#08031

Valley Farms

Main

4 RSPH w/65" AH

EATON | Hydraulics

Electronic Proportional (EP) Control for Heavy Duty Series 2 Piston Pumps

Model 33
Model 39
Model 46
Model 54
Model 64

1/5/07

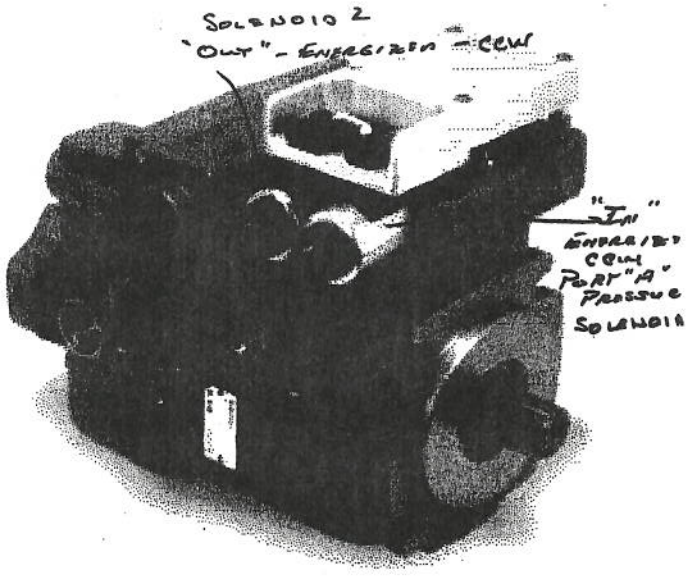
The Electronic Proportional (EP) Control is ideal for a wide range of mobile and industrial applications where electrical control of pump displacement is desired. Eaton's robust design incorporates an electronic module, proportional solenoids and a valve assembly.

Pump displacement is controlled by an input command signal which is converted into proportional current output by the electronic module. The proportional solenoid-actuated valve assembly then converts the current output into proportional pump displacement.

Designed to meet the rigorous duty cycle requirements of off-highway equipment, the EP Control utilizes an electronic module encapsulated in an aluminum enclosure and environmentally-sealed Metri-Pack® connectors to assure maximum protection from the elements. The EP Control is designed to resist Electromagnetic Interference (EMI) which could affect proper operation.

The EP Control offers maximum design and application flexibility with two different types of command input options and compatibility with both 12 and 24 Vdc power supplies. Typical input devices include joysticks (1-6 Vdc) and PLCs (±4-20 mA).

For precise, repeatable operation, closed-loop current control is used to compensate for resistance and voltage changes of the proportional solenoids due to temperature variation. In the event of a power loss or loss of signal, the EP Control automatically returns the pump to neutral. Mechanical feedback of the swashplate position provides closed-loop control to maintain the selected displacement setting over a wide range of operating conditions. Solenoids have integral manual override actuators.



EP Control Features

- Robust, flexible electronic pump control
- Electronic module encapsulated for environmental protection
- Automotive style environmentally sealed Metri-Pack® connectors
- Closed-loop current control compensates for resistance change of the proportional solenoids due to temperature variations
- Return to neutral for loss of power or loss of command input signal
- Mechanical feedback of swashplate position for closed-loop control
- Two choices for command input signal
- Operates from 12 or 24 Vdc power supply
- Ease of installation
- Operating temperature range -40° to +85° C
- On-pump mounting for many installations
- External neutral adjustment
- Manual override capability
- Drive module qualification per SAE J1455, SAE J1113, CISPR 25
- External fuse (customer supplied): 3A

Electronic Module Qualification

(Contact Eaton for Specific Levels)

- *SAE J1455 - Recommended Environmental Practices for Electronic Equipment Design*
  - Humidity/Temperature Extreme Cycling
  - Salt Spray
  - Splash & Immersion
  - Steam Cleaning/High Pressure Wash
  - Vibration
  - Mechanical Shock
  - Temperature Cycling
  - Load Dump Transients
  - Inductive Load Switching Transients
- *SAE J1113 - Electromagnetic Susceptibility Measurement Procedures for Vehicle Components*
  - EMI/EMC - Conducted & Radiated Immunity
- *CISPR 25 - International Electrotechnical Commission "Limits and Methods of Measurement of Radio Disturbance Characteristics for the Protection of Receivers used on Board Vehicles"*
  - EMI/EMC - Conducted & Radiated Emissions

EATON | Hydraulics

Electronic Proportional (EP) Control for Medium Duty 72400 Piston Pumps

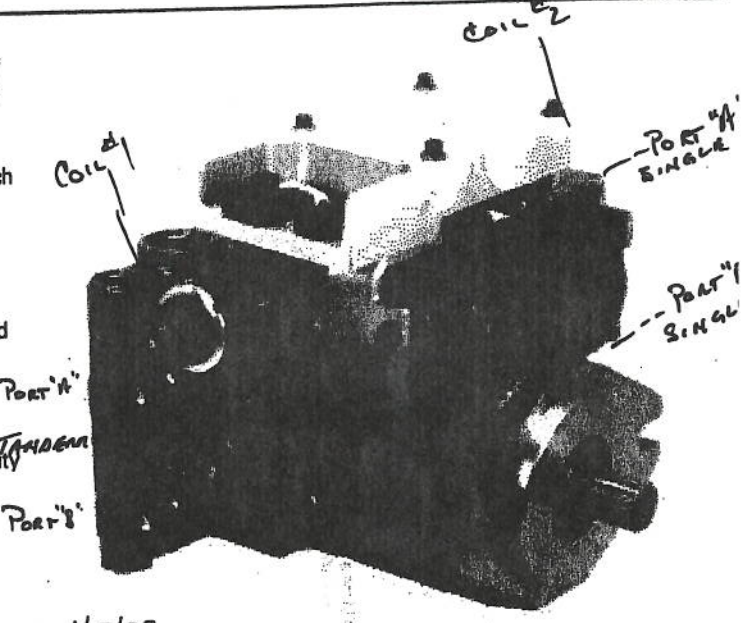
The Electronic Proportional (EP) Control is ideal for a wide range of mobile and industrial applications where electrical control of pump displacement is desired. Eaton's robust design incorporates an electronic module, proportional solenoids and a valve assembly.

Pump displacement is controlled by an input command signal which is converted into proportional current output by the electronic module. The proportional solenoid-actuated valve assembly then converts the current output into proportional pump displacement.

Designed to meet the rigorous duty cycle requirements of off-highway equipment, the EP Control utilizes an electronic module encapsulated in an aluminum enclosure and environmentally-sealed Metri-Pack® connectors to assure maximum protection from the elements. The EP Control is designed to resist Electromagnetic Interference (EMI) which could affect proper operation.

The EP Control offers maximum design and application flexibility with two different types of command input options and compatibility with both 12 and 24 Vdc power supplies. Typical input devices include joysticks (1-6 Vdc) and PLCs (±4-20 mA).

For precise, repeatable operation, closed-loop current control is used to compensate for resistance and voltage changes of the proportional solenoids due to temperature variation. In the event of a power loss or loss of signal, the EP Control automatically returns the pump to neutral. Mechanical feedback of the swashplate position provides closed-loop control to maintain the selected displacement setting over a wide range of operating conditions. Solenoids have integral manual override actuators.



1/5/07
Energized - Coil
#1 Coil Next To Pressure Ports - "In"
Pressure Out Port "A"
#2 Coil Away From Ports - "Out"

EP Control Features

- Robust, flexible electronic pump control
- Electronic module encapsulated for environmental protection
- Automotive style environmentally sealed Metri-Pack® connectors
- Closed-loop current control compensates for resistance change of the proportional solenoids due to temperature variations
- Return to neutral for loss of power or loss of command input signal
- Mechanical feedback of swashplate position for closed-loop control
- Two choices for command input signal
- Operates from 12 or 24 Vdc power supply
- Ease of installation
- Operating temperature range -40° to +85° C
- On-pump mounting for many installations
- External neutral adjustment
- Manual override capability
- Drive module qualification per SAE J1455, SAE J1113, CISPR 25
- External fuse (customer supplied): 3A

Electronic Module Qualification
(Contact Eaton for Specific Levels)

- *SAE J1455 - Recommended Environmental Practices for Electronic Equipment Design*
  - Humidity/Temperature Extreme Cycling
  - Salt Spray
  - Splash & Immersion
  - Steam Cleaning/High Pressure Wash
  - Vibration
  - Mechanical Shock
  - Temperature Cycling
  - Load Dump Transients
  - Inductive Load Switching Transients
- *SAE J1113 - Electromagnetic Susceptibility Measurement Procedures for Vehicle Components*
  - EMI/EMC - Conducted & Radiated Immunity
- *CISPR 25 - International Electrotechnical Commission "Limits and Methods of Measurement of Radio Disturbance Characteristics for the Protection of Receivers used on Board Vehicles"*
  - EMI/EMC - Conducted & Radiated Emissions

