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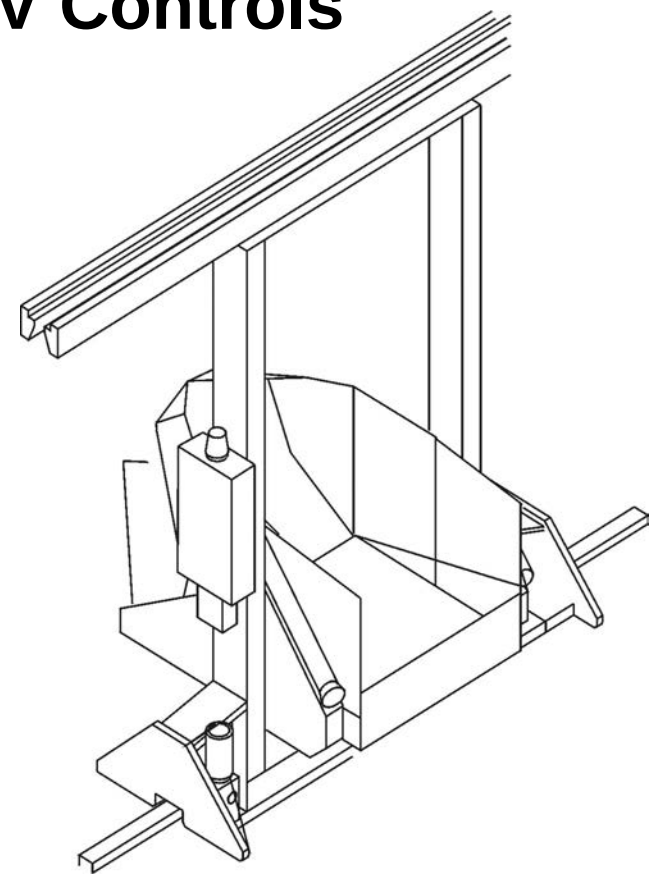
Schematic/Electrical Parts

COBUD, PIVOTING COBUD

Wet Goods Shuttle

Mark V 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.

Table of Contents
ME6COBD1AE/22463A

COMPONENT PARTS LIST

W6CD5SPL/2019232N

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
	>>CONTROL BOX LAYOUTS				
01	DETAIL-CONTROL BOX LAYOUT	W6CD5TG1	B2T2005007	COBUD CONTROL BOX	COBUD C-BOX
02	DETAIL-INPUTS/OUTPUTS	W6CD5TG1	B2TAG96020	SHUTTLE CONTROL BOARDS <>	COBUD C-BOX
03	DETAIL-PROCESSOR BOX (MULTITRAC CNT)	W6CD5TG2	B2T2001058	TAG:186 PROCESSOR COSHA	PROCESSOR BX
04	DETAIL-PROCESSOR CONTROL BOX	W6CD5TG2	B2TAG91095	REMOTE SHUTTLE CNTRL BOX	RMT PROC BOX
05	DETAIL-PROCESSOR CONTROL DOOR	W6CD5TG2	B2TAG90073	REMOTE SHUTTLE CNTRL DOOR <>	RMT PROC BOX
BA	**>>PRINTED CIRCUIT BOARDS**				
BBB-1	BOARD-BATTERY BACKUP	W6CD5SBD	08BSBBIT	BOARD:SER BATT BACKUP-TEST	PROCESSOR BX
BDVFD	DISPLAY-MICROPROCESSOR	W6CD5SKPD	08BSEVFD5V	BD: SERIAL VFD 2LINE 186-19200B-TEST	SWITCH PANEL
BIO-1	BOARD-8OUTPUT/16INPUT #1	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BIO-2	BOARD-8OUTPUT/16INPUT #2 (HIGH SPEED)	W6CD5SBD	08BS816CHT	SERIAL 8OUT-16INPUT HIGH SPEED-TESTED	COBUD C-BOX
BIO-3	BOARD-8OUT/16IN #3 (ELEVATING)	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BIO-4	BOARD -8OUT/16IN #4 (ALLIED LOADING)	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BIO-5	BOARD-8OUT/16IN #5 (ALLIED DISCHARGE	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BIO-6	BOARD-8OUTPUT/16INPUT #6	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BIO-7	BOARD-8OUTPUT/16INPUT #7	W6CD5SBD	08BS816CT	SERIAL 8OUT-16INPUT-TESTED	COBUD C-BOX
BMTH-1	MOTHER BOARD	W6CD5SBD	08BS8MTHAT	BD:SERIAL 8 CARD MOTHER-TEST	COBUD C-BOX
BO2	BOARD 6 OUPUT	W6CD5SDC	08BN6OAT	6 OUTPUT BOARD->TEST	PROCESSOR BX
BPB	BOARD-MICROPROCESSOR	W6CD5SBD	08BSPE2T	SERIAL 186 PROC BD+FP->TEST	PROCESSOR BX
BPB	BOARD-MICROPROCESSOR	W6CD5SDC	08BSPE2T	SERIAL 186 PROC BD+FP->TEST	PROCESSOR BX
CD	**>>RELAY-TIME DELAY**				
CDSA	DELAY-ALLOWED TO MOVE	W6CD5SMC	09CF001037	TDR F1S 2PDT 11PIN 120V60C	COBUD C-BOX
CDSA	DELAY-ALLOWED TO MOVE	W6CD5SMCP	09CF001037	TDR F1S 2PDT 11PIN 120V60C	COBUD C-BOX
CR	**>>RELAY-PILOT OR CONTROL**				
CREXL	RELAY-FULLY EXTENDED TO LOAD	W6CD5SSC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRM	RELAY-MANUAL OPERATIONS	W6CD5SMC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRM	RELAY-MANUAL OPERATIONS	W6CD5SMCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRPEH	RELAY-PLUNGER ENGAGED	W6CD5SMCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRRTL	RELAY-FULLY RETRACTED FROM LOAD	W6CD5SSC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRS+	RELAY-3-WIRE	W6CD5SS+	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRS1	RELAY-ROTATED TO DISCHARGE	W6CD5SIP	09C024DC12	RELAY 12VDC 14 PIN OMRON	COBUD C-BOX
CRTD	RELAY-COBUD TILTED FULL DOWN	W6CD5SSC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRTD	RELAY-COBUD TILTED FULL DOWN	W6CD5SSCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
CRTDA	RELAY-COBUD TILTED FULL DOWN	W6CD5SSC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRTDA	RELAY-COBUD TILTED FULL DOWN	W6CD5SSCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRTU	RELAY-COBUD TILTED FULL UP	W6CD5SSC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRTU	RELAY-COBUD TILTED FULL UP	W6CD5SSCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRXML	RELAY-MOVE COBUD LEFT	W6CD5SMC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRXML	RELAY-MOVE COBUD LEFT	W6CD5SMCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRXMR	RELAY-MOVE COBUD RIGHT	W6CD5SMC	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CRXMR	RELAY-MOVE COBUD RIGHT	W6CD5SMCP	09C024D37	4PDT MINITURE RELAY PT W/LED	COBUD C-BOX
CS	**>>CONTACTOR-MOTOR STARTER**				
CSVP	CONTACTOR-INVERTER TRANSVERSE	W6CD5SMC	09MR04B337	12A 3P REV+2N/C 120V5/6 IEC	COBUD C-BOX
CSVP	CONTACTOR-INVERTER TRANSVERSE	W6CD5SMCP	09MR04B337	12A 3P REV+2N/C 120V5/6 IEC	COBUD C-BOX
EB	**>>BUZZER OR AUDIBLE SIGNAL**				
EBSG	BUZZER-SIGNAL AUDIBLE	W6CD5SS+	09H020	ALARM, MALLORY SONALERT SC110 115V	COBUD C-BOX
EBSGF	BUZZER-SIGNAL AUDIBLE	W6CD5SMC	09H020	ALARM, MALLORY SONALERT SC110 115V	COBUD C-BOX
EBSGF	BUZZER-SIGNAL AUDIBLE	W6CD5SMCP	09H020	ALARM, MALLORY SONALERT SC110 115V	COBUD C-BOX
EF	**>>FUSE OR FUSE HOLDER**				
EF37	FUSE-120VAC CONTROL CIRCUIT	W6CD5SP	09FF006AMA	FUSE BK/ABC 6 AMP 250V BUSS	COBUD C-BOX
EFL1	FUSE-PRIMARY INCOMING VOLTAGE	W6CD5SP	09FF005AWN	FUSE BUSS KTK 5AMP 600V=HPS HOLDER	COBUD C-BOX
EFL2	FUSE-PRIMARY INCOMING VOLTAGE	W6CD5SP	09FF005AWN	FUSE BUSS KTK 5AMP 600V=HPS HOLDER	COBUD C-BOX
EL	**>>LIGHT-PILOT OR INDICATOR**				
ELEXL	LIGHT-FULLY EXTENDED TO LOAD	W6CD5SSC	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	COBUD C-BOX
ELM	LIGHT-MANUAL OPERATIONS	W6CD5SMC	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	COBUD C-BOX
ELM	LIGHT-MANUAL OPERATIONS	W6CD5SMCP	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	COBUD C-BOX
ELRTL	LIGHT-FULLY RETRACTED FROM LOAD	W6CD5SSC	09J060A37	LAMP 1/2" AMB 125V IDI 1050QC3	COBUD C-BOX
ELSG	LIGHT-VISUAL FLASHING	W6CD5SS+	09H025V37	BEACON ROT.120V 5.5"DIA AMB #MV110	TOP OF C-BOX
ELSGF	LIGHT-VISUAL FLASHING	W6CD5SMC	09H025V37	BEACON ROT.120V 5.5"DIA AMB #MV110	TOP OF C-BOX
ELSGF	LIGHT-VISUAL FLASHING	W6CD5SMCP	09H025V37	BEACON ROT.120V 5.5"DIA AMB #MV110	TOP OF C-BOX
ELTD	LIGHT-COBUD TILTED FULL DOWN	W6CD5SSC	09J060R37	LAMP 1/2" RED 125V IDI 1050QCI	COBUD C-BOX
ELTD	LIGHT-COBUD TILTED FULL DOWN	W6CD5SSCP	09J060R37	LAMP 1/2" RED 125V IDI 1050QCI	COBUD C-BOX
ELTU	LIGHT-COBUD TILTED FULL UP	W6CD5SSC	09J060R37	LAMP 1/2" RED 125V IDI 1050QCI	COBUD C-BOX
ELTU	LIGHT-COBUD TILTED FULL UP	W6CD5SSCP	09J060R37	LAMP 1/2" RED 125V IDI 1050QCI	COBUD C-BOX
ES	**>>POWER SUPPLY-ELECTRONIC**				
ESPS1	POWER SUPPLY-REMOTE MICROPROCESSOI	W6CD5SBD	08PSS3401T	40 WATT POWER SUPPLY TESTED	RMT PROC BX

COMPONENT PARTS LIST

W6CD5SPL/2019232N

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
ESPS2	POWER SUPPLY-COBUD CONTROL BOX	W6CD5SBD	08PSS3401T	40 WATT POWER SUPPLY TESTED	COBUD C-BOX
EX	**>>TRANSFORMERS**				
EX37-1	TRANSFORMER-208/240VAC TO 120VAC	W6CD5SP	09U249AA37	XFMR 200-240V PRI/120VSEC/250VA	COBUD C-BOX
EX37-2	TRANSFORMER-380/480>120VAC	W6CD5SP	09U200AAB	XFMR 380-480V/240-120V-250VA	COBUD C-BOX
EX37-3	TRANSFORMER-600->120VAC	W6CD5SP	09U251AA37	XFMR 600VPRI/120VSEC/250VA	COBUD C-BOX
MT	**>>>MOTOR**				
MTLR	MOTOR-LEFT/RIGHT	W6CD5SVPP	MESSAGE SN	SEE SPECIFIC MACHINE + NAMEPL	BOTTOM RAIL
MTLR	MOTOR-LEFT/RIGHT	W6CD5SVP	MESSAGE SN	SEE SPECIFIC MACHINE + NAMEPL	BOTTOM RAIL
MV	**>>>MOTOR POWER INVERTERS**				
MVINR	IN LINE REACTOR-LOW VOLT	W6CD5SVPP	09MX030A74	REACTOR 3HP 230V 12A	COBUD C-BOX
MVINR	IN LINE REACTOR HIGH VOLT	W6CD5SVPP	09MX030A96	REACTOR 3HP 460V 6A	COBUD C-BOX
MVINR	IN LINE REACTOR-LOW VOLT	W6CD5SVP	09MX030A74	REACTOR 3HP 230V 12A	COBUD C-BOX
MVINR	IN LINE REACTOR HIGH VOLT	W6CD5SVP	09MX030A96	REACTOR 3HP 460V 6A	COBUD C-BOX
MVINV	INVERTER-VARI SPEED LOW VOLTAGE	W6CD5SVPP	09MV030G74	VARSPEED 3HP 11A 230V GPD305	COBUD C-BOX
MVINV	INVERTER-VARI SPEED HIGH VOLTAGE	W6CD5SVPP	09MV030F96	VARSPEED 3HP 4.8A 460V GPD315	COBUD C-BOX
MVINV	INVERTER-VARI SPEED LOW VOLTAGE	W6CD5SVP	09MV030G74	VARSPEED 3HP 11A 230V GPD305	COBUD C-BOX
MVINV	INVERTER-VARI SPEED HIGH VOLTAGE	W6CD5SVP	09MV030F96	VARSPEED 3HP 4.8A 460V GPD315	COBUD C-BOX
PX	**>>PROXIMITY SWITCH**				
PXD1	PROX SW-DISCHARGE #1	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP OF C-BOX
PXEXL	PROX SW-BUCKET FULLY EXTENDED	W6CD5SSC	09RPS18CAU	PRXSW QK CONN 18M NO-AC UNSHLD	ON BUCKET
PXH1	PROX SW-HOME #0	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP OF C-BOX
PXH1	PROX SW-COBUD ROTATED TO HOME TRGET	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	PIVOT ARM
PXH2	PROX SW-HOME #1	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP OF C-BOX
PXL1	PROX SW-UNLOAD POSITION #1	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP RAIL
PXLP0	PROX SW-LOAD POSITION #0	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP OF C-BOX
PXLP0	PROX SW-LOAD POSITION #0	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	SIDE OF MACH
PXLP1	PROX SW-LOAD POSITION #1	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	SIDE OF MACH
PXRTL	PROX SW-BUCKET FULLY RETRACTED	W6CD5SSC	09RPS18CAU	PRXSW QK CONN 18M NO-AC UNSHLD	ON BUCKET
PXS1	PROX SW- SHUTTLE POSTION #1	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP RAIL
PXS1	PROX SW-COBUD ROTATED TO DISC TARGET	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	PIVOT ARM
PXSDL	PROX SW-ROTATE SLOW LEFT	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	PIVOT ARM
PXSDR	PROX SW-ROTATE SLOW RIGHT	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	PIVOT ARM
PXTD	PROX SW-TILT FULL DOWN	W6CD5SSC	09RPS30CAU	PRXSW QK CONN 30M NO-AC UNSHLD	ON BUCKET

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W6CD5SPL/2019232N

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
PXTD	PROX SW-TILT FULL DOWN	W6CD5SSCP	09RPS30CAU	PRXSW QK CONN 30M NO-AC UNSHLD	ON BUCKET
PXTU	PROX SW-TILT FULL UP	W6CD5SSC	09RPS30CAS	PROXSW QK CONN 30M NO-AC SHLD	ON BUCKET
PXTU	PROX SW-TILT FULL UP	W6CD5SSCP	09RPS30CAS	PROXSW QK CONN 30M NO-AC SHLD	ON BUCKET
PXUP0	PROX SW-UNLOAD POSITION #0	W6CD5SIP	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	SIDE OF MACH
PXUP1	SWITCH-UNLOAD POSITION #0	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	SIDE OF MACH
PXX	SWITCH-LIMIT EXCEEDED	W6CD5SI	09RPS18ADU	PRXSW QK CONN 18M NO-DC UNSHLD	TOP OF C-BOX
RS	**>>RESISTORS**				
RS01	RESISTOR-16OHM 25W	W6CD5SBD	ECEUV8R	LOAD RESISTOR ASSY MILTOUCH	CONTROL BOX
SH	**>>SWITCH-HAND OPERATED**				
SHER	SWITCH-EXTEND/RETRACT	W6CD5SCL	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHLR	SWITCH-MOVE LEFT/RIGHT	W6CD5SMC	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHLR	SWITCH-MOVE LEFT/RIGHT	W6CD5SMCP	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHMD	SWITCH-ENABLE DOWN	W6CD5SS+	09N405PB11	SWASSY PBBK 1NO/1NC	COBUD SWPNL
SHMO	SWITCH-AUTOMATIC/MANUAL	W6CD5SI	09N405M240	SWASS M2W 4NO	COBUD SWPNL
SHMO	SWITCH-AUTOMATIC/MANUAL	W6CD5SIP	09N405M240	SWASS M2W 4NO	COBUD SWPNL
SHMO	SWITCH-AUTOMATIC/MANUAL	W6CD5SMC	09N405M240	SWASS M2W 4NO	COBUD SWPNL
SHMO	SWITCH-AUTOMATIC/MANUAL	W6CD5SMCP	09N405M240	SWASS M2W 4NO	COBUD SWPNL
SHS+	SWITCH-START	W6CD5SS+	09N405PG10	SWASS PBGN 1NO	MULTITRAC
SHSG	SWITCH-SIGNAL CANCEL	W6CD5SI	09N405PY10	SWASS PB YELLOW INO	RMT PROC BX
SHSG	SWITCH-SIGNAL CANCEL	W6CD5SIP	09N405PY10	SWASS PB YELLOW INO	RMT PROC BX
SHSMA	SWITCH-MASTER	W6CD5SS+	09N405M220	SWASS M2W 2NO	MULTITRAC
SHSO	SWITCH-STOP	W6CD5SS+	09N405PR01	SWASS PBRD 1NC	MULTITRAC
SHUD	SWITCH-UP/DOWN	W6CD5SMC	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHUD	SWITCH-UP/DOWN	W6CD5SMCP	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHVA	SWITCH-TILT UP/DOWN	W6CD5SMC	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SHVA	SWITCH-TILT UP/DOWN	W6CD5SMCP	09N405S320	SWASS S3W 2NO	COBUD SWPNL
SK	**>>SWITCH-KEYLOCK**				
SKPRO	SWITCH-PROGRAM/RUN (KEY OPERATED)	W6CD5SI	09N127C	KEYSW SPST 7A120VAC SCREW TERM	RMT PROC BX
SKPRO	SWITCH-PROGRAM/RUN (KEY OPERATED)	W6CD5SIP	09N127C	KEYSW SPST 7A120VAC SCREW TERM	RMT PROC BX
SMPEH	SWITCH-PLUNGER ENGAGED	W6CD5SMCP	09R012	MICSW SPDT PAINTED BZE6-RN 01	PIVOT ARM
ST	**>>SWITCH-THERMOSTAT**				
STDB	SWITCH-DYNAMIC BRAKE THERMOSTAT	W6CD5SS+	30RA175T	THERMOSTAT OPENS AT 175F	CONTROL BOX
VE	**>>VALVE-ELECTRIC OPERATED**				

COMPONENT PARTS LIST

COMPONENT NUMBER	FUNCTION OF THIS COMPONENT	WHERE TO FIND THIS COMPONENT	MILNOR P/N	DESCRIPTION	LOCATION
VECPH	SOLENOID-COBUD HOME PLUNGER	W6CD5SMCP	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VEST	VALVE-RETRACT TO LOAD	W6CD5SCL	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VETD	VALVE-TILT DOWN	W6CD5SMC	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VETD	VALVE-TILT DOWN	W6CD5SMCP	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VETU	VALVE-TILT UP	W6CD5SMC	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VETU	VALVE-TILT UP	W6CD5SMCP	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VETUC	VALVE-TILT UP CUSHION	W6CD5SSC	96TDC2AA37	1/2"N/C2WY120V50/60C VLV	SIDE OF MACH
VETUC	VALVE-TILT UP CUSHION	W6CD5SSCP	96TDC2AA37	1/2"N/C2WY120V50/60C VLV	SIDE OF MACH
VEXSD	VALVE-MOVE COBUD DOWN	W6CD5SMC	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VEXSD	VALVE-MOVE COBUD DOWN	W6CD5SMCP	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VEXSU	VALVE-MOVE COBUD UP	W6CD5SMC	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VEXSU	VALVE-MOVE COBUD UP	W6CD5SMCP	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX
VEY	VALVE-EXTEND TO LOAD	W6CD5SCL	96R301B37	1/8"AIRPILOT 3W NC 120V50/60	AIR VALVE BX

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 repaired or 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.

ANY SALE OR FURNISHING OF ANY EQUIPMENT BY MILNOR IS MADE ONLY UPON THE EXPRESS UNDERSTANDING THAT MILNOR MAKES NO EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE OR PURPOSE OR ANY OTHER WARRANTY IMPLIED BY LAW INCLUDING BUT NOT LIMITED TO REDHIBITION. MILNOR WILL NOT BE RESPONSIBLE FOR ANY COSTS OR DAMAGES ACTUALLY INCURRED OR REQUIRED AS A RESULT OF: THE FAILURE OF ANY OTHER PERSON OR ENTITY TO PERFORM ITS RESPONSIBILITIES, FIRE OR OTHER HAZARD, ACCIDENT, IMPROPER STORAGE, MIS-USE, NEGLECT, POWER OR ENVIRONMENTAL CONTROL MALFUNCTIONS, DAMAGE FROM LIQUIDS, OR ANY OTHER CAUSE BEYOND THE NORMAL RANGE OF USE. REGARDLESS OF HOW CAUSED, IN NO EVENT SHALL MILNOR BE LIABLE FOR SPECIAL, INDIRECT, PUNITIVE, LIQUIDATED, OR CONSEQUENTIAL COSTS OR DAMAGES, OR ANY COSTS OR DAMAGES WHATSOEVER WHICH EXCEED THE PRICE PAID TO MILNOR FOR THE EQUIPMENT IT SELLS OR FURNISHES.

THE PROVISIONS ON THIS PAGE REPRESENT THE ONLY WARRANTY FROM MILNOR AND NO OTHER WARRANTY OR CONDITIONS, STATUTORY OR OTHERWISE, SHALL BE IMPLIED.

WE NEITHER ASSUME, NOR AUTHORIZE ANY EMPLOYEE OR OTHER PERSON TO ASSUME FOR US, ANY OTHER RESPONSIBILITY AND/OR LIABILITY IN CONNECTION WITH THE SALE OR FURNISHING OF OUR EQUIPMENT TO ANY BUYER.

BMP720097/19036

BIUUUD19 (Published) Book specs- Dates: 20081231 / 20081231 / 20081231 Lang: ENG01 Applic: UUU

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 —

BIUUUK01 (Published) Book specs- Dates: 20130308 / 20130308 / 20130308 Lang: ENG01 Applic: PCR UUU

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).

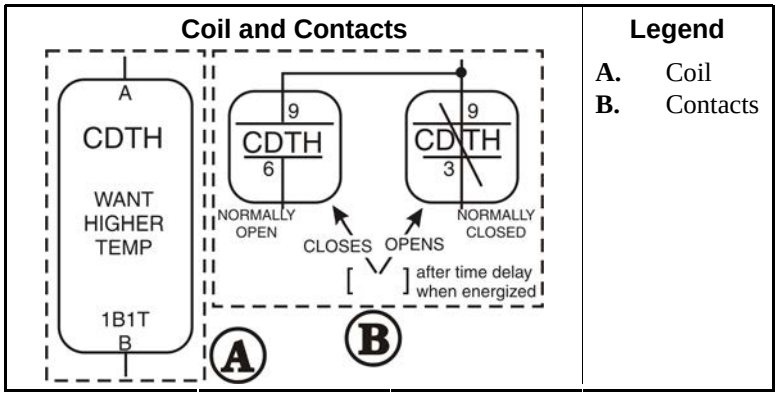
BA=Printed Circuit Board—Insulating substrate on which a thin pattern of copper conductors has been formed to connect discrete electronic components also mounted on the board.

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)

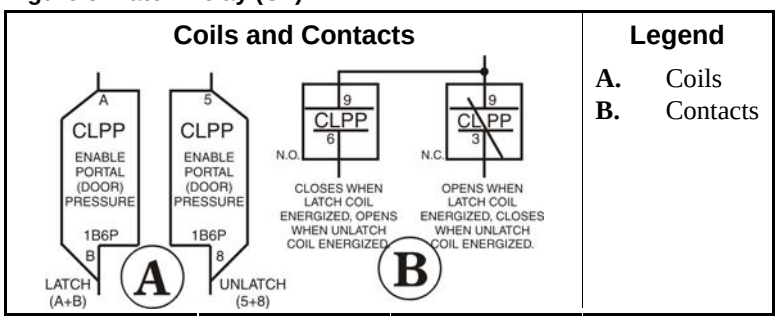
CD=Control, Time Delay Relay (Figure 2)—A relay whose contacts switch only after a fixed or adjustable delay, once voltage has been applied to its coil. The contacts switch back to normal (de-energized state) immediately when the voltage is removed.

Figure 2: Time Delay Relay (CD)



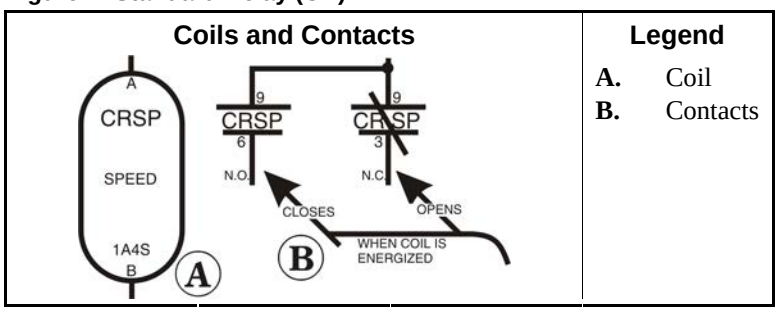
CL=Control, Latch Relay (Figure 3)—A relay which latches in an energized or set position when operated by one coil (the latch/set coil). The relay stays latched even though coil voltage is removed. The relay releases or unlatches when voltage is applied to a second coil (the unlatch/reset coil).

Figure 3: Latch Relay (CL)



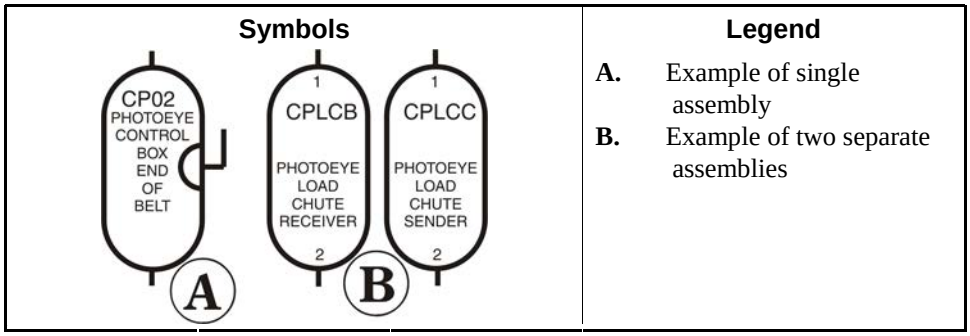
CR=Control, Relay (Figure 4)—A relay whose contacts switch immediately when voltage is applied to its coil and revert to normal when the voltage is removed.

Figure 4: Standard Relay (CR)



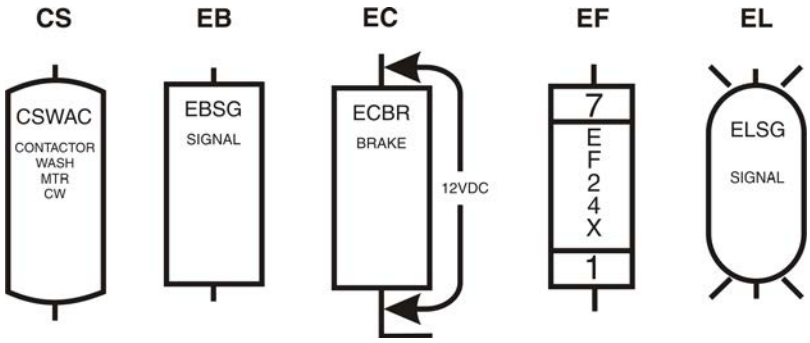
CP=Control, Photo-Eye (Figure 5)—Photo-eyes sense the presence of an object without direct physical contact. Photo-eyes consist of a transmitter, receiver, and output module. These components may be housed in one assembly with the transmitter bouncing light off of a reflector to the receiver, or these 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.

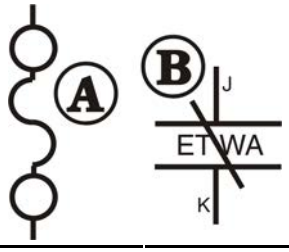
EL=Electric Light (Figure 6)—Indicator lights may be either incandescent or fluorescent.

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.

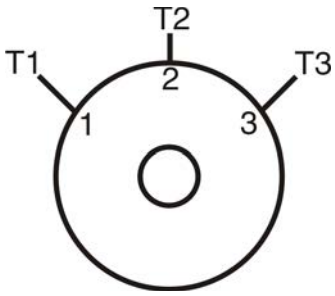
KB=Keyboard—Device similar to a typewriter for making entries to a computer.

