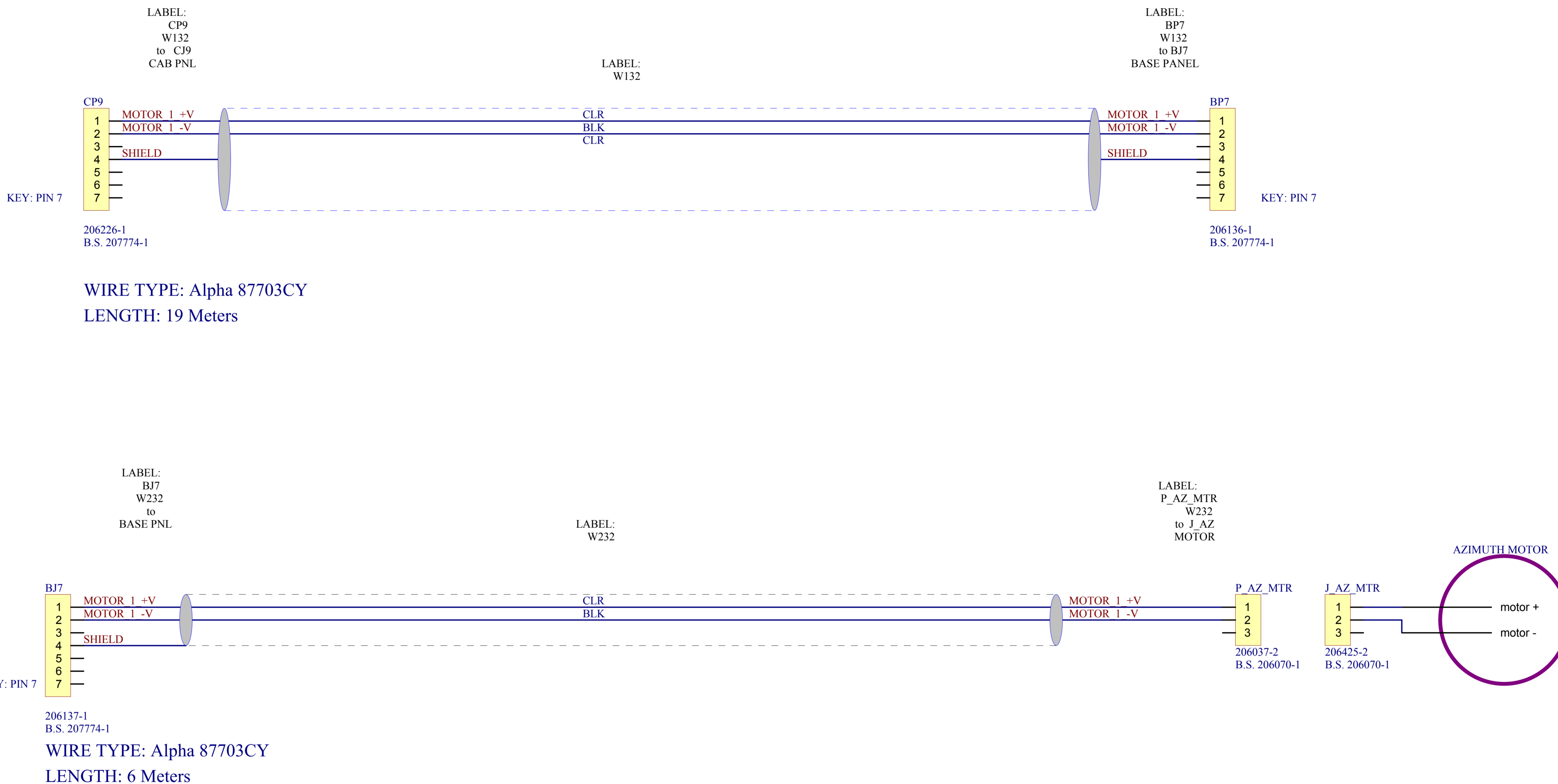
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3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE  
**APF Azimuth Encoder B**

DOCUMENT NUMBER <b>SCH-5389-2</b>	SIZE <b>A3</b>
EastConfig SCH-5389-1	SHEET 4 OF 47

APF Azimuth Encoder B  
SCH-5389-2

# AZIMUTH MOTOR DRIVE



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3160 E. TRANSCON WAY, Suite 180  
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TITLE

**APF Azimuth Motor Drive**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5389-1

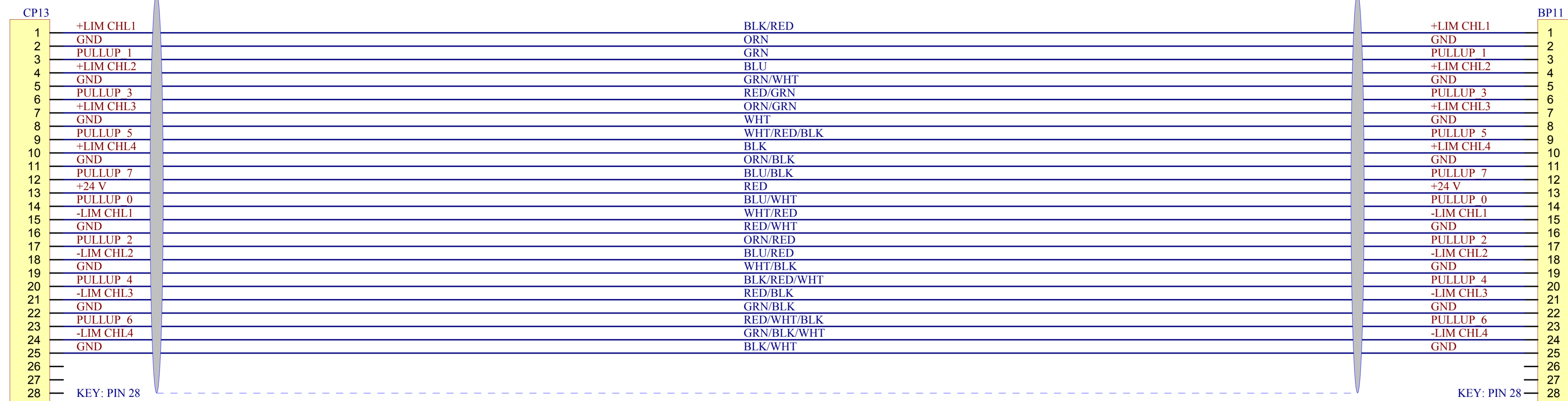
SHEET 5 OF 47

### AZIMUTH LIMIT INPUTS

Label:  
CP13  
W124  
to CJ13  
CAB\_PNL

Label:  
W124

Label:  
BP11  
W124  
to BJ11  
BASE PNL



206039-1  
B.S. 206070-1  
WIRE TYPE: ALPHA 6348  
LENGTH: 19 Meters

205839-3  
B.S. 206070-1

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**EOS Technologies, Inc.**  
3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE  
**APF Azimuth Limits**

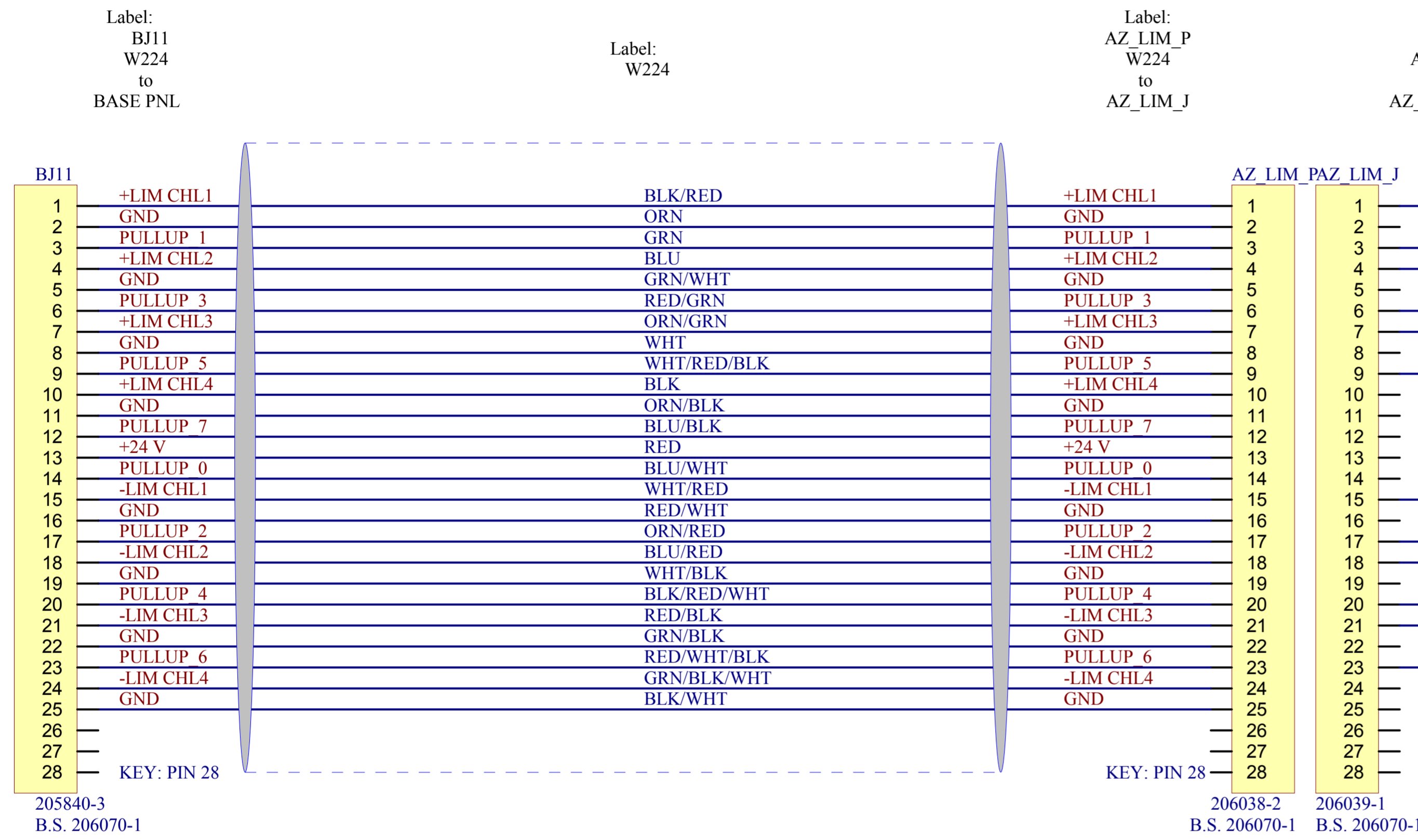
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**SCH-5389-2** SIZE  
**A3**