)UTPUT
ELECTION

ARAMETER
ELECTION

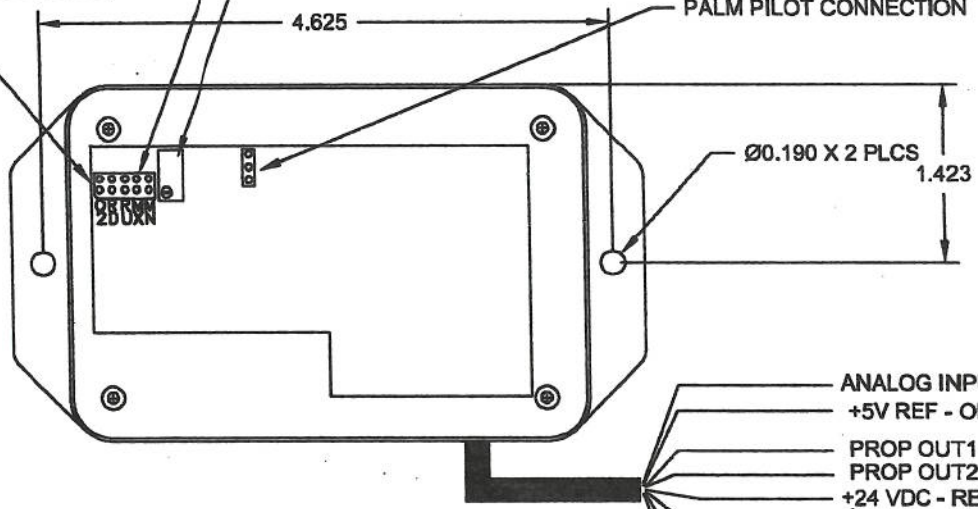
MN	= ADJUST MINIMUM SETTING
MX	= ADJUST MAXIMUM SETTING
RMP UX	= ADJUST RAMP UP SETTING
RMP DN	= ADJUST RAMP DOWN SETTING
O2	= OUTPUT SELECTION (1 OR 2)

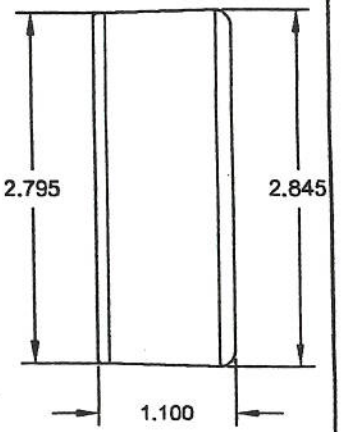
Jumper

FUNCTION SELECT JUMPERS

ADJUSTMENT POTENTIOMETER

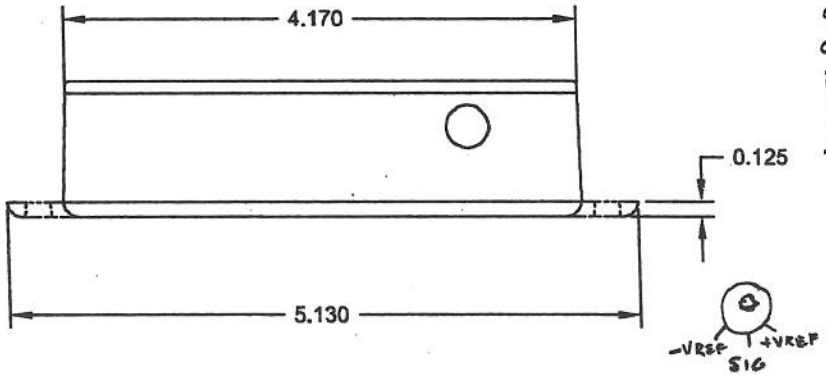
PALM PILOT CONNECTION





ANALOG INPUT - BLUE
+5V REF - ORANGE
PROP OUT1 - GREEN
PROP OUT2 - YELLOW
+24 VDC - RED
GROUND - BLACK
PROP 1 REDUCTION - PURPLE
PROP 2 REDUCTION - WHITE

BLUE TO POT SIGNAL
ORANGE TO POT +VREF W/ 2K RESISTOR
GREEN TO PIN C COIL #2
RED TO PANEL 12VDC
BLACK TO PANEL GROUND
-VREF ON POT TO PANEL GROUND W/ 10K RESISTOR



REF: KAR-TECH

PROPORTIONAL OUTPUT SETTINGS ARE CHANGEABLE
THOUT THE PALM PILOT UTILIZING THE ON-BOARD
MPERS AND ADJUSTMENT POTENTIOMETER. USE THE
LLOWING PROCEDURE:

SELECT WHICH OUTPUT'S PARAMETERS TO CHANGE
USING THE "O2" SHORTING JUMPER. WHEN THE "O2"
IS ARE SHORTED USING THE JUMPER, PROPORTIONAL
TPUT #2 IS SELECTED. WHEN THE PINS ARE NOT
ORTED TOGETHER, OUTPUT 1 IS SELECTED.

SELECT THE DESIRED PARAMETER TO CHANGE BY
STALLING A SHORTING JUMPER ON THE
RRESPONDING SET OF PINS AS SHOWN ABOVE:

N" TO ADJUST THE MINIMUM PROPORTIONAL OUTPUT
TTING. SET ANALOG INPUT SIGNAL(POTENTIOMETER,
YSTICK) TO IT'S LOWEST POSITION, ADJSUT "MN" AND
ONITOR OUTPUT TO VALVE FOR DESIRED VALUE.

X" TO ADJUST THE MAXIMUM PROPORTIONAL OUTPUT
TTING, SET ANALOG INPUT SIGNAL(POTENTIOMETER,
YSTICK) TO IT'S MAXIMUM POSITION, ADJSUT "MX" AND
ONITOR OUTPUT TO VALVE FOR DESIRED VALUE.

U" TO ADJUST THE RAMP UP SETTING,
D" TO ADJUST THE RAMP DOWN SETTING,

) ADJUST THE VALUE TO THE DESIRED SETTING USING
HE ADJUSTMENT POTENTIOMETER SHOWN ON THE
RAWING.

) SAVE THE PARAMETER BY REMOVING THE JUMPER
ROM THE SELECTED PARAMETER PINS. DO NOT
HANGE THE STATE OF THE "O2" PINS BEFORE
EMOVING THE JUMPER FROM THE PARAMETER PINS
R THE SETTING MAY NOT BE SAVED IN MEMORY.

) REPEAT PROCEDURE TO CHANGE ANY AND ALL
ARAMETERS FOR THE 2 PROPORTIONAL OUTPUTS.
EMEMBER TO REMOVE THE PARAMETER JUMPER
EFORE SELECTING WHICH OUTPUT TO CHANGE USING
HE "O2" JUMPER.

.) REMOVE BOTH JUMPERS AND PLACE HORIZONTALLY
OR STORAGE ON TWO ADJACENT PINS

EE MANUAL FOR INSTRUCTIONS ON HOW TO SET THE
ARAMETERS USING A PALM PILOT.

REV	BY	DATE	DESCRIPTION
A	AJL	02-02-05	RELEASED

DO NOT SCALE PRINT

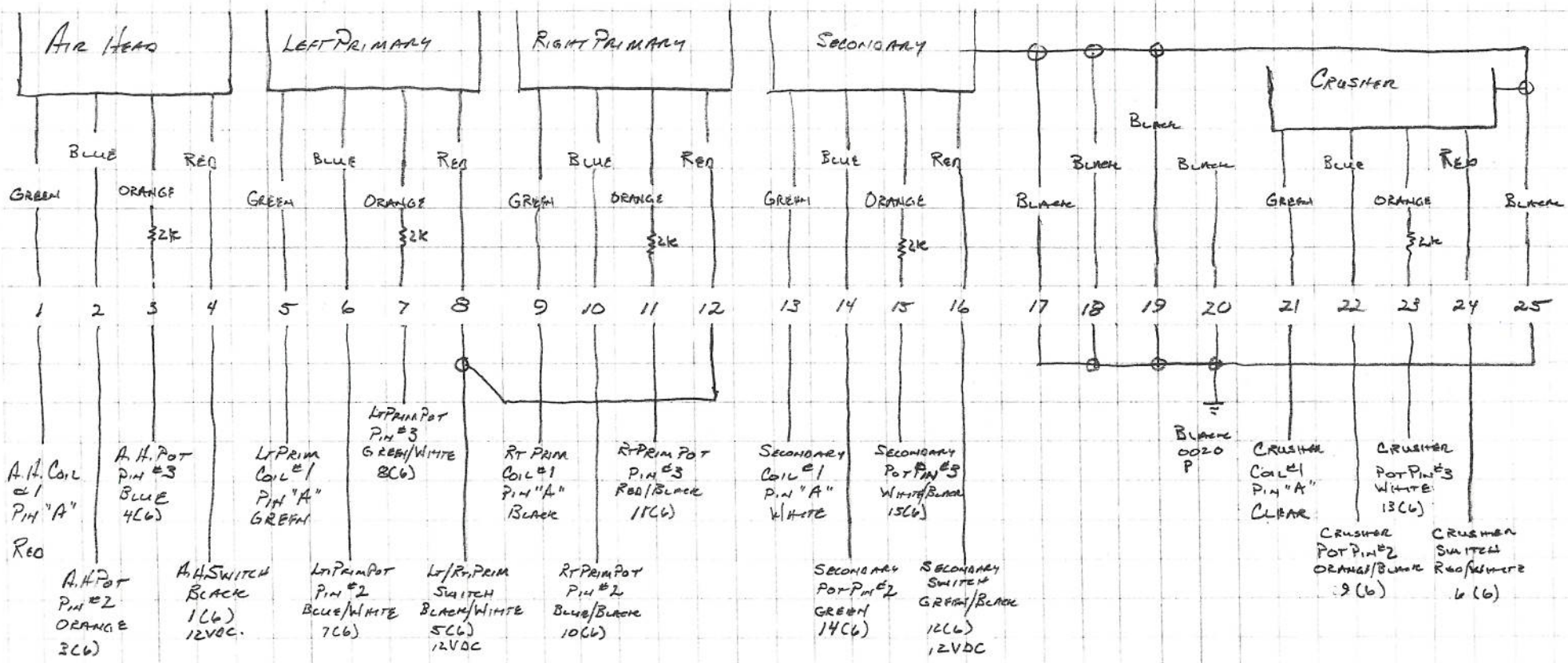
KAR-TECH
Delafield, WI 53018

DIGITAL VALVE DRIVER

CAD DRAWING DO NOT REVISE MANUALLY

SIZE	SHEET	DATE	DRAWN	APPROVED	DRAWING NO.	REV
FULL	ALL	12-12-05			21-017-2-A-2	B

UNLESS OTHERWISE SPECIFIED TOLERANCE
XX ± .1
XXX ± .05
XXXX ± .005
FRACTIONAL ± 1/8
ANGULAR ± .5 deg



24 PIN PLUG IN CONTROLLER BOX

POTENTIOMETER TO KAN-TECH CONTROLLER

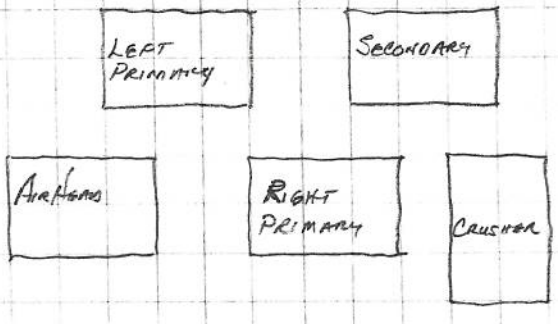
BELDEN 8468

KAN-TECH CONTROLLER TO PENNY

BELDEN M 9418

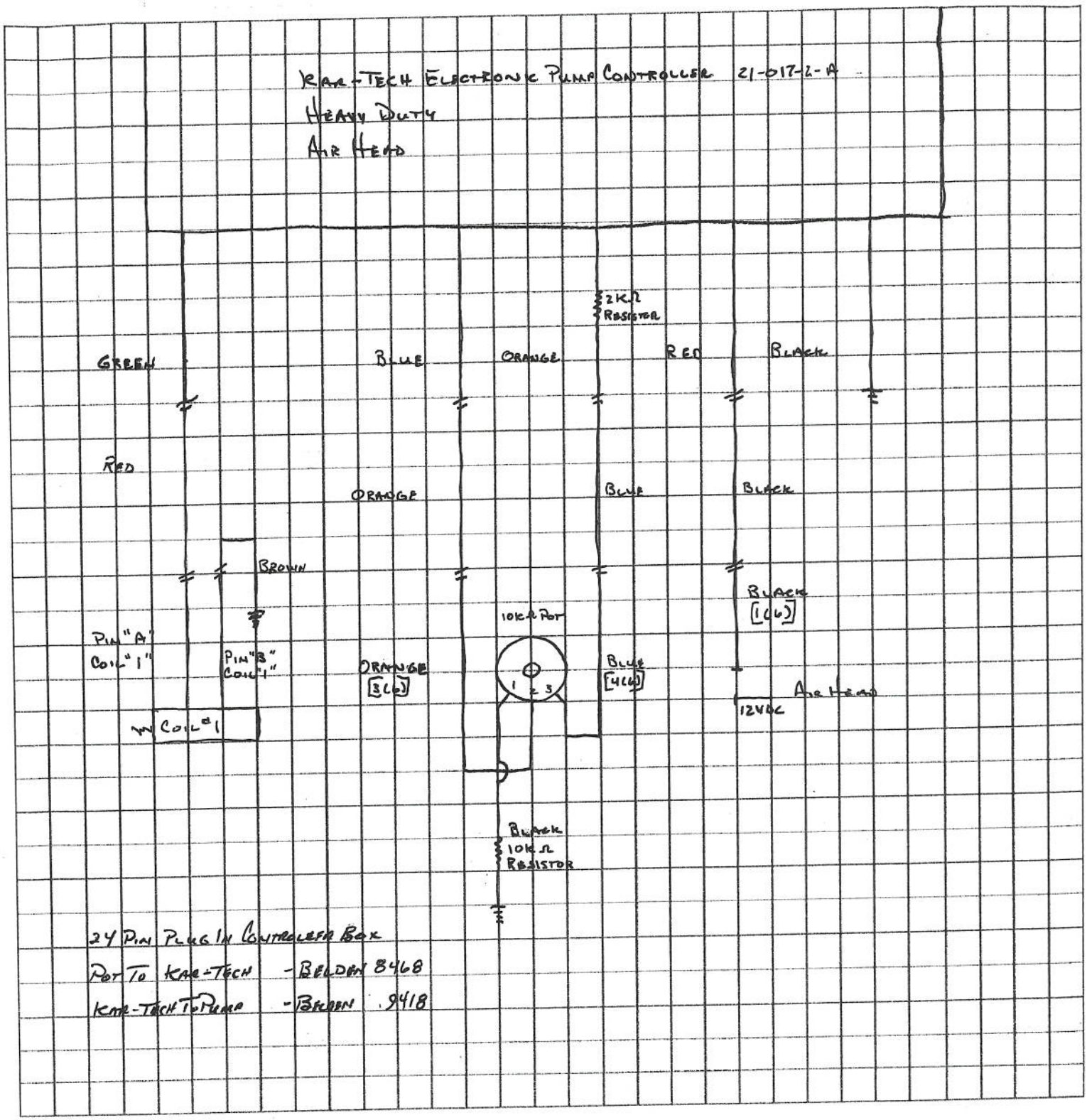
BELDEN 8762 (CRUSHER)

	FULL	1/2	OFF
GREEN	7.7	4.3	0
BLUE	4.42	3.42	2.2
ORANGE	4.42	4.42	4.42
RED	12	12	0



8/28/08
KAN-TECH CONTROLLER
21-017-2-R.

2/26/07


KAR-TECH ELECTRONIC PUMP CONTROLLER 21-017-2-A
HEAVY DUTY
AIR HEAD
2K Ω RESISTOR
GREEN
BLUE
ORANGE
RED
BLACK
RED
ORANGE
BLUE
BLACK
BROWN
BLACK [106]
10K Ω POT
PIN "A" COIL "1"
PIN "B" COIL "1"
ORANGE [306]
1 2 3
BLUE [406]
AIR HEAD
12VDC
COIL #1
BLACK
10K Ω RESISTOR
24 PIN PLUG IN CONTROLLER BOX
POT TO KAR-TECH - BELDEN 8468
KAR-TECH TO PUMP - BELDEN 9418

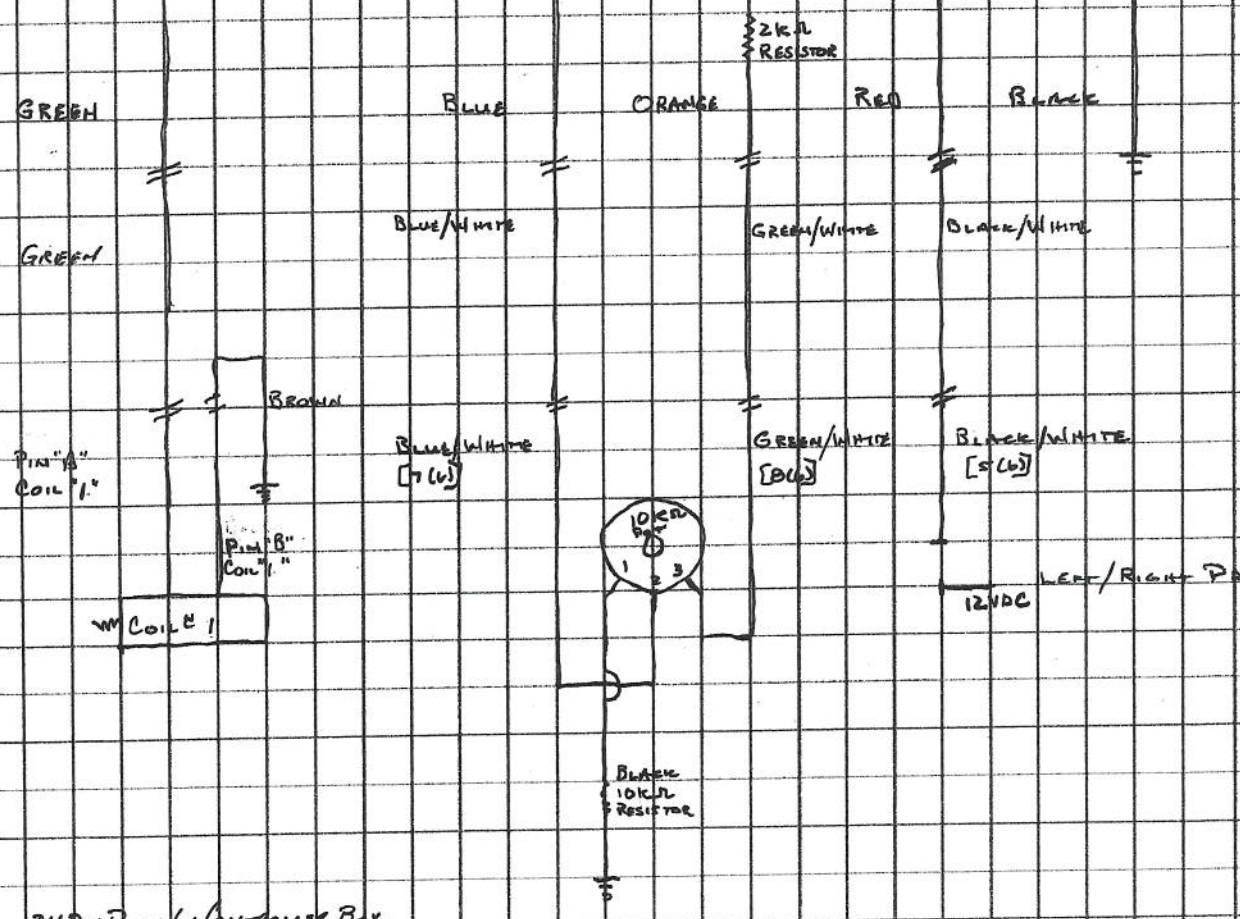
2/26/07

21-617-2-A

KAR-TECH ELECTRONIC PUMA CONTROLLER

MEDIUM DUTY

LEFT PRIMARY



24 PIN PLUG IN CONTROLLER BOX

POT TO KAR-TECH - BELDEN 8468

KAR-TECH TO PUMA - BELDEN 3418

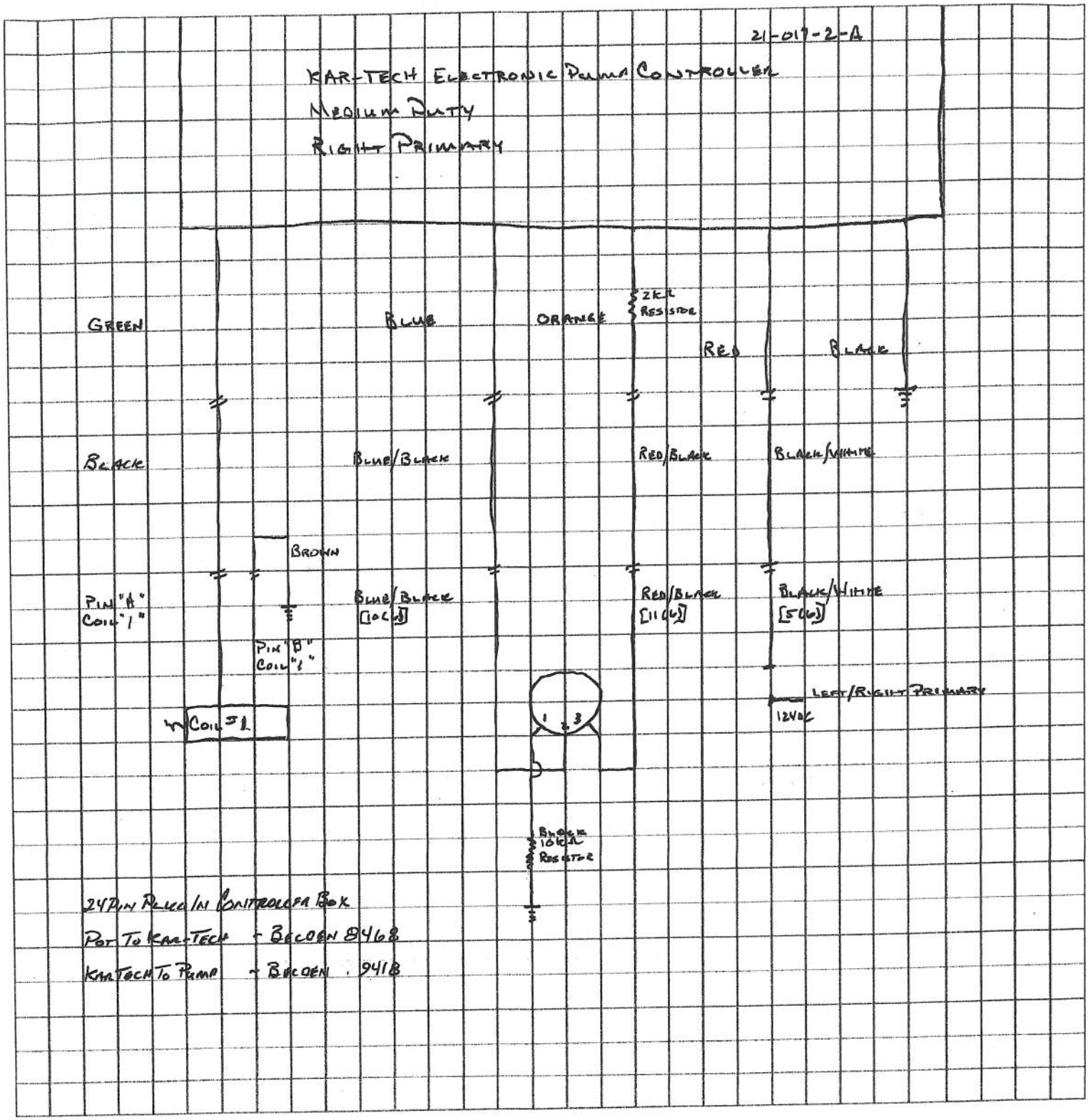
2/26/07

21-017-2-A

KAR-TECH ELECTRONIC PUMA CONTROLLER

MEDIUM DUTY

RIGHT PRIMARY



24 PIN PELCO IN CONTROLLER BOX

POT TO KAR-TECH - BECOEN 8468

KAR TECH TO PUMP - BECOEN . 9418

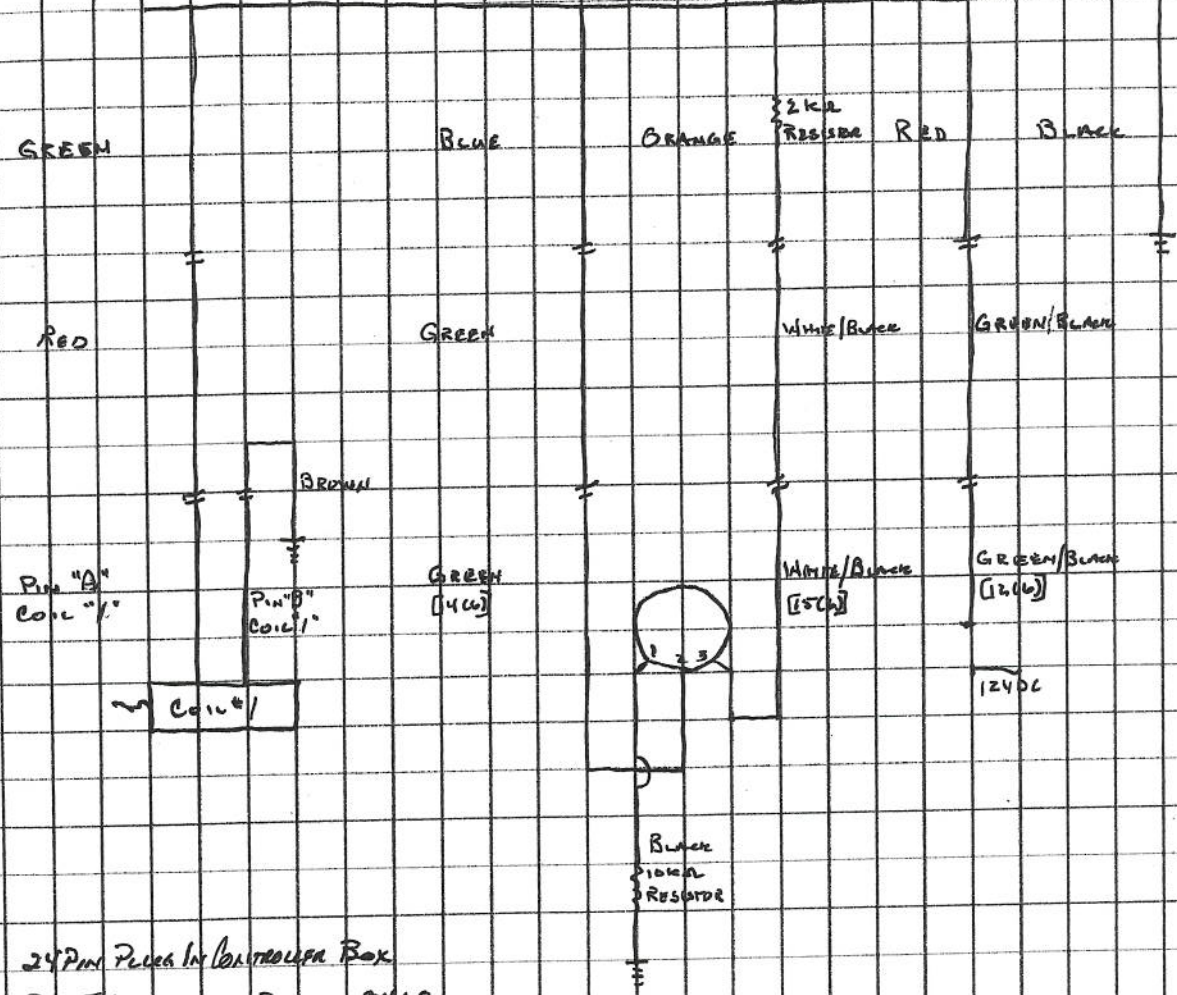
2/26/07

21-017-2-A

KAR-TECH ELECTRONIC PUMP CONTROLLER

MEDIUM DUTY

SECONDARY



24 PIN PLUG IN CONTROLLER BOX

POT TO KAR-TECH - BELDEN 8468

KAR-TECH TO PUMP - BELDEN 9418

#08031 **VALLEY FARMS - MC CAIN** 8/8/08

4RSPH W/ 65" - TANK

PLUG #6

1	BLACK	AIR HEAD CONTROLLER POWER SUPPLY PIN "4"
2	RED	
3	ORANGE	AIR HEAD CONTROLLER COMMAND SIGNAL PIN "2"
4	BLUE	AIR HEAD CONTROLLER COMMAND SIGNAL PIN "3"
5	BLACK / WHITE	LEFT / RIGHT PRIMARY CONTROLLAER POWER SUPPLY PIN "8"
6	RED / WHITE	CRUSHER CONTROLLER POWER SUPPLY PIN "21"
7	BLUE / WHITE	LEFT PRIMARY CONTROLLER COMMAND SIGNAL PIN " 6 "
8	GREEN / WHITE	LEFT PRIMARY CONTROLLER COMMAND SIGNAL PIN " 7 "
9	ORANGE / BLACK	CRUSHER CONTROLLER COMMAND SIGNAL PIN "22"
10	BLUE / BLACK	RIGHT PRIMARY CONTROLLER COMMAND SIGNAL PIN "10"
11	RED / BLACK	RIGHT PRIMARY CONTROLLER COMMAND SIGNAL PIN "11"
12	GREEN / BLACK	SECONDARY CONTROLLER POWER SUPPLY PIN "16"
13	WHITE	CRUSHER CONTROLLER COMMAND SIGNAL PIN "23"
14	GREEN	SECONDARY CONTROLLER COMMAND SIGNAL PIN "14"
15	WHITE / BLACK	SECONDARY CONTROLLER COMMAND SIGNAL PIN "15"
16		

LEFT / RIGHT PRIMARY - SECONDARY -- COIL #1 PIN "B" TO GROUND
AIR HEAD -- COIL #1 PIN "B" TO GROUND

KAR-TECH ENCLOSURE

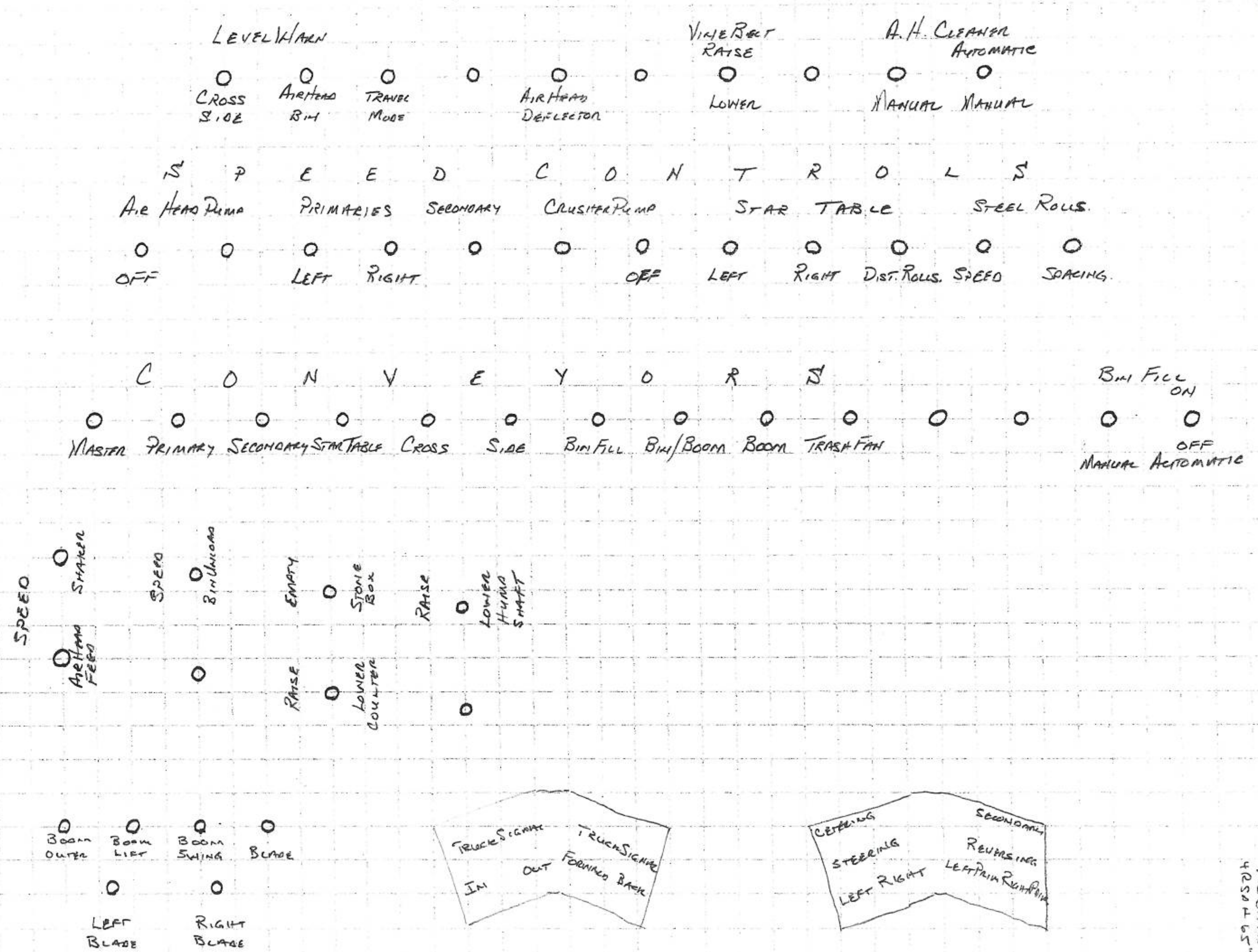
#08031 **VALLEY FARMS - MC CAIN** **8/8/08**

4RSPH W/ 65" - TANK

PIN #				
1	* RED		AIR HEAD COIL #1 - PIN "A"	* 9418
2	ORANGE		AIR HEAD POTENTIOMETER TERMINAL #2	8468
3	BLUE		AIR HEAD POTENTIOMETER TERMINAL #3	8468
4	BLACK		AIR HEAD SWITCH - ON / OFF	8468
5	* GREEN		LEFT PRIMARY COIL #1 - PIN "A"	* 9418
6	BLUE/WHITE		LEFT PRIMARY POTENTIOMETER TERMINAL #2	8468
7	GREEN/WHITE		LEFT PRIMARY POTENTIOMETER TERMINAL #3	8468
8	BLACK/WHITE		LEFT / RIGHT PRIMARY SWITCH - ON / OFF	8468
9	* BLACK		RIGHT PRIMARY COIL #1 - PIN "A"	* 9418
10	BLUE/BLACK		RIGHT PRIMARY POTENTIOMETER TERMINAL #2	8468
11	RED/BLACK		RIGHT PRIMARY POTENTIOMETER TERMINAL #3	8468
12				
13	* WHITE		SECONDARY COIL #1 - PIN "A"	* 9418
14	GREEN		SECONDARY POTENTIOMETER TERMINAL #2	8468
15	WHITE/BLACK		SECONDARY POTENTIOMETER TERMINAL #3	8468
16	GREEN/BLACK		SECONDARY SWITCH - ON / OFF	8468
17				
18				
19				
20	BLACK	0020	KAR-TECH GROUND TO PANEL	P
21	* CLEAR		CRUSHER COIL #1 - PIN "A"	* 8762
22	ORANGE/BLACK		CRUSHER POTENTIOMETER TERMINAL #2	8468
23	WHITE		CRUSHER POTENTIOMETER TERMINAL #3	8468
24	RED/WHITE		CRUSHER SWITCH - ON / OFF	8468

LEFT PRIMARY	1
RIGHT PRIMARY	2
AIR HEAD	3
SECONDARY	4
CRUSHER	5

#08031
Valley Farms
McCain
4RSAH 65" LIAH



#08031
VALLEY FARMS
McCAIN
4RSA + 65" LIA H

LEVEL/WARN

VINEBELT RAISE

A.H. CLEANER AUTOMATIC

CROSS SIDE TGA10
AIRHEAD BIN TGA10
TRAVEL MODE 2X464
AIRHEAD DEFLECTOR 4X203
LOWER SS208C-BK
MANUAL 4X203
MANUAL TG6261

S P E E D C O N T R O L S

AIR HEAD PUMP — OFF 2X464
POT - 753-5261
KNOB - 664-1654
PRIMARIES — LEFT, RIGHT
SECONDARY
RESISTOR - 895-0382
CRUSHER PUMP — OFF 2X464
STAR TABLE — LEFT SS208C-BK, RIGHT SS208C-BK
STEEL ROLLS — DIST. ROLLS SS208C-BK, SPEED SS208C-BK, SPACING SS208C-BK

C O N V E Y O R S

MASTER TG643
PRIMARY 2X464
SECONDARY 2X464
STAR TABLE 2X464
CROSS 2X464
SIDE 2X464
BIN FILL 2X464
BIN/BOOM TG643
BOOM 2X464
TRASH FAN 2X464

BIN FILL
MANUAL 4X203
ON / OFF AUTOMATIC 2X464

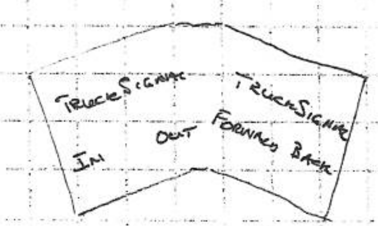
SPEED
SHAKER SS208C-BK
AIRHEAD FEED SS208C-BK

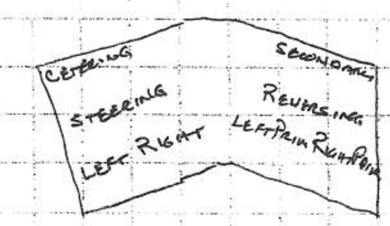
SPEED
BIN UNLOAD SS208C-BK

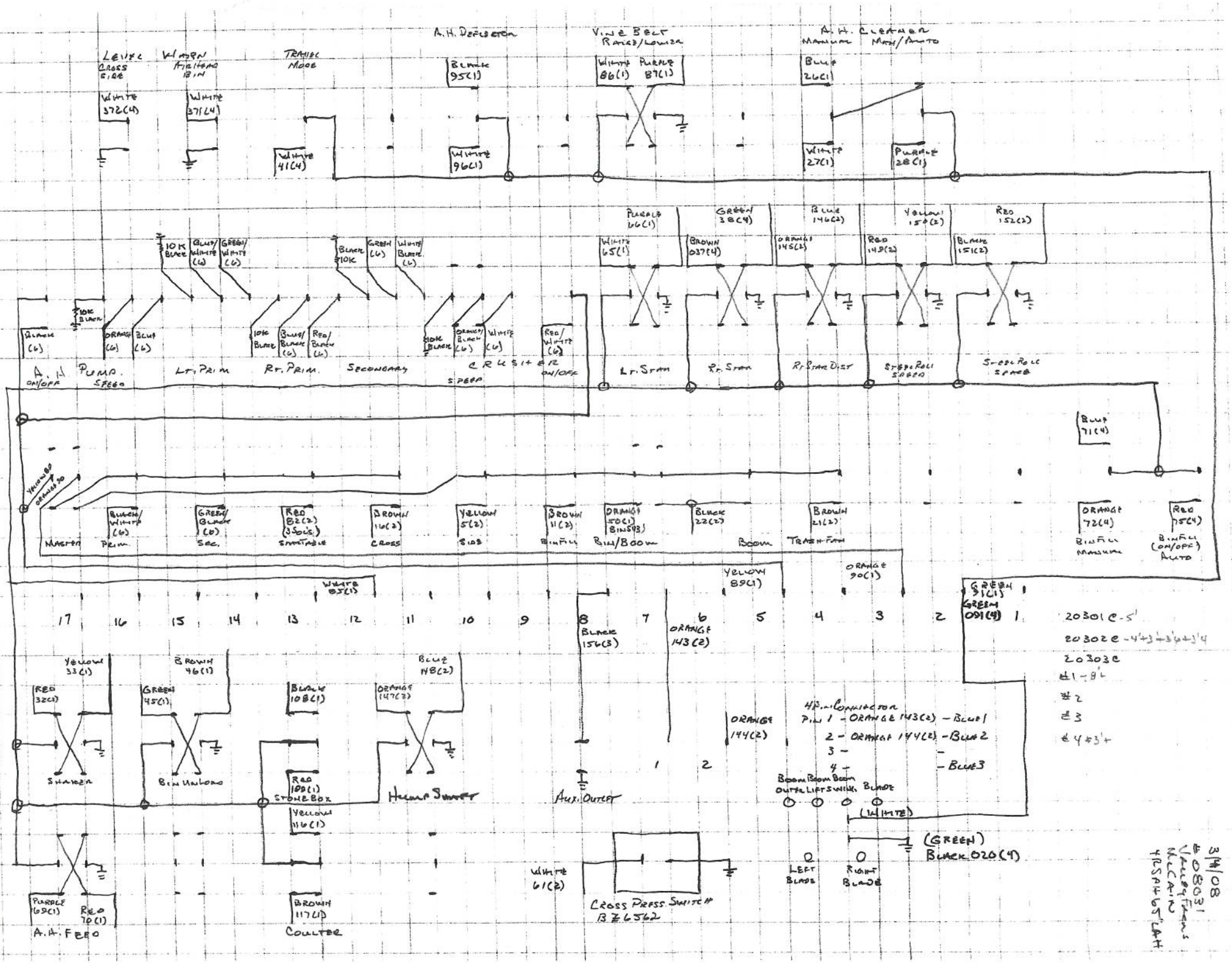
EMPTY / RAISE
STONE BOX 4X203
LOWER COULTER 4X203

RAISE
LOWER HUMP SHAFT SS208C-BK

BOOM OUTER
BOOM LIFT
BOOM SWING
BLADE
LEFT BLADE
RIGHT BLADE






A.H. Deflector
Vine Belt Raise/Lower
A.H. Cleaner Manual Man/Auto
Left Cross Side
Right Auto Reverse
Trailer Mode
White 372(4)
White 371(4)
White 41(4)
Black 95(1)
White 96(1)
White 86(1)
Purple 87(1)
Blue 26(1)
White 27(1)
Purple 28(1)
Purple 66(1)
Green 38(4)
Blue 146(2)
Yellow 150(2)
Red 152(2)
White 65(1)
Brown 037(4)
Orange 145(2)
Red 149(2)
Black 151(2)
10K Black
Blue/White (4)
Green/White (4)
Black 10K
Green (4)
White/Black (4)
10K Black
Orange/Black (4)
White (4)
Red/White (4)
Black (4)
Orange (4)
Blue (4)
10K Black
Blue/Black (4)
Red/Black (4)
A.H. On/Off
Pump Speed
Lt. Prim
Rt. Prim.
Secondary
Crusher Speed
Crusher On/Off
Lt. Strm
Rt. Strm
Rt. Strm Dist
Strm Roll Speed
Strm Roll Strm
Blue 71(4)
Yellow 80
Orange 20
Black/White (4)
Green/Black (4)
Red 82(2) (3 Sols.)
Brown 116(2)
Yellow 5(2)
Brown 11(2)
Orange 150(1) Bin 593
Black 22(2)
Brown 21(2)
Orange 72(4)
Red 75(4)
Master
Prim.
Sec.
Switchable
Cross
Bins
Bin Fill
Bin/Boom
Boom
Trash Fan
Bin Fill Manual
Bin Fill (On/Off) Auto
White 85(1)
Yellow 89(1)
Orange 90(1)
Green 31(1)
Green 091(4)
17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
Black 156(3)
Orange 143(2)
Orange 144(2)
Yellow 33(1)
Brown 46(1)
Blue 148(2)
Red 32(1)
Green 45(1)
Black 108(1)
Orange 147(2)
Red 109(1) Stone Box
Yellow 116(1)
Brown 117(2)
Shaker
Bin Unload
Header Sweep
Aux. Outlet
Coulter
A.H. Feed
White 61(2)
Cross Press Switch BZ6562
4 Pin Connector
Pin 1 - Orange 143(2) - Blue1
2 - Orange 144(2) - Blue2
3 - - -
4 - - Blue3
Boom Boom Boom Boom
Outer Lift Switch Blade
(Limited)
(Green)
Black 020(4)
Left Blade
Right Blade
20301e-5'
20302e-4'+3'+3'+3'+4'
20303e
#1-8'
#2
#3
#4 3'+
3/4/08
#080321
Valley Farms
McCain
4 Rsp 45' Lay

A. H. FAN

FILTER W/ARN

GROUND DRIVE

LOW HYDRAULIC OIL

H. RANGE

LO RANGE GROUND DRIVE 4X4

4X2

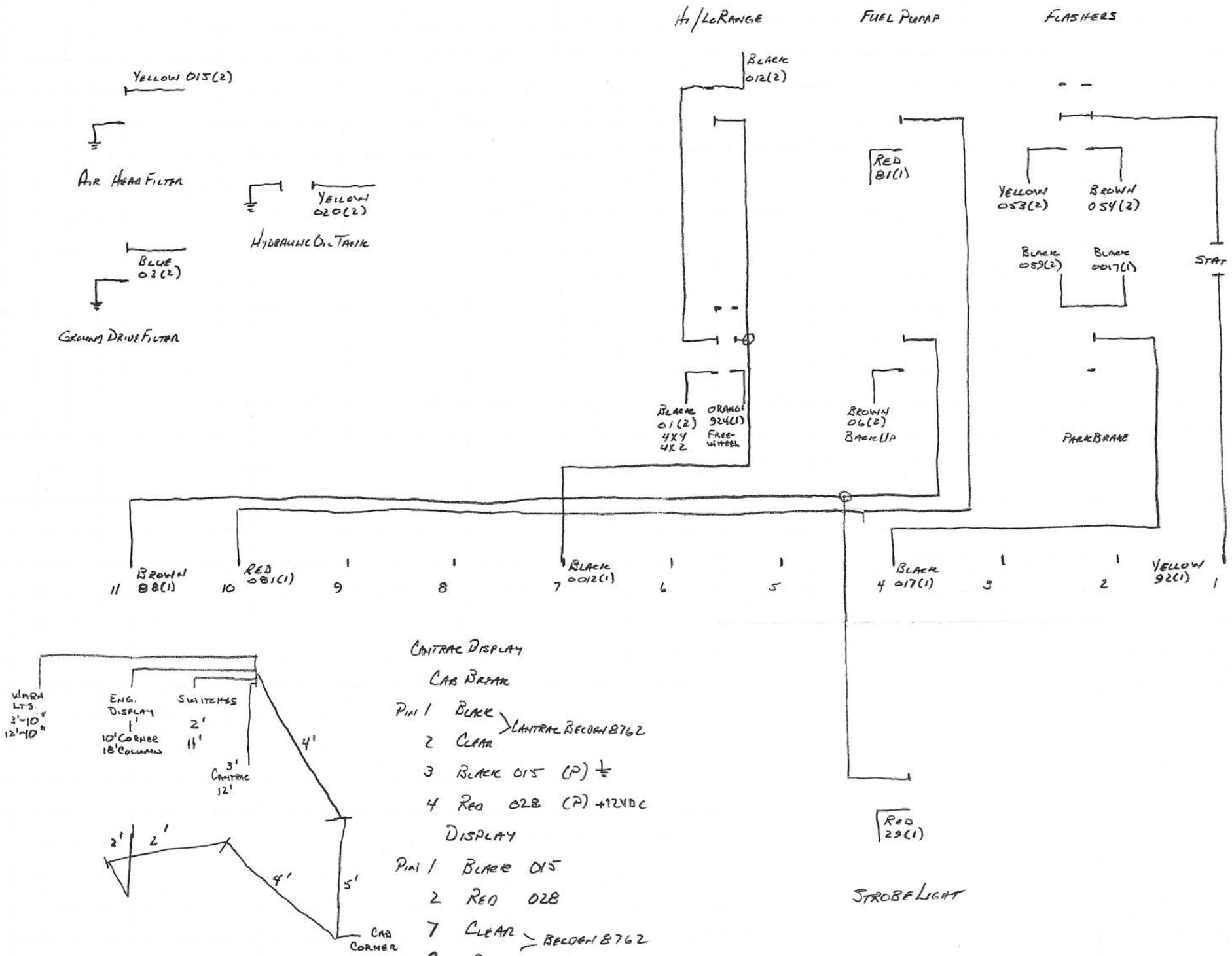
FUEL PUMP

BACK UP LIGHTS

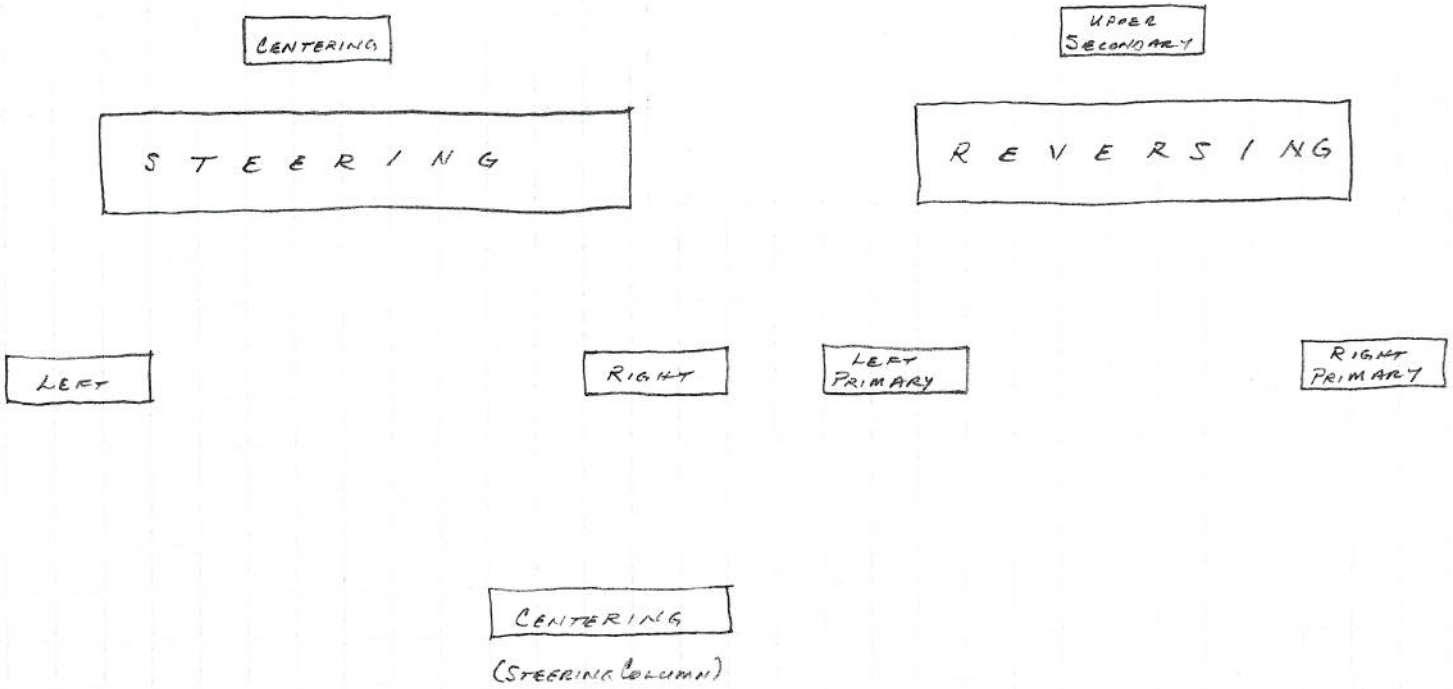
FLASHERS

PARKING BRAKE OFF

STROBE LIGHT

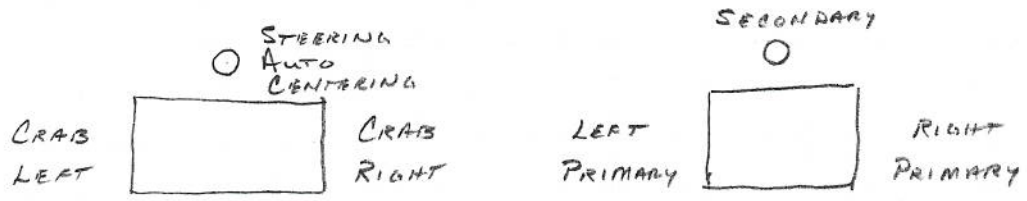

Hi/Lo Range
Fuel Pump
Flashers
Yellow 015(2)
Air Heat Filter
Yellow 020(2)
Hydraulic Oil Tank
Blue 03(2)
Ground Drive Filter
Black 012(2)
Red 81(1)
Yellow 053(2)
Brown 054(2)
Black 059(2)
Black 0017(1)
Start
Black 01(2) 4X4 4X2
Orange 924(1) Free-wheel
Brown 06(2) Back Up
Park Brake
11 Brown 88(1)
10 Red 081(1)
9
8
7 Black 0012(1)
6
5
4 Black 017(1)
3
2
1 Yellow 92(1)
Warn Lts 3'-10" 12'-10"
Eng. Display
10' Corner 18' Columns
Switches
2'
11'
3'
Cantrac 12'
4'
2'
2'
4'
5'
Cab Corner
Cantrac Display
Cab Break
Pin 1 Black
2 Clear
Cantrac Beckon 8762
3 Black 015 (P)
4 Red 028 (P) +12VDC
Display
Pin 1 Black 015
2 Red 028
7 Clear
8 Black
Beckon 8762
Red 29(1)
Strobe Light

Foot Pedal Switches



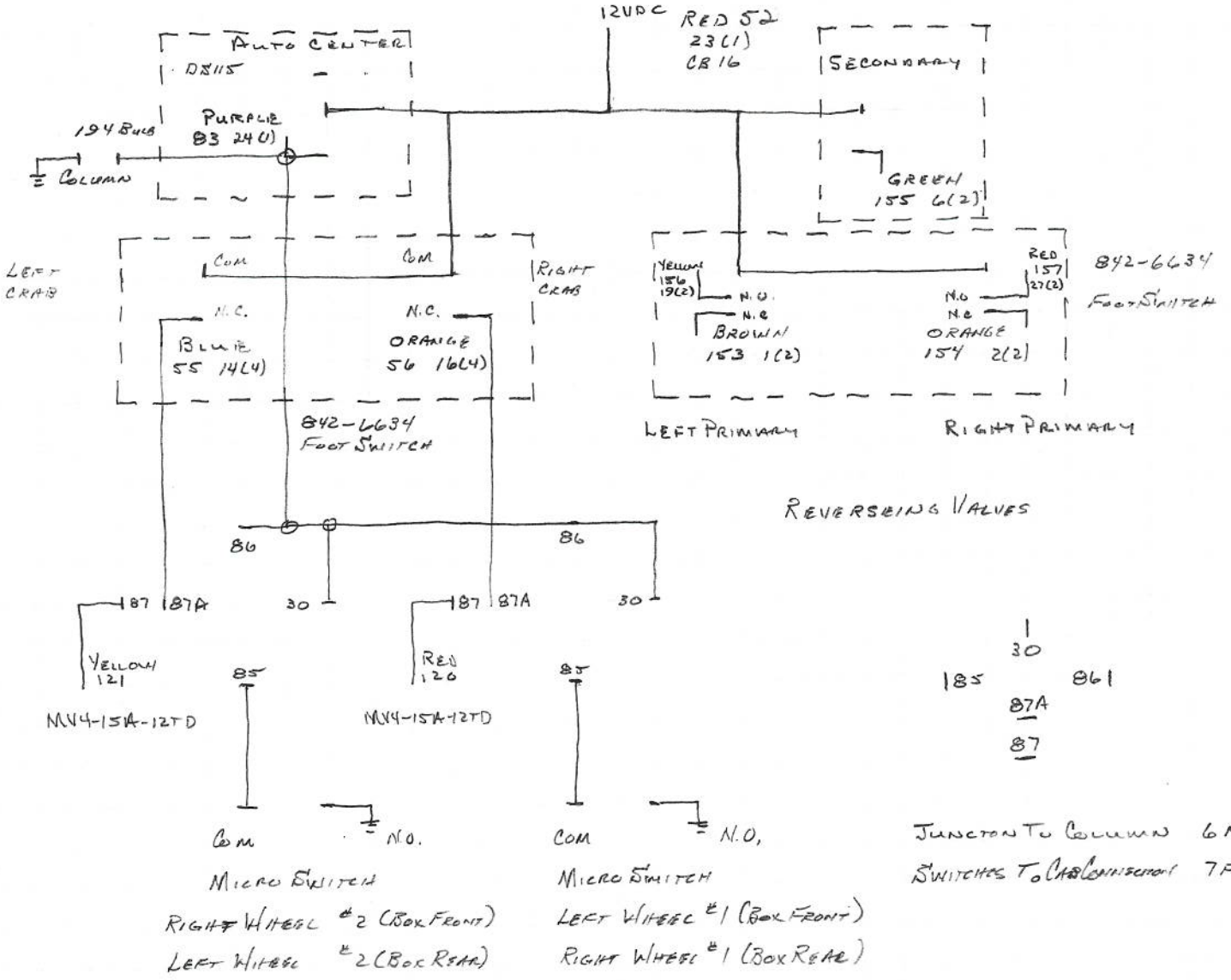
Revision 11/27/07
Primary Reverse
Manoil Valve

Foot Pedal Switches



Steering
Rear Axle

Reversing
Valves

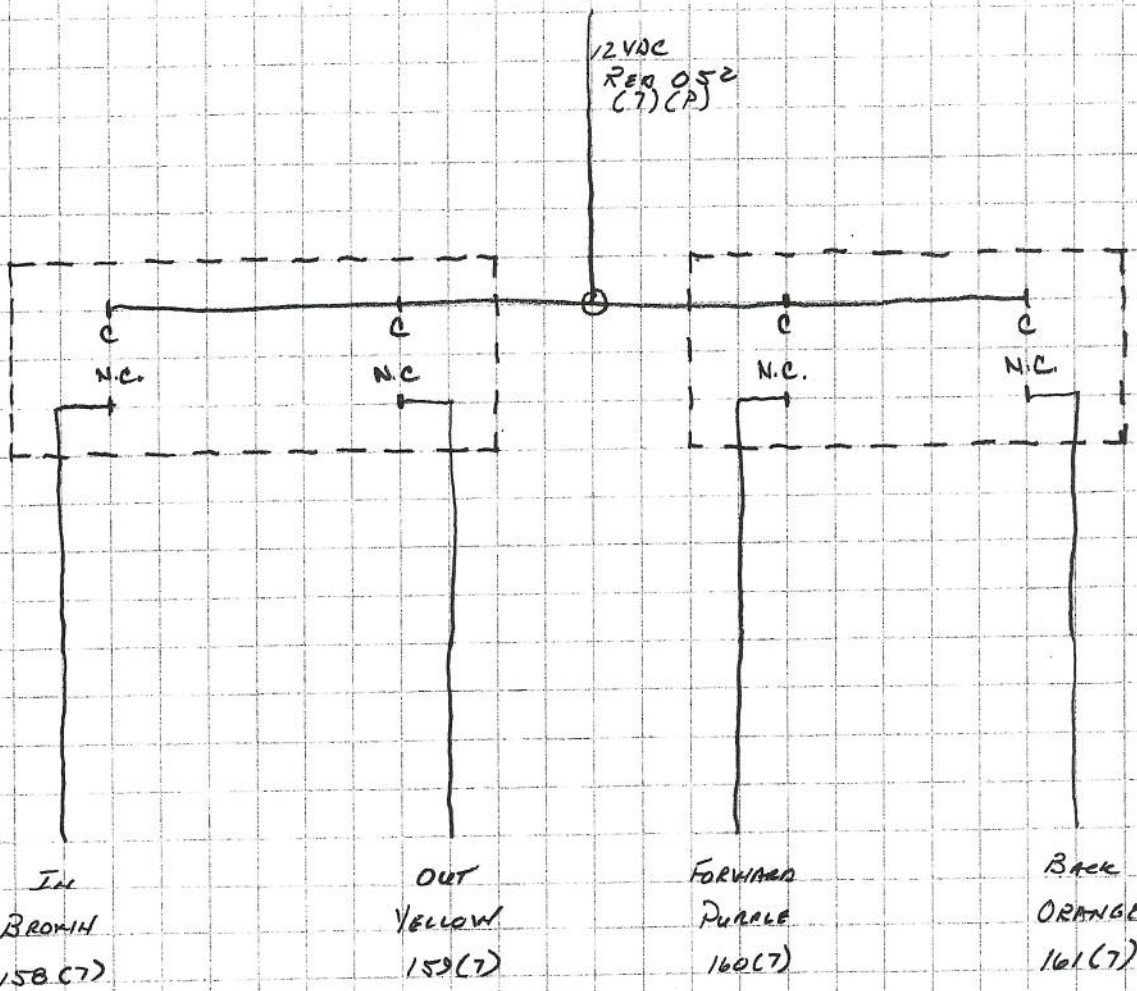


Micro Switch
Right Wheel #2 (Box Front)
Left Wheel #2 (Box Rear)

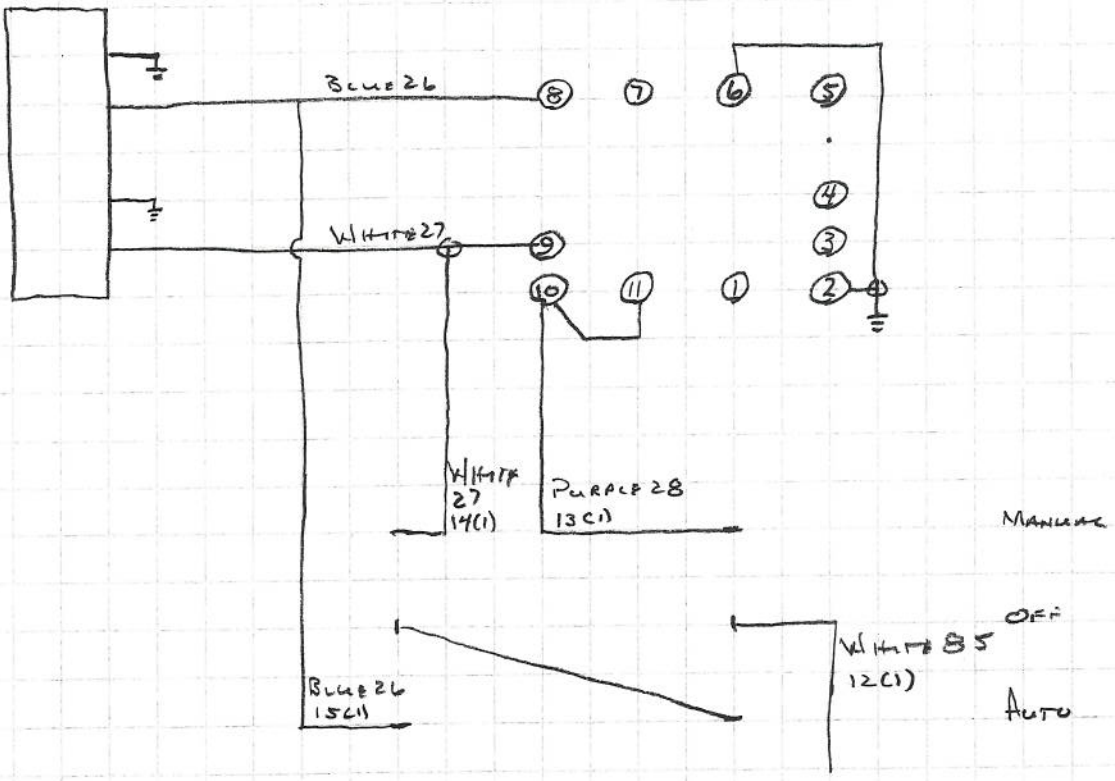
Micro Switch
Left Wheel #1 (Box Front)
Right Wheel #1 (Box Rear)

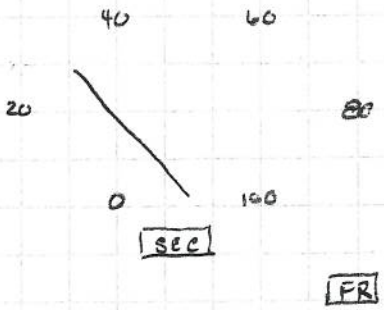
Junction To Column 6 Ft
Switches To Cab Connector 7 Ft.

TRUCK SIGNALING FOOTPLATE



Air Head Cleaner

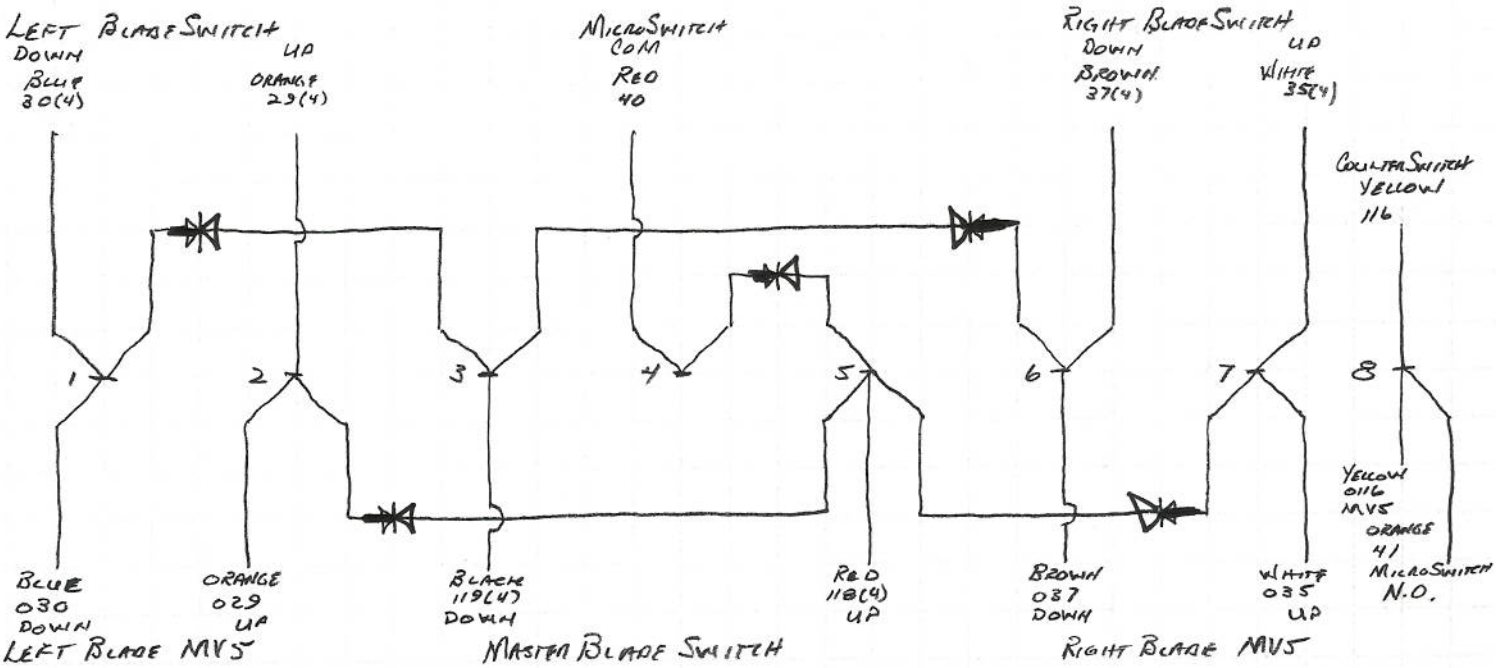




FR

5/2/08

Blade / Coulter Control



Pin			
	1	Blue	30
	2	Orange	29
	3	Red	40
	4	Brown	37
	5	White	35
	6	Yellow	116
	7	Blue	030
	8	Orange	029
	9	Black	119
	10	Red	118
	11	Brown	037
	12	White	035
	13	Yellow	0116
	14	Orange	41
	15		
	16		

Rectifier 6A	266-0086	(276-1661)
Enclosure (Q1313 10pce)	78351/14069	
Mounting Track	58371	
Terminal Block	58364	
End Clamp	58373	