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Schematic/Electrical Parts

CENTRIFUGAL EXTRACTORS

MarkV/VI Controls

Read the **separate safety manual** before installing, operating, or servicing

PELLERIN MILNOR CORPORATION POST OFFICE BOX 400, KENNER, LOUISIANA 70063-0400, U.S.A.

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COMPONENT PARTS LIST

W6EX5PL/2023402N

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
	>>>CONTROL BOX LAYOUTS				
001	LAYOUT-INVERTER CONTROL BOX	W6EX5TG1	B2T2000001	EXTRACTOR INVERTER BOX	SEE DESCRIPTION
002	LAYOUT-VALVE SET M#V	W6EX5TG1	B2TAG92069	EXTRACTOR VALVE SET BOX <>	SEE DESCRIPTION
003	LAYOUT-LOW VOLTAGE CONTROL BOX	W6EX5TG2	B2T2000010	M7/9V LOW VOLTAGE C-BOX	SEE DESCRIPTION
004	LAYOUT-CONNECTION BOX RIGHT	W6EX5TG2	B2T2000009	1MTR EXTRACTOR CONN RT	SEE DESCRIPTION
005	LAYOUT-DYNAMIC BRAKE RESISTOR BOX1	W6EX5TG3	B2T2003017	TAG:M7/9 EXTRACTOR RESISTOR BOX	SEE DESCRIPTION
006	LAYOUT-DYNAMIC BRAKE RESISTOR BOX2	W6EX5TG3	B2T2016007	TAG:EXTRACTOR RESISTOR BOX 2	SEE DESCRIPTION
ACBA	ACCELEROMETER-BALANCE	W6EX5EC	EACCLRM5	ASSY:ACCEL 1-5G ADXL 105+TEST	MACHINE FRAME
ACBAA	ACCELEROMETER-BALANCE	W6EX5ECA	EACCLRM5	ASSY:ACCEL 1-5G ADXL 105+TEST	MACHINE FRAME
BA	**>>PRINTED CIRCUIT BOARDS**				
BBAD-1	BOARD- A TO D CONVERTER	W6EX5EC	08BSBADCTE	SR BALANCE A-D BD EXTACTR-TEST	LOW VOLT BOX
BBADA-1	BOARD- A TO D CONVERTER	W6EX5ECA	08BSBADCTE	SR BALANCE A-D BD EXTACTR-TEST	LOW VOLT BOX
BBB-1	BOARD-BATTERY BACKUP BOARD	W6EX5BWA	08BSBB1T	BOARD: SER BATT BACKUP-TEST	PROCESSOR BX
BDVFD	BOARD-SERIAL DISPLAY	W6EX5SD	08BSEVFD5V	BD:SER VFD.2LINE-19200B-TEST	SWITCH PANEL
BIO-1	BOARD-8-OUTPUT, 16-INPUT BOARD 1	W6EX5BWA	08BS816DT	SERIAL 8OUT-16INPUT-TESTED	LOW VOLT BOX
BIO-2	BOARD-8-OUTPUT, 16-INPUT BOARD 2	W6EX5IDP2	08BS816DT	SERIAL 8OUT-16INPUT-TESTED SURFACE	LOW VOLT BOX
BIO-3	BOARD-8-OUTPUT, 16-INPUT BOARD 3	W6EX5IDP3	08BS816DT	SERIAL 8OUT-16INPUT-TESTED SURFACE	LOW VOLT BOX
BIO-4	BOARD-8-OUTPUT, 16-INPUT BOARD 4	W6EX5BWA	08BS816DHT	BD:SMT HIGH-SPEED 8OUT-16INPUT-TEST	LOW VOLT BOX
BO24-1	BOARD-24-OUTPUT BOARD	W6EX5BWA	08BSO24AT	BD:SERIAL 24 OUTPUT->TEST	LOW VOLT BOX
BO24-2	BOARD-24-OUTPUT BOARD	W6EX5OPA	08BSO24AT	BD:SERIAL 24 OUTPUT->TEST	LOW VOLT BOX
BPB	BOARD-PROCESSOR BOARD	W6EX5BWA	08BSPE3T	BD: SERIAL 186PROCESSOR SMD->TEST	PROCESSOR BX
BRS1	BOARD-SPEED SENSING	W6EX5BWA	08BNDSR1T	BD:EXTRACTOR ROTATION->TEST	LOW VOLT BOX
BRSA (42")	BOARD-SPEED SENSING FAST TURN AROUNI	W6EX5BWA	08BNDSRDT	BD:EXT ROTAT>FAST TURN AROUND 42	LOW VOLT BOX
BRSA (48")	BOARD-SPEED SENSING FAST TURN AROUNI	W6EX5BWA	08BNDSRCT	BD:EXT ROTAT>FAST TURN AROUND 48	LOW VOLT BOX
CB	**>>CIRCUIT BREAKERS**				
CB1	CIRCUIT BREAKER	W6EX5MTA	09FC016CAA	IEC MINI CIR.BREAK 16A 480V3P	HIGH VOLT BOX
CP	**>>PHOTOEYES**				
CPCBM	PHOTOEYE-BELT B LOAD END EYE BL0CK	W6EX5IA	09RPE004	SENSOR DARK OPERATE AC N/O-OUT	BELT B SIDE
CPCCR	PHOTOEYE-RECEIVER LOAD CHUTE	W6EX5S+	09RPE010R	PHOTOEYE RECEIVER AC	ON LD CHUTE
CPCCS	PHOTOEYE-SENDER LOAD CHUTE	W6EX5S+	09RPE010E	P.E. EMITTER AC #SM303E W/30"	ON LD CHUTE
CPCPL	PHOTOEYE-BELT B IS LOADED	W6EX5IA	09RPE004	SENSOR DARK OPERATE AC N/O-OUT	BELT B SIDE
CPHTGC	PHOTOEYE-BELT A HAS GOODS	W6EX5HYP	09RPE004	SENSOR DARK OPERATE AC N/O-OUT	BELT A SIDE
CPHTGCA	PHOTOEYE-BELT A HAS GOODS 2ND EYE	W6EX5HYP	09RPE004	SENSOR DARK OPERATE AC N/O-OUT	BELT A SIDE

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
CPPSP	PHOTOEYE-SPEED	W6EX5BWA	09RPE013Q	SENSOR E-Z BEAM QUICK CONN DC	DRIVE PULLEY
CR	**>>RELAY-PILOT OR CONTROL**				
CRBB	RELAY-BALANCE BOARD OPERATING	W6EX5EC	09C024D37	4PDT "KH" 110/120V	HIGH VOLT BOX
CRBBA	RELAY-BALANCE BOARD A OPERATING	W6EX5ECA	09C024D37	4PDT "KH" 110/120V	HIGH VOLT BOX
CRBR	RELAY-DYNAMIC BRAKE	W6EX5EV	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRCBM	RELAY-BELT B LOAD END EYE BLOCKED	W6EX5IA	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRCCR	RELAY-LOAD CHUTE BLOCKED	W6EX5S+	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRCU	RELAY-CONVEYOR SIDE FULL UP	W6EX5HYP	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRHTD	RELAY-HYDRAULIC TILT DOWN	W6EX5HYP	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRHTG	RELAY-BELT A HAS GOODS	W6EX5HYP	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRHTGA	RELAY-BELT A HAS GOODS 2ND EYE	W6EX5HYP	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CROL	RELAY:BRAKING OVERLOAD/HEAT SENSOR	W6EX5VPBR	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CROL	RELAY-BRAKING OVERLOAD/HEAT SENSOR	W6EX5VPBS	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRS+	RELAY-3-WIRE	W6EX5S+	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRSSB	RELAY-SPEED ABOVE SET VALUE	W6EX5IA	09C024E24	RELAY 4PDT DIFGLD 14PIN 24DC	LOW VOLT BOX
CRWRD	RELAY-REAR IS DOWN	W6EX5S+	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CRWRT	RELAY-REAR IS AT INTERMED. POSIT.	W6EX5HYP	09C024D37	4PDT "KH" 110/120V	LOW VOLT BOX
CS	**>>CONTACTOR-MOTOR STARTER**				
CSERP	CONTACTOR-RETURN PUMP>250V ALL	W6EX5EPA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSERP	CONTACTOR-RETURN PUMP<250V ALL	W6EX5EPA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSERP	CONTACTOR-CONVEYOR A >250V ALL	W6EX5MCA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSERP	CONTACTOR-CONVEYOR A <250V ALL	W6EX5MCA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSERP	CONTACTOR-CONVEYOR B >250V ALL	W6EX5MCA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSERP	CONTACTOR-CONVEYOR B <250V ALL	W6EX5MCA	09MC04B337	12A CP CON. NR. 120V5/6 IEC	HIGH VOLT BOX
CSFAN1	CONTACTOR-DOOR FANS	W6EX5S+	09MC08D337	23A 3P MCS CONT NR 120V5/6	RESISTOR BOX
CSFAN2	CONTACTOR-HOOD FAN 2	W6EX5S+	09MC08B337	12A 3P MCS CONT NR 120V5/6	RESISTOR BOX
CSFAN3	CONTACTOR HOOD FAN 3	W6EX5S+	09MC08B337	12A 3P MCS CONT NR 120V5/6	RESISTOR BOX
CSHYD	CONTACTOR-HYDRAULIC>250V 42M7/9V	W6EX5MCA	09MC08D337	23A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSHYD	CONTACTOR-HYDRAULIC<250V 42M7/9V	W6EX5MCA	09MC08N337	72A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSHYD	CONTACTOR-HYDRAULIC>250V 42MM/XV	W6EX5MCA	09MC08L337	60A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSHYD	CONTACTOR-HYDRAULIC<250V 42MM/XV	W6EX5MCA	09MC08T337	110A 3P MCS CONT. NR 120V5/6	HIGH VOLT BOX
CSHYD	CONTACTOR-HYDRAULIC>250V 48M7/9V	W6EX5MCA	09MC08G337	37A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSHYD	CONTACTOR-HYDRAULIC<250V 48M/9V	W6EX5MCA	09MC08L337	60A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
CSI	CONTACTOR-INV ENABLED>250V 42M7/9V	W6EX5MCA	09MC08G337	37A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSI	CONTACTOR-INV ENABLED<250V 42M7/9V	W6EX5MCA	09MC08N337	72A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSI	CONTACTOR-INV ENABLED>250V 42MM/XV	W6EX5MCA	09MC08N337	72A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSI	CONTACTOR-INV ENABLED<250V 42MM/XV	W6EX5MCA	09MC08T337	110A 3P MCS CONT. NR 120V5/6	HIGH VOLT BOX
CSI	CONTACTOR-INV ENABLED>250V 48M7/9V	W6EX5MCA	09MC08N337	72A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
CSI	CONTACTOR-INV ENABLED<250V 48M/9V	W6EX5MCA	09MC08U337	180A 3P MCS CONT NR 120V5/6	HIGH VOLT BOX
EB	**>>BUZZER OR AUDIBLE SIGNAL**				
EBSG	BUZZER-SIGNAL	W6EX5S+	09H015	BUZZ.115V W/6-32 CTR+6"LEADS	LOW VOLT BOX
	>>DIODES				
	600V ARRESTER	W6EX5MT6	09X001A	SECONDARY ARRESTER 650V3P DELTA	HIGH VOLT BOX
EF	**>>FUSES**				
EFF1	FUSE-LEFT DOOR FAN L1	W6EX5MTA	09FF003AWV	FUSE BUSS STYLE CC TYPE FNQ-R 3 AMP	RESISTOR BOX
EFF2	FUSE-LEFT DOOR FAN L2	W6EX5MTA	09FF003AWV	FUSE BUSS STYLE CC TYPE FNQ-R 3 AMP	RESISTOR BOX
EFF3	FUSE-RIGHT DOOR FAN L1	W6EX5MTA	09FF003AWV	FUSE BUSS STYLE CC TYPE FNQ-R 3 AMP	RESISTOR BOX
EFF4	FUSE-RIGHT DOOR FAN L2	W6EX5MTA	09FF003AWV	FUSE BUSS STYLE CC TYPE FNQ-R 3 AMP	RESISTOR BOX
EFP1	FUSE-CONTROL CIRCUIT PRIMARY L1	W6EX5PS	09EF005AWN	FUSE #KTK 5A600V=HPS HOLDER	LOW VOLT BOX
EFP2	FUSE-CONTROL CIRCUIT PRIMARY L2	W6EX5PS	09EF005AWN	FUSE #KTK 5A600V=HPS HOLDER	LOW VOLT BOX
EF37	**F**USE-CONTROL CIRCUIT	W6EX5PS	09FF006AMA	FUSE BK/ABC 6 AMP 250V BUSS	LOW VOLT BOX
EL	**>>LIGHT PILOT OR INDICATOR**				
ELERP	LIGHT-EXT. RETURN PUMP RUNNING	W6EX5EPA	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	SWITCH PANEL
ELETT	LIGHT-EXT. RETURN PMP DID NOT RUN	W6EX5EPA	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	SWITCH PANEL
ELSG	LIGHT-SIGNAL	W6EX5S+	09J060WH37	LAMP 1/2" WHITE 120V TAB	LOW VOLT BOX
ELSGR	LIGHT-FLASHING LIGHT	W6EX5S+	09H025V37	BEACON ROT.120V 5.5"DIA AMB #MV110	LOW VOLT BOX
EM	**>>SWITCH ASSY EMERGENCY STOP**				
EMCF1	FAN-RESISTOR BOX 1	W6EX5VPBR	13AF235A37	FAN 235CFM 115V 50/60	RESISTOR BOX
EMCF1	FAN-RESISTOR BOX 1	W6EX5VPBS	13AF235A37	FAN 235CFM 115V 50/60	RESISTOR BOX
EMCF2	FAN-RESISTOR BOX 2	W6EX5VPBR	13AF235A37	FAN 235CFM 115V 50/60	RESISTOR BOX
EMCF2	FAN-RESISTOR BOX 2	W6EX5VPBS	13AF235A37	FAN 235CFM 115V 50/60	RESISTOR BOX
EMSPA	SWITCH-EMERGENCY STOP SWITCH PNL	W6EX5S+	09N505	SW ASSY EMER STOP	MOUNTONMACH
EMSPB	SWITCH-EMERGENCY STOP LEFT	W6EX5S+	09N505	SW ASSY EMER STOP	MOUNTONMACH
EMSPC	SWITHC-EMERGENCY STOP RIGHT	W6EX5S+	09N505	SW ASSY EMER STOP	MOUNTONMACH
ES	**>>POWER SUPPLY TESTED**				
ESPS	POWER SUPPLY-MICPROCESSOR	W6EX5BWA	08PSS3401T	40 WATT POWER SUPPLY TESTED	LOW VOLT BOX

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
ET	**>>THERMAL OVERLOAD DEVICES**				
ETB1	OVERLOAD-BELT A >250V-ALL	W6EX5MTA	09FTD0010T	EI PLUS OL RELAY 1.0-5.0A	HIGH VOLT BOX
ETB1	OVERLOAD-BELT A<250V ALL	W6EX5MTA	09FTD0016T	EI PLUS OL RELAY 1.0-5.0A	HIGH VOLT BOX
ETB2	OVERLOAD-BELT B >250V-ALL	W6EX5MTA	09FTD0010T	EI PLUS OL RELAY 1.0-5.0A	HIGH VOLT BOX
ETB2	OVERLOAD-BELT B<250V ALL	W6EX5MTA	09FTD0016T	EI PLUS OL RELAY 1.0-5.0A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP >250V 42M7/9V	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP <250V 42M7/9V	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP >250V 42MM/XVV	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP <250V 42MM/XVV	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP >250V 48M7/9V	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETERP	OVERLOAD-REUSE PUMP <250V 48M7/9V	W6EX5MTA	09FTD0037T	E1 PLUS OL RELAY 3.2-16A	HIGH VOLT BOX
ETFAN1	OVERLOAD-DOOR FANS	W6EX5S+	09FTD0010T	EI PLUS OL RELAY 1.0-5.0A	RESISTOR BOX
ETHYD	OVERLOAD-HYDRAULIC >250V 42M7/9V	W6EX5MTA	09FTD0039T	E1 PLUS OL RELAY 5.4-27A	HIGH VOLT BOX
ETHYD	OVERLOAD-HYDRAULIC <250V 42M7/9V	W6EX5MTA	09FTD0121T	E1 PLUS OL RELAY 9-45A	HIGH VOLT BOX
ETHYD	OVERLOAD-HYDRAULIC >250V 42MM/XVV	W6EX5MTA	09FTD0039T	E1 PLUS OL RELAY 5.4-27A	HIGH VOLT BOX
ETHYD	OVERLOAD-HYDRAULIC <250V 42MM/XVV	W6EX5MTA	09FTD0039T	E1 PLUS OL RELAY 5.4-27A	HIGH VOLT BOX
ETHYD	OVERLOAD-HYDRAULIC >250V 48M7/9V	W6EX5MTA	09FTD0120T	E1 PLUS OL RELAY 9-45A	HIGH VOLT BOX
ETHYD	OVERLOAD-HYDRAULIC <250V 48M7/9V	W6EX5MTA	09FTD0230T	E1 PLUS OL RELAY 18-90A	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED >250V 42M7/9V	W6EX5MTA	09FTD0121T	E1 PLUS OL RELAY 9-45A	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED <250V 42M7/9V	W6EX5MTA	09FTD0230T	E1 PLUS OL RELAY 18-90A	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED >250V 42MM/XV	W6EX5MTA	09FTD0230T	E1 PLUS OL RELAY 18-90A	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED <250V 42MM/XV	W6EX5MTA	09FTD0040T	OL RELAY 40-200A AB #193-EEJF	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED >250V 48M7/9V	W6EX5MTA	09FTD0230T	E1 PLUS OL RELAY 18-90A	HIGH VOLT BOX
ETI	OVERLOAD-INV ENABLED <250V 48M7/9V	W6EX5MTA	09FTD0040T	OL RELAY 40-200A AB #193-EEJF	HIGH VOLT BOX
EX	**>>TRANSFORMERS**				
EX37-1	TRANSFORMER-208/240VAC TO 120VAC	W6EX5PS	09U249AA37	XFMR 200-240 PRI/120SEC 250VA	HIGH VOLT BOX
EX37-2	TRANSFORMER-380/480VAC TO 120VAC	W6EX5PS	09U200AAB	XFMR 380-480/240-120V 250VA	HIGH VOLT BOX
EX37-3	TRANSFORMER-600VAC TO 120VAC	W6EX5PS	09U251AB37	XFMR 600VPRI/120VSC-250VA 3%REG	HIGH VOLT BOX
EXFHV	TRANSFORMER FAN 480VAC-240VAC	W6EX5MTA	09US010A96	XFMR 1PH1.5KVA240/480X120/240	RESISTOR BOX
F	**>>FAN**				
FAN1	FAN-INVERTER COOLING	W6EX5MCA	13AF235A37	FAN 235CFM 115V 50/60	HIGH VOLT BOX
KB	**>>KEYBOARD-ELECTRONIC**				
KBM	KEYPAD-MICROPROCESSOR	W6EX5KP	08MD5X6WE	KEYPAD:5X6MATRIX WASHER-EXT	LOW VOLT BOX

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
MT	**>>MOTORS**				
MTD	MOTOR-DRIVE >250 VAC 42 M9V	W6EX5VPA	39G840AATD	20HP 4P 220/380/440 50/60HZ	TOP OF MACH
MTD	MOTOR-DRIVE <250VAC 42M9V	W6EX5VPA	39G840AAHD	20HP 4P 208/240/60 ODP INV	TOP OF MACH
MTD	MOTOR-DRIVE >250 VAC 42 MMV	W6EX5VPA	39G870AATD	40HP4P 220/380/440 50/60HZ	TOP OF MACH
MTD	MOTOR-DRIVE <250VAC 42MMV	W6EX5VPA	39G870AAHD	40HP4P 208/240 50/60HZ	TOP OF MACH
MTD	MOTOR-DRIVE >250 VAC 42 MXV	W6EX5VPA	39G860AATD	30HP4P 220/380/440 50/60HZ	TOP OF MACH
MTD	MOTOR-DRIVE <250VAC 42MXV	W6EX5VPA	39G860AAHD	30HP4P 208/240/60 ODP INV	TOP OF MACH
MTD	MOTOR-DRIVE 48M7V	W6EX5VPA	39G860AATD	50HP 6P 230/460/60	TOP OF MACH
MTD	MOTOR-DRIVE 48M9V	W6EX5VPA	39G8C0AAT	60HP 6P 230/460/60	TOP OF MACH
MTDF	MOTOR-DOOR FAN 240VAC	W6EX5MTA	13AF210071	FAN 2100 CFM 240V 60HZ	REAR OF EXTR
MTDFL	FAN-DOOR LEFT	W6EX5MTA	13AF210071	FAN 2100 CFM 240V 60HZ	REAR OF EXTR
MTDFR	FAN-DOOR RIGHT	W6EX5MTA	13AF210071	FAN 2100 CFM 240V 60HZ	REAR OF EXTR
MV	**>>VARIABLE SPEED INVERTER**				
MVD	INVERTER-DRIVE MOTOR->250VAC 42M9V	W6EX5VPA	09MWA03996	INVERTER 39AMPS 480V F7	HIGH VOLT BOX
MVD	INVERTER-DRIVE MOTOR->250VAC 42MMV	W6EX5VPA	09MWA09196	F7 INVERTER 91 AMPS	HIGH VOLT BOX
MVD	INVERTER-DRIVE MOTOR->250VAC 42MXV	W6EX5VPA	09MWA07596	F7 INVERTER 75 AMP	HIGH VOLT BOX
MVD	INVERTER-DRIVE MOTOR->250VAC 48M7J	W6EX5VPA	09MWA07596	F7 INVERTER 75 AMP	HIGH VOLT BOX
MVD	INVERTER-DRIVE MOTOR->250VAC 48M9V	W6EX5VPA	09MWA09196	F7 INVERTER 91 AMPS	HIGH VOLT BOX
MVD	INVERTER- DRIVE MOTOR-<250VAC 42M9V	W6EX5VPA	09MWA07174	F7 INVERTER 71AMP	HIGH VOLT BOX
MVD	INVERTER- DRIVE MOTOR-<250VAC 42MMV	W6EX5VPA	09MWA18074	F7 INVERTER 180AMPS	HIGH VOLT BOX
MVD	INVERTER- DRIVE MOTOR-<250VAC 42MXV	W6EX5VPA	09MWA14574	F7 INVERTER 145 AMPS	HIGH VOLT BOX
MVD	INVERTER- DRIVE MOTOR-<250VAC 48M7V	W6EX5VPA	09MWA14574	F7 INVERTER 145 AMPS	HIGH VOLT BOX
MVD	INVERTER- DRIVE MOTOR-<250VAC 48M9V	W6EX5VPA	09MWA18074	F7 INVERTER 180AMPS	HIGH VOLT BOX
MVDR	BRAKING MODULE >250V 42 M7/9V	W6EX5VPA	09MVBT50HC	BRAKE MODULE-OPEN CHASSIS	BRAKING BOX
MVDR	BRAKING MODULE <250V 42 M7/9V	W6EX5VPA	09MVBT25LC	BRAKEMODULE OPEN CHASIS INVERT	BRAKING BOX
MVDR	BRAKING MODULE> 250V 48M7/9V	W6EX5VPA	09MVBT25HC	BRAKE MODULE-OPEN CHASSIS	BRAKING BOX
MVDR	BRAKING MODULE< 250V 48M7/9V	W6EX5VPA	09MVBT25LC	BRAKEMODULE OPEN CHASIS INVERT	BRAKING BOX
PS	**>>POWER SUPPLY**				
PS24	POWER SUPPLY-24V	W6EX5BWA	08PSL6C224	PWR SUP 100-240VAC TO 24VDC	LOW VOLT BOX
PX	**>>PROXIMITY SWITCH**				
PXCD	PROX SW-CONVEYOR SIDE IS DOWN	W6EX5IA	09RPS30ADS	PRXSW QK CONN 30M NO-DC SHLD	CONVEYOR
PXDD	PROX SW-LOAD DOOR IS DOWN	W6EX5IA	09RPS30ADS	PRXSW QK CONN 30M NO-DC SHLD	LOAD DOOR
PXDU	PROX SW-LOAD DOOR IS UP	W6EX5IA	09RPS30ADS	PRXSW QK CONN 30M NO-DC SHLD	LOAD DOOR

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
PXLCD	PROX SW-LOAD CHUTE IS DOWN	W6EX5IA	09RPS30ADS	PRXSW QK CONN 30M NO-DC SHLD	LOAD CHUTE
PXLCU	PROX SW-LOAD CHUTE IS UP	W6EX5IA	09RPS30ADS	PRXSW QK CONN 30M NO-DC SHLD	LOAD CHUTE
PXRD	PROX SW-REAR IS DOWN	W6EX5S+	09RPS30CAS	PROXSW QK CONN 30M NO-AC SHLD	SIDE OF MACH
PXRDI	PROX SW-REAR IS AT INTERMEDIATE	W6EX5HYP	09RPS30CAS	PROXSW QK CONN 30M NO-AC SHLD	SIDE OF MACH
PXSFU	PROX SW-CONVEYOR SIDE UP	W6EX5HYP	09RPS30CAS	PROXSW QK CONN 30M NO-AC SHLD	CONVEYOR SDE
RD	**>>DYNAMIC BRAKING RESISTORS**				
RDB	RESISTOR-DYNAMIC BRAKE 1&2	W6EX5VPBR	09MVR272D9	RESIST 27.2OHM DUAL 600V 10A	RESISTOR BOX
RDB	RESISTOR-DYNAMIC BRAKE 3	W6EX5VPBR	09MVR272S9	RESISTOR 27.2 OHMS SINGLE 600V 10A	RESISTOR BOX
RDB	RESISTOR-DYNAMIC BRAKE 1&2	W6EX5VPBS	09MVR068D9	RESISTOR 6.8OHM DUAL 600V	RESISTOR BOX
RDB	RESISTOR-DYNAMIC BRAKE 3	W6EX5VPBS	09MVR068S9	RESISTOR 6.8OHM SINGLE 600V	RESISTOR BOX
RS	**>>RESISTORS**				
RS01	RESISTOR-POWER SUPPLY	W6EX5BWB	ECEUV8R	LOAD RESISTOR ASSY MILTOUCH	LOW VOLT BOX
SH	**>>SWITCH-HAND OPERATED**				
SHBL1	SWITCH-MOVE CONV.FRWRD UNDER EX	W6EX5MCA	09N405M210	SWASS M2W 1NO	SWITCH PANEL
SHBL2	SWITCH-MOVE CONV.FRWRD OUTSIDE EX	W6EX5MCA	09N405M210	SWASS M2W 1NO	SWITCH PANEL
SHERP	SWITCH-EXTRACTOR RETURN PUMP	W6EX5EPA	09N405M210	SWASS M2W 1NO	SWITCH PANEL
SHMD	SWITCH-MILDATA	W6EX5IA	09N405M210	SWASS M2W 1NO	SWITCH PANEL
SHS+	SWITCH-START	W6EX5S+	09N405PB10	SWASS PBBK 1NO	SWITCH PANEL
SHSG	SWITCH-SIGNAL CANCEL	W6EX5IA	09N405PY10	SWASS PB YELLOW 1NO	SWITCH PANEL
SHSMA	SWITCH-MASTER	W6EX5S+	09N405M220	SWASS M2W 2NO	SWITCH PANEL
SHSO	SWITCH-STOP	W6EX5S+	09N404PR01	SWASS PBRD 1NC	SWITCH PANEL
SK	**>>SWITCH-KEY OPERATED**				
SKCP	SWITCH-ACCESS PANEL OVERRIDE	W6EX5S+	09N127C	KEYSW SPST 7A120VAC SCREW TER	SIDE OF MACH
SKPR	SWITCH-PROGRAM	W6EX5IA	09N127C	KEYSW SPST 7A120VAC SCREW TER	SWITCH PANEL
SL	**>>SWITCH-LEVEL**				
SLEPH	SWITCH-EXT. PUMP HIGH LEVEL SWITCH	W6EX5EPA	09RM01412S	CAPSW 12" ROTARY ACTUATE SILVE	SWITCH PANEL
SLEPL	SWITCH-EXT. PUMP LOW LEVEL SWITCH	W6EX5EPA	09RM01412S	CAPSW 12" ROTARY ACTUATE SILVE	SWITCH PANEL
SM	**>>SWITCH-MECHANICAL**				
SMCP#	SWITCH-ACCESS PANEL	W6EX5S+	09RM01418G	CAPSW 18' ROTARY ACTUATE GOLD	MOUNTONMACH
SMERB	SWITCH-MACHINE EXCURSION	W6EX5IA	09R008A	MICSW SPDT BZE6-2RN183	MOUNTONMACH
SMPCL	SWITCH-PULL CORD LEFT	W6EX5S+	09R014A	MINI-SW SPDT STAKON #V15G1C26	MOUNTONMACH
SMPCR	SWITCH-PULL CORD RIGHT	W6EX5S+	09R014A	MINI-SW SPDT STAKON #V15G1C26	MOUNTONMACH
SMRD	SWITCH-REAR IS DOWN	W6EX5S+	09RM01412S	CAPSW 12" ROTARY ACTUATE SILVER	RIGHT SIDE

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
SMRU	SWITCH-REAR IS FULL UP	W6EX5IA	09RM01412S	CAPSW 12" ROTARY ACTUATE SILVER	LEFT SIDE TOP
SP	**>>SWITCH-PRESSURE**				
SPBR	SWITCH-BRAKE	W6EX5IA	09N082A	PRESSW NASON CLOSE @ 62LB.	AIR VALVE BOX
VE	**>>VALVE-ELECTRIC**				
VECSD	VALVE-CONVEYOR SIDE DOWN	W6EX5HYP	09R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEDLG	VALVE-DEFLECT LOAD GOODS	W6EX5HYP	09R302B37	1/8" AIRPILOT 3W NO 120V50/60	AIR VALVE BOX
VEDO	VALVE-OPEN LOAD DOOR	W6EX5EV	09R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEDP	VALVE-CLOSE LOAD DOOR	W6EX5EV	09R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEFDD	VALVE-FLAG DOWN DISCHARGE	W6EX5EV	09R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEFDL	VALVE-FLAG DOWN LOAD	W6EX5EV	09R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEHTD	VALVE-HYDRAULIC TILT DOWN	W6EX5HYP	96RH707E37	VALVE MANIFOLD BLOCK ASSY	HYDRAULIC UNIT
VEHTU	VALVE-HYDRAULIC TILT UP	W6EX5HYP	96RH707E37	VALVE MANIFOLD BLOCK ASSY	HYDRAULIC UNIT
VELC	VALVE-LOWER CHUTE	W6EX5EV	96R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VELD	VALVE-LOWER CHUTE	W6EX5EV	96R302B37	1/8" AIRPILOT 3W NO 120V50/60	AIR VALVE BOX
VESDS	VALVE-DEFLATE SEAL	W6EX5EV	96R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VESIS	VALVE-INFLATE SEAL	W6EX5EV	96R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX
VEWBR	VALVE-BRAKE	W6EX5EV	96R301B37	1/8" AIRPILOT 3W NC 120V50/60	AIR VALVE BOX

PELLERIN MILNOR CORPORATION
LIMITED STANDARD WARRANTY

We warrant to the original purchaser that MILNOR machines including electronic hardware/software (hereafter referred to as "equipment"), will be free from defects in material and workmanship for a period of one year from the date of shipment (unless the time period is specifically extended for certain parts pursuant to a specific MILNOR published extended warranty) from our factory with no operating hour limitation. This warranty is contingent upon the equipment being installed, operated and serviced as specified in the operating manual supplied with the equipment, and operated under normal conditions by competent operators.

Providing we receive written notification of a warranted defect within 30 days of its discovery, we will—at our option—repair or replace the defective part or parts, EX Factory (labor and freight specifically NOT included). We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is tampered with, modified, or abused, used for purposes not intended in the design and construction of the machine, or is altered in any way without MILNOR's written consent.

Parts damaged by exposure to weather, to aggressive water, or to chemical attack are not covered by this warranty. For parts which require routine replacement due to normal wear—such as gaskets, contact points, brake and clutch linings, belts, hoses, and similar parts—the warranty time period is 90 days.

We reserve the right to make changes in the design and/or construction of our equipment (including purchased components) without obligation to change any equipment previously supplied.

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How to Get the Necessary Repair Components

This document uses Simplified Technical English.
Learn more at http://www.asd-ste100.org.

You can get components to repair your machine from the approved supplier where you got this machine. Your supplier will usually have the necessary components in stock. You can also get components from the Milnor® factory.

Tell the supplier the machine model and serial number and this data for each necessary component:

- The component number from this manual
- The component name if known
- The necessary quantity
- The necessary transportation requirements
- If the component is an electrical component, give the schematic number if known.
- If the component is a motor or an electrical control, give the nameplate data from the used component.

To write to the Milnor factory:

Pellerin Milnor Corporation
Post Office Box 400
Kenner, LA 70063-0400
UNITED STATES

Telephone: 504-467-2787
Fax: 504-469-9777
Email: parts@milnor.com

— End of BIUUUD19 —

Special Load Interface Requirements for the Milnor® Centrifugal Extractor

Regardless of what device loads a Milnor centrifugal extractor or what type of system the extractor is in, communication between the extractor and the loading device requires one or more allied interface connections (see Note 1). This document explains how to establish these connections when:

- the centrifugal extractor is loaded by a Milnor CBW® or Milnor COBUC (wet goods shuttle) and both devices communicate with Miltrac™ (either the older Miltrac controller or PC Miltrac software running on a MultiTrac PC),
- the centrifugal extractor is loaded by a Milnor CBW controlled by a Mentor® or Mark 8 Miltron™ controller, but one or both of the devices **do not** communicate with Miltrac.

Unlikely and/or nonspecific loading devices (e.g., COBUC in a non-Miltrac system, CBW with non-serial controls, allied tunnel) are not covered in this document. For such conditions, consult with Milnor Technical Support.

Allied interface signals are referred to in this document by their common names only. Connection points (terminal and pin number) are not provided. See the allied interface signals tables for this information. These tables can be found both in manual MTPALI01 (see Note 1) and in the schematic manuals for the individual machines.

> **Note 1:** For a detailed explanation of allied interfaces, refer to manual MTPALR01 "Allied Interfaces for Milnor Automated Laundering System Machines (Mark 5 Controls and Later)."

1. When the Devices Communicate Via Miltrac

If the CBW or COBUC and the centrifugal extractor communicate with Miltrac, all batch data and most operational data are handled by the Miltrac controller. Only the **start cycle** allied input to the extractor need be used in addition. This signal ensures proper distribution by causing the extractor to begin the cycle, and hence, to go from loading speed to distribution speed, as soon as the goods transfer, and before too much water has drained out. This timing cannot be reliably achieved by Miltrac.

If the centrifugal extractor is loaded by a CBW, this extractor input must be triggered by a CBW programmable output, as explained in Section 2.6 "The Start Cycle Signal". If loaded by a Milnor COBUC, use the COBUC **finished unloading to Milnor** output to close the extractor input (see Note 2). The COBUC is used where two or more extraction devices receive batches from the same tunnel. Wire this COBUC output to each centrifugal extractor that receives goods from the COBUC. Only the extractor that is currently receiving from the COBUC will respond to this signal.

> **Note 2:** Two COBUC outputs perform similar functions: **finished unloading to Milnor** (TBC-1 and TBC-2) and **finished unloading** (WCO-03 and WCO-04). The first is specifically for the Milnor centrifugal extractor and closes when the bucket, tilting up to dump the goods, reaches its upper limit. The second is for use by any other allied device.

2. When Devices Do Not Communicate Via Miltrac

If the CBW or the centrifugal extractor or both **do not** communicate with Miltrac, all communication between the CBW and the centrifugal extractor is via an allied interface. This requires that data passing is enabled on the Mentor or Miltron controller (Section 2.1). Batch data passed from the CBW to the extractor includes the **extract code** (Section 2.3), the **empty load** signal (Section 2.4), and may include other batch data, if available (Section 2.2). Operational signals from the CBW to the extractor include the optional **end extract (early call)** signal and the

required **start extractor** signal (Section 2.5), and the **start cycle** signal (Section 2.6). Additionally, the extractor must pass a **extractor says load allowed** signal to the CBW (Section 2.7).

2.1. Enabling Allied Data Pass—Whether the CBW is Miltron- or Mentor-controlled, allied data pass must be enabled and the module that supplies the batch data must be specified. On the Miltron, allied data pass is enabled in *Display N, Data Pass*. On the Mentor, it is enabled in *Data Pass* on the *CBW Hardware Configuration* page. The last module of the CBW supplies batch data to the extractor. The number that identifies this module is one less than the number of modules (for example, the last module on a 10 module CBW is module 9) because for this purpose, counting starts at zero (the first module is module 0). On the Miltron, enter this value in *Display H, Page 01*, in the *NCPOS* field. On the Mentor, enter it on the *CBW Output Timers* page, in the *Module Supplying Batch Data* field.

2.2. Batch Data—Applicable CBWs can provide, via allied signals, and the centrifugal extractor can read in: 16 dry codes, 256 customer codes, and the following signals: new formula, new customer, and single cake. The extractor can also read in 128 goods codes and 16 destination codes, but the CBW can only provide 8 destination codes. Refer to manual MTPALR01 (see Note 1) or the machine schematic manuals for connection points for these signals.

The extractor can be programmed for 16 discrete extract codes. Some, but not all applicable CBWs provide these. However, a work-around is available to handle extract codes, as explained in Section 2.3, below. The extractor can also read in an empty load signal. This must be handled as explained in Section 2.4, below.

2.3. Using Drycode for Extract Code on Certain CBW's—Some CBWs explicitly provide 16 extract code output signals. The following CBW controllers **do not**:

- Miltron controller with a software version 9401C or earlier
- Mentor controller with Generation2 (G2) Mentor software version 97107 or earlier
- Mentor controller with any Generation3 (G3) Mentor software version

On CBW's with any of the controllers listed above, the four output signals for drycode must be used instead for the extract code. If the CBW is Miltron-controlled, the extract codes would be programmed in the *Drycodes* column of Miltron *Display H, page 3, field B*. If the CBW is Mentor-controlled, they would be entered, instead of drycode, in the *Post Wash Codes* zone of the *Formula Programming* page. Of course, this means that another method must be used to introduce dry codes farther downstream in the system, if needed.

2.4. The Empty Load Signal—The CBW does not provide an explicit “empty load” (also referred to as pass empty) allied output. However, the “don't main press goods” output, normally used with the Milnor two-stage press, may be used for this purpose. Wire this output to the empty load input on the extractor. Whether the CBW is Miltron or Mentor controlled, enable this output for the “pass empty” formula by programming a value of 1 for press pressure. On the Mark 8 Miltron, this is *Display H, Page 3, Field E*. On the Mentor, this is the *Pressure* drop down box (not the *Pass Empty* check box) in the *Post-Wash Codes* zone of the *Formula Programming* page.

2.5. The End Extract (Early Call) and Start Extractor Signals—The end extract (early call) (if used) and start extractor inputs on the extractor can both be enabled at the same time. Hence, they can be served by a single output on the CBW. There is no explicit allied output provided for this purpose. Rather, a programmable output (C-bit) assigned to the last module must be allocated and wired to both the early call / end extract and loading mode / start extractor inputs on the extractor. This output is programmed as follows (whether the CBW is Miltron or Mentor controlled):

Compatibility = off
Op code = 09 (“Early Call”)
Hold code = N (or not checked)
Init code = A
On time = 255 (for every formula)

2.6. The Start Cycle Signal—Although the CBW does provide an explicit start press allied output, this is only for use with the press, not the extractor. Rather, for proper timing, a programmable output assigned to the last module must be allocated and wired to the to the extractor start cycle input. Whether a Miltron or a Mentor, this output is programmed as follows:

Compatibility = off
Hold code = N (or not checked)
Op code = 00 (“Standard Timed”)
Init code = H
On time = 004 (for every formula)

2.7. The Extractor Says Load Allowed Signal—The extractor says load allowed output on the extractor signals the CBW that it is free to receive a load. On a CBW with a Miltron controller or a Generation2 (G2) Mentor controller, connect this output to the explicitly provided press free allied input. The Generation3 (G3) Mentor controller does not provide an explicit press free input. On these machines, allocate a programmable input for this purpose and assign it input op code 11 (“Press Free”).