EastConfig SCH-5389-1 SHEET 6 OF 47

APF Azimuth Limits

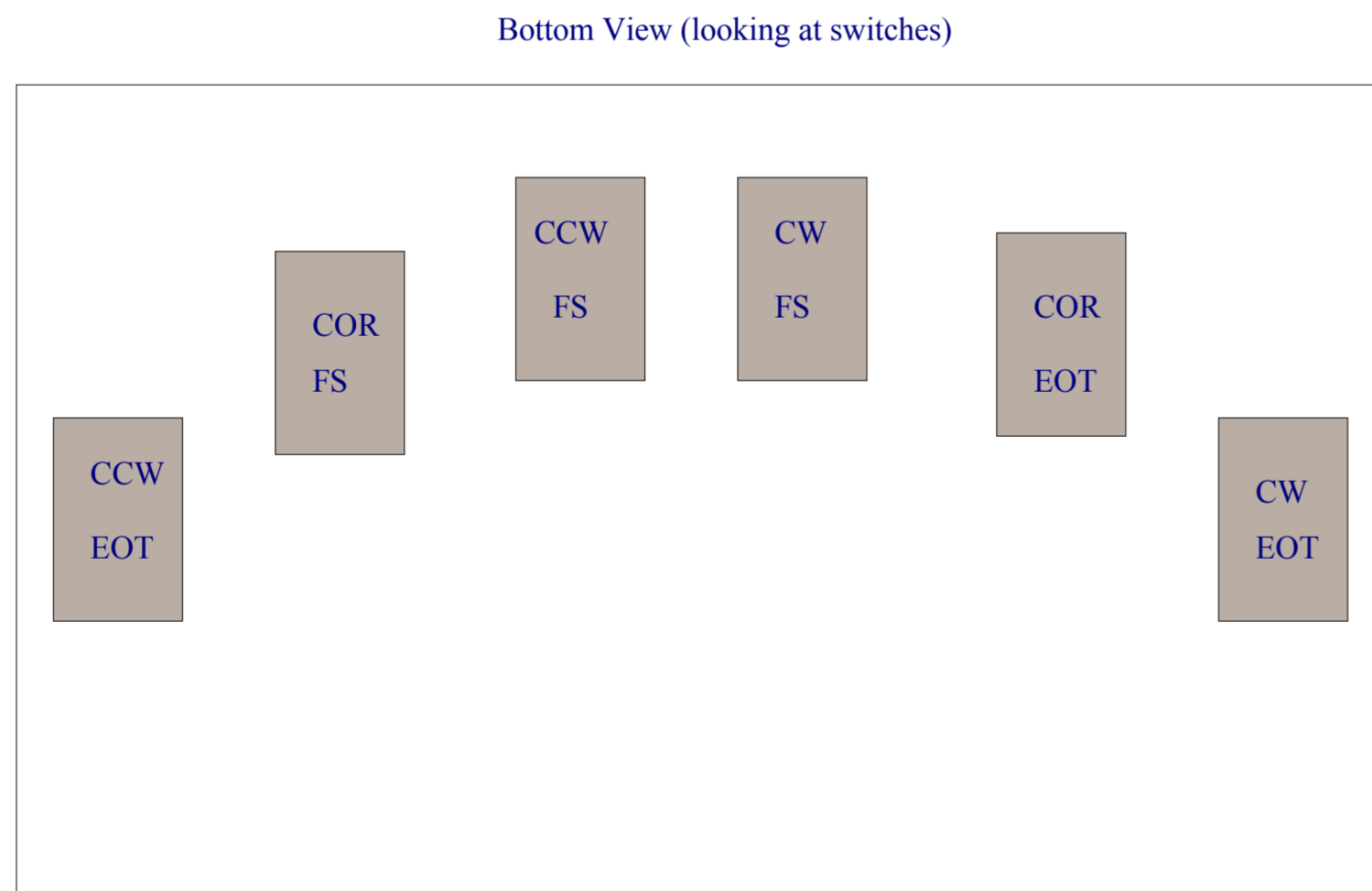
SCH-5389-2

# AZIMUTH LIMIT SWITCHES

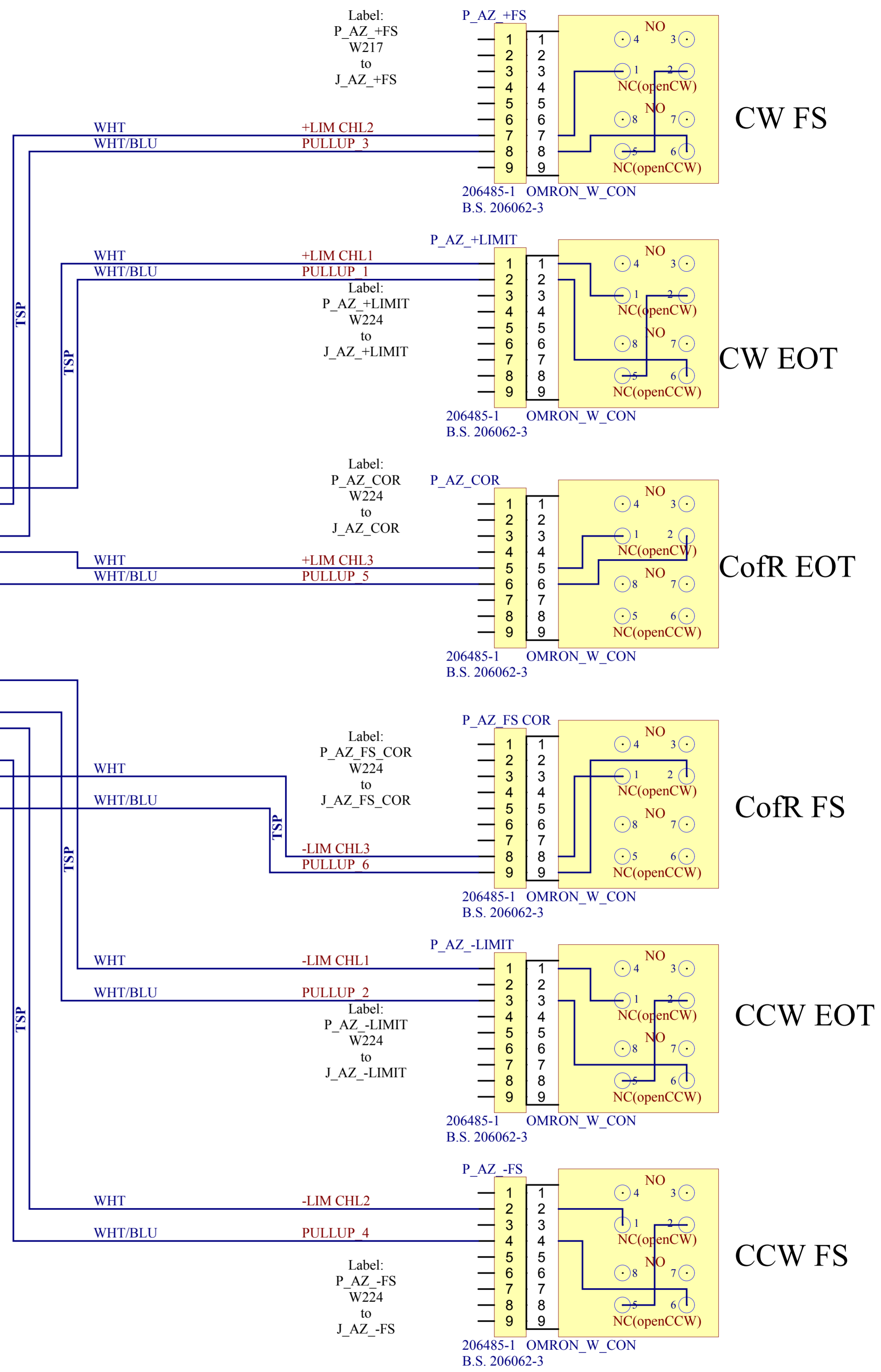


WIRE TYPE: ALPHA 6348  
 LENGTH: 6 Meters

WIRE TYPE: Raychem M27500-20S TSP  
 LENGTH: TBD at installation



Note:  
 CONNECTORS INSTALLED IN LIMIT SWITCHES ARE AMP 206486-2. This is accomplished as follows:  
 Modify a 206062-3 backshell by sawing it perpendicular to the thread line 12mm from the threaded end of the backshell.  
 Screw this modified piece of backshell onto a 206486-2 connector.  
 Using a press, carefully insert the backshell/connector into the threaded hole in the switch.



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TITLE

**APF Azmiuth Limit Switches**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5389-2

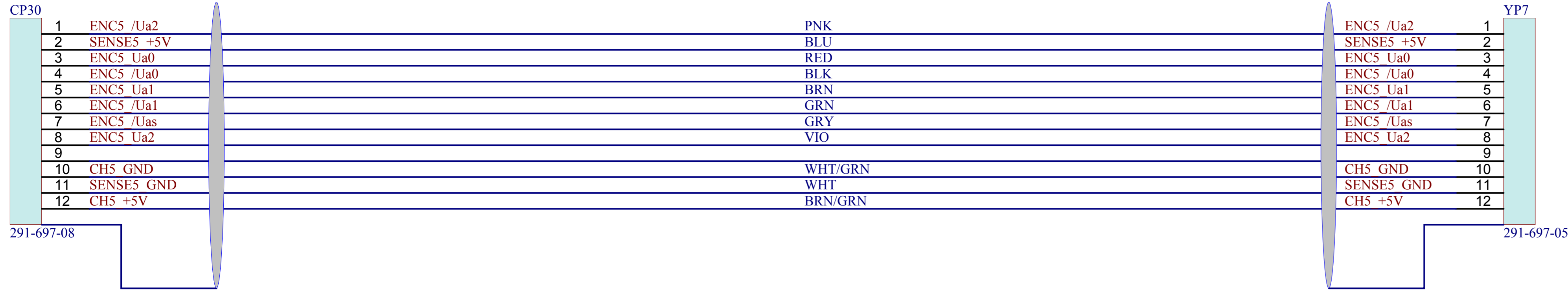
SHEET 7 OF 47

# ELEVATION A ENCODER INPUTS

LABEL:  
CP30  
W146  
to CJ30  
CAB PNL

LABEL:  
W146

LABEL:  
YP7  
W146  
to YJ7  
YOKE PNL



WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

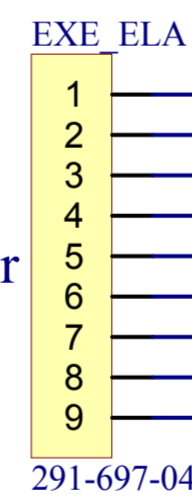
LABEL:  
YJ7  
W246  
to  
YOKE PNL

LABEL:  
W246

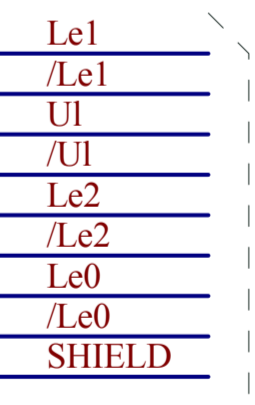
LABEL:  
P\_EXE\_ELA  
W246  
to  
EL\_A\_EXE



WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 6 Meters



1 METER Pigtail on Encoder



ENCODER HEAD

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3160 E. TRANSCON WAY, Suite 180  
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TITLE

**APF Elevation Encoder A**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EostConfig

SCH-5376-2

SHEET 11

OF 47

# ELEVATION B ENCODER INPUTS

LABEL:  
CP31  
W147  
to CJ31  
CAB PNL

LABEL:  
W147

LABEL:  
YP8  
W147  
to YJ8  
YOKE PNL

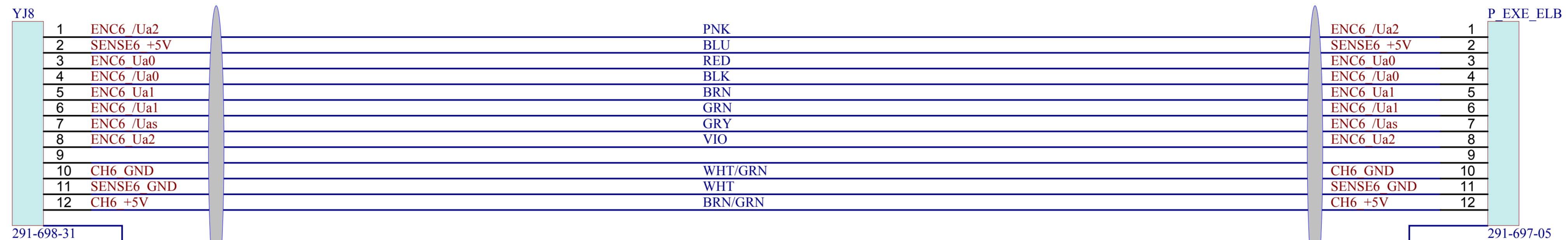


WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

LABEL:  
YJ8  
W247  
to  
YOKE PNL

LABEL:  
W247

LABEL:  
P\_EXE\_ELB  
W247  
to  
J\_EXE\_ELB



WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 6 Meters



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TEMPLATE: Eost\_tabloid\_SUBS

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TUCSON, ARIZONA 85706 USA

TITLE

**APF Elevation Encoder B**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

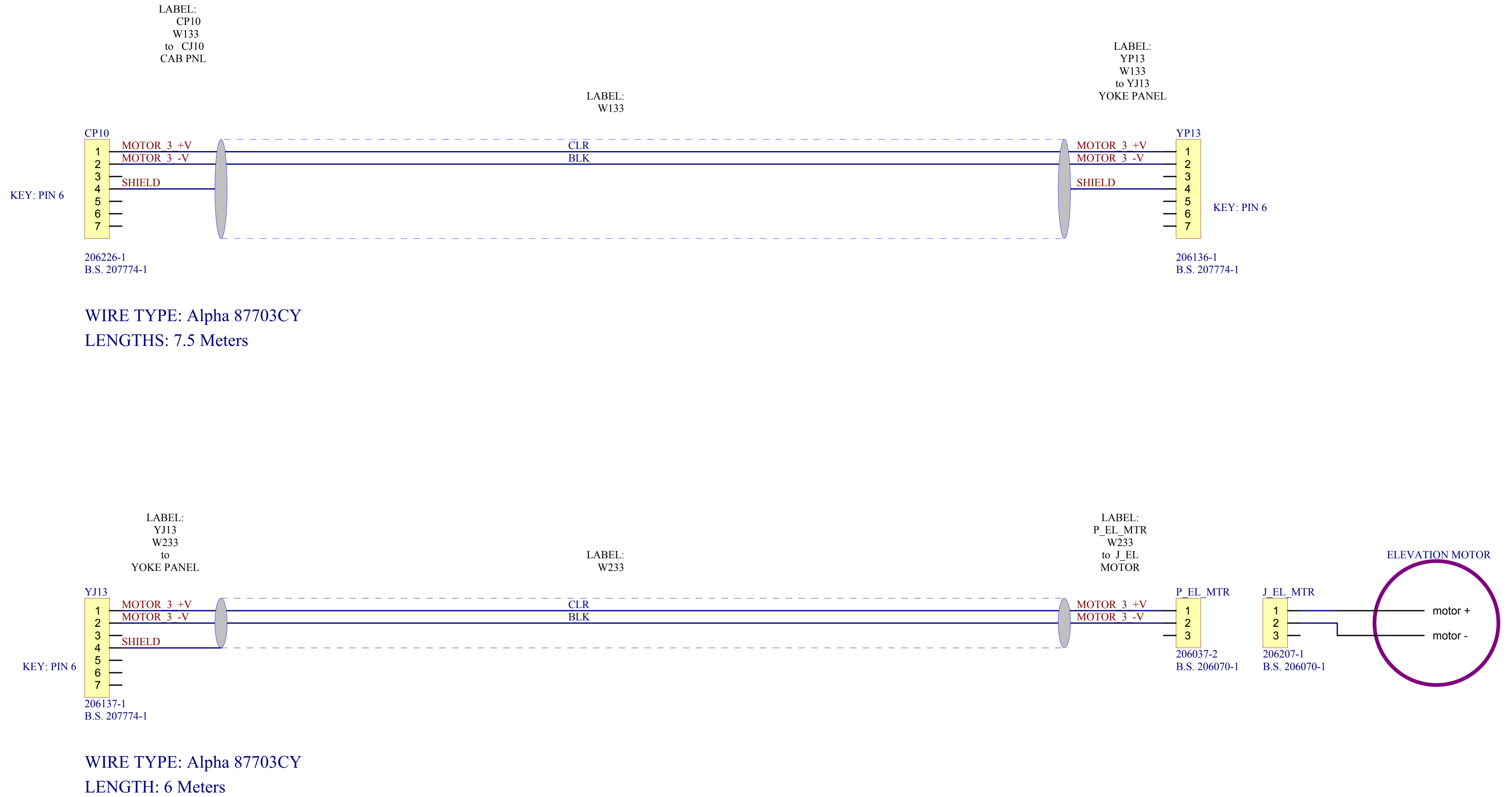
EastConfig

SCH-5389-1

SHEET 12

OF 47

# ELEVATION MOTOR DRIVE



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TITLE

**APF Elevation Motor Drive**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5389-2

SHEET 13 OF 47

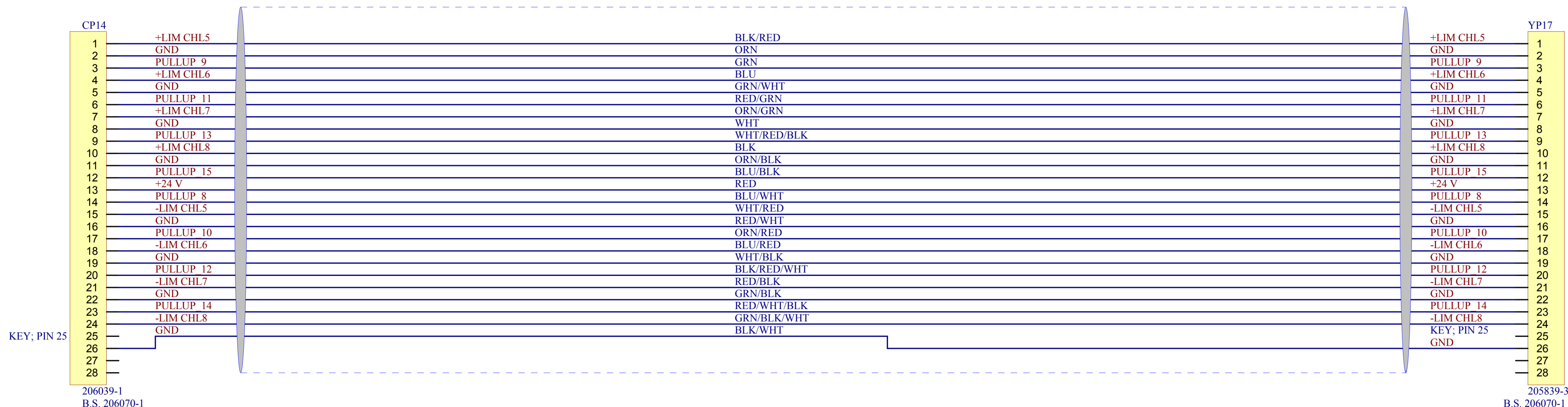


# ELEVATION LIMIT INPUTS

Label:  
CP14  
W125  
to CJ14  
CAB\_PNL

Label:  
W125

Label:  
YP17  
W125  
to YJ17  
YOKE PNL



KEY; PIN 25

206039-1  
B.S. 206070-1

205839-3  
B.S. 206070-1

WIRE TYPE: ALPHA 6348  
LENGTHS: 7.5 Meters

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PRINTED 12/8/2009 4:00:07 PM  
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TITLE