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)

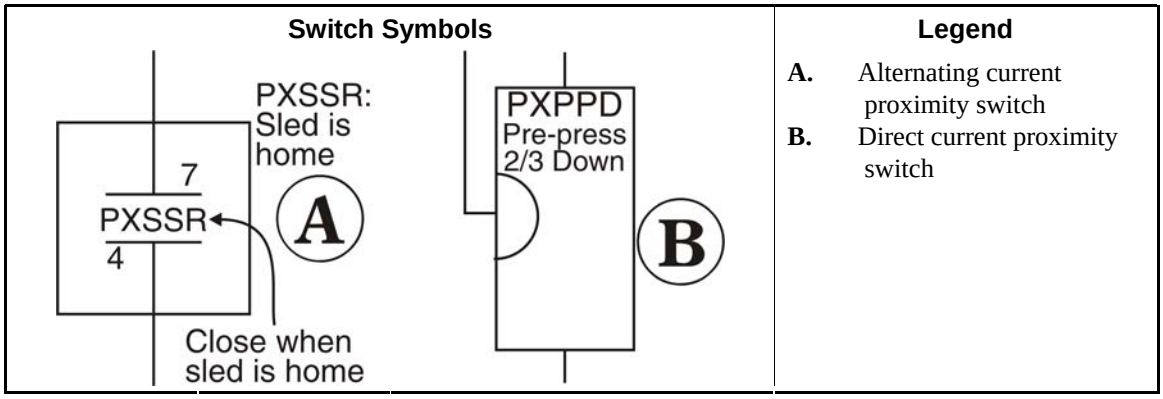


MV=Motor (Variable Speed) Inverter—To vary the speed of an AC motor, the volts to frequency ratio must be kept constant. The motor will overheat if this ratio is not maintained. The motor variable speed inverter converts three phase AC to DC. The inverter then uses this DC voltage to generate AC at the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

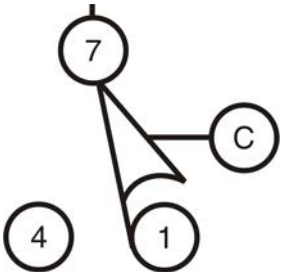
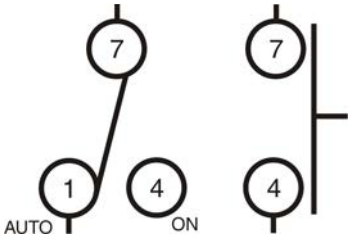


Figure 12: Hand Operated Switch (SH)



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)

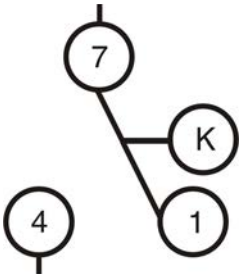
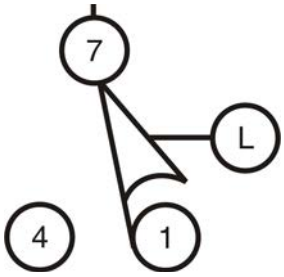


Figure 14: Level Switch (SL)



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)

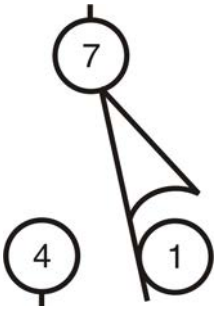
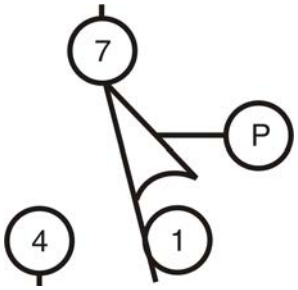


Figure 16: Pressure Switch (SP)



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)

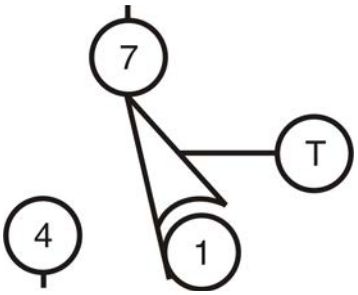
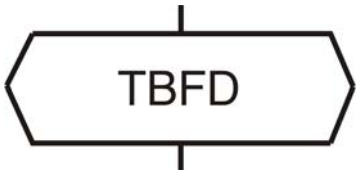


Figure 18: Terminal Board (TB)



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)

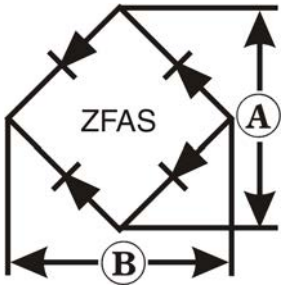
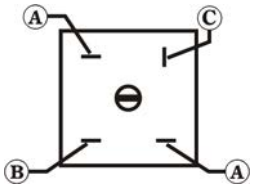
Component Symbol	Legend
	**A.** Alternating current input **B.** Direct current output

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.

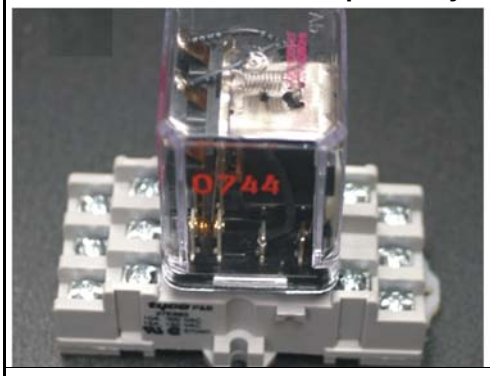
2. Component Terminal Numbering

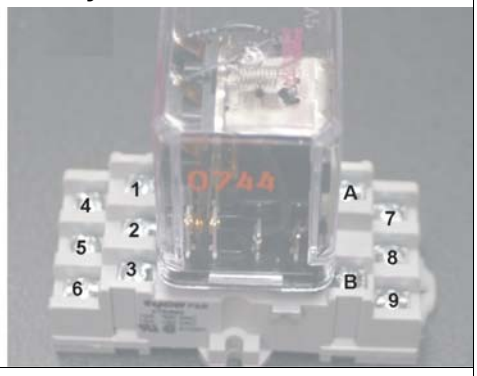
CAUTION 1: Risk of Mis-wiring—Due to electrical component manufacturing inconsistencies, the pin numbers imprinted on components such as connectors and relay bases used on Milnor machines often do not correspond to the pin numbers shown in the schematics.

- 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.

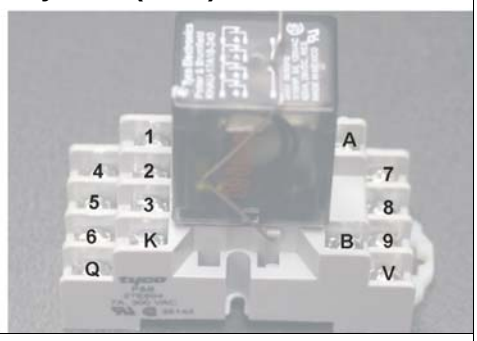
Figure 22: Plug-in Relays

11-pin Relay with Grey Base

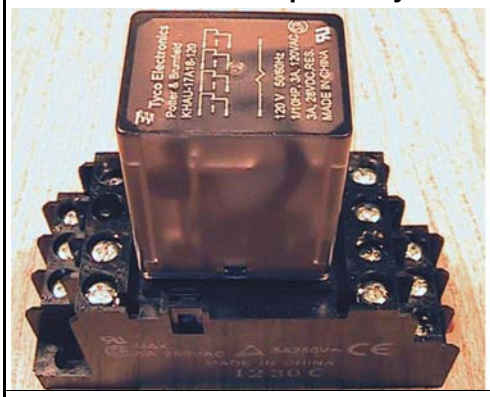


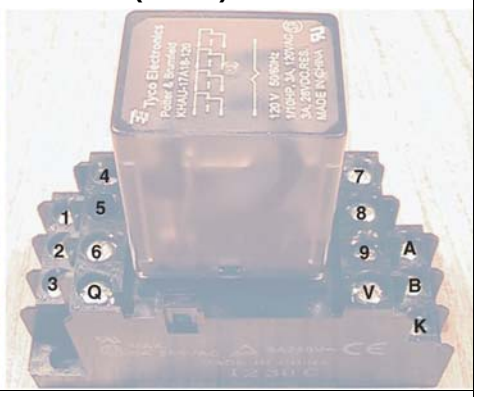


14-pin Relay with Grey Base (older)

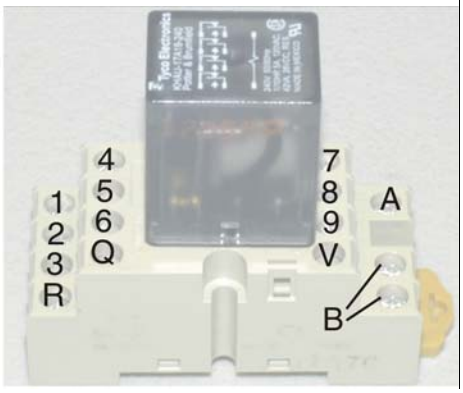


14-pin Relay with Black Base (newer)





14-pin Relay with Beige Base (rare)



Legend

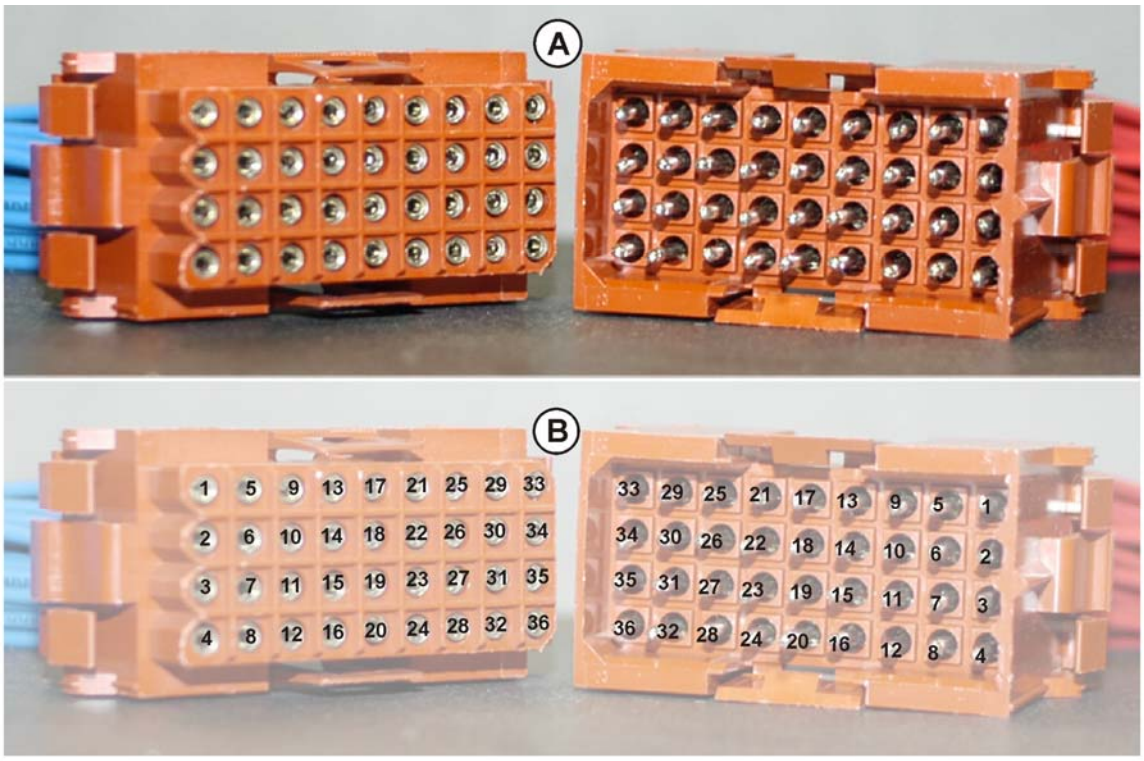
Left. View of relay and base

Right. Same view, showing pin numbers

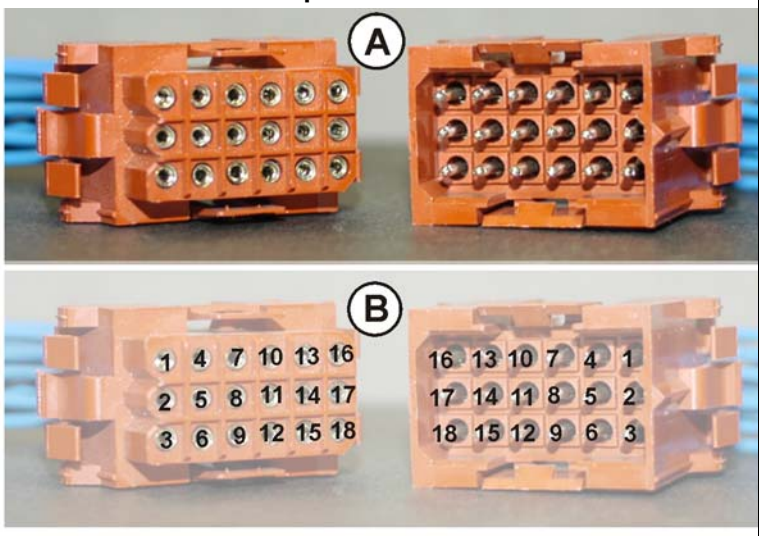
Note 3: Relay functional names ending with the letter "M" (e.g., CRxxM) are not discrete components but are a component of a printed circuit board. They are usually not individually replaceable.

Figure 23: AMP Connector Pin Locations

36-pin Connector



18-pin Connector

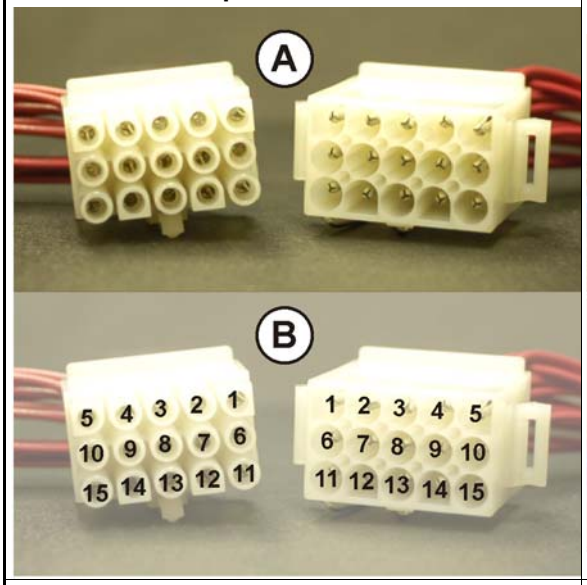


Legend

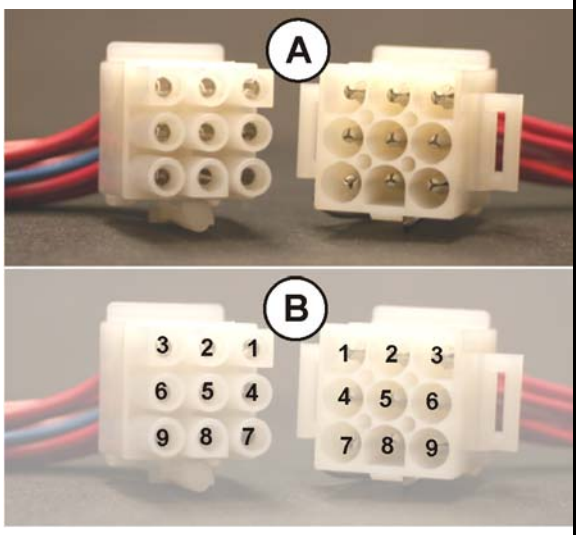
A. View of mating halves of connector
B. Same view, showing assigned pin numbers

Figure 24: Molex Connector Pin Locations

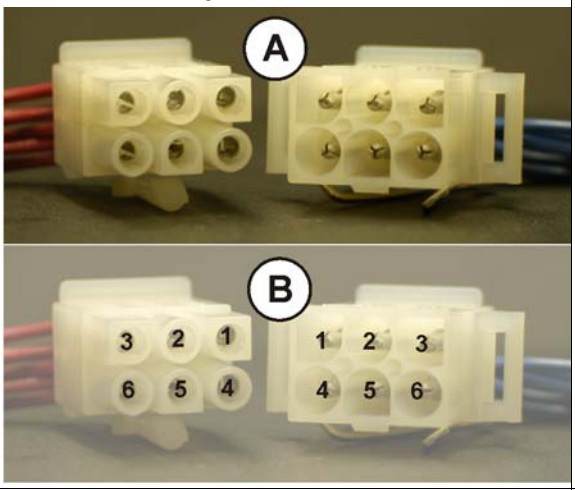
15-pin Connector



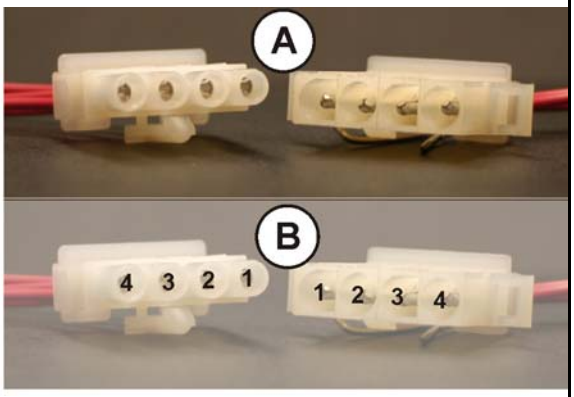
9-pin Connector



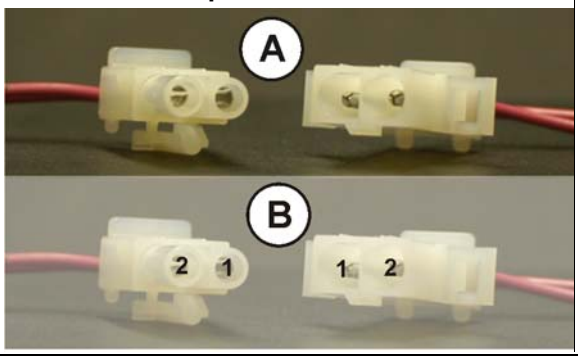
6-pin Connector



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

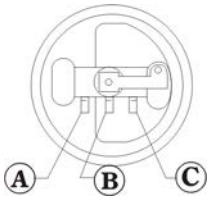
Component	Legend
	**A.** Contact 1—Normally open **B.** Contact 2—Normally closed **C.** Contact 3—Common

Figure 26: Toggle Switch

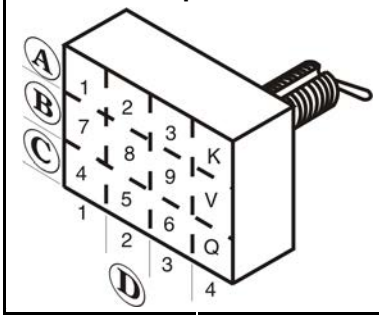
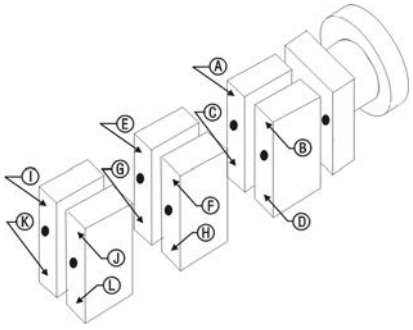
Component	Legend
	**A.** Normally closed contacts **B.** Common contacts **C.** Normally open contacts **D.** Pole

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

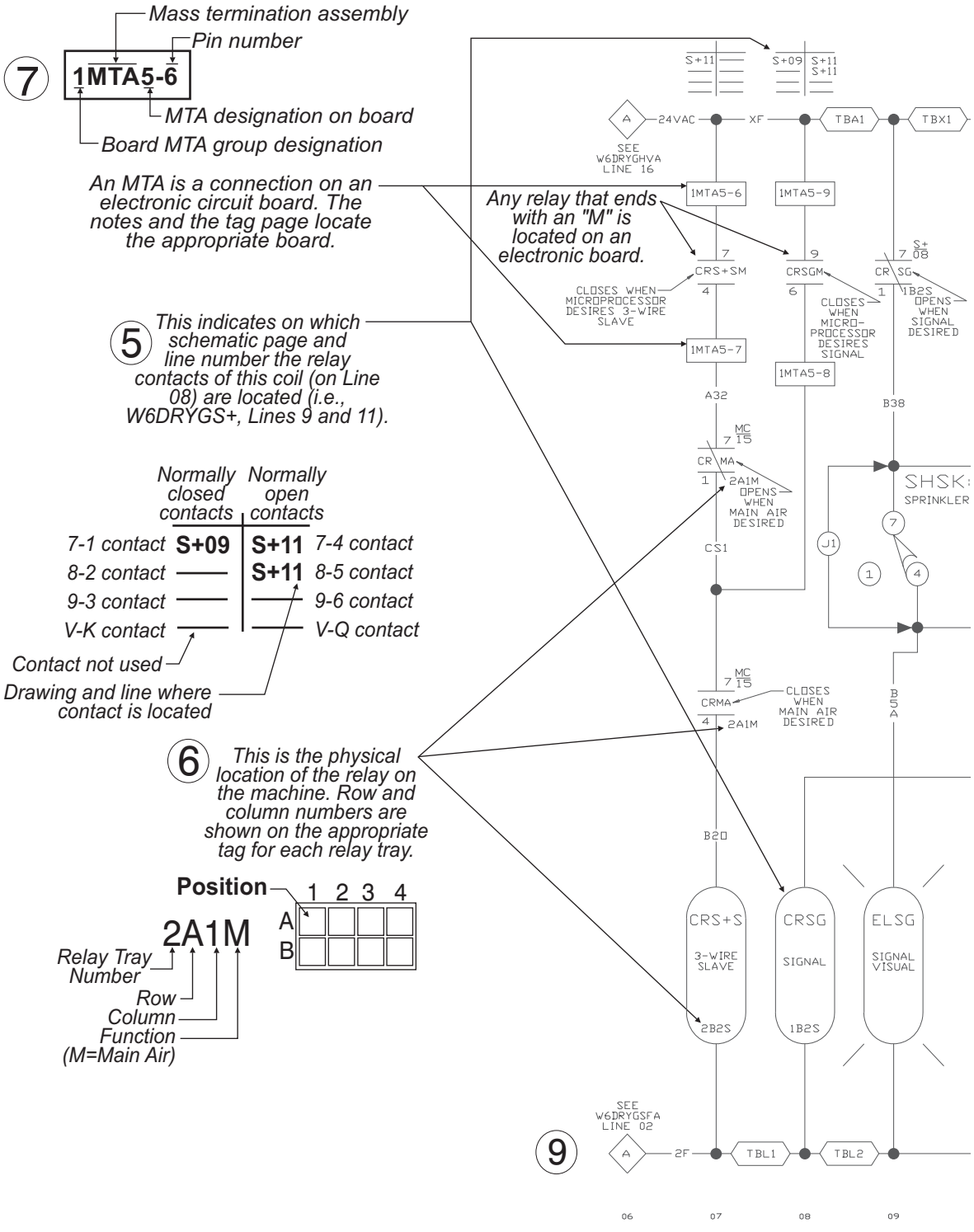
circuitry (S+=three-wire circuit) and establish the order in which the schematic occurs in the manual (schematics are arranged in alpha-numeric order in the manual).

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).

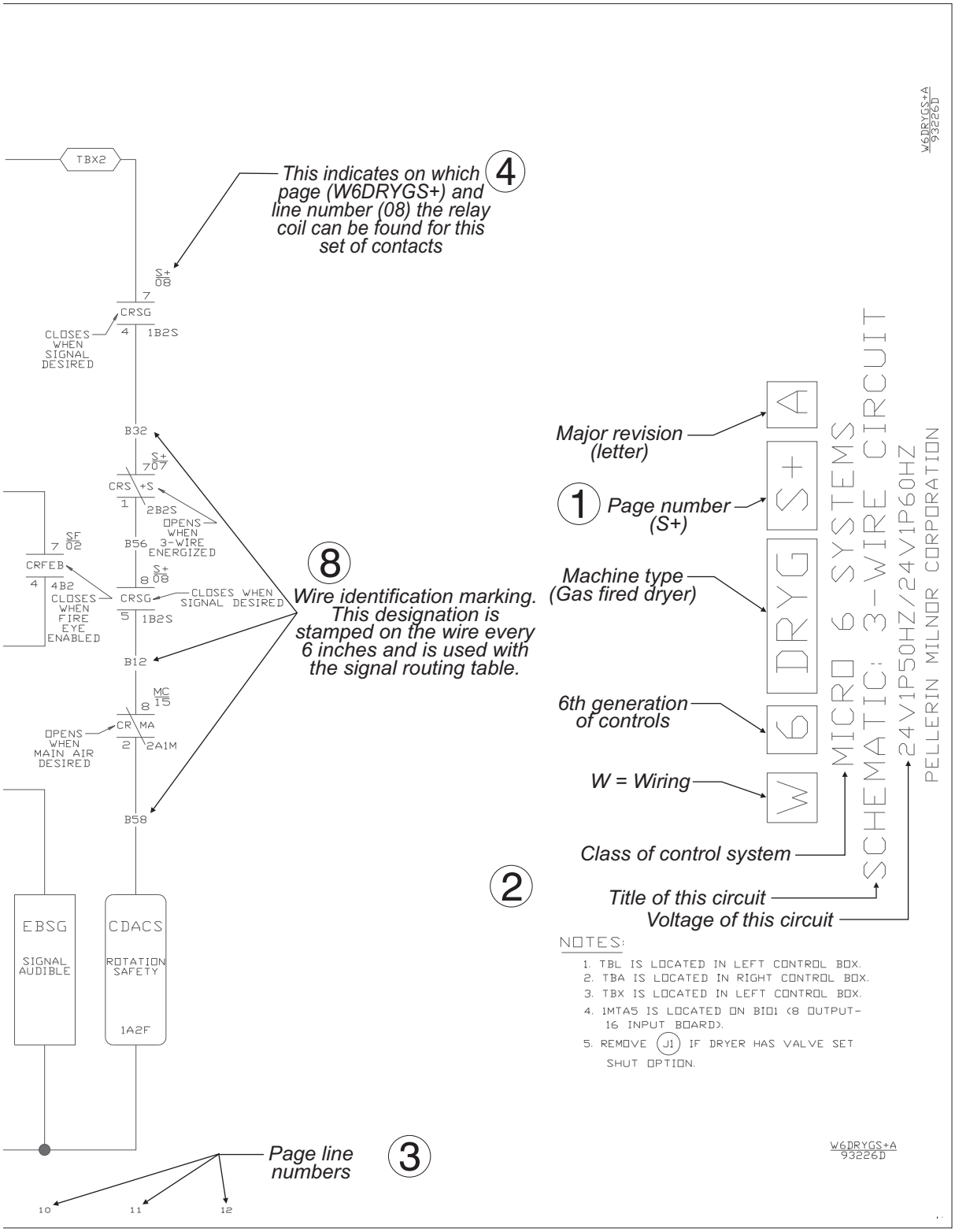
2. Included in the drawing title are the class of control system, the title of this circuit, and the circuit voltage.
3. Line numbers are provided along the bottom edge of the drawing. These permit service personnel in the field and at the Milnor® factory to quickly relate circuit locations when discussing 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 —



BMP010012 (left) / 2018343



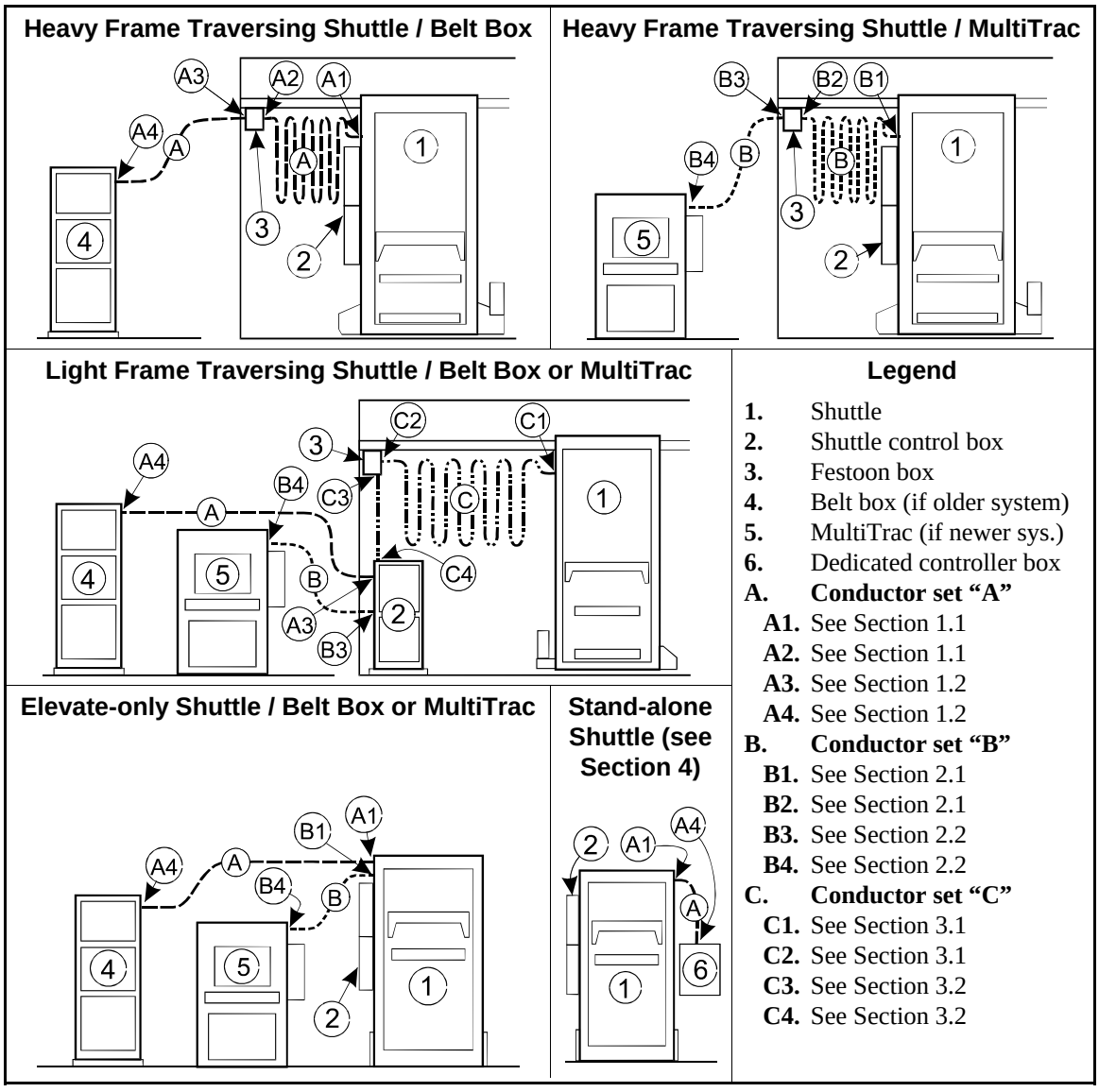
BMP010012 (right) / 2018343

On-Site Control Connections for Shuttles With Mark 5 Controls

This document covers typical connection procedures for shuttles used in Miltrac and MultiTrac systems. Special conditions not shown here may also arise. Contact Milnor Technical Support for assistance with conditions not shown. Referring to Figure 1, the types of on-site connections vary with the combination of:

- shuttle type: 1) heavy frame, traversing, 2) light frame, traversing, or 3) elevate-only, and
- system control type: 1) Miltrac in a central controls mounting panel (belt box), 2) MultiTrac, or 3) shuttle stand-alone.