— End of BICXUI01 —

Milnor® Allied Interface Specifications and Signals, Centrifugal Extractor

An allied device that interfaces with the Milnor system machine equipped with Mark 5 or later microprocessor controls must meet the electrical specifications and functional requirements given in Section 1 "Electrical and Functional Specifications".

The "Signals..." section(s) herein identify the allied interface signals and provide related information (see Section 2 "How the Signals Tables Are Organized").

This document also provides useful information for troubleshooting allied interfaces:

- The **Display/code** and **Board/code** values in the signals tables, are cross-references to the output and input displays and to the output and input numbers on the I/O boards respectively. Section 4 "Monitoring Allied Interface Outputs and Inputs", explains how to use these cross-references.
- As an aid in working with **numeric signals**, Section 5 "Decimal / Binary Conversion and How It Applies to Allied Interfaces" explains how to determine, for any batch code, which value (off or on) each signal in a group should pass.

1. Electrical and Functional Specifications

WARNING 1: Electrocution and Electrical Burn Hazards—Contact with high voltage will electrocute or burn you. Power switches on the machine and the control box do not eliminate these hazards. High voltage is present at the machine unless the main machine power disconnect is off.

- Do not service machine unless qualified and authorized.
- Lock out and tag out power at the main machine disconnect before opening electric boxes and accessing electrical components.

For inputs from Milnor (Milnor outputs), the allied device must limit circuit load to that specified in Section 1.1, below. For outputs to Milnor (Milnor inputs), the allied device must supply circuitry that meets the specifications in Section 1.2, below. The functional requirements stated in Section 1.3 must be met for proper coordination and data exchange between the devices.

1.1. Permissible Load for Milnor Outputs

—For signals from Milnor to allied (Milnor outputs/allied inputs), Milnor supplies potential-free contacts located on board-mounted relays. The signals are conducted by traces on the board having the following capacity:

- Maximum voltage: 240V
- Maximum current: 0.5 amps
- Maximum VA: 3

CAUTION 2: Risk of Damage/Malfunction—Traces on control boards may burn out, requiring board replacement, if called upon to handle heavy currents. High voltages can cause arcing across traces.

- Do not apply loads exceeding the specified capacity.
- Do not use allied interface outputs to operate motors or for any other unintended purpose. These may, however, be used to operate relays that do not exceed the specified capacity.

1.2. Component Requirements for Milnor Inputs—For signals from allied to Milnor (allied outputs/Milnor inputs–which connect directly to control boards and are used to ground Milnor control inputs), Milnor applies a low energy signal as follows:

- Voltage: 5VDC or 12VDC
- Minimum current: 5 milliamps

The potential-free contacts supplied by allied and the circuit wiring must be capable of faithfully carrying these low energy signals.

CAUTION 3: Risk of Bad Data—Resistance due to wire length or deteriorated contacts can mask signals. Inadequate shielding against electrical noise can trigger false signals.

- Keep wire runs as short as possible.
- Use a digital signal ground connection (wire number 2G on the CBW; wire number 7 on other Milnor devices), not merely chassis ground.
- Ground any spare wires.
- Pass all wires through a ferrite bead.
- Replace relays that have worn or corroded contacts.
- Do not run input wiring adjacent to, or in the same conduit with, any wires carrying AC. For example, do not run input and output wiring in the same conduit if AC is used to power Milnor output/allied input signals.

1.3. Functional Requirements

1. For numeric signals (batch codes) from allied to Milnor (allied loading interface), all signals must be properly set when the operational signal indicating this data is valid occurs. Signals must remain set for the longer of 5 seconds or through any subsequent operational signal requiring this data (see “Loading Interface non-Numeric Signals...”). Milnor will read all numeric signals during this time.
2. For numeric signals from Milnor to allied (allied discharge interface), allied must not read signals until the data valid, or other operational signal indicating data is valid occurs (see “Discharge Interface non-Numeric Signals...”).
3. Although not all the operational signals listed in the tables are necessarily required, (the signals used will vary with specific machine models and with variations in the operating cycle), those signals used, must occur in the order listed.
4. When connecting numeric signals between devices, ensure that signals are properly matched up with respect to significance (least significant-to-least significant, next least significant-to-next least significant, etc.).

2. How the Signals Tables Are Organized

For an allied device that loads the Milnor machine, Milnor provides an allied **loading interface**. For an allied device that receives goods from (discharges) the Milnor machine, Milnor provides an allied **discharge interface**. In both cases, some signals are used in groups to pass **numeric** values in binary and some signals are used individually to pass **non-numeric** (on/off) values. The receiving device can read the groups of numeric signals in any order as long as it reads this data during the window of time within which it is valid. However, because each signal within a group of numeric signals represents a specific digit of the binary number, the order of significance of the signals (**digit order**) must be understood and must match on sending and receiving devices. Most non-numeric signals provide operational information which must be exchanged according to a predetermined “handshaking” scheme. Hence, the sequence in which operational signals occur (**enabling order**) is critical. Accordingly, the signal information is presented in four tables:

1. **Loading interface numeric *input* signals and digit order**—In this table, signals are depicted in digit order, that is, the way they would be read as a binary number. The rightmost **column** represents the signal that carries the least significant digit. Each adjacent **column** to the left is the signal representing the digit of next higher significance. The table is divided into **row** groups—one row group for each batch code provided. Each row group provides pertinent information for the signals used with that batch code. In an allied loading interface, all numeric signals pass from allied to Milnor and are therefore, **inputs** to Milnor.
2. **Loading interface non-numeric signals and enabling order**—In this table, each **row** represents a signal and each **column** provides pertinent information for that signal. Generally, these signals must be exchanged by the interfaced devices in the order listed. The labels given to operational signals in the schematics can vary from device to device. However, the document "Summary of Milnor Allied Interface Capability" provides generic names for these. The right-hand column of this table provides both the generic (function) name and the signal name as shown in the schematic, except where these are the same.
3. **Discharge interface numeric *output* signals and digit order**—This table is arranged the same as the "loading interface numeric..." table. However, in an allied discharge interface, all numeric signals pass from Milnor to allied and are therefore, **outputs** from Milnor.
4. **Discharge interface non-numeric signals and enabling order**—This table is arranged the same as the "loading interface non-numeric..." table. As with a loading interface, the devices need to exchange these signals in the order shown.

3. Signals—Centrifugal Extractors With Mark 5 Controls [Document BICALC05]

Table 1: Loading Interface Numeric Input Signals and Digit Order—Centrifugal Extractor

Signal name on schematic (e.g., Drycode A, B, etc.)-->		Common Conn.	Most Significant		Dedicated Connections (Binary Data Signals)							Least Significant
			J	I	H	G	F	E	D	C	B	A
16 Drycodes (00 - 15)	Multi-terminal	TBA							WC2	WC2	WC2	WC2
	Pin Number	7							8	7	6	5
	Wire Number	7							231	232	233	234
	Display/code	--							i3/H	i3/G	i3/F	i3/E
	Board/code	--							io2/7	io2/6	io2/5	io2/4
16 Destination Codes (00-15)	Multi-terminal	TBA							WC1	WC1	WC1	WC1
	Pin Number	7							12	11	10	9
	Wire Number	7							347	348	349	340
	Display/code	--							i4/L	i4/K	i4/J	i4/I
	Board/code	--							io3/11	io3/10	io3/9	io3/8
256 Customer Codes (000-255)	Multi-terminal	TBA			WC1	WC2	WC2	WC2	WC2	WC2	WC2	WC2
	Pin Number	7			1	16	15	14	13	12	11	10
	Wire Number	7			330	241	242	243	244	247	248	249
	Display/code	--			i4/A	i3/P	i3/O	i3/N	i3/M	i3/L	i3/K	i3/J
	Board/code	--			io3/0	io2/15	io2/14	io2/13	io2/12	io2/11	io2/10	io2/9
128 Goods Codes (000-127)	Multi-terminal	TBA				WC1	WC1	WC1	WC1	WC1	WC1	WC1
	Pin Number	7				8	7	6	5	4	3	2
	Wire Number	7				331	332	333	334	337	338	339
	Display/code	--				i4/H	i4/G	i4/F	i4/E	i4/D	i4/C	i4/B
	Board/code	--				io3/7	io3/6	io3/5	io3/4	io3/3	io3/2	io3/1
16 Extract Formula Codes (00-15)	Multi-terminal	TBA							WC2	WC2	WC2	WC2
	Pin Number	7							4	3	2	1
	Wire Number	7							237	238	239	230
	Display/code	--							i3/D	i3/C	i3/B	i3/A
	Board/code	--							io2/3	io2/2	io2/1	io2/0

Table 2: Loading Interface non-Numeric Signals and Enabling Order—Centrifugal Extractor

Signal Direction	Common Connection*			Dedicated Connection			Display / code	Board / code	Function Name / Signal Name
	Multi-terminal	Pin	Wire	Multi-terminal	Pin	Wire			
Although Milnor reads the batch data (previous table and next four signals) when it receives the "loading mode / start extractor" signal, these signals should be set before the "early call / end extract" signal (if used) is enabled.									
Input	TBA	7	7	WC1	13	344	i4/M	io3/12	new formula
Input	TBA	7	7	WC1	14	343	i4/N	io3/13	new customer
Input	TBA	7	7	WC1	15	342	i4/O	io3/14	empty load
Input	TBA	7	7	WC2	9	240	i3/I	io2/8	single cake
Input	TBA	7	7	TBA	71	71	i1/D	**	early call / end extract
Output*	TBA	100	100	TBA	99	99	o1/n	o1/5	load desired / extractor desires load
Input	TBA	7	7	TBA	88	88	i2/K	io1/11	loading mode / start extractor
Output*	TBA	109	109	TBA	101	101	o1/d	io1/3	load allowed / extractor says load allowed
Input	TBA	7	7	TBA	91	91	i2/L	io1/12	transfer complete / start cycle
* For outputs from Milnor, Milnor does not normally assign either pin of the potential-free contact as the common. Hence, both pins have unique pin and wire numbers. ** This signal uses a direct input on the processor board, not an input on a peripherial board.									

Table 3: Discharge Interface Numeric Output Signals and Digit Order—Centrifugal Extractor

Signal name on schematic (e.g., Drycode A, B, etc.)-->		Common Conn.*	Most Significant		Dedicated Connections (Binary Data Signals)							Least Significant
			J	I	H	G	F	E	D	C	B	A
16 Drycodes (00 - 15)	Multi-terminal	n/a							WCZ	WCZ	WCZ	WCZ
	Pin Number	n/a							7 • 8	5 • 6	3 • 4	1 • 2
	Wire Number	n/a							452 • 460	454 • 453	456 • 455	459 • 458
	Display/code	--							o3/d	o3/c	o3/b	o3/a
	Board/code	--							io2/3	io2/2	io2/1	io2/0
16 Destination Codes (00-15)	Multi-terminal	n/a							WCD	WCD	WCD	WCD
	Pin Number	n/a							21** • 22	21** • 24	25 • 26	27 • 28
	Wire Number	n/a							267 • 274	267 • 275	268 • 276	269 • 277
	Display/code	--							o4/n	o4/m	o4/l	o4/k
	Board/code	--							o2/13	o2/12	o2/11	o2/10
256 Customer Codes (000-255)	Mulit-terminal	n/a			WCX	WCX	WCX	WCX	WCX	WCX	WCX	WCX
	Pin Number	n/a			15 • 16	13 • 14	11 • 12	9 • 10	7 • 8	5 • 6	3 • 4	1 • 2
	Wire Number	n/a			368 • 369	366 • 367	364 • 365	361 • 362	352 • 360	354 • 353	356 • 355	359 • 358
	Display/code	--			o3/p	o3/o	o3/n	o3/m	o3/l	o3/k	o3/j	o3/i
	Board/code	--			io3/7	io3/6	io3/5	io3/4	io3/3	io3/2	io3/1	io3/0
128 Goods Codes (000-127)	Mulit-terminal	n/a				WCD	WCD	WCD	WCD	WCD	WCD	WCD
	Pin Number	n/a				31 • 32	15 • 16	13 • 14	11 • 12	9 • 10	7 • 8	5 • 6
	Wire Number	n/a				271 • 279	257 • 265	256 • 264	255 • 263	254 • 262	253 • 261	252 • 260
	Display/code	--				o4/i	o4/h	o4/g	o4/f	o4/e	o4/d	o4/c
	Board/code	--				o2/8	o2/7	o2/6	o2/5	o2/4	o2/3	o2/2
16 Formula Codes (00-15)	Mulit-terminal	n/a							WCZ	WCZ	WCZ	WCZ
	Pin Number	n/a							15 • 16	13 • 14	11 • 12	9 • 10
	Wire Number	n/a							468 • 469	466 • 467	464 • 465	461 • 462
	Display/code	--							o3/h	o3/g	o3/f	o3/e
	Board/code	--							io2/7	io2/6	io2/5	io2/4

* For outputs from Milnor, Milnor does not normally assign either pin of the potential-free contact as the common. Hence, both pins have unique pin and wire numbers. In this table these are listed together in the same cell, with a dot between (e.g., C • D)

** To provide 4 destination signals with limited available terminals, Destination Codes C and D had to share pin 21.

Table 4: Discharge Interface non-Numeric Signals and Enabling Order—Centrifugal Extractor

Signal Direc-tion	Common Connection*			Dedicated Connection			Display / code	Board / code	Function Name / Signal Name
	Multi-terminal	Pin	Wire	Multi-terminal	Pin	Wire			
Input	TBA	7	7	TBA	94	94	i2/P	io1/15	(no function name) / discharge allowed***
Output*	TBA	96	96	TBA	95	95	o1/h	io1/7	discharge desired / discharge desired
Milnor sets all batch data (previous table and next three signals) before it enables the "transfer complete / discharge finished" signal.									
Output*	WCD	3	251	WCD	4	259	o4/b	o2/1	new formula
Output*	WCD	29	270	WCD	30	278	o4/j	o2/9	new customer
Output*	WCD	1	250	WCD	2	258	o4/a	o2/0	single cake
Input	TBA	7	7	TBA	76	76	i1/J	**	load allowed / start discharge
Output*	TBA	98	98	TBA	97	97	o1/p	o1/7	transfer complete / discharge finished

* For outputs from Milnor, Milnor does not normally assign either pin of the potential-free contact as the common. Hence, both pins have unique pin and wire numbers.

** This signal uses a direct input on the processor board, not an input on a peripherial board.

*** The function of this input is to inable/disable discharging via a manually operated switch. This is not the "discharge allowed" function.

4. Monitoring Allied Interface Outputs and Inputs

The status of outputs and inputs can be monitored on the machine display while the machine is in operation, as explained in the machine reference manual (see Note 1 and Note 2). Beginning with Mark 4 controls (Mark 9 on the CBW), output and input status can also be monitored on the I/O boards. These boards contain LED's—one green LED for each input and one red LED for each output (see Note 3). When the LED is illuminated, the circuit is made.

Note 1: It is also possible to actuate certain outputs for testing, as explained in the reference manual. However, the “Display/code” values in the tables herein, refer only to the displays used to view outputs/inputs.

Note 2: The outputs and inputs available for viewing on the display include some (but not all) allied interface signals as well as signals for many other functions. See the reference manual for a listing of all outputs and inputs that can be monitored during operation.

Note 3: Almost all allied interface outputs and inputs are passed via the I/O boards (peripheral boards) and are therefore, represented by LED's on the boards. A few, however, are passed directly via the processor board (direct outputs/inputs). The processor board does not contain LED's.

4.1. Identifying Outputs and Inputs on the Display Pages —On CBW's, some allied inputs are available for viewing on the Mentor *Direct and Standard Inputs* page (as indicated in the signals tables). It is fairly easy to identify signals on the Mentor because the signal names are displayed.

The single stage press, two stage press, centrifugal extractor, shuttle, COBUC, and dryer use a two or four line by 20 character LCD display (see Note 4). On these devices, each output or input is represented by a character (lower or upper case letter) on the top line and a plus (+) or minus (-) sign under the character indicating the on/off status of the signal. The outputs and inputs span several display pages. Each page is accessed via the keypad and the procedures for doing so are explained in the reference manual. The “Display/code” values listed in the tables herein tell you which display page and character represent the indicated signal, as shown in the following example:

i2/H

Where:

i = **input** display page (o = **output** display page)

2 = the second in a series of input display pages. See the reference manual for the keystrokes used to access each display page in the series. Note that in some software such as the centrifugal extractor, page numbering begins with 0 (zero); that is, the first page is page #0. Hence, on software such as the extractor, i2 = inputs page #1 (the second inputs page).

H = This input is represented by the character "H" on the display.

Note 4: When the Milnor Dryer/Shuttle Controller is provided for a new installation, the LCD displays are omitted from the controllers for any shuttle(s) and dryer(s) also provided. In this case, inputs and outputs may be viewed on the monitor supplied with the shuttle/dryer controller. As with the CBW Mentor controller, it is easy to identify signals because the signal names are displayed.

4.2. Identifying Output and Input LED's On the I/O Boards (all except 76032 CBW)

—Two types of output/input peripheral boards are used in conjunction with the allied interfaces covered herein. Their designations and capacities are:

1. **BO24-x**—contains 24 outputs (and no inputs). x is "1", "2", etc. indicating the first, second, etc. such board in this machine.
2. **BIO-x**—contains 16 inputs and 8 outputs. x is "1", "2", etc. indicating the first, second, etc. such board in this machine.

For all except the CBW, the peripheral boards are located in the low voltage electric box. The arrangement and combination of these boards within the card cage varies with the machine type and optional equipment provided. For the G3 CBW (Mark 9), the boards that support the explicit allied interface signals are located in the card cage in the left (Standard Output) section of the main control box.

A tag located in the electric box identifies the boards that may be provided and shows the position of each board in the card cage. Each 24 output board has a set of red LED's (numbered 0 through 23). Each 16/8 I/O board has two sets of LED's—a red set for the outputs (numbered 0 through 7) and a green set for the inputs (numbered 0 through 15). The "Board/code" values listed in the tables herein tell you which board and output or input number represent the indicated signal, as in the following example:

io2/5

Where:

io2 = the 16/8 I/O board designated "BIO-2". (Other examples: io1=BIO-1, o1=BO24-1, o2=BO24-2)

5 = input #5, if this signal is an input or output #5 if this signal is an output.

5. Decimal / Binary Conversion and How It Applies to Allied Interfaces

Batch codes (decimal numbers) are converted to binary by the sending controller, then passed via the numeric signals to the receiving controller, where they must be converted back to decimal numbers. For example, if an interface provides for passing 16 drycodes, then to pass drycode 14

(binary 1110), drycode signals D, C, B, and A (from most to least significant) must be on, on, on, and off respectively, during the "data valid" window.

Table 5 "Numeric Signal Decimal and Binary Values" shows, for the first 16 decimal numbers (e.g., drycodes 00 through 15), the corresponding binary numbers and which numeric signal carries each binary digit. This table's columns correspond to, and align with the columns in each table of numeric signals herein. For higher numbers, use the "Decimal Value of Signal" values in this table to convert between decimal and binary as explained herein.

Table 5: Numeric Signal Decimal and Binary Values

Signal name on schematic (e.g., Drycode A, B, etc.)-->		Decimal Value of Group	Most Significant		Binary Data Signals						Least Significant
			J or K or 9	I or J or 8	H or 7	G or 6	F or 5	E or 4	D or 3	C or 2	B or 1	A or 0
Decimal Value of Signal-->			**512**	**256**	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**
		0							0	0	0	0
		1							0	0	0	1
		2							0	0	1	0
		3							0	0	1	1
		4							0	1	0	0
		5							0	1	0	1
		6							0	1	1	0
		7							0	1	1	1
		8							1	0	0	0
		9							1	0	0	1
		10							1	0	1	0
		11							1	0	1	1
		12							1	1	0	0
		13							1	1	0	1
		14							1	1	1	0
		15							1	1	1	1

The number of data signals required for typical ranges of batch codes are as follows:

Code Range	Signals Required
00-15	A-D
00-31	A-E
00-63	A-F
000-127	A-G
000-255	A-H
000-511	A-I or J
0000-1023	A-J or K

For brevity, this table shows only the binary numbers for decimals 0 - 15 (e.g., decimal 7 = binary 0111).

Use the "Decimal Value of Signal" values above, to convert between decimal and binary, for any decimal number between 16 and 1023.

See explanations of decimal / binary conversion herein.

For convenience, an example and explanations of converting between decimal and binary follow. Many other examples and explanations can be found in mathematics texts, on the Internet, etc. Also, some pocket calculators and many computer programs are available for converting between decimal and binary.

Note 5: In Table 6, which follows, the "Decimal value of binary 1 in this position" is the same as "Decimal Value of Signal" in Table 5.

Table 6: Decimal Values for Binary Digit 1 In the First Ten Positions

Significance of digit	**most**									**least**	
Position of digit	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	
Decimal value of binary 1 in this position	**512**	**256**	**128**	**64**	**32**	**16**	**8**	**4**	**2**	**1**	
Example binary number	1	0	0	1	0	1	1	0	1	0	
Decimal value carried down for this example	512	0	0	64	0	16	8	0	2	0	= 602

5.1. Converting Decimal to Binary—Referring to Table 6, if you want to convert decimal number 602 to binary, use the "Decimal value of binary 1 in this position" values, as follows:

512 = highest value not exceeding 602.
602 – 512 = 90
64 = highest value not exceeding 90.
90 – 64 = 26
16 = highest value not exceeding 26.
26 – 16 = 10
8 = highest value not exceeding 10.
10 – 8 = 2
2 = highest value not exceeding 2.
2 – 2 = 0

In the above arithmetic, you used the decimal values 512, 64, 16, 8, and 2. You did not use 256, 128, 32, 4, and 1. Placing a 1 in the position for each decimal value used and a 0 (zero) in each position not used, yields 1001011010. Hence, decimal 602 = binary 1001011010.

5.2. Converting Binary to Decimal—Referring to Table 6, if you want to convert binary to decimal, simply sum the decimal values corresponding to the 1's in each position of the binary number. Keep in mind that while a 1 in any position has a certain positive decimal value, a 0 (zero) in any position has the decimal value 0 (zero). The conversion for binary 1001011010 looks like this:

512 + 0 + 0 + 64 + 0 + 16 + 8 + 0 + 2 + 0 = 602

Hence, binary 1001011010 = decimal 602.

— End of BICALC02 —

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How to Use Milnor® Electrical Schematic Diagrams

Milnor® electrical schematic manuals contain a table of contents/component list and a set of schematic drawings. These documents are cross referenced and must be used together.

The table of contents/components list shows, for every component on every schematic in the manual, the component item number (explained in detail below), statement of function, parent schematic number, part number, description and electric box location. In older manuals, two component lists are provided: List 1 sorts the components by function, and List 2 by type of component. Newer schematic manuals include only the list sorted by component number.

The schematic drawings use symbols for each electromechanical component, and indicate the function of each. Integrated circuits are not shown, but the function of each microprocessor input and output is stated. Certain electrical components not pertinent to circuit logic, such as wire connectors, are not represented on the schematic.

Most machines require several schematics to describe the complete control system and all the options available on the included models. In most manuals there are some schematic pages that don't apply to your specific machine because certain options and configurations are mutually exclusive or are not necessary in all markets. You may find it helpful to mark or remove such pages. A schematic page that only applies to a subset of machines will normally state, in the title, which models and/or options it covers. Compare this with the nameplate on your machine and with your purchase records.

Each schematic is devoted to circuits with common functions (e.g., microprocessor inputs, motor contactors). Schematics appear in the manual in alphanumeric order.

1. Component Prefix Classifications and Descriptions

Component item numbers consist of up to six characters and appear as part of a component's symbol on the schematic. The first two characters indicate the general class of component, and the remaining characters are a mnemonic for the function. For example, “CD” is the code for all time delay relays, and “SR” stands for safety reset. Thus, CDSR is a time delay relay that serves as a safety reset.

The following are descriptions of electrical components used in Milnor® machines. Descriptions are in alphabetical order by the component class code (two character prefix).

> **Note 1:** Some component class codes do not have a corresponding symbol, but are represented by a box and an accompanying note describing the component. Examples of such codes are BA (printed circuit board), ED (electronic display), and ES (electronic power supply).

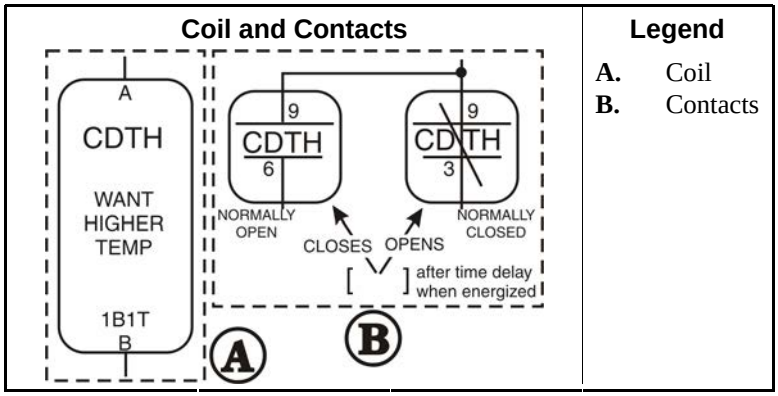
BA=Printed Circuit Board—Insulating substrate on which a thin pattern of copper conductors has been formed to connect discrete electronic components also mounted on the board.

CB=Circuit Breaker (Figure 1)—Automatic switch that opens an electric circuit in abnormal current conditions (e.g., an overload).

Figure 1: Circuit Breaker (CB)

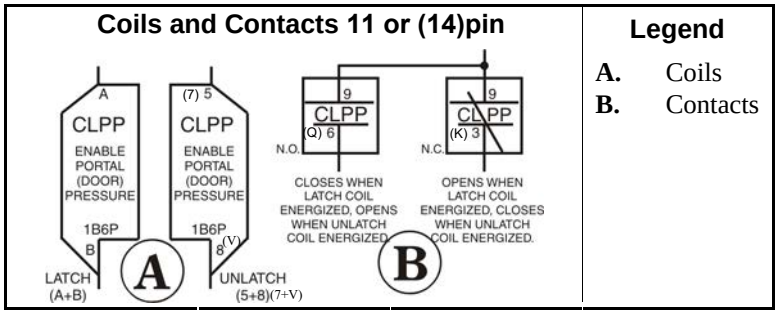
CD=Control, Time Delay Relay (Figure 2)—A relay whose contacts switch only after a fixed or adjustable delay, once voltage has been applied to its coil. The contacts switch back to normal (de-energized state) immediately when the voltage is removed.

Figure 2: Time Delay Relay (CD)



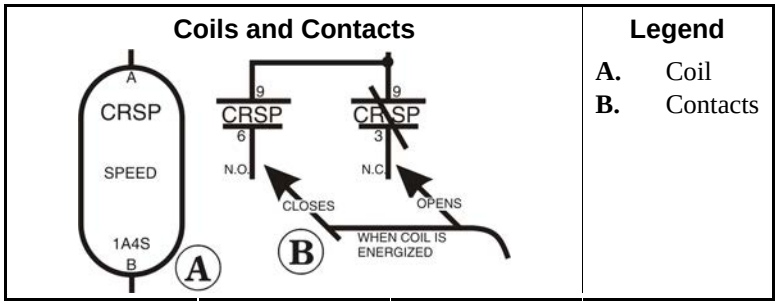
CL=Control, Latch Relay (Figure 3)—A relay which latches in an energized or set position when operated by one coil (the latch/set coil). The relay stays latched even though coil voltage is removed. The relay releases or unlatches when voltage is applied to a second coil (the unlatch/reset coil).

Figure 3: Latch Relay (CL)



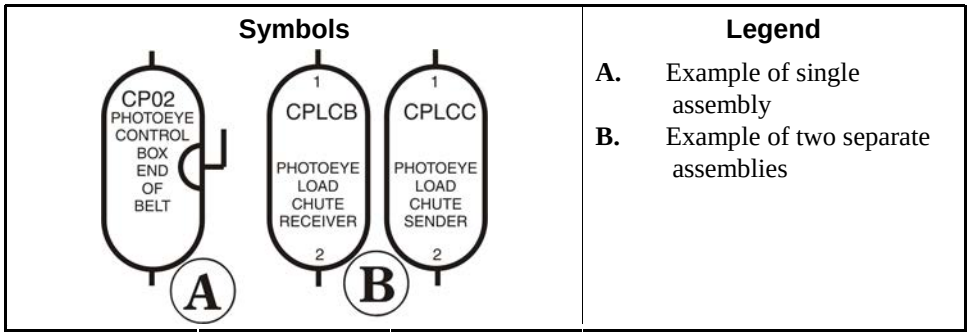
CR=Control, Relay (Figure 4)—A relay whose contacts switch immediately when voltage is applied to its coil and revert to normal when the voltage is removed.

Figure 4: Standard Relay (CR)



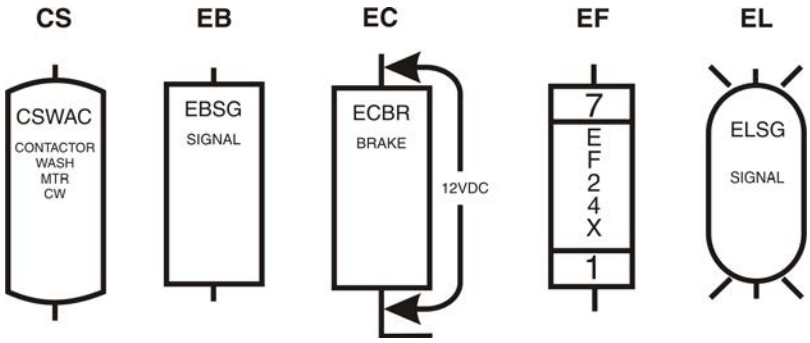
CP=Control, Photo-Eye (Figure 5)—Photo-eyes sense the presence of an object without direct physical contact. Photo-eyes consist of a transmitter, receiver, and output module. These components may be housed in one assembly with the transmitter bouncing light off of a reflector to the receiver, or these components can be housed in two separate assemblies with the transmitter pointed directly at the receiver. The photo-eye can be set to turn on its output either when the light beam becomes blocked (dark operate) or when it becomes un-blocked (light operate).

Figure 5: Photo-eye (CP)



CS=Control, Contactor/Motor Starter (Figure 6)—A relay capable of handling heavier electrical loads, usually a motor.

Figure 6: Other Control Symbols



EB=Electric Buzzer (Figure 6)—An audible signaling device.

EC=Electric Clutch (Figure 6)—A clutch consists of a coil and a rotor. The rotor has two separate rotating plates. These plates are free to rotate independent of each other until the coil is energized. Once energized the two plates turn as one.

ED=Electronic Display—A visual presentation of data, such as an LCD (liquid crystal display), LED (light emitting diode) display, or VFD (vacuum florescent display).

EF=Electric Fuse (Figure 6)—A fuse is an over-current safety device with a circuit opening fusible member which is heated and severed by the passage of over-current through it.

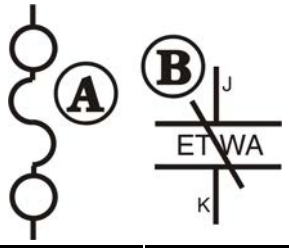
EL=Electric Light (Figure 6)—Indicator lights may be either incandescent or fluorescent.

EM=Electro Magnet Solenoid—A device consisting of a core surrounded by a wire coil through which an electric current is passed. While current is flowing, iron is attracted to the core (e.g., a pinch tube drain valve solenoid).

ES=Electronic Power Supply—A device that converts AC (alternating current) to filtered and regulated DC (direct current). The input voltage to the power supply is usually 120 or 240 VAC. The output is +5, +12, and -12 VDC.

ET=Thermal Overload (Figure 7)—A safety device designed to protect a motor. A thermal overload consists of an overload block, heaters, and an auxiliary contact. The auxiliary contact is normally installed in a safety (three-wire) circuit that stops power to the motor contactor coil when a motor overload occurs.

Figure 7: Thermal Overload (ET)

Schematic Symbol	Legend
	**A.** Heater (one per phase) **B.** Overload relay; contacts open if overload condition exists

EX=Electrical Transformer (Figure 8)—A device that transfers electrical energy from one isolated circuit to another, often raising or lowering the voltage in the process.

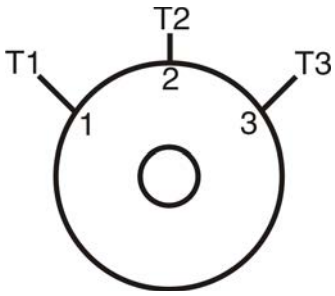
KB=Keyboard—Device similar to a typewriter for making entries to a computer.

MN=Electronic Monitor (CRT)—A cathode ray tube used for visual presentation of data.

MR=Motors (Figure 9)—Electromechanical device that converts electrical energy into mechanical energy.

Figure 8: Transformer (EX)

Figure 9: Electric Motor (MR)

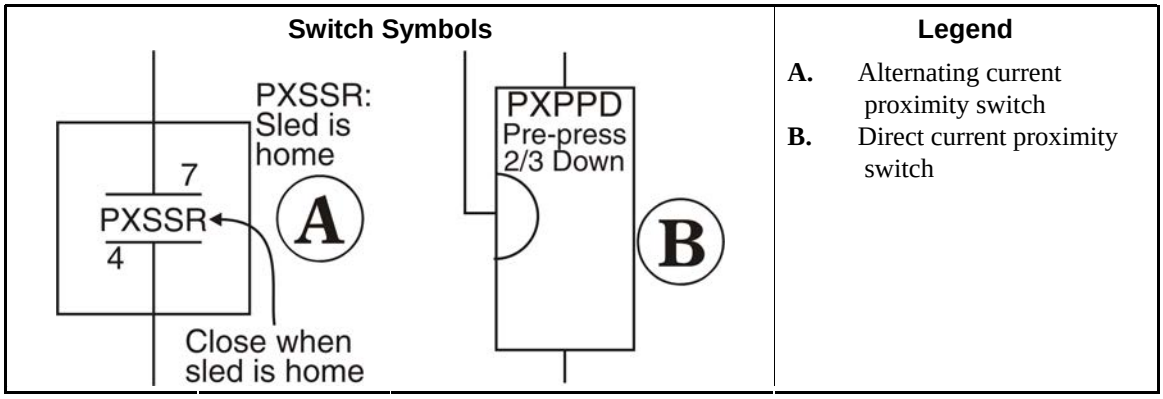


MV=Motor (Variable Speed) Inverter—To vary the speed of an AC motor, the volts to frequency ratio must be kept constant. The motor will overheat if this ratio is not maintained. The motor variable speed inverter converts three phase AC to DC. The inverter then uses this DC voltage to generate AC at the proper voltage and frequency for the commanded speed.

Note 2: Switch symbols used in the schematics and described below always depict the switch in its un-actuated state.

PX=Proximity Switch (Figure 10)—A device which reacts to the proximity of an target without physical contact or connection. The actuator or target causes a change in the inductance of the proximity switch which causes the switch to operate. Proximity switches can be two-wire (AC) or three-wire (DC) devices.

Figure 10: Proximity Switches (PX)



SC=Switch, Cam Operated (Figure 11)—A switch in which the electrical contacts are opened and/or closed by the mechanical action of a cam(s). Applications include 35-50 pound timer operated machines, Autospot, timer reversing motor assembly, and some balancing systems.

SH=Switch, Hand Operated (Figure 12)—A switch that is manually operated (e.g., *Start button*, *Master switch*, etc.).

Figure 11: Cam Switch (SC)

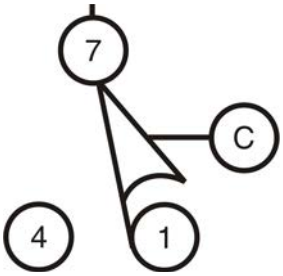
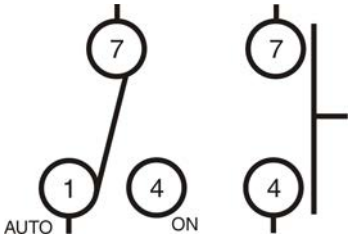


Figure 12: Hand Operated Switch (SH)



SK=Switch, Key Lock (Figure 13)—A switch that requires a key to operate. This prevents unauthorized personnel from gaining access to certain functions (e.g., the *Program menu*).

SL=Switch, Level Operated (Figure 14)—A switch connected to a float that causes the switch to open and close as the level changes.

Figure 13: Key Switch (SK)

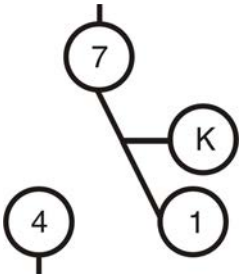
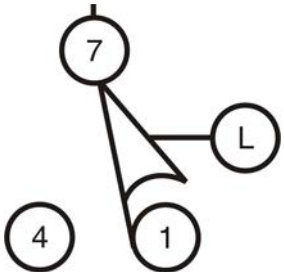


Figure 14: Level Switch (SL)



SM=Switch, Mechanically Operated (Figure 15)—A switch that is mechanically operated by a part of or the motion of the machine (e.g., door closed switch, tilt limit switches, etc.)

SP=Switch, Pressure Operated (Figure 16)—A switch in which a diaphragm presses against a switch actuator.

Figure 15: Mechanical Switch (SM)

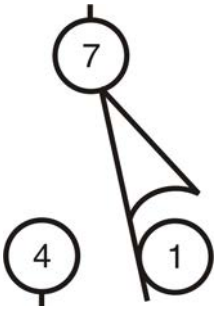
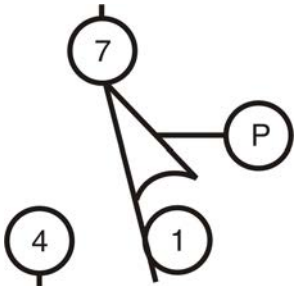


Figure 16: Pressure Switch (SP)



ST=Switch, Temperature Operated (Figure 17)—A switch that is actuated at a preset temperature (e.g., dryer safety probes) or has adjustable set points (e.g., Motometers or Combistats).

TB=Terminal Board (Figure 18)—A strip or block for attaching or terminating wires.

Figure 17: Temperature Switch (ST)

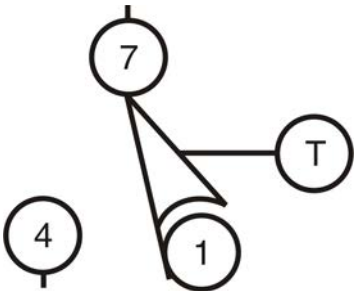
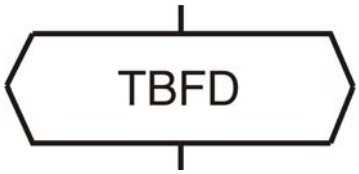


Figure 18: Terminal Board (TB)



VE=Valve, Electric Operated (Figure 19)—A valve operated by an electric coil to control the flow of fluid. The fluid can be air, water or hydraulic.

Figure 19: Electrically Operated Valve (VE)

ZF=Rectifier (Figure 20)—A solid state device that converts alternating current to direct current.

Figure 20: Bridge Rectifier (ZF)

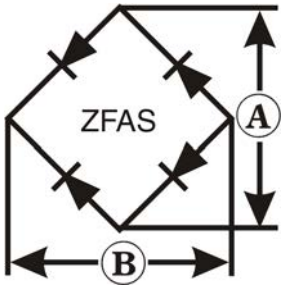
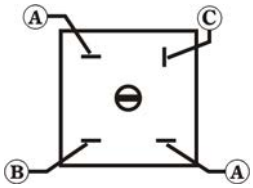
Component Symbol	Legend
	**A.** Alternating current input **B.** Direct current output

Figure 21: Bridge Rectifier

Component	Legend
	**A.** Alternating current in **B.** Negative direct current out **C.** Positive direct current out

WC=Wiring Connector—A coupling device for joining two cables or connecting a cable to an electronic circuit or piece of equipment. Connectors are male or female, according to whether they plug into or receive the mating connector.