**APF Elevation Limits**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

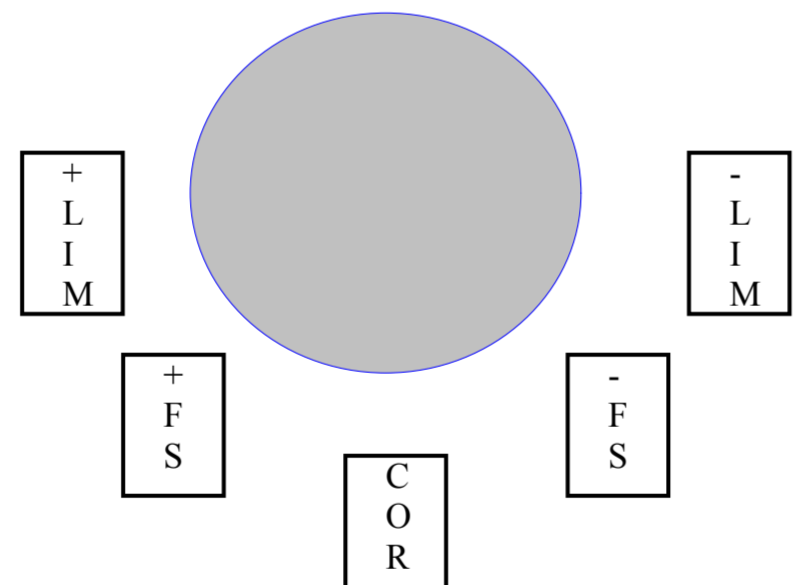
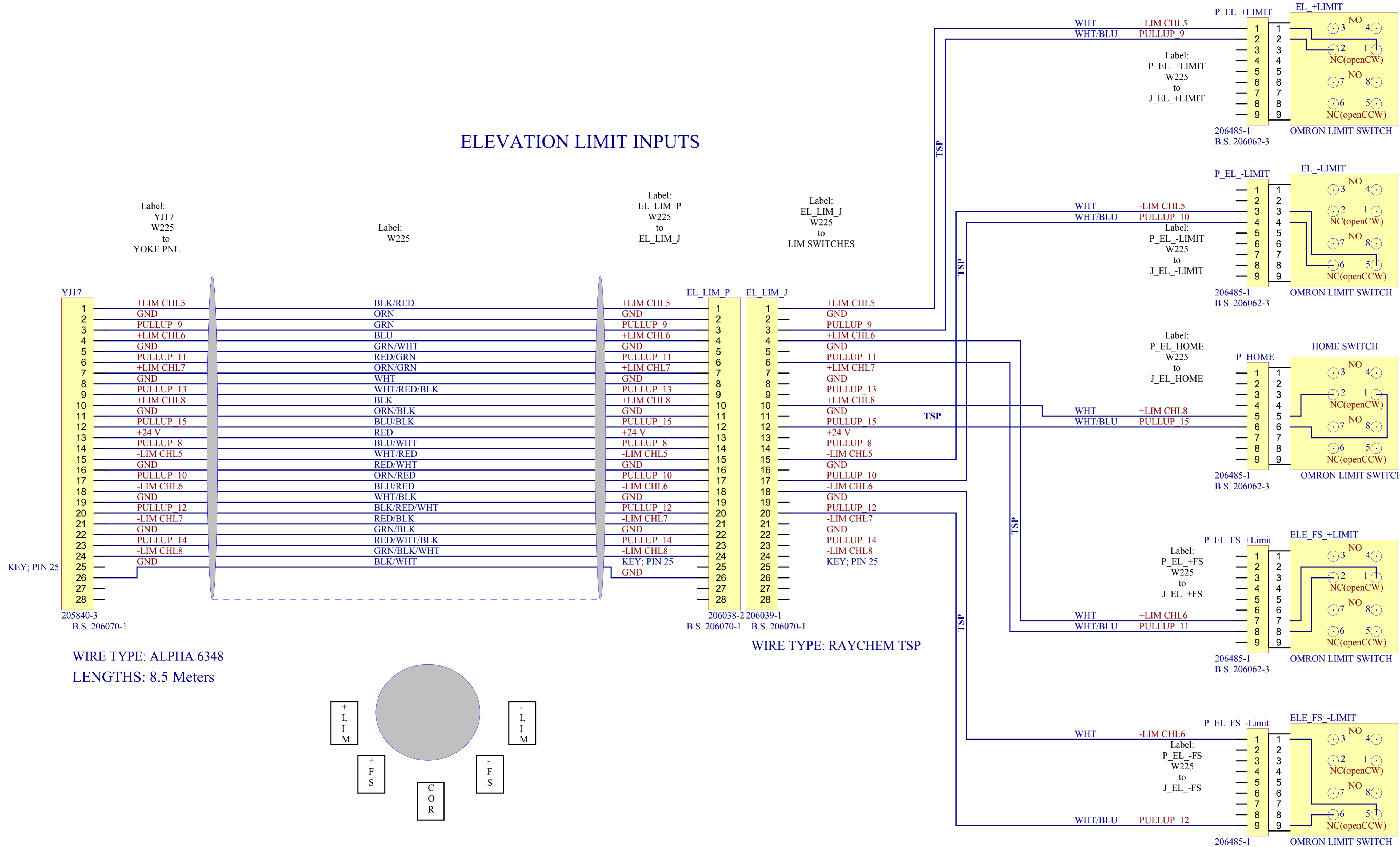
EastConfig SCH-5389-1

SHEET 14 OF 47

APF Elevation Limits

SCH-5389-2

# ELEVATION LIMIT INPUTS



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TITLE

**APF Elevation Limit Switches**

DOCUMENT NUMBER

**SCH-5389-2**

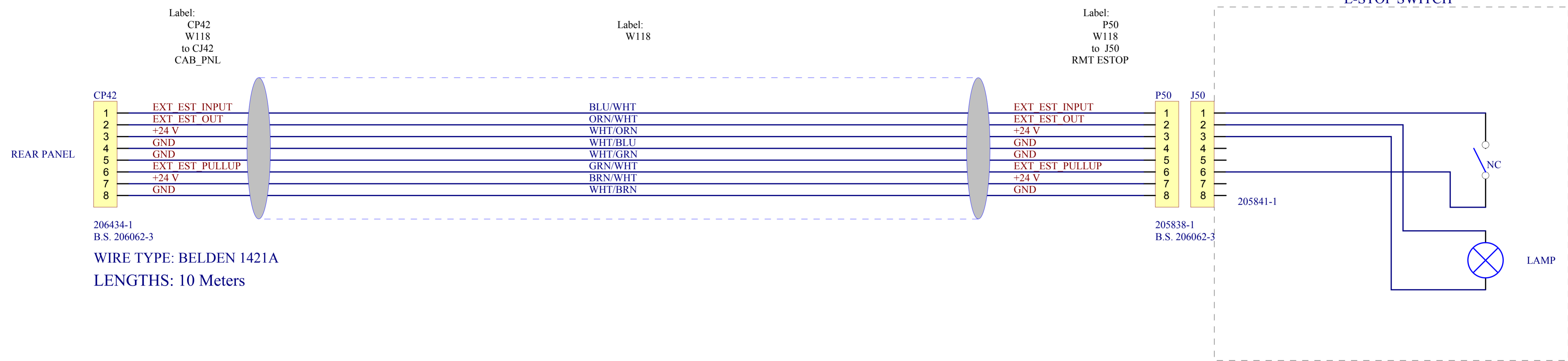
SIZE

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EastConfig SCH-5389-2

SHEET 15 OF 47

## EXTERNAL ESTOP



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TITLE

**APF Emergency Stop Switch**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

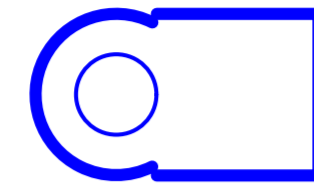
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EostConfig SCH-5389-1

SHEET 8 OF 47

# GROUNDING CABLE

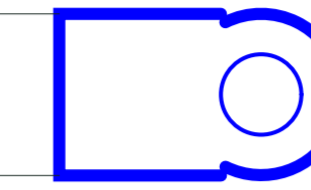
TCC BACK PANEL  
GROUNDING BOLT



LABEL:  
W117  
TCC PNL BOLT

RINGTERM\_LG (NEWARK P/N 84F292)

LENGTHS: 19 Meters

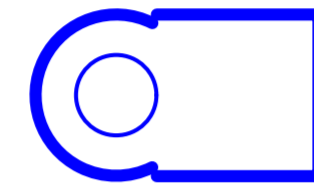


LABEL:  
W117  
TELESCOPE  
BASE PNL

RINGTERM\_LG (NEWARK P/N 84F292)

TELESCOPE BASE

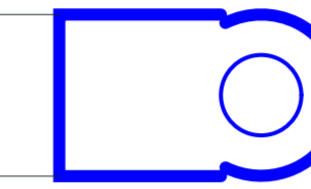
TCC BACK PANEL  
GROUNDING BOLT



LABEL:  
W217  
TELESCOPE  
PNL BOLT

RINGTERM\_LG (NEWARK P/N 84F292)

LENGTH: 6.5 Meters

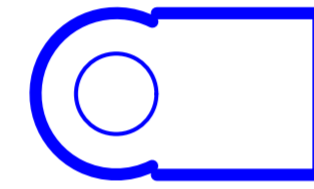


LABEL:  
W217  
TELESCOPE  
BASE

RINGTERM\_LG (NEWARK P/N 84F292)

TELESCOPE YOKE

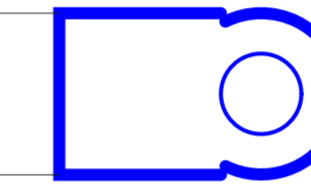
TELE BASE PNL  
GROUNDING BOLT



LABEL:  
W117b  
TELESCOPE  
TCC

RINGTERM\_LG (NEWARK P/N 84F292)

LENGTH: 0.5 Meter

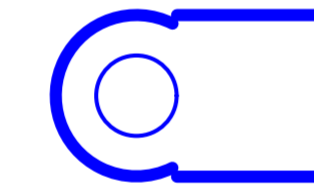


LABEL:  
W117b  
TELESCOPE  
YOKE PNL BOLT

RINGTERM\_LG (NEWARK P/N 84F292)

TELESCOPE BASE

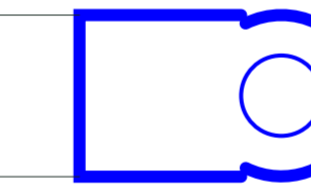
TELE YOKE PNL  
GROUNDING BOLT



LABEL:  
W217b  
TELESCOPE  
PNL BOLT

RINGTERM\_LG (NEWARK P/N 84F292)

LENGTH: 1.1 Meter

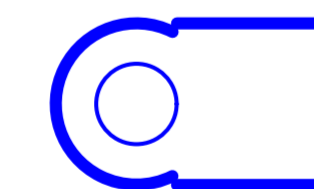


LABEL:  
W217b  
TELESCOPE  
YOKE GND LUG

RINGTERM\_LG (NEWARK P/N 84F292)

TELESCOPE YOKE PANEL

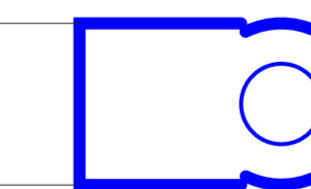
TELE YOKE PNL  
GROUNDING BOLT



LABEL:  
W317  
TELESCOPE  
YOKE GND LUG

RINGTERM\_LG (NEWARK P/N 84F292)

LENGTH: 12.1 Meters



LABEL:  
W317  
TELESCOPE  
CTR SEC  
GND LUG

RINGTERM\_LG (NEWARK P/N 84F292)

TELESCOPE CENTER SECTION

WIRE TYPE: CAROLPRENE 2GA WELDING CABLE

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PRINTED 12/8/2009 4:00:13 PM  
TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF Telescope Grounding Cables**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5389-1