Figure 1: Shuttle On-Site Connection Points for Various Shuttle and System Types



As shown in Figure 1, three sets of control conductors, "A", "B", and "C", commonly occur. These may be segmented, with some segments prefabricated and some fabricated on site. This document addresses all cabling and distinguishes between the two conditions.

1. Conductor Set "A" (see Figure 1)

Conductor set "A" applies to systems with Miltrac in a central controls mounting panel (belt box) and stand-alone shuttles with a dedicated controller box. In belt box systems, the shuttle processor board, keypad, display, and certain faceplate controls are located in the belt box. With stand-alone shuttles, these controls are located in a dedicated controller box. Conductor set "A" connects between the points in the shuttle control box and those in the belt box or dedicated controller box shown in Table 1.

Table 1: Shuttle (control box)-To-Shuttle Controller Connections (in belt box or dedicated controller box)

Purpose	Cable Specification	Connection Point			
		In Shuttle Control Box and Festoon Box*		On Shuttle Controller in Belt Box or Small Electric Box	
		Connector	Pin	Connector	Pin
Earth ground	One conductor: 14AWG (2.5mm²) with 600VAC insulation	TB (ground terminal)	6	TBA (ground terminal)	6
120VAC faceplate controls	Multi-conductor cable: 18AWG (1.0mm²) with 300VAC color coded insulation. Ground unused wires on one end only.	TB	19**	WCM	1**
		TB	15	WCM	2
		TB	23	WCM	4
		TB	16	WCM	5
		TB	5	WCM	6
		TB	6	WCM	7
		TB	4	WCM	9
Internal (board-to-board) serial link*	Two-conductor shielded cable: 18AWG (1.0mm²) twisted pair with 300VAC color coded insulation and 85% braided shield. Ground shield one end only.	TB	106	1MTA33 (serial link #2 low)	1 or 2
		TB	107	1MTA33 (serial link #2 high)	3 or 4

* Tags in the festoon box identify which terminal strip pins in the festoon box correspond to the connection points in the shuttle control box.

** The gate-operated safety switch(es) for safety fencing to be supplied by the customer are wired in series between these points.

The procedures for on-site installation of cabling, including any intermediate segments of conductor set "A" are provided in the following sub-sections. The connection points may be on terminal blocks, terminal strips, mating connectors or wire-to-wire. Where possible, segments pre-fabricated at the factory use mating connectors that need only be plugged together. For segments that will be fabricated on site, the mating connectors and pins are provided in a bag located in the control box or cabinet.

1.1. A1-to-A2: Shuttle-to-Festoon Box (Milnor-supplied Festoon Cable)—The festoon cable is fabricated at the Milnor factory. It contains the control conductors for the 120VAC faceplate controls and an internal serial link comprising conductor set A. It also contains three-phase power conductors which only run between the shuttle and the festoon box (where shuttle power is connected). At A1, secure the festoon cable to the shuttle at the shuttle junction box and plug together the mating connectors that were pre-wired to the 120VAC conductors. Use white caps (wire-to-wire) to connect the individually tagged and/or color coded three phase power conductors and serial link conductors. Connect the serial cable shields together also.

The festoon cable is shipped attached and pre-wired to the small festoon box at A2. At the site, the box need only be mounted on the rail or wall.

1.2. A3-to-A4: Festoon Box-to-Belt Box (fabricated on site)—Whether the connections at A3 are made in the festoon box, as with heavy frame shuttles or in the shuttle control box, as with light frame shuttles, the connections are the same. Tags in the festoon box identify which terminal strip pins in the festoon box correspond to the shuttle control box connection points. Refer to Table 1 in either case.

2. Conductor Set “B” (see Figure 1)

Conductor set “B” applies to MultiTrac systems. In such systems, the shuttle processor board is located in the shuttle control box and communicates with MultiTrac via two or more serial links. Also, certain Shuttle faceplate controls are located on the MultiTrac cabinet. Conductor set “B” connects between the points in the shuttle control box and those in the MultiTrac cabinet shown in Table 2.

Table 2: Shuttle (control box)-To-MultiTrac (cabinet) Connections

Purpose	Cable Specification	Connection Point			
		In Shuttle Control Box and Festoon Box**		In MultiTrac Cabinet	
		Connector	Pin	Connector	Pin
Earth ground	One conductor: 14AWG (2.5mm²) with 600VAC insulation	TB (ground terminal)	6	TBA (ground terminal)	6
120VAC faceplate controls	Multi-conductor cable: 18AWG (1.0mm²) with 300VAC color coded insulation. Ground unused wires on one end only.	TB	4	*TBC	4
		TB	5	*TBC	5
		TB	15	*TBC	15
		TB	16	*TBC	16
		TB	18***	*TBC	19***
		On Shuttle Processor Board		In MultiTrac Cabinet	
Miltrac serial link	See document BICCUC01 "On Site Installation and Troubleshooting of Permanent Serial Communication Cables" for a complete explanation.	1MTA32	1or 2	Miltrac SRL	
		1MTA32	3 or 4	Miltrac SRH	
Drynet serial link		1MTA29	1or 2	Drynet SRL	
		1MTA29	3 or 4	Drynet SRH	
Mildata serial link		1MTA34	1or 2	Mildata SRL	
		1MTA34	3 or 4	Mildata SRL	

* Asterisk represents the shuttle number, as displayed in the faceplate controls.

** Tags in the festoon box identify which terminal strip pins in the festoon box correspond to the connection points in the shuttle control box.

*** The gate-operated safety switch(es) for safety fencing to be supplied by the customer are wired in series either between pins TB18 (shown) and TB19 in the shuttle box, or between pins TBC19 (shown) and TBC18 in the Multitrac cabinet.

The procedures for on-site installation of cabling, including any intermediate segments of conductor set “B” are provided in the following sub-sections. The connection points may be on terminal blocks, mating connectors, or wire-to-wire. Where possible, segments pre-fabricated at the factory use mating connectors that need only be plugged together. For segments that will be wired on site, the mating connectors and pins are provided in a bag located in the control box or cabinet.

2.1. **B1-to-B2: Shuttle-to-Festoon Box (Milnor-supplied Festoon Cable)**—The festoon cable is fabricated at the Milnor factory. It contains the control conductors for the 120VAC faceplate controls and the external serial links (Miltrac, Mildata, and optional Drynet) comprising conductor set B. It also contains three-phase power conductors which only run between the shuttle and the festoon box (where shuttle power is connected). At B1, secure the festoon cable to the shuttle at the shuttle junction box and plug together the mating connectors that were pre-wired to the 120VAC conductors. Use white caps (wire-to-wire) to connect the individually tagged and/or color coded three phase power conductors and serial link conductors. Connect the serial cable shields together also.

The festoon cable is shipped attached and pre-wired to the small festoon box at B2. At the site, the box need only be mounted to the rail or wall.

2.2. B3-to-B4: Festoon Box-to-MultiTrac (Customer-supplied Cabling)—Whether the connections at B3 are made in the festoon box, as with heavy frame shuttles, or in the shuttle control box, as with light frame shuttles, the connections are the same. Tags in the festoon box identify which terminal block pins in the festoon box correspond to the shuttle control box connection points. Refer to Table 2 in either case.

3. Conductor Set "C" (see Figure 1)

Conductor set "C" applies to systems with light frame traversing shuttles. In such systems, the shuttle control box, which is otherwise mounted on the shuttle frame is a free-standing cabinet located near the end of the shuttle path. This conductor set is comprised of 120VAC conductors for faceplate controls and individual motor feeds. Conductor set "C" connects between the shuttle and the remote shuttle control box. All connector set "C" segments are pre-fabricated at the factory. The procedures for on-site installation of the conductor set "C" segments are provided in the following sub-sections. The connection points may be on terminal blocks, terminal strips, or pre-wired mating connectors.

3.1. C1-to-C2: Shuttle-to-Festoon Box (Milnor-supplied Festoon Cable)—The festoon cable is fabricated at the Milnor factory. At C1, secure the festoon cable to the shuttle at the shuttle junction box and plug together the mating connectors for the 120VAC conductors. Wire the motor feeds to the terminal block, matching the tags on the wires to those on the terminal block.

The festoon cable is shipped attached and pre-wired to the small festoon junction box at C2. At the site, the box need only be mounted on the rail or wall.

3.2. C3-to-C4: Festoon Box-to-Shuttle Control Box (Milnor-supplied Cable)—All control conductors are in flexible cabling supplied by Milnor. The shuttle control box ships with the cable attached and pre-wired on this end (C4). At C3, secure the cable to the festoon box and plug together the pre-wired mating connectors for the 120VAC conductors. Wire the motor feed conductors the the terminal block, matching the tags on the individual conductors to those on the terminal block. A connector and pin identification tag is also provided in the festoon box.

4. About the Controls for Stand-alone, Elevating Shuttles

Elevate-only, stand-alone shuttles have a dedicated controller box containing the shuttle processor board, keypad, display and certain faceplate controls (see Note 1). The cabling between the shuttle and this box is conductor set "A" (see Table 1). However, the on-site connections, if any, are usually made with mating connectors.

This type of shuttle is most often used to load a Milnor dryer in a stand-alone (not part of an automated laundering system) configuration, and as such, is dedicated to that dryer. Typically, the shuttle and dryer controls are located together. These are usually, but not necessarily, mounted on the shuttle frame.

> **Note 1:** Previously, Milnor stand-alone, elevate-only shuttles used relay logic controls. Today, these shuttles are only offered with microprocessor controls.

4.1. Stand-alone Shuttle Controls Mounted on the Shuttle Frame—If the dedicated controller box is mounted on the shuttle frame, no on site connections for the shuttle are required. However, if the dryer control box is also mounted to the shuttle frame, on-site connections are required for the dryer. These are made via a flexible conduit. The shuttle will normally ship with the dryer control box mounted and the cabling attached. All connections on the shuttle end pre-wired, and mating connectors pre-wired on the other end. At the site, secure the other end of the cabling to the dryer and mate the connectors. Refer to the related section in document BICDUI01 for more information.

4.2. Stand-alone Shuttle Controls Located Remotely—If the dedicated controller box will be near, but not on the shuttle frame (for example, if it is mounted on the dryer), the connections are normally made via a flexible conduit supplied by Milnor. The shuttle will normally ship with the cabling attached, all connections on the shuttle end pre-wired, and mating connectors installed on the other end. At the site, secure the other end of the conduit to the dedicated controller box, and mate the connectors.

— End of BICSUI01 —

Milnor® Allied Interface Specifications and Signals, Shuttle

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—Shuttles With Mark 5 Controls [Document BICALC06]

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

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	TBK							TBI	TBI	TBI	TBI
	Pin Number	G							D	C	B	A
	Wire Number	7							403	402	401	400
	Display/code	--							i3/D	i3/C	i3/B	i3/A
	Board/code	--							io3/3	io3/1	io3/2	io3/0
16 Destination Codes (00-15)	Multi-terminal	TBK							TBI	TBI	TBI	TBI
	Pin Number	H							H	G	F	E
	Wire Number	7							411	410	409	408
	Display/code	--							i3/H	i3/G	i3/F	i3/E
	Board/code	--							io3/7	io3/6	io3/5	io3/4
64 Customer Codes (00-63)	Multi-terminal	TBG					TBJ	TBJ	TBJ	TBJ	TBJ	TBJ
	Pin Number	1 or 2					F	E	D	C	B	A
	Wire Number	7					443	442	441	440	439	438
	Display/code	--					i4/F	i4/E	i4/D	i4/C	i4/B	i4/A
	Board/code	--					io4/5	io4/4	io4/3	io4/2	io4/1	io4/0

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

Signal Direc-tion	Common Connection*			Dedicated Connection			Display / code	Board / code	Function Name / Signal Name
	Multi-terminal	Pin	Wire	Multi-terminal	Pin	Wire			
Input	TBJ	Q	7	TBG	8	452	i4/O	io4/14	2nd level / go 2nd load position
Input	TBG	5	7	TBJ	J	446	i4/I	io4/8	opposite side / load reverse direction
Input	TBG	7	7	TBJ	G	444	i4/G	io4/6	at left / left of home
Input	TBG	5	7	TBJ	H	445	i4/H	io4/7	at right / right of home
Milnor reads in the directional signals above when it receives the "discharge desired / desires to load shuttle" signal below.									
Input	TBL	G	7	TBI	R	419	i3/P	io3/15	discharge desired / desires to load shuttle
Output*	TBE	2	470	TBE	1	471	o3/i	io6/o	load desired / shuttle is empty
Milnor reads in all batch data (previous table and next two signals) when it receives the "data valid" signal.									
Input	TBL	G	7	TBJ	R	453	i4/P	io4/15	new customer**
Input	TBL	G	7	TBI	J	412	i3/I	io3/8	single cake
Input	TBL	G	7	TBI	K	413	i3/J	io3/9	data valid
Output*	TBI	T	420	TBI	S	421	o2/c	io3/2	load allowed / shuttle desires to receive load
Output*	TBJ	X	458	TBJ	W	459	o1/k	io2/2	transfer not complete / shuttle is loading
Input	TBG	6	7	TBJ	N	450	i4/M	io4/12	error: cancel transfer / cancel transfer
Output*	TBI	X	424	TBI	W	425	o2/h	io3/7	transfer complete / shuttle is loaded (not COSLIDE) ***
If the shuttle can take another cake, the applicable signals shown in this table are repeated here.									
Input	TBG	7	7	TBJ	K	447	i4/J	io4/9	transfer complete / belt is loaded (COSLIDE)

* 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.

** The "new customer" input is used when it is not necessary to track batch codes electronically, but merely to ensure that different customers' goods are kept segregated. If the Milnor controller sees this input made at the appropriate time during the cycle, it will increment the customer codes by one (e.g., from 07 to 08) to signal downstream devices not to combine these batches.

*** The duration of this output is controlled by the "Allied Loading Completed Delay" configure decision.

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

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							TBK	TBK	TBK	TBI
	Pin Number	n/a							E • F	C • D	A • B	1 • 2
	Wire Number	n/a							436 • 437	434 • 435	432 • 433	430 • 431
	Display/code	--							o2/b	o2/a	o2/g	o2/f
	Board/code	--							io3/1	io3/0	io3/6	io3/5
16 Destina-tion Codes (00-15)	Multi-terminal	n/a							TBL	TBL	TBL	TBJ
	Pin Number	n/a							E • F	C • D	A • B	1 • 2
	Wire Number	n/a							468 • 469	466 • 467	464 • 465	462 • 463
	Display/code	--							o2/j	o2/i	o2/o	o2/n
	Board/code	--							io4/1	io4/0	io4/4	io4/5

* 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)

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

Signal Direc-tion	Common Connection*			Dedicated Connection			Display / code	Board / code	Function Name / Signal Name
	Multi-terminal	Pin	Wire	Multi-terminal	Pin	Wire			
Output*	TBI	V	422	TBI	U	423	o2/d	io3/3	discharge desired / desires to unload
Input	TBL	H	7	TBI	M	415	i3/L	io3/11	2nd level / go 2nd unload position
Input	TBL	G	7	TBI	L	414	i3/K	io3/10	opposite side / load reverse direction
Input	TBL	H	7	TBI	Q	418	i3/O	io3/14	at left / left of home
Input	TBL	H	7	TBJ	L	448	i4/K	io4/10	at right / right of home
Milnor reads in the directional signals above when it receives the "load desired / machine desires load from shuttle" signal below.									
Input	TBL	H	7	TBI	N	416	i3/M	io3/12	load desired / machine desires load from shuttle **
Output*	TBJ	V	456	TBJ	U	457	o2/l	io4/3	discharge allowed / ready to unload
Input	TBG	1	7	TBI	P	417	i3/N	io3/13	load allowed / machine allowed to receive load from shuttle **
Output*	TBK	K	426	TBK	J	427	o2/p	io4/7	transfer not complete / not finished unloading
Input	TBG	8	7	TBJ	P	451	i4/N	io4/13	error: cancel transfer / cancel transfer
Milnor sets all batch data (previous table and next signal) before it enables the "data valid" signal.									
Output*	TBJ	Z	460	TBJ	Y	461	o2/m	io4/4	single cake
Output*	TBJ	T	454	TBJ	S	455	o2/k	io4/2	data valid
Output*	TBI	Z	428	TBI	Y	429	o2/e	io3/4	transfer complete / shuttle is finished unloading
Input	TBG	1	7	TBJ	M	449	i4/L	io4/11	transfer complete / allied discharge complete

* 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.

** These inputs must remain on until transfer is complete.

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**
The number of data signals required for typical ranges of batch codes are as follows:		0		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.					0	0	0	0
		1							0	0	0	1
		2							0	0	1	0
		3							0	0	1	1
		4							0	1	0	0
Code Range	Signals Required	5							0	1	0	1
		6							0	1	1	0
00-15	A-D	7							0	1	1	1
00-31	A-E	8							1	0	0	0
00-63	A-F	9							1	0	0	1
000-127	A-G	10							1	0	1	0
000-255	A-H	11							1	0	1	1
000-511	A-I or J	12							1	1	0	0
0000-1023	A-J or K	13							1	1	0	1
		14							1	1	1	0
		15							1	1	1	1

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 —

Connections and Configuration Needed when Loading Multi-Cake Dryers with Single-Cake Shuttle

At times it is necessary to configure a system with a single-cake shuttle to provide multiple cakes for a single dryer load. This operation is only possible if the shuttle discharge and the dryer receive are both controlled by Miltrac.

Sequence of Operations

After the shuttle delivers the first cake to the dryer, the dryer basket begins turning and the dryer door remains open. The shuttle returns to the extraction device for the next cake, then delivers that cake to the dryer. This sequence continues until either the dryer receives the maximum number of cakes or the shuttle receives an incompatible cake.

Connections

Shuttle/Dryer

Referring to Figure 1, wire the output from the shuttle to the input of each dryer in the system.

[Note: This illustration will be replaced with official documents as soon as possible. The actual schematics and line numbers to be referenced are W6DR3FI2, 01 and 02; W6DR3FTC, 02-07; and W6SH5SIX, 14.]

Shuttle/No-Dry Station

If the dryers control a no-dry station, the input for "NO-DRY FINISHED RECEIVING" must be wired identically to the dryers. Use input 2MTA4-5 for LED-type boards, or 2MTA3-4 for older (non-LED) boards. If the no-dry station is always ready to accept a load, this input can be permanently grounded.

Configuration

Shuttle

Set configure decision "HOLD UNLOAD DEVICE TIL FULL" to 1=YES.

Set configure decision "FINISHED UNLOADING OUTPUT" to 1=YES. This requires that two additional 8/16 boards, with addresses 03h and 04h, be installed in the shuttle controller.

Dryer

Set configure decision "MAX CAKES TO RCV" to the maximum number of cakes the dryer can accept.

Miltrac: Configure Devices

Set "COMPATIBILITY?" to 1. This causes goods to be grouped into batches by code.

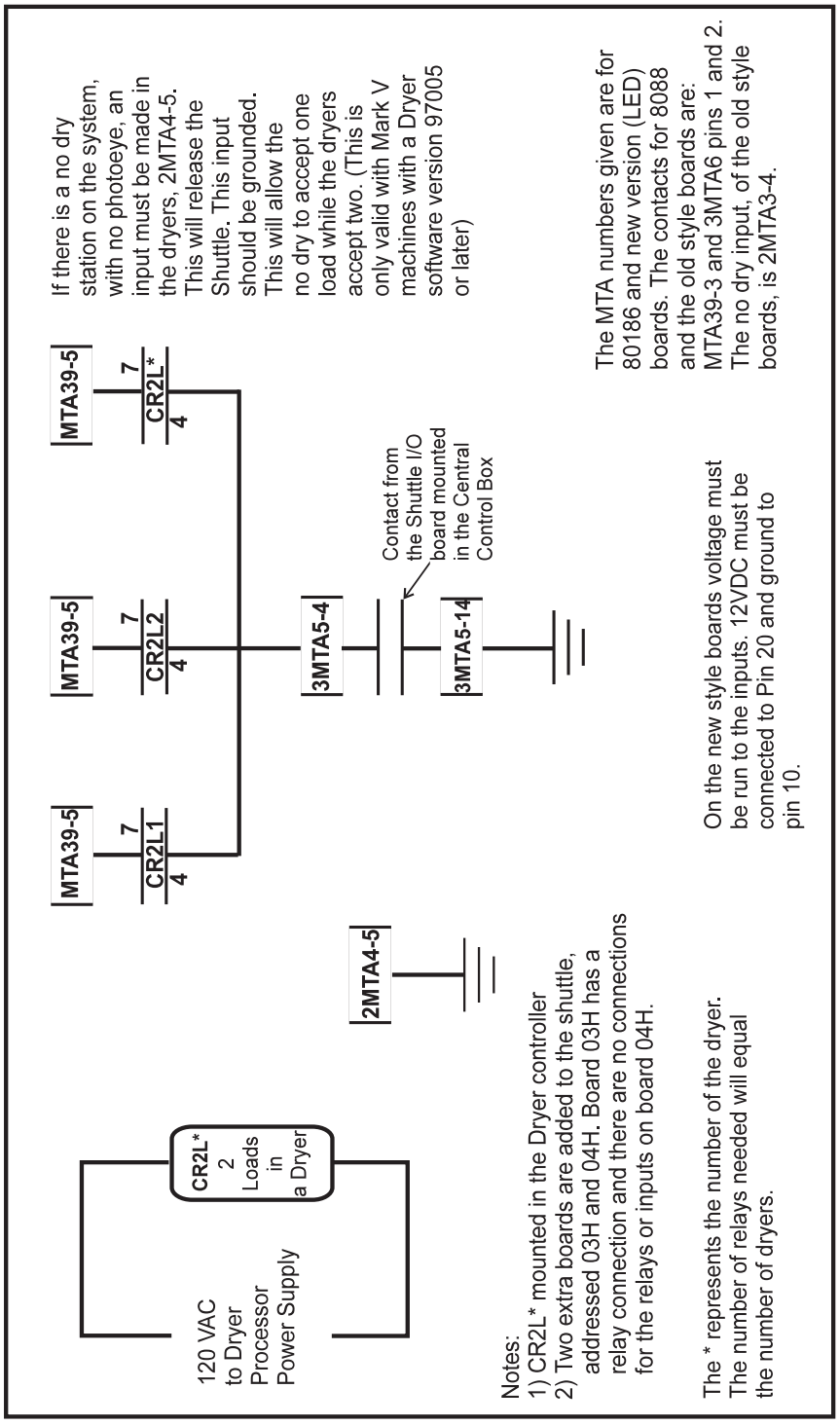


FIGURE 1 (MSIN0913AE)
Electrical Schematic - Shuttle to Dryers

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)	✓		

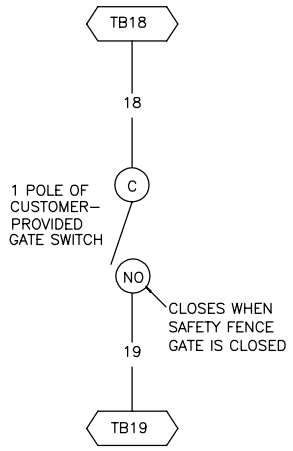
Test each interlocked machine as follows:

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.

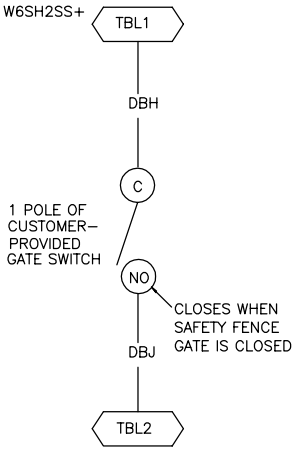
— End of BISUUI02 —

SAFETY FENCE GATE WIRING FOR ALL SHUTTLES

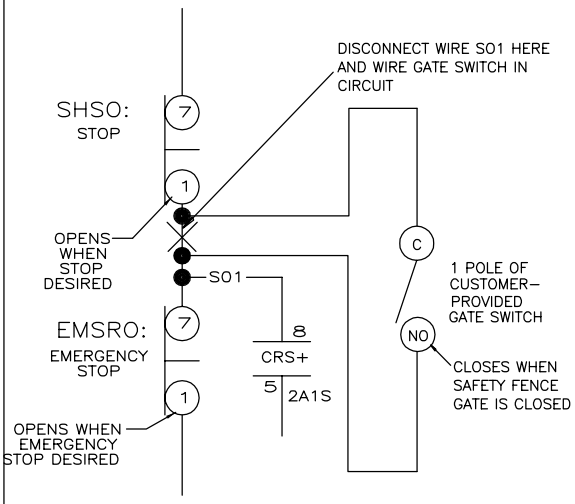
SHUTTLES MANUFACTURED AFTER 9–15–94
SEE SCHEMATIC W6SH5SS+



SHUTTLES MANUFACTURED BETWEEN 11–11–90
AND 8–28–96
SEE SCHEMATIC W6SH2SS+
OR W6S112S+

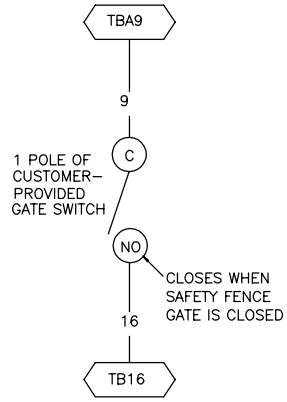


SHUTTLES MANUFACTURED BEFORE 11–11–90
SEE SCHEMATIC W6S112S+

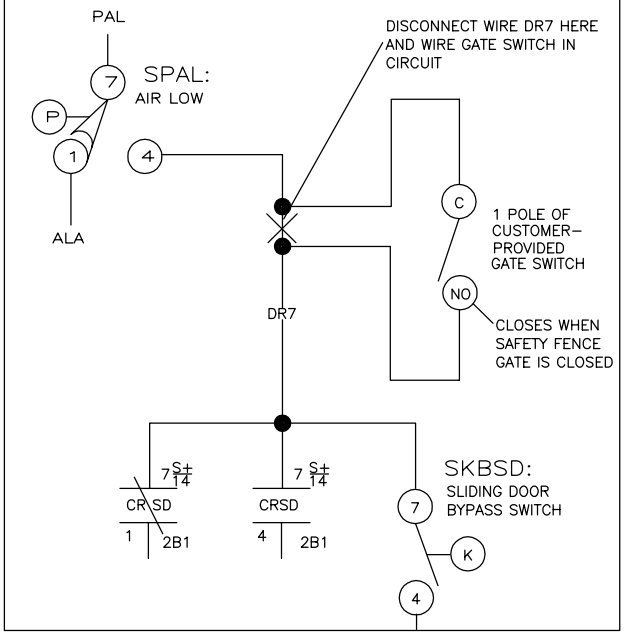


SAFETY FENCE GATE WIRING FOR ALL 2 STAGE PRESSES

PRESSES MANUFACTURED AFTER 2–19–98
SEE SCHEMATIC W6PR5SS+



PRESSES MANUFACTURED BEFORE 2–19–98
SEE SCHEMATIC W6PR3SS+,
W6PR2SS+,W6PRSSS+A,
AND W6PRSSS+.