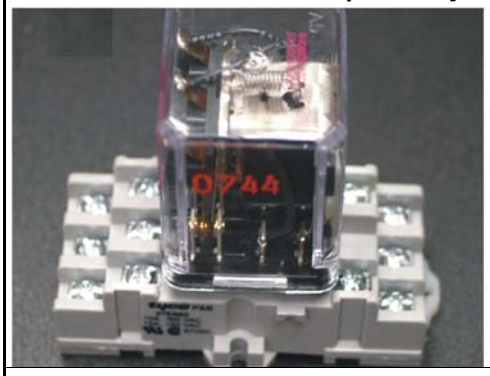
2. Component Terminal Numbering

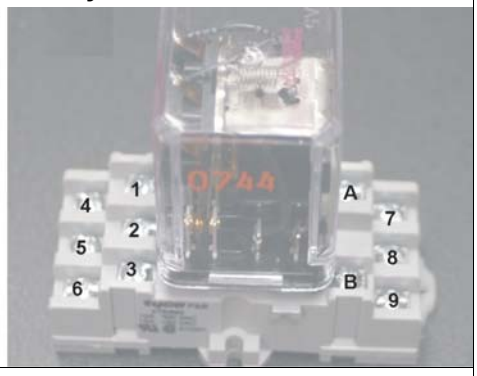
CAUTION 1: Risk of Mis-wiring—Due to electrical component manufacturing inconsistencies, the pin numbers imprinted on components such as connectors and relay bases used on Milnor machines often do not correspond to the pin numbers shown in the schematics.

- Ignore pin numbers imprinted on in-line connectors (e.g., Molex connectors) and relay bases.
- Use the pin identification illustrations herein to identify pins on these components.

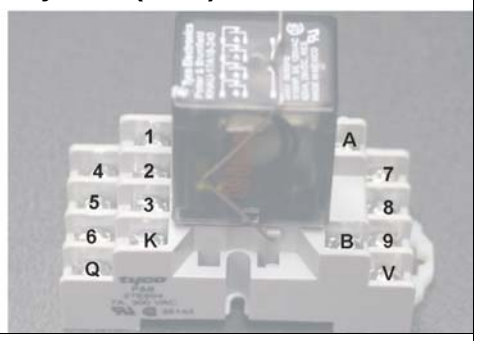
Figure 22: Plug-in Relays

11-pin Relay with Grey Base

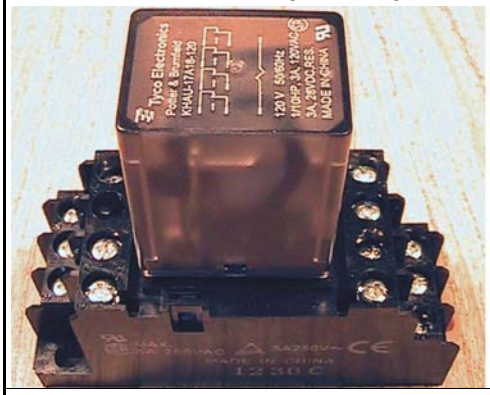


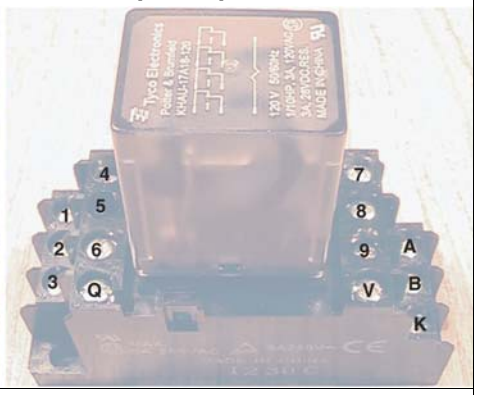


14-pin Relay with Grey Base (older)

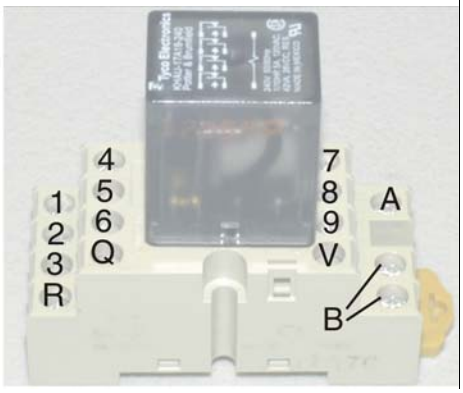


14-pin Relay with Black Base (newer)





14-pin Relay with Beige Base (rare)



Legend

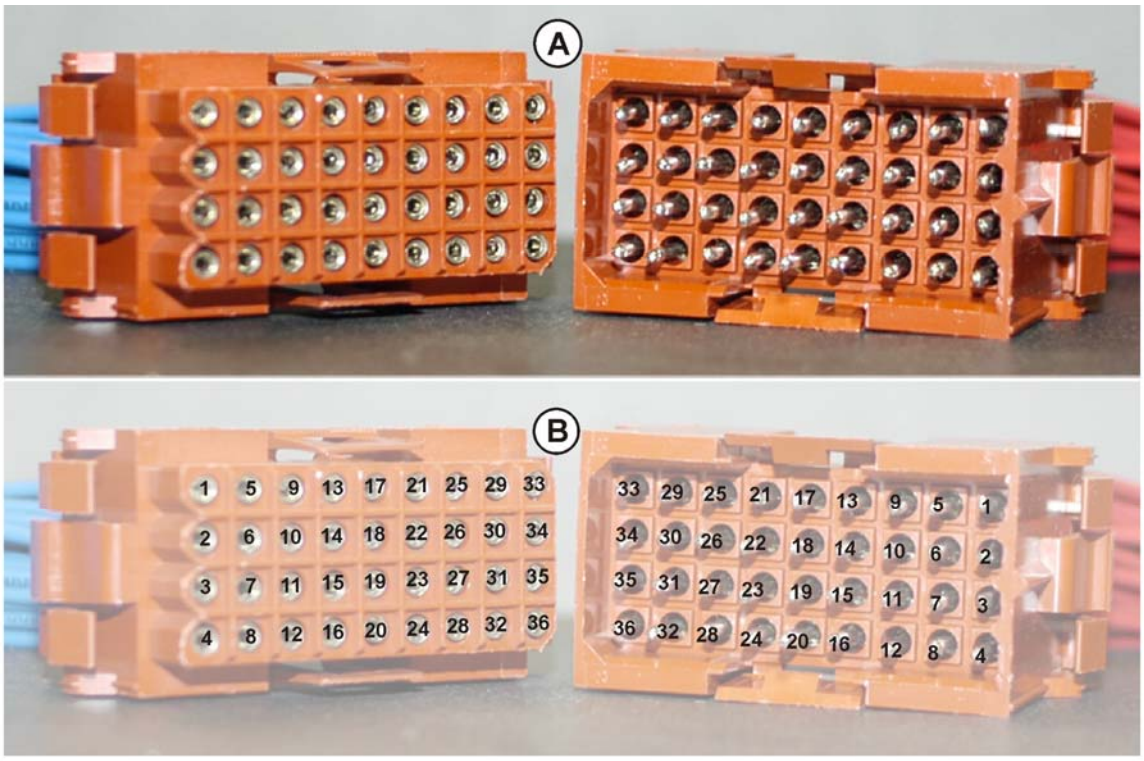
Left. View of relay and base

Right. Same view, showing pin numbers

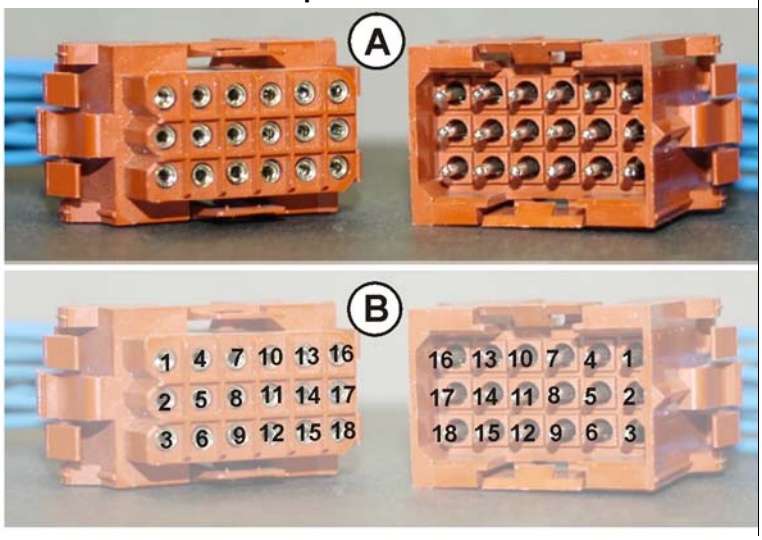
Note 3: Relay functional names ending with the letter "M" (e.g., CRxxM) are not discrete components but are a component of a printed circuit board. They are usually not individually replaceable.

Figure 23: AMP Connector Pin Locations

36-pin Connector



18-pin Connector

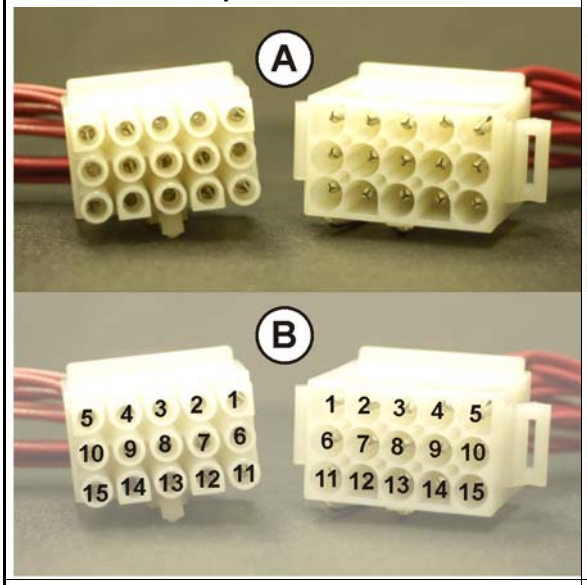


Legend

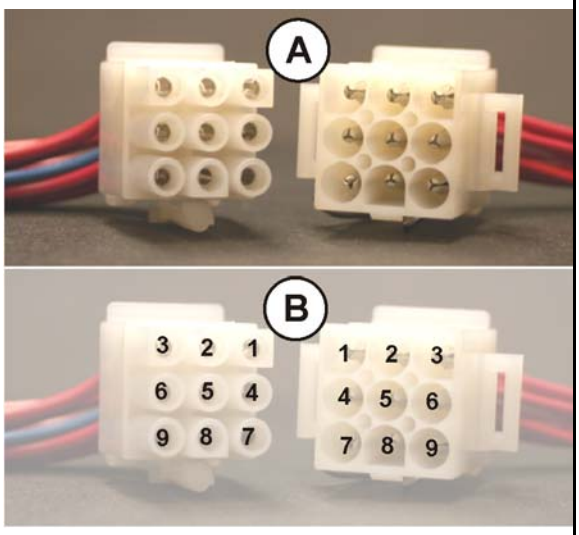
A. View of mating halves of connector
B. Same view, showing assigned pin numbers

Figure 24: Molex Connector Pin Locations

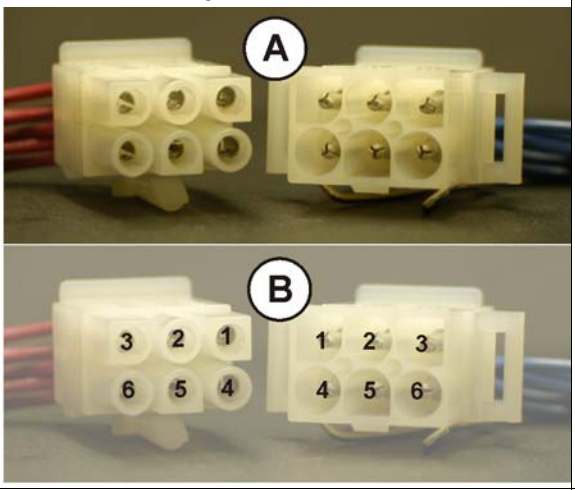
15-pin Connector



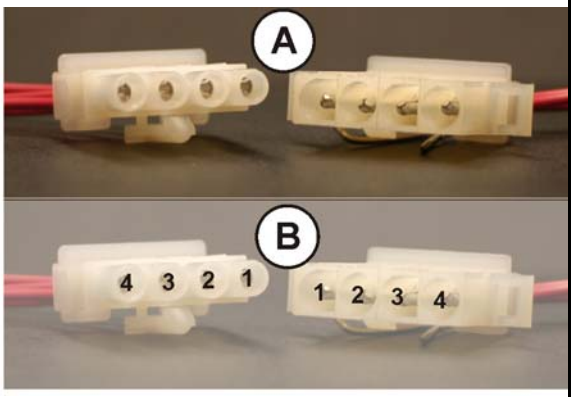
9-pin Connector



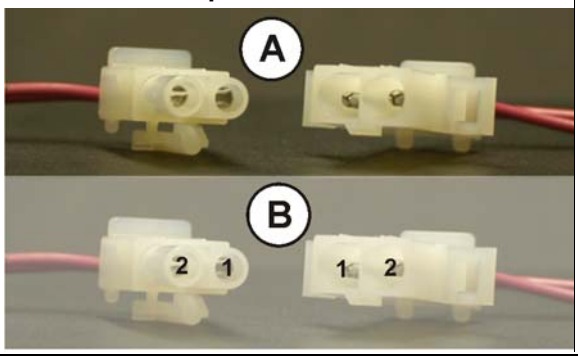
6-pin Connector



4-Pin Connector



2-pin Connector



Legend

A. View of mating halves of connector
B. Same view, showing assigned pin numbers

Figure 25: Pressure Switch

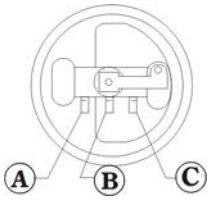
Component	Legend
	**A.** Contact 1—Normally open **B.** Contact 2—Normally closed **C.** Contact 3—Common

Figure 26: Toggle Switch

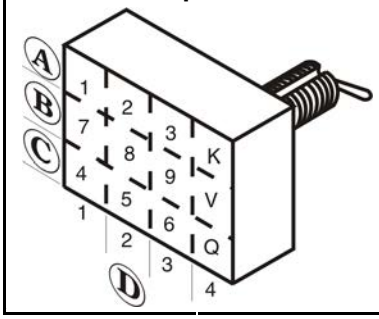
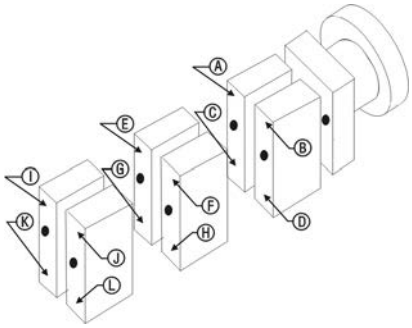
Component	Legend
	**A.** Normally closed contacts **B.** Common contacts **C.** Normally open contacts **D.** Pole

Figure 27: Switch with Replaceable Contact Blocks

Rotary or Push-button Switch Component	Legend
	**A.** Terminal 7 **B.** Terminal 8 **C.** Terminal 4 if normally open; terminal 1 if normally closed **D.** Terminal 5 if normally open; terminal 2 if normally closed **E.** Terminal V **F.** Terminal 9 **G.** Terminal Q if normally open; terminal K if normally closed **H.** Terminal 6 if normally open; terminal 3 if normally closed **I.** Terminal W **J.** Terminal X **K.** Terminal R if normally open; terminal L if normally closed **L.** Terminal S if normally open; terminal M if normally closed

3. Features of Milnor® Electrical Schematic Diagrams

Document BMP010012 (following this section) is a sample schematic, based on a schematic diagram for the Milnor® gas dryer. For the purposes of this exercise, the schematic is shown gray and explanations of the items on the schematic are shown black.

The item numbers below correspond to the circled item numbers shown on the drawing.

1. The first six characters of the drawing number (W6DRYG) indicate that this is a wiring diagram (W), identify the generation of controls (6), and identify the type of machine (DRYG=Gas Dryer). These characters appear in the drawing number of every schematic in the set.

   The characters following the first six are unique to each drawing. The two characters identified as the page number are an abbreviation for the function performed by the depicted

circuitry (S+=three-wire circuit) and establish the order in which the schematic occurs in the manual (schematics are arranged in alpha-numeric order in the manual).

Whenever circuitry changes are significant enough to warrant publishing a new schematic drawing, the new drawing number will be the same as the old except for the major revision letter (A in the example).

2. Included in the drawing title are the class of control system, the title of this circuit, and the circuit voltage.
3. Line numbers are provided along the bottom edge of the drawing. These permit service personnel in the field and at the Milnor® factory to quickly relate circuit locations when discussing troubleshooting over the phone. Page and line numbers are referenced on the drawing as explained in items five and six below.
4. Relay contacts show the page and line number on which the relay coil may be found. This is the type of cross referencing most frequently used in troubleshooting.
5. Relay coils show the page and line number on which its associated contacts are located.
6. Relay contacts and relay coils show the physical location of the relay.
7. The designation MTA applies to electronic circuit board connections. Typically, a control system will contain several different types of circuit boards and one or more boards of each type. A numerical suffix identifies the board type and a numerical prefix identifies which one of several boards of a given type is being depicted. For example, the designation 1MTA5 identifies this as the first I/O board (8 output, 16 input board) in the control system. As shown on the drawing, a pin number follows the board number, separated by a dash. Thus, 1MTA5-9 is pin 9 on this board. The numerical designations for board types vary from one control system to another. Some of the board types commonly encountered on the Mark V and Mark VI washer-extractor control and their designations are as follows:
   - MTM1-MTM8 = Mother board
   - MTA1-MTA5 = 8 output, 16 input (8/16) boards
   - MTA11-MTA14 = 24 output boards
   - MTA30-MTA40 = processor boards
   - MTA41-MTA43 = digital to analog (D/A) boards
   - MTA51-MTA55 = analog to digital (A/D) boards
   - MTA81-MTA85 = balance A-D board

   The complete listing of the boards utilized in a given control system can be found in the component list for that system.
8. Wire numbers, as described earlier in this section, are shown at appropriate locations on the schematic drawing.
9. Where diamond symbols appear at the end of a conductor, these are match points for continuing the schematic on another drawing. The page and line number that continues the circuit is printed adjacent to the diamond symbol. Where more than one match point appears on the referenced page, match diamonds containing corresponding letters.

— End of BIUUUK01 —

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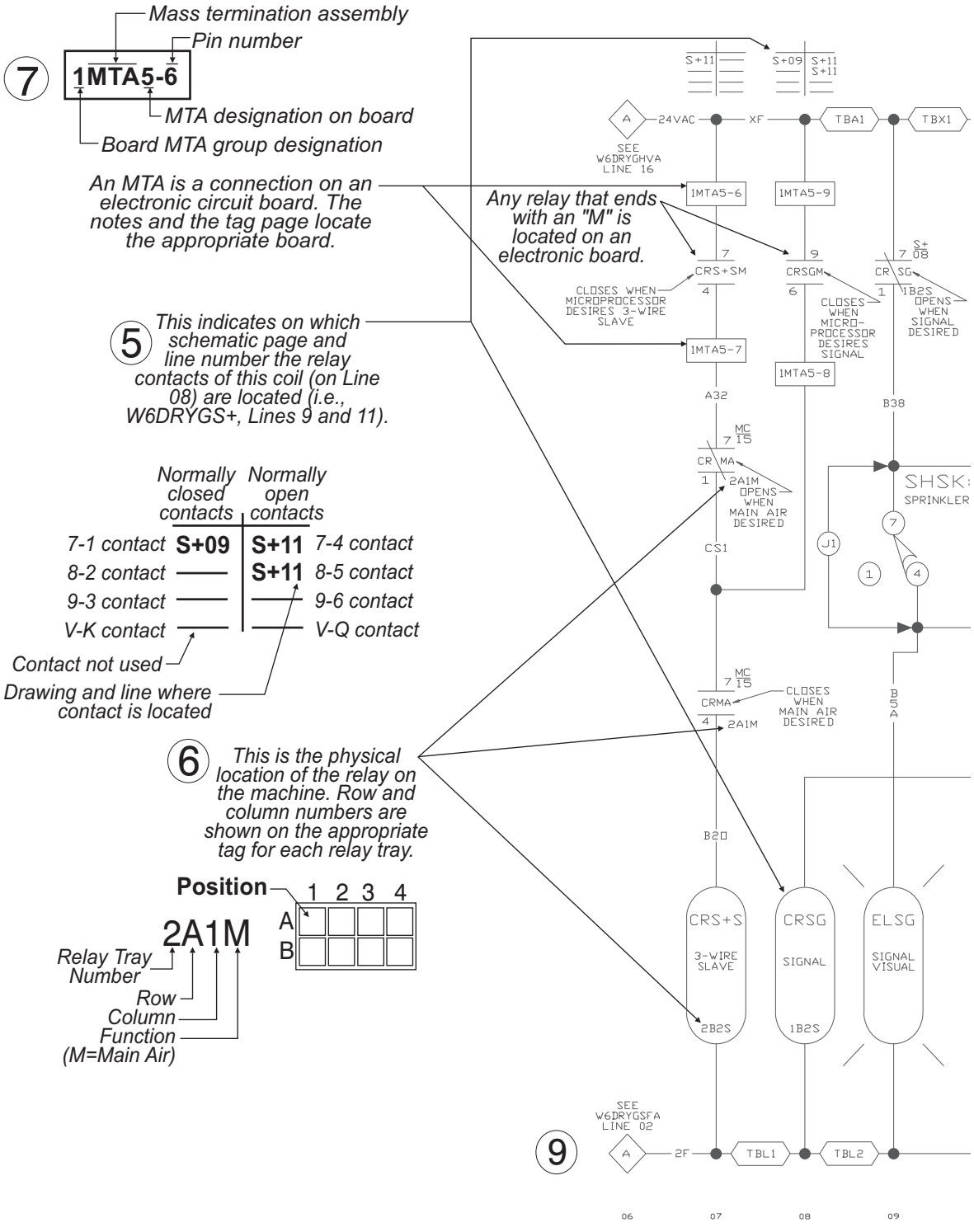
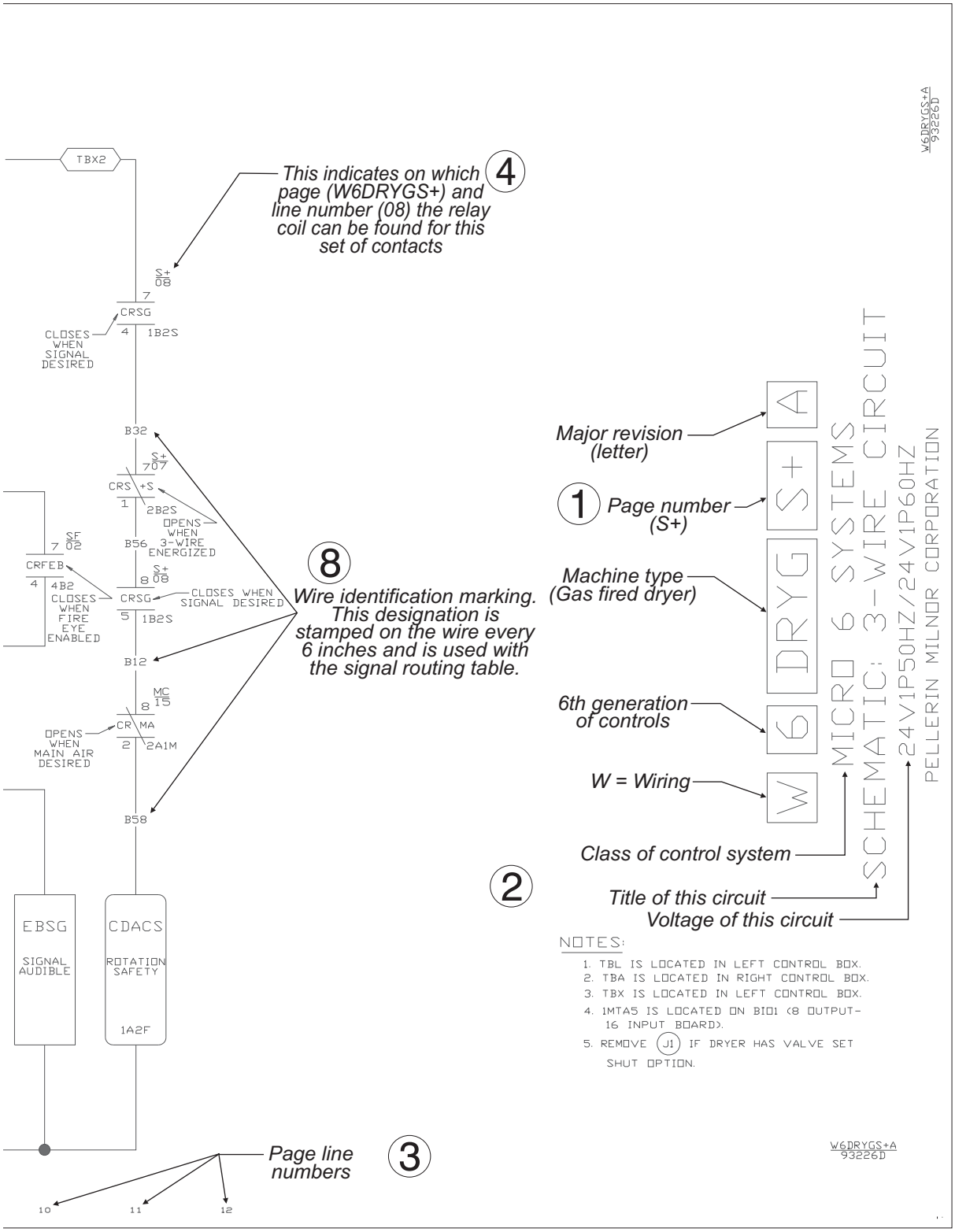


BMP010012 (left) / 2018343



BMP010012 (right) / 2018343

Wiring Safety Fence Gate Interlocks on Milnor® Shuttles, Presses and Centrifugal Extractors

This document is to be used in conjunction with Milnor document W6SYSSG "Micro 6 Systems Schematic: Customer-Provided Safety Fence Gate Interlock". Together, these documents describe how to connect a customer-provided gate switch or series of switches to any Milnor shuttle, press, or centrifugal extractor. Another Milnor document—BISUUI01 "Proximity Safeguarding for Automatic Shuttle Conveyors"—discusses the general hazards that safety fencing addresses.

1. Precautions

WARNING 1: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.
- Perform all work with machine power locked out/tagged out.

WARNING 2: Strike and Crush Hazards—A traveling machine such as a shuttle can strike, crush, or entrap you if you ride on it or enter its path. Traveling machines or their components can move automatically in any direction. Placing a system machine on line by energizing the machine control may immediately summon a shuttle or other traveling machine.

- Lock out and tag out power to the traveling machine at the main machine disconnect if you must work in the path of the traveling machine.

2. Wiring Guidelines

As explained in BISUUI01, a gate interlock switch must have one pole per machine to be interlocked. Each pole on the switch must be electrically isolated from any other poles on that switch. The gate interlock circuit for a given machine is a series circuit that includes one pole per switch (per gate). This circuit is wired into, and becomes part of the machine's three-wire circuit (see definition below).

three-wire circuit—a circuit that provides control power for all machine functions. Any of several safety devices in the three-wire circuit will open the circuit and stop machine operation if a malfunction is detected. Once open, the three-wire circuit can only be closed by manual intervention and then only if the condition that opened the circuit is rectified.

W6SYSSG depicts schematically, various circuit segments the technician may encounter, depending on the type and age of the machine. Only one depiction will match a given machine. It may be helpful to refer to the electrical schematics for your machine; however, you should be able to identify the pertinent electrical components by referring to the tags inside the electric box doors on your machine. You will use one of two wiring methods depending on which circuit segment on W6SYSSG corresponds to your machine:

1. **Jumpered terminals**—Remove the jumper and connect the two incoming conductors to the terminals (pins) where the jumpers were removed. A tag was tied to the jumper at the factory to identify this as the gate interlock switch connection point.
2. **Circuitry that must be split**—Locate convenient connection points (e.g., a pin on a switch) at which to split the circuit and connect the incoming conductors. You may need to splice wires to complete the connection.

3. Testing

Once wiring is completed, it is vital to test the system to ensure that:

1. all gate interlocks function properly, and
2. all components that were part of the machine's three-wire circuit before the gate interlocks were added continue to function properly. The objective is to ensure that the added wiring did not inadvertently bypass existing components.

3.1. Testing Gate Interlocks

1. Close all gates.
2. Restore power to all interlocked machines.
3. **For each gate:**
   a. Start all interlocked machines (①) and place in *Manual* mode (all machines idling in manual).
   b. Open the gate and verify that all interlocked machines shut down (as indicated by their individual operator alarms).
   c. Close the gate so the next gate can be tested.

3.2. Testing Three-wire Circuit Components on Each Interlocked Machine—

Typically, these include the components listed in Table 1.

Table 1: Typical Three-wire Circuit Components

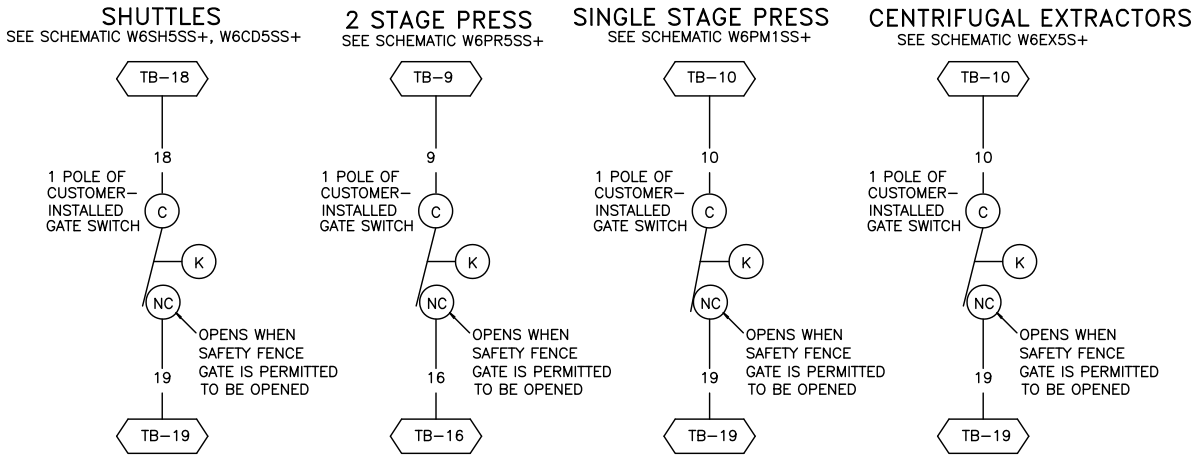
Component	Found On		
	Shuttle	**Press**	**Centrifugal Extractor**
Stop (⓪) push button on control panel	✓	✓	✓
Emergency Stop switch(es) (locking push button)	✓	✓	✓
Manually lifted access door (typically two per machine)		✓	
Manually removed access panel (typically two per machine)			✓
Pull cord (certain shuttles)	✓		
Kick plate (typically two per machine)	✓		

Test each interlocked machine as follows:

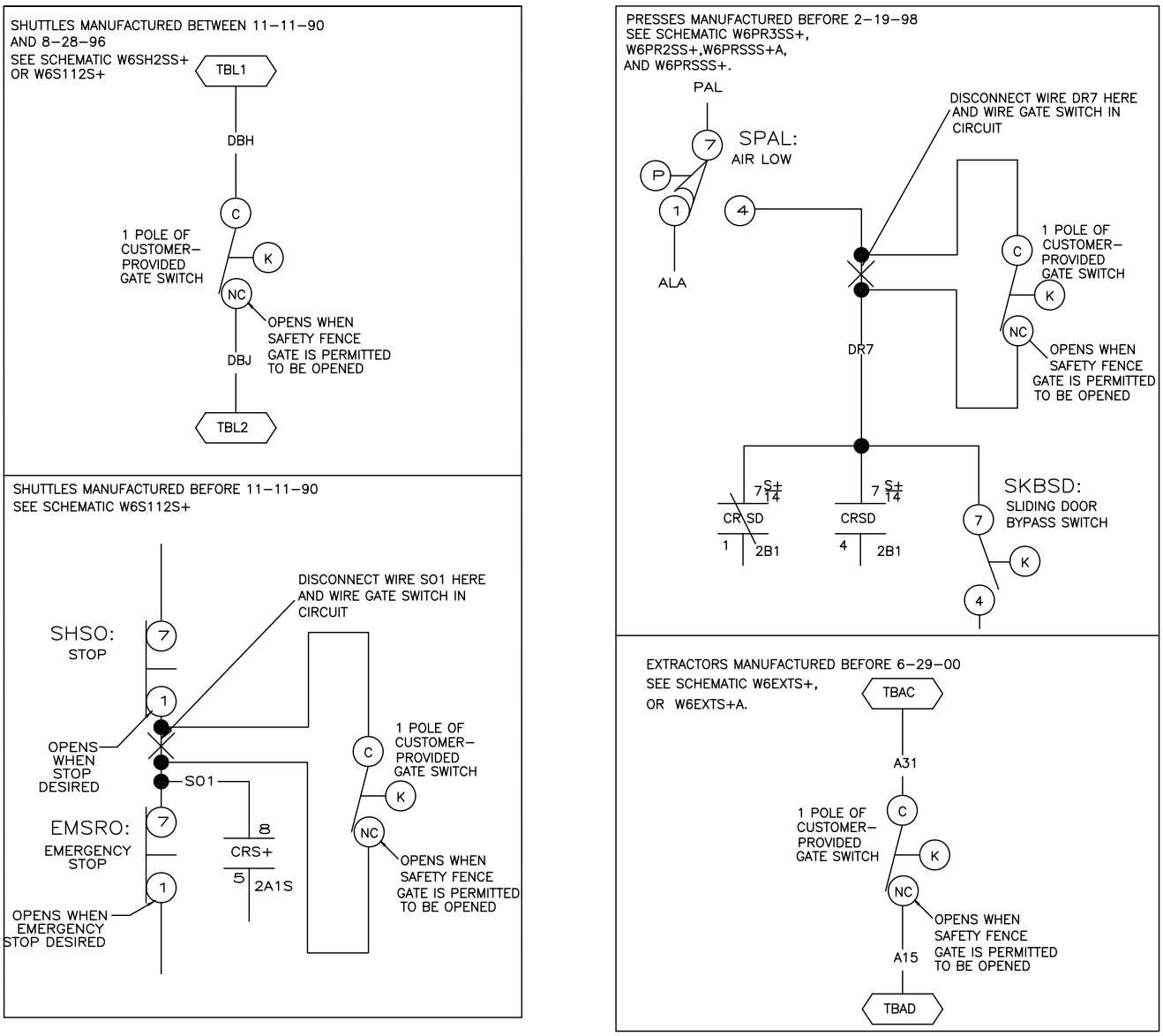
1. Start the machine and place in *Manual* mode (machine idling in manual).
2. For each three-wire circuit component on the machine:
   a. Actuate the component (e.g., press the Stop button) and verify that the machine shuts down (as indicated by the operator alarm).
   b. If needed, de-actuate the component. For example, release an Emergency Stop switch or close an access door, so the next component can be tested.

— End of BISUUI02 —

SAFETY FENCE GATE WIRING FOR



CONNECTION POINTS ON EARLIER MACHINES

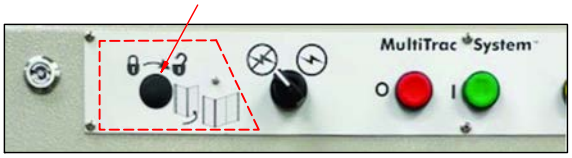


W6SYSSG
2025256B

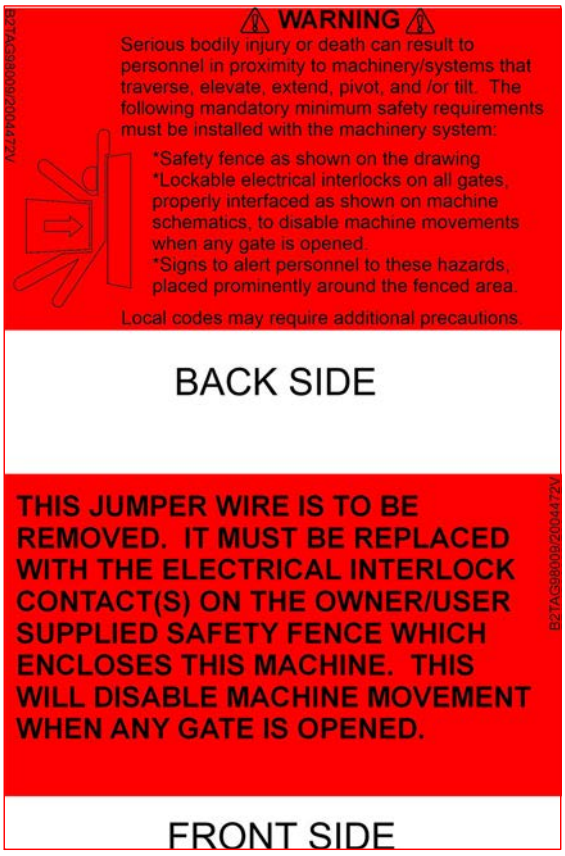
W6SYSSG
MICRO 6 SYSTEMS
SCHEMATIC: CUSTOMER INSTALLED SAFETY FENCE GATE INTERLOCK
PELLERIN MILNOR CORPORATION

IMPORTANT: EACH MOVING MACHINE MUST BE ENCLOSED IN A RESTRICTED ACCESS FENCED AREA AS SHOWN LAUNDRY LAYOUT DRAWINGS.

THE CUSTOMER IS RESPONSIBLE TO MOUNT THE ELECTRONIC PASS KEY IN THE HOLE PROVIDED ON THE MULTITRAC SWITCH PANEL. THE INSTALLER MUST WIRE EACH MACHINE'S 3–WIRE CIRCUIT CONTACTS IDENTIFIED BY THE FOLLOWING RED TAG. THE JUMPER MUST BE REMOVED AND THE CONTACTS MUST BE WIRED TO A SEPERATE POLE ON THE ELECTRONIC PASS KEY SWITCH.



MULTITRAC SWITCH PANEL



TAG ON JUMPER

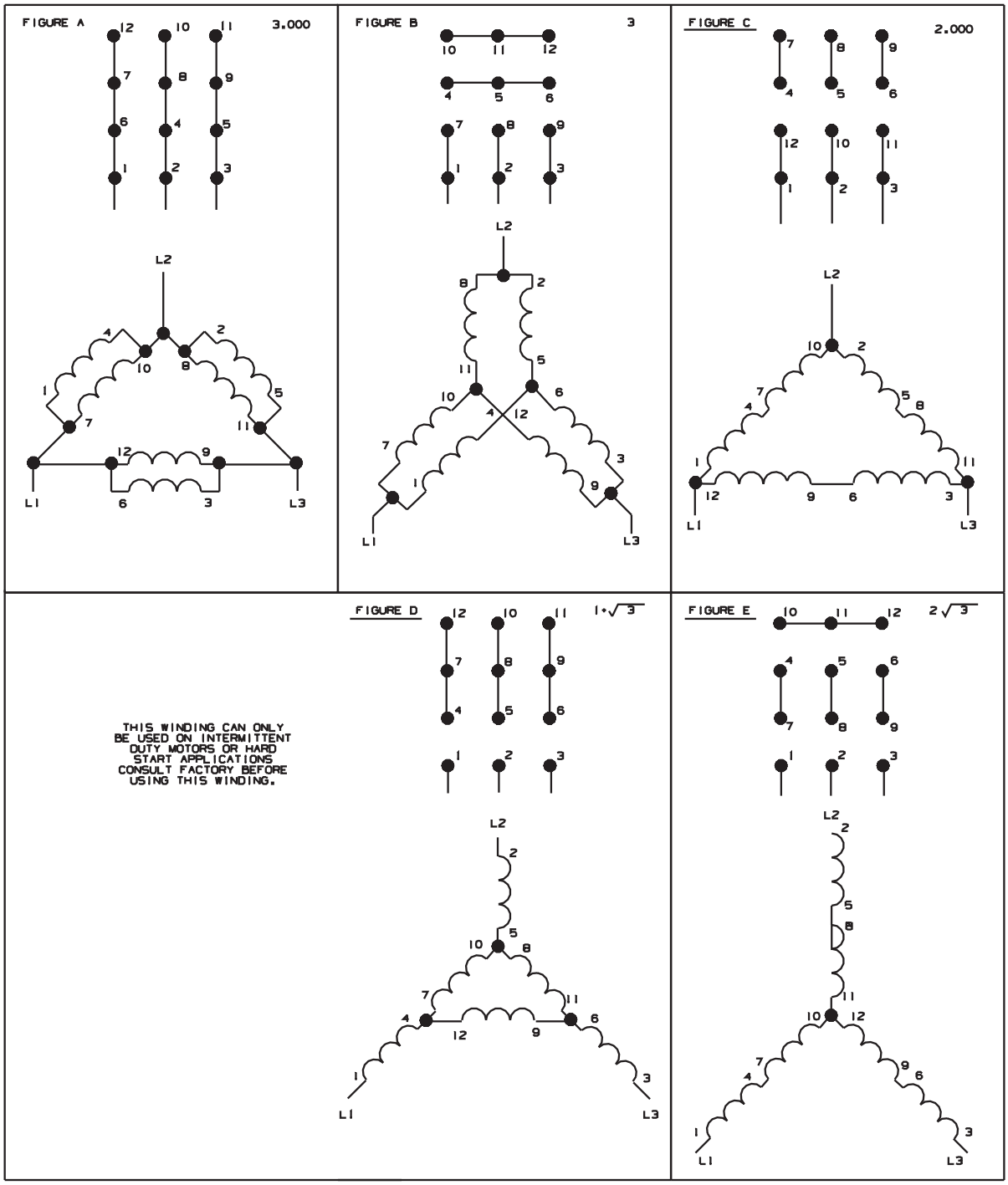
OPERATION:

TO START THE PROCESS OF ENTERING THE RESTRICTED AREA THE OPERATOR MUST TURN THE PASS KEY TO THE UNLOCKED POSITION. AT THAT POINT ALL OF THE MACHINES ARE DISABLED AND THE OPERATOR CAN THEN REMOVE THE PASS KEY AND GO TO THE FENCE GATE DOUBLE MECHANICAL LOCK AND UNLOCK THE GATE. HE/SHE CAN THEN REMOVE THE SECOND KEY TO PREVENT SOMEONE FROM RELOCKING THE GATE WHILE THEY ARE IN THE RESTRICTED AREA. THEY CAN THEN ENTER THE RESTRICTED AREA FOR MAINTENANCE. WHEN FINISHED THEY MUST RETURN THE KEY TO THE GATE LOCK, LOCK THE GATE AND RELEASE THE PASS KEY. THE PASS KEY IS THEN BROUGHT BACK TO THE MULTITRAC ELECTRONIC CYLINDER AND TURNED BACK TO LOCKED POSITION. THE SYSTEM CAN NOW BE RESTARTED

SEE MILNOR DOCUMENTS BISUUI01 AND BISUUI02 "PROXIMITY SAFEGUARDING FOR AUTOMATIC SHUTTLE CONVEYORS" FOR MORE INFORMATION.

09 10 11 12 13

FIGURE	ELECTRICAL VALUES	SUFFIXES									
		B		H		M		T		U	
		50HZ	60HZ	50HZ	60HZ	50HZ	60HZ	50HZ	60HZ	50HZ	60HZ
A	1.000	208	230			200	220	220	240	200-220	208-240
B	$\sqrt{3}$				208	346	380	380		346-380	380
C	2.000	416	460	220	240	400	440	440	480	400-440	440-480
D	$1 \cdot \sqrt{3}$						600				600
E	$2\sqrt{3}$			380							



06 07 08 09 10 11 12 13 14 15 16 17

BMP850029

MOTOR CONNECTION DIAGRAMS

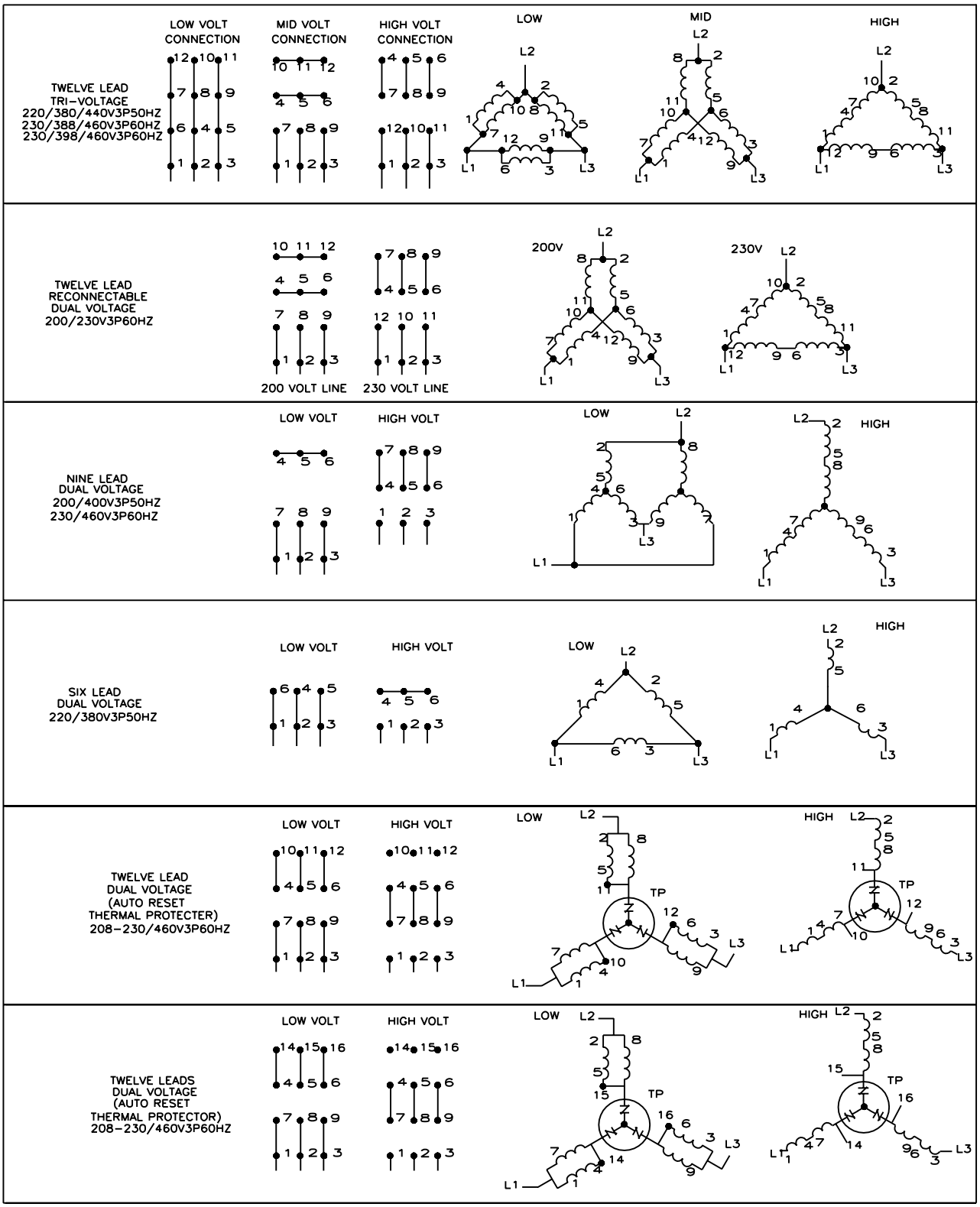
THREE PHASE SINGLE SPEED MOTORS WITH MULTIPLE VOLTAGE RATINGS

(ONLY FOR MOTOR SUFFIXES LISTED)

PELLERIN MILNOR CORPORATION

BMP850029
993628

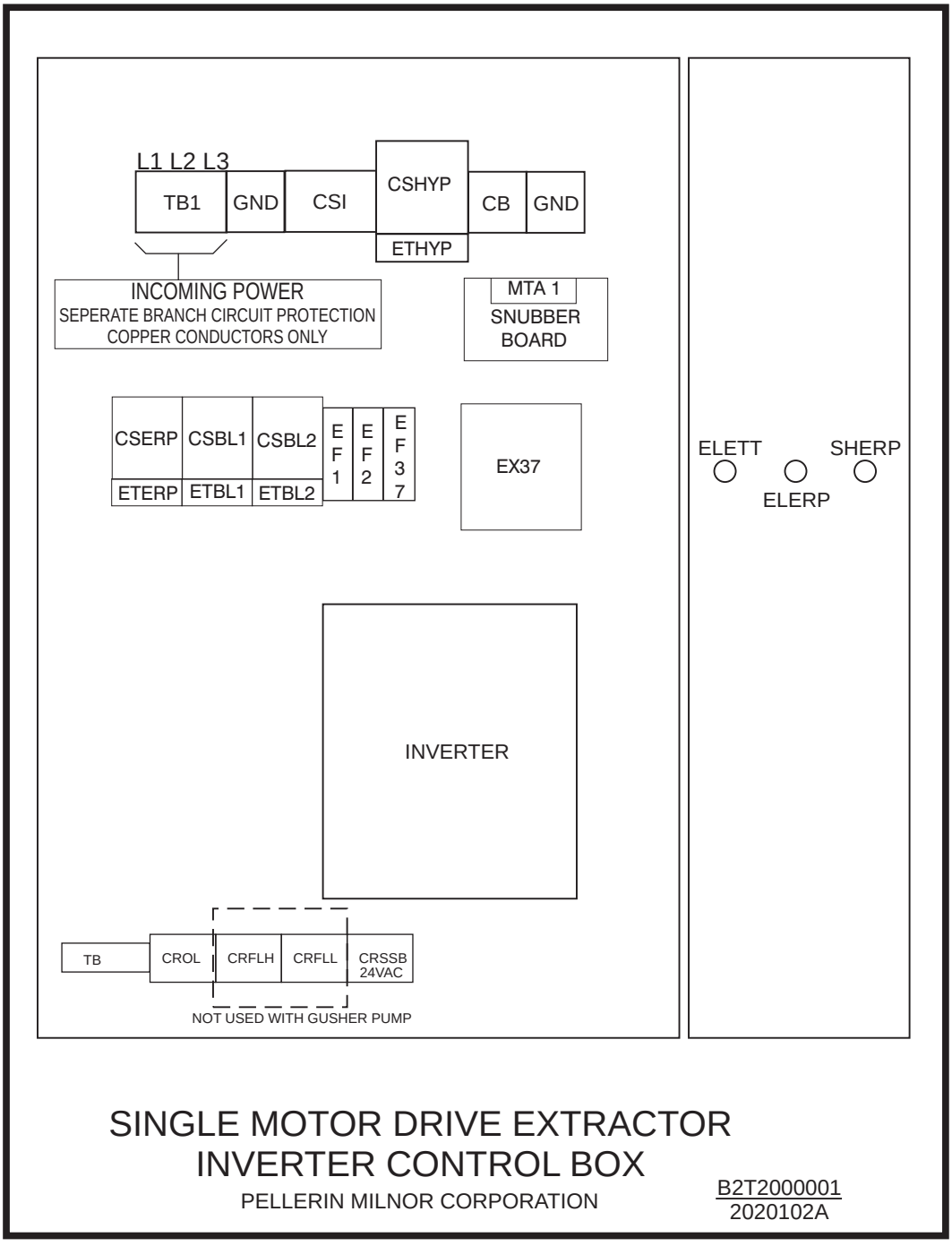
BMP850029
993628



W80008

THREE PHASE
MOTOR CONNECTION DIAGRAMS
SINGLE SPEED MOTORS WITH MULTIPLE VOLTAGE RATINGS
PELLERIN MILNOR CORPORATION

W80008
2001253A



SINGLE MOTOR DRIVE EXTRACTOR
INVERTER CONTROL BOX

PELLERIN MILNOR CORPORATION

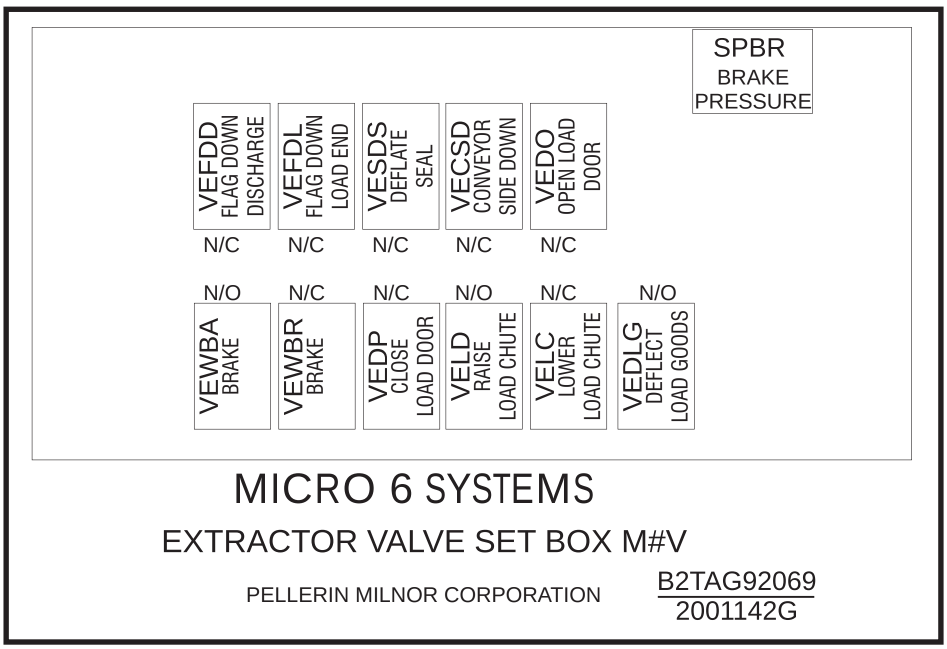
B2T2000001
2020102A

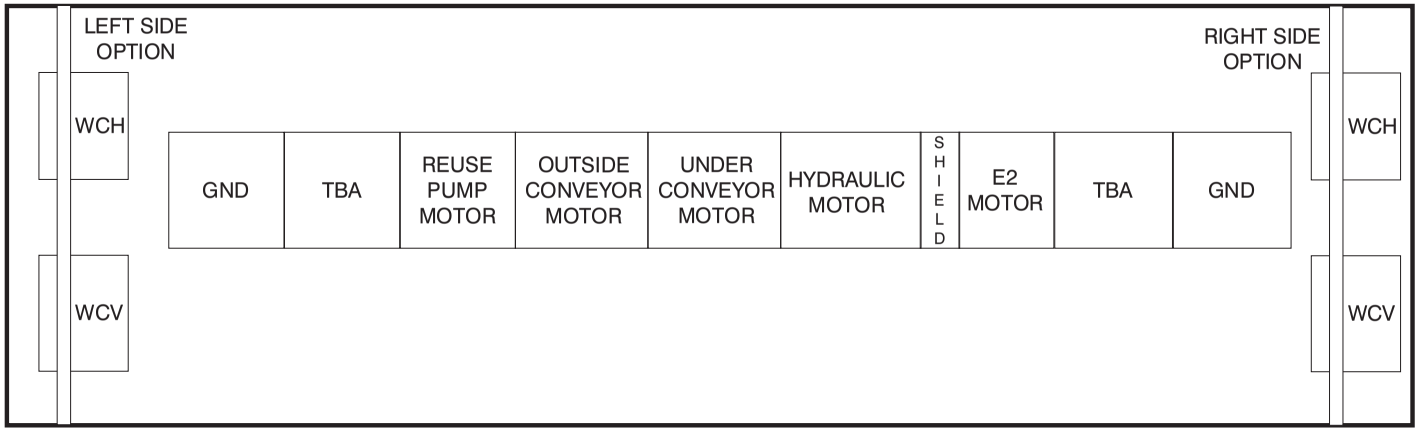
W6EX5TG1
2020046B

W6EX5TG1

EXTRACTOR MACHINE TAGS

PELLERIN MILNOR CORPORATION

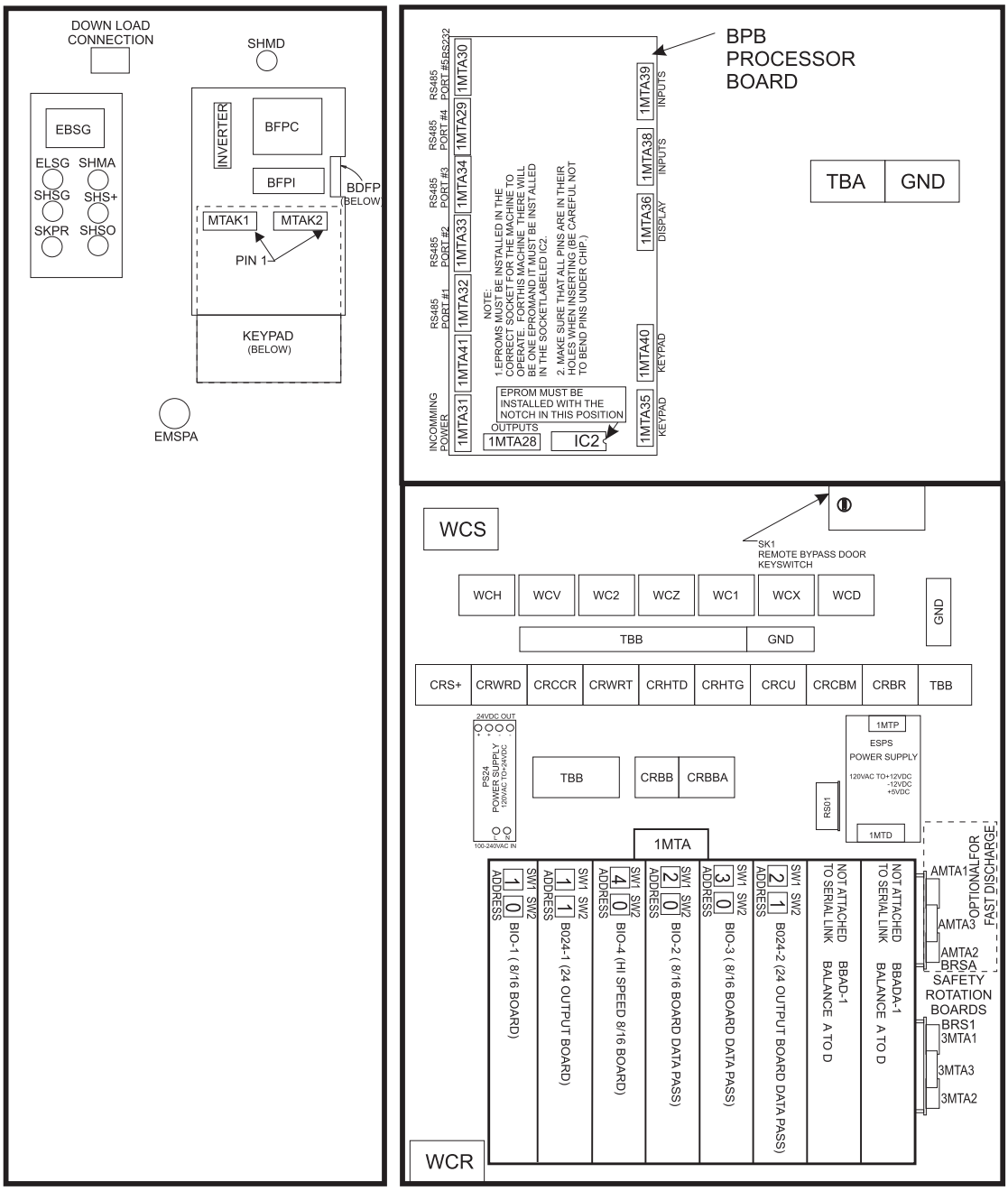




MICRO 6 SYSTEMS

SINGLE DRIVE MOTOR EXTRACTOR CONTROLS
CONNECTOR CONTROL BOX
PELLERIN MILNOR CORPORATION

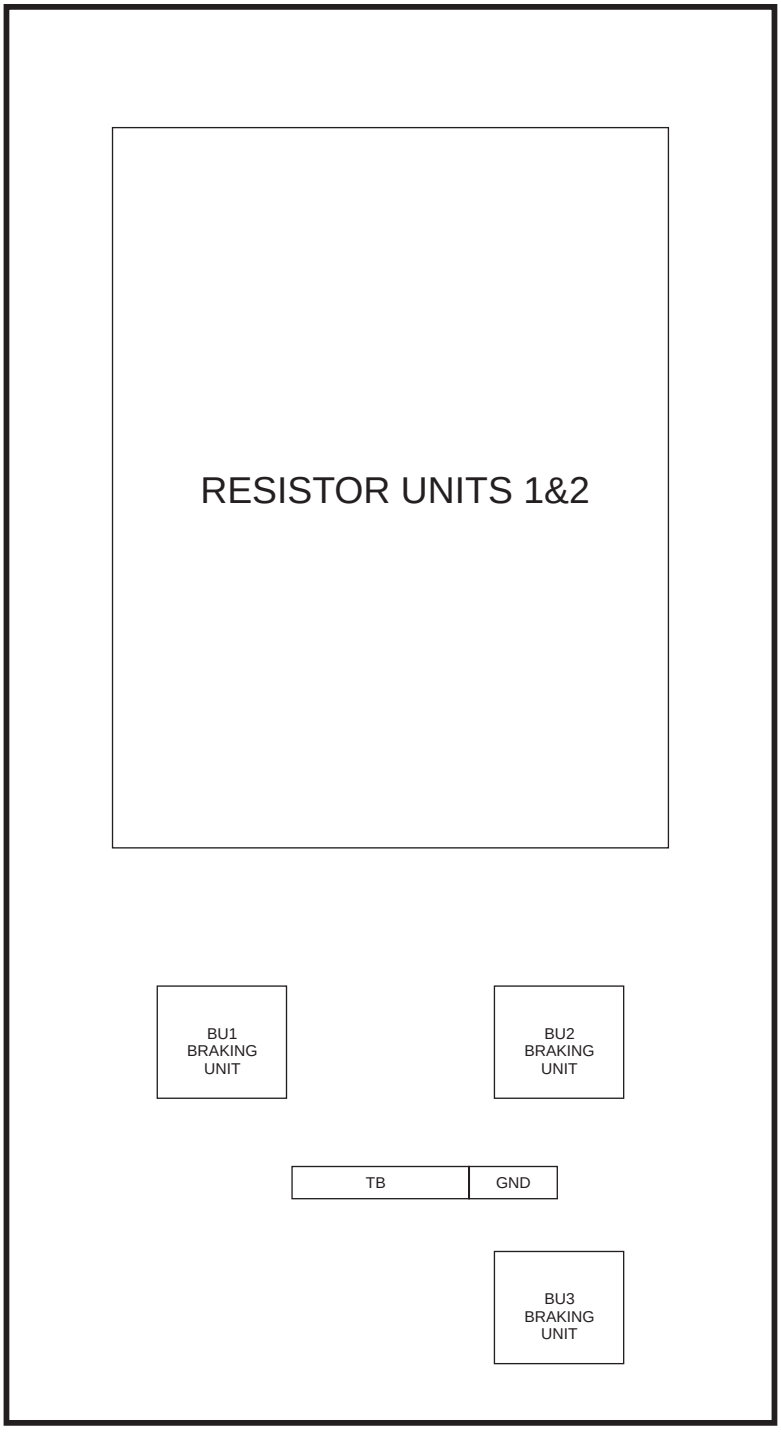
B2T2000009
2009145G



W6EX5TG2
EXTRACTOR MACHINE TAGS
PELLERIN MILNOR CORPORATION

MICRO 6 SYSTEMS
M7/9 EXTRACTOR LOW VOLTAGE CONTROL BOX MARK 6 CONTROLS
PELLERIN MILNOR CORPORATION

B2T2000010
2022096A



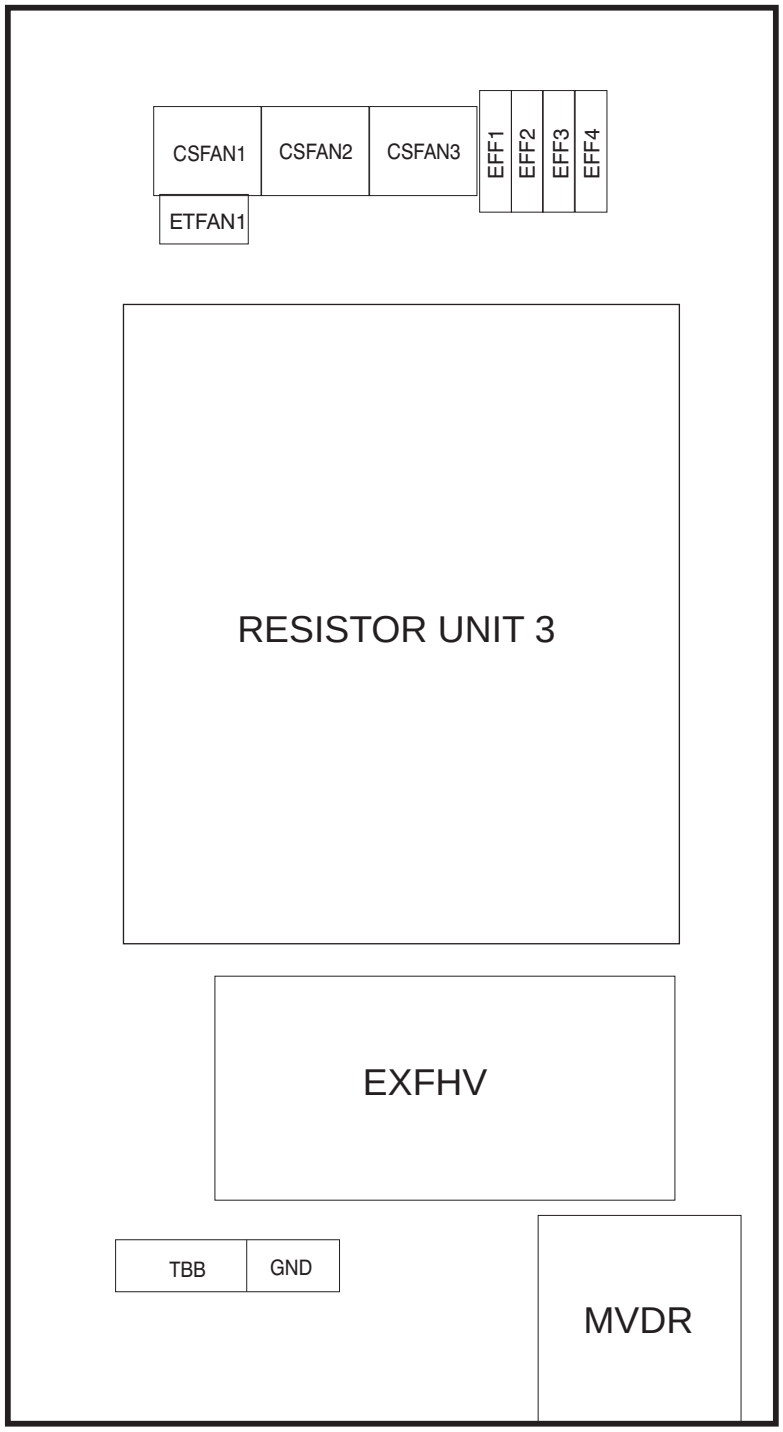
MICRO 6 SYSTEMS

MARK V/VI CONTROLS
EXTRACTORS
RESISTOR BOX #1

PELLERIN MILNOR CORPORATION

B2T2003017
2017445A

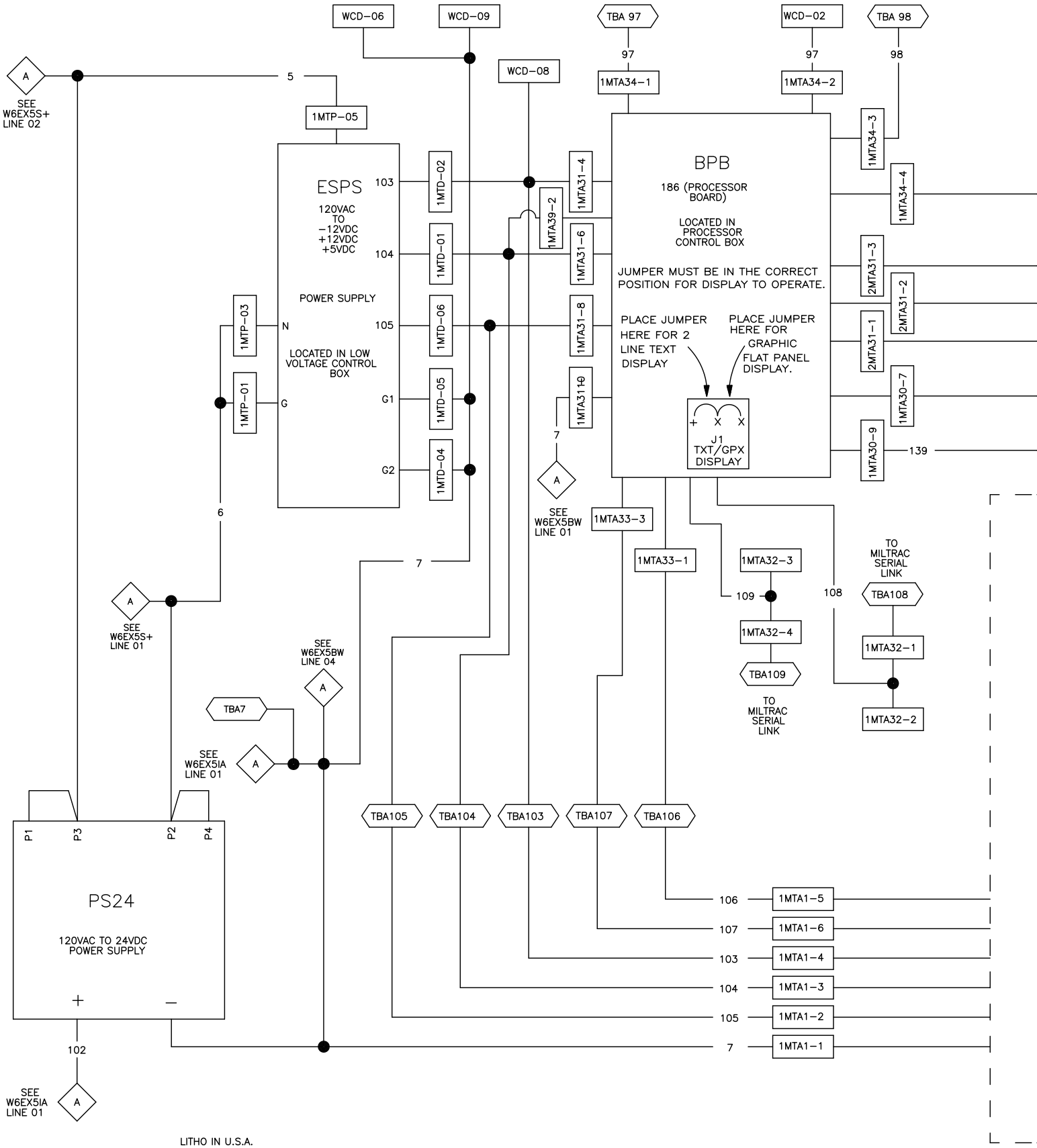
W6EX5TG3
2017445B



MICRO 6 SYSTEMS
MARK V/VI CONTROLS
EXTRACTORS
RESISTOR BOX #2
PELLERIN MILNOR CORPORATION

B2T2016007
2017445A

W6EX5TG3
EXTRACTOR MACHINE TAGS
PELLERIN MILNOR CORPORATION



W6EX5BWA
2015205B

SCHEMATIC: BOARD TO BOARD WIRING FOR 08BSPE2T

W6EX5BWA

MICRO 6 SYSTEMS
MARK V CONTROLS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION

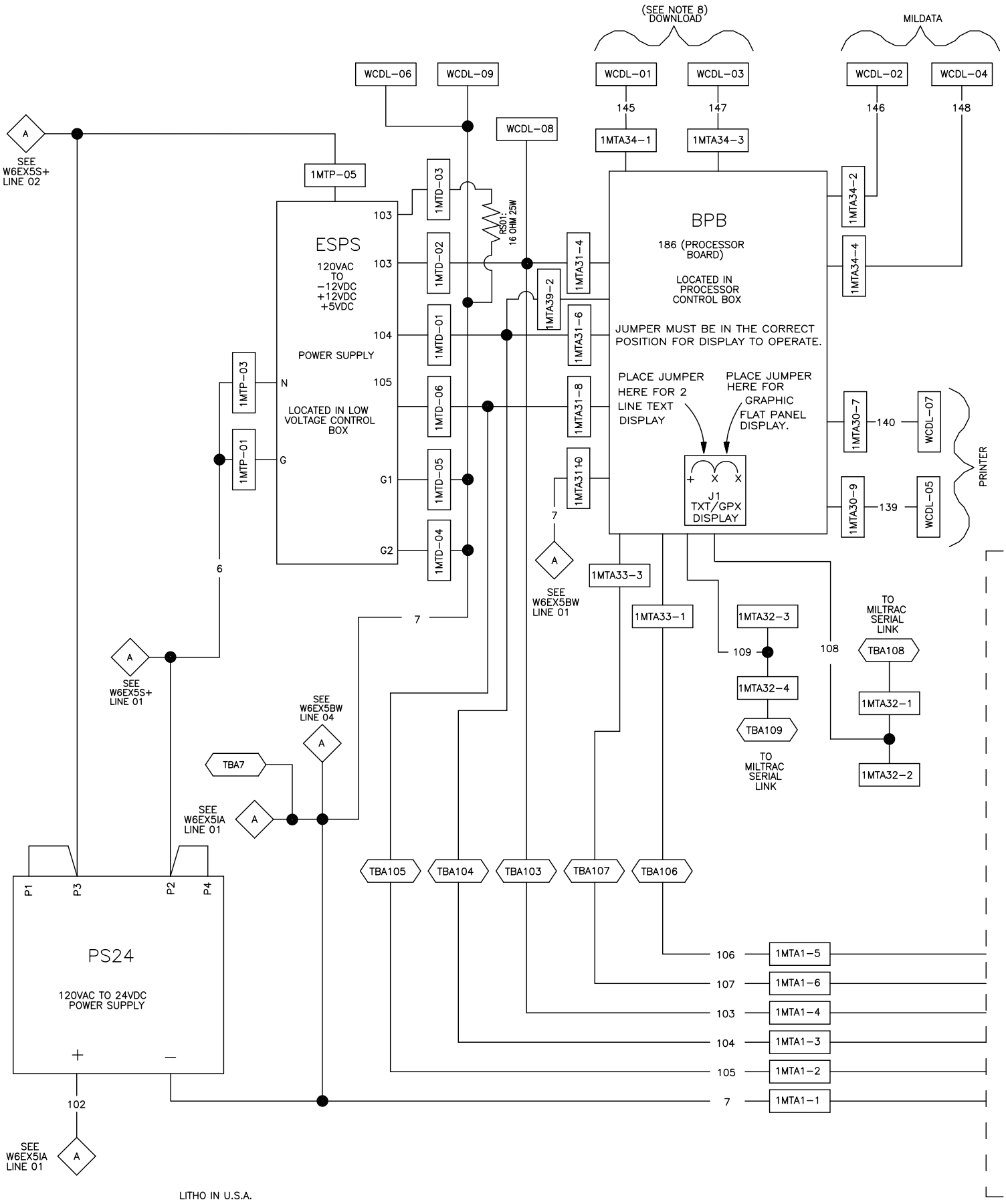
WIRE NO.	VOLTAGE	WIRE COLOR
103	+5VDC	BLUE
104	+12VDC	BLUE/ORANGE
105	−12VDC	BLUE/BLACK
7	GROUND	BLUE/WHITE
107	SERIAL HIGH	BLUE/RED
106	SERIAL LOW	BLUE/BLACK
INPUTS	−	BLUE/BLACK
−	24VAC	BLUE/RED
−	120VAC	RED
6	CONTROL GROUND	RED/WHITE

WCD−04
98
149
7
104
140
WCD−07
WCD−05
1MTA41−3
1MTA41−2
1MTA41−1
BBB−1
(BATTERY BACKUP BOARD)
(LOCATED IN PROCESSOR CONTROL BOX)
+12VDC
104
+12VDC
104
3MTA2−4
3MTA1−4
BRS1
SPEED SENSING BOARD
(EXTRACTOR ROTATION BOARD)
CPPSP
SPEED PHOTOEYE
BLUE
BLACK
3MTA2−3
3MTA2−2
3MTA1−3
152
7
BIO−4
(8 OUTPUT − 16 INPUT BOARD)
HIGH SPEED
LOCATED IN LOW VOLTAGE CONTROL BOX
0 SW2
4 SW1
4MTA2−6 — 104 — 4MTA4−20
4MTA2−4 — 7 — 4MTA4−10
BO24−1
(24 OUTPUT BOARD)
LOCATED IN LOW VOLTAGE CONTROL BOX
1 SW2
1 SW1
BIO−1
(8 OUTPUT, 16 INPUT BOARD 1)
LOCATED IN LOW VOLTAGE CONTROL BOX
0 SW2
1 SW1
1MTA2−6 — 104 — 1MTA4−20
1MTA2−4 — 7 — 4MTA4−10
BMTH−1
8 CARD MOTHER BOARD

NOTES:

1. 1MTP, 1MTD ARE LOCATED ON ESPS (POWER SUPPLY).
2. 1MTTA31, 1MTA33, 2MTA31, 1MTA 34 AND 1MTA39 ARE LOCATED ON BPB (PROCESSOR BOARD).
3. 1MTA1 IS LOCATED ON BMTH−1 (8−CARD MOTHER BOARD).
4. 1MTA41 IS LOCATED ON BBB−1 (BATTERY BACKUP BOARD).
5. WC D IS THE DOWN LOAD/PRINTER/MILDATA CONNECTOR.
6. TBA IS LOCATED IN THE LOW VOLTAGE CONTROL BOX.
7. TB1 IS LOCATED IN THE PROCESSOR BOX.

11 12 13 14 15 16 17 18 19



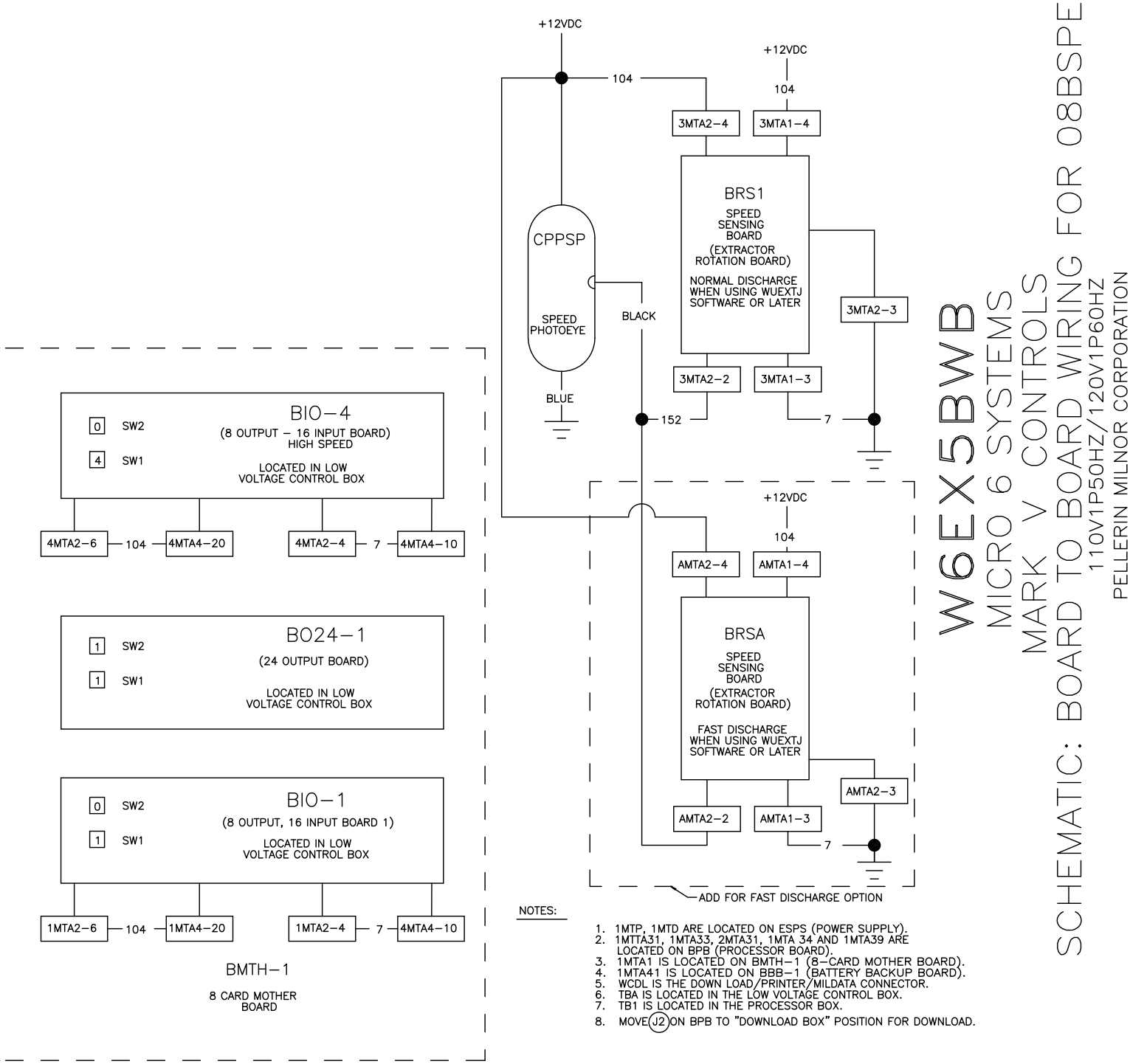
W6EX5BWB
2022093B

SCHEMATIC: BOARD TO BOARD WIRING FOR 08BSPE3T

W6EX5BWB

MICRO 6 SYSTEMS
MARK V CONTROLS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION

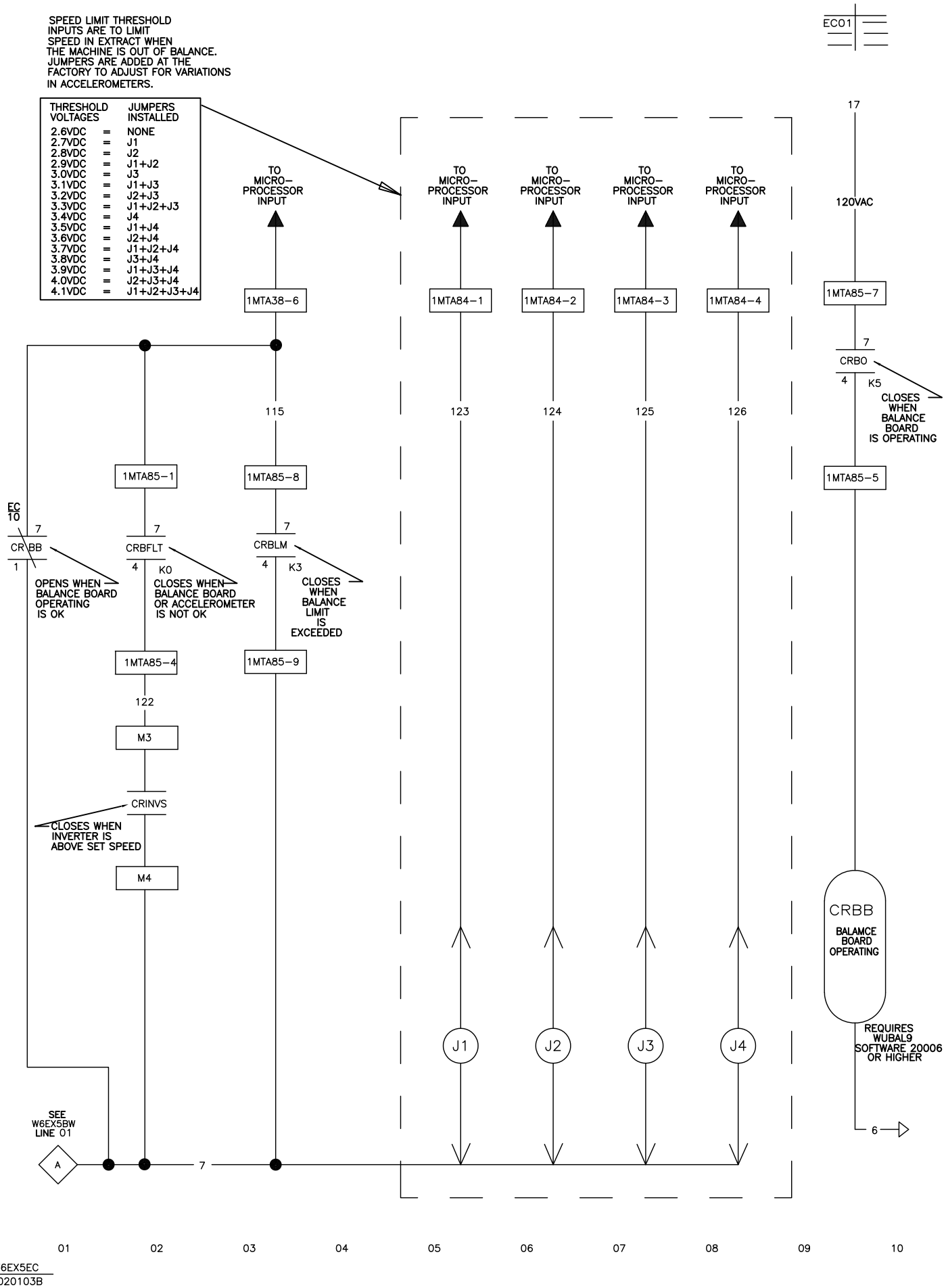
WIRE NO.	VOLTAGE	WIRE COLOR
103	+5VDC	BLUE
104	+12VDC	BLUE/ORANGE
105	−12VDC	BLUE/BLACK
7	GROUND	BLUE/WHITE
107	SERIAL HIGH	BLUE/RED
106	SERIAL LOW	BLUE/BLACK
INPUTS	–	BLUE/BLACK
–	24VAC	BLUE/RED
–	120VAC	RED
6	CONTROL GROUND	RED/WHITE



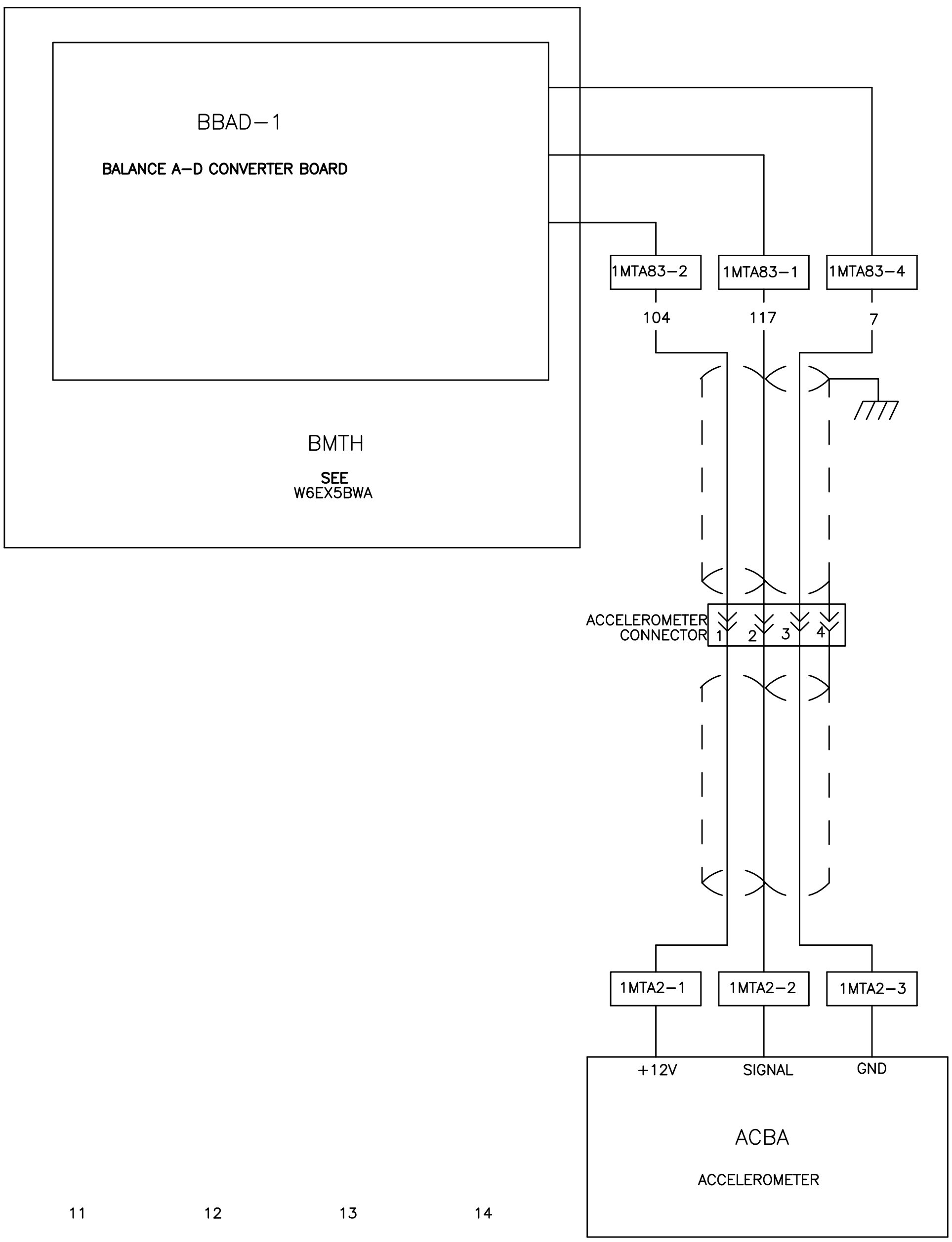
NOTES:

1. 1MTP, 1MTD ARE LOCATED ON ESPS (POWER SUPPLY).
2. 1MTTA31, 1MTA33, 2MTA31, 1MTA 34 AND 1MTA39 ARE LOCATED ON BPB (PROCESSOR BOARD).
3. 1MTA1 IS LOCATED ON BMTH−1 (8−CARD MOTHER BOARD).
4. 1MTA41 IS LOCATED ON BBB−1 (BATTERY BACKUP BOARD).
5. WCDL IS THE DOWN LOAD/PRINTER/MILDATA CONNECTOR.
6. TBA IS LOCATED IN THE LOW VOLTAGE CONTROL BOX.
7. TB1 IS LOCATED IN THE PROCESSOR BOX.
8. MOVE (J2) ON BPB TO "DOWNLOAD BOX" POSITION FOR DOWNLOAD.

11 12 13 14 15 16 17 18 19

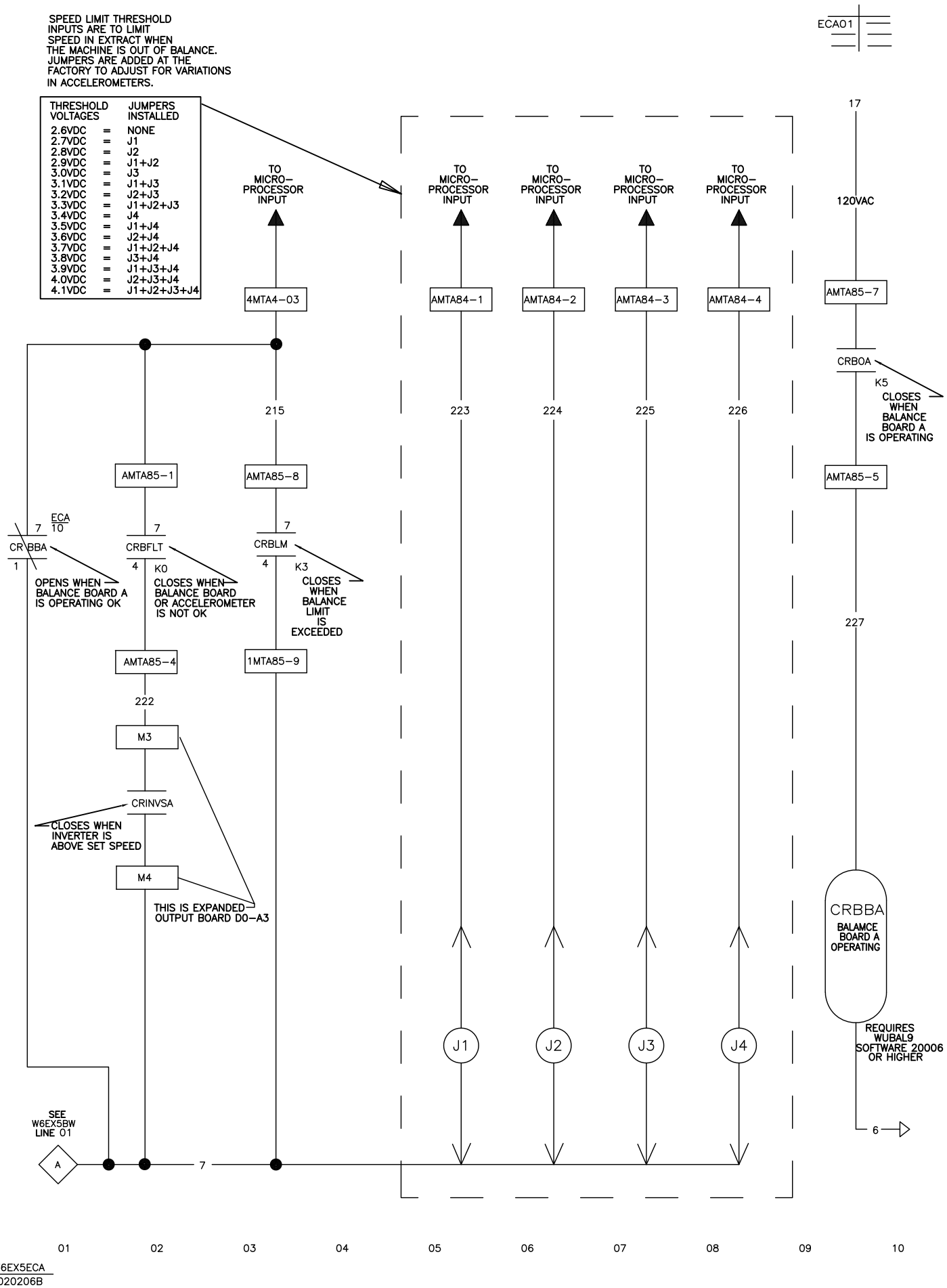

SPEED LIMIT THRESHOLD INPUTS ARE TO LIMIT SPEED IN EXTRACT WHEN THE MACHINE IS OUT OF BALANCE. JUMPERS ARE ADDED AT THE FACTORY TO ADJUST FOR VARIATIONS IN ACCELEROMETERS.
THRESHOLD VOLTAGES = JUMPERS INSTALLED
2.6VDC = NONE
2.7VDC = J1
2.8VDC = J2
2.9VDC = J1+J2
3.0VDC = J3
3.1VDC = J1+J3
3.2VDC = J2+J3
3.3VDC = J1+J2+J3
3.4VDC = J4
3.5VDC = J1+J4
3.6VDC = J2+J4
3.7VDC = J1+J2+J4
3.8VDC = J3+J4
3.9VDC = J1+J3+J4
4.0VDC = J2+J3+J4
4.1VDC = J1+J2+J3+J4
EC01
17
120VAC
TO MICRO-PROCESSOR INPUT
1MTA38-6
1MTA84-1
1MTA84-2
1MTA84-3
1MTA84-4
1MTA85-7
7
CRBO
4
K5
CLOSES WHEN BALANCE BOARD IS OPERATING
115
123
124
125
126
1MTA85-1
1MTA85-8
1MTA85-5
EC 10
7
CRBB
1
OPENS WHEN BALANCE BOARD OPERATING IS OK
CRBFLT
4
K0
CLOSES WHEN BALANCE BOARD OR ACCELEROMETER IS NOT OK
CRBLM
K3
CLOSES WHEN BALANCE LIMIT IS EXCEEDED
1MTA85-4
1MTA85-9
122
M3
CRINVS
CLOSES WHEN INVERTER IS ABOVE SET SPEED
M4
CRBB
BALAMCE BOARD OPERATING
REQUIRES WUBAL9 SOFTWARE 20006 OR HIGHER
J1
J2
J3
J4
SEE W6EX5BW LINE 01
A
7
6
00
01
02
03
04
05
06
07
08
09
10
W6EX5EC
2020103B

W6EX5EC
MICRO 6 SYSTEMS MARK V
SCHEMATIC: ELECTRONIC BALANCE FOR EXTRACTOR ONLY
PELLERIN MILNOR CORPORATION



11 12 13 14

W6EX5EC
2020103B

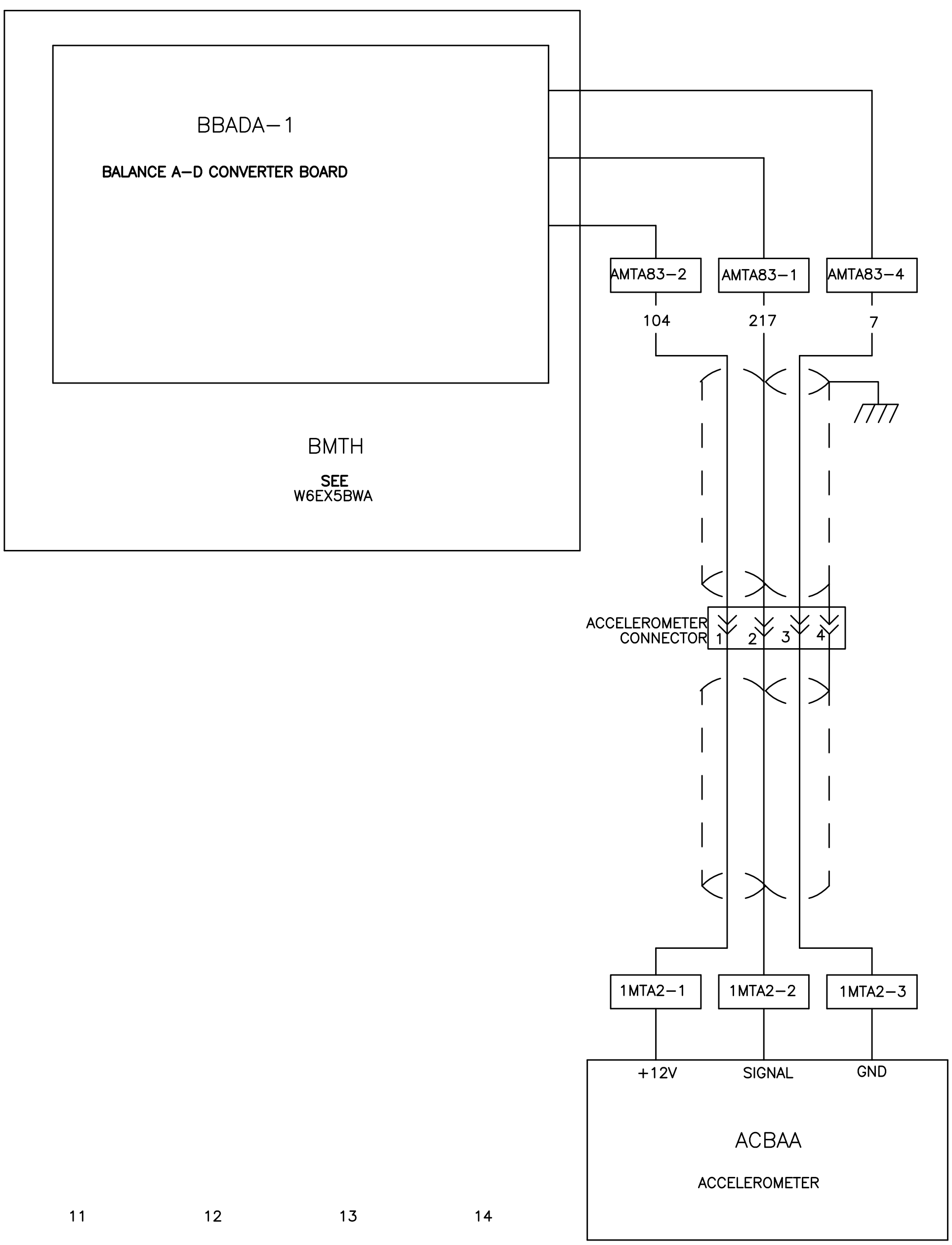

SPEED LIMIT THRESHOLD INPUTS ARE TO LIMIT SPEED IN EXTRACT WHEN THE MACHINE IS OUT OF BALANCE. JUMPERS ARE ADDED AT THE FACTORY TO ADJUST FOR VARIATIONS IN ACCELEROMETERS.
THRESHOLD VOLTAGES = JUMPERS INSTALLED
2.6VDC = NONE
2.7VDC = J1
2.8VDC = J2
2.9VDC = J1+J2
3.0VDC = J3
3.1VDC = J1+J3
3.2VDC = J2+J3
3.3VDC = J1+J2+J3
3.4VDC = J4
3.5VDC = J1+J4
3.6VDC = J2+J4
3.7VDC = J1+J2+J4
3.8VDC = J3+J4
3.9VDC = J1+J3+J4
4.0VDC = J2+J3+J4
4.1VDC = J1+J2+J3+J4
ECA01
TO MICRO-PROCESSOR INPUT
4MTA4-03
AMTA84-1
AMTA84-2
AMTA84-3
AMTA84-4
17
120VAC
AMTA85-7
CRB0A
K5
CLOSES WHEN BALANCE BOARD A IS OPERATING
AMTA85-5
215
223
224
225
226
227
AMTA85-1
AMTA85-8
ECA 10
CRBBA
CRBFLT
CRBLM
K0
K3
OPENS WHEN BALANCE BOARD A IS OPERATING OK
CLOSES WHEN BALANCE BOARD OR ACCELEROMETER IS NOT OK
CLOSES WHEN BALANCE LIMIT IS EXCEEDED
AMTA85-4
1MTA85-9
222
M3
CRINVSA
CLOSES WHEN INVERTER IS ABOVE SET SPEED
M4
THIS IS EXPANDED OUTPUT BOARD D0-A3
CRBBA
BALAMCE BOARD A OPERATING
REQUIRES WUBAL9 SOFTWARE 20006 OR HIGHER
J1
J2
J3
J4
SEE W6EX5BW LINE 01
A
7
6
00 01 02 03 04 05 06 07 08 09 10
W6EX5ECA
2020206B

W6EX5ECA
2020206B

W6EX5ECA

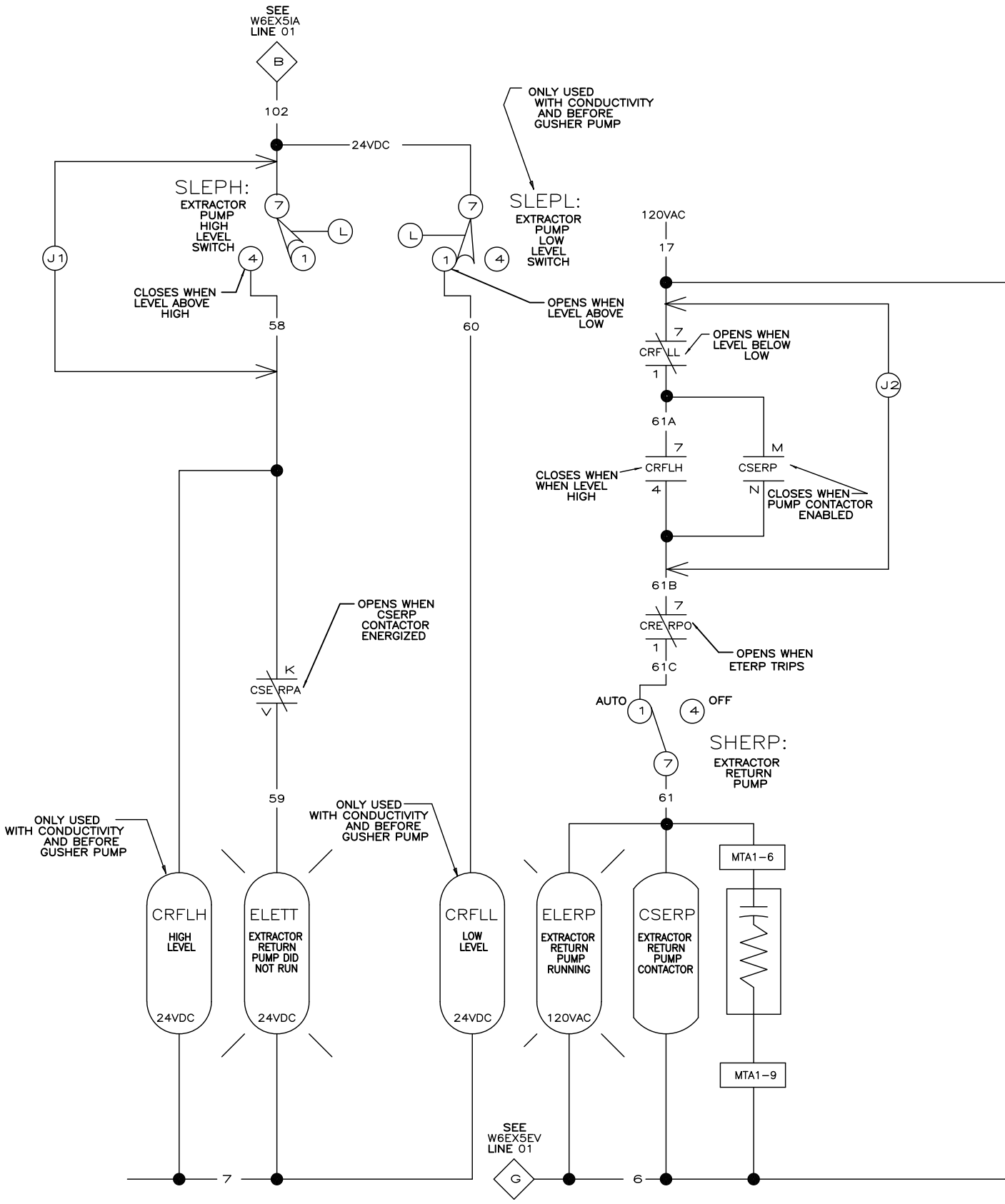
MICRO 6 SYSTEMS
MARK V
SCHEMATIC: ELECTRONIC BALANCE
FOR EXTRACTOR ONLY BOARD #2

PELLERIN MILNOR CORPORATION



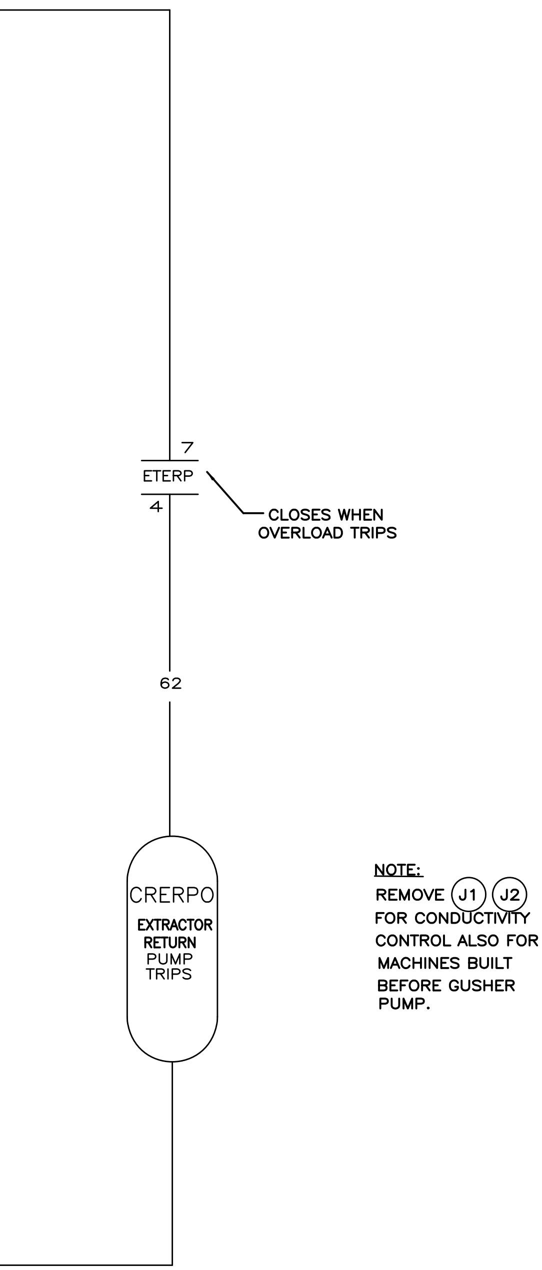
11 12 13 14

W6EX5ECA
2020206B



W6EX5EPA
2020442B

W6EX5EPA
2020442B



W6EX5EPA

MICRO 6 SYSTEMS

MARK V CONRTROLS

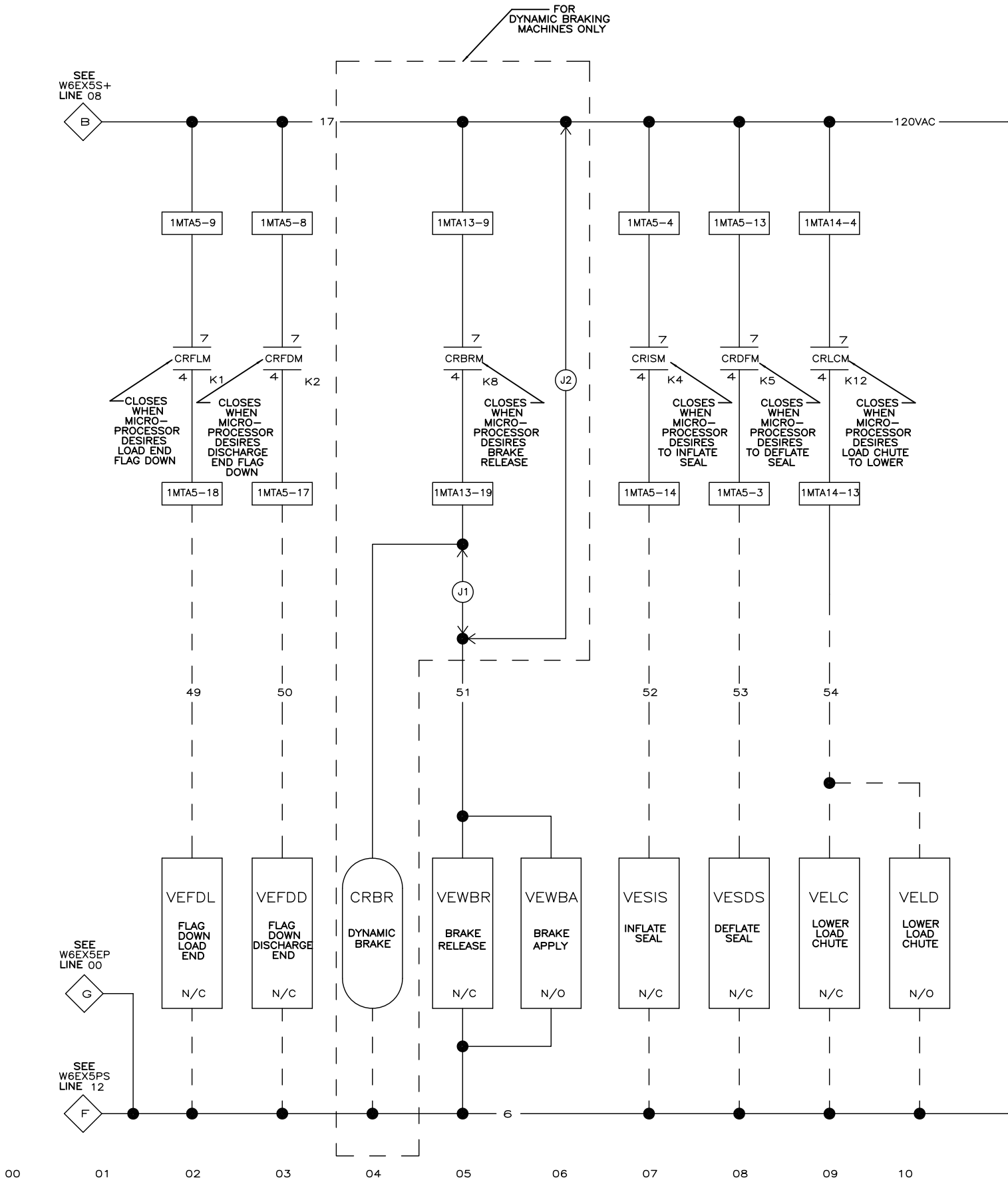
SCHEMATIC: EXTRACTOR RETURN PUMP

WITH CONDUCTIVITY PROBES

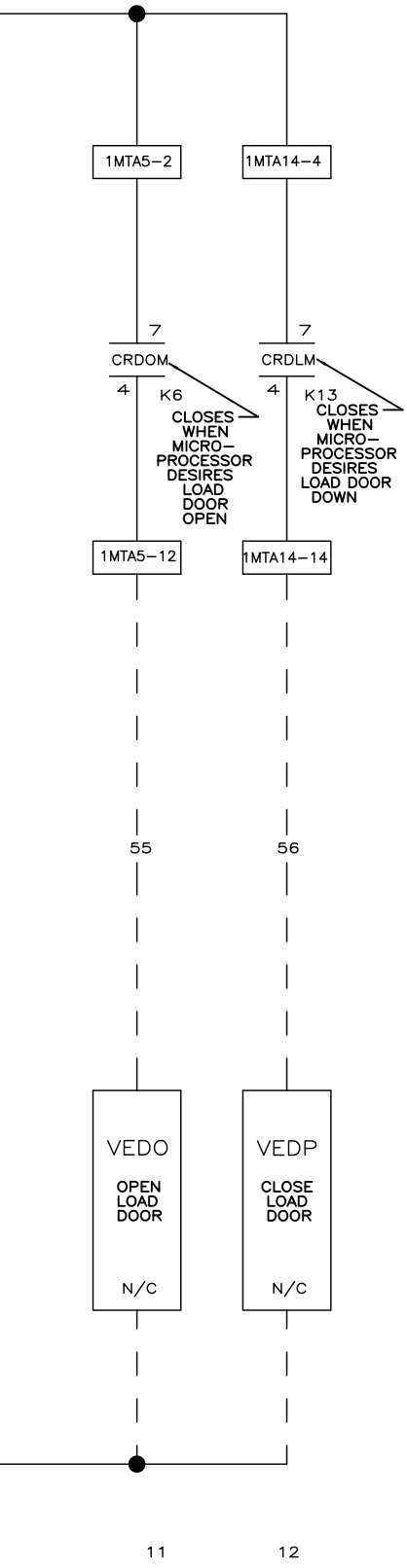
PELLERIN MILNOR CORPORATION

10

W6EX5EPA
2020442B



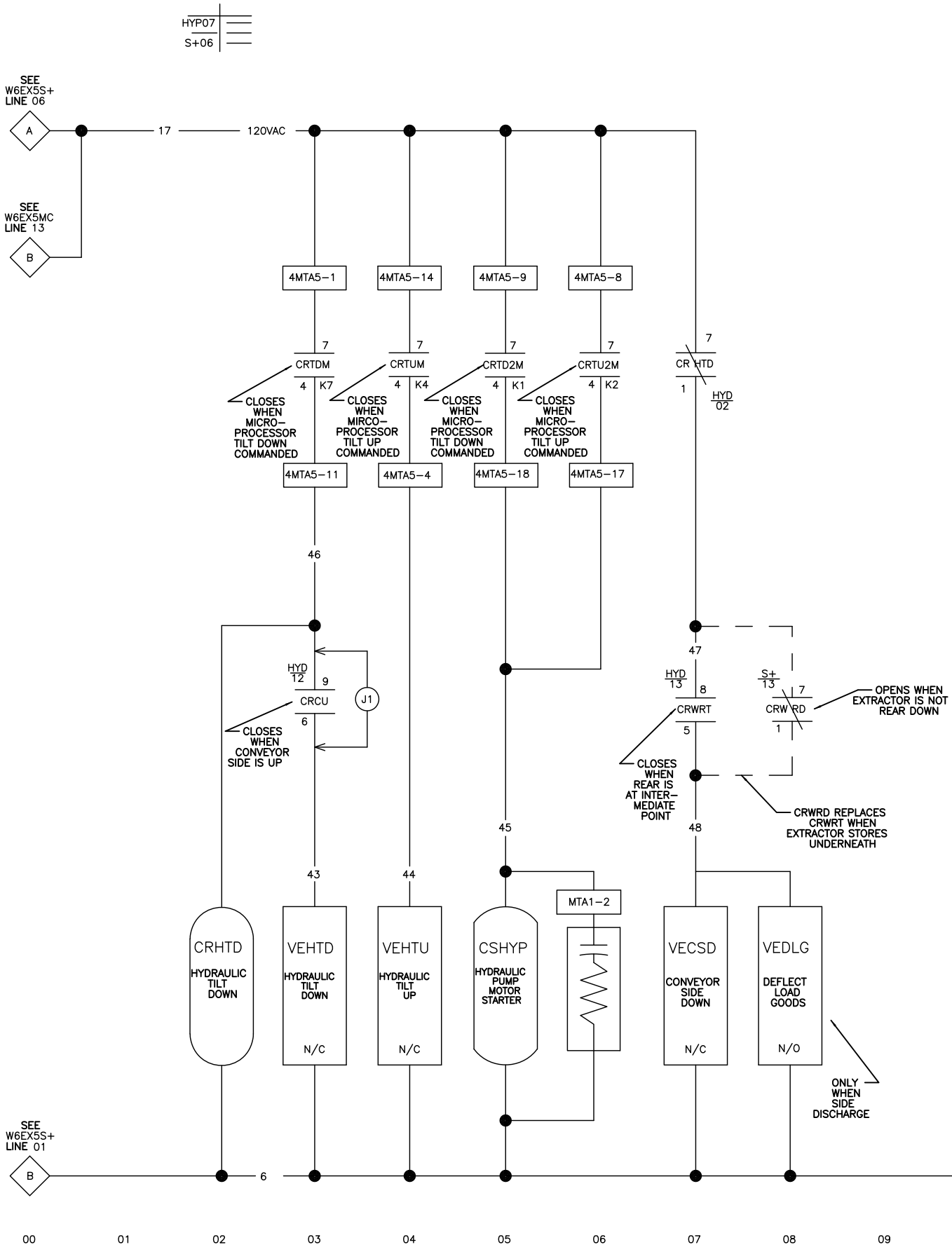
W6EX5EV
2017202B



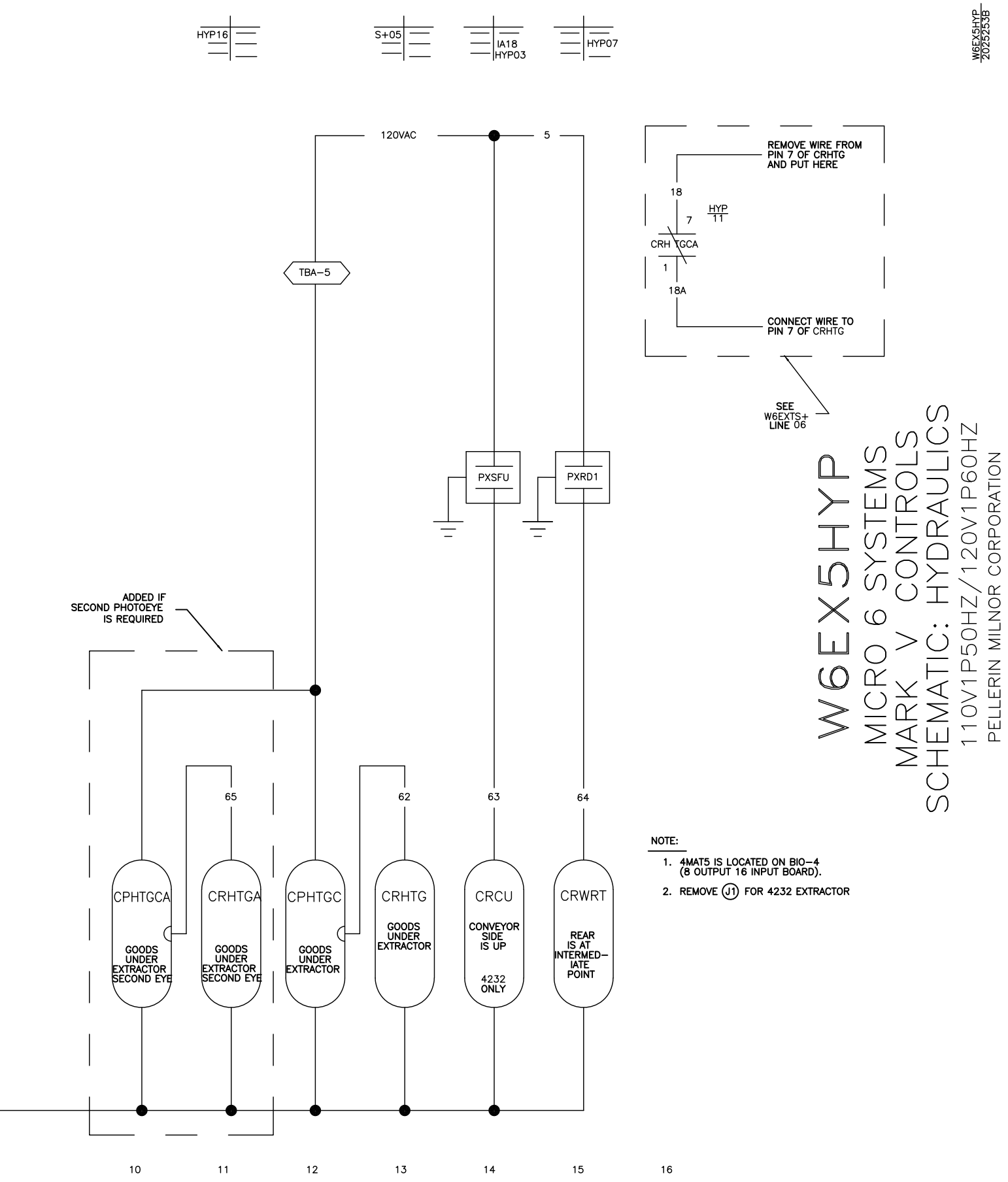
NOTES:

1. 1MTA5 IS LOCATED ON BIO–1 (8 OUTPUT 16 INPUT BOARD).
2. IMTA13 AND 1MTA14 ARE LOCATED ON BO24 (24 OUTPUT BOARD).
3. REMOVE (J1) FOR DYNANIC BRAKE.
4. REMOVE (J2) FOR MECHANICAL BRAKE.