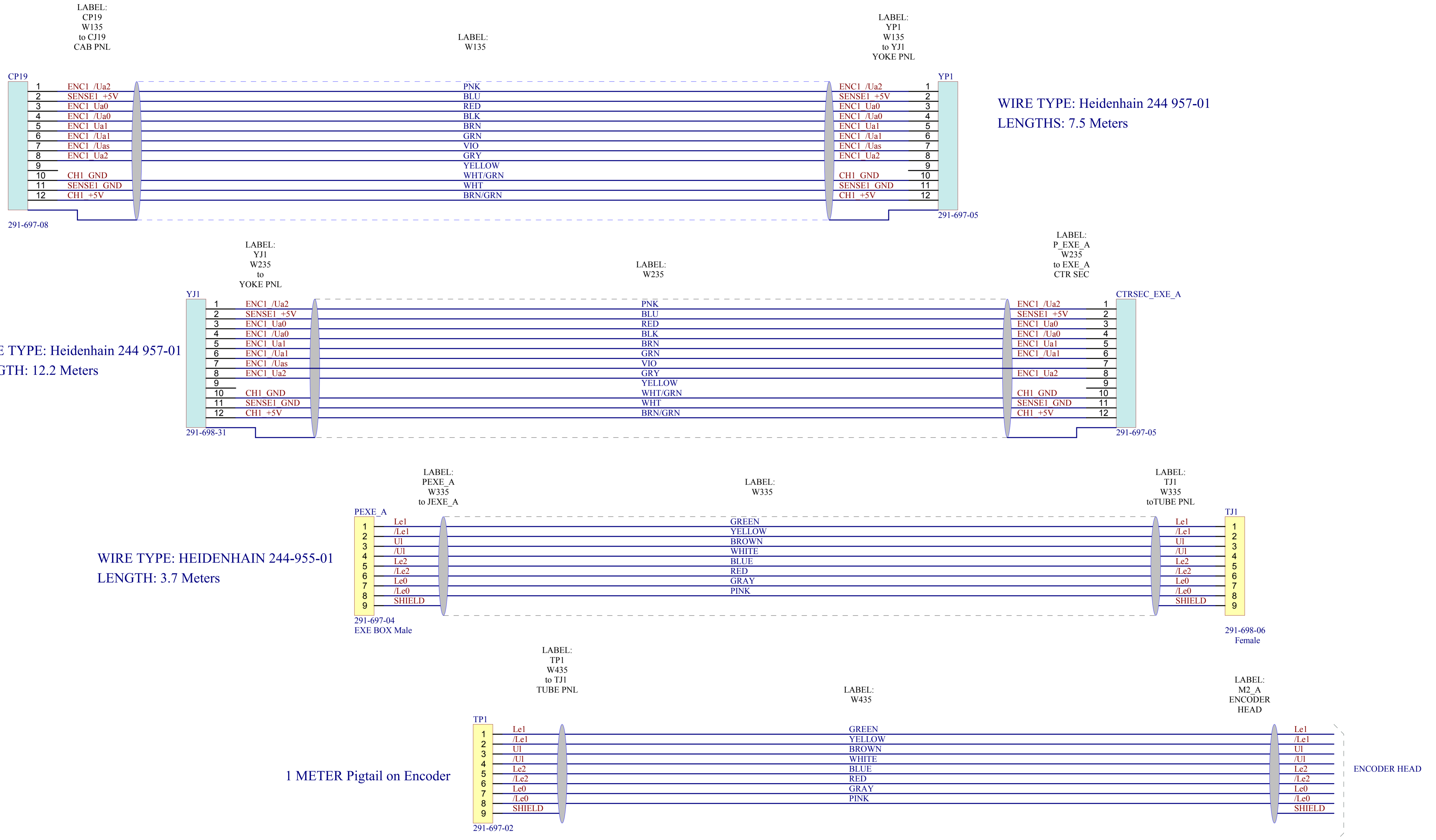
SHEET 9

OF

47

SCH-5389-2 APF Telescope Grounding Cables

## SECONDARY A ENCODER INPUTS



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2linearW135.SCHDOC  
 PRINTED 12/8/2009 4:00:14 PM  
 TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

3160 E. TRANSCON WAY, Suite 180  
 TUCSON, ARIZONA 85706 USA

TITLE

**APF M2\_A Linear Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

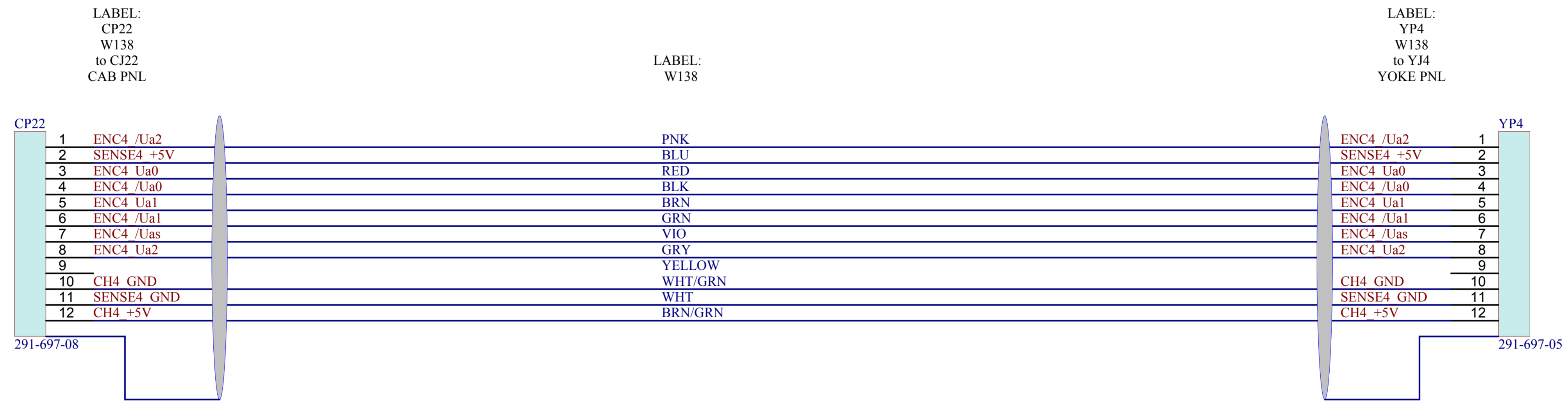
SIZE

**A3**

EastConfig SCH-5376-2

SHEET 27 OF 47

## SECONDARY A MOTOR ENCODER INPUTS



WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

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PRINTED 12/8/2009 4:00:16 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF M2\_A Motor Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

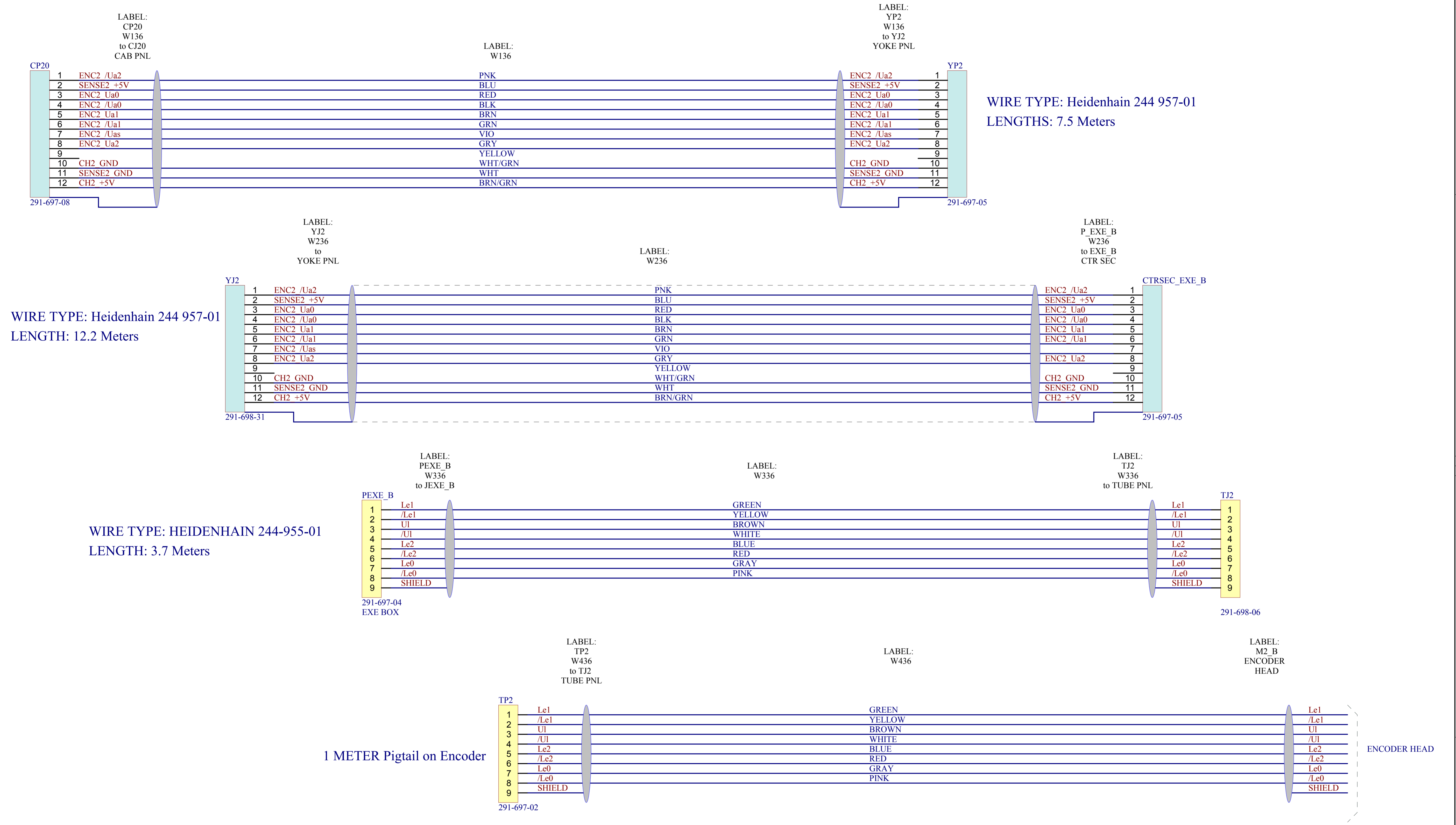
SIZE

**A3**

EastConfig SCH-5376-2

SHEET 28 OF 47

# SECONDARY B ENCODER INPUTS



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2blnearW136.SCHDOC  
PRINTED 12/8/2009 4:00:18 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF M2\_B Linear Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

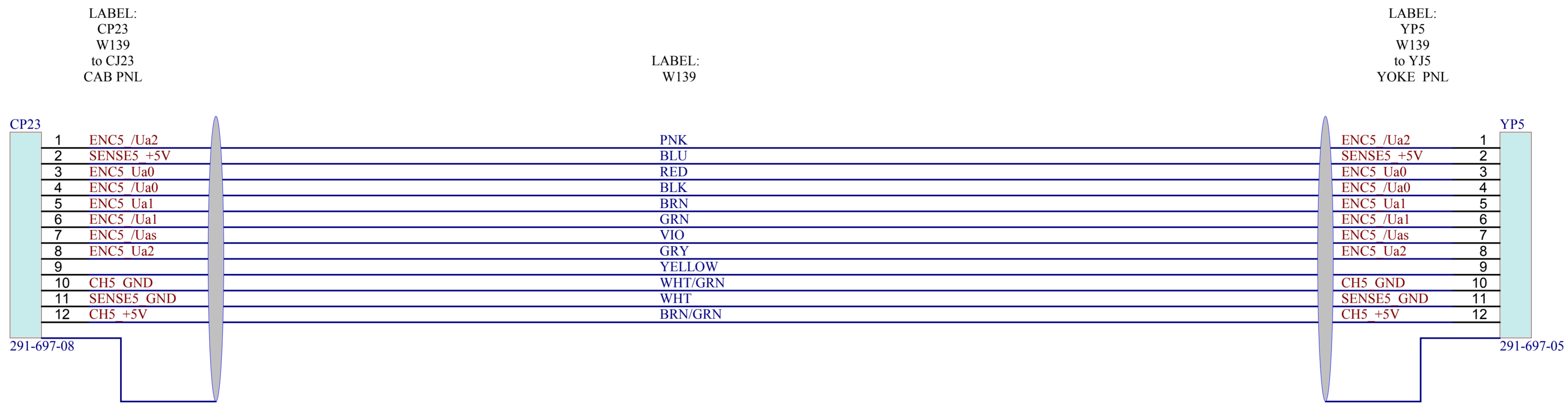
EastConfig

SCH-5376-2

SHEET 29 OF 47

SCH-5389-2 APF M2\_B Linear Encoder

## SECONDARY B MOTOR ENCODER INPUTS



WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

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PRINTED 12/8/2009 4:00:21 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TITLE

**APF M2\_B Motor Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig SCH-5376-2

SHEET 30 OF 47



# SECONDARY C ENCODER INPUTS

LABEL:  
CP21  
W137  
to CJ21  
CAB PNL

LABEL:  
W137

LABEL:  
YP3  
W137  
to YJ3  
YOKE PNL

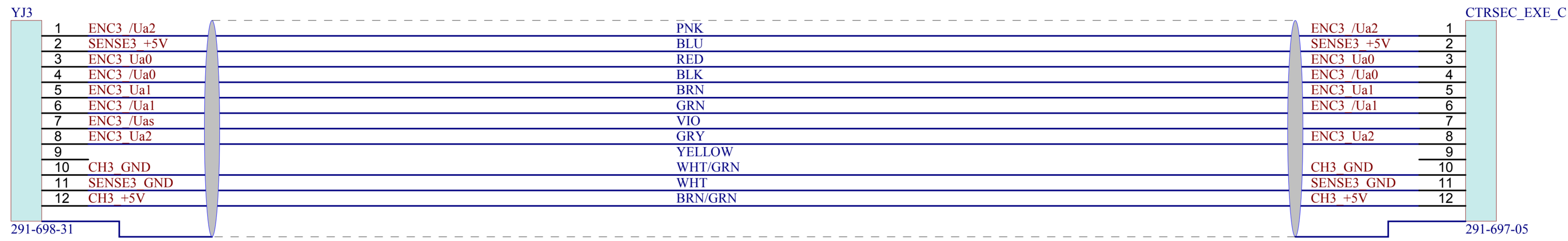


WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

LABEL:  
YJ3  
W237  
to  
YOKE PNL

LABEL:  
W237

LABEL:  
P\_EXE\_C  
W237  
to EXE\_C  
CTR SEC

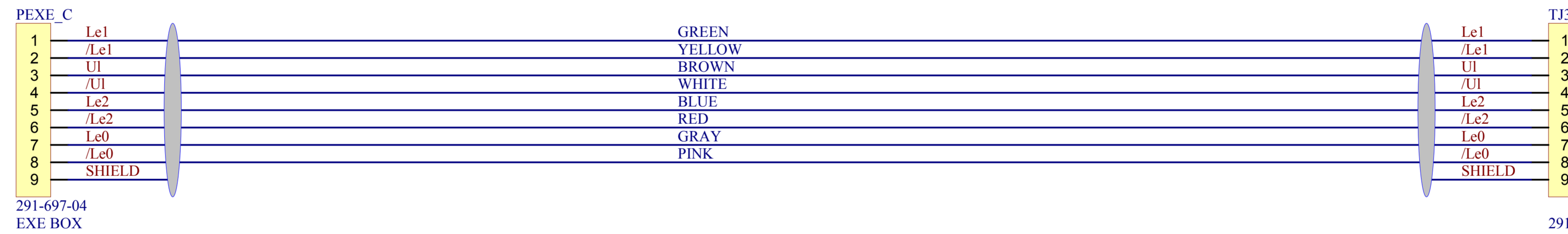


WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 12.2 Meters

LABEL:  
PEXE\_C  
W337  
to JEXE\_C

LABEL:  
W337

LABEL:  
TJ3  
W337  
to TUBE PNL

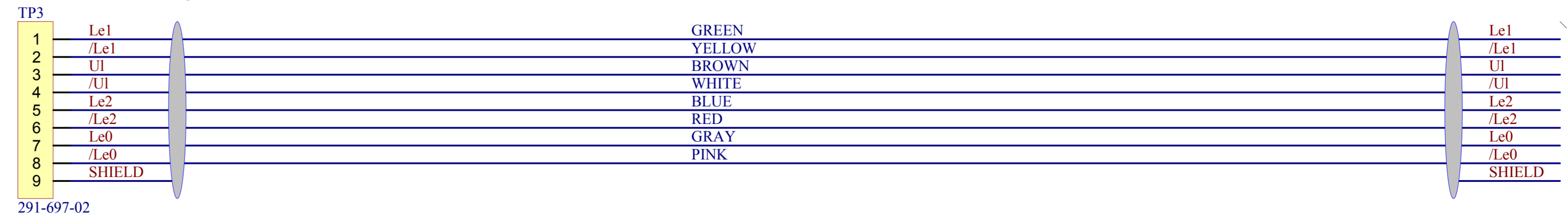


WIRE TYPE: HEIDENHAIN 244-955-01  
LENGTH: 3.7 Meters

LABEL:  
TP3  
W437  
to TP3  
TUBE PNL

LABEL:  
W437

LABEL:  
M2\_C  
ENCODER  
HEAD



1 METER Pigtail on Encoder

ENCODER HEAD

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TITLE  
**APF M2\_C Linear encoder**

FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2linearW137.SCHDOC  
PRINTED 12/8/2009 4:00:22 PM  
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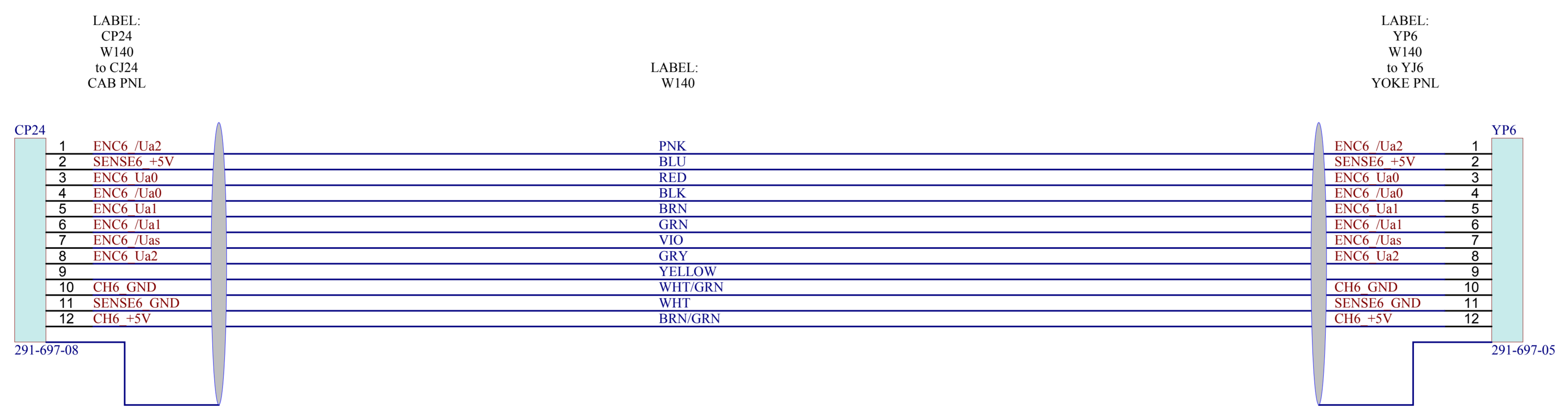
DOCUMENT NUMBER  
**SCH-5389-2**  
EastConfig SCH-5376-2 SHEET 31 OF 47

SIZE  
**A3**

APF M2\_C Linear encoder

SCH-5389-2

## SECONDARY C MOTOR ENCODER INPUTS



**WIRE TYPE:** Heidenhain 244 957-01  
**LENGTHS:** 7.5 Meters

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2cmtrncW140.SCHDOC  
 PRINTED 12/8/2009 4:00:24 PM  
 TEMPLATE: Eost\_tabloid\_SUBS

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 TUCSON, ARIZONA 85706 USA

TITLE  
**APF M2\_C Motor Encoder**

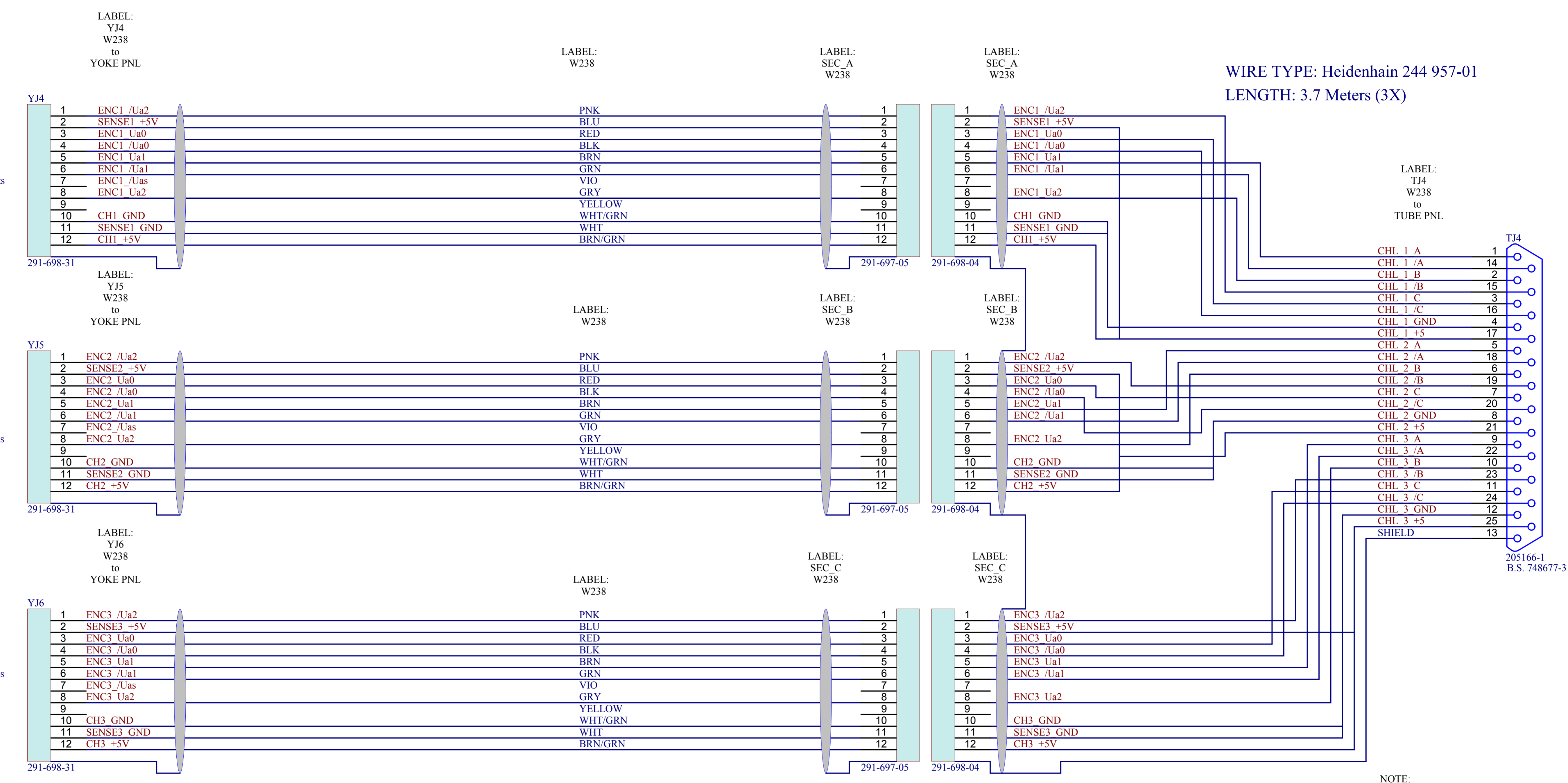
DOCUMENT NUMBER <b>SCH-5389-2</b>	SIZE <b>A3</b>
--------------------------------------	-------------------

EastConfig	SCH-5376-2	SHEET 32 OF 47
------------	------------	----------------

APF M2\_C Motor Encoder  
 SCH-5389-2

# COMBINED SECONDARY MOTOR ENCODER INPUTS

WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 3.7 Meters (3X)



Note: Secondary A encoder inputs

Note: Secondary B encoder inputs

Note: Secondary C encoder inputs

NOTE:  
Connect "Sense" wires to power and ground wires  
in the backshell of "TJ4" connector.

WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 12.2 Meters (3X)

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2combinedlinearW238.SCHDOC  
PRINTED 12/8/2009 4:00:26 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TITLE  
**APF M2 Combined Linear Encoder**

DOCUMENT NUMBER	SIZE
<b>SCH-5389-2</b>	<b>A3</b>
EastConfig SCH-5376-2	SHEET 33 OF 47

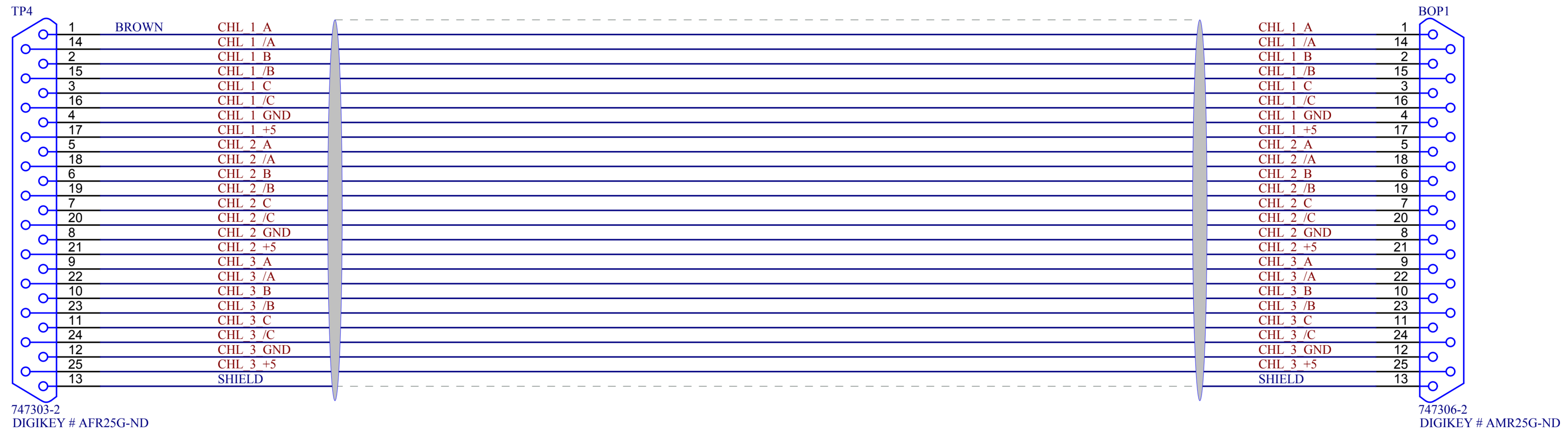
SCH-5389-2 APF M2 Combined Linear Encoder

# COMBINED SECONDARY MOTOR ENCODER INPUTS

LABEL:  
TP4  
W338  
to TJ4  
TUBE PNL

LABEL:  
W338

LABEL:  
BOP1  
W338  
to  
BOJ1\_M2



WIRE TYPE: 25 CONDUCTOR SHIELDED RIBBON CABLE  
LENGTH: 2 Meters

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2comblnearW338.SCHDOC  
PRINTED 12/8/2009 4:00:28 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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3160 E. TRANSCON WAY, Suite 180  
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TITLE

**APF M2 Combined Linear Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

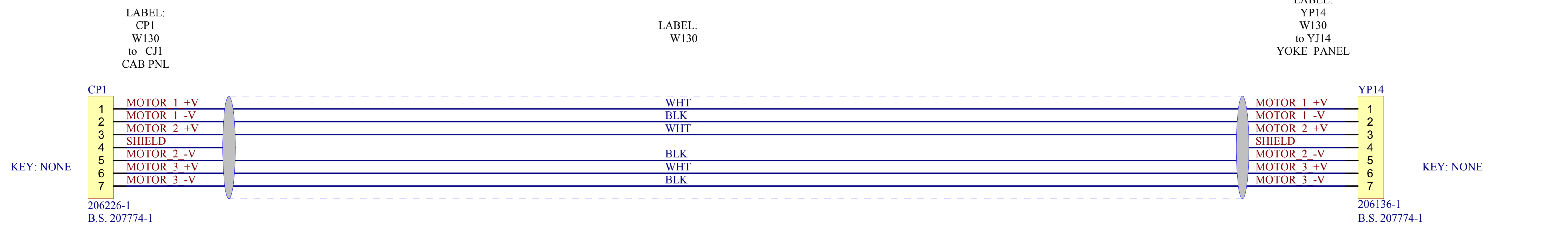
EastConfig

SCH-5376-2

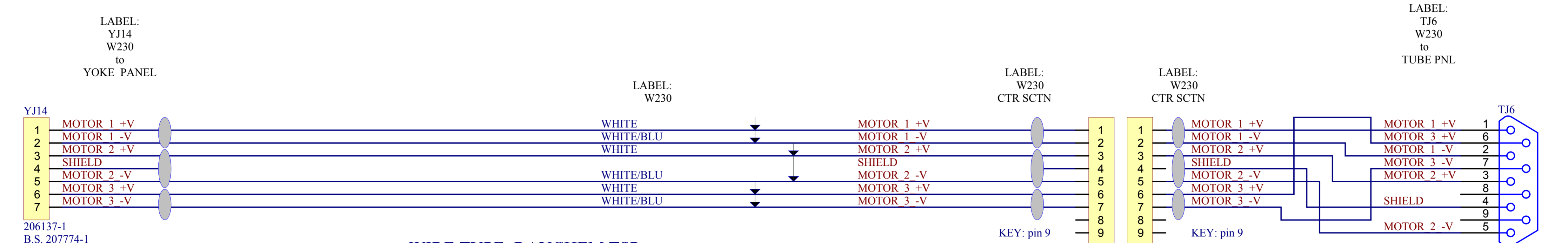
SHEET 34

OF 47

# SECONDARY MOTOR DRIVE

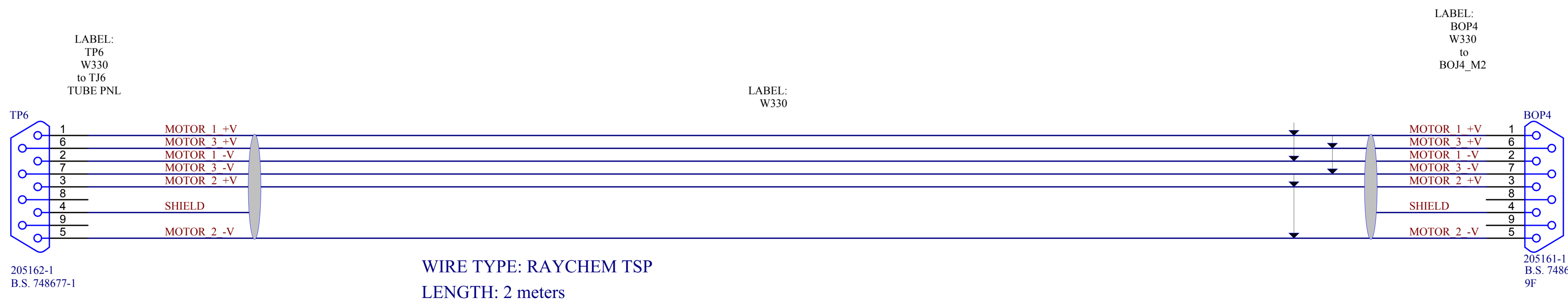


**WIRE TYPE: A.E.PETSCHKE PVAZBD6298**  
**LENGTHS: 7.5 Meters**



**WIRE TYPE: RAYCHEM TSP**  
**LENGTH: 12.5 Meters**

**WIRE TYPE: RAYCHEM TSP**  
**LENGTH: 3.7 Meters**



**WIRE TYPE: RAYCHEM TSP**  
**LENGTH: 2 meters**

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2drn\W130.SCHDOC  
 PRINTED 12/8/2009 4:00:30 PM  
 TEMPLATE: Eost\_tabloid\_SUBS

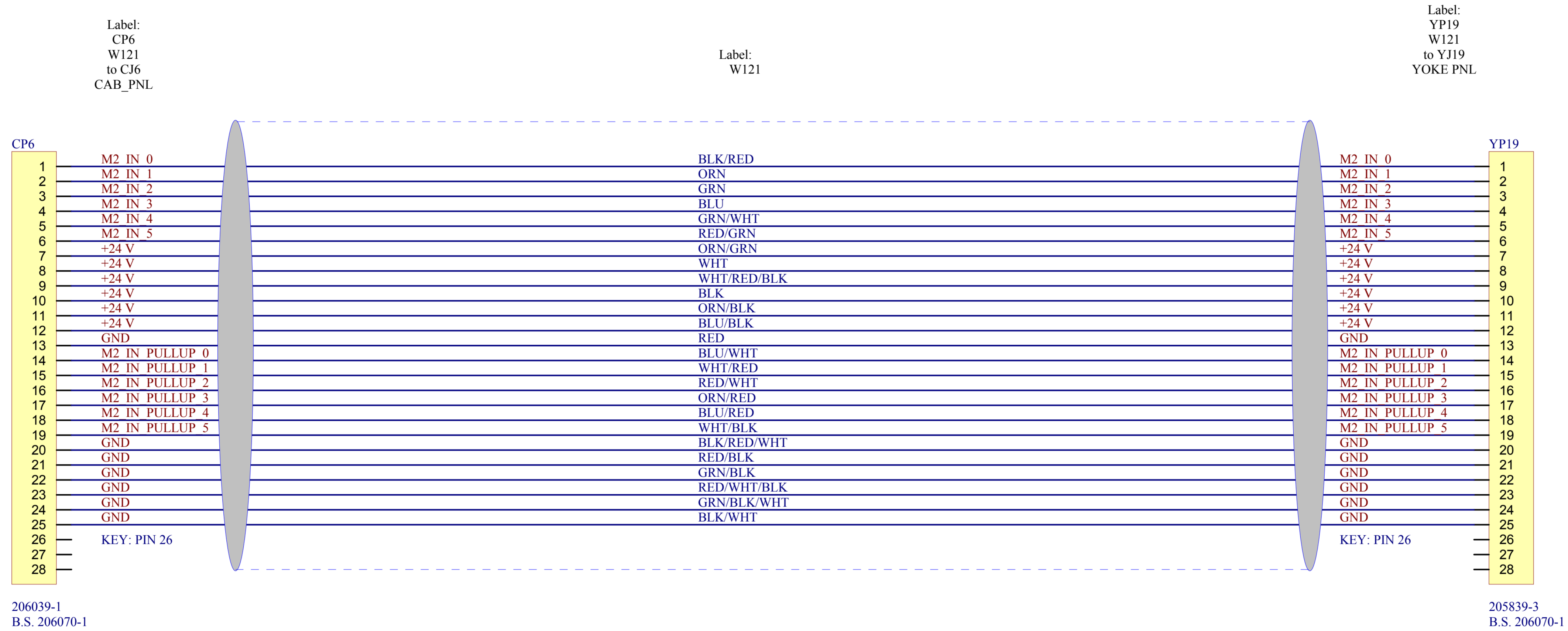
**EOS Technologies, Inc.**  
 3160 E. TRANSCON WAY, Suite 180  
 TUCSON, ARIZONA 85706 USA

TITLE  
**APF M2 Motor Drive**

DOCUMENT NUMBER	<b>SCH-5389-2</b>	SIZE	<b>A3</b>
EastConfig	SCH-5376-2	SHEET 35	OF 47

APF M2 Motor Drive  
 SCH-5389-2

# M2 FAILSAFE I/O



WIRE TYPE: ALPHA 6348  
LENGTHS: 7.5 Meters

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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2fs\W121.SCHDOC  
PRINTED 12/8/2009 4:00:32 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TITLE

**APF M2 Failsafe**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

SHEET 40

OF 47

# M2 FAILSAFE I/O

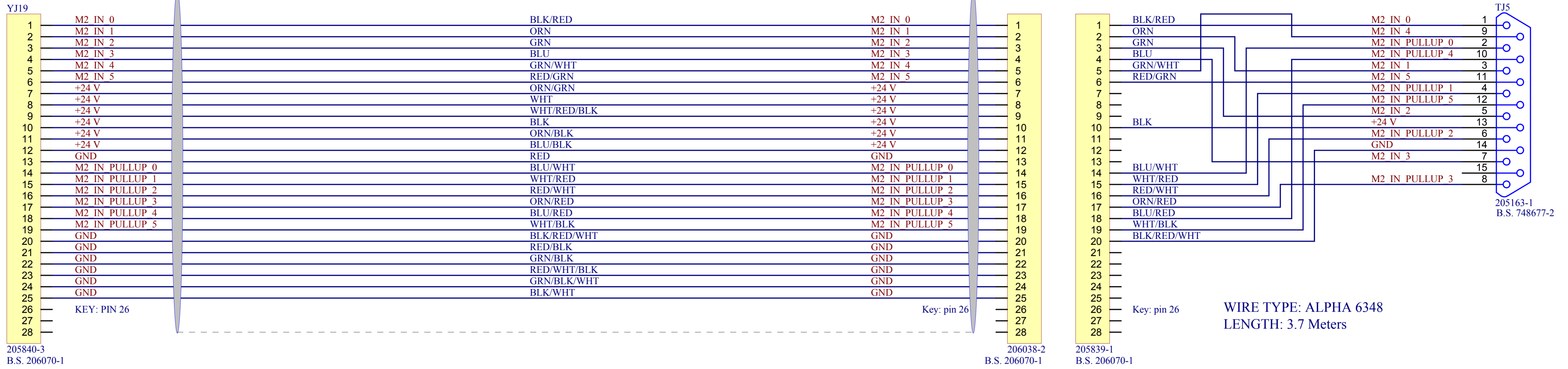
Label:  
YJ19  
W221  
to  
YOKE PNL

Label:  
W221

Label:  
W221  
CTR SCTN

Label:  
W221  
CTR SCTN

Label:  
TJ5  
W221  
to  
TUBE PNL



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m2fsW221.SCHDOC  
PRINTED 12/8/2009 4:00:33 PM  
TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

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TUCSON, ARIZONA 85706 USA

TITLE

**APF M2 Failsafe**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

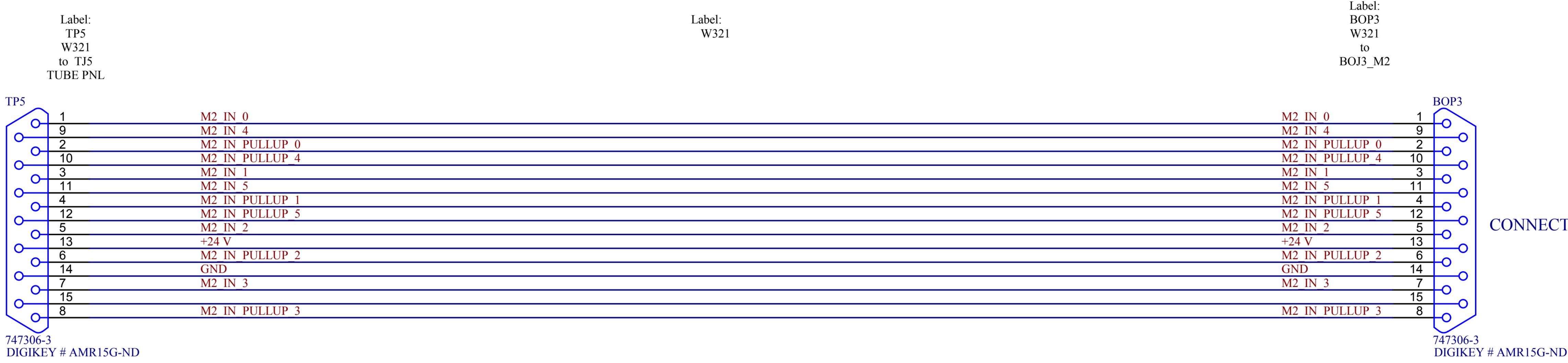
EastConfig

SCH-5376-2

SHEET 41

OF 47

# M2 FAILSAFE I/O



WIRE TYPE: 15 CONDUCTOR RIBBON CABLE  
LENGTH: 2.5M

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PRINTED 12/8/2009 4:00:34 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TITLE  
**M2 Failsafe I/O**

DOCUMENT NUMBER  
**SCH-5389-2**

SIZE  
**A3**

EostConfig SCH-5376-2 SHEET 42 OF 47

M2 Failsafe I/O

SCH-5389-2

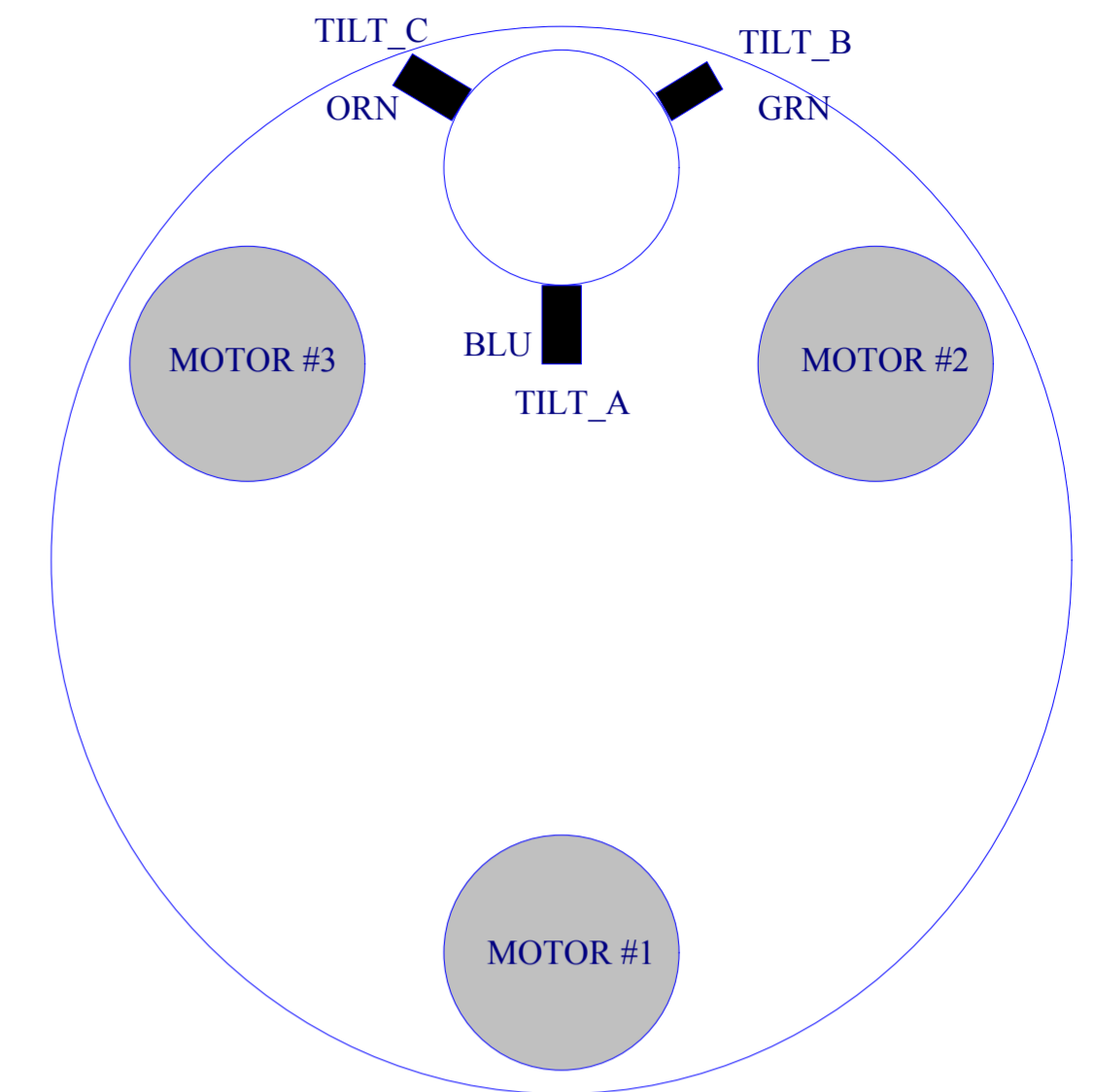
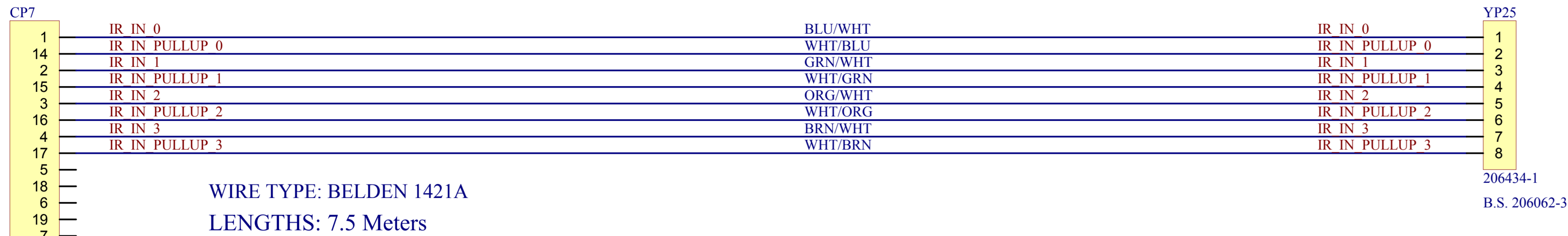


# M2 TILT F.S.

Label:  
CP7  
W122  
to CJ7  
CAB\_PNL

Label:  
W122

Label:  
YP25  
W122  
to YJ25  
YOKE PNL



VIEW FROM MIRROR END OF M2

KEY: PIN 13

KEY: PIN 13

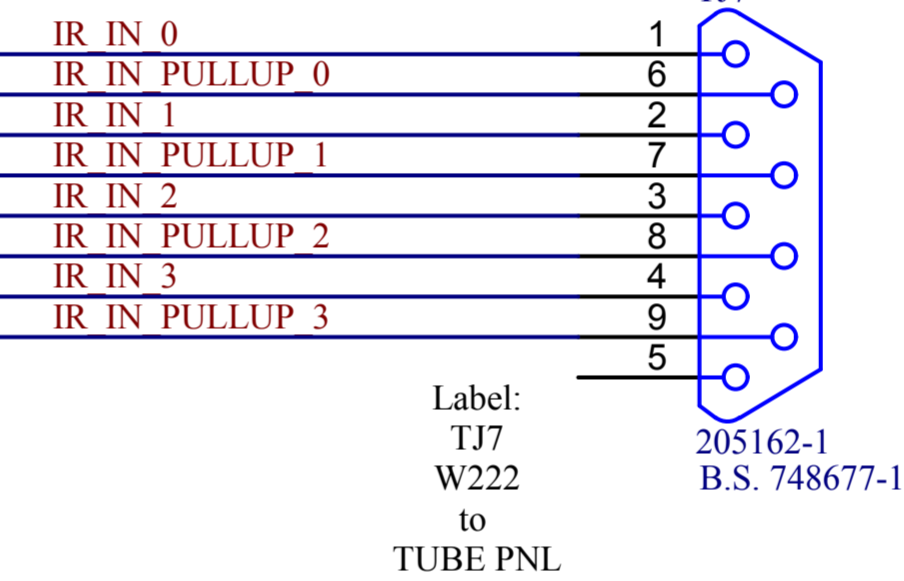
Label:  
YJ25  
W222  
to  
YOKE PNL

Label:  
W222

206039-1  
B.S. 206070-1

YJ25  
1 IR IN 0  
2 IR IN PULLUP 0  
3 IR IN 1  
4 IR IN PULLUP 1  
5 IR IN 2  
6 IR IN PULLUP 2  
7 IR IN 3  
8 IR IN PULLUP 3  
206433-1  
B.S. 206062-3

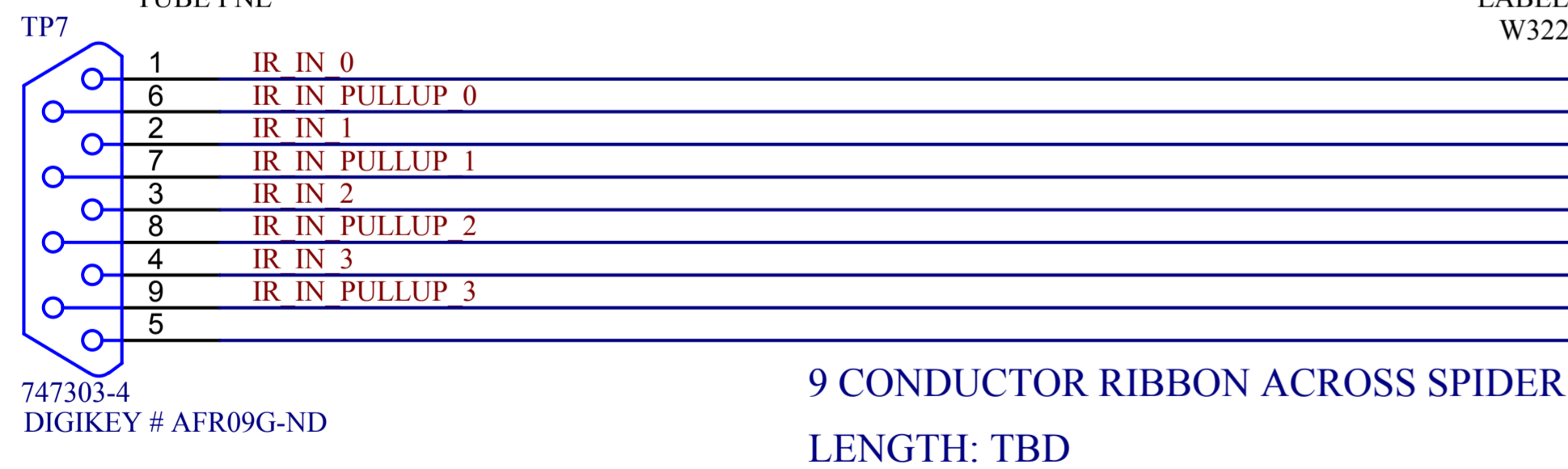
WIRE TYPE: BELDEN 1421A  
LENGTH: TBD



LABEL:  
TP7  
W322  
to  
TJ7  
TUBE PNL

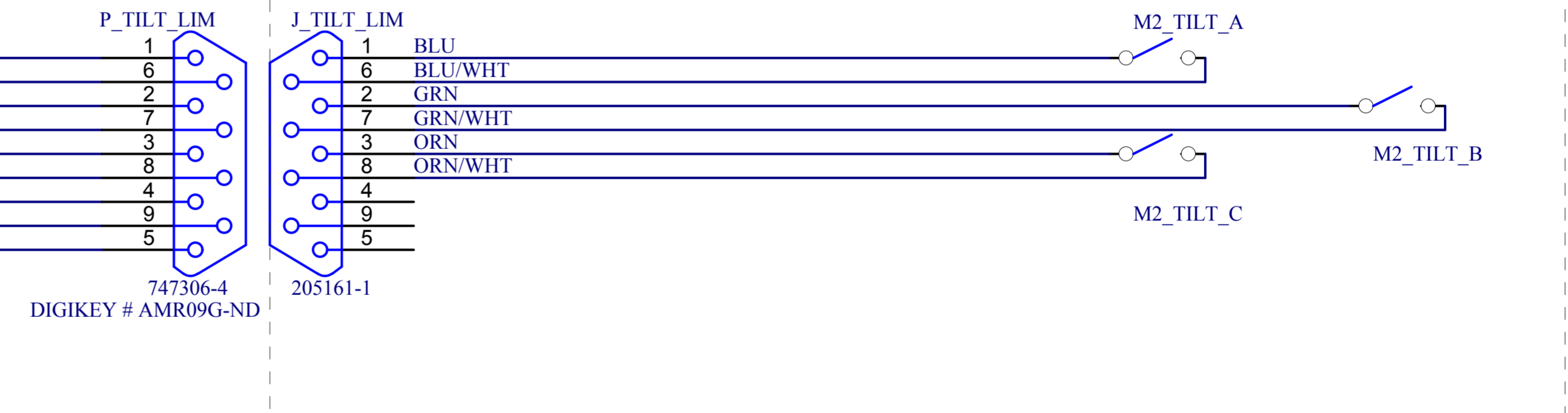
KEY: PIN 13

LABEL:  
W322



LABEL:  
P\_TILT\_LIM  
W322  
to  
J\_TILT\_LIM  
M2\_UNIT

LIMIT SWITCH CAN



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TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

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TUCSON, ARIZONA 85706 USA

TITLE

**APF M2 Failsafe Tilt Limits**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

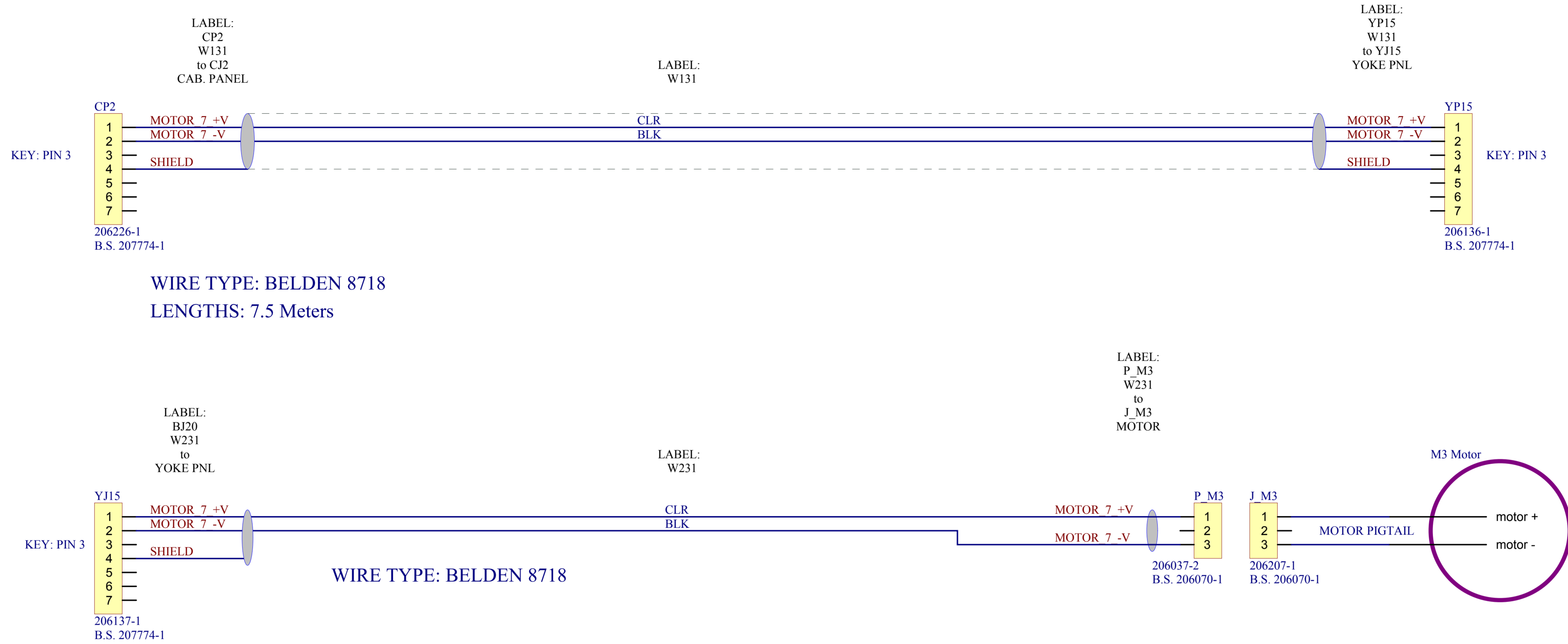
EastConfig

SCH-5376-2

SHEET 43

OF 47

# M3 MIRROR ROTATOR MOTOR DRIVES



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PRINTED 12/8/2009 4:00:37 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TITLE

**APF Tertiary Mirror Rotator Motor Drive**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

SHEET 23

OF 47

# M3 ENCODER INPUTS

LABEL:  
CP25  
W141  
to CJ25  
CAB PNL

LABEL:  
W141

LABEL:  
YP9  
W141  
to T19  
YOKE PNL



WIRE TYPE: Heidenhain 244 957-01  
LENGTHS: 7.5 Meters

LABEL:  
YJ9  
W241  
to  
YOKE PNL

LABEL:  
W241

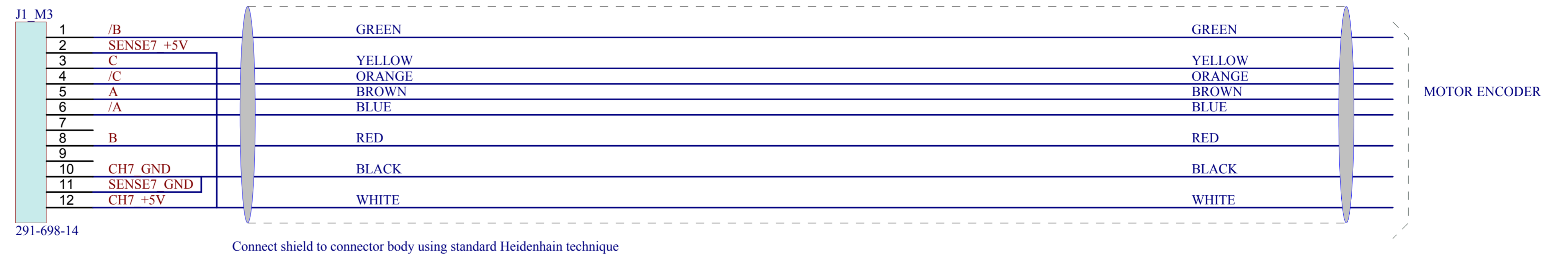
LABEL:  
P1\_M3 ENC  
W241  
to  
J1\_M3 ENC

WIRE TYPE: Heidenhain 244 957-01  
LENGTH: 14M



1 METER Pigtail on Encoder  
Flying Lead

LABEL:  
J1\_M3  
W341



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m3encW141.SCHDOC  
PRINTED 12/8/2009 4:00:38 PM  
TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

3160 E. TRANSCON WAY, Suite 180  
TUCSON, ARIZONA 85706 USA

TITLE

**APF Tertiary Mirror Rotator Encoder**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

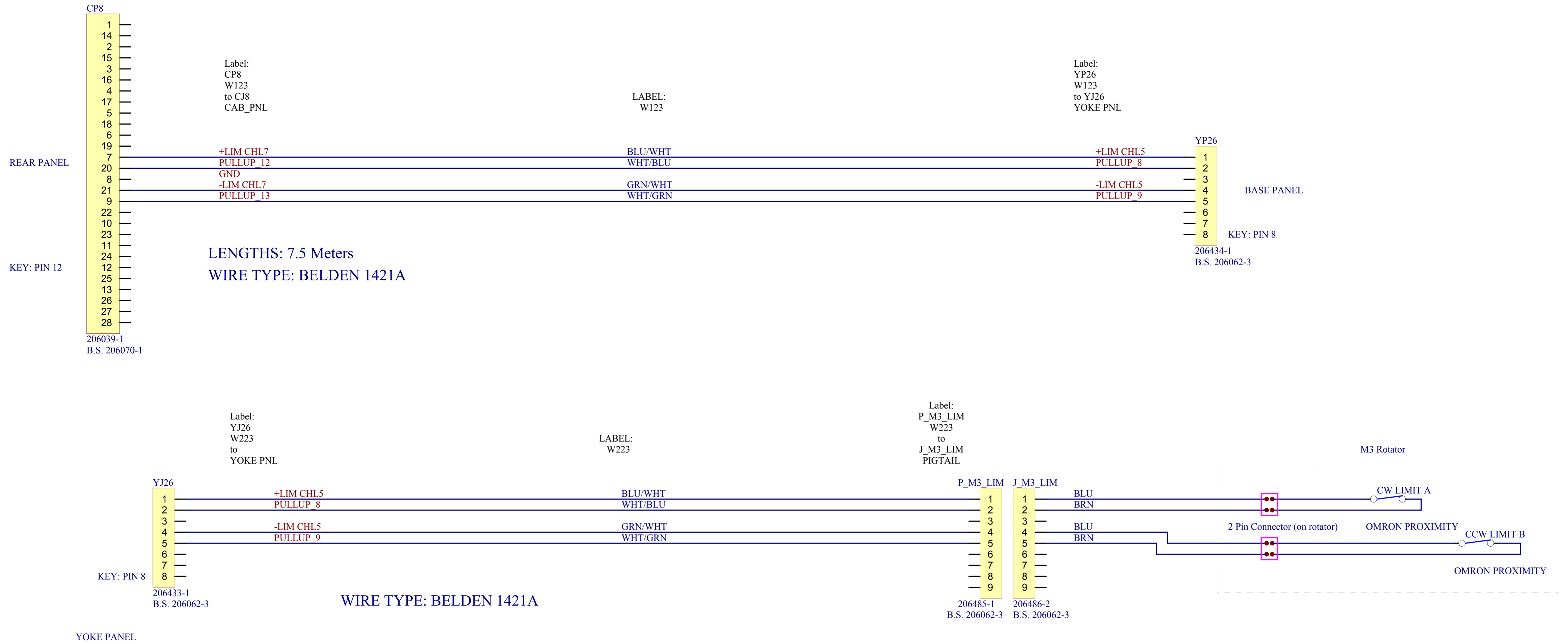
EastConfig

SCH-5376-2

SHEET 22

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# M3 LIMIT SWITCHES



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\m3limW123.SCHDOC  
PRINTED 12/8/2009 4:00:40 PM  
TEMPLATE: Eost\_tabloid\_SUBS

**EOS Technologies, Inc.**

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TUCSON, ARIZONA 85706 USA

TITLE

**APF Tertiary Mirror Rotator Limits**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

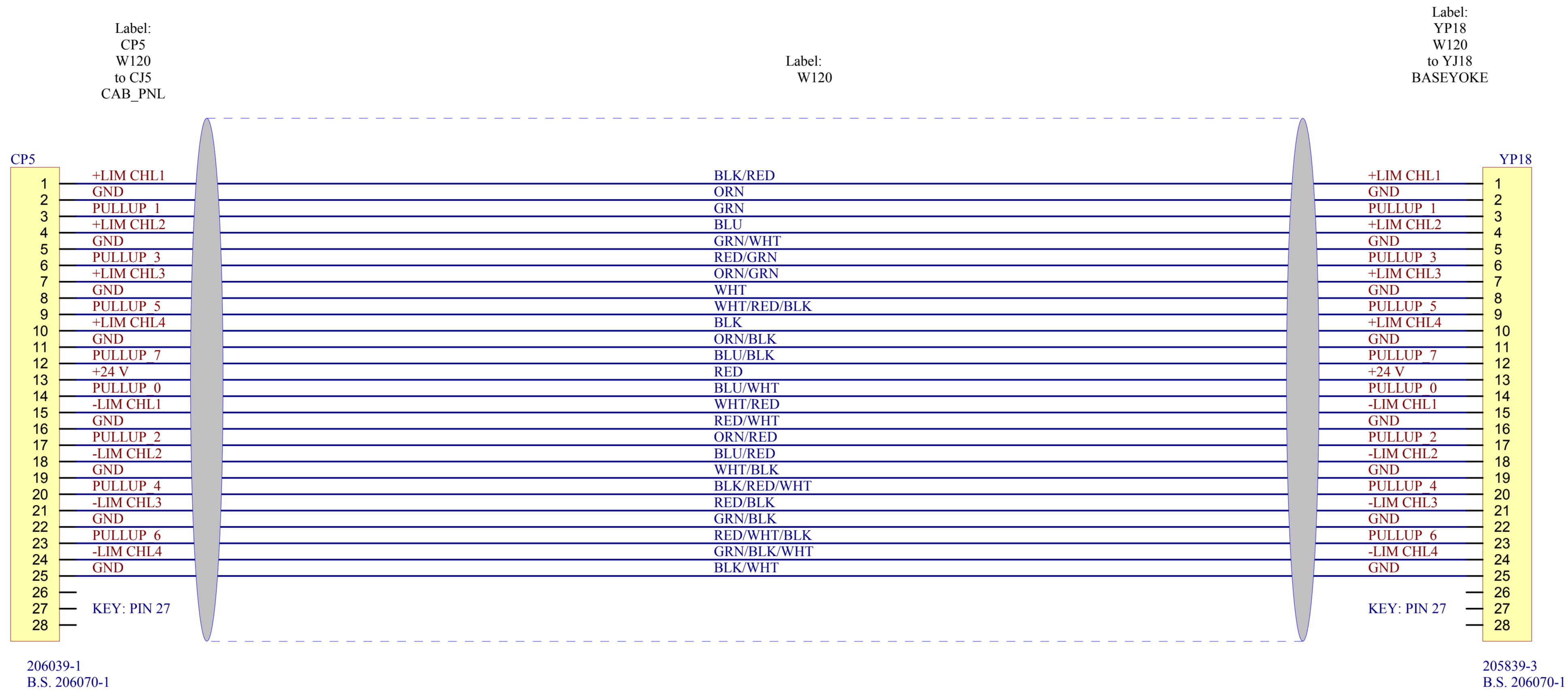
**A3**

EastConfig

SCH-5376-2

SHEET 24 OF 47

## SECONDARY LIMIT INPUTS PMAC LIMIT INPUTS [1..4]



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FILE C:\GGay\Lick Schematics\SCH-5389-2 APF Telescope Cables TEMP\pmaclim14W120.SCHDOC  
PRINTED 12/8/2009 4:00:42 PM  
TEMPLATE: Eost\_tabloid\_SUBS

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TUCSON, ARIZONA 85706 USA

TITLE

**APF M2 EOT Limits**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

SHEET 37

OF 47

## SECONDARY LIMIT INPUTS PMAC LIMIT INPUTS [1..4]

Label:  
YJ18  
W220  
to  
YOKE PNL

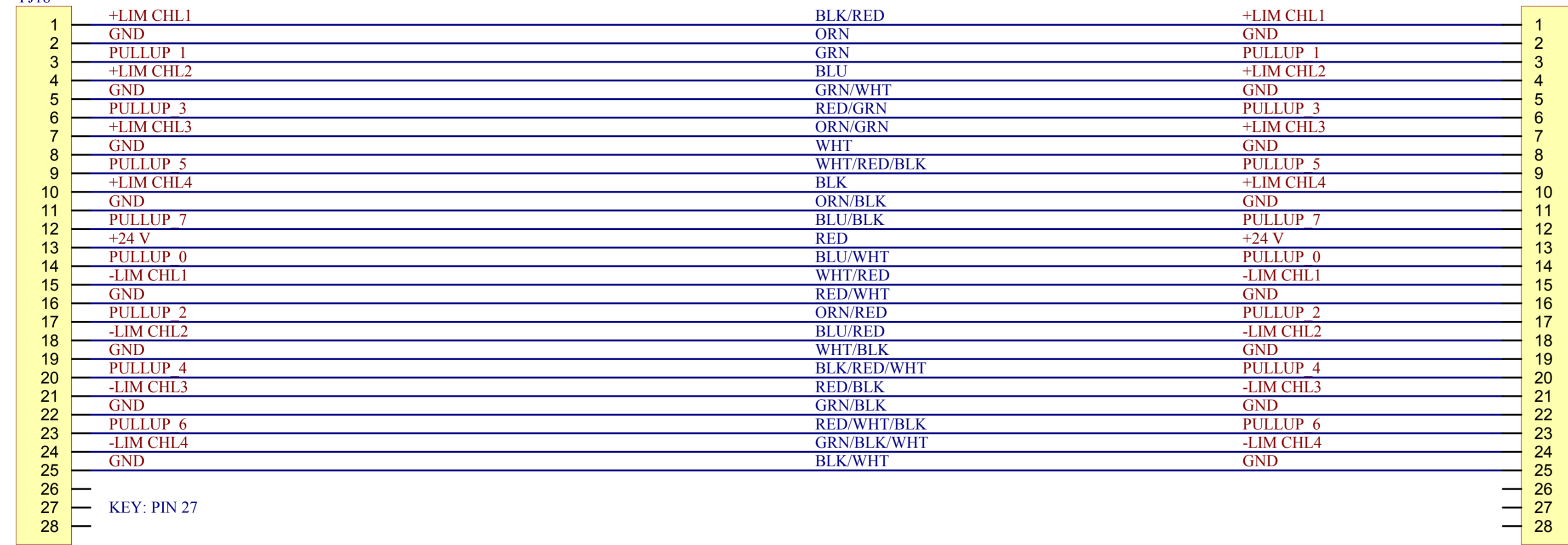
Label:  
W220

Label:  
W220  
CTR SCTN

Label:  
W220  
CTR SCTN

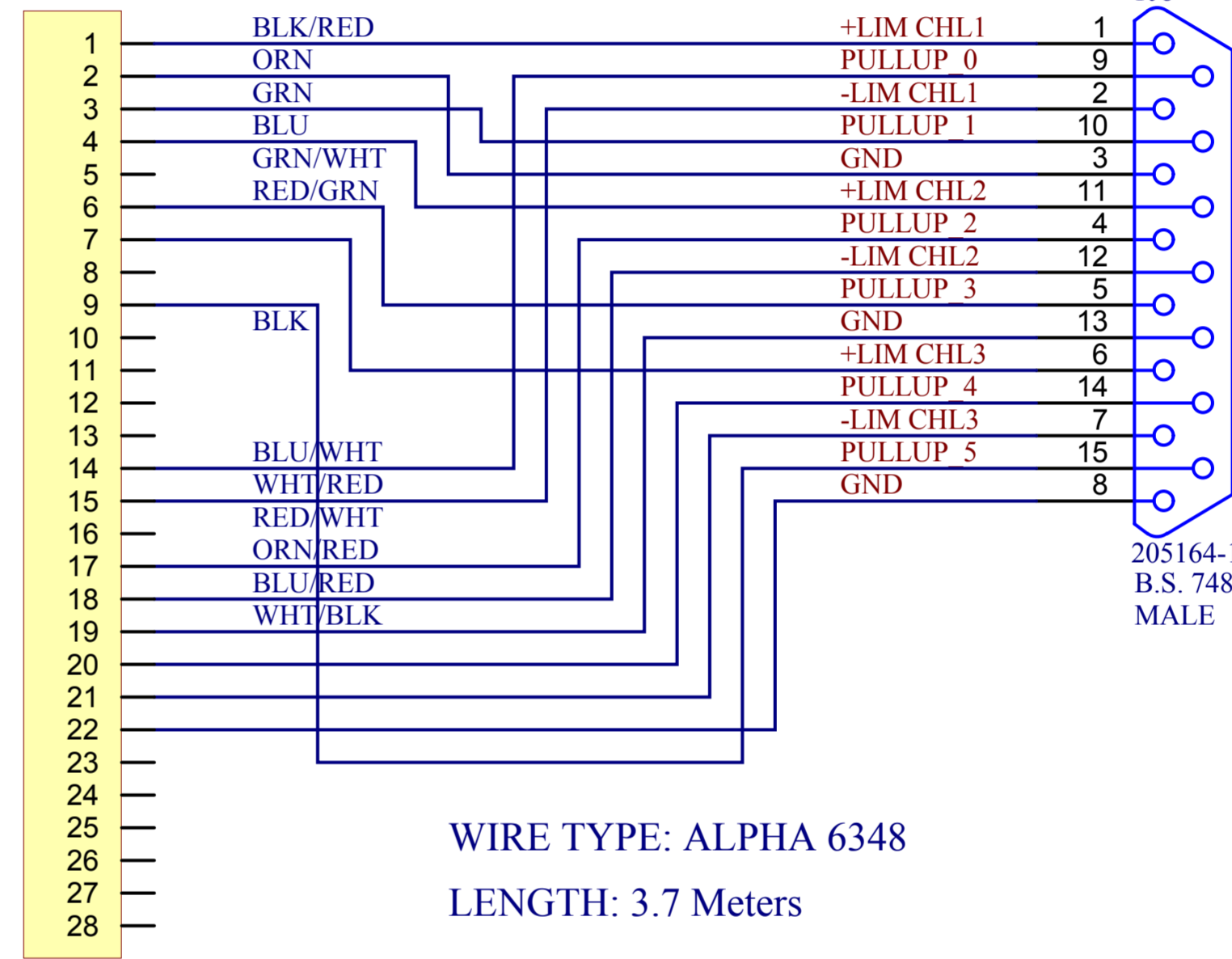
Label:  
TJ8  
W220  
to  
TUBE\_PNL

YJ18



205840-3  
B.S. 206070-1

WIRE TYPE: ALPHA 6348  
LENGTH: 12.35 Meters



206038-2  
B.S. 206070-1

206039-1  
B.S. 206070-1

WIRE TYPE: ALPHA 6348  
LENGTH: 3.7 Meters

205164-1  
B.S. 748677-2  
MALE

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**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

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47

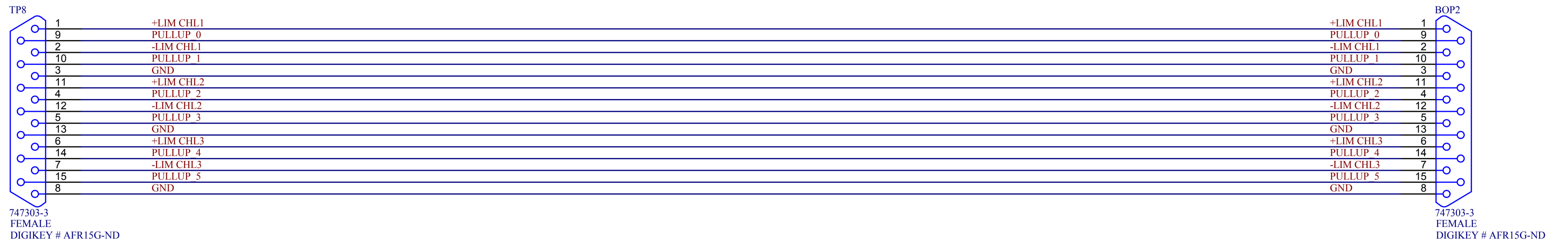
## SECONDARY LIMIT INPUTS

### PMAC LIMIT INPUTS [1..4]

Label:  
TP8  
W320  
to TJ8  
TUBE PNL

Label:  
W320

Label:  
BOP2  
W320  
to  
BOJ2\_M2



WIRE TYPE: 15 CONDUCTOR RIBBON  
LENGTH: 2 Meters

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**APF M2 EOT Limits**

DOCUMENT NUMBER

**SCH-5389-2**

SIZE

**A3**

EastConfig

SCH-5376-2

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