

VERTICAL MACHINING CENTER
Model: KVR-2418 / KVR-2418A
(FANUC-0i/18i/32i)
OPERATION MANUAL



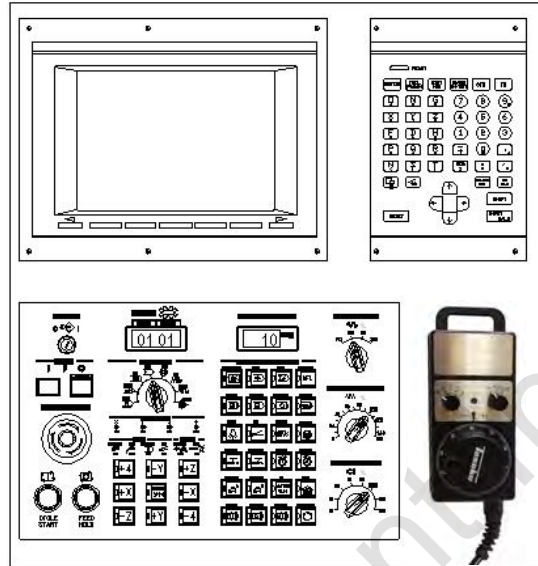
KVR-2418 Operation Manual

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Chapter 1 Description of Operating Box

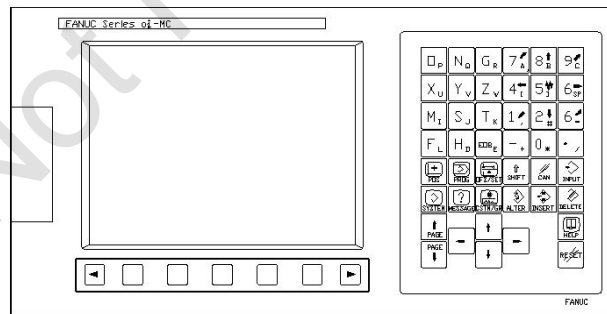
1-1. Description of Operating Box



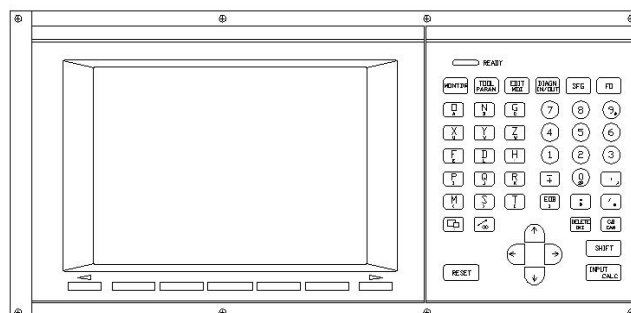
1-2. CNC Control Panel:

The operating method of this panel. Please refer to each controller's manual.

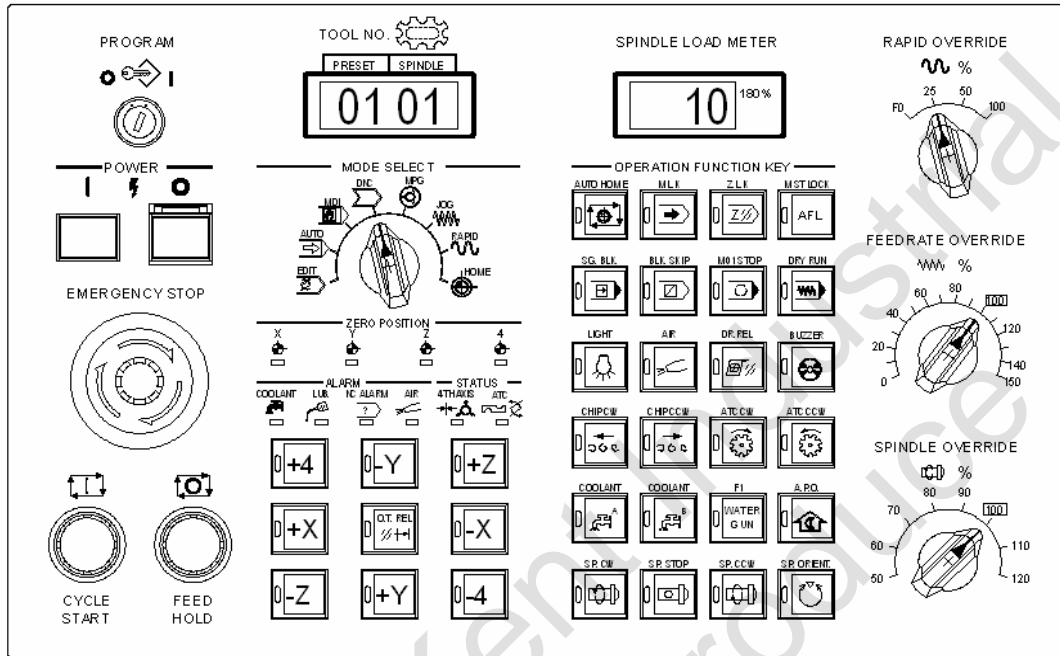
(1) FANUC Serial :