00 01 02 03 04 05 06 07 08

W6SYSSG
2007192B

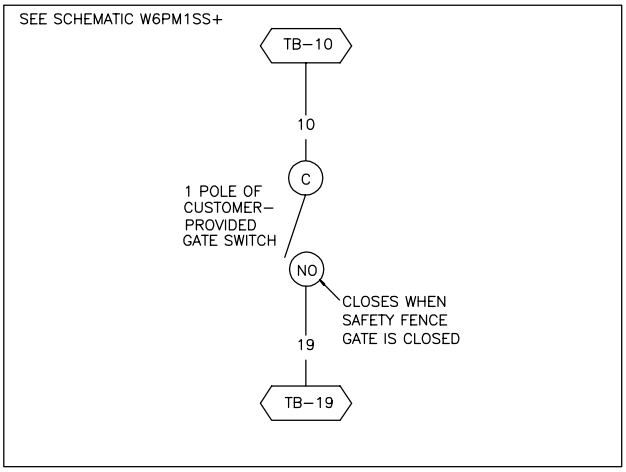
SCHEMATIC:CUSTOMER PROVIDED SAFETY FENCE GATE INTERLOCK

W6SYSSG

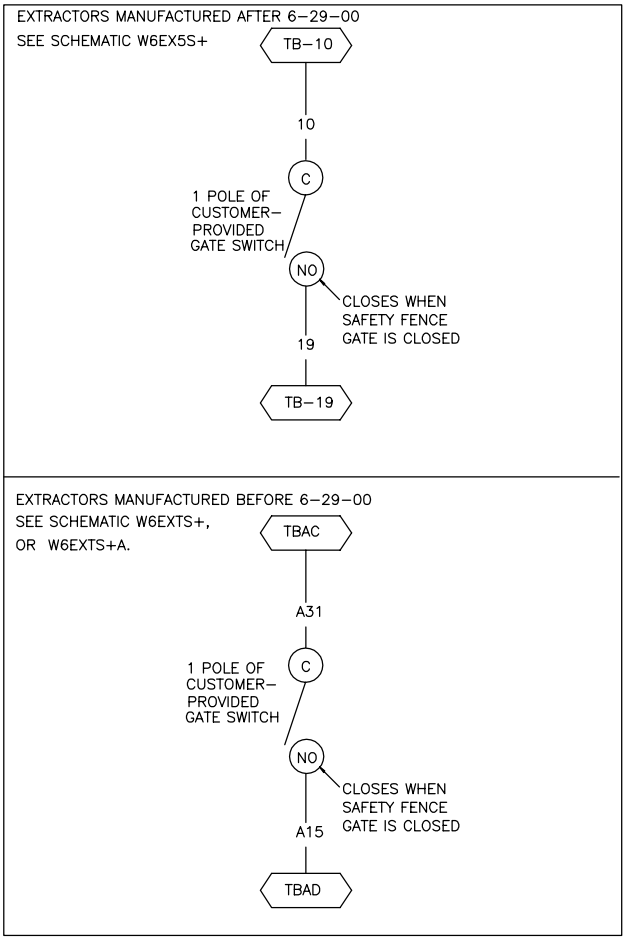
MICRO 6 SYSTEMS

PELLERIN MILNOR CORPORATION

SAFETY FENCE GATE WIRING FOR ALL SINGLE STAGE PRESSES



SAFETY FENCE GATE WIRING FOR ALL CENTRIFUGAL EXTRACTOR



NOTE:

THE SAFETY FENCE GATE INTERLOCK SWITCH PROVIDED BY THE END USER MUST HAVE A SEPERATE POLE FOR EACH MACHINE THAT IS WITHIN THE SAFETY FENCE AREA.

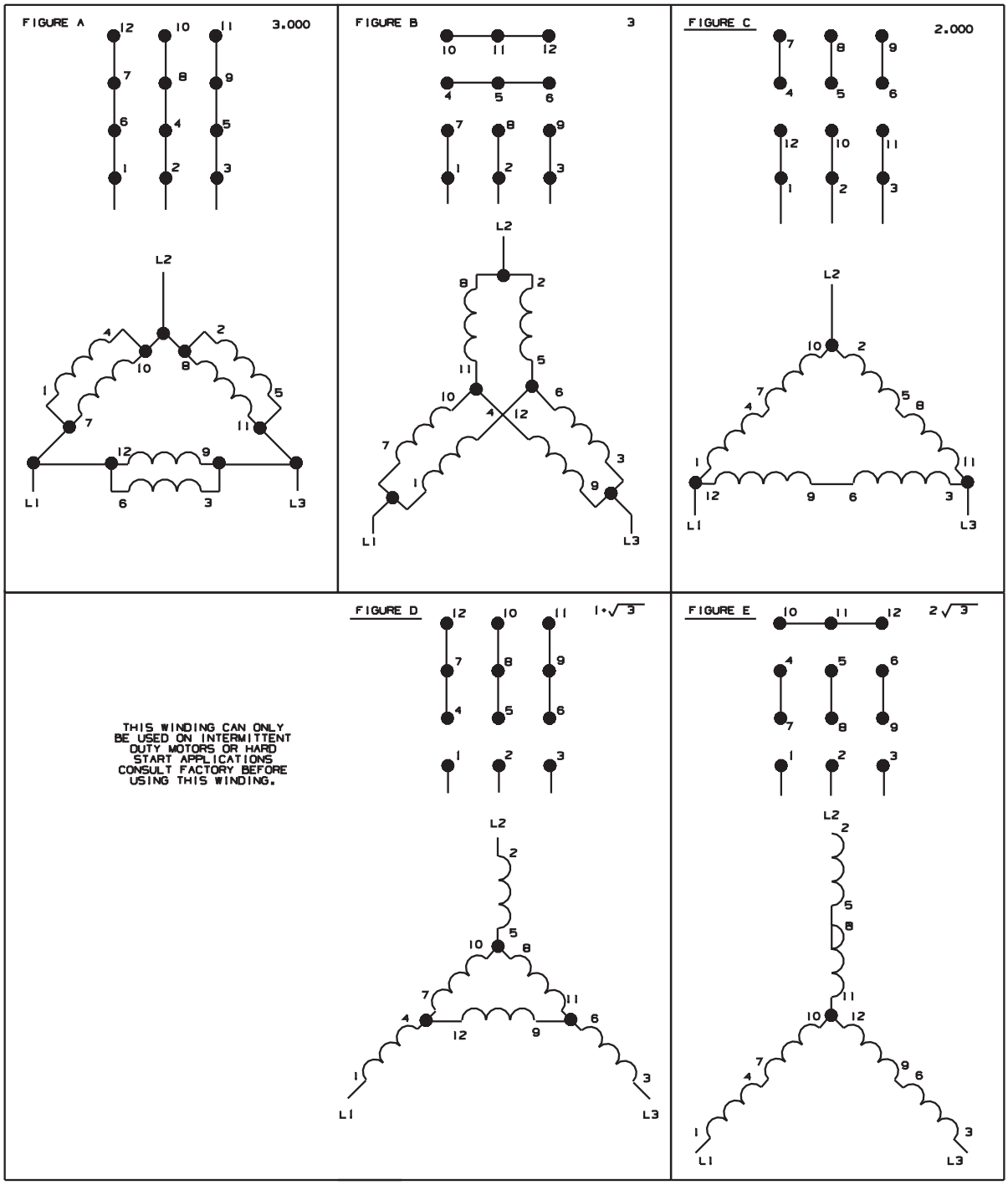
SHOWN ARE THE CONNECTION POINTS FOR EACH MACHINE THAT IS IN THE FENCED AREA.

IF MULTIPLE GATES GIVE ACCESS TO THE FENCED AREA THEN EACH GATE MUST HAVE AN INTERLOCK SWITCH WIRED IN SERIES BETWEEN THE MACHINE CONNECTION POINTS.

SEE MILNOR DOCUMENT 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

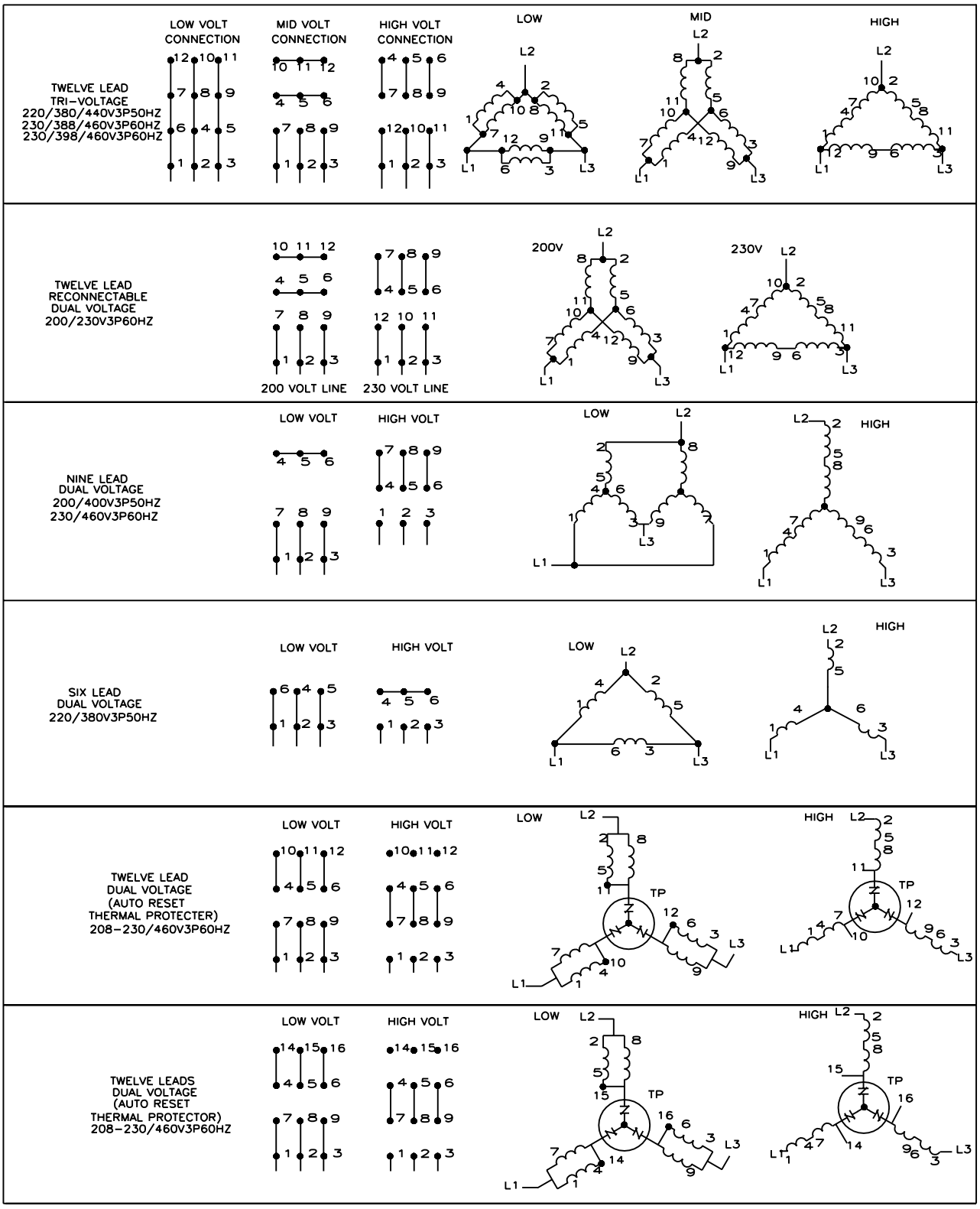
BMP850029

MOTOR CONNECTION DIAGRAMS

THREE PHASE SINGLE SPEED MOTORS WITH MULTIPLE VOLTAGE RATINGS

(ONLY FOR MOTOR SUFFIXES LISTED)

PELLERIN MILNOR CORPORATION

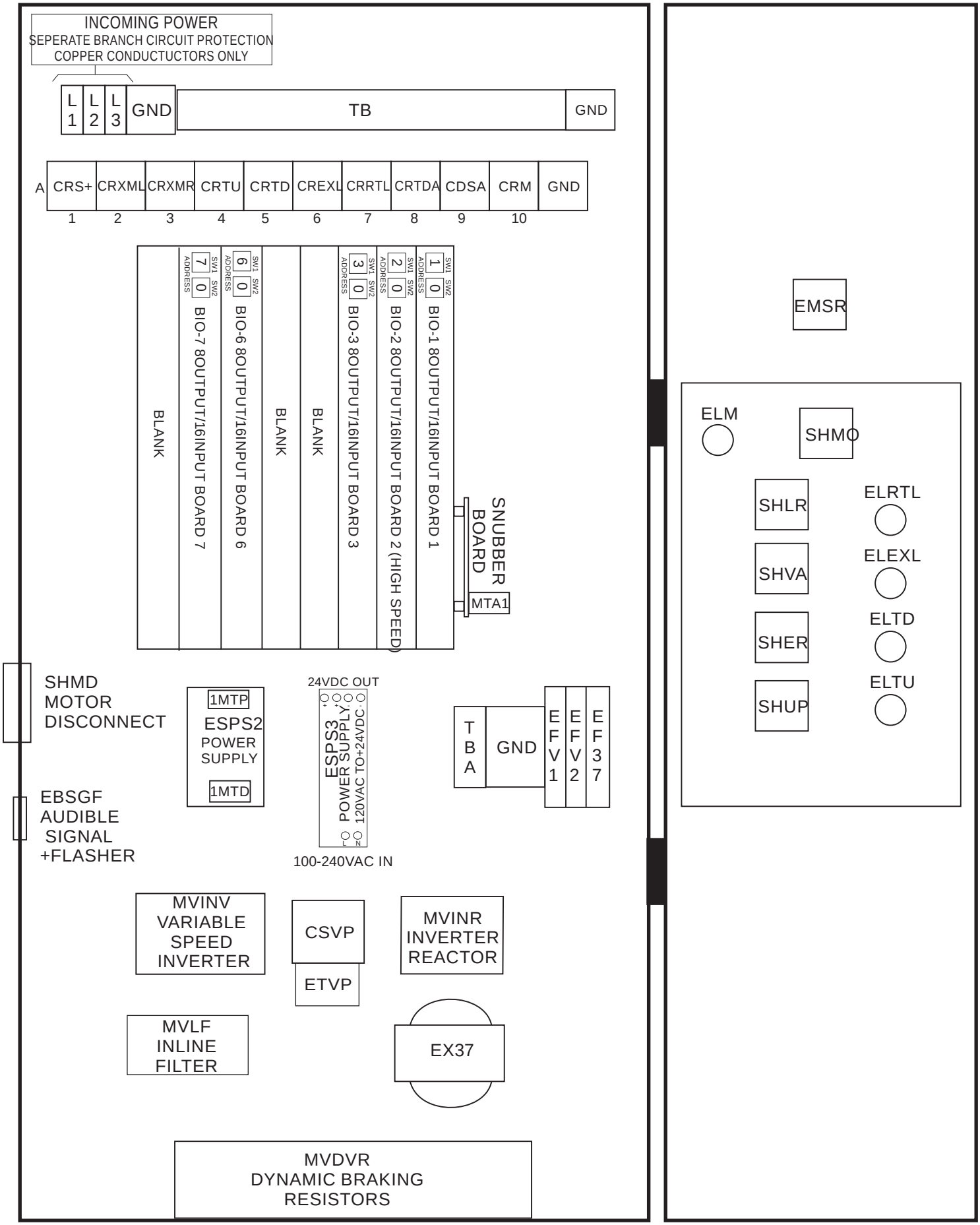


W80008

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

PELLERIN MILNOR CORPORATION

W80008
2001253A



W6CD5STG1
2020065B

MICRO 6 SYSTEMS
COBUD CONTROL BOX

PELLERIN MILNOR CORPORATION

B2T2005007
2020065A

BIO-1

INPUTS
0 UNLOAD POSITION 1
1 UP OR DOWN LIMIT EXCEEDED
2 LOAD POSITION 1
3 LEFT OR RIGHT LIMIT EXCEEDED
4 LOAD POSITION 2
5 LOAD END BLOCKED BELT 1
6 UNLOAD END BLOCKED BELT 0
7 UNLOAD END BLOCKED BELT1
8 LOAD POSITION0
9 UNLOADPOSITION 0
10 ON WHEN IN AUTOMATIC
11 ON WHEN 3-WIRE ENERGIZED
12 HOME SWITCH 0 OR 1
13 DISCHARGE SWITCH 0 OR 1
14 LOAD SWITCH 0 OR 1
15 LOAD END BLOCKED BELT 0

OUTPUTS
0 MOVE UP
1 MOVE DOWN
2 MOVE LEFT
3 MOVE RIGHT
4 BELT 1 REVERSE
5 BELT 1 FORWARD
6 BELT 0 REVERSE
7 BELT 0 FORWARD

BIO-2

INPUTS
0 NOT USED
1 UNLOAD POSITION 2
2 GO DOWN BEFORE GOING UP
3 LOAD POSITION 3
4 UNLOAD POSITION 3
5 NOT USED
6 BELT OVER SHOOT EYE
7 ENCODER
8 RESET COUNTER
9 NOT USED
10 RETRACTED
11 EXTENDED TO LOAD
12 NOT USED
13 NOT USED
14 EXTENDED TO UNLOAD
15 RETRACTED

OUTPUT
0 NOT USED
1 SIGNAL
2 NOT USED
3 SLOW DOWN
4 ALTERNATE DECELERATION
5 FLAG DOWN
6 MOVEMENT COMMANDED
7 HIGH SPEED DISCHARGE

BIO-3 (DATA PASS)

INPUTS
0 DRY CODE A
1 DRY CODE B
2 DRY CODE C
3 DRY CODE D
4 DESTINATION A
5 DESTINATION B
6 DESTINATION C
7 DESTINATION D
8 SINGLE CAKE
9 DATA VALID
10 DESIRES LOAD REVERSE
11 GO TO 2ND UNLOAD POSITION
12 MACHINE DESIRES LOAD
13 MACHINE IS ALLOWED TO LOAD
14 TO LEFT DESIRES LOAD
15 MACHINE DESIRES TO UNLOAD

OUTPUTS
0 DRYCODE 2
1 DRYCODE 3
2 DESIRES TO RECEIVE LOAD
3 SHUTTLE DESIRES TO UNLOAD
4 SHUTTLE IS UNLOADED
5 DRYCODE 0
6 DRYCODE 1
7 SHUTTLE IS LOADED

BIO-4 (DATA PASS)

INPUTS
0 CUSTOMER CODE A
1 CUSTOMER CODE B
2 CUSTOMER CODE C
3 CUSTOMER CODE D
4 CUSTOMER CODE E
5 CUSTOMER CODE F
6 TO LEFT, DESIRES TO LOAD
7 TO RIGHT DESIRES TO LOAD
8 LOAD SHUTTLE IN REVERSE
9 BELT IS LOADED
10 TO RIGHT DESIRES A LOAD
11 ALLIED DISCHARGE A LOAD
12 ALLIED LOADING CANCELLED
13 ALLIED DISCHARGE CANCELLED
14 ALLIED BELT 0 TO LOAD LEVEL 1
15 NEW CUSTOMER

OUTPUTS
0 DESTINATION 2
1 DESTINATION 3
2 DATA VALID
3 READY TO UNLOAD
4 PARTIAL LOAD
5 DESTINATION 0
6 DESTINATION 1
7 NOT USED

BIO-5 (SEMI-AUTO,AUTO LOADING)

INPUTS
0 LOAD STATION 3 (SHUTTLE CALL)
1 LOAD STATION 2 (SHUTTLE CALL)
2 LOAD STATION 1 (SHUTTLE CALL)
3 LOAD STATION 0 (SHUTTLE CALL)
4 LOAD STATION 4 (SHUTTLE CALL)
5 LOAD STATION 5 (SHUTTLE CALL)
6 LOAD STATION 6 (SHUTTLE CALL)
7 NOT USED
8 NOT USED
7 NOT USED
10 NOT USED
11 NOT USED
12 NOT USED
13 NOT USED
14 LOAD STATION 7 (SHUTTLE CALL)
15 NOT USED

OUTPUTS
0 EXTEND BELT 1 TO UNLOAD
1 RETRACT BELT 1 FROM UNLOAD
2 EXTEND BELT 1 TO LOAD
3 RETRACT BELT 1 FROM LOAD
4 SEMI-AUTO LOAD DESIRED
5 SEMI-AUTO FIN. UNLOADING
6 NOT USED
7 NOT USED

BIO-6 (2-WIDE SHUTTLE + EXTEND/RETRACT)

INPUTS
0 LOAD STATION SWITCH 1 OR 2
1 DISCH STATION SW 0 OR 1
2 UP OR DOWN LIMIT EXCEEDED
3 LOAD POSITION 0 (2-WIDE)
4 UNLOAD POSITION 0 (2-WIDE)
5 LOAD POSITION 1 (2-WIDE)
6 UNLOAD POSITION 1 (2-WIDE)
7 NOT USED
8 UNLOAD POSITION 2 (2-WIDE)
9 NOT USED
10 NOT USED
11 NOT USED
12 NOT USED
13 NOT USED
14 NOT USED
15 NOT USED

OUTPUTS
0 I'M EMPTY
1 EXTEND TO UNLOAD
2 EXTEND TO LOAD
3 RETRACT FROM LOAD
4 RETRACT FROM UNLOAD
5 NOT USED
6 NOT USED
7 NOT USED

BIO-7 (COBUD)

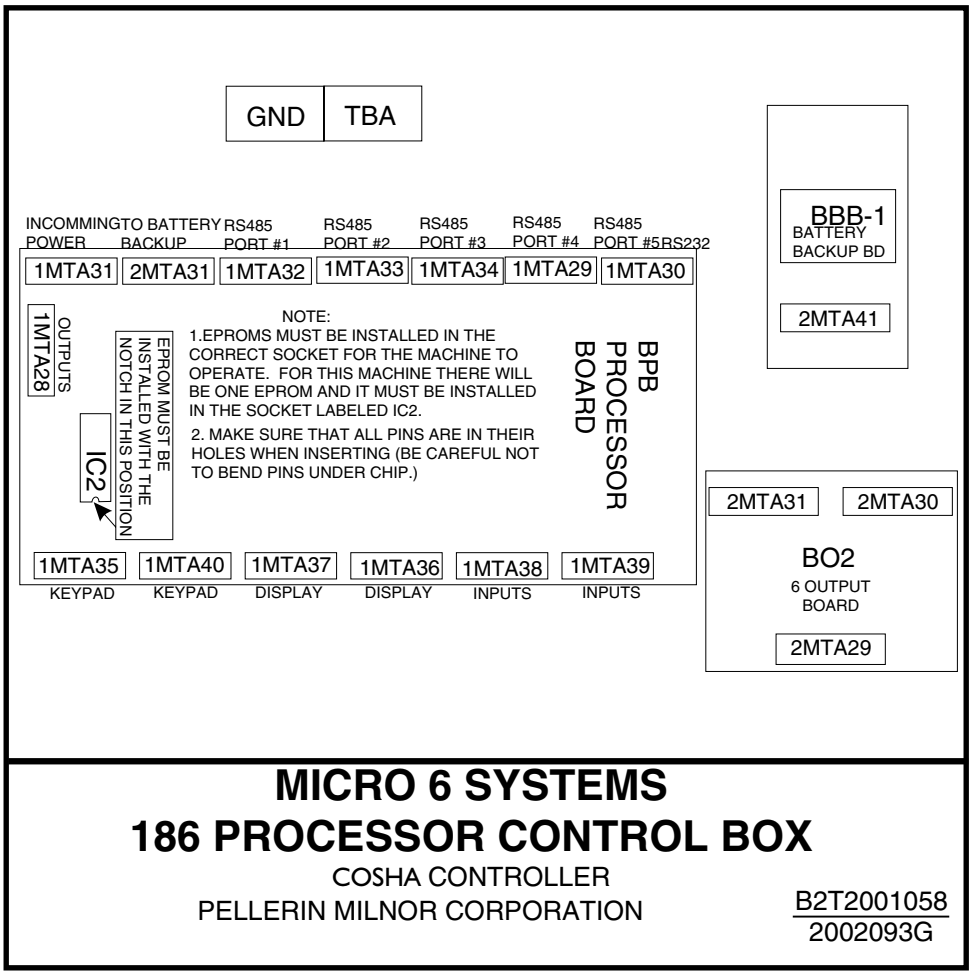
INPUTS
0 TILTED FULL UP
1 TILTED FULL DOWN
2 ROTATE TO SLOW (PIVOT)
3 PLUNGER ENABLED (PIVOT)
4 LEFT TO HOME (PIVOT)
5 NOT USED
6 NOT USED
7 NOT USED
8 NOT USED
9 NOT USED
10 NOT USED
11 NOT USED
12 NOT USED
13 NOT USED
14 NOT USED
15 NOT USED

OUTPUTS
0 TILT UP DESIRED
1 TILT DOWN DESIRED
2 COBUD HAS DISCHARGED
3 HERE COMES A LOAD
4 PLUNGER RELEASE (PIVOT)
5 NOT USED
6 NOT USED
7 NOT USED

MICRO 6 SYSTEMS
SHUTTLE CONTROL BOARDS
PELLERIN MILNOR CORPORATION

B2TAG96020
2016083A

W6CD5STG1
MICRO 6 SYSTEMS
COBUD
CONTROL BOX LAYOUTS
PELLERIN MILNOR CORPORATION

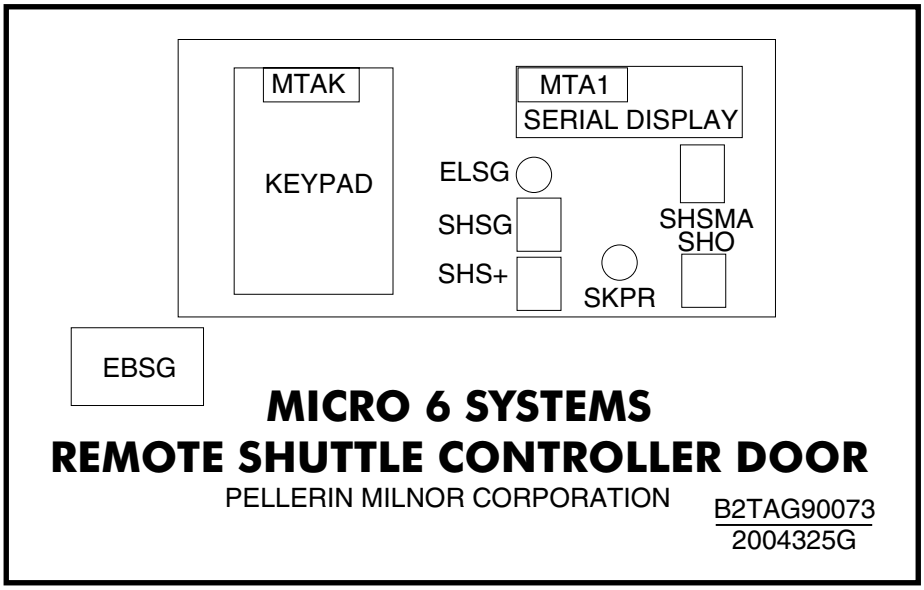


MICRO 6 SYSTEMS
186 PROCESSOR CONTROL BOX

COSHA CONTROLLER
PELLERIN MILNOR CORPORATION

B2T2001058
2002093G

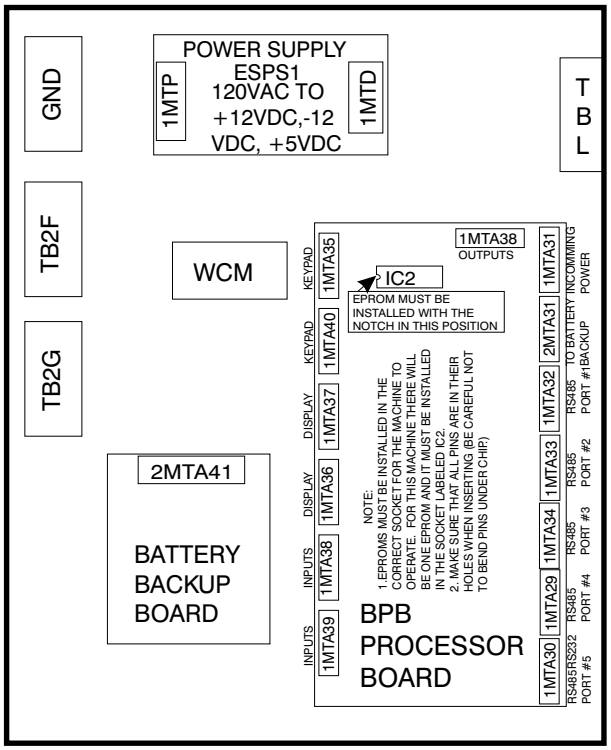
W6CD5STG2
2005176B



MICRO 6 SYSTEMS
REMOTE SHUTTLE CONTROLLER DOOR
PELLERIN MILNOR CORPORATION

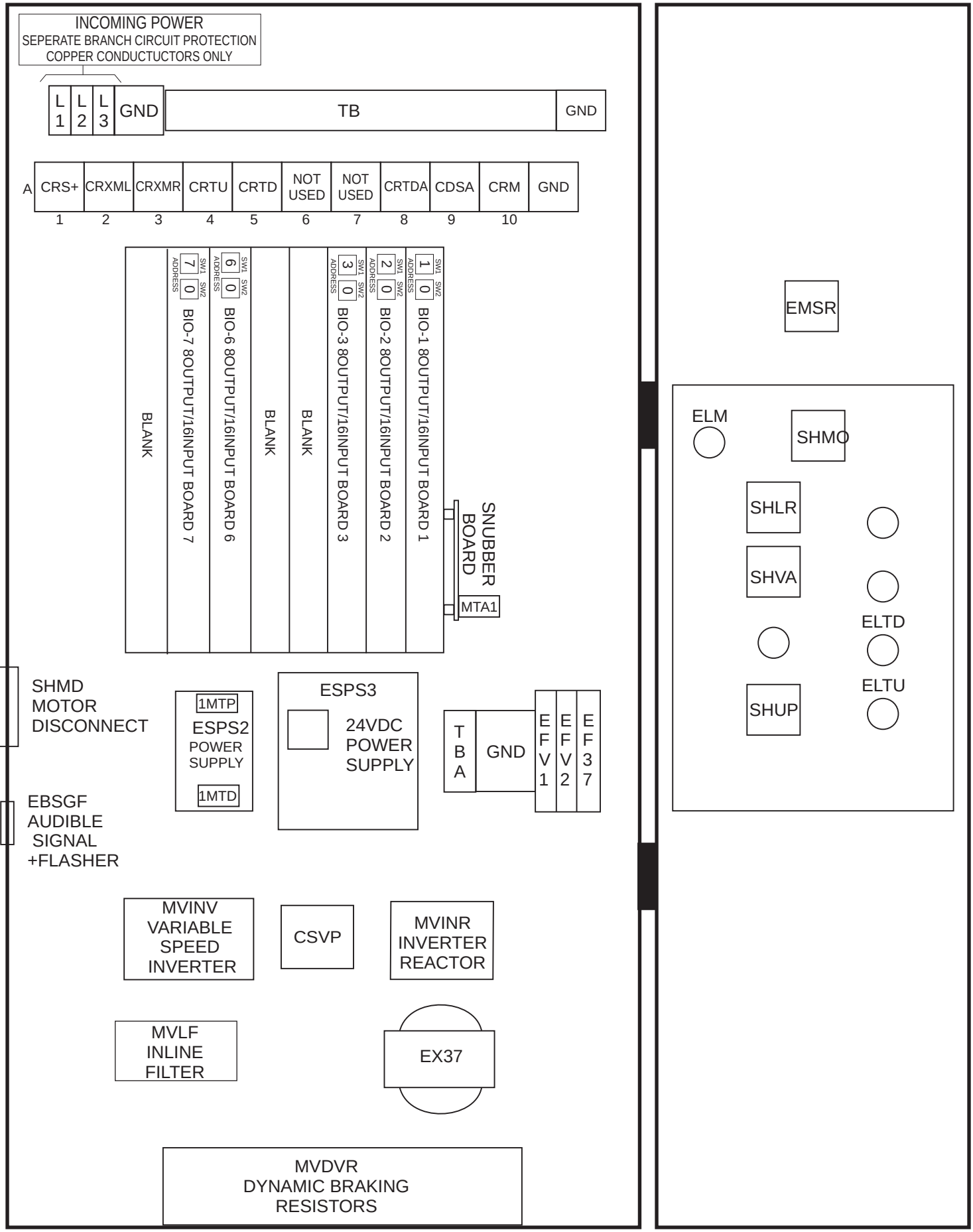
B2TAG90073
2004325G

W6CD5STG2
MICRO 6 SYSTEMS
COBUD
CONTROL BOX LAYOUTS
PELLERIN MILNOR CORPORATION



MICRO 6 SYSTEMS
REMOTE SHUTTLE CONTROLLER
PELLERIN MILNOR CORPORATION

B2TAG091095
2000302G



W6CD5STG3
2016083B

MICRO 6 SYSTEMS
PIVOTING COBUD CONTROL BOX

PELLERIN MILNC RPORATION

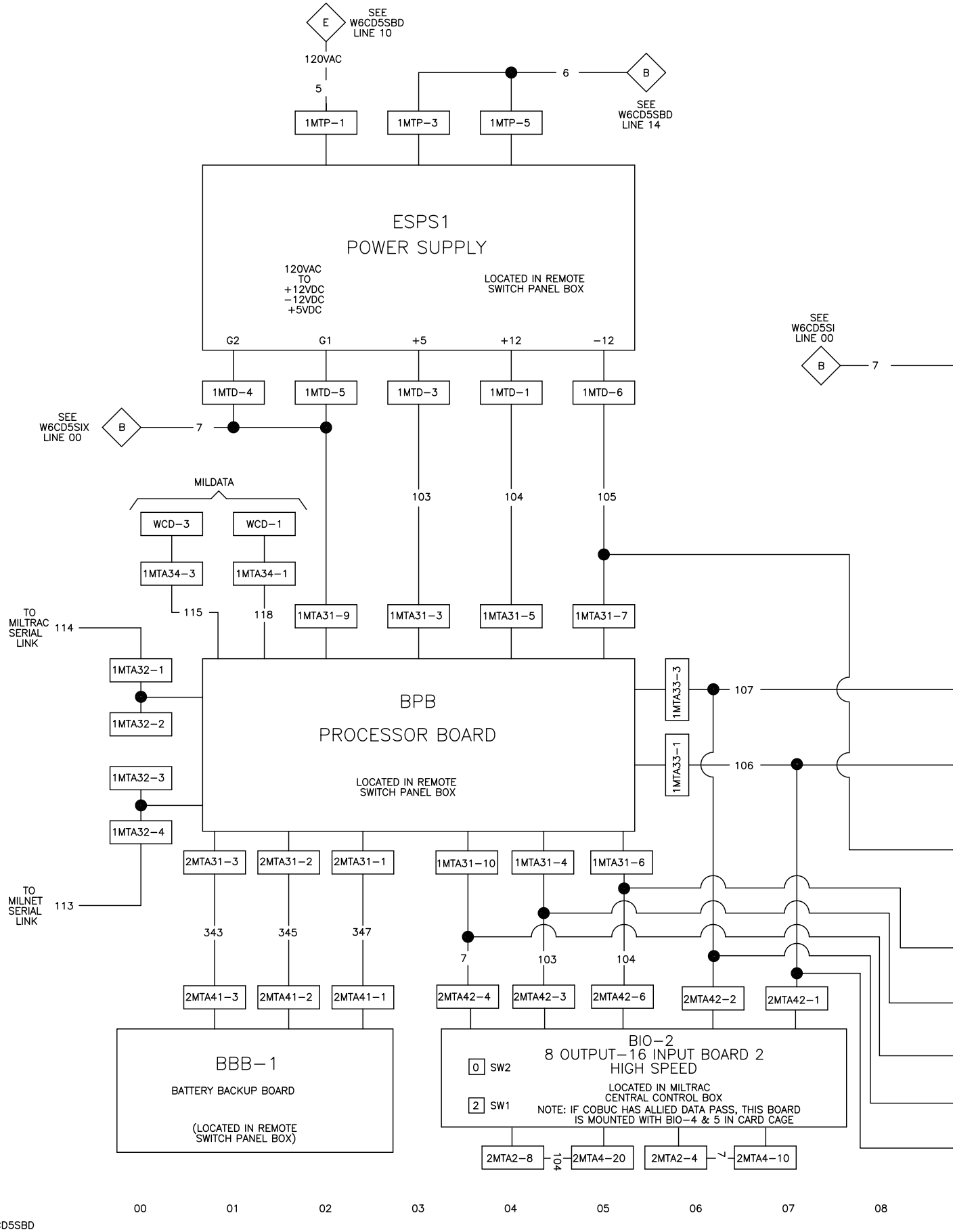
B2T2016003
2016083A

W6CD5STG3

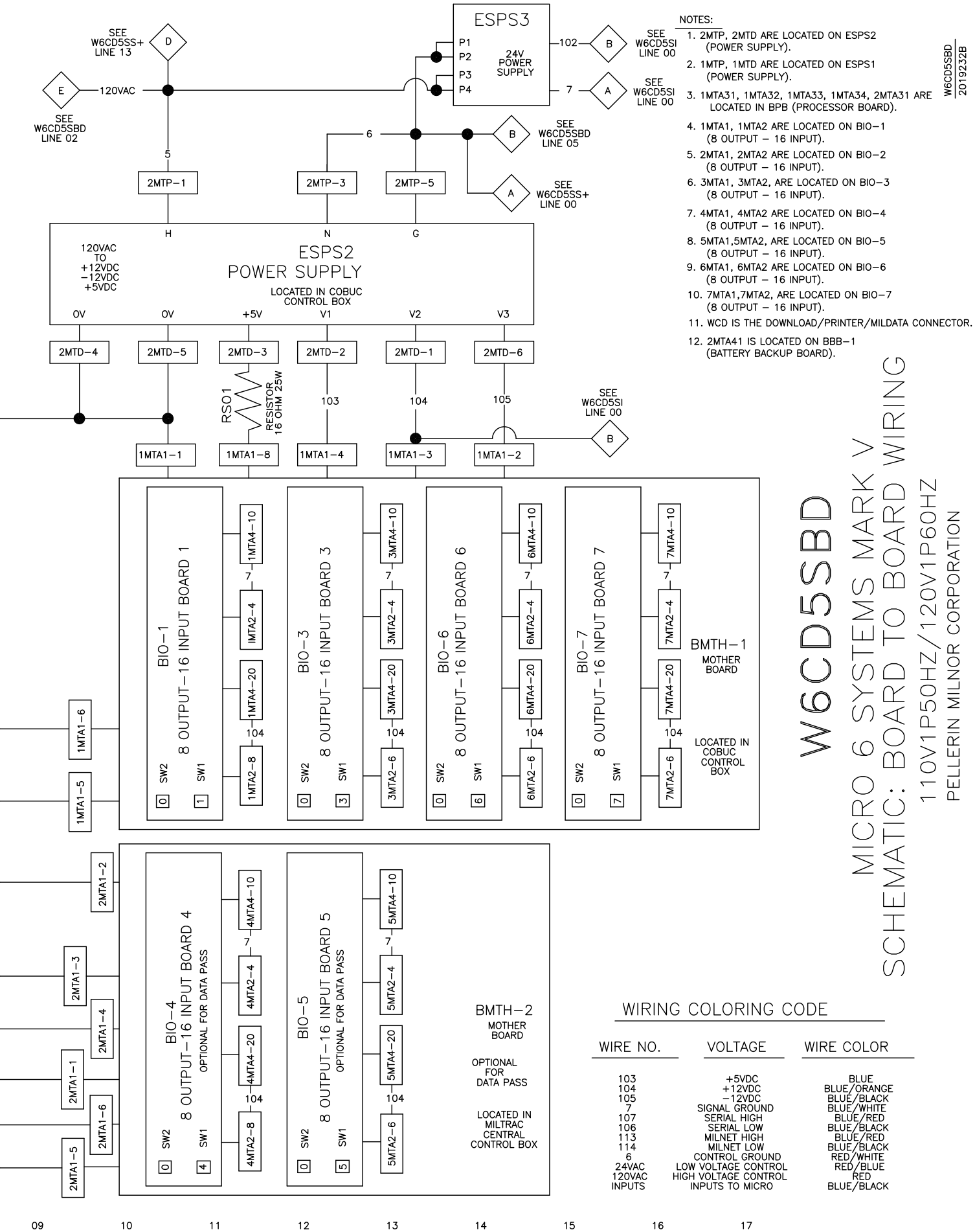
MICRO 6 SYSTEMS
PIVOTING COBUD
CONTROL BOX LAYOUTS
PELLERIN MILNOR CORPORATION

W6CD5STG3
2016083B

W6CD5STG3
2016083B



W6CD5SBD
2019232B



NOTES:

1. 2MTP, 2MTD ARE LOCATED ON ESPS2 (POWER SUPPLY).
2. 1MTP, 1MTD ARE LOCATED ON ESPS1 (POWER SUPPLY).
3. 1MTA31, 1MTA32, 1MTA33, 1MTA34, 2MTA31 ARE LOCATED IN BPB (PROCESSOR BOARD).
4. 1MTA1, 1MTA2 ARE LOCATED ON BIO−1 (8 OUTPUT − 16 INPUT).
5. 2MTA1, 2MTA2 ARE LOCATED ON BIO−2 (8 OUTPUT − 16 INPUT).
6. 3MTA1, 3MTA2, ARE LOCATED ON BIO−3 (8 OUTPUT − 16 INPUT).
7. 4MTA1, 4MTA2 ARE LOCATED ON BIO−4 (8 OUTPUT − 16 INPUT).
8. 5MTA1,5MTA2, ARE LOCATED ON BIO−5 (8 OUTPUT − 16 INPUT).
9. 6MTA1, 6MTA2 ARE LOCATED ON BIO−6 (8 OUTPUT − 16 INPUT).
10. 7MTA1,7MTA2, ARE LOCATED ON BIO−7 (8 OUTPUT − 16 INPUT).
11. WCD IS THE DOWNLOAD/PRINTER/MILDATA CONNECTOR.
12. 2MTA41 IS LOCATED ON BBB−1 (BATTERY BACKUP BOARD).

W6CD5SBD
2019232B

W6CD5SBD

MICRO 6 SYSTEMS MARK V

SCHEMATIC: BOARD TO BOARD WIRING

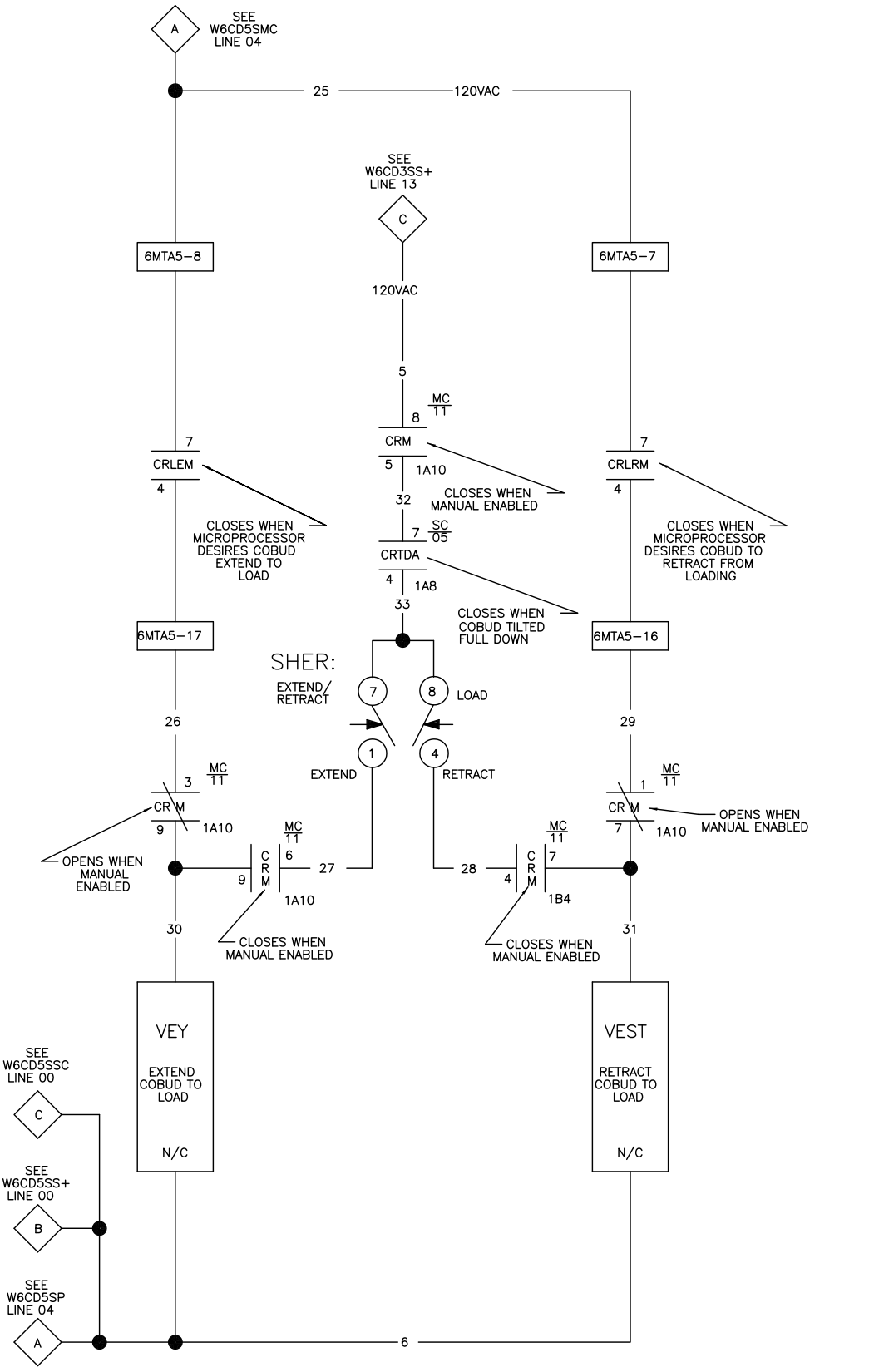
110V1P50HZ/120V1P60HZ

PELLERIN MILNOR CORPORATION

WIRING 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
113	MILNET HIGH	BLUE/RED
114	MILNET 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

W6CD5SBD
2019232B


A
SEE W6CD5SMC LINE 04
25
120VAC
SEE W6CD3SS+ LINE 13
C
6MTA5–8
6MTA5–7
120VAC
5
8
MC 11
CRM
5
1A10
7
CRLEM
4
7
CRLRM
4
32
CLOSES WHEN MANUAL ENABLED
CLOSES WHEN MICROPROCESSOR DESIRES COBUD EXTEND TO LOAD
CLOSES WHEN MICROPROCESSOR DESIRES COBUD TO RETRACT FROM LOADING
7
SC 05
CRTDA
4
1A8
33
CLOSES WHEN COBUD TILTED FULL DOWN
6MTA5–17
6MTA5–16
SHER:
EXTEND/ RETRACT
7
8
LOAD
1
4
EXTEND
RETRACT
26
29
3
1
MC 11
CR M
9
1A10
7
OPENS WHEN MANUAL ENABLED
OPENS WHEN MANUAL ENABLED
C R M
6
9
27
28
4
7
1B4
1A10
30
31
CLOSES WHEN MANUAL ENABLED
CLOSES WHEN MANUAL ENABLED
VEY
EXTEND COBUD TO LOAD
N/C
VEST
RETRACT COBUD TO LOAD
N/C
SEE W6CD5SSC LINE 00
C
SEE W6CD5SS+ LINE 00
B
SEE W6CD5SP LINE 04
A
6
00
01
02
03
04
05
06
07
08
W6CD5SCL
2017063B

W6CD5SCL

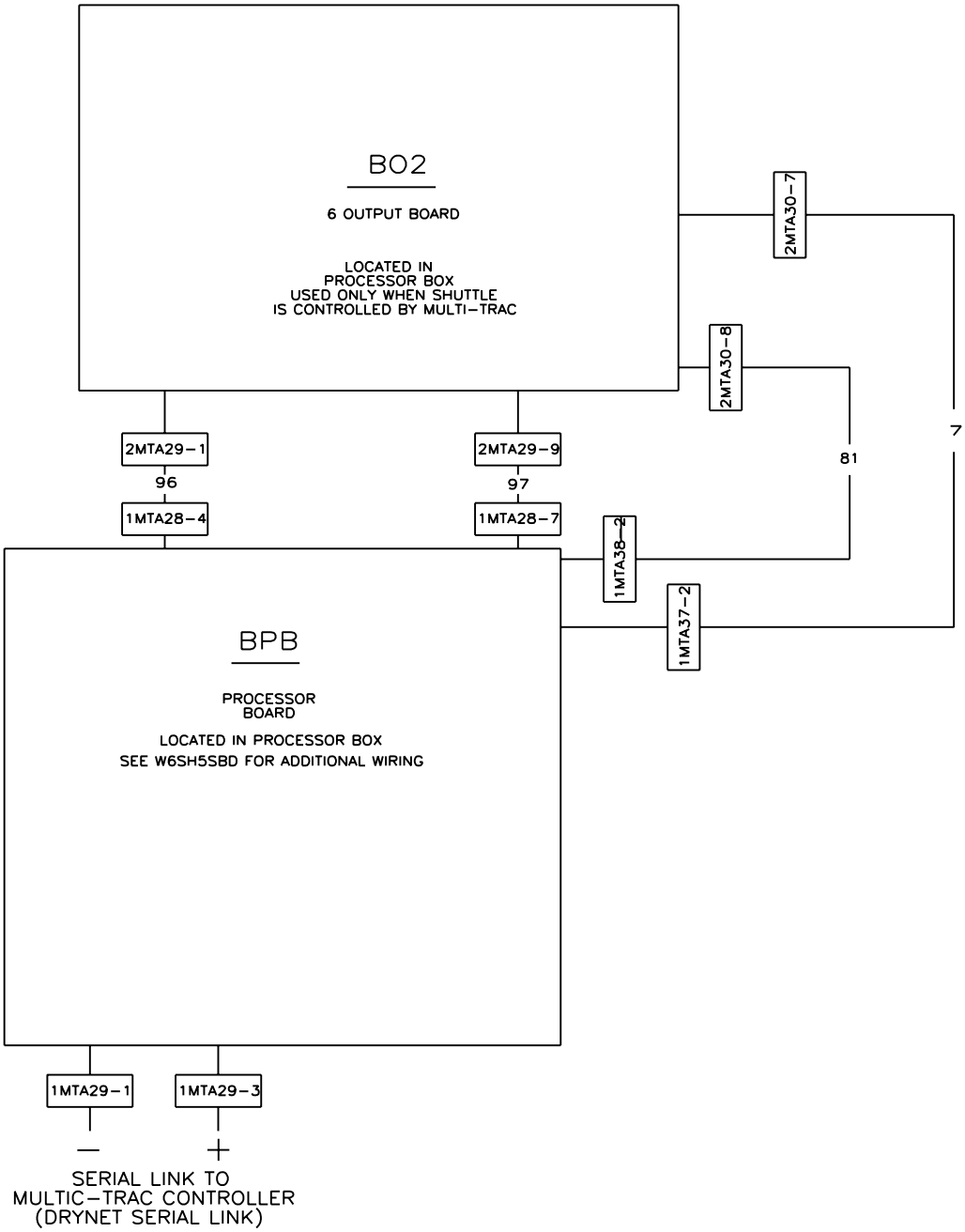
MICRO 6 SYSTEMS
SCHEMATIC: EXTEND/RETRACT

110V1P50HZ/120V1P60HZ

PELLERIN MILNOR CORPORATION

W6CD5SCL
2017063B

W6CD5SCL
2017063B



00 01 02 03 04 05 06 07 08 09 10

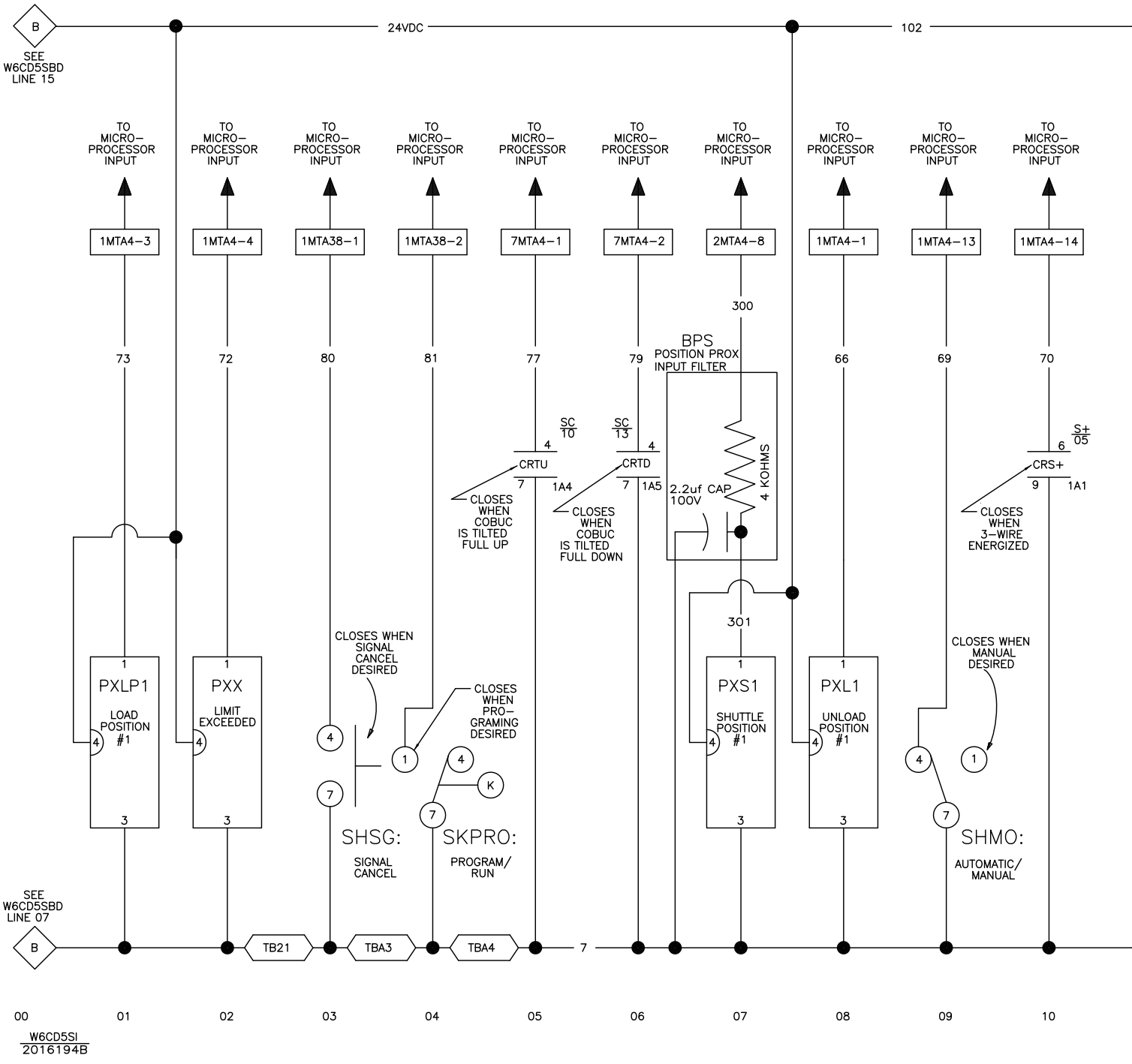
W6CD5SDC

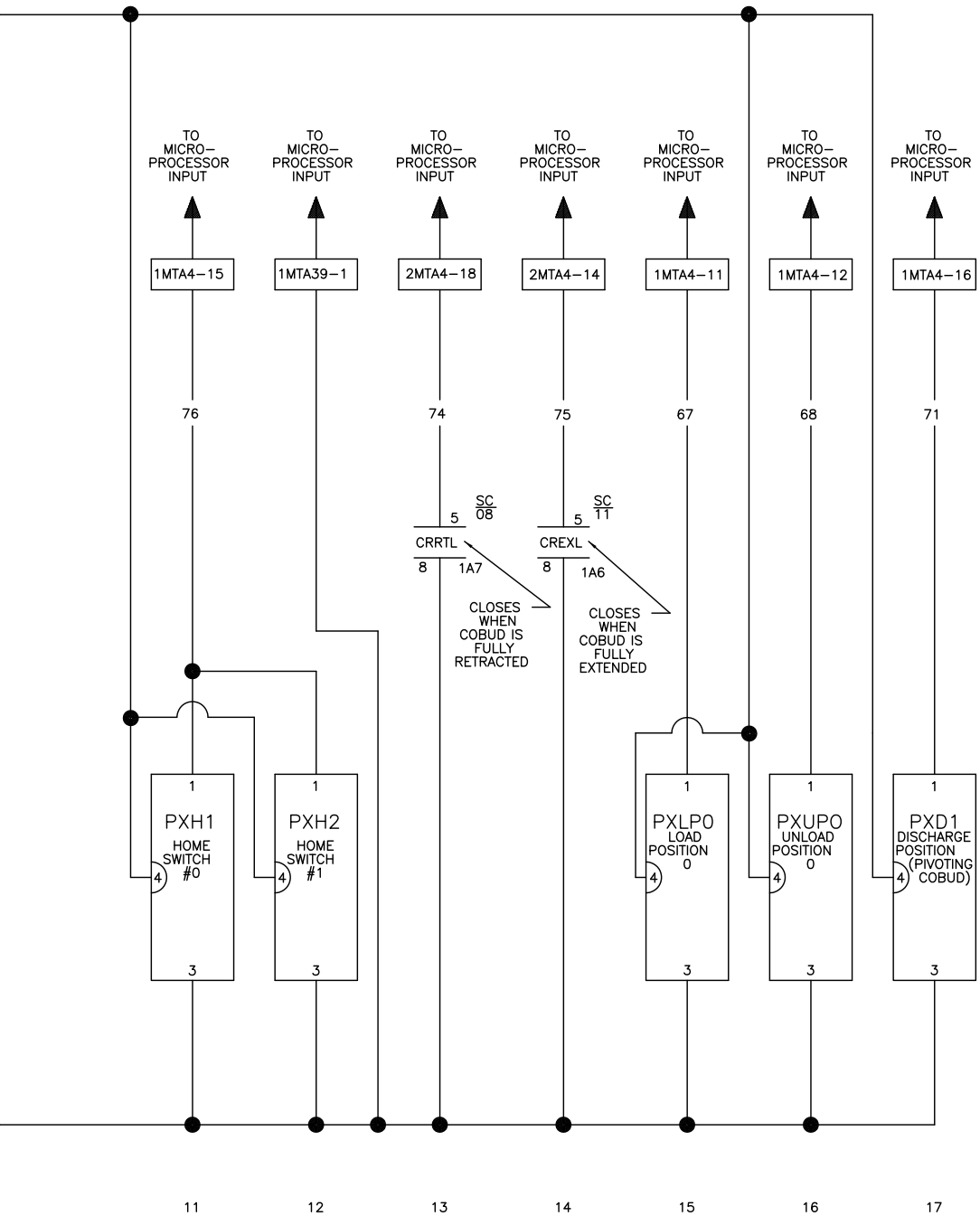
MICRO 6 SYSTEMS MARK V CONTROLS
SCHEMATIC; ADDITIONAL BOARD
WIRING FOR INTERFACE WITH
MULTI—TRAC CONTROLLER

PELLERIN MILNOR CORPORATION

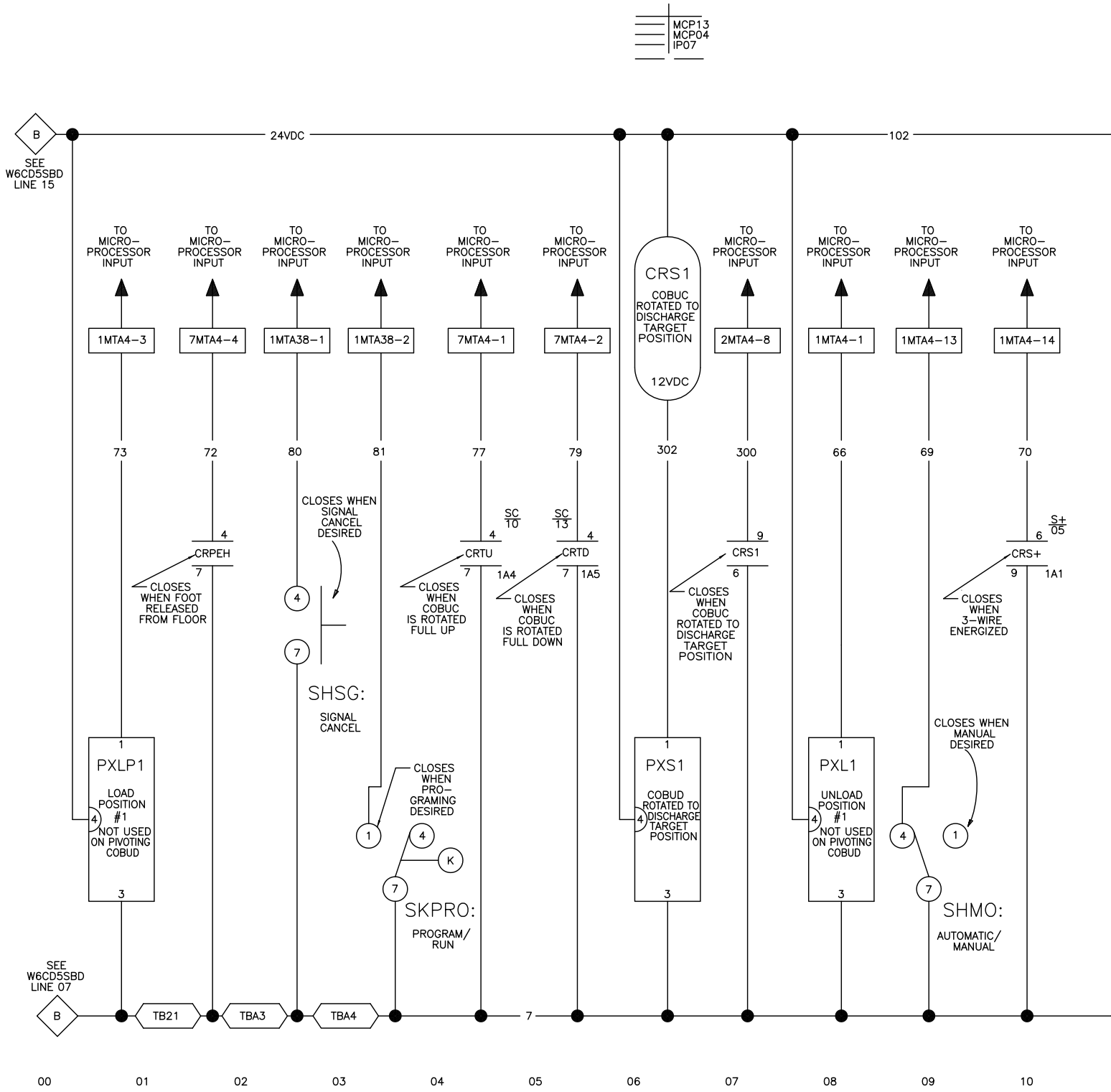
NOTE:
THIS SCHEMATIC IS USED ONLY WHEN THE COBUC IS CONTROLLED BY A DRYER/ SHUTTLE CONTROLLER RATHER THAN AN INDIVIDUAL COBUC CONTROLLER, THIS SCHEMATIC REPLACES W6CD5SKPD AND THE DIRECT INPUT FOR THE PROGRAM KEY AS SHOWN ON W6CDSI LINE 04.

11 12 13 14 15 16 17 18 19

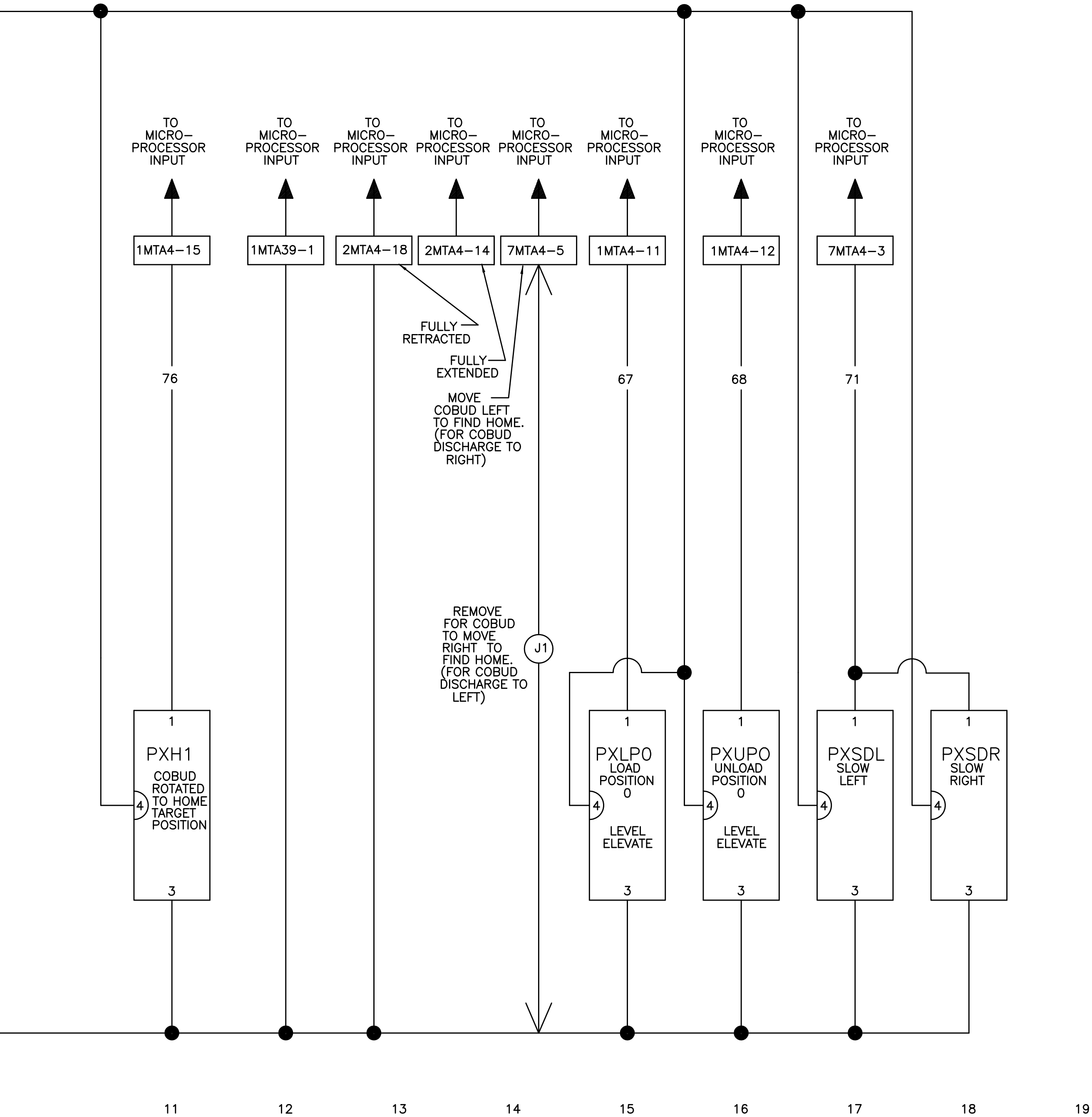

B
SEE W6CD5SBD LINE 15
24VDC
102
TO MICRO–PROCESSOR INPUT
1MTA4–3
1MTA4–4
1MTA38–1
1MTA38–2
7MTA4–1
7MTA4–2
2MTA4–8
1MTA4–1
1MTA4–13
1MTA4–14
73
72
80
81
77
79
300
66
69
70
BPS
POSITION PROX
INPUT FILTER
SC 10
SC 13
S+ 05
CRTU
CRTD
CRS+
1A4
1A5
1A1
CLOSES WHEN COBUC IS TILTED FULL UP
CLOSES WHEN COBUC IS TILTED FULL DOWN
2.2uf CAP 100V
4 KOHMS
CLOSES WHEN 3–WIRE ENERGIZED
301
CLOSES WHEN SIGNAL CANCEL DESIRED
CLOSES WHEN PRO–GRAMING DESIRED
CLOSES WHEN MANUAL DESIRED
PXLP1
LOAD POSITION #1
PXX
LIMIT EXCEEDED
PXS1
SHUTTLE POSITION #1
PXL1
UNLOAD POSITION #1
SHSG:
SIGNAL CANCEL
SKPRO:
PROGRAM/ RUN
SHMO:
AUTOMATIC/ MANUAL
SEE W6CD5SBD LINE 07
B
TB21
TBA3
TBA4
7
00
01
02
03
04
05
06
07
08
09
10
W6CD5SI
2016194B



W6CD5SI
MICRO 6 SYSTEMS
SCHEMATIC: INPUTS



W6CD5SIP
2016194B



W6CD5SIP
2016194B

W6CD5SIP

MICRO 6 SYSTEMS

SCHEMATIC: INPUTS—REPLACES W6CD5SI FOR PIVOTING COBUD

PELLERIN MILNOR CORPORATION

W6CD5SIP
2016194B

4 CONDUCTOR FESTOON
FOR
3 PHASE POWER

WIRE #	TERMINAL	WIRE # COLOR
L1	TBP1	BLACK
L2	TBP2	BLUE
L3	TBP3	RED
GND	TBP4	ORANGE

4 CONDUCTOR FESTOON
FOR
SERIAL LINK

WIRE #	TERMINAL	WIRE COLOR
106	TBS1	BLACK
107	TBS2	RED
GND	TBS3	ORANGE/ BLUE

00 01 02 03 04 05 06 07 08 09

W6CD5SINT
2005176B

W6CD5SINT
2005176B

8 CONDUCTOR FESTOON
FOR
ELECTRICAL INTERLOCK

WIRE #	TERMINAL	WIRE COLOR	WCM CONNECTION BOX IN CONTROLLER
19	TBW1	BLACK	WCM01
15	TBW2	BLUE	WCM02
	TBW3	BROWN	WCM03
23	TBW4	ORANGE	WCM04
16	TBW5	RED	WCM05
5	TBW6	YELLOW	WCM06
6	TBW7	BLUE/ BLACK	WCM07
4	TBW9	RED/ BLACK	WCM09

W6CD5SINT

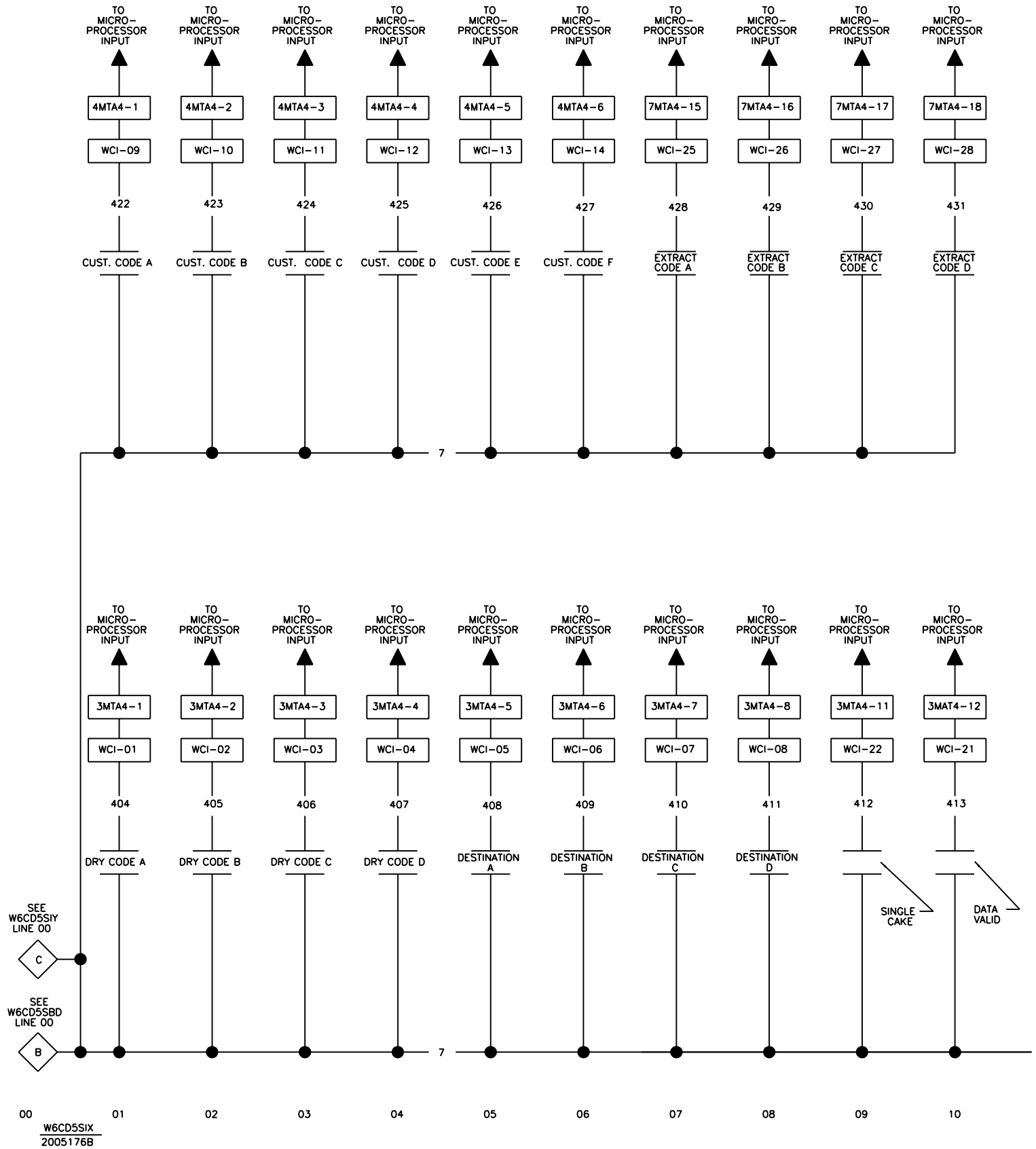
MICRO 6 SYSTEMS

SCHEMATIC: CONNECTION AT END OF RAIL

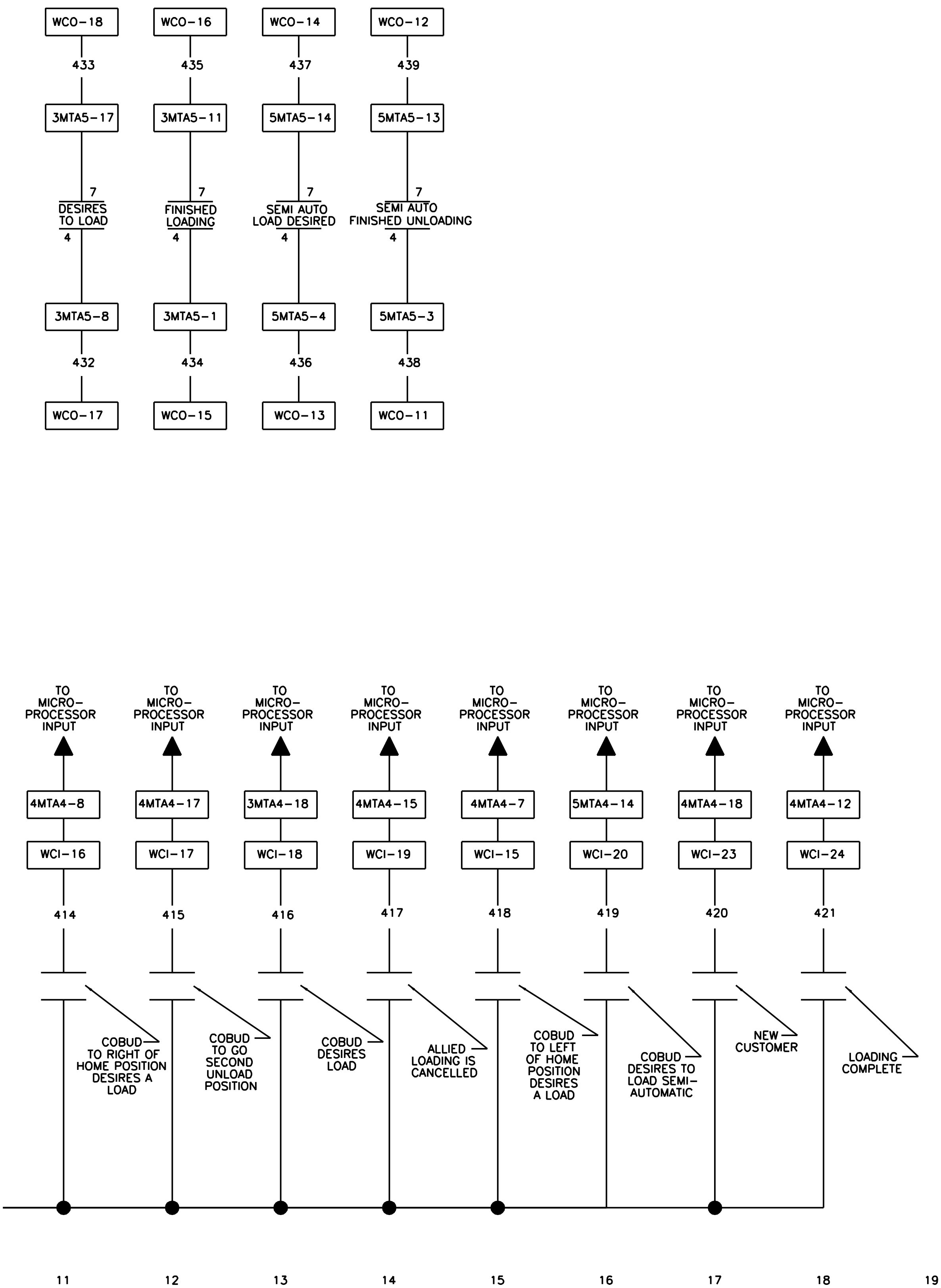
PELLERIN MILNOR CORPORATION

10 11 12 13 14 15 16 17 18 19

W6CD5SINT
2005176B


TO MICRO-PROCESSOR INPUT
4MTA4-1
4MTA4-2
4MTA4-3
4MTA4-4
4MTA4-5
4MTA4-6
7MTA4-15
7MTA4-16
7MTA4-17
7MTA4-18
WCI-09
WCI-10
WCI-11
WCI-12
WCI-13
WCI-14
WCI-25
WCI-26
WCI-27
WCI-28
422
423
424
425
426
427
428
429
430
431
CUST. CODE A
CUST. CODE B
CUST. CODE C
CUST. CODE D
CUST. CODE E
CUST. CODE F
EXTRACT CODE A
EXTRACT CODE B
EXTRACT CODE C
EXTRACT CODE D
7
3MTA4-1
3MTA4-2
3MTA4-3
3MTA4-4
3MTA4-5
3MTA4-6
3MTA4-7
3MTA4-8
3MTA4-11
3MAT4-12
WCI-01
WCI-02
WCI-03
WCI-04
WCI-05
WCI-06
WCI-07
WCI-08
WCI-22
WCI-21
404
405
406
407
408
409
410
411
412
413
DRY CODE A
DRY CODE B
DRY CODE C
DRY CODE D
DESTINATION A
DESTINATION B
DESTINATION C
DESTINATION D
SINGLE CAKE
DATA VALID
SEE W6CD5SIY LINE 00
C
SEE W6CD5SBD LINE 00
B
7
00
01
02
03
04
05
06
07
08
09
10
W6CD5SIX
2005176B

W6CD5SIX
2005176B



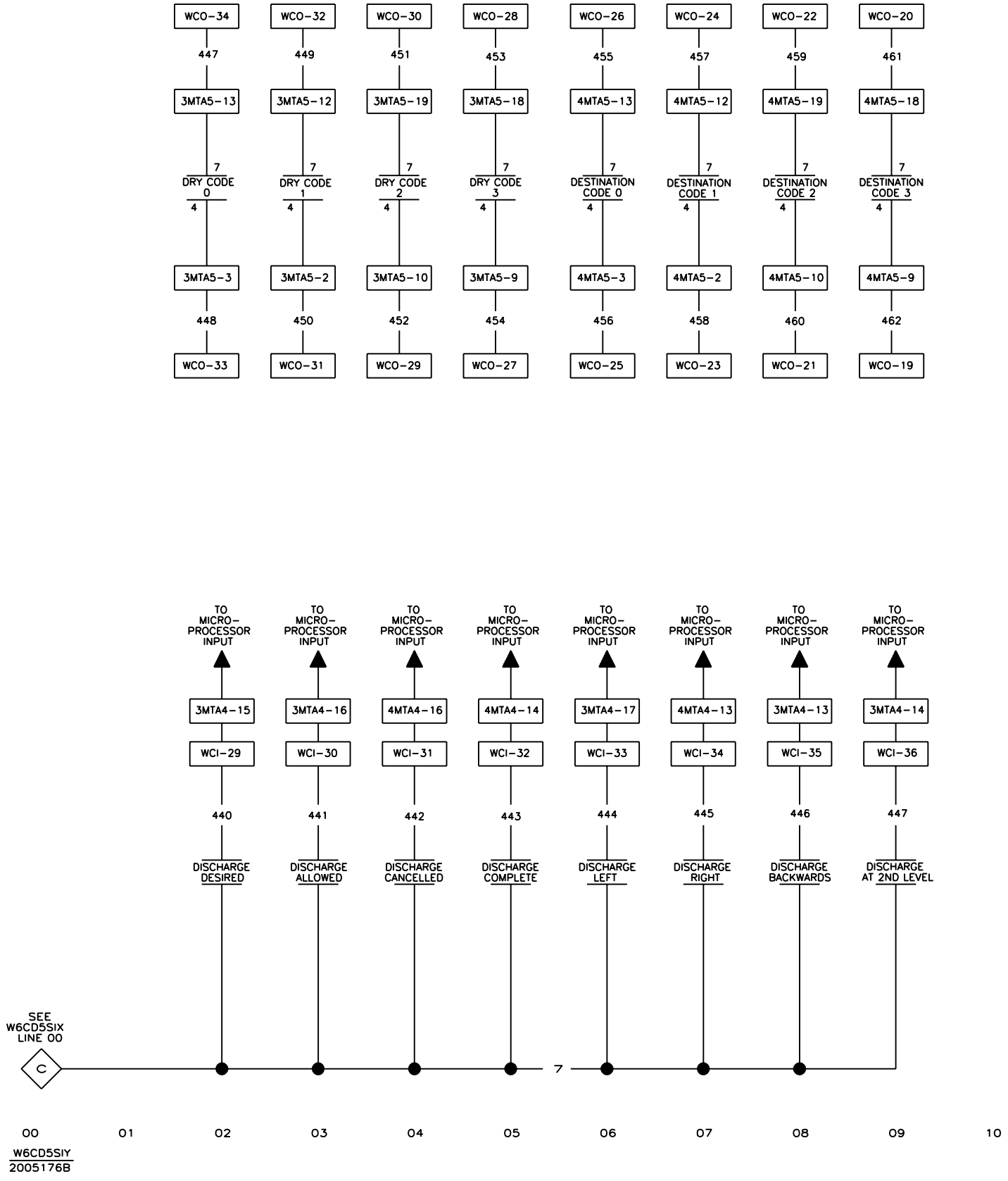
W6CD5SIX

MICRO 6 SYSTEMS MARK V

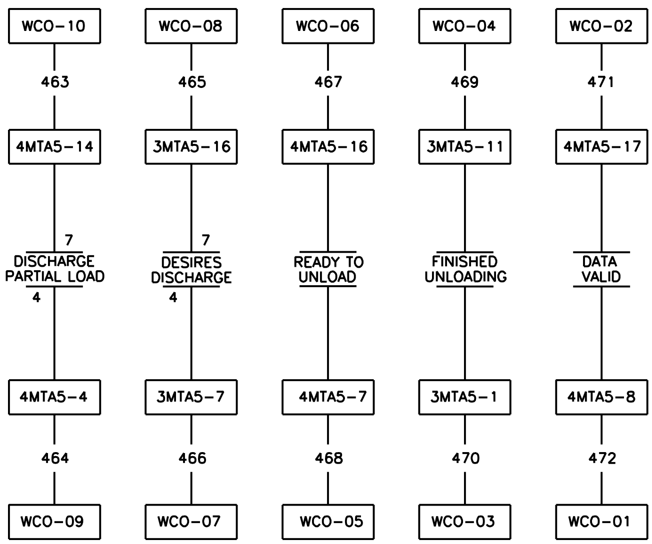
SCHEMATIC: ALLIED LOADING INPUTS + OUTPUTS

PELLERIN MILNOR CORPORATION

W6CD5SIX
2005176B


WCO-34
447
3MTA5-13
7
DRY CODE 0
4
3MTA5-3
448
WCO-33
WCO-32
449
3MTA5-12
7
DRY CODE 1
4
3MTA5-2
450
WCO-31
WCO-30
451
3MTA5-19
7
DRY CODE 2
4
3MTA5-10
452
WCO-29
WCO-28
453
3MTA5-18
7
DRY CODE 3
4
3MTA5-9
454
WCO-27
WCO-26
455
4MTA5-13
7
DESTINATION CODE 0
4
4MTA5-3
456
WCO-25
WCO-24
457
4MTA5-12
7
DESTINATION CODE 1
4
4MTA5-2
458
WCO-23
WCO-22
459
4MTA5-19
7
DESTINATION CODE 2
4
4MTA5-10
460
WCO-21
WCO-20
461
4MTA5-18
7
DESTINATION CODE 3
4
4MTA5-9
462
WCO-19
TO MICRO-PROCESSOR INPUT
3MTA4-15
WCI-29
440
DISCHARGE DESIRED
TO MICRO-PROCESSOR INPUT
3MTA4-16
WCI-30
441
DISCHARGE ALLOWED
TO MICRO-PROCESSOR INPUT
4MTA4-16
WCI-31
442
DISCHARGE CANCELLED
TO MICRO-PROCESSOR INPUT
4MTA4-14
WCI-32
443
DISCHARGE COMPLETE
TO MICRO-PROCESSOR INPUT
3MTA4-17
WCI-33
444
DISCHARGE LEFT
TO MICRO-PROCESSOR INPUT
4MTA4-13
WCI-34
445
DISCHARGE RIGHT
TO MICRO-PROCESSOR INPUT
3MTA4-13
WCI-35
446
DISCHARGE BACKWARDS
TO MICRO-PROCESSOR INPUT
3MTA4-14
WCI-36
447
DISCHARGE AT 2ND LEVEL
SEE W6CD5SIX LINE 00
C
7
00
01
02
03
04
05
06
07
08
09
10
W6CD5SIY
2005176B

W6CD5SIY
2005176B



W6CD5SIY

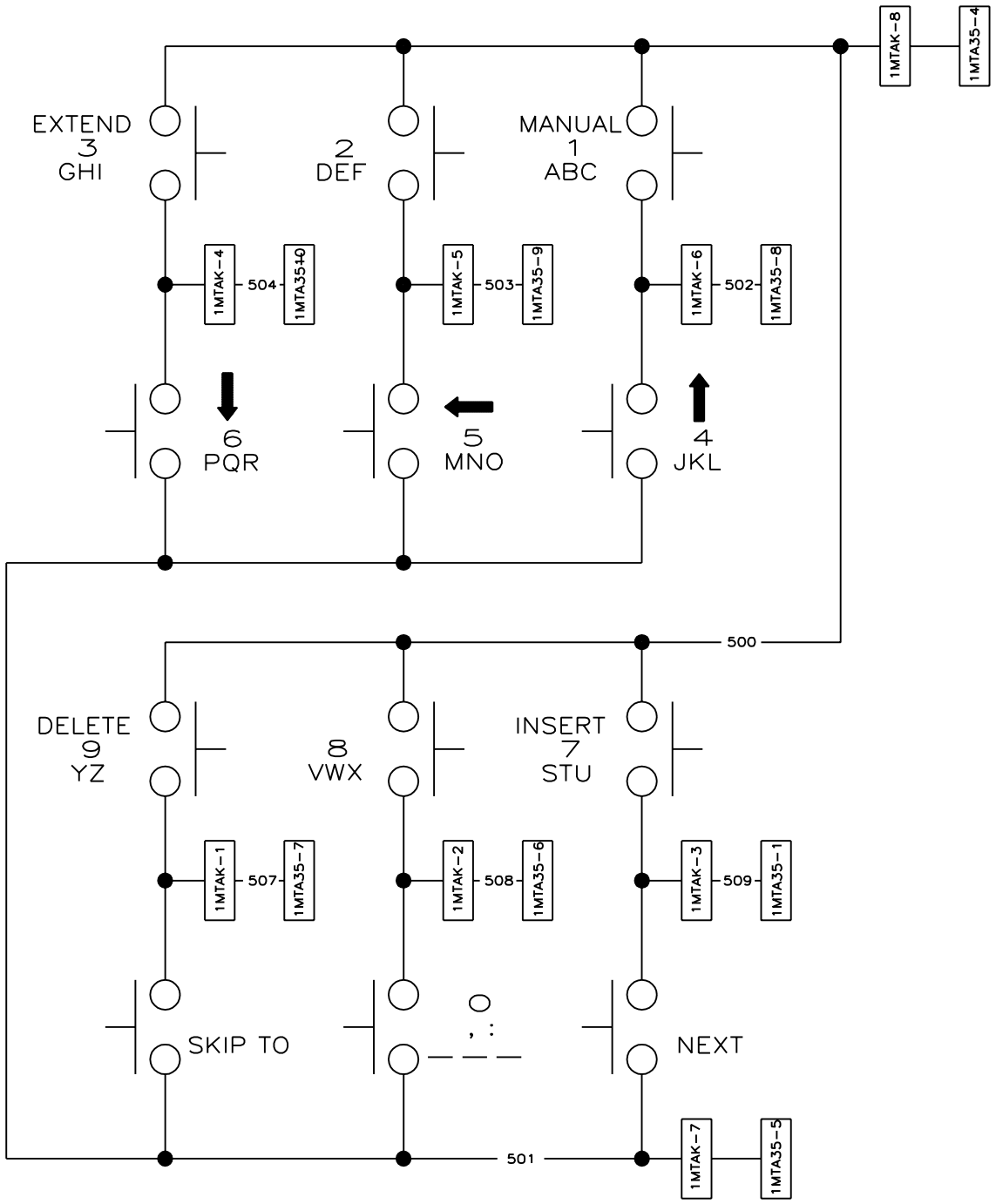
MICRO 6 SYSTEMS MARK V

SCHEMATIC: ALLIED DISCHARGE INPUTS + OUTPUTS

PELLERIN MILNOR CORPORATION

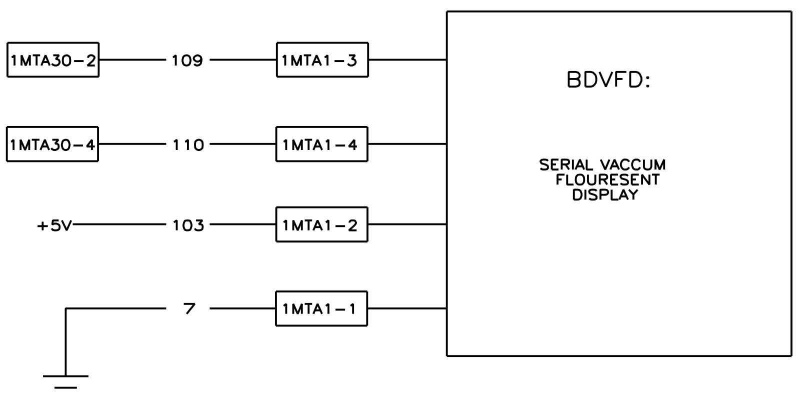
11 12 13 14 15 16 17 18 19

W6CD5SIY
2005176B



00 01 02 03 04 05 06 07 08 09

W6CD5SKPD
2005176B



W6CD5SKPD

MICRO 6 SYSTEMS

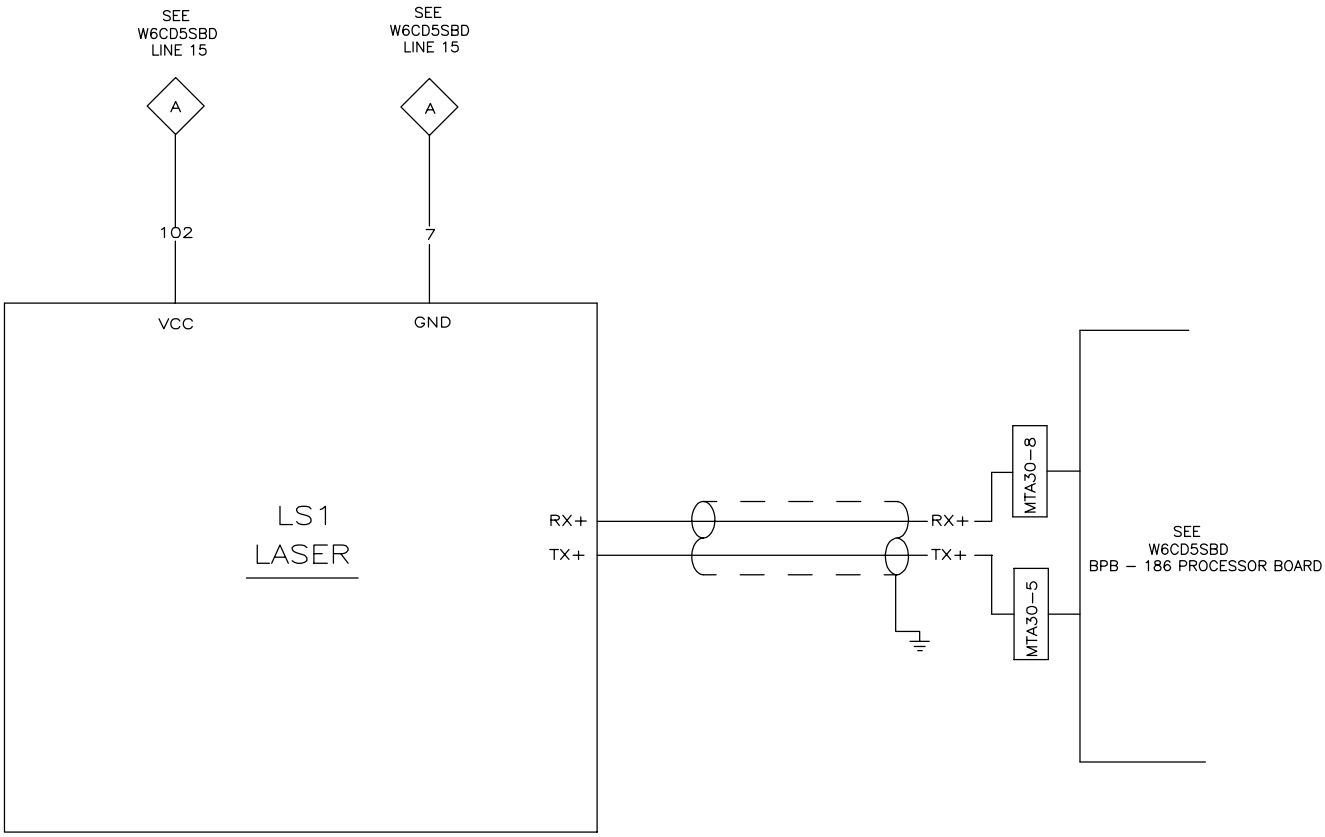
SCHEMATIC: KEYPAD DISPLAY

PELLERIN MILNOR CORPORATION

NOTES:

1. 1MTAK IS LOCATED ON KEYPAD.
2. 1MTA35 AND 1MTA30 ARE LOCATED ON BPB (PROCESSOR BOARD).

10 11 12 13 14 15 16 17 18 19



00 01 02 03 04 05 06 07 08 09 10

W6CD5SLR

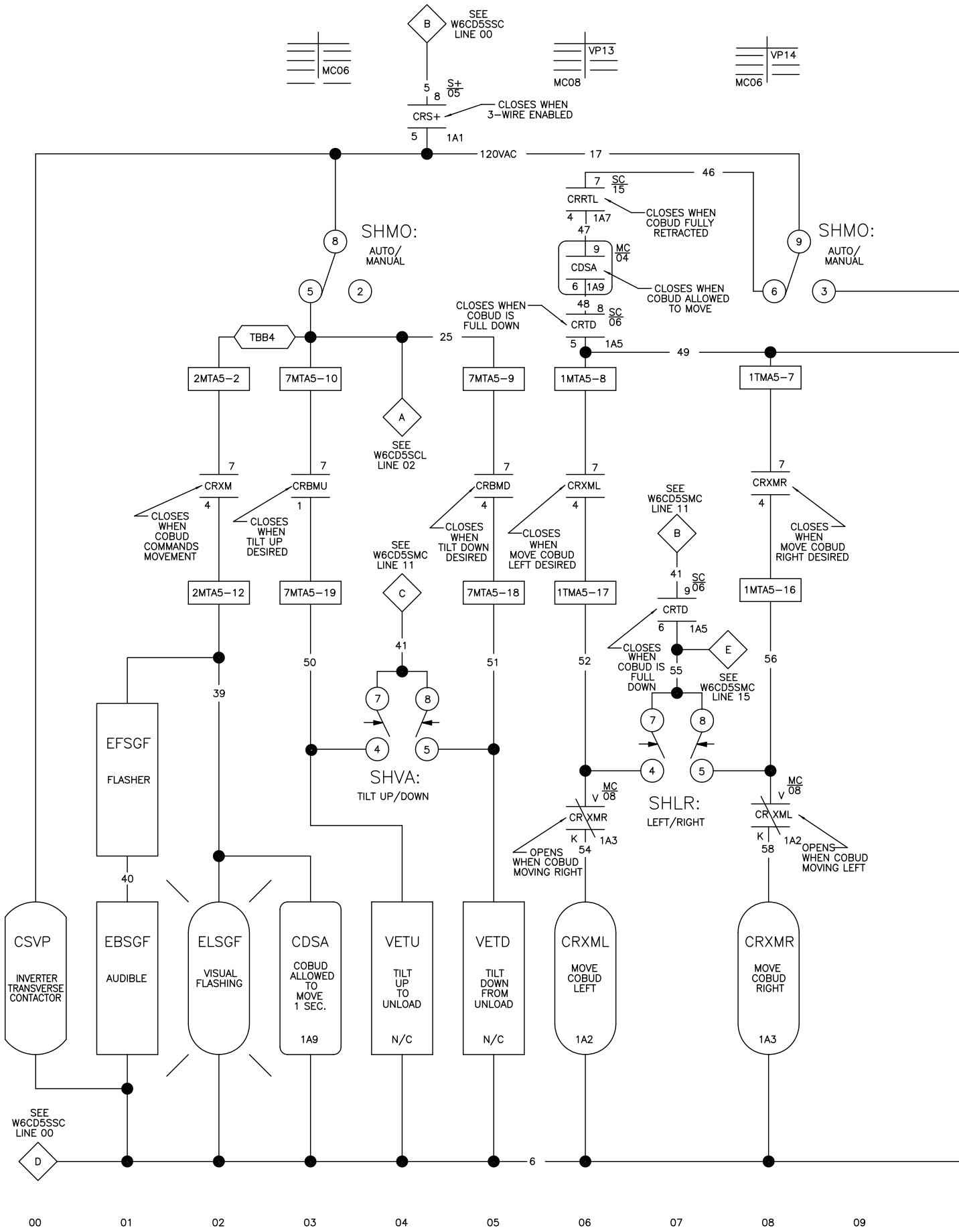
MICRO 6 SYSTEMS MARK V CONTROLS

SCHEMATIC; LASER WIRING

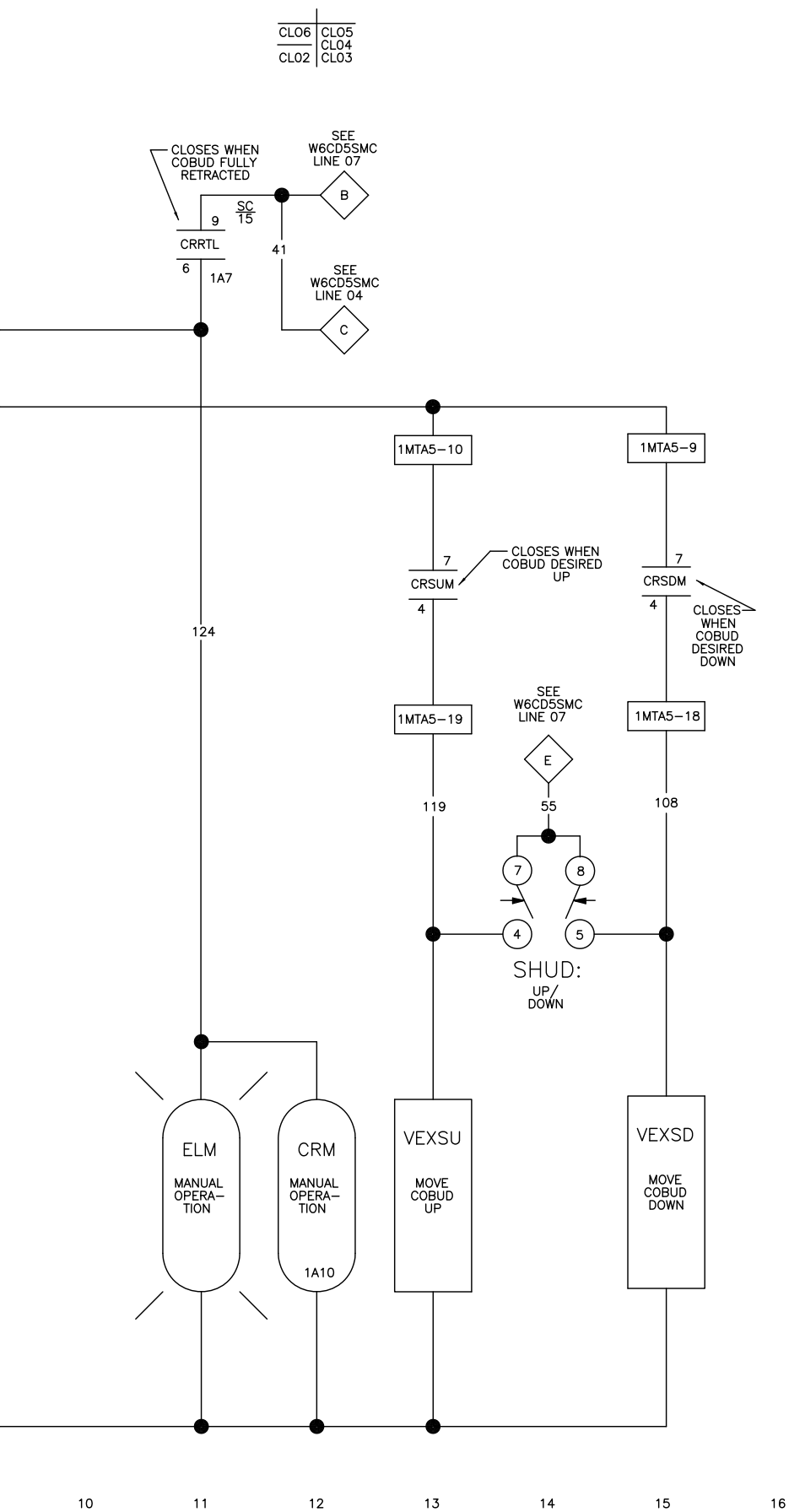
PELLERIN MILNOR CORPORATION

W6CD5SLR
2011404B

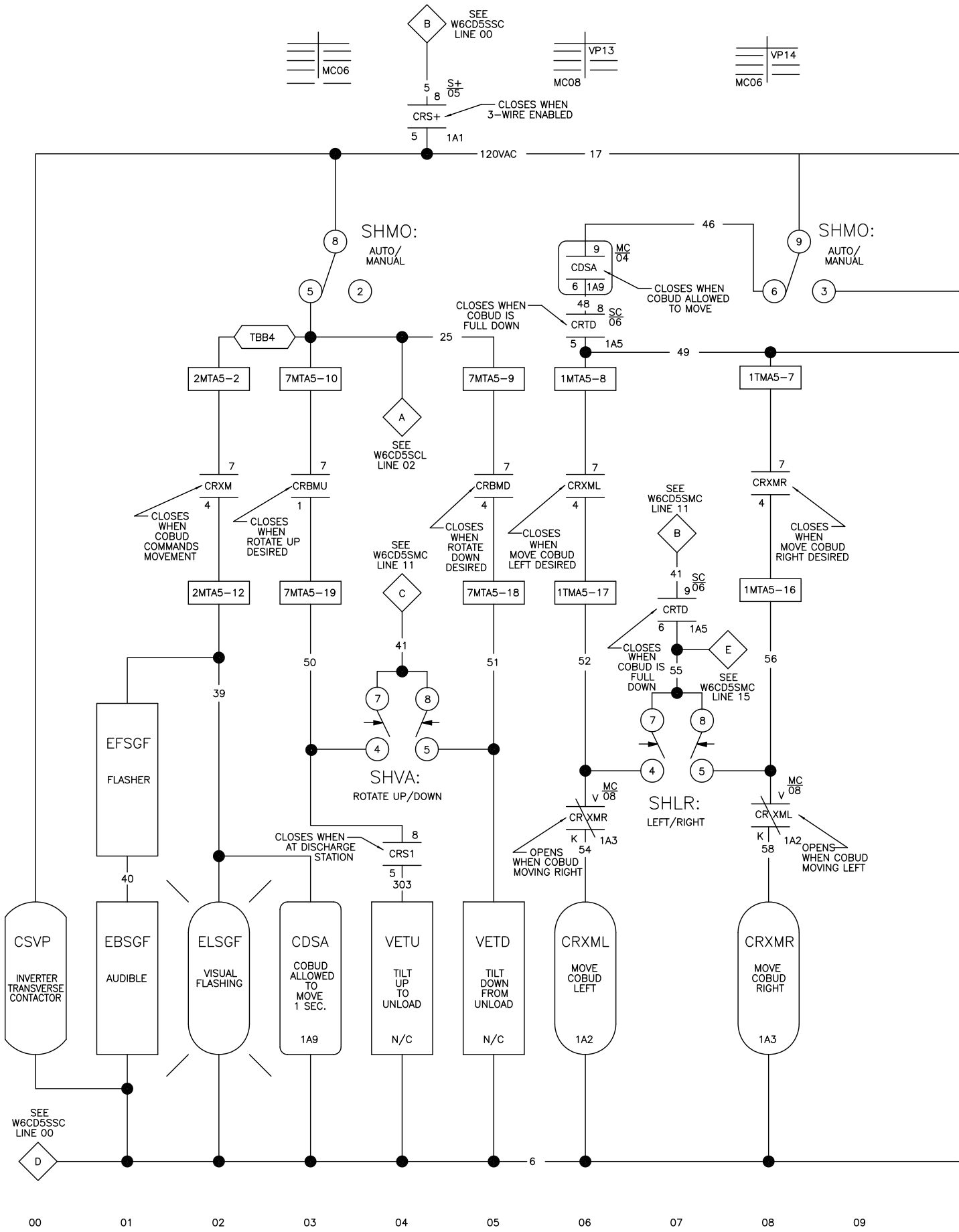
W6CD5SLR
2011404B



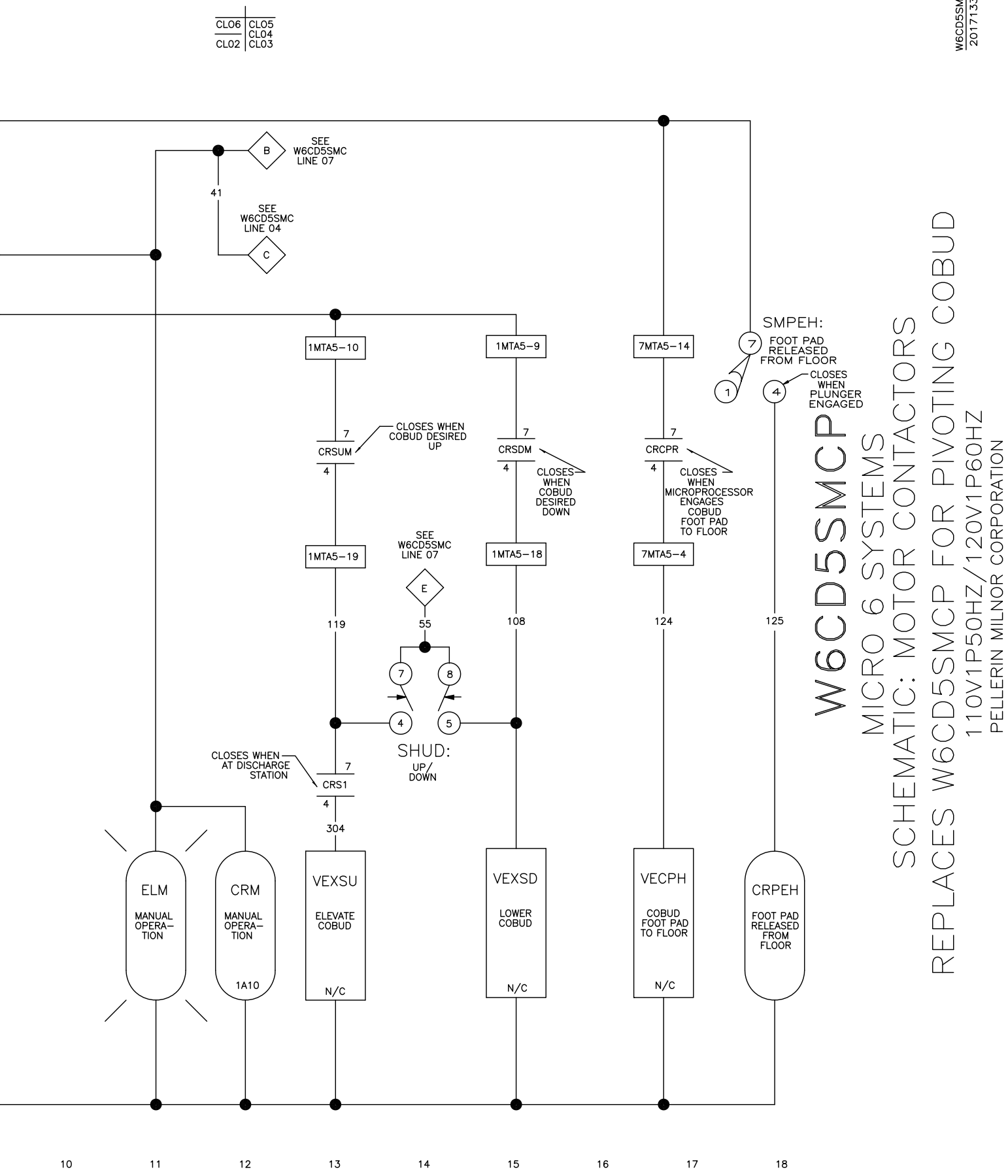
W6CD5SMC
2017133B



W6CD5SMC
MICRO 6 SYSTEMS
SCHEMATIC: MOTOR CONTACTORS
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION



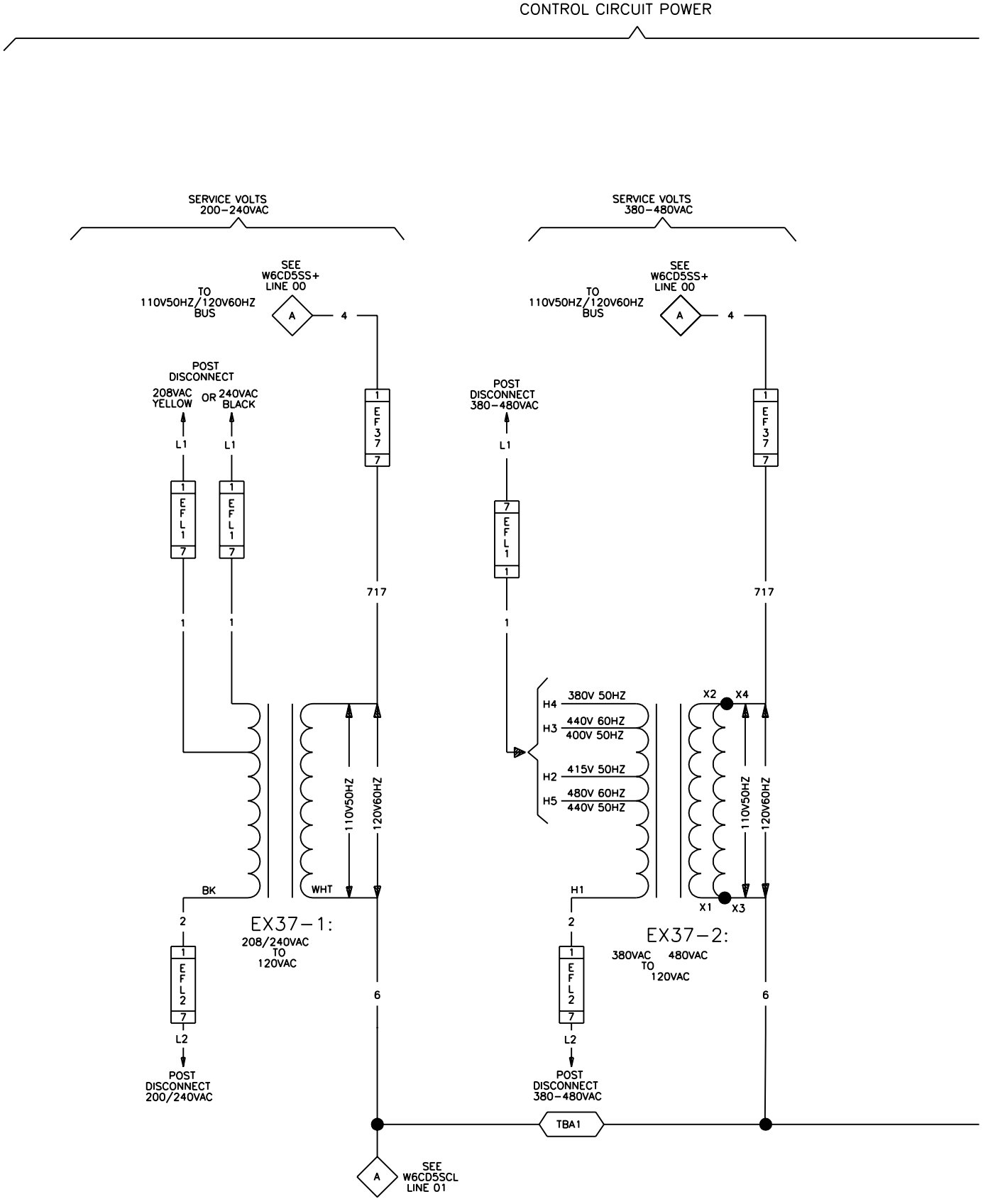
W6CD5SMCP
2017133B



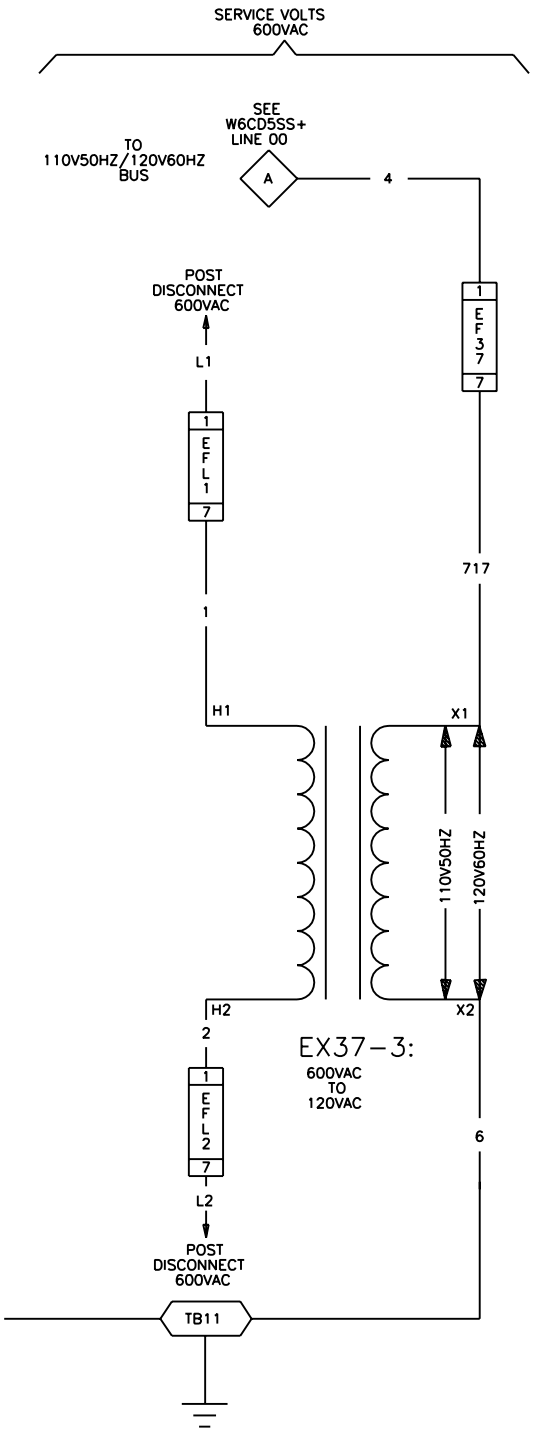
W6CD5SMCP

MICRO 6 SYSTEMS SCHEMATIC: MOTOR CONTACTORS

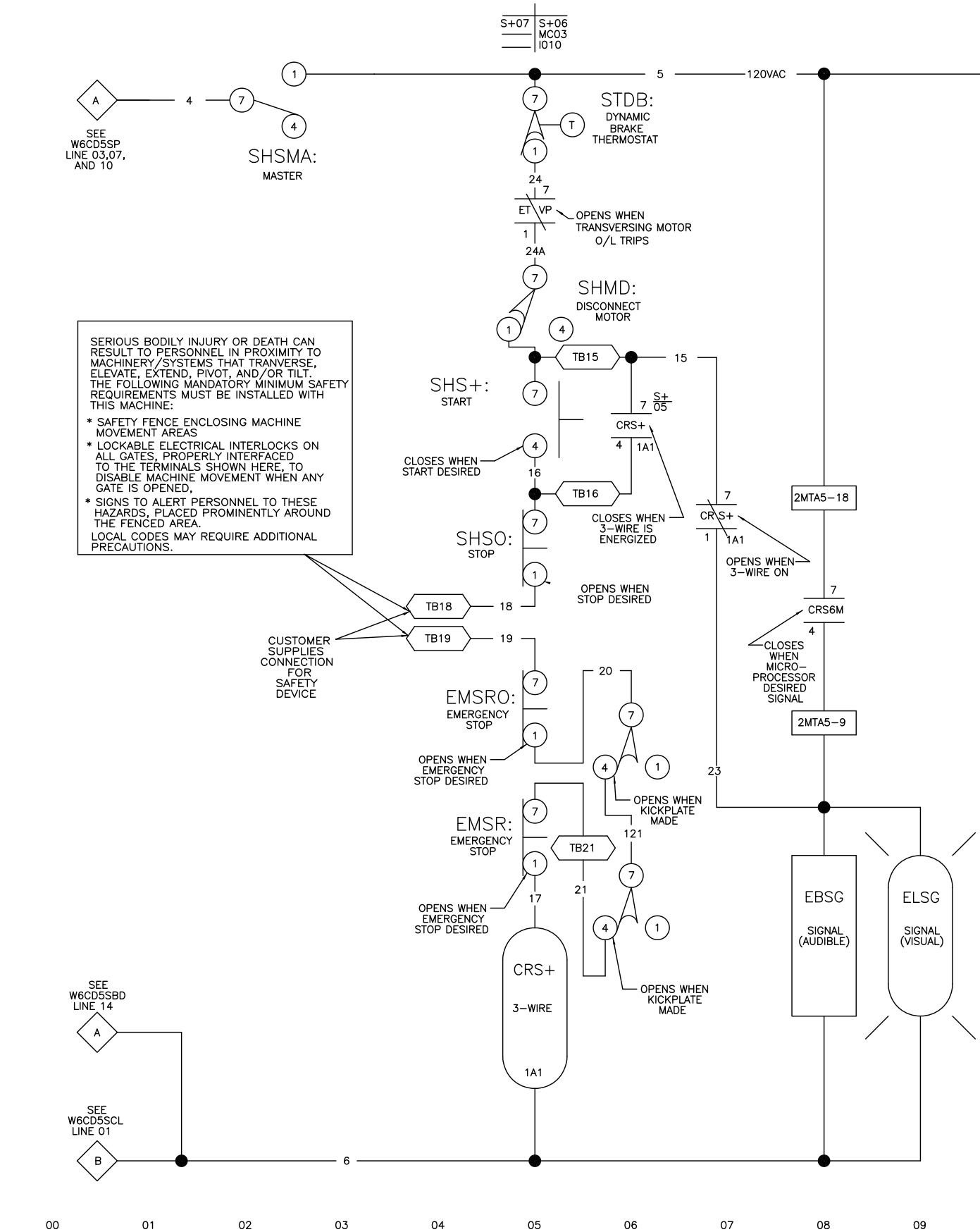
REPLACES W6CD5SMCP FOR PIVOTING COBUD
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION



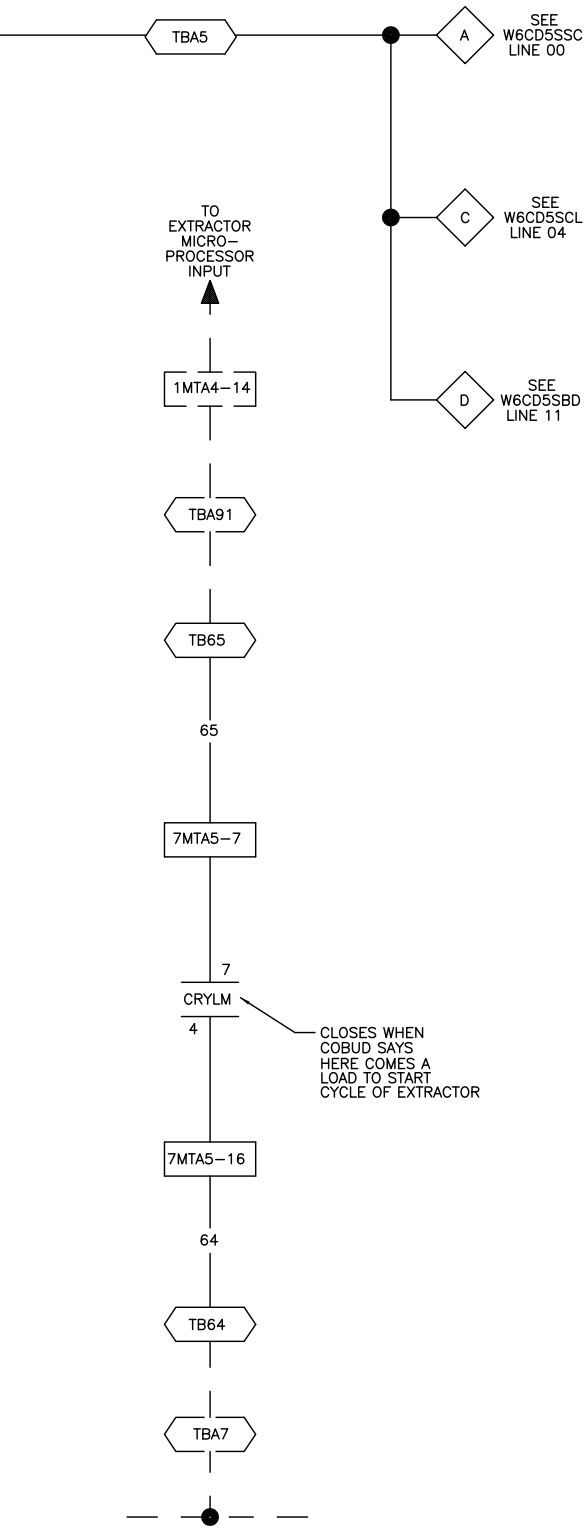
W6CD5SP
2005176B



W6CD5SP
MICRO 6 SYSTEMS
SCHEMATIC: CONTROL CIRCUIT
110V1P50HZ/120V1P60HZ
PELLERIN MILNOR CORPORATION



W6CD5SS+
2022463B

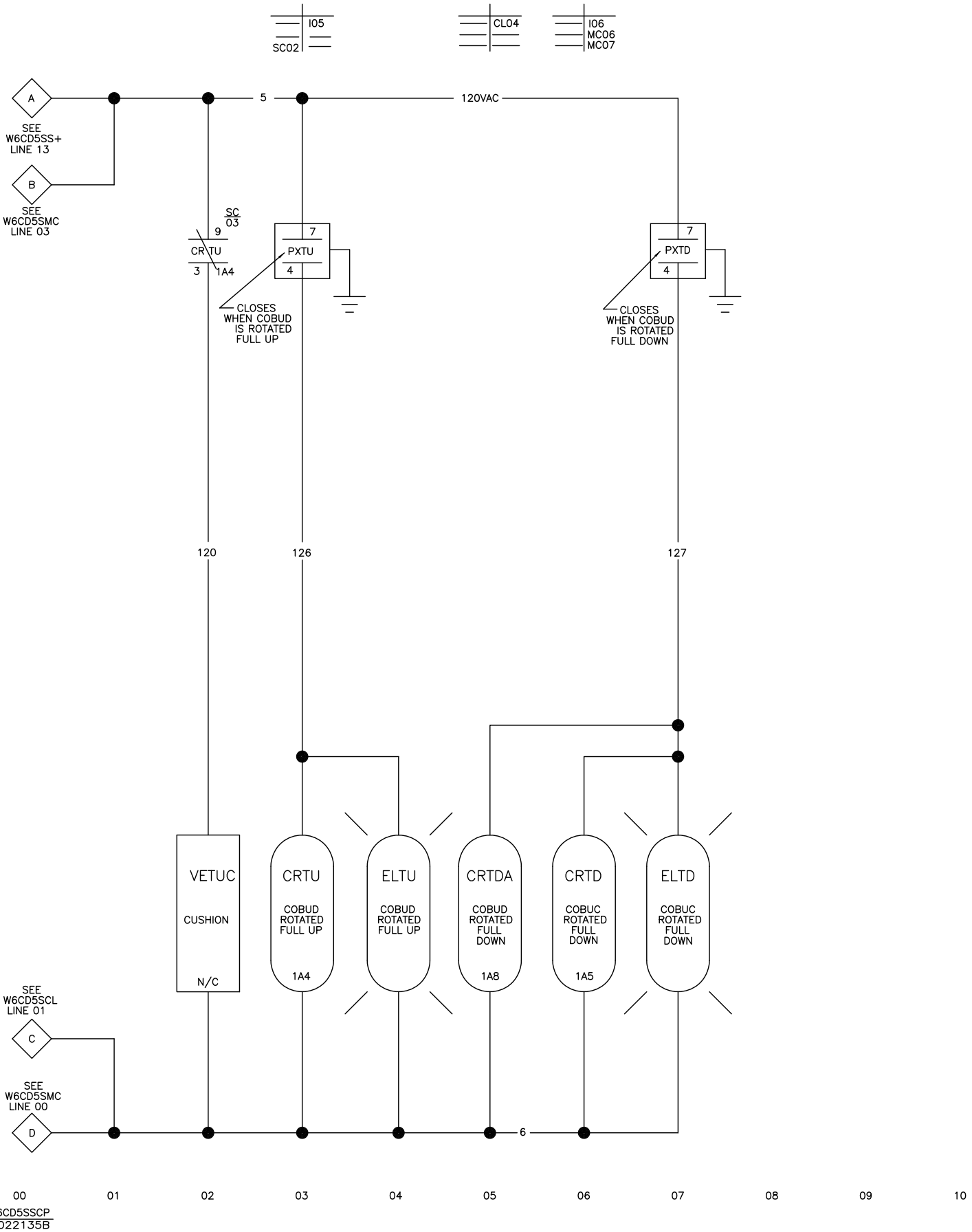


NOTE:

1. REMOVE (J1) FOR INVERTER DRIVE.
2. DOTTED LINES ARE IN CENTRIFUGAL EXTRACTOR.

W6CD5SS+
MICRO 6 SYSTEMS
SCHEMATIC: 3–WIRE CIRCUIT
110V1P50HZ/112OV1P60HZ
PELLERIN MILNOR CORPORATION

10 11 12 13 14


I05
SC02
CL04
I06
MC06
MC07
A
SEE W6CD5SS+ LINE 13
B
SEE W6CD5SMC LINE 03
5
120VAC
SC 03
9
CR TU
3
1A4
7
PXTU
4
CLOSES WHEN COBUD IS ROTATED FULL UP
7
PXTD
4
CLOSES WHEN COBUD IS ROTATED FULL DOWN
120
126
127
VETUC
CUSHION
N/C
CRTU
COBUD ROTATED FULL UP
1A4
ELTU
COBUD ROTATED FULL UP
CRTDA
COBUD ROTATED FULL DOWN
1A8
CRTD
COBUC ROTATED FULL DOWN
1A5
ELTD
COBUC ROTATED FULL DOWN
SEE W6CD5SCL LINE 01
C
SEE W6CD5SMC LINE 00
D
6
00
01
02
03
04
05
06
07
08
09
10
W6CD5SSCP
2022135B

W6CD5SSCP

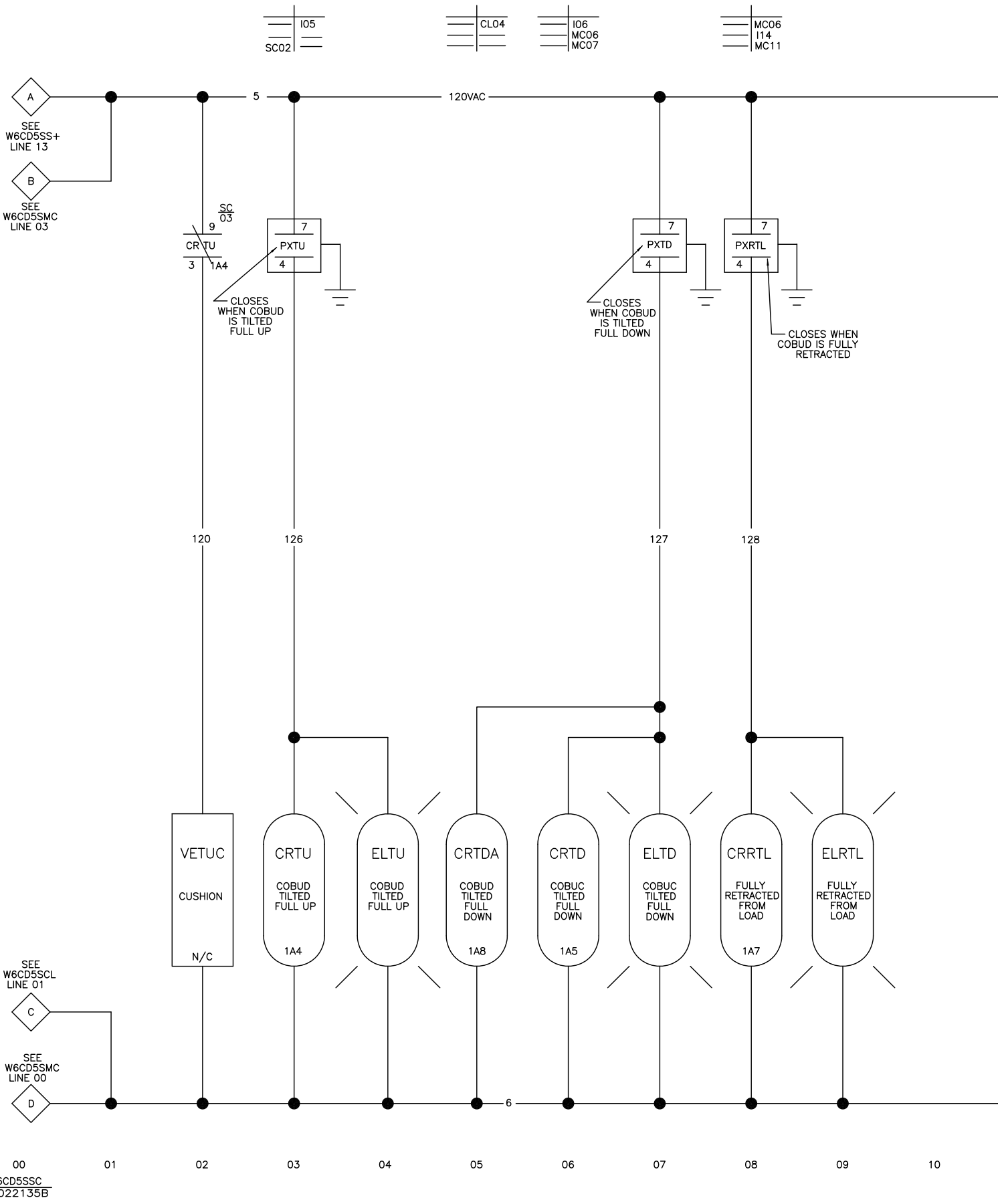
MICRO 6 SYSTEMS
SCHEMATIC: LIMIT SWITCHES
REPLACES W6CD5SSC FOR PIVOTING COBUD

110V1P50HZ/120V1P60HZ

PELLERIN MILNOR CORPORATION

W6CD5SSCP
2022135B

W6CD5SSCP
2022135B


I05
SC02
CL04
I06
MC06
MC07
MC06
I14
MC11
A
SEE W6CD5SS+ LINE 13
B
SEE W6CD5SMC LINE 03
5
120VAC
SC 03
9
CR TU
3
1A4
7
PXTU
4
CLOSES WHEN COBUD IS TILTED FULL UP
7
PXTD
4
CLOSES WHEN COBUD IS TILTED FULL DOWN
7
PXRTL
4
CLOSES WHEN COBUD IS FULLY RETRACTED
120
126
127
128
VETUC
CUSHION
N/C
CRTU
COBUD TILTED FULL UP
1A4
ELTU
COBUD TILTED FULL UP
CRTDA
COBUD TILTED FULL DOWN
1A8
CRTD
COBUC TILTED FULL DOWN
1A5
ELTD
COBUC TILTED FULL DOWN
CRRTL
FULLY RETRACTED FROM LOAD
1A7
ELRTL
FULLY RETRACTED FROM LOAD
SEE W6CD5SCL LINE 01
C
SEE W6CD5SMC LINE 00
D
6
00
01
02
03
04
05
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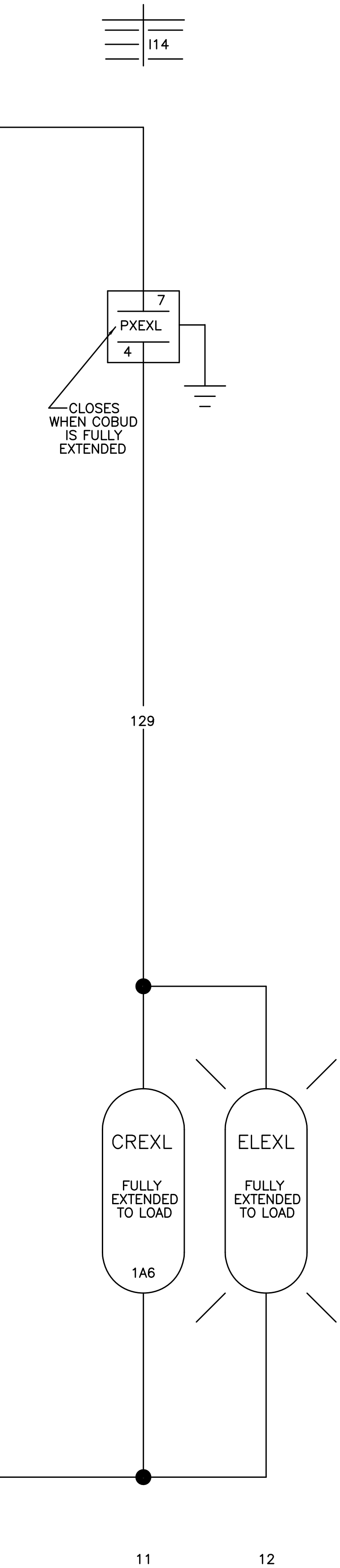
07
08
09
10
W6CD5SSC
2022135B



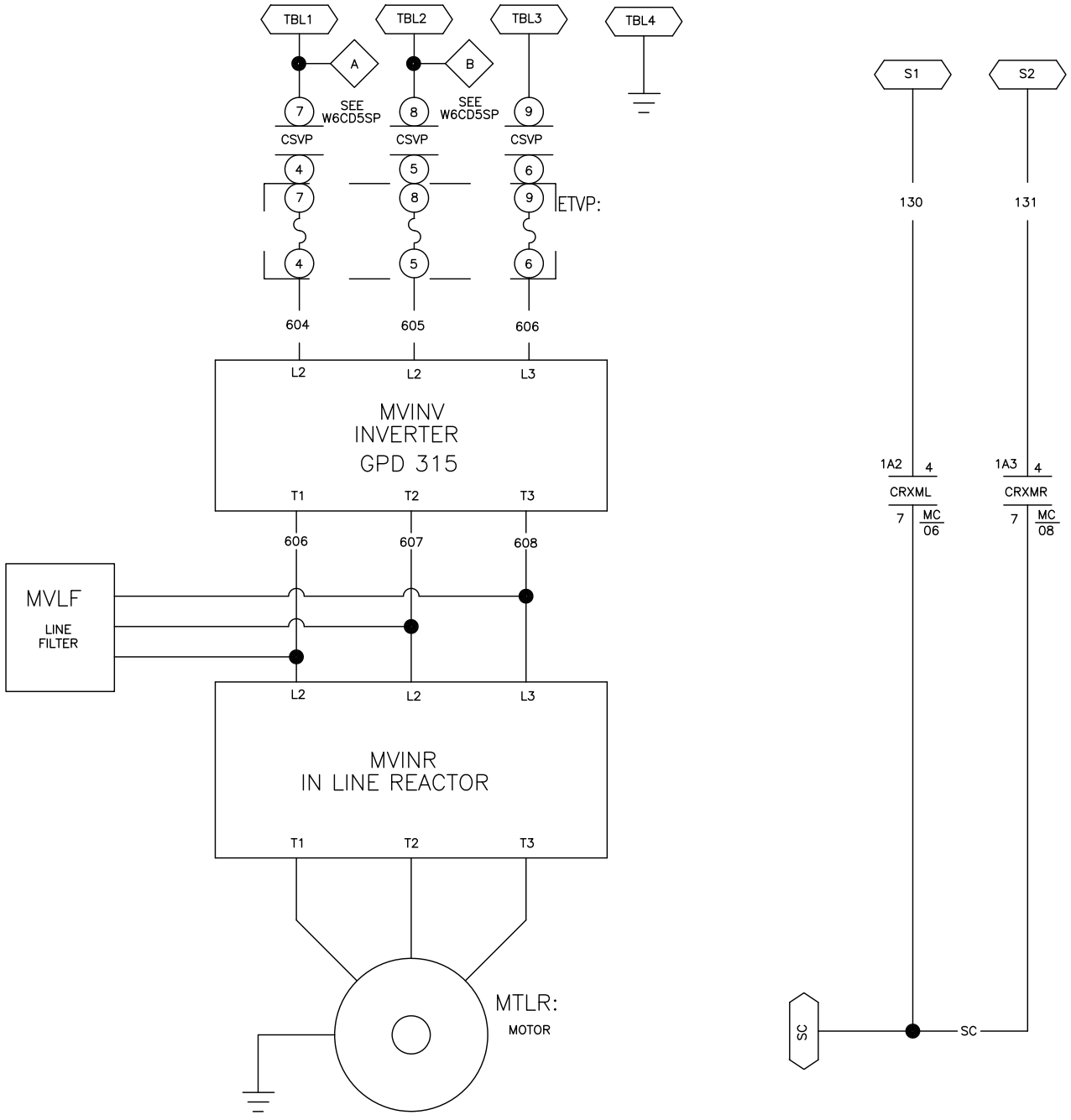
W6CD5SSC

MICRO 6 SYSTEMS

SCHEMATIC: LIMIT SWITCHES

110V1P50HZ/120V1P60HZ

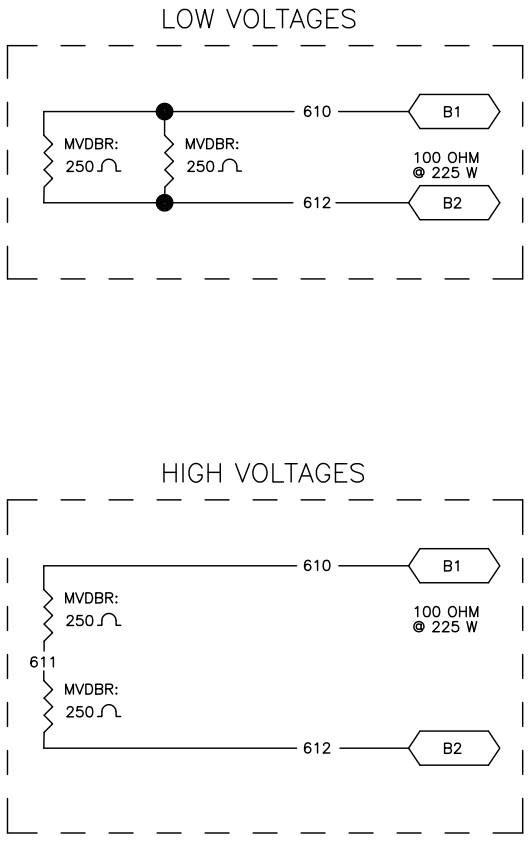
PELLERIN MILNOR CORPORATION



00 01 02 03 04 05 06 07 08 09

W6CD5SVP
2020065B

W6CD5SVP
SCHEMATIC:LEFT/RIGHT VARIABLE SPEED CONTROLLER
PELLERIN MILNOR CORPORATION



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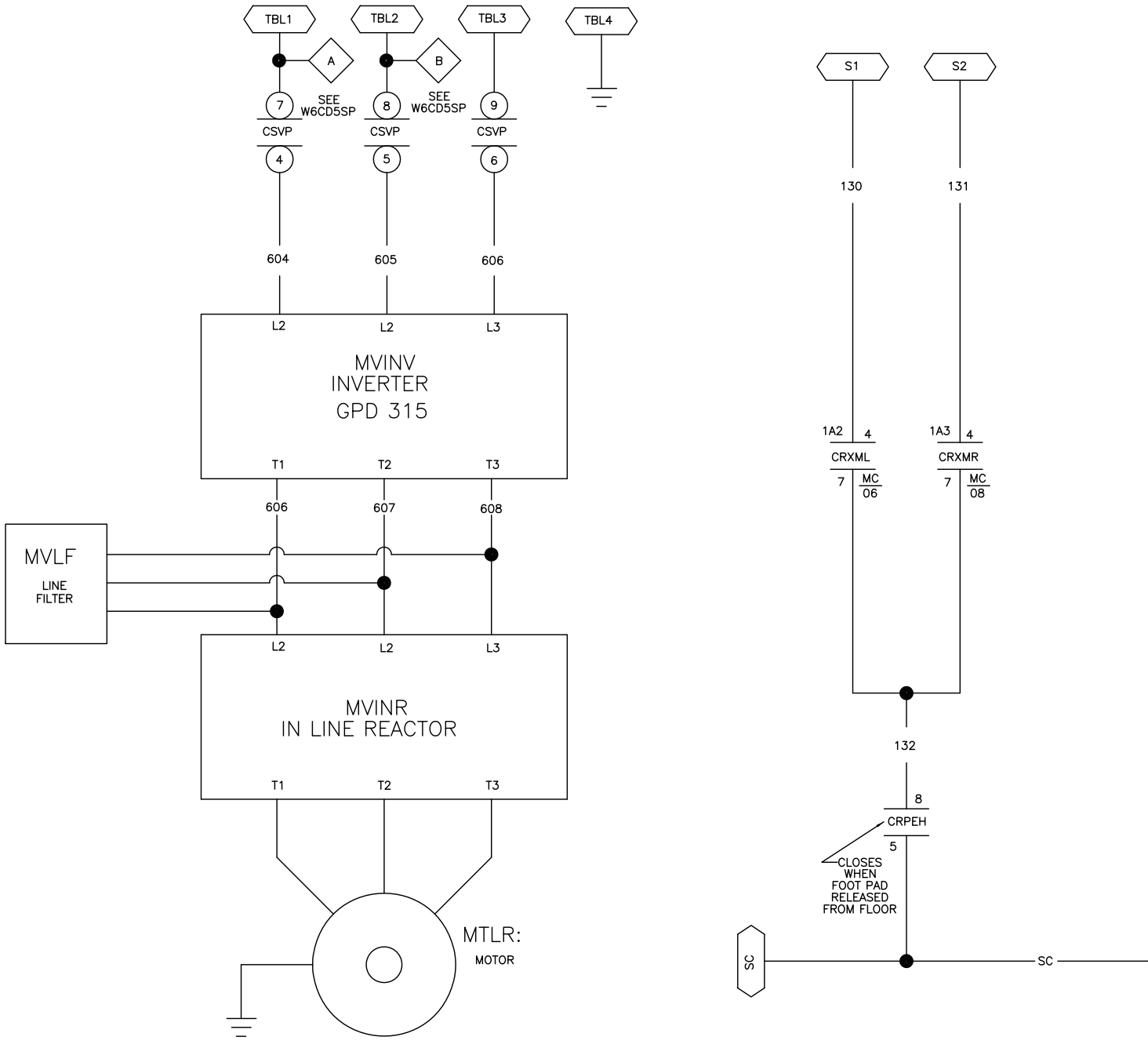


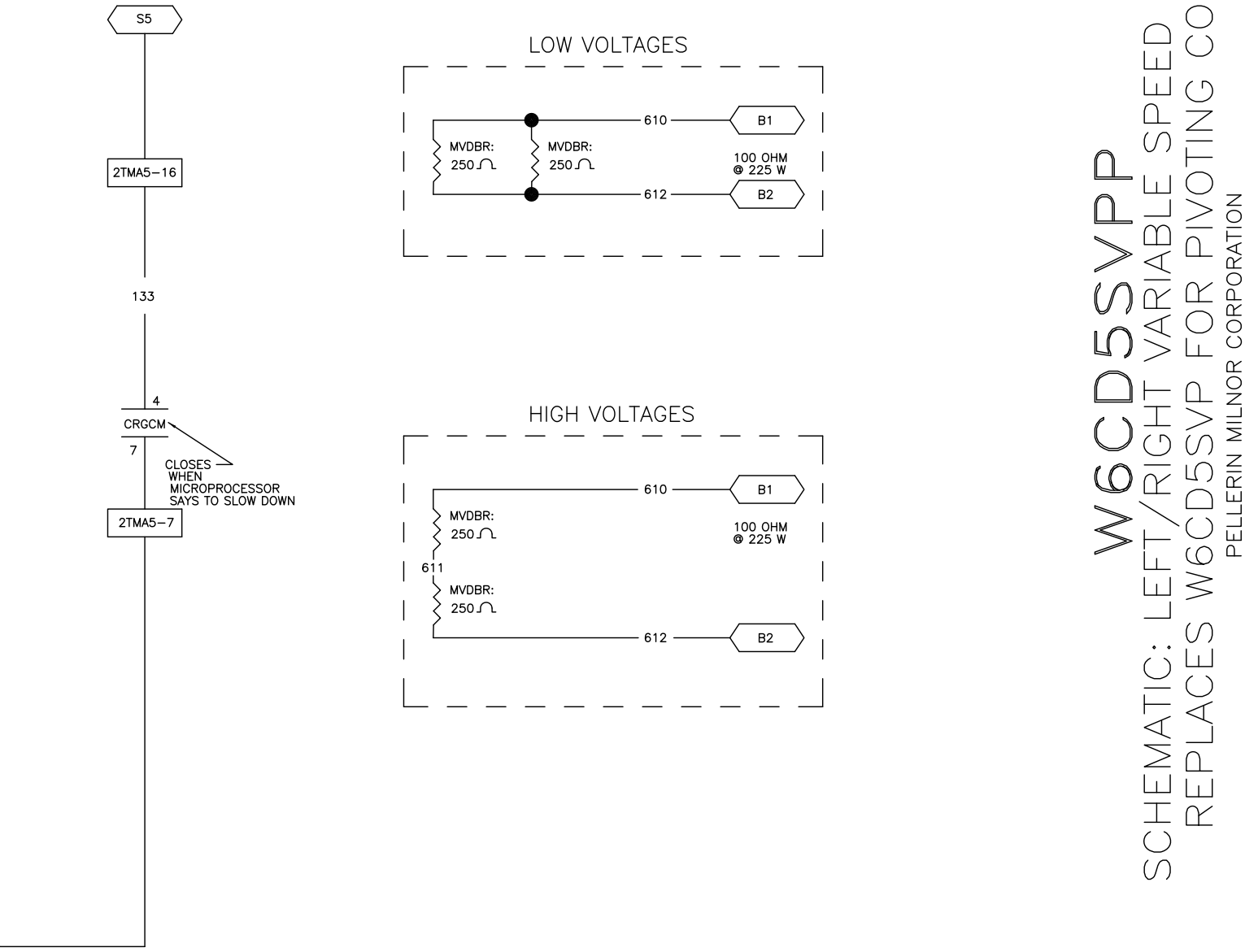
W6CD5SVPP
2017196B

W6CD5SVPP

SCHEMATIC: LEFT/RIGHT VARIABLE SPEED CONTROLLER

REPLACES W6CD5SVP FOR PIVOTING COBUD

PELLERIN MILNOR CORPORATION



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