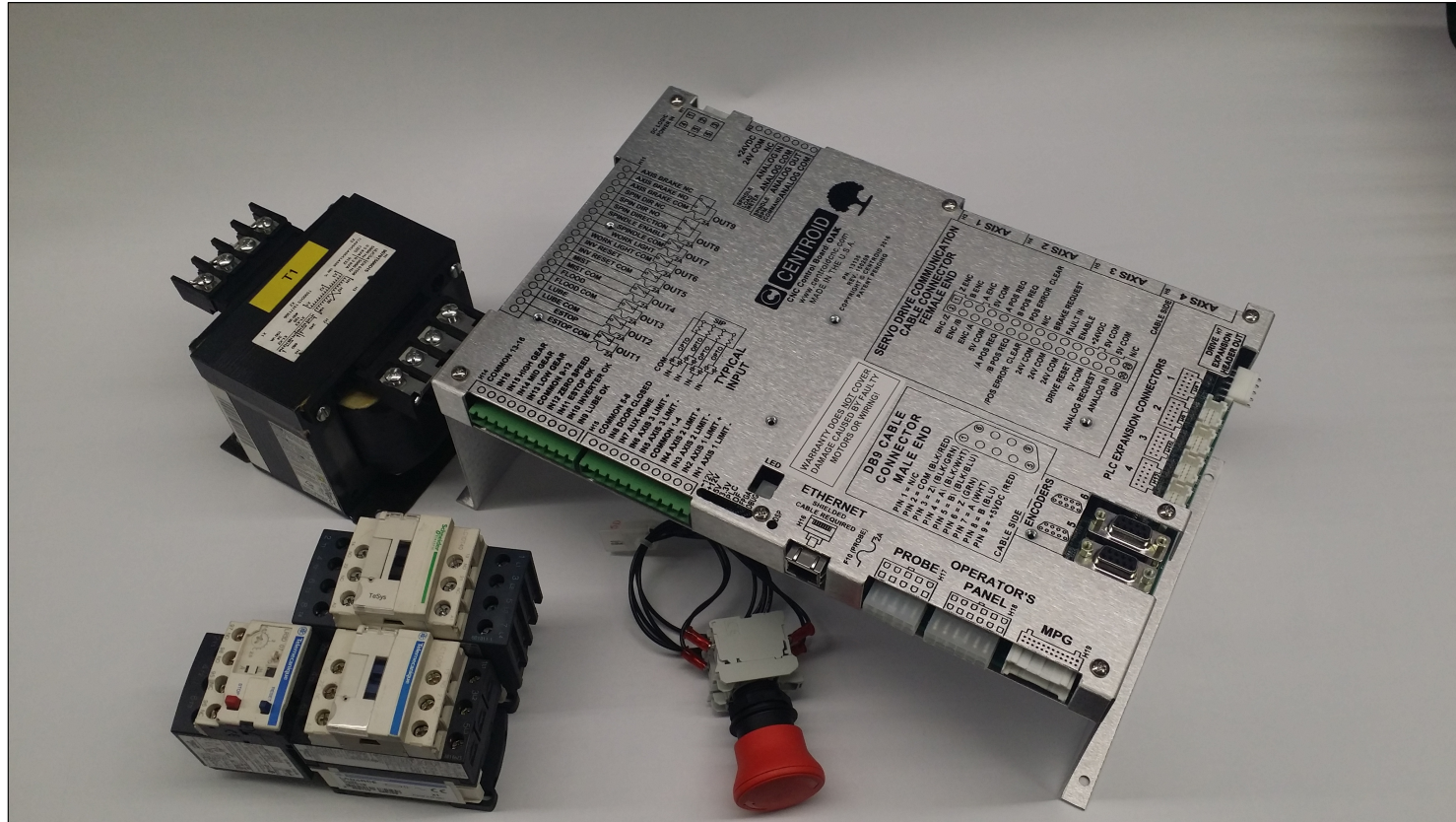




**CENTROID™**

# OAK Individual Circuit Schematic Set



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2ND E-STOP	8	BRAKING MOTOR	16

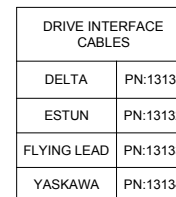
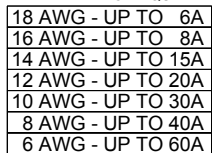
REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGED TITLE/LOGO LAYOUT	SPM
3	6-17-2016	CHANGED WORDING OF SHEET 3 TITLE FOR CONSISTENCY	SPM



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Title  
**OAK INDIVIDUAL CIRCUIT SCHEMATIC SET**

Size <b>A</b>	Serial Number	Rev <b>3</b>
Date 160523	Drawn by SPM	
Filename OAK SET.dwg	Sheet 1 of 16	

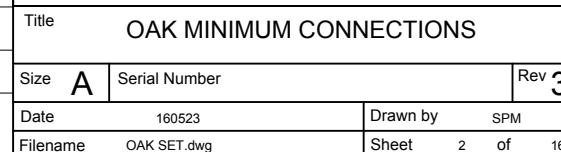


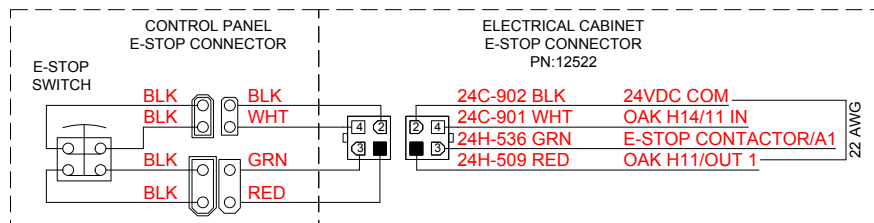
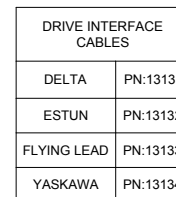
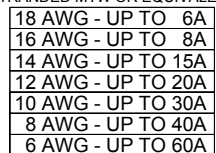
INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

SIP IDENTIFICATION - XXX VALUE

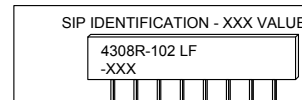
4308R-102 LF  
-XXX

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SP
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION	SP
3	6-28-2016	ADDED NOTE 2 FOR CONTACTOR SNUBBER, & 24V STANDARD NOTE @C2, ADJUSTED GROUND SYMBOL GLOBALLY	SP

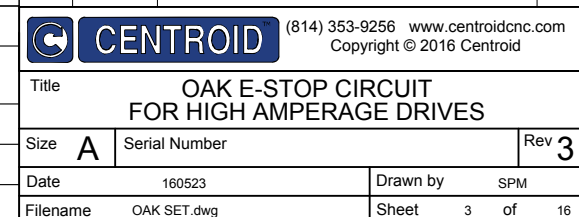




REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION	SPM
3	6-17-2016	ADDED NOTE 2 FOR CONTACTOR SNUBBER, & 24V STANDARD NOTE @C2, CHANGES TO E-STOP CIRCUIT FOR CLARITY	SPM



RESISTOR PACK (SIP) CHART		
INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K



**NOTE 1**  
INPUTS REQUIRE 5, 12, OR 24VDC EXTERNAL POWER SUPPLY. POWER SUPPLY FOR OAK BOARD CAN BE USED. SIP RESISTOR VALUE MUST BE APPROPRIATE FOR INPUT VOLTAGE USED FOR EACH BANK OF 4 INPUTS. (SEE CHART)





A

B

C

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1

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2

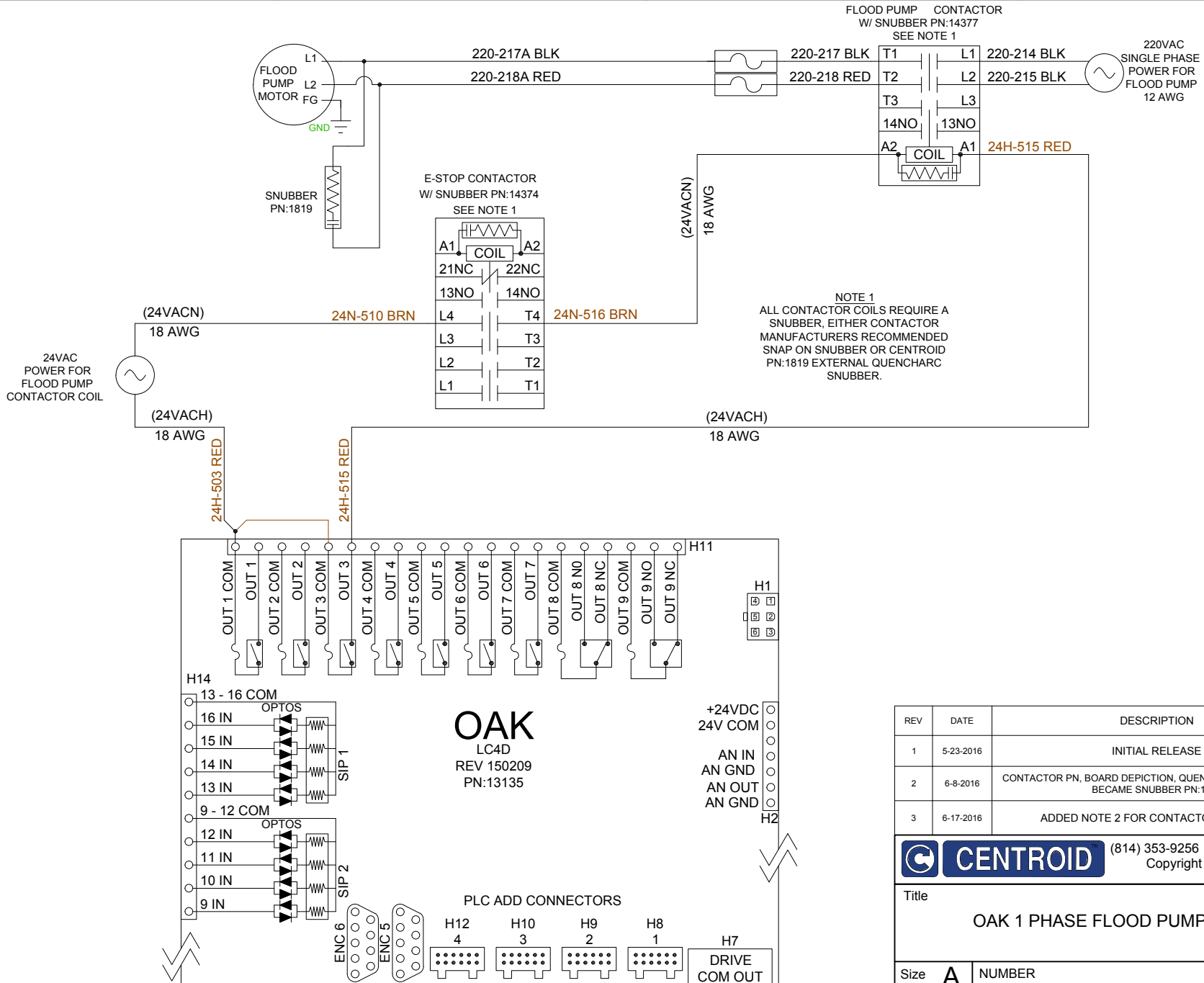
2

3

3

4

4



REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION, QUENCHARC PN:1819 (@B1) BECAME SNUBBER PN:1819	SPM
3	6-17-2016	ADDED NOTE 2 FOR CONTACTOR SNUBBER	SPM

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Title		
OAK 1 PHASE FLOOD PUMP CIRCUIT		
Size	A	NUMBER
Date	160523	Rev 3
Filename	OAK SET.dwg	Sheet 5 of 16



A

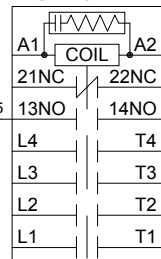
B

C

D

NOTE 1  
ALL CONTACTOR COILS REQUIRE A  
SNUBBER, EITHER CONTACTOR  
MANUFACTURERS RECOMMENDED  
SNAP ON SNUBBER OR CENTROID  
PN:1819 EXTERNAL QUENCHARC  
SNUBBER.

E-STOP CONTACTOR  
W/ SNUBBER PN:14374  
SEE NOTE 1



(RUN)  
22 AWG MIN.

515

514

(INVERTER COMMON)  
22 AWG MIN.

(RUN FORWARD)

515A

22 AWG MIN.

514

SINGLE PHASE  
POWER FOR  
FLOOD PUMP



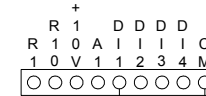
220-215  
220-214



GND

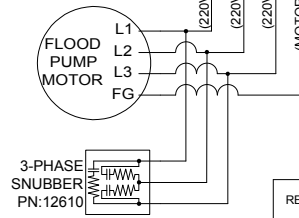
AUTOMATION  
DIRECT  
GS1

CM = INVERTER INPUT COM  
DI1 = RUN FORWARD



L L L G  
1 2 3

T T T G  
1 2 3



(220VAC/L1)  
(220VAC/L2)  
(220VAC/L3)  
(MOTOR GROUND)

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION	SPM
3	6-17-2016	ADDED NOTE 2 FOR CONTACTOR SNUBBER	SPM



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Title		
OAK 1 PHASE TO 3 PHASE FLOOD PUMP CIRCUIT		

Size	A	NUMBER	Rev	3
Date	160523	Drawn by	SPM	
Filename	OAK SET.dwg	Sheet	7 of 16	

A

B

C

D

OAK

LC4D  
REV 150209  
PN:13135

PLC ADD CONNECTORS

H12  
4

H10  
3

H9  
2

H8  
1

H7  
DRIVE  
COM OUT

+24VDC  
24V COM

AN IN  
AN GND  
AN OUT  
AN GND

H2

H1

H11

H14

13 - 16 COM

16 IN

15 IN

14 IN

13 IN

9 - 12 COM

12 IN

11 IN

10 IN

9 IN

ENC 6

ENC 5

ENC 4

ENC 3

ENC 2

ENC 1

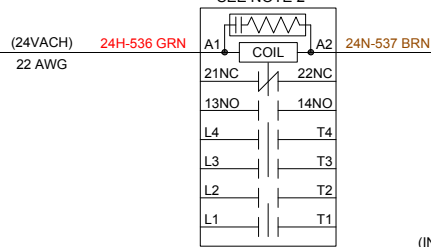
A

B

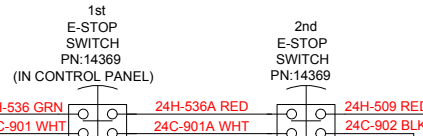
C

D

E-STOP CONTACTOR  
W/ SNUBBER PN:14374  
SEE NOTE 2



(24VACN) 18 AWG  
(24VACH) 18 AWG  
24VAC POWER  
FOR E-STOP  
CONTACTOR  
COIL

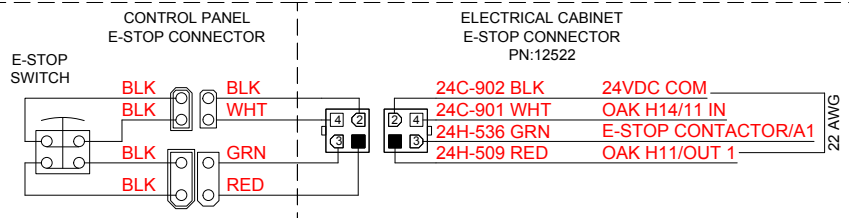
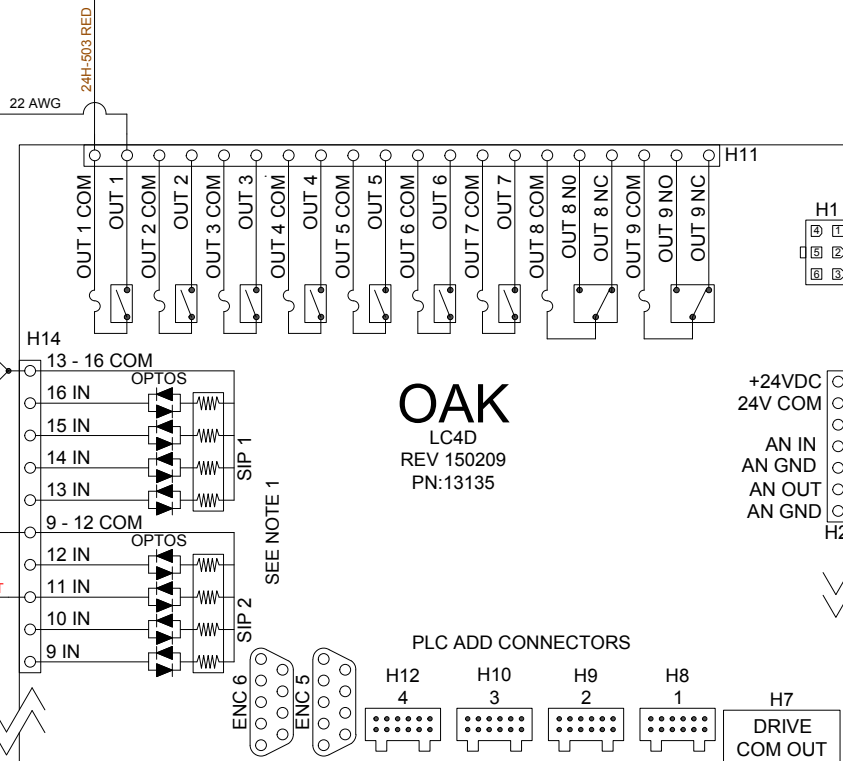


NOTE 2  
ALL CONTACTOR COILS REQUIRE A  
SNUBBER, EITHER CONTACTOR  
MANUFACTURERS RECOMMENDED  
SNAP ON SNUBBER OR CENTROID  
PN:1819 EXTERNAL QUENCHARC  
SNUBBER.

24VDC POWER  
FOR E-STOP  
INPUT

+24VDC CONNECTED TO THE  
INPUT COMMONS WITH THE  
INPUTS PULLED DOWN TO  
24VDC COMMON IS STANDARD  
(SEE NOTE 1)

(24VDC COM) 22 AWG 24C-901 WHT +24-803 YEL



NOTE 1  
INPUTS REQUIRE 5, 12, OR 24VDC EXTERNAL  
POWER SUPPLY. POWER SUPPLY FOR OAK BOARD  
CAN BE USED. SIP RESISTOR VALUE MUST BE  
APPROPRIATE FOR INPUT VOLTAGE USED FOR  
EACH BANK OF 4 INPUTS. (SEE CHART)

SIP IDENTIFICATION - XXX VALUE

4308R-102 LF  
-XXX

RESISTOR PACK (SIP) CHART

INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION	SPM
3	6-17-2016	ADDED NOTE 2 FOR SNUBBER & IN CABINET E-STOP NOTE	SPM



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Title OAK 2ND E-STOP CONNECTION CIRCUIT			
Size	A	NUMBER	Rev 3
Date	160523	Drawn by	SPM
Filename	OAK SET.dwg	Sheet	8 of 16

A

B

C

D



A

B

C

D

1

2

3

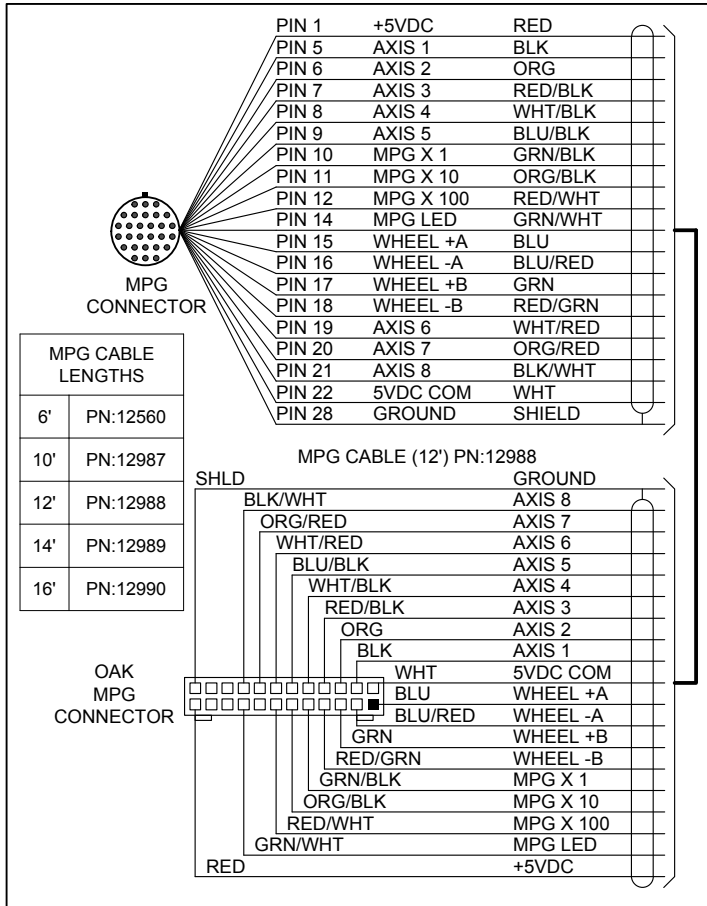
4

1

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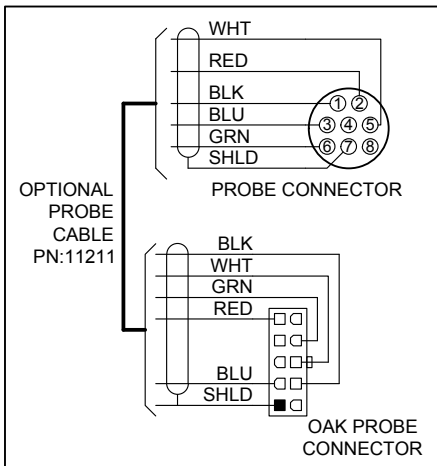
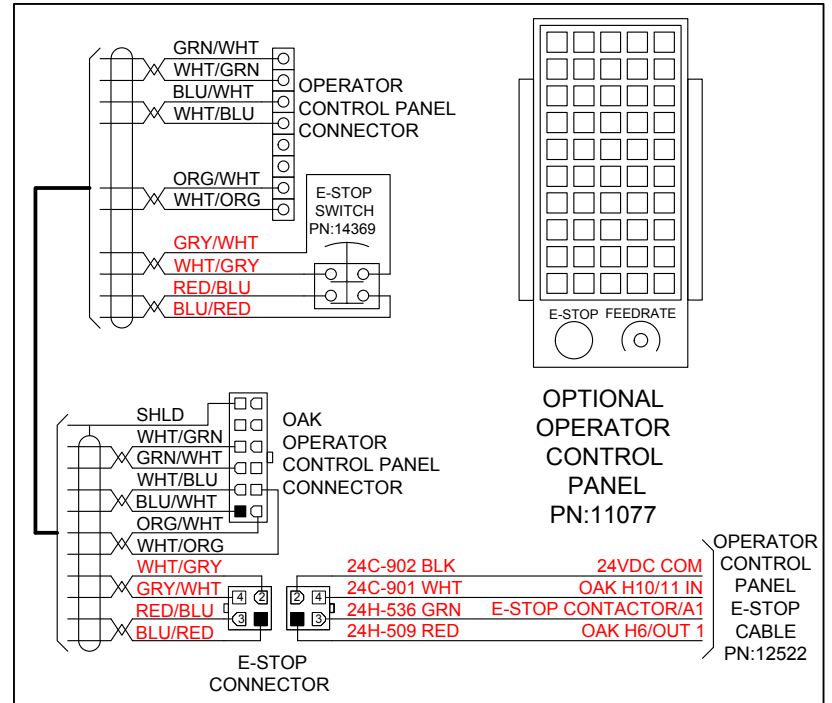
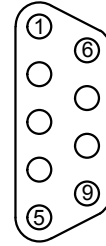
4



## ENCODER CABLE DB9 END

PIN 1 = N/C  
PIN 2 = COM (BLK/RED)  
PIN 3 = Z \ (BLK/GRN)  
PIN 4 = A \ (BLK/WHT)  
PIN 5 = B \ (BLK/BLU)  
PIN 6 = Z (GRN)  
PIN 7 = A (WHT)  
PIN 8 = B (BLU)  
PIN 9 = +5VDC (RED)

CABLE SIDE



## DRIVE INTERFACE CABLE PINOUT

Signal	Color
/Z ENCODER	GRN
/B ENCODER	BLK
/A ENCODER	BLU
5V COM	RED
/A POS. REQUEST	WHT
/B POS. REQUEST	BLK
/POS. ERROR CLEAR	BLU
24V COM	GRN
24V COM	ORG
24V COM	RED
DRIVE RESET	WHT
5V COM	BLK
ANALOG REQUEST	BLU
ANALOG IN	GRN
GND	SHLD

**LOOKING AT FRONT OF CONNECTOR**

CENTROID DRIVE INTERFACE CABLES	
DELTA	PN:13131
ESTUN	PN:13132
FLYING LEAD	PN:13133
YASKAWA	PN:13134

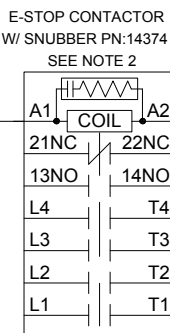
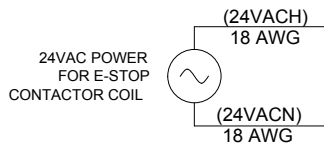
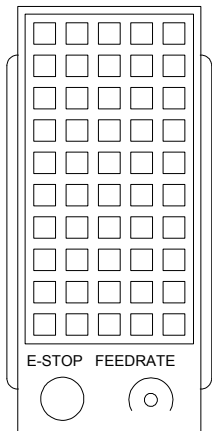
REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO STANDARD	SPM



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Title			
OAK CABLES			
Size	A	NUMBER	Rev 2
Date	160523	Drawn by	SPM
Filename	OAK SET.dwg	Sheet	9 of 16

# OPERATORS CONTROL PANEL PN:11077



24H-536 GRN

(24VACH)  
22 AWG

OPERATOR  
CONTROL PANEL  
CABLE CONNECTOR

24VDC POWER  
FOR E-STOP  
INPUT



SHLD

GRN/WHT  
WHT/GRN  
WHT/BLU  
BLU/WHT  
ORG/WHT  
WHT/ORG

OAK  
OPERATOR CONTROL  
PANEL  
CONNECTOR

WHT/GRY  
GRY/WHT  
RED/BLU  
BLU/RED

24C-901 WHT  
24C-902 BLK  
24H-536 GRN  
24H-509 RED

ELECTRICAL CABINET  
E-STOP CONNECTOR

NOTE 2  
ALL CONTACTOR COILS REQUIRE A  
SNUBBER, EITHER CONTACTOR  
MANUFACTURERS RECOMMENDED  
SNAP ON SNUBBER OR CENTROID  
PN:1819 EXTERNAL QUENCHARC  
SNUBBER.

NOTE 1  
INPUTS REQUIRE 5, 12, OR 24VDC  
EXTERNAL POWER SUPPLY. POWER  
SUPPLY FOR OAK BOARD CAN BE USED.  
SIP RESISTOR VALUE MUST BE  
APPROPRIATE FOR INPUT VOLTAGE  
USED FOR EACH BANK OF 4 INPUTS.  
(SEE CHART)

+24-803 YEL

(+24VDC)  
18 AWG

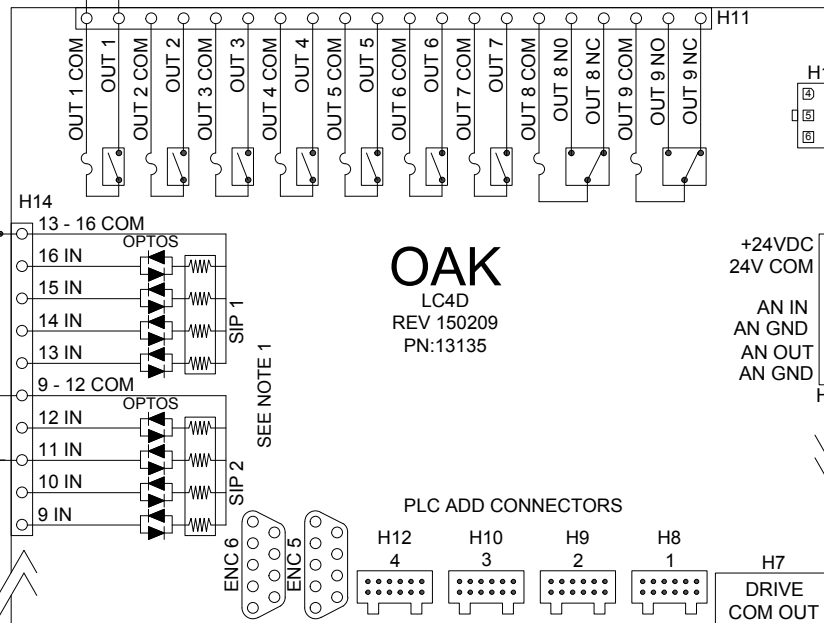
(24VDC COM)  
22 AWG

(24VDC COM)  
22 AWG

(24VACH)  
22 AWG

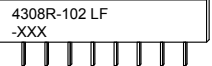
24H-503 RED

24H-509 RED



+24VDC CONNECTED TO THE  
INPUT COMMONS WITH THE  
INPUTS PULLED DOWN TO  
24VDC COMMON IS STANDARD  
(SEE NOTE 1)

SIP IDENTIFICATION - XXX VALUE



RESISTOR PACK (SIP) CHART

INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CONTACTOR PN, BOARD DEPICTION	SPM
3	6-28-2016	ADDED NOTE 2 FOR CONTACTOR SNUBBER, ADJUSTED TEXT OF CONTROL PANEL CONNECTOR WIRE LABELS	SPM

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Title OAK OPERATOR CONTROL PANEL CIRCUIT			
Size A	NUMBER		Rev 3
Date 160523	Drawn by SPM		
Filename OAK SET.dwg	Sheet 10 of 16		

A

B

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D

1

1

2

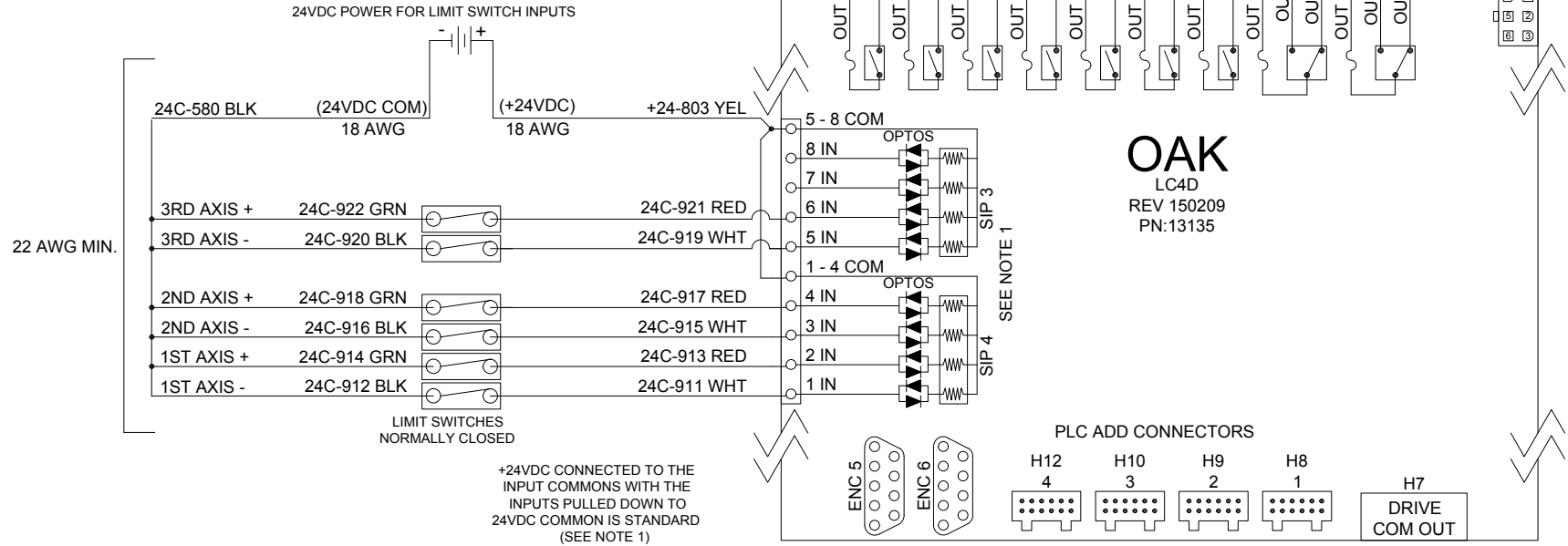
2

3

3

4

4



## SIP IDENTIFICATION - XXX VALUE

4308R-102 LF  
-XXX

## RESISTOR PACK (SIP) CHART

INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

## NOTE 1

INPUTS REQUIRE 5, 12, OR 24VDC EXTERNAL POWER SUPPLY. POWER SUPPLY FOR OAK BOARD CAN BE USED. SIP RESISTOR VALUE MUST BE APPROPRIATE FOR INPUT VOLTAGE USED FOR EACH BANK OF 4 INPUTS. (SEE CHART)

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO BOARD DEPICTION, SWITCH ALIGNMENT	SPM