(2) MITSUBISHI Serial :

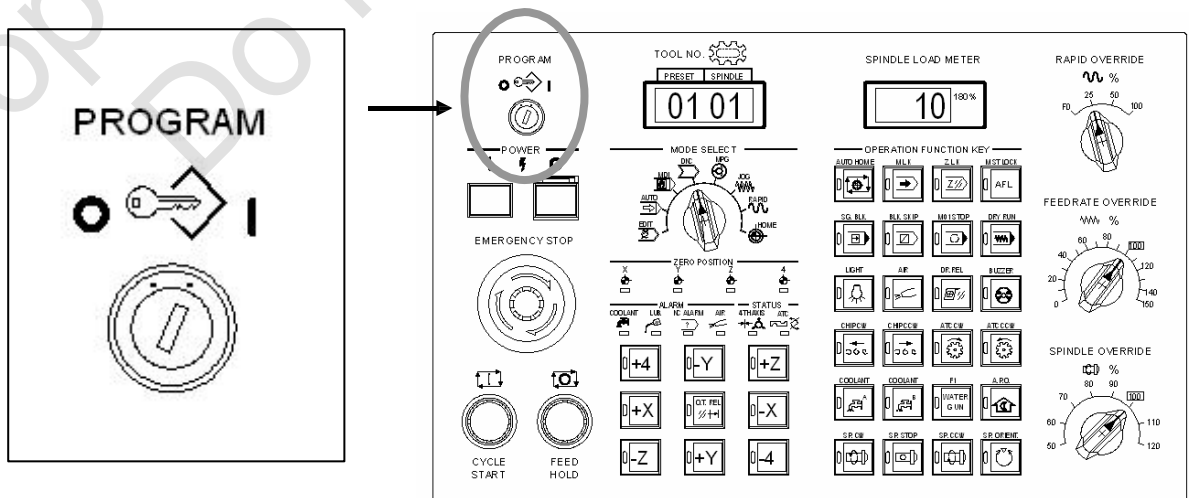


1-3. Operating Panel

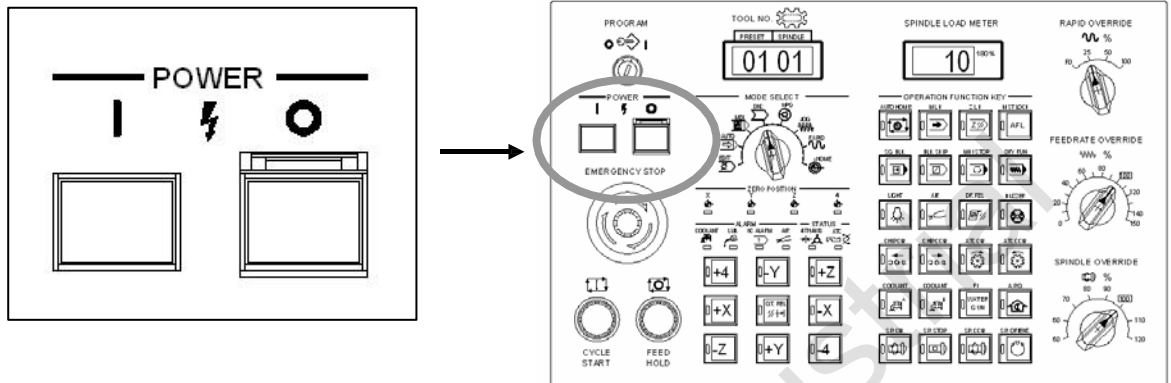


1-4. PROGRAM KEY:

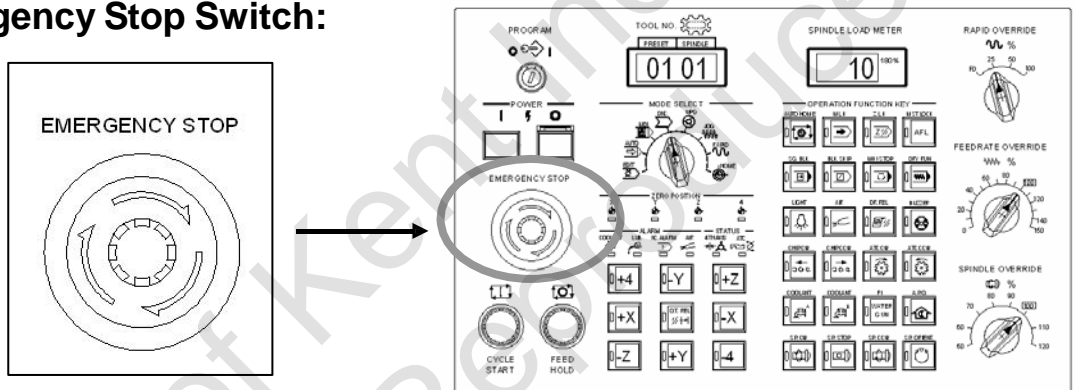
When the key is locked, the program cannot be edited or modified.