W6EX5EV
MICRO 6 SYSTEMS
MARK V CONTROLS
SCHEMATIC: ELECTRICAL VALVES
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION



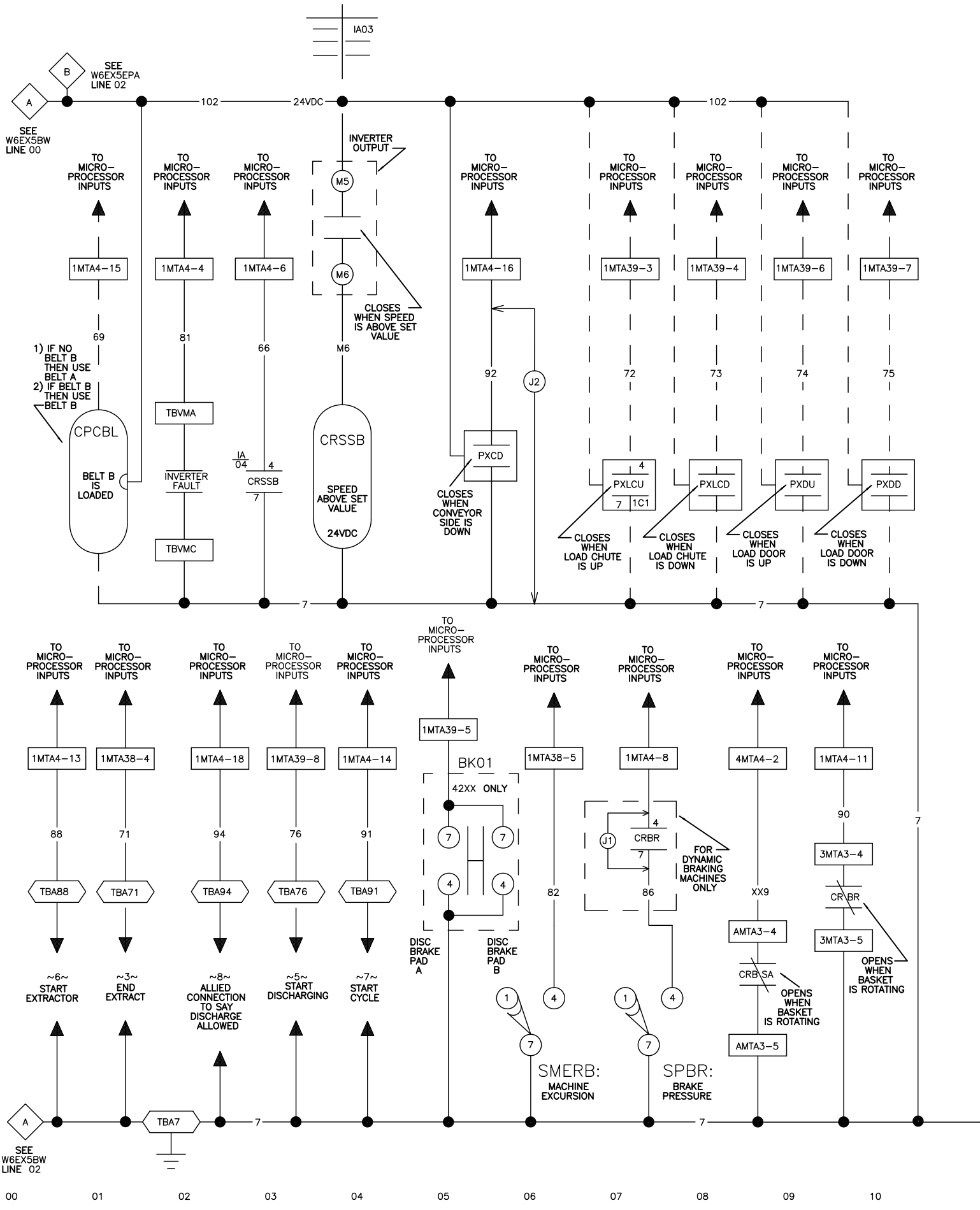
W6EX5HYP
2025253B

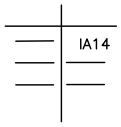


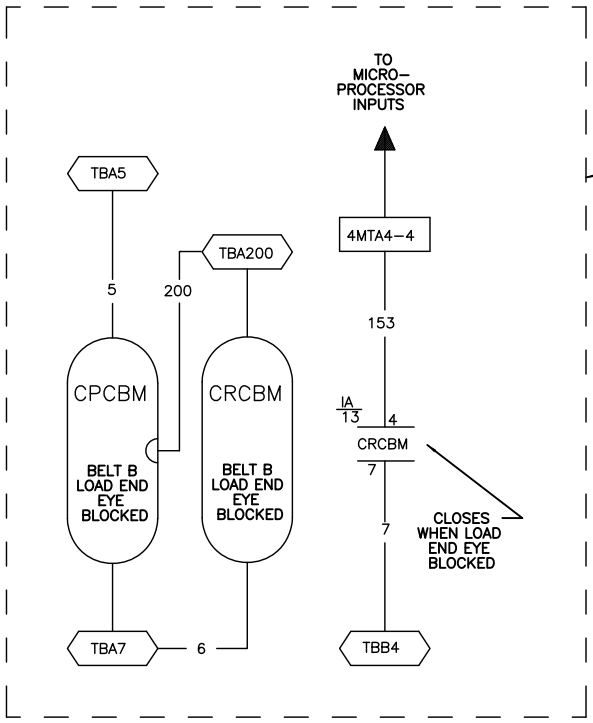
W6EX5HYP
MICRO 6 SYSTEMS
MARK V CONTROLS
SCHEMATIC: HYDRAULICS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION

NOTE:

1. 4MAT5 IS LOCATED ON BIO–4 (8 OUTPUT 16 INPUT BOARD).
2. REMOVE (J1) FOR 4232 EXTRACTOR


IA03
B
SEE W6EX5EPA LINE 02
A
SEE W6EX5BW LINE 00
102
24VDC
102
INVERTER OUTPUT
M5
M6
CLOSES WHEN SPEED IS ABOVE SET VALUE
TO MICRO-PROCESSOR INPUTS
1MTA4-15
1MTA4-4
1MTA4-6
1MTA4-16
1MTA39-3
1MTA39-4
1MTA39-6
1MTA39-7
69
81
66
M6
92
72
73
74
75
J2
1) IF NO BELT B THEN USE BELT A
2) IF BELT B THEN USE BELT B
CPCBL
BELT B IS LOADED
TBVMA
INVERTER FAULT
TBVMC
IA 04 4
CRSSB 7
CRSSB
SPEED ABOVE SET VALUE
24VDC
PXCD
CLOSES WHEN CONVEYOR SIDE IS DOWN
4
PXLCU
7 1C1
PXLCD
PXDU
PXDD
CLOSES WHEN LOAD CHUTE IS UP
CLOSES WHEN LOAD CHUTE IS DOWN
CLOSES WHEN LOAD DOOR IS UP
CLOSES WHEN LOAD DOOR IS DOWN
7
7
1MTA4-13
1MTA38-4
1MTA4-18
1MTA39-8
1MTA4-14
1MTA39-5
1MTA38-5
1MTA4-8
4MTA4-2
1MTA4-11
88
71
94
76
91
82
86
XX9
90
TBA88
TBA71
TBA94
TBA76
TBA91
BK01
42XX ONLY
J1
CRBR
7
FOR DYNAMIC BRAKING MACHINES ONLY
3MTA3-4
CR BR
3MTA3-5
AMTA3-4
CRB SA
AMTA3-5
OPENS WHEN BASKET IS ROTATING
~6~ START EXTRACTOR
~3~ END EXTRACT
~8~ ALLIED CONNECTION TO SAY DISCHARGE ALLOWED
~5~ START DISCHARGING
~7~ START CYCLE
DISC BRAKE PAD A
DISC BRAKE PAD B
SMERB: MACHINE EXCESSION
SPBR: BRAKE PRESSURE
TBA7
A
SEE W6EX5BW LINE 02
00
01
02
03
04
05
06
07
08
09
10
W6EX5IA
2025253B





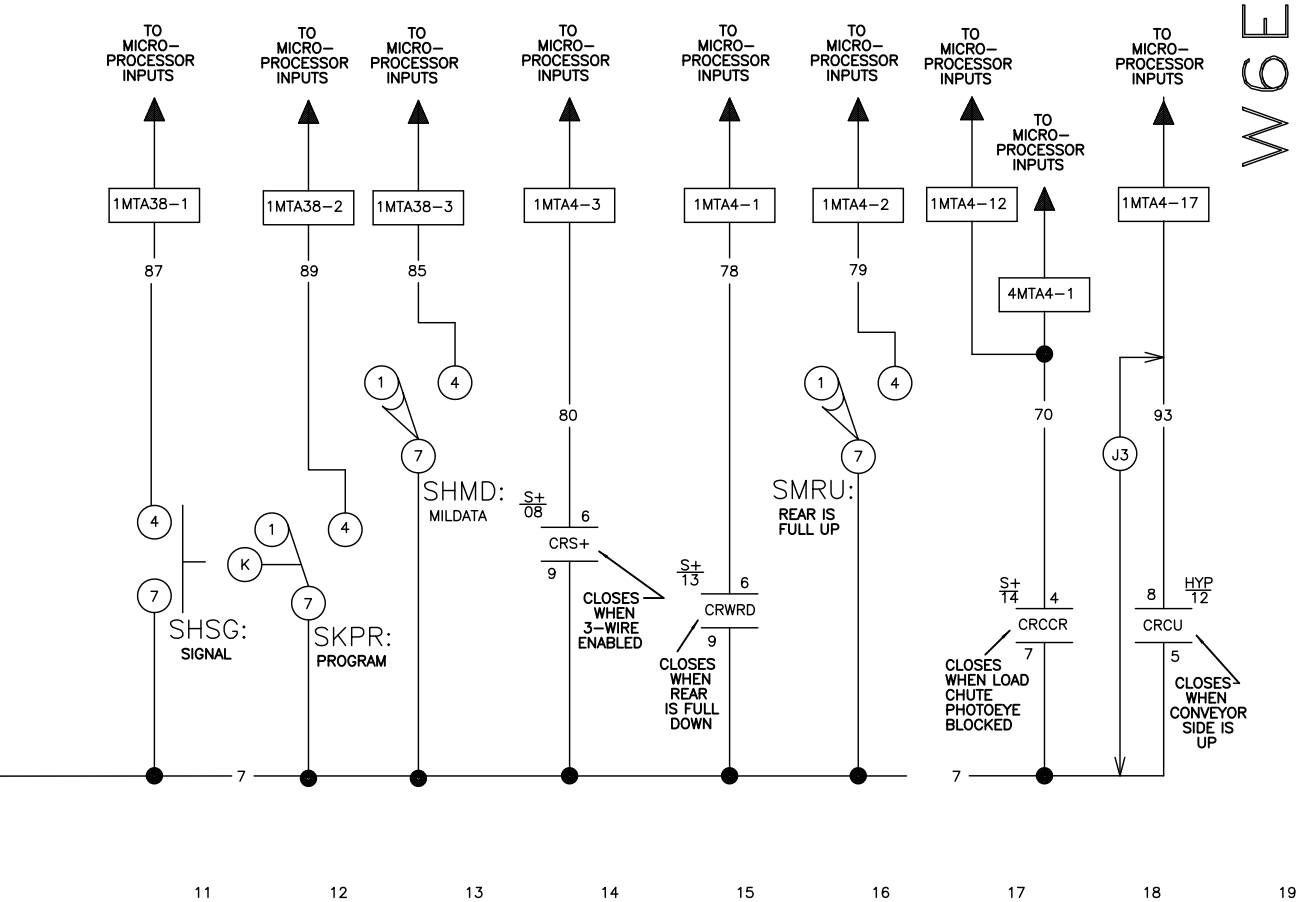
NOTES:

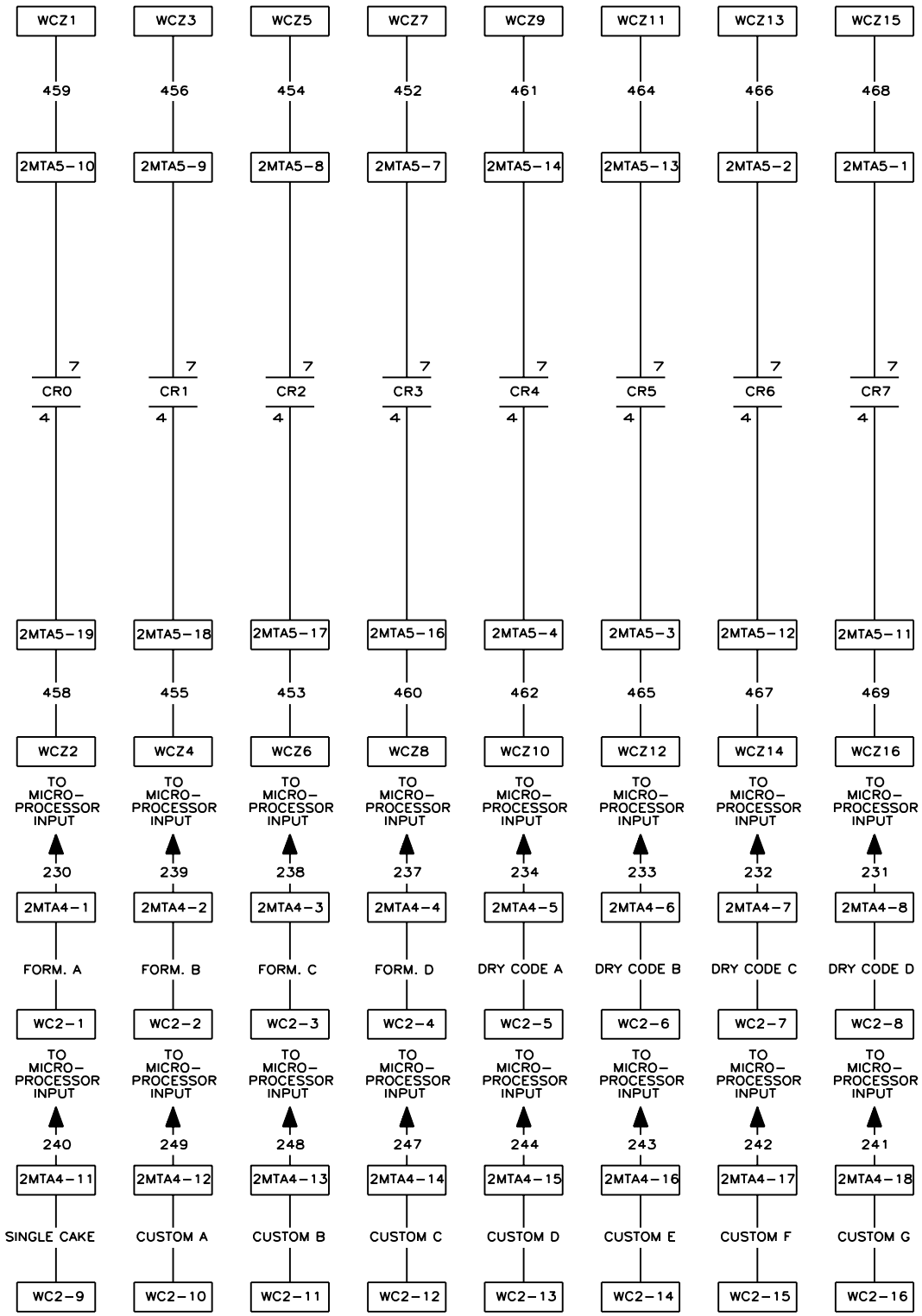
1. REMOVE (J1) FOR DYNAMIC BRAKES.
2. REMOVE (J2) & (J3) FOR 4232 EXTRACTOR.
3. (M5) & (M6) ARE LOCATED ON THE INVERTER.

NOTE:

1. 1MTA38 AND 1MTA39 ARE LOCATED ON BPB (186 PROCESSOR BOARD).
2. 1MTA4 IS LOCATED ON BIO–1 (8 OUTPUT 16 INPUT BOARD).
3. 3MTA3 IS LOCATED ON BRS1 (SPEED SENSING BOARD FOR NORMAL DISCHARGING).
4. AMTA3 IS LOCATED ON BRS2 (SPEED SENSING BOARD) FOR FAST DISCHARGING.

W6EX5IA
MICRO 6 SYSTEMS
MARK V CONTROLS
SCHEMATIC: INPUTS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION

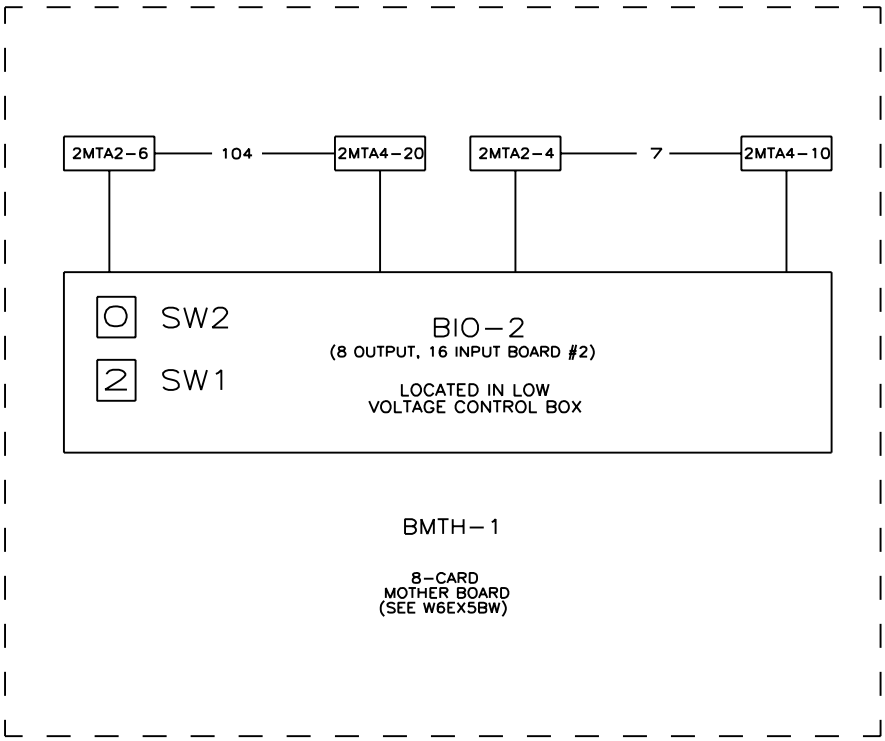




W6EX5IDP2
2001092B

NOTES:

CR0 = DRYCODE A
CR1 = DRYCODE B
CR2 = DRYCODE C
CR3 = DRYCODE D
CR4 = FORMULA A
CR5 = FORMULA B
CR6 = FORMULA C
CR7 = FORMULA D



W6EX5IDP2
MICRO 6 SYSTEMS
SCHEMATIC: EXTRACTOR DRY CONTACT DATA PASS
(8 OUTPUT 16 INPUT BOARD #2)

PELLERIN MILNOR CORPORATION

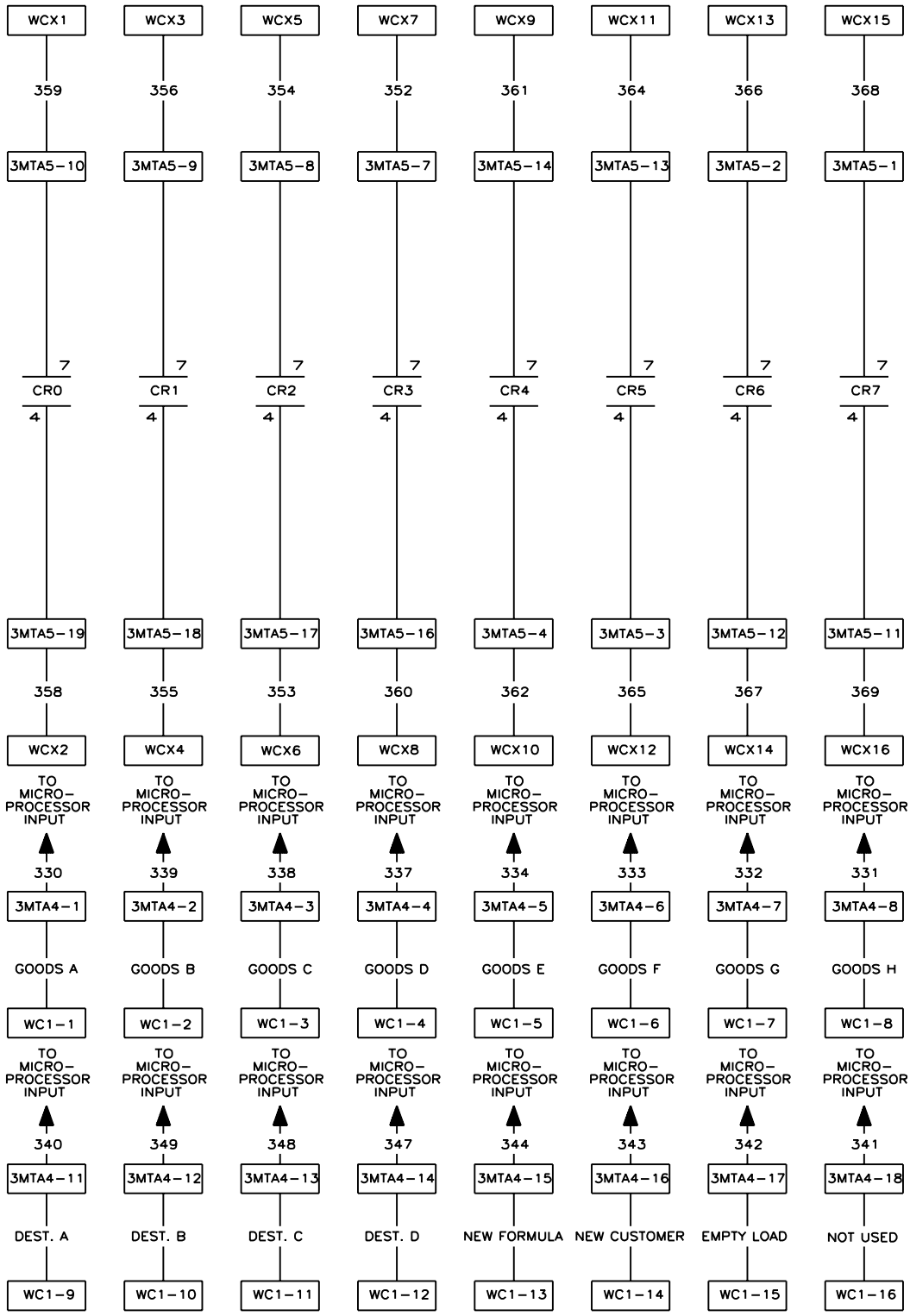
WIRE COLOR CODE

WIRE NO.	VOLTAGE	WIRE COLOR
103	+5VDC	BLUE
104	+12VDC	BLUE/ORANGE
105	-12VDC	BLUE/BLACK
7	SIGNAL GROUND	BLUE/WHITE
107	SERIAL HIGH	BLUE/RED
106	SERIAL LOW	BLUE/BLACK
6	CONTROL GROUND	RED/WHITE
24VAC	LOW VOLTAGE CONTROL	RED/BLUE
120VAC	HIGH VOLTAGE CONTROL	RED
INPUTS	INPUTS TO MICRO	BLUE/BLACK
OUTPUTS	OUTPUTS FROM MACRO	RED/BLACK

NOTES:

1. WC2 AND WC2 ARE LOCATED IN THE LOW VOLTAGE CONTROL BOX.
2. 2MTA2, 2MTA4, AND 2MTA5 ARE LOCATED ON BIO-2 (8OUTPUT 16 INPUT BOARD #2).

10 11 12 13 14 15 16

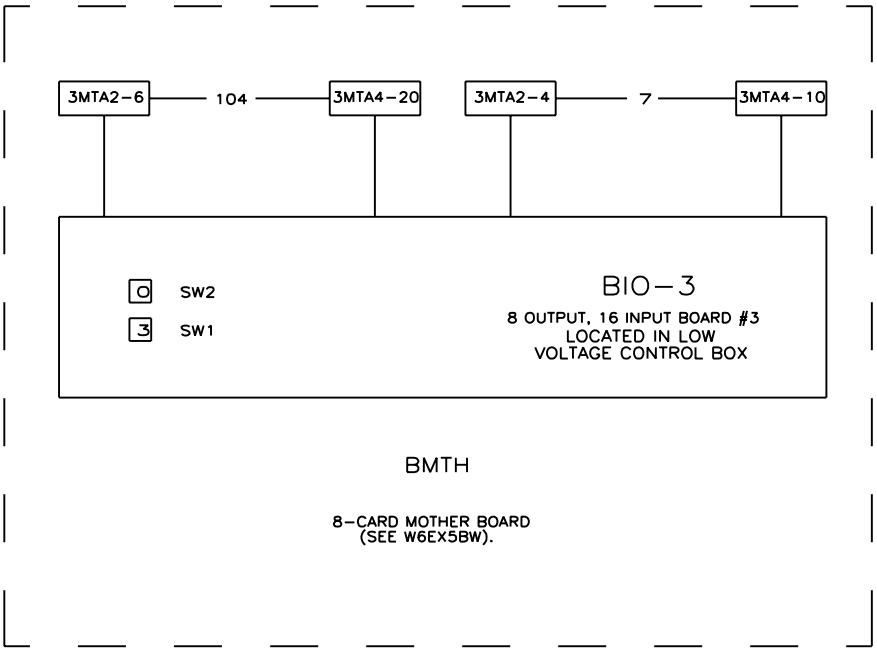


00 01 02 03 04 05 06 07 08 09 10

W6EX5IDP3
2002222B

NOTES:

CR0 = CUSTOMER A
CR1 = CUSTOMER B
CR2 = CUSTOMER C
CR3 = CUSTOMER D
CR4 = CUSTOMER E
CR5 = CUSTOMER F
CR6 = CUSTOMER G
CR7 = CUSTOMER H



W6EX5IDP3

MICRO 6 SYSTEMS

SCHEMATIC: EXTRACTOR DRY CONTACT DATA PASS (8 OUTPUT 16 INPUT BOARD #3)

PELLERIN MILNOR CORPORATION

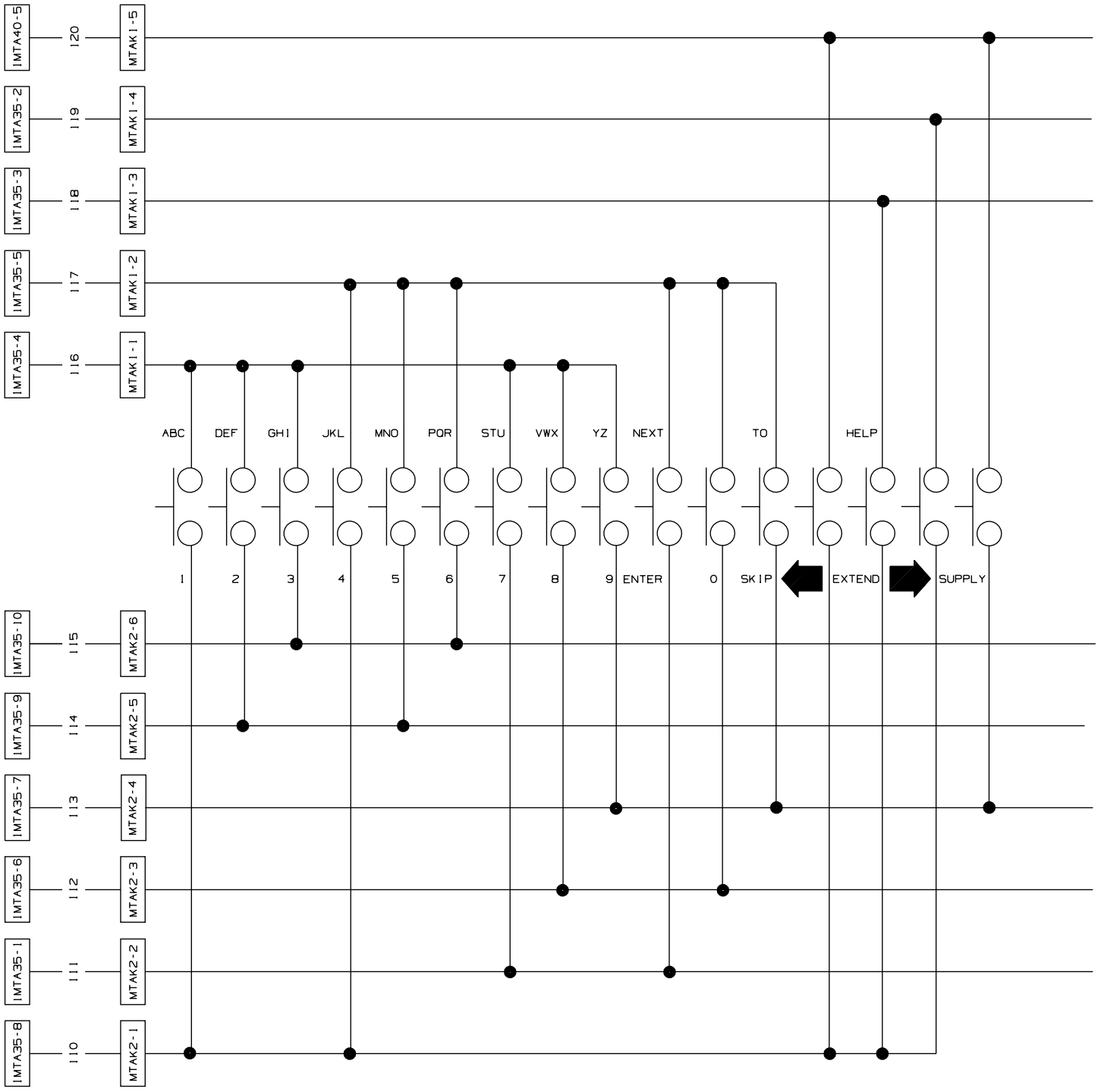
WIRE COLORING CODE

WIRE NO.	VOLTAGE	WIRE COLOR
103	+5VDC	BLUE
104	+12VDC	BLUE/ORANGE
105	-12VDC	BLUE/BLACK
7	SIGNAL GROUND	BLUE/WHITE
107	SERIAL HIGH	BLUE/RED
106	SERIAL LOW	BLUE/BLACK
6	CONTROL GROUND	RED/WHITE
24VAC	LOW VOLTAGE CONTROL	RED/BLUE
120VAC	HIGH VOLTAGE CONTROL	RED
INPUTS	INPUTS TO MICRO	BLUE/BLACK
OUTPUTS	OUTPUTS FROM MACRO	RED/BLACK

NOTES:

1. WCZ AND WC2 ARE LOCATED IN THE LOW VOLTAGE CONTROL BOX.
2. 3MTA2, 3MTA4, AND 3MTA5 ARE LOCATED ON BIO-3 (8 OUTPUT 16 INPUT BOARD #4).

11 12 13 14 15 16



LITHO IN U.S.A.

00 01 02 03 04 05 06 07 08 09 10

W6EX5KP
2000203B

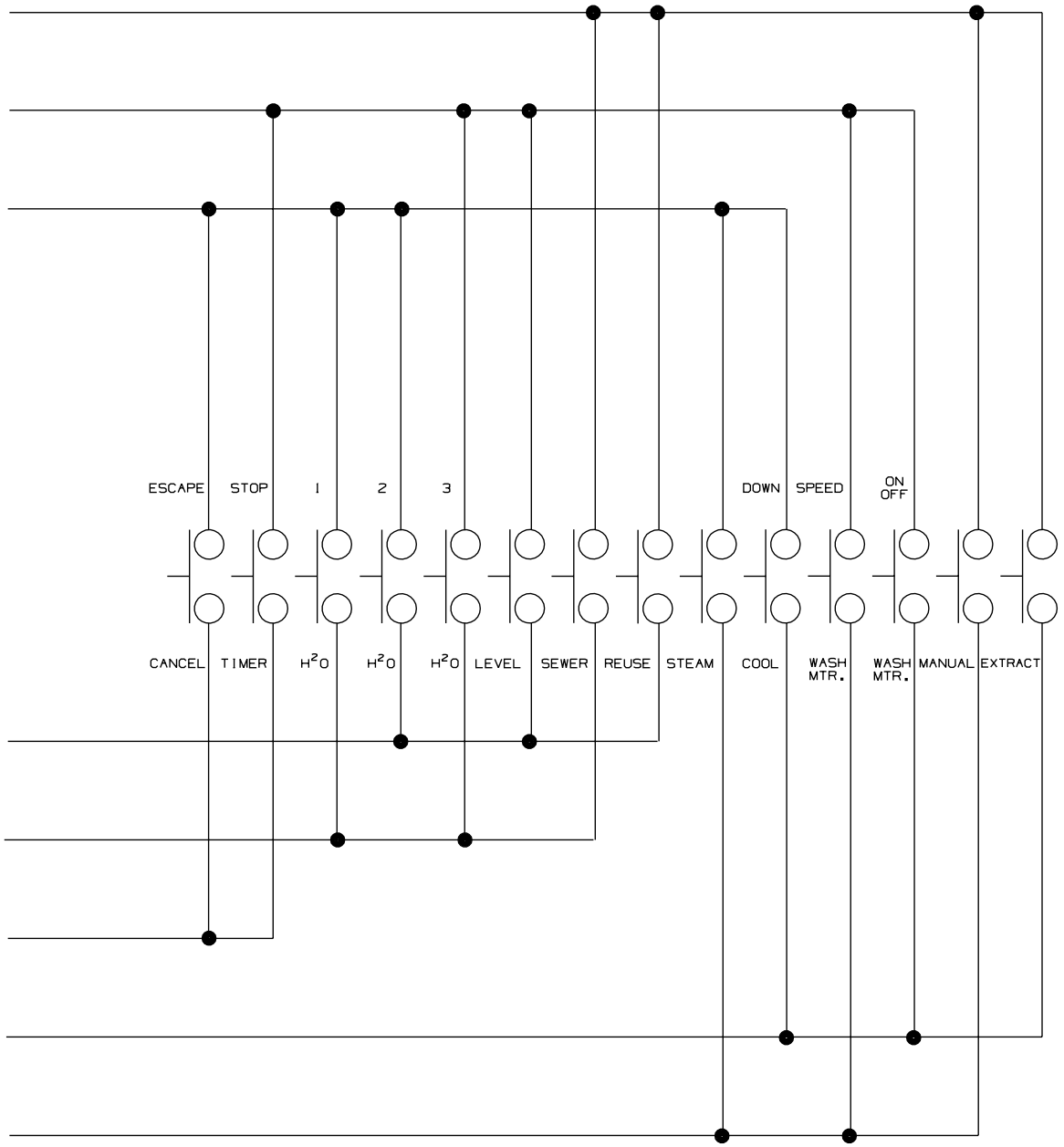
W6EX5KP

MICRO 6 SYSTEMS

SCHEMATIC: KEYPAD (SERIAL CONTROLS)

110V1P50HZ/120V1P60HZ

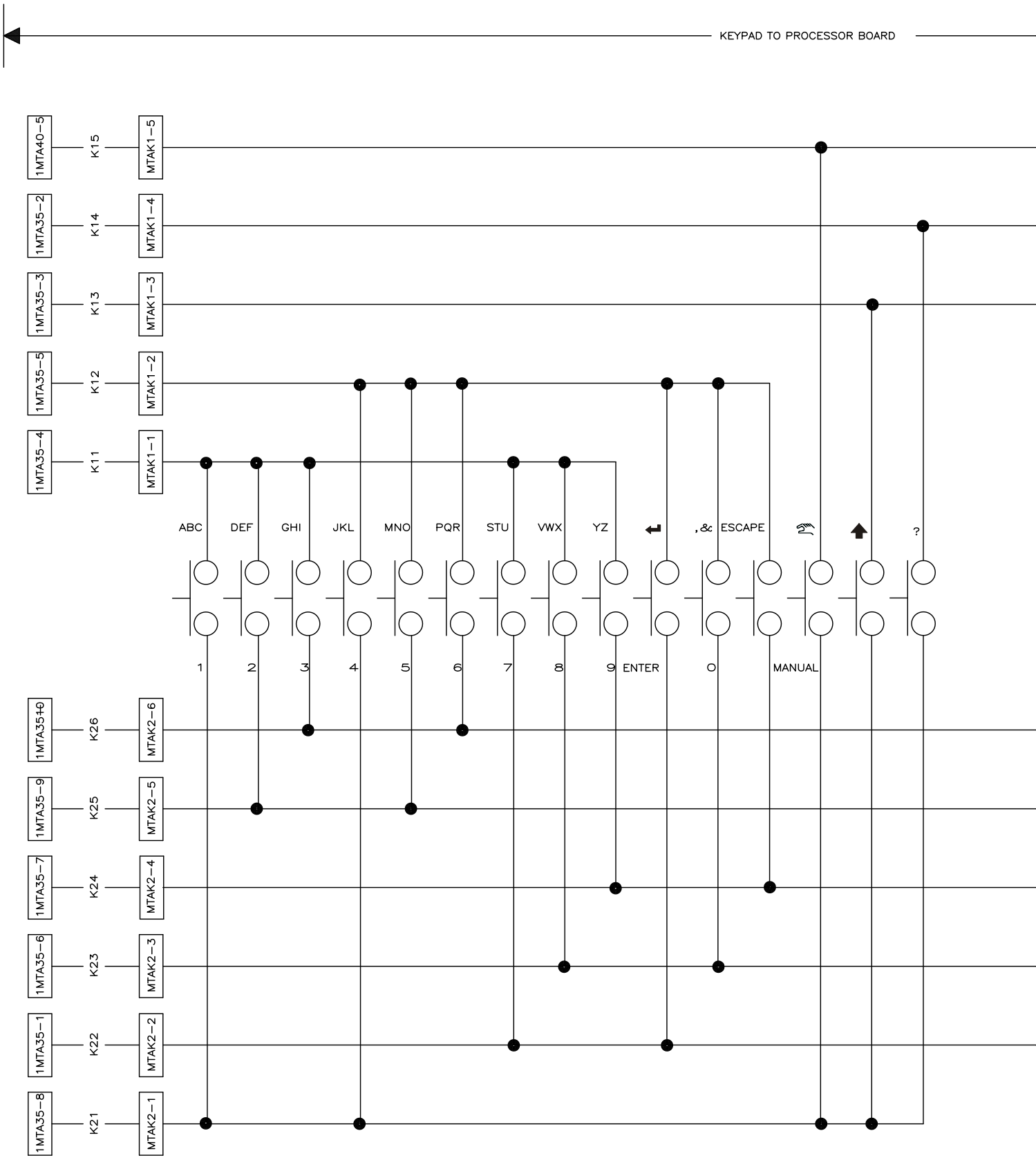
PELLERIN MILNOR CORPORATION

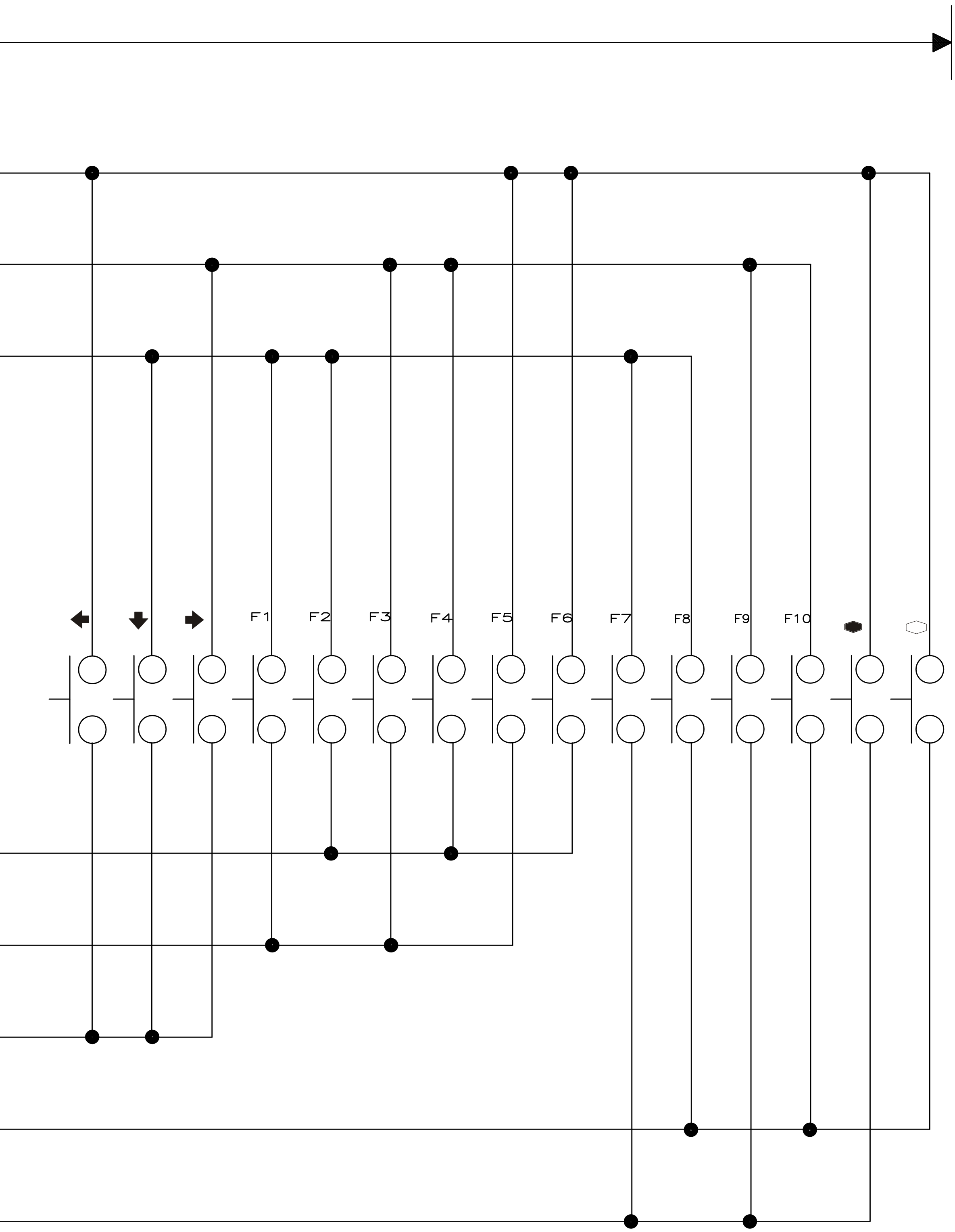


NOTES:

1. MTAK1 & MTAK2 ARE LOCATED ON KEYPAD.
2. IMTA35 & IMTA40 ARE LOCATED ON BPB (PROCESSOR BOARD).

11 12 13 14 15 16 17 18 19


KEYPAD TO PROCESSOR BOARD
1MTA40-5
K15
MTAK1-5
1MTA35-2
K14
MTAK1-4
1MTA35-3
K13
MTAK1-3
1MTA35-5
K12
MTAK1-2
1MTA35-4
K11
MTAK1-1
ABC
DEF
GHI
JKL
MNO
PQR
STU
VWX
YZ
,&
ESCAPE
?
1
2
3
4
5
6
7
8
9
ENTER
0
MANUAL
1MTA35-0
K26
MTAK2-6
1MTA35-9
K25
MTAK2-5
1MTA35-7
K24
MTAK2-4
1MTA35-6
K23
MTAK2-3
1MTA35-1
K22
MTAK2-2
1MTA35-8
K21
MTAK2-1
LITHO IN U.S.A.
00
01
02
03
04
05
06
07
08
09
10
W6EX5KPA
2013204B



W6EX5KPA

MICRO 6 SYSTEMS
MARK VI
SCHEMATIC: KEYPAD (SERIAL CONTROLS)
PELLERIN MILNOR CORPORATION

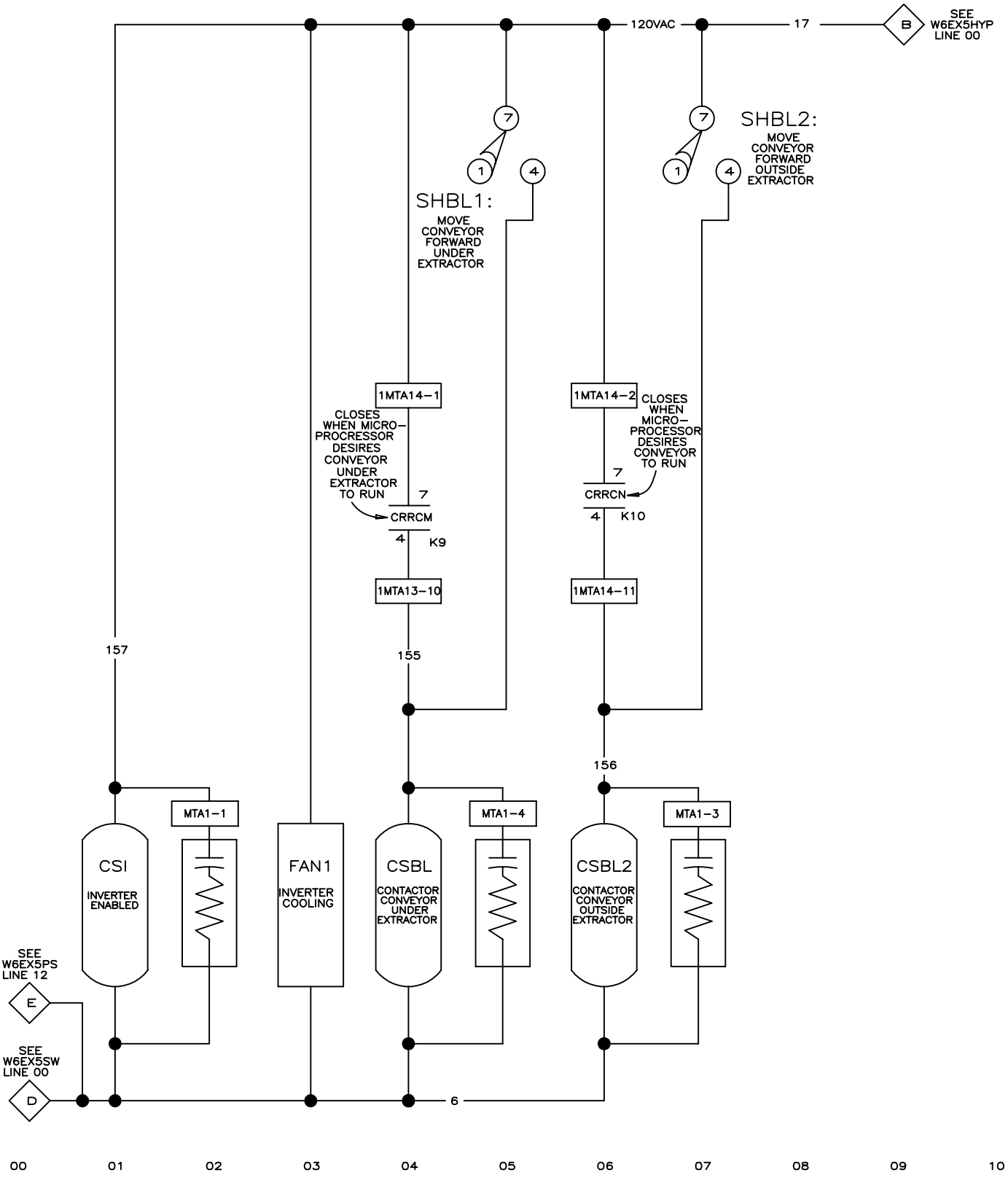
W6EX5KPA
2013204B

NOTES:

1. MTAK1 & MTAK2 ARE LOCATED ON KEYPAD.
2. 1MTA35 & 1MTA40 ARE LOCATED ON
   BPB (PROCESSOR BOARD).

11 12 13 14 15 16 17 18 19

W6EX5KPA
2013205B



W6EX5MCA
2010063B

W6EX5MCA
2010063B

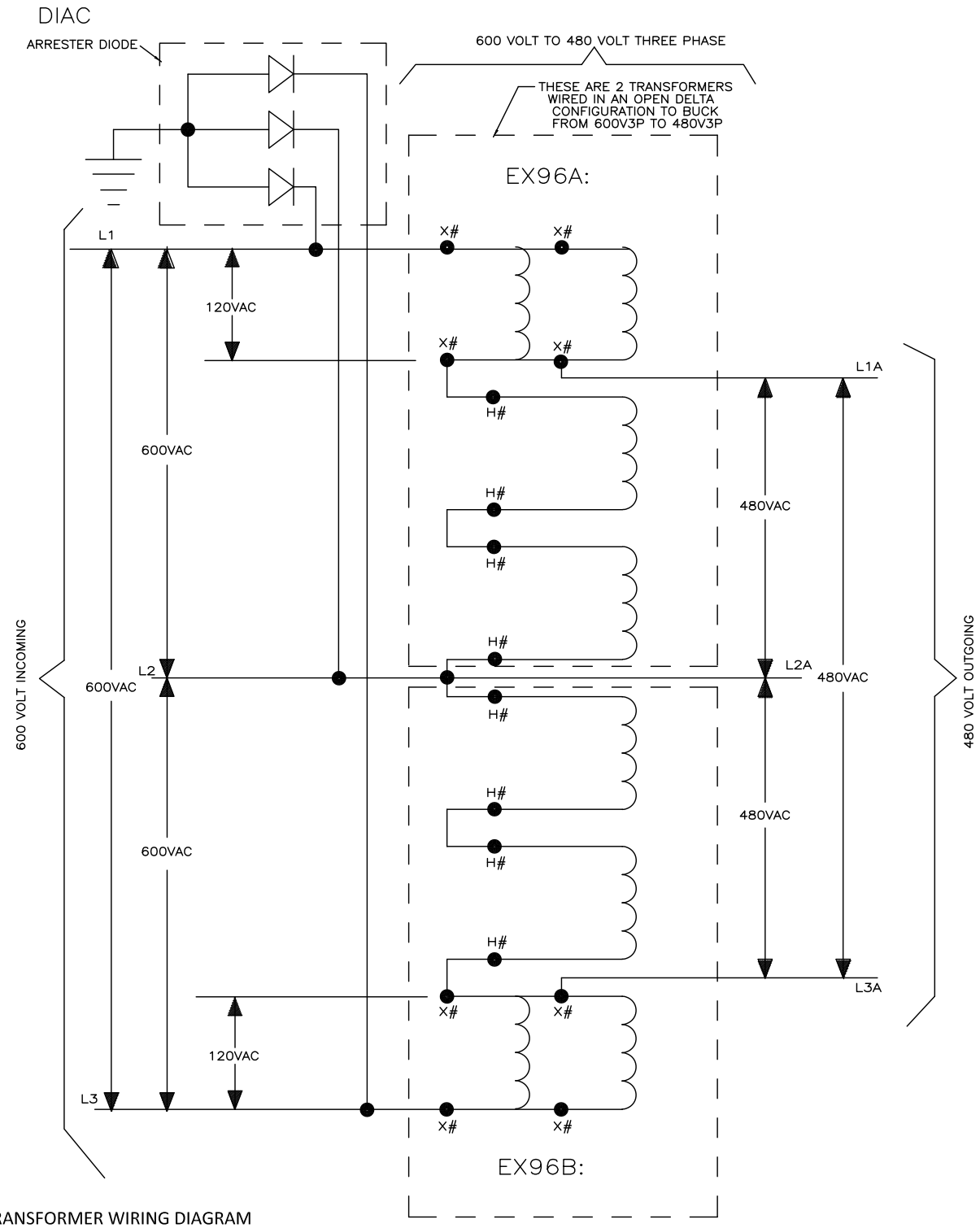
W6EX5MCA
MARK V CONTROLS
SCHEMATIC: DRIVE MOTOR CONTACTORS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION

NOTES:

1. 1MTA5 IS LOCATED ON BIO−1 (8 OUTPUT, 16 INPUT BOARD).
2. 1MTA13, 1MTA14, AND 1MTA15 ARE LOCATED ON BO−1 (24 OUTPUT BOARD).

11 12 13 14 15

W6EX5MCA
2010063B



REFER TO TRANSFORMER WIRING DIAGRAM FOR APPROPIATE WIRE NUMBERS.

THE PRIMARY OF EACH TRANSFORMER NOTED BY H# MUST BE WIRED FOR 480 VOLTS. THE SECONDARY OF EACH TRANSFORMER NOTED BY X# MUST BE WIRED FOR 120 VOLTS.

00 01 02 03 04 05 06 07 08 09 10

W6EX5MT6
2023402B

W6EX5MT6
2023402B

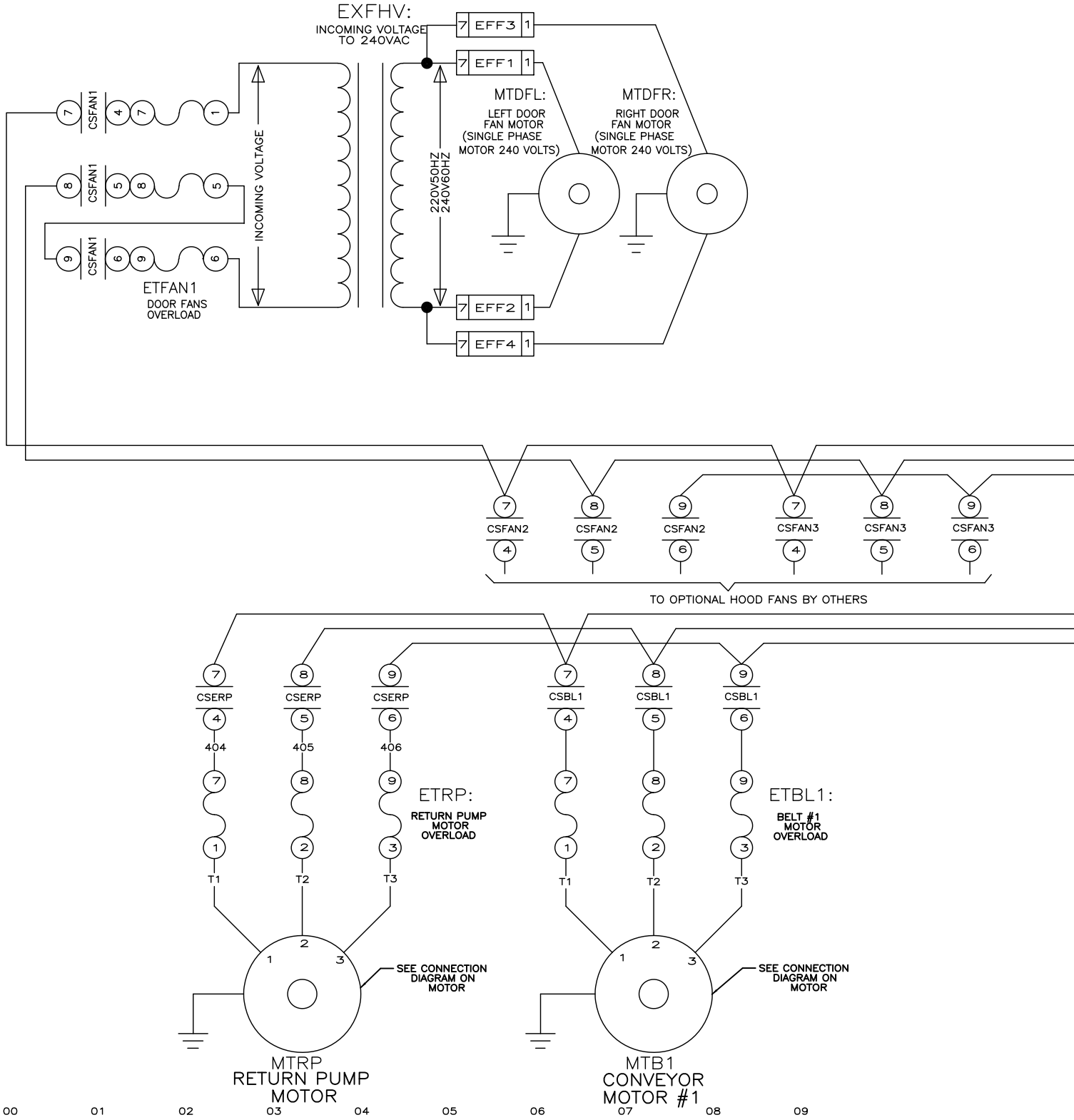
INPUT (SUPPLY SYSTEM)	DESIRED OUTPUT CONNECTION	
DELTA 3 WIRE	WYE 3 OR 4 WIRE	DO NOT USE
OPEN DELTA 3 WIRE	WYE 3 OR 4 WIRE	DO NOT USE
WYE 3 OR 4 WIRE	CLOSED DELTA 3 WIRE	DO NOT USE
WYE 4 WIRE	WYE 3 OR 4 WIRE	OK
WYE 3 OR 4 WIRE	OPEN DELTA 3 WIRE	OK
CLOSED DELTA 3 WIRE	OPEN DELTA 3 WIRE	OK

W6EX5MT6

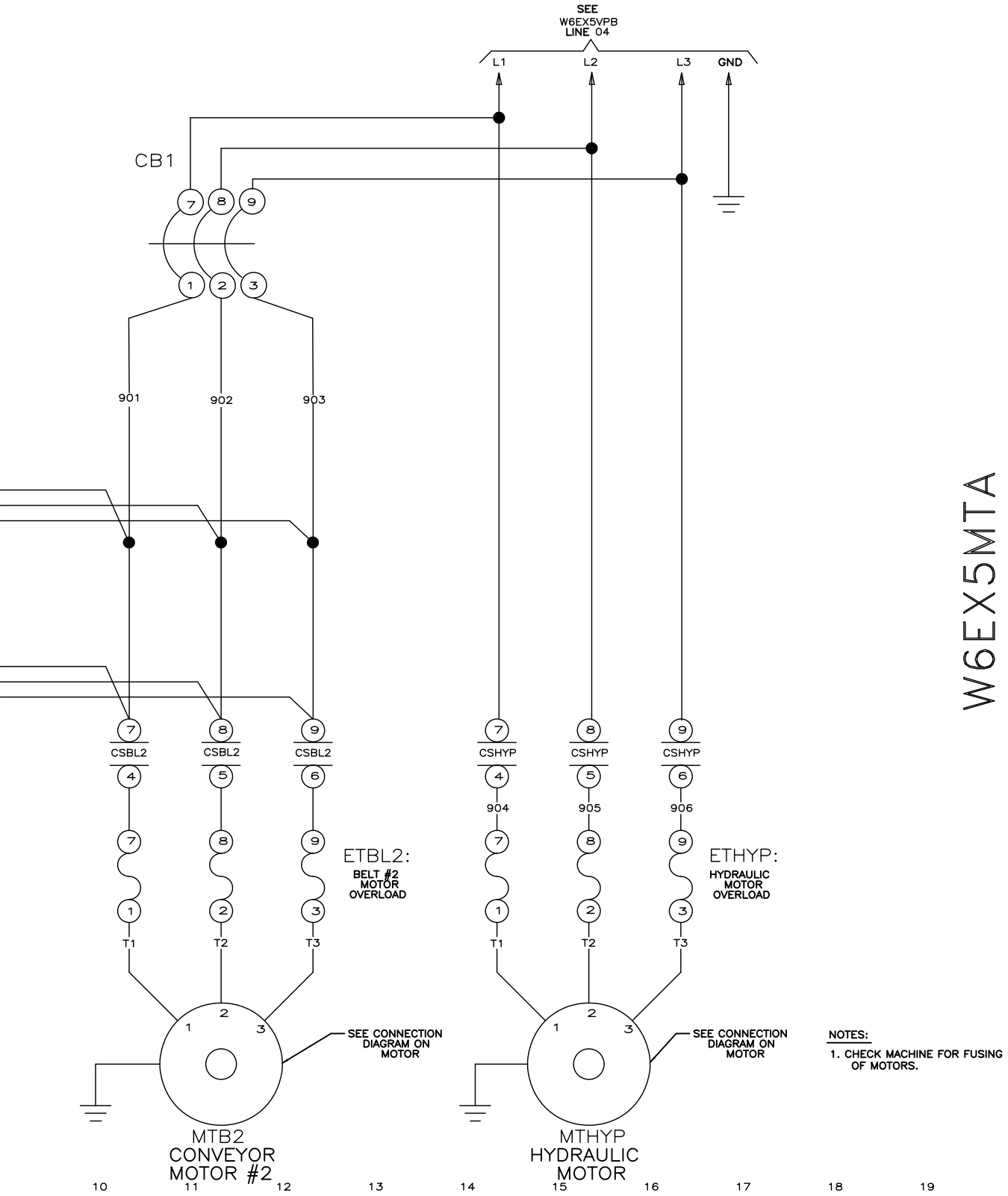
MICRO 6 SYSTEMS
MARK VI CONTROLS
SCHEMATIC:600V MACHINES
600V TO 480 VOLT STEP DOWN
PELLERIN MILNOR CORPORATION

11 12 13 14 15 16 17

W6EX5MT6
2023402B



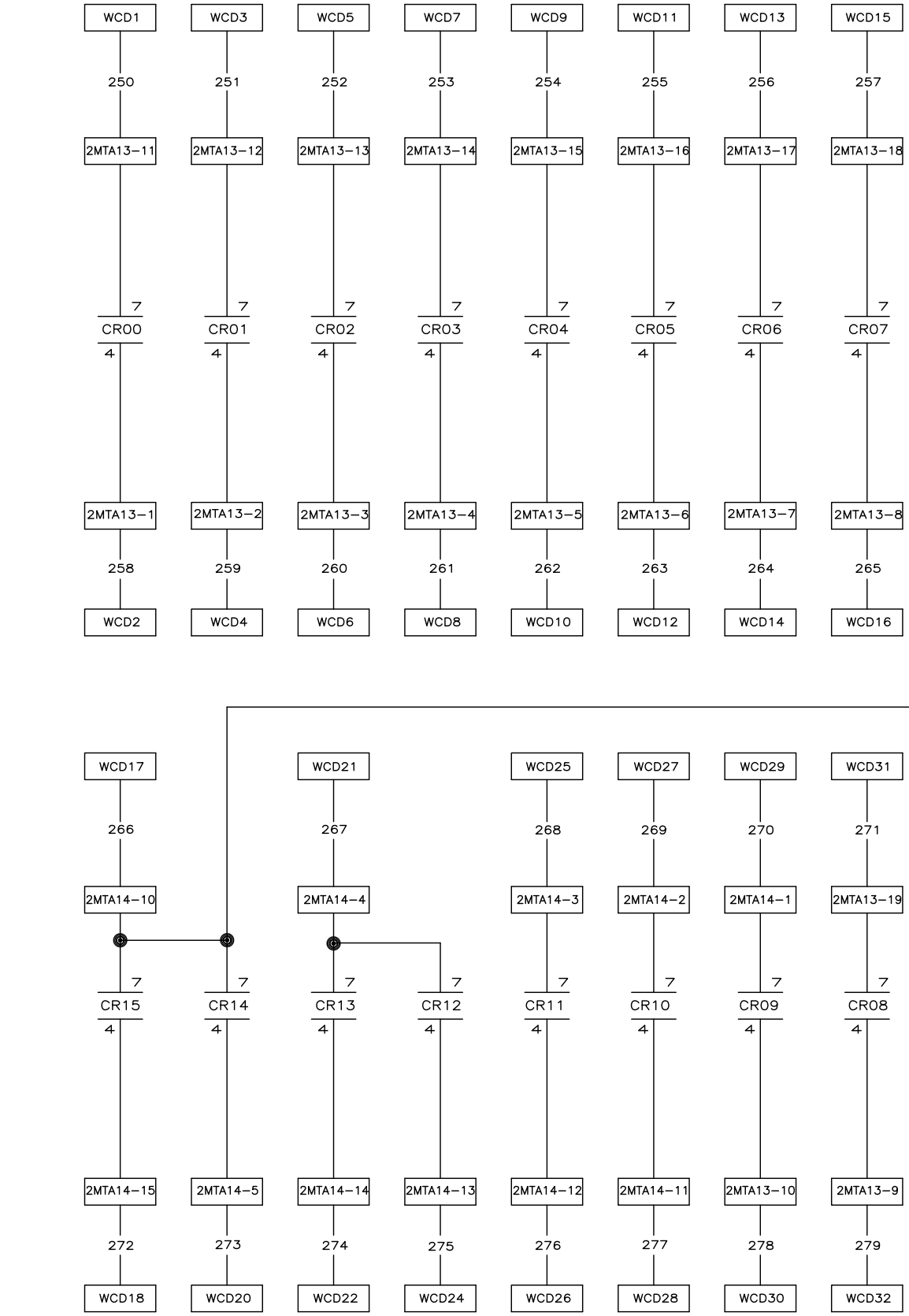
W6EX5MTA
2024334B



W6EX5MTA
MICRO 6 SYSTEMS SERIAL CONTORLS
SCHEMATIC: EXTRACTOR MOTOR CONNECTIONS
PELLERIN MILNOR CORPORATION

NOTES:

1. CHECK MACHINE FOR FUSING OF MOTORS.

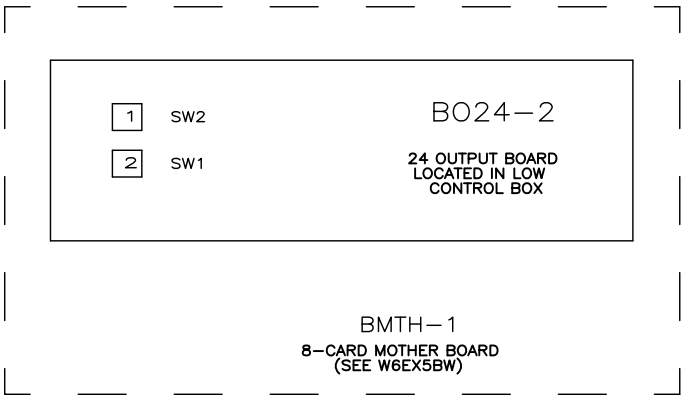


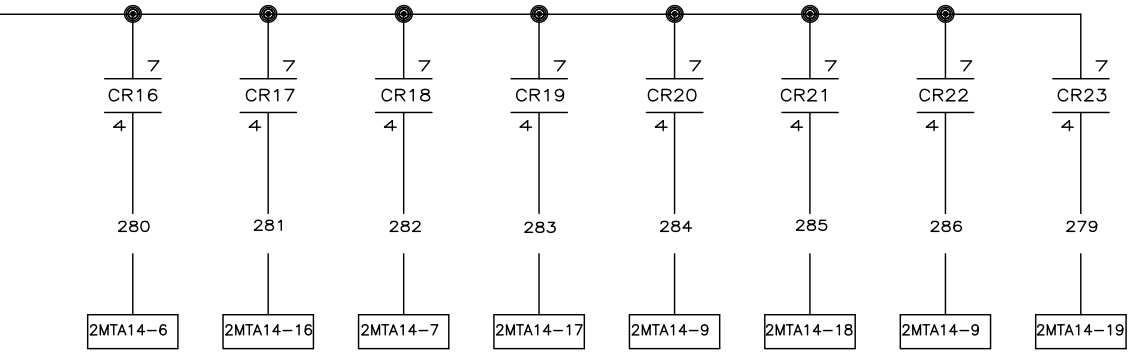
W6EX50DP
2020246D

W6EX5ODP
MICRO 6 SYSTEMS
SCHEMATIC: EXTRACTOR DRY CONTACT DATA PASS (24 OUTPUT BOARD #2)
PELLERIN MILNOR CORPORATION

NOTES:

CR00 = SINGLE CAKE
CR01 = NEW FORMULA
CR02 = GOODS CODE A
CR03 = GOODS CODE B
CR04 = GOODS CODE C
CR05 = GOODS CODE D
CR06 = GOODS CODE E
CR07 = GOODS CODE F
CR08 = GOODS CODE G
CR09 = NEW CUSTOMER
CR10 = DESTINATION A
CR11 = DESTINATION B
CR12 = DESTINATION C
CR13 = DESTINATION D
CR14 = WEIGHT BIT 0=1
CR15 = WEIGHT BIT 1=2
CR16 = WEIGHT BIT 2=4
CR17 = WEIGHT BIT 3=8
CR18 = WEIGHT BIT 4=16
CR19 = WEIGHT BIT 5=32
CR20 = WEIGHT BIT 6=64
CR21 = WEIGHT BIT 7=128
CR22 = NOT USED
CR23 = NOT USED





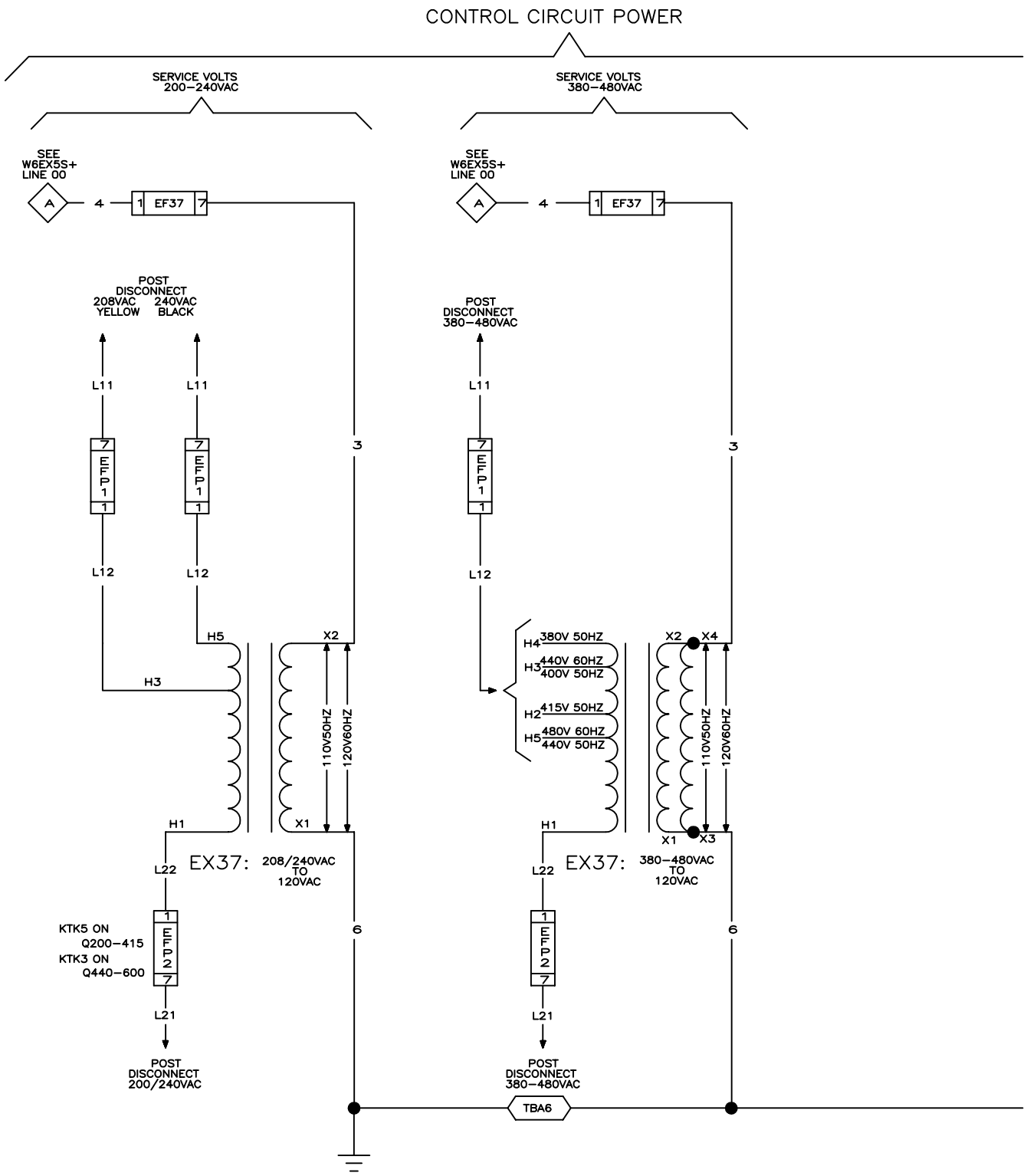
WIRE COLORING CODE

WIRE NO.	VOLTAGE	WIRE COLOR
103	+5VDC	BLUE
104	+12VDC	BLUE/ORANGE
105	-12VDC	BLUE/BLACK
7	SIGNAL GROUND	BLUE/WHITE
107	SERIAL HIGH	BLUE/RED
106	SERIAL LOW	BLUE/BLACK
6	CONTROL GROUND	RED/WHITE
24VAC	LOW VOLTAGE CONTROL	RED/BLUE
120VAC	HIGH VOLTAGE CONTROL	RED
INPUTS	INPUTS TO MICRO	BLUE/BLACK
OUTPUTS	OUTPUTS FROM MICRO	RED/BLACK

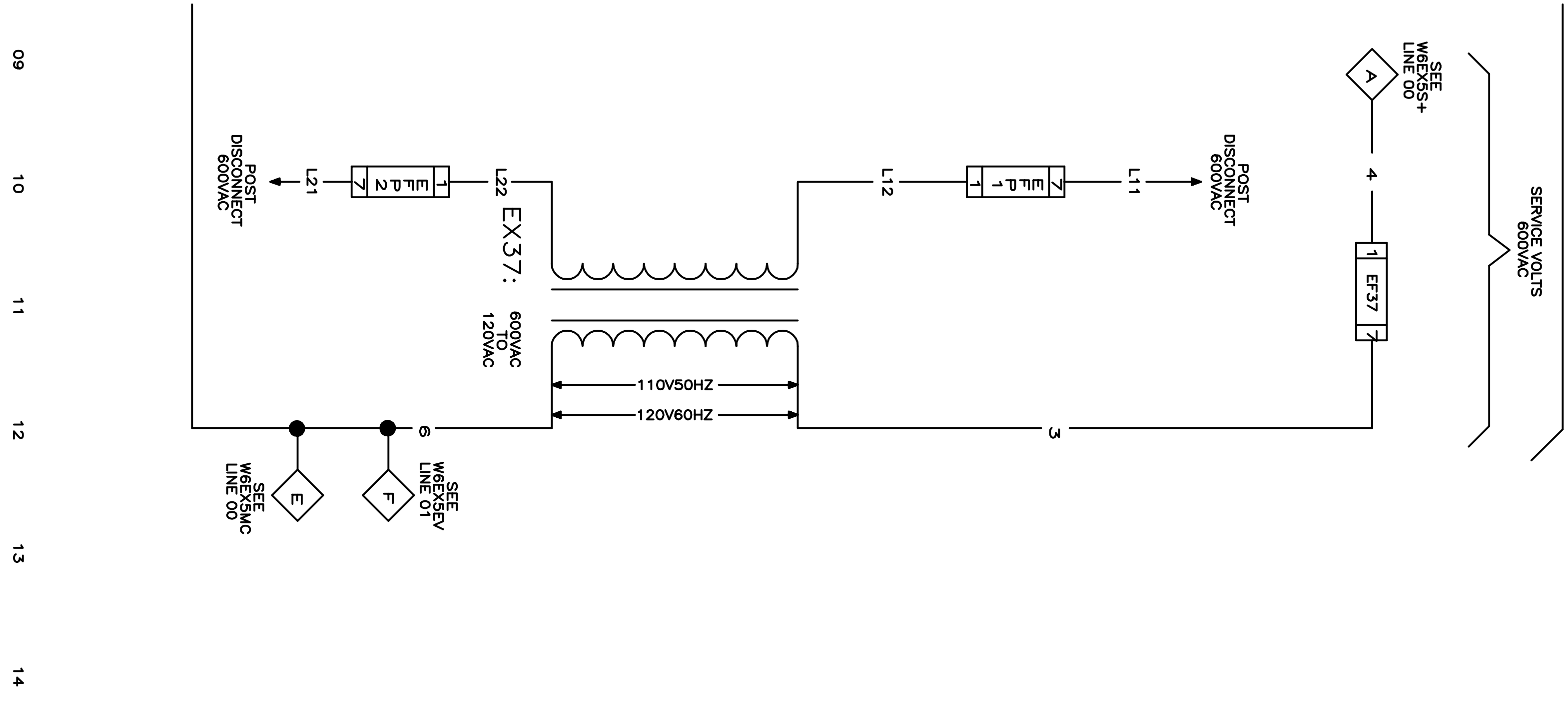
NOTES:

1. WCD IS LOCATED ON LOW VOLTAGE CONTROL BOX.
2. 2MTA11, 2MTA12, 2MTA13, 2MTA14, 2MTA15, 2MTA16 ARE LOCATED ON B024-2

10 11 12 13 14 15 16



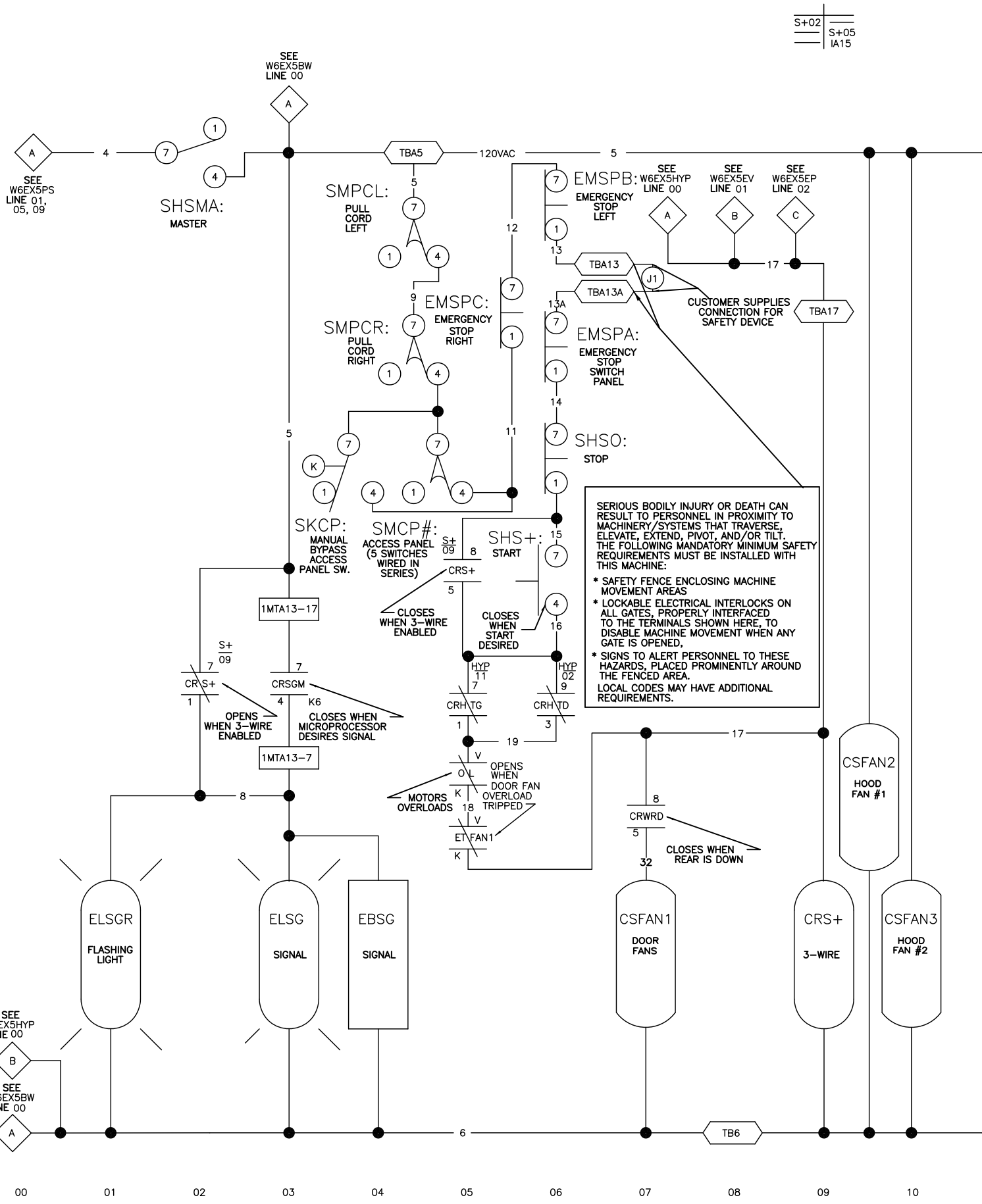
W6EX5PS
2010063B



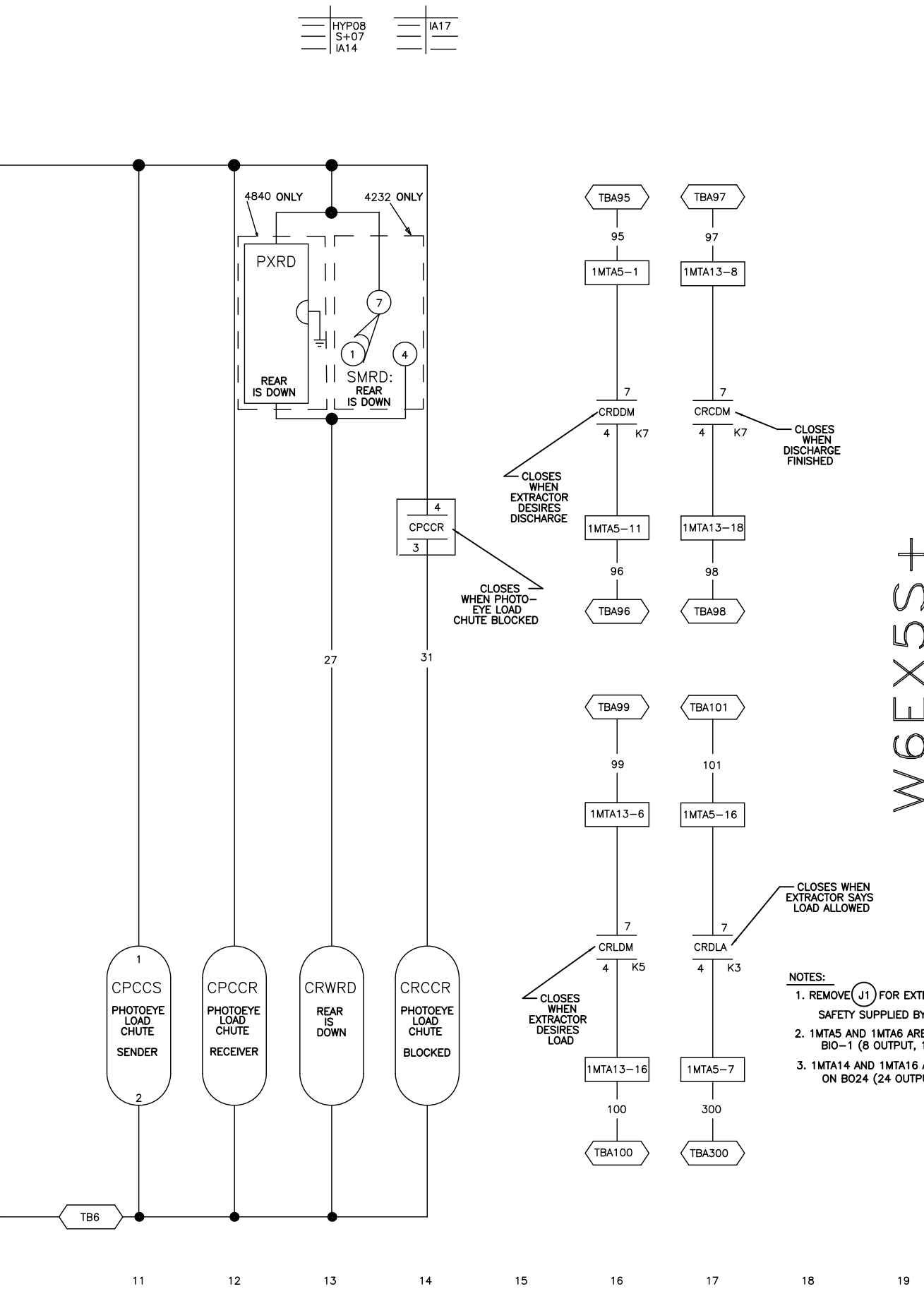
W6EX5PS

MICRO 6 SYSTEMS
MARK V CONTROLS
SCHEMATIC: SOURCE 110V1P50HZ/120V1P60HZ
CONTROL CIRCUIT POWER
PELLERIN MILNOR CORPORATION

W6EX5PS
2010063B



W6EX5S+
2025253B

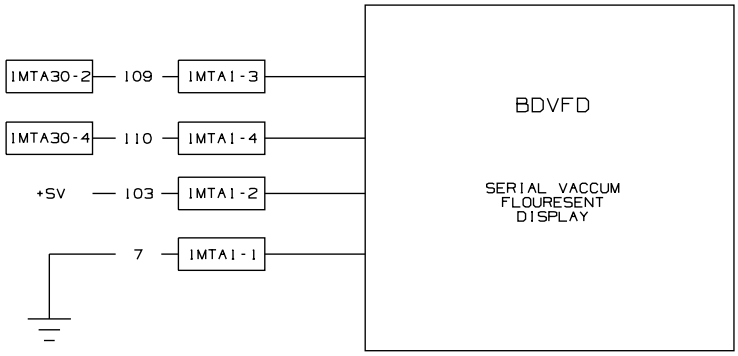


NOTES:

1. REMOVE (J1) FOR EXTERNAL SAFETY SUPPLIED BY OTHERS.
2. 1MTA5 AND 1MTA6 ARE LOCATED ON BIO-1 (8 OUTPUT, 16 INPUT BOARD).
3. 1MTA14 AND 1MTA16 ARE LOCATED ON BO24 (24 OUTPUT BOARD).

W6EX5S+
MICRO 6 SYSTEMS
MARK V CONTROLS
SCHEMATIC: 3-WIRE CIRCUIT
110V1P50HZ/120V1P60HZ

PELLERIN MILNOR CORPORATION



00 01 02 03 04 05 06 07 08 09 10

W6EX5SD

MICRO 6 SYSTEMS

MARK V CONTROLS

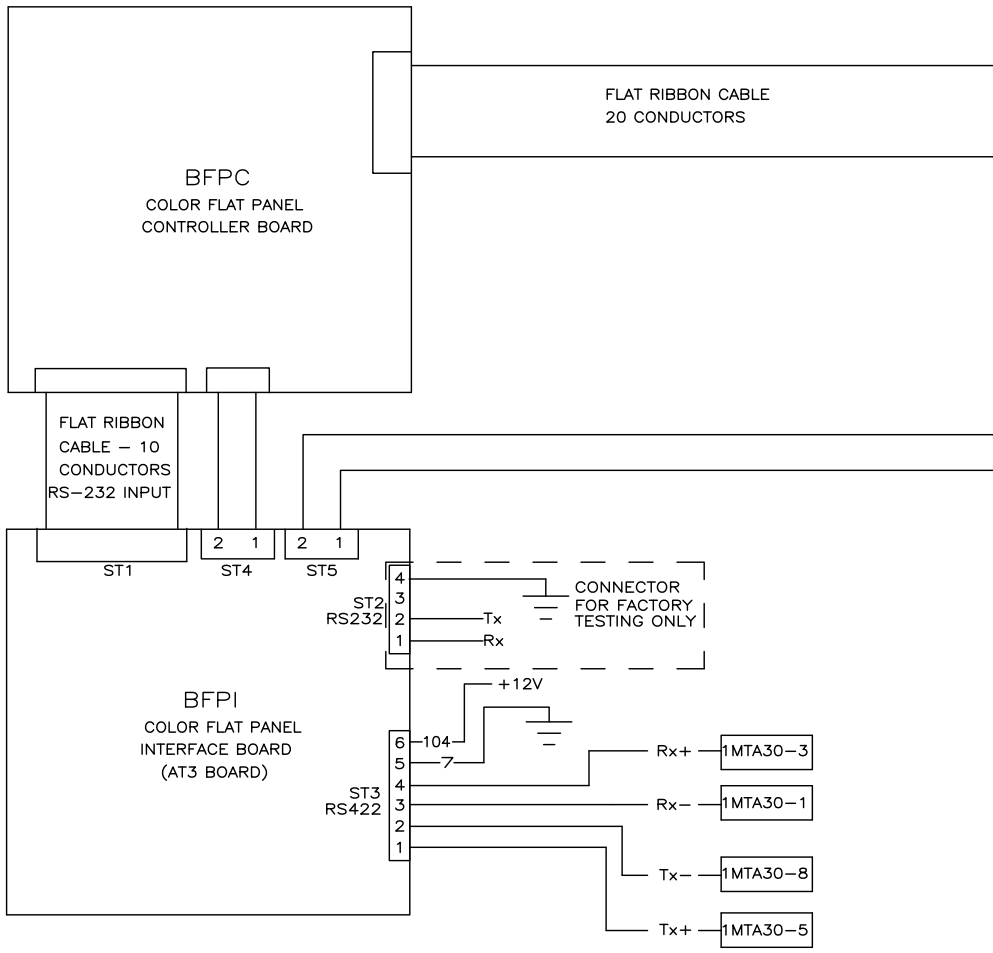
SHCEMATIC: SERIAL DISPLAY

PELLERIN MILNOR CORPORATION

NOTES

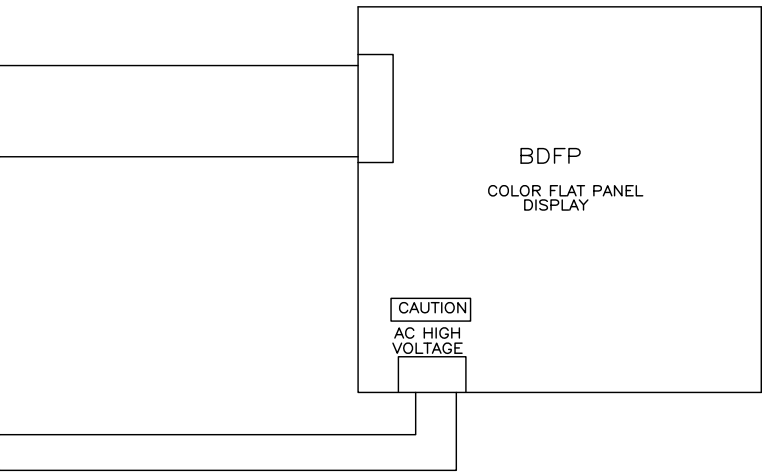
1. IMTA30 IS LOCATED ON BPB (PROCESSOR BORD).
2. IMTA1 IS LOCATED ON DISPLAY BOARD.

11 12 13 14 15 16 17 18



00 01 02 03 04 05 06 07 08 09

W6EX5SDA
2013204B



NOTES

1. 1MTA30 IS LOCATED ON BPB (PROCESSOR BOARD).
2. ST1 THROUGH ST5 IS LOCATED ON BFPI COLOR FLAT PANEL INTERFACE BOARD.

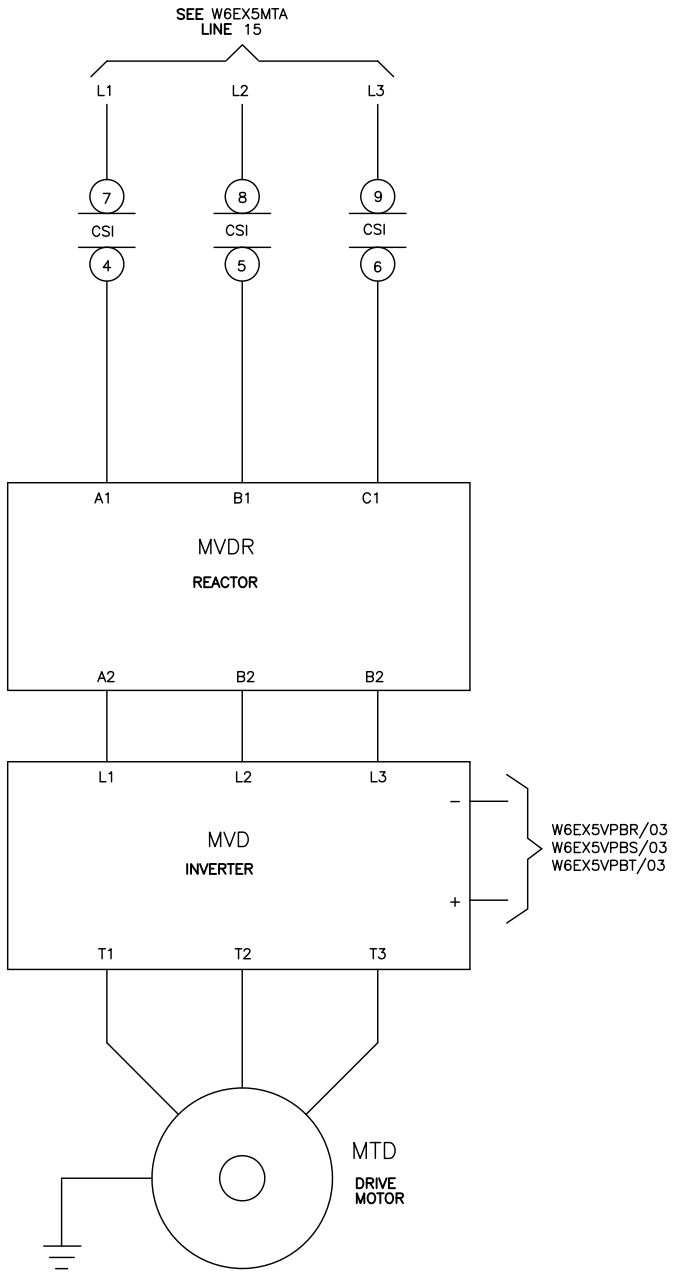
W6EX5SDA
MICRO 6 SYSTEMS
MARK VI
SCHEMATIC: COLOR FLAT PANEL DISPLAY

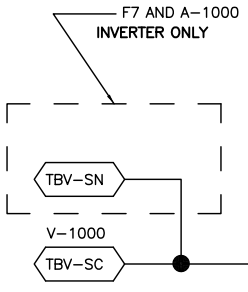
PELLERIN MILNOR CORPORATION

W6EX5SDA
2013204B

10 11 12 13 14 15 16 17 18

W6EX5SDA
2013204B



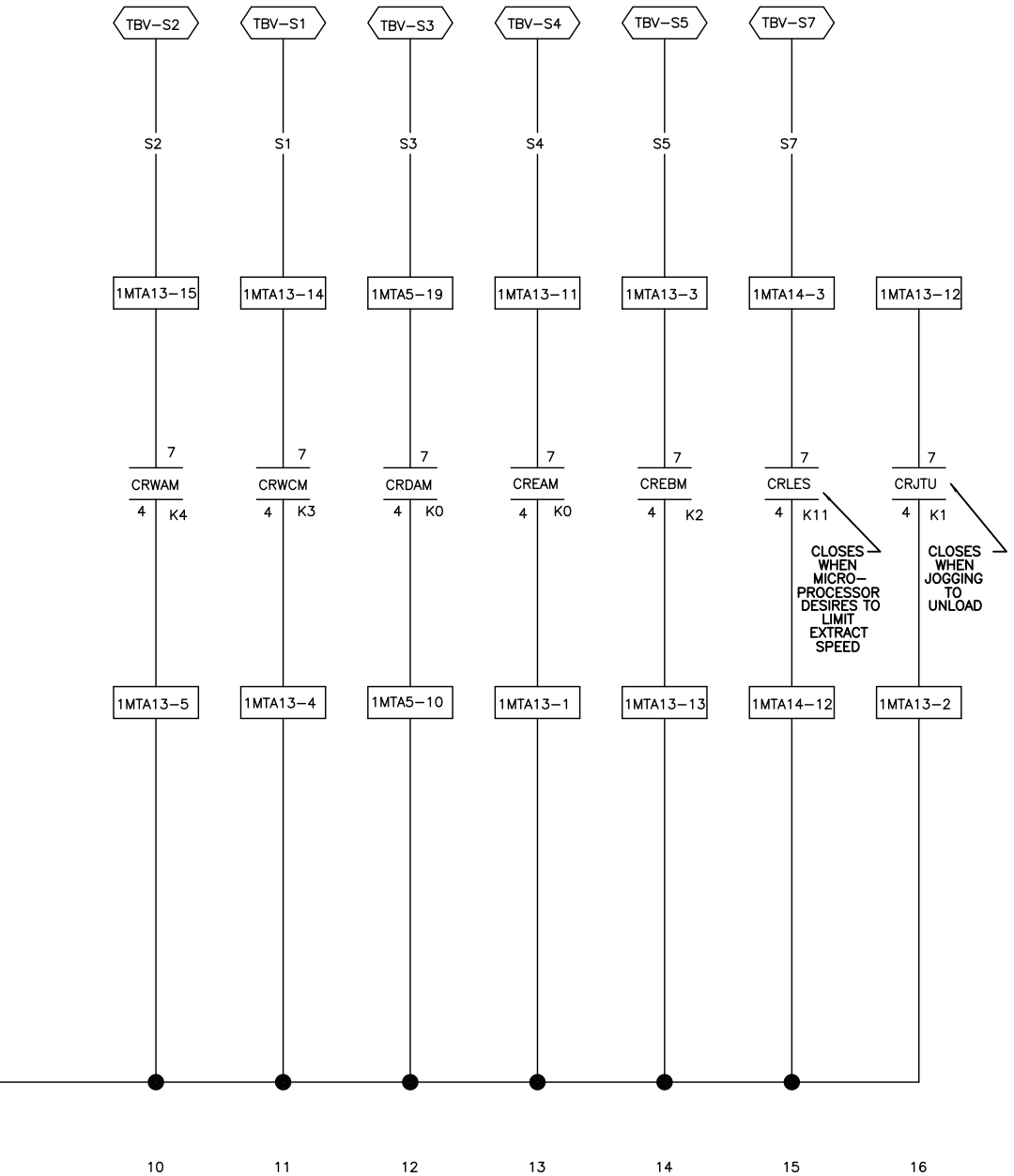


LITHO IN U.S.A.

00 01 02 03 04 05 06 07 08 09

W6EX5VPA
2019333B

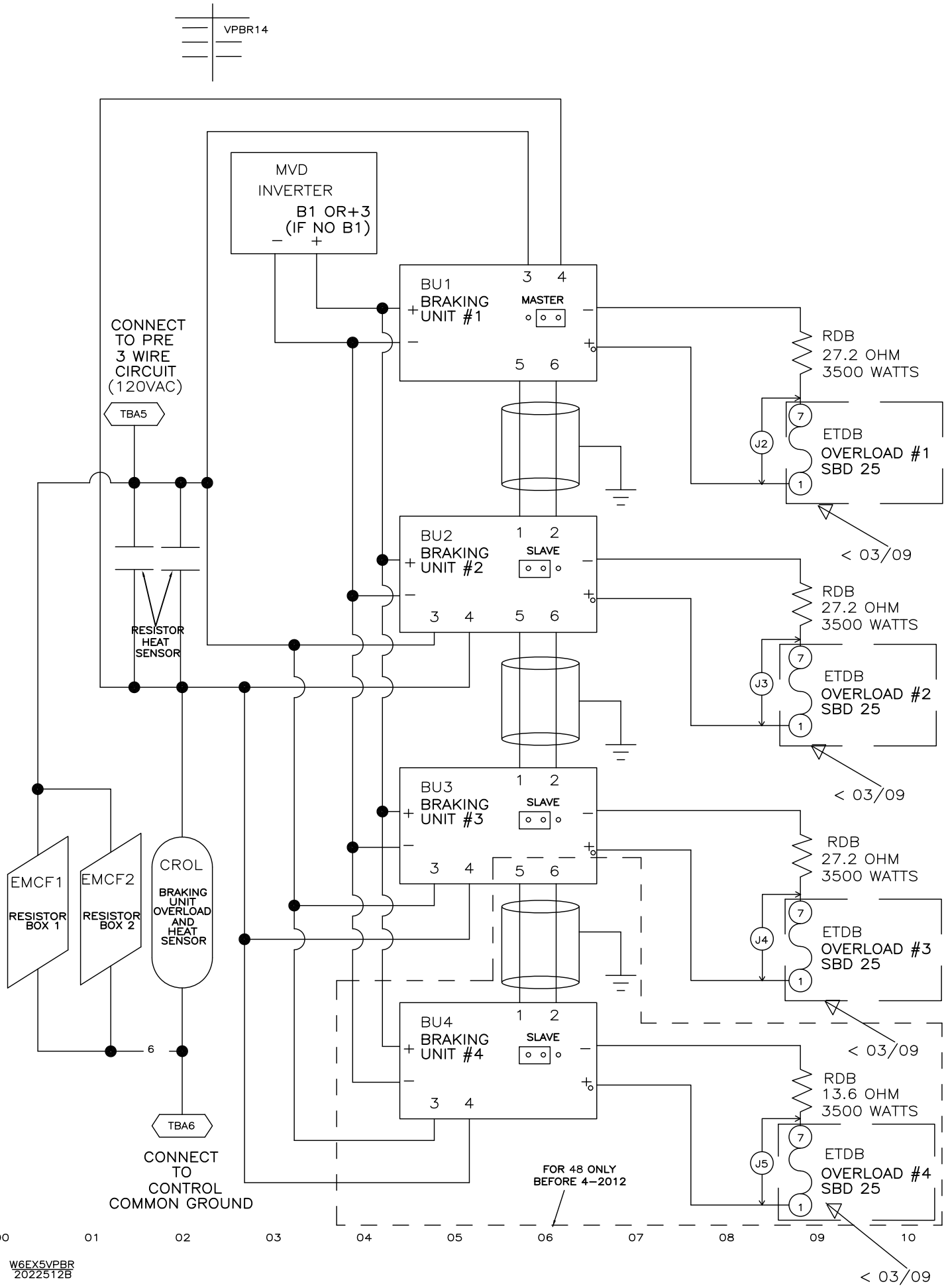
	WA	WC	DA	EA	EB
W1		X			
D1		X	X		
E1		X		X	
E2		X	X	X	
E3		X			X
E4		X	X		X

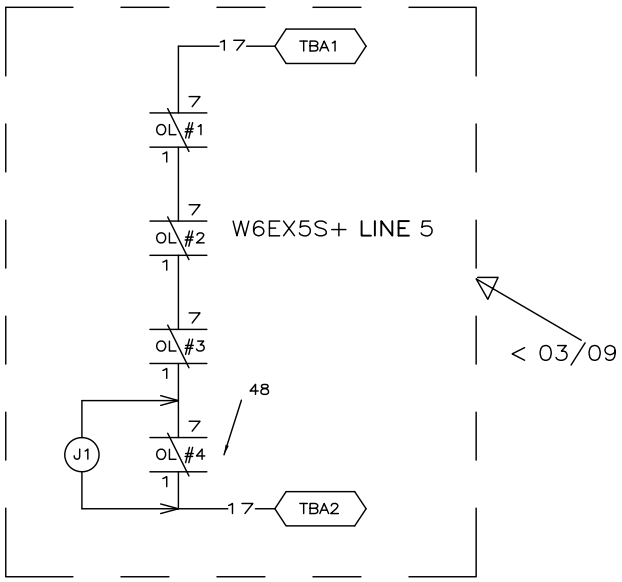


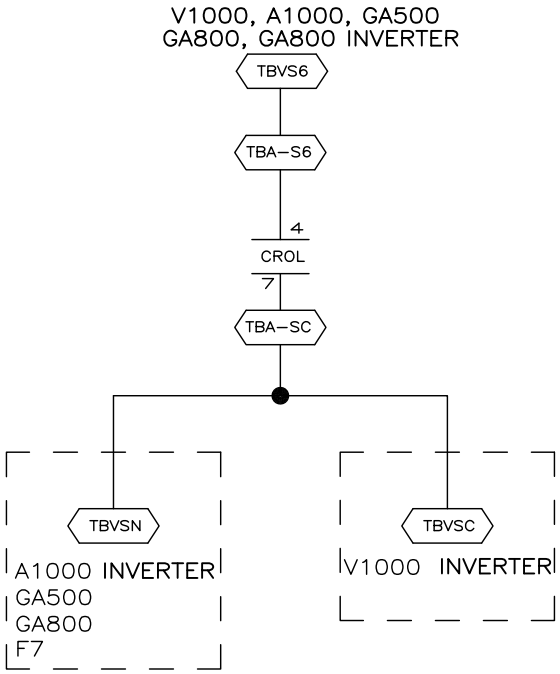
NOTES:

1. TBV'S LOCATED ON MVD DRIVE INVERTER.

W6EX5VPA
MICRO 6 SYSTEMS
SCHEMATIC; VARIABLE SPEED
SCHEMATIC: VARIABLE SPEED CONTROLLER
PELLERIN MILNOR CORPORATION


VPBR14
MVD
INVERTER
B1 OR+3
(IF NO B1)
BU1
BRAKING
UNIT #1
MASTER
BU2
BRAKING
UNIT #2
SLAVE
BU3
BRAKING
UNIT #3
SLAVE
BU4
BRAKING
UNIT #4
SLAVE
CONNECT
TO PRE
3 WIRE
CIRCUIT
(120VAC)
TBA5
RESISTOR
HEAT
SENSOR
EMCF1
RESISTOR
BOX 1
EMCF2
RESISTOR
BOX 2
CROL
BRAKING
UNIT
OVERLOAD
AND
HEAT
SENSOR
TBA6
CONNECT
TO
CONTROL
COMMON GROUND
RDB
27.2 OHM
3500 WATTS
RDB
13.6 OHM
3500 WATTS
ETDB
OVERLOAD #1
SBD 25
ETDB
OVERLOAD #2
SBD 25
ETDB
OVERLOAD #3
SBD 25
ETDB
OVERLOAD #4
SBD 25
< 03/09
FOR 48 ONLY
BEFORE 4–2012
00 01 02 03 04 05 06 07 08 09 10
W6EX5VPBR
2022512B





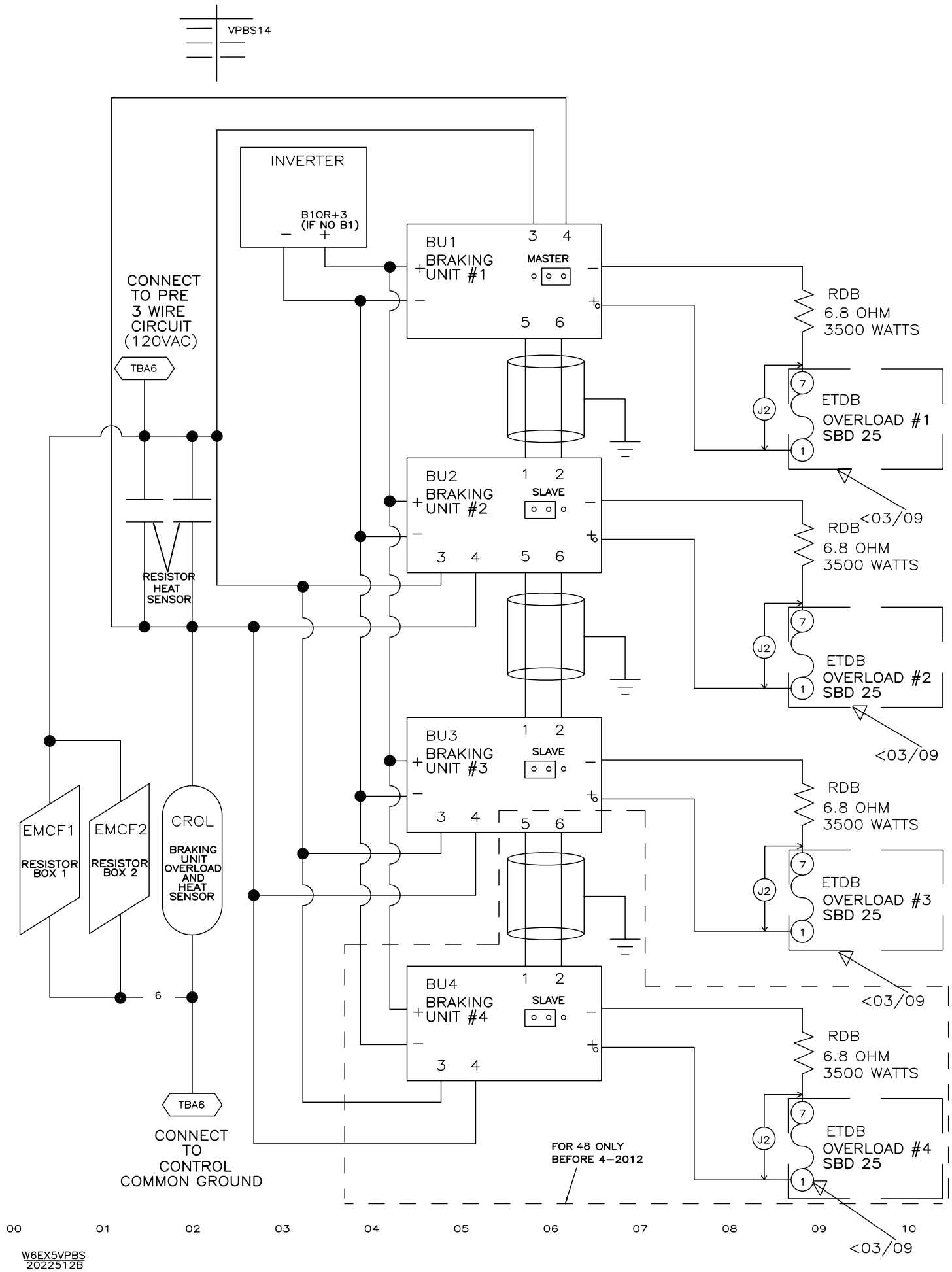
NOTE

1. TBA IS LOCATED IN RESISTOR CABINET.
2. INVERTER VOLTAGE CONSTANTS MUST BE ABOVE 400VOLTS.
3. JUMPERS IN BRAKING UNITS MUST MATCH INCOMING VOLTAGE.
4. REMOVE (J1) FOR 4232 EXTRACTOR.
5. (J2) (J3) (J4) (J5) USED AFTER 03/09 REPLACING OVERLOADS_ SBD 25.
6. RDB VALUE WAS 13.6 OHM BEFORE 4–2012

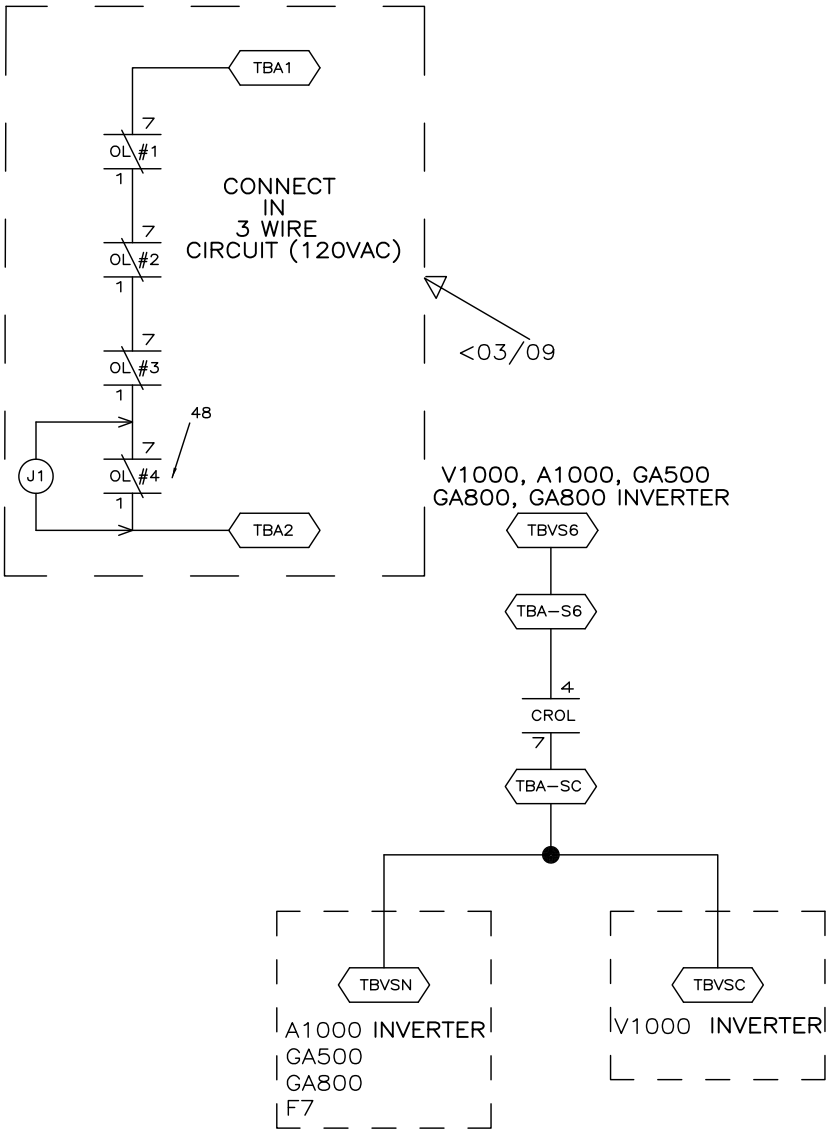
W6EX5VPBR
MICRO 6 SYSTEMS
MARK V
SCHEMATIC: HIGH VOLT BRAKING MODULES

PELLERIN MILNOR CORPORATION

11 12 13 14 15 16 17 18 19



W6EX5VPBS
2022512B



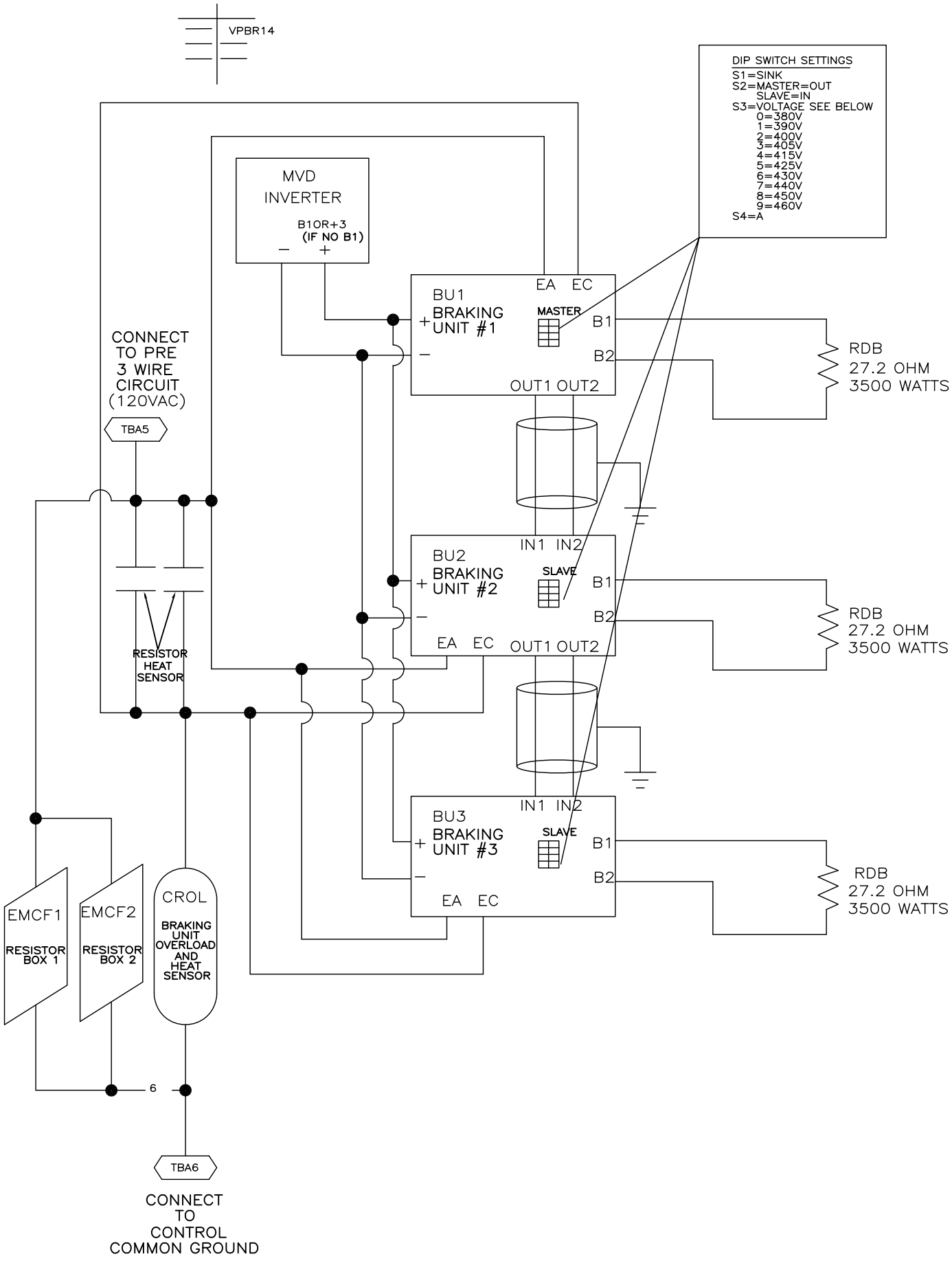
W6EX5VPBS
MICRO 6 SYSTEMS
MARK V
SCHEMATIC: LOW VOLT BRAKING MODULES

PELLERIN MILNOR CORPORATION

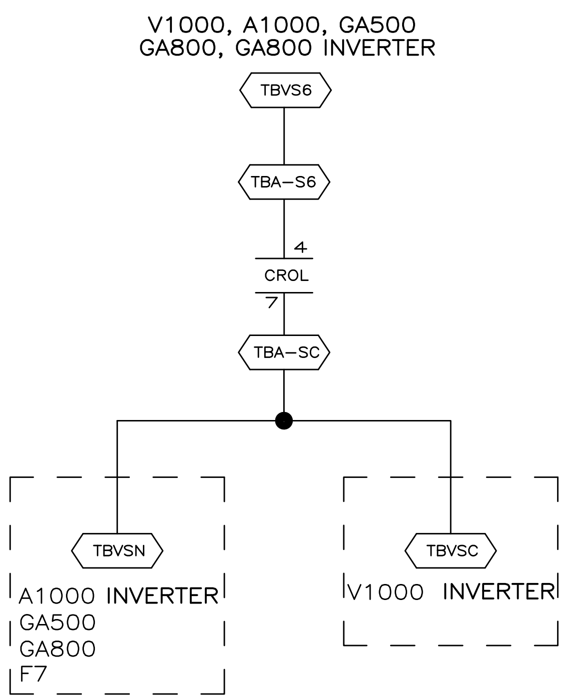
NOTE

1. TBA IS LOCATED IN RESISTOR CABINET.
2. INVERTER VOLTAGE CONSTANTS MUST BE 220 VOLTS OR HIGHER.
3. JUMPERS IN BRAKING UNITS MUST MATCH INCOMING VOLTAGE.
4. REMOVE (J1) FOR 4232 EXTRACTORS.
5. (J2) USED AFTER 03/09
   REPLACING OVERLOADS_ SBD 25.

11 12 13 14 15 16 17 18 19



W6EX5VPBT
2022512B



NOTE
1. TBA IS LOCATED IN RESISTOR CABINET.
2. INVERTER VOLTAGE CONSTANTS MUST BE ABOVE 400VOLTS.
3. JUMPERS IN BRAKING UNITS MUST MATCH INCOMING VOLTAGE.

W6EX5VPBT
MICRO 6 SYSTEMS MARK V
SCHEMATIC: HIGH VOLT BRAKING MODULES—D VERSION

PELLERIN MILNOR CORPORATION

W6EX5VPBT
2022512B

11 12 13 14 15 16 17 18 19