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Title

OAK LIMIT SWITCH CIRCUIT

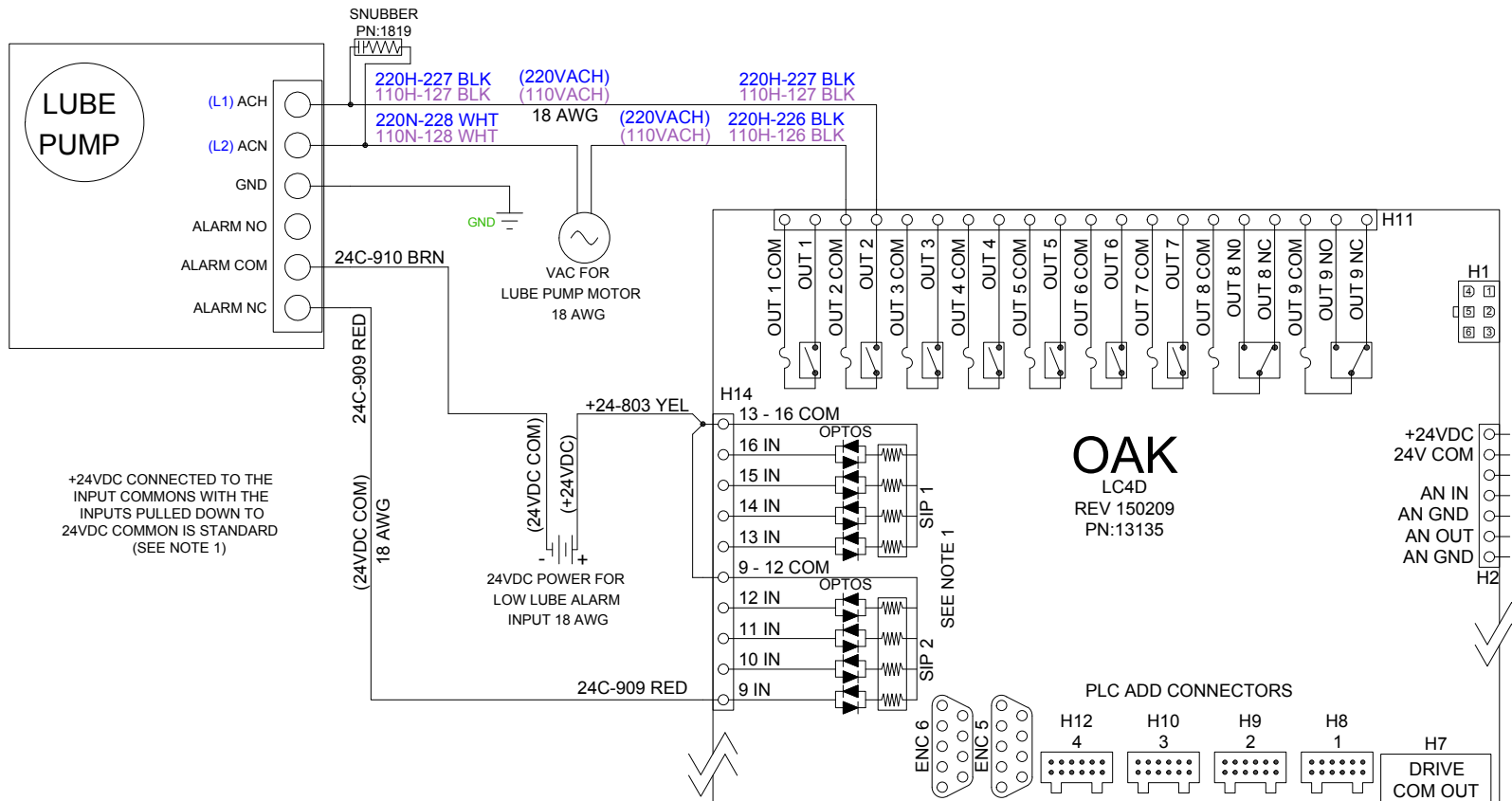
Size	A	NUMBER	Rev	2
Date	160523	Drawn by	SPM	
Filename	OAK SET.dwg	Sheet	11 of 16	

A

B

C

D



+24VDC CONNECTED TO THE INPUT COMMONS WITH THE INPUTS PULLED DOWN TO 24VDC COMMON IS STANDARD (SEE NOTE 1)

24VDC POWER FOR LOW LUBE ALARM INPUT 18 AWG

**OAK**  
LC4D  
REV 150209  
PN:13135

PLC ADD CONNECTORS

+24VDC  
24V COM  
AN IN  
AN GND  
AN OUT  
AN GND

SIP IDENTIFICATION - XXX VALUE

4308R-102 LF  
-XXX

RESISTOR PACK (SIP) CHART

INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

NOTE 1

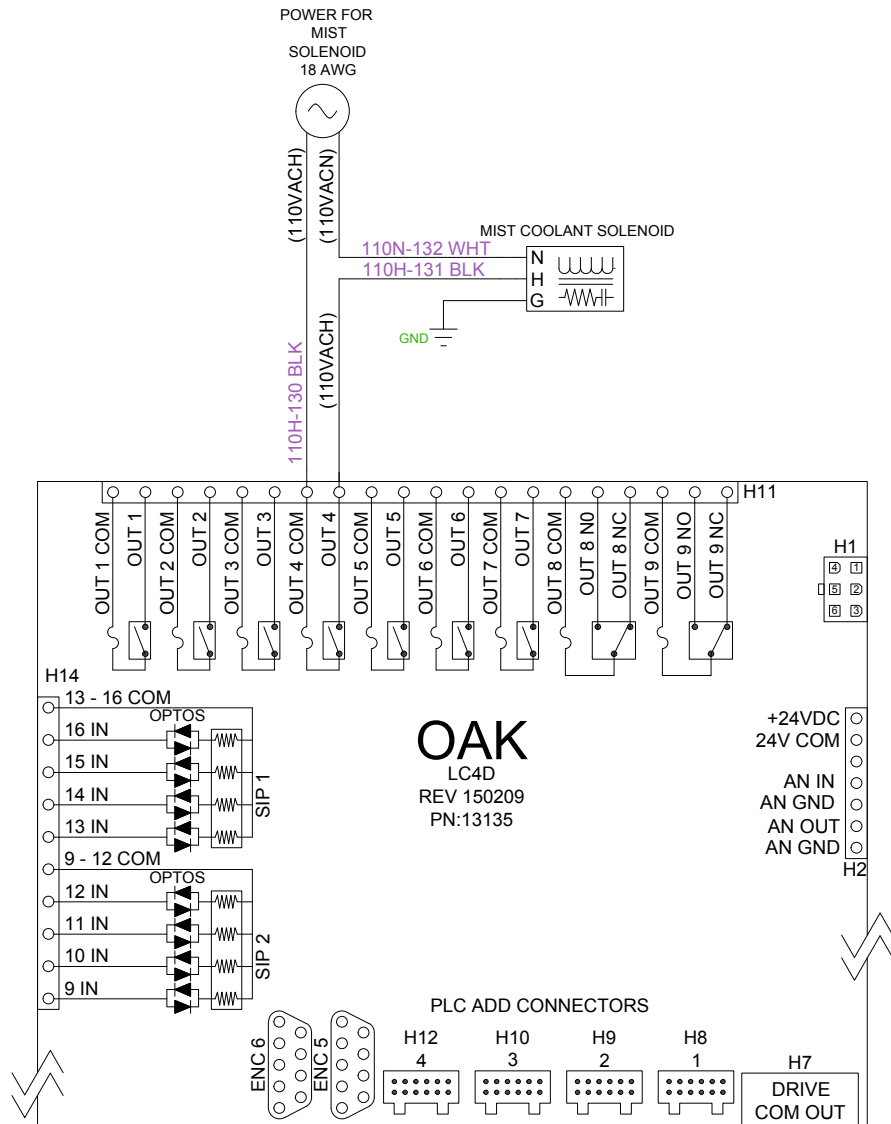
INPUTS REQUIRE 5, 12, OR 24VDC EXTERNAL POWER SUPPLY. POWER SUPPLY FOR OAK BOARD CAN BE USED. SIP RESISTOR VALUE MUST BE APPROPRIATE FOR INPUT VOLTAGE USED FOR EACH BANK OF 4 INPUTS. (SEE CHART)

REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO BOARD DEPICTION	SPM

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Title <b>OAK LUBE PUMP CIRCUIT</b>			
Size <b>A</b>	NUMBER	Rev <b>2</b>	
Date	160523	Drawn by	SPM
Filename	OAK SET.dwg	Sheet	12 of 16





REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO BOARD DEPICTION	SPM



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Title	
OAK 110VAC MIST COOLANT CIRCUIT	

Size	A	NUMBER	Rev	2
Date	160523	Drawn by	SPM	
Filename	OAK SET.dwg	Sheet	13 of 16	

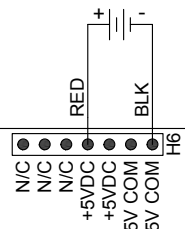
A

B

C

D

USE ONE RT-50B (PN:7820) TO  
POWER UP TO 3 PLCADD1616'S

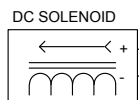
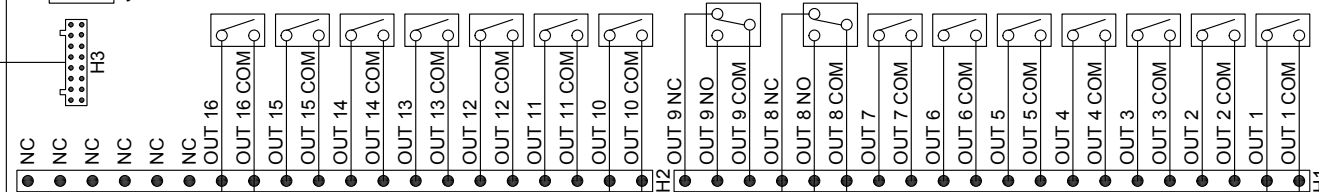


**PLCADD1616**  
REV 090306  
PN:11025

RELAYS RATED FOR 5A (NO) /3A (NC)  
AT 30 VDC/277VAC

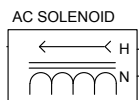


COMMUNICATION  
CABLE PN:11071



DC VOLTAGE  
30VDC 5A MAX

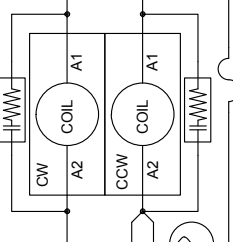
FUSE



AC VOLTAGE  
277VAC 5A MAX

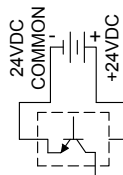
FUSE

CONTACTOR COILS

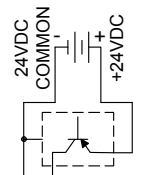


AC VOLTAGE FOR  
CONTACTOR COILS

SINKING (NPN)  
SENSOR



SOURCING (PNP)  
SENSOR



SIP IDENTIFICATION - XXX VALUE

4308R-102 LF  
-XXX

RESISTOR PACK (SIP) CHART

INPUT VOLTAGE	SIP MARKING "XXX"	VALUE (OHMS)
5	471	470
12	102	1.0K
24	222	2.2K

#### NOTE 1

INPUTS REQUIRE 5, 12, OR  
24VDC EXTERNAL POWER  
SUPPLY.  
POWER SUPPLY FOR OAK BOARD  
CAN BE USED.  
SIP RESISTOR VALUE MUST BE  
APPROPRIATE FOR INPUT  
VOLTAGE USED FOR EACH BANK  
OF 4 INPUTS. (SEE CHART)

+24VDC CONNECTED TO THE  
INPUT COMMONS WITH THE  
INPUTS PULLED DOWN TO  
24VDC COMMON IS STANDARD  
(SEE NOTE 1)



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Title

**PLCADD1616 CIRCUIT EXAMPLES**

Size **A**

NUMBER

Rev **2**

Date 160523

Drawn by SPM

Filename OAK SET.dwg

Sheet 14 of 16

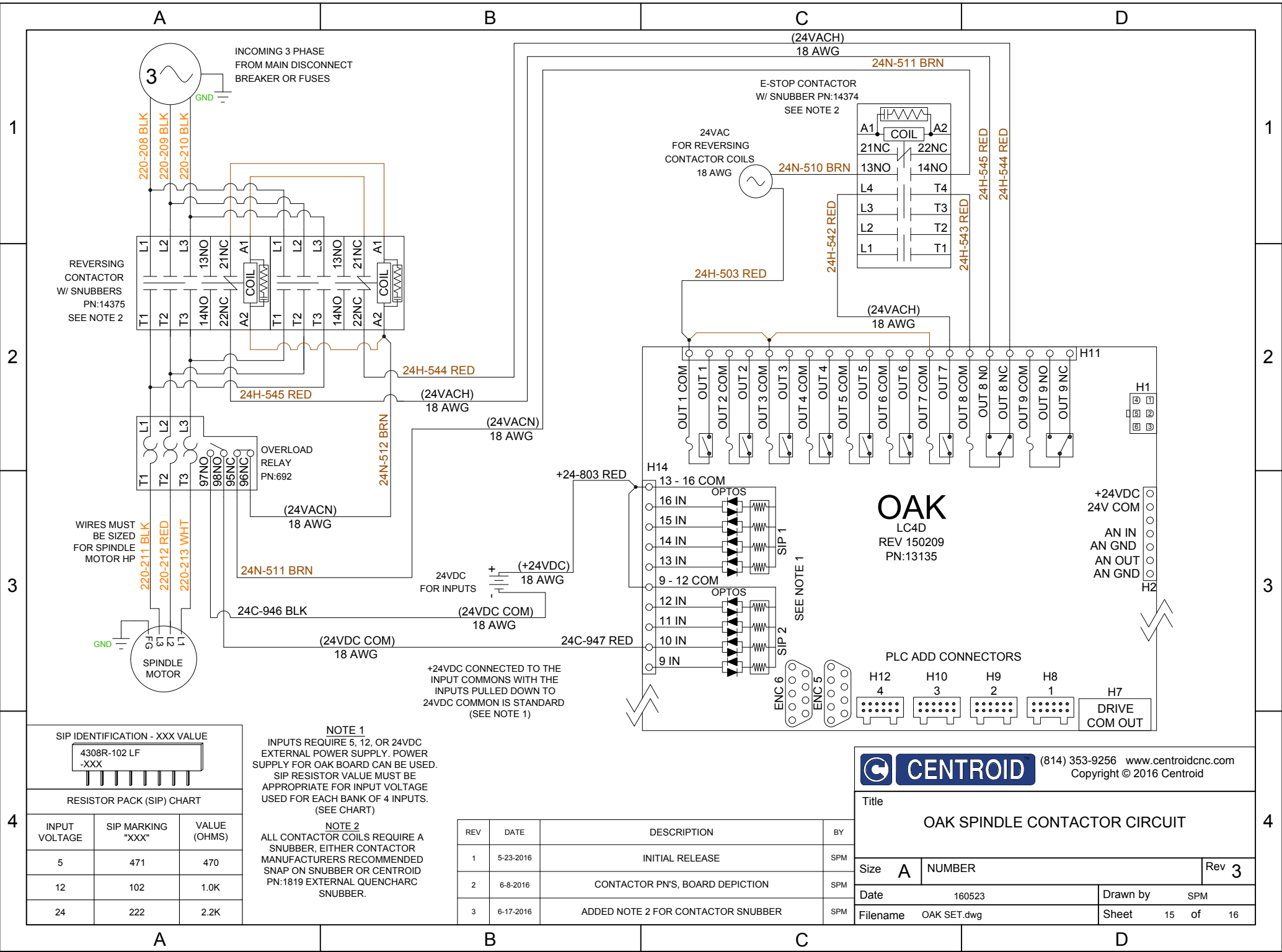
REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO BOARD DEPICTION	SPM

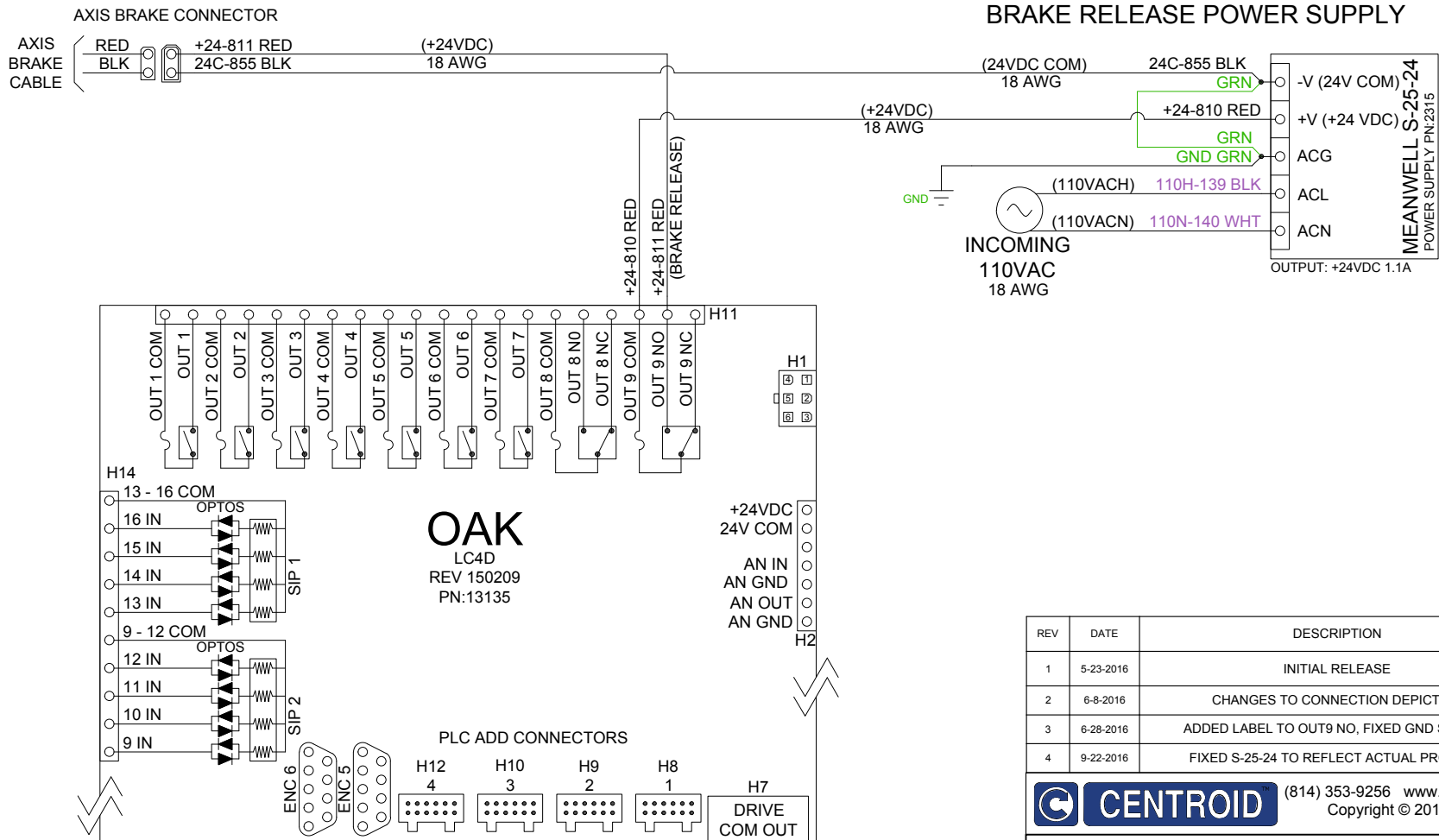
A

B


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REV	DATE	DESCRIPTION	BY
1	5-23-2016	INITIAL RELEASE	SPM
2	6-8-2016	CHANGES TO CONNECTION DEPICTION	SPM
3	6-28-2016	ADDED LABEL TO OUT9 NO, FIXED GND SYMBOL	SPM
4	9-22-2016	FIXED S-25-24 TO REFLECT ACTUAL PRODUCT	DRS

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Title OAK BRAKING MOTOR CONNECTIONS			
Size	A	NUMBER	Rev 4
Date	160523		Drawn by SPM
Filename	OAK SET.dwg		Sheet 16 of 16