1-5. Power Switch (Power ON/OFF): Turns the power ON and OFF.

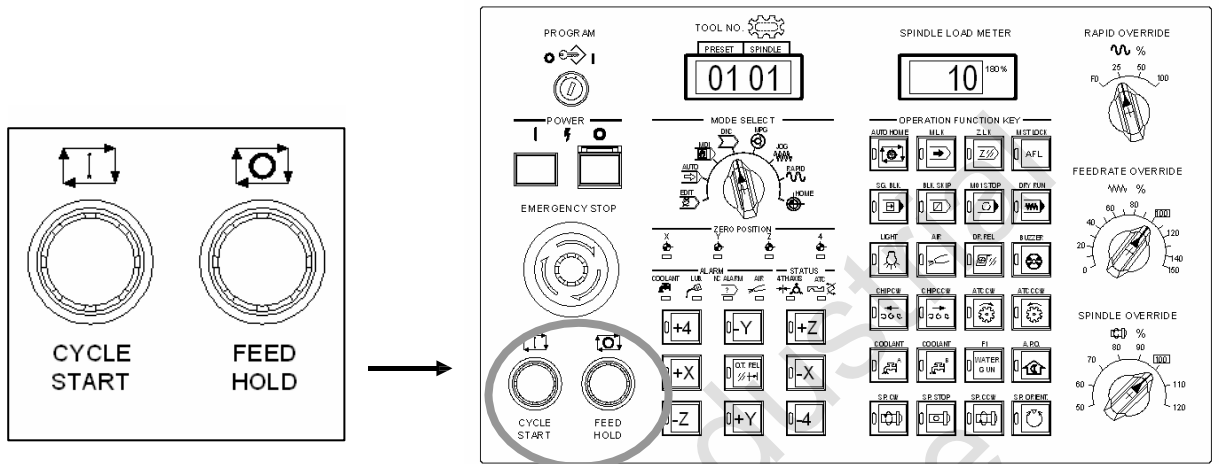


1-6. Emergency Stop Switch:



1. It is used in emergency situations, e.g., the machine running improperly and may cause or endanger the operator or machine itself.
2. After pressing the button, each motor will be cut off and stop all operation immediately.
3. After pressing the button:
 - A. The three axes will stop (including 4th axis, if one exists)
 - B. The spindle will stop rotating.
 - C. The controller's screen will display the alarm message.
 - D. The rotating alarm light will be enabled.
 - E. The ATC will stop running a tool change.
4. Release Method: It is released by turning the switch clockwise, but certain conditions should be noted:
 - A. It can be released after the alarm situation is removed.
 - B. It can be released after every command and action is cancelled and the machine is rebooted.
 - C. While there is a tool change and the button is pushed, it can be released after the tool is returned to its original position by manual control.

1-7 Cycle Start / Feed Hold Switch:



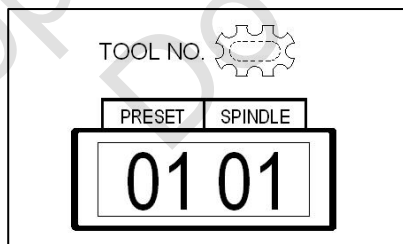
A. Cycle Start Switch: When “ON” under auto mode (AUTO, MDI), the machine will execute the program.

B. Feed Hold Switch:

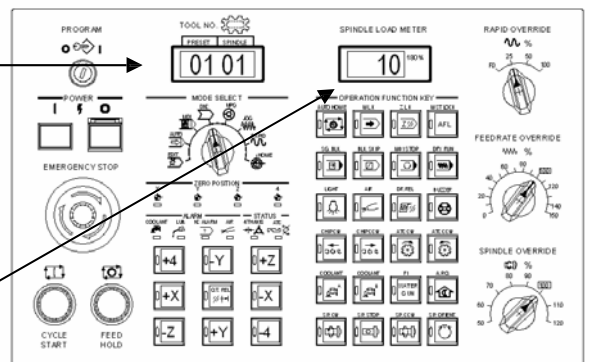
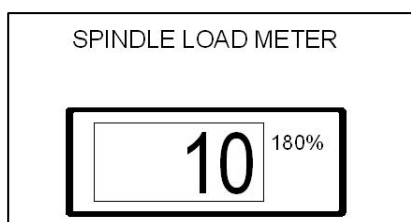
1. Under auto mode, the executing program will pause when the switch is “ON.”
2. The program will restart when pressing the “Cycle Start Switch.”

1-8. A.T.C. Tool NO. / Spindle Load Meter Indication LED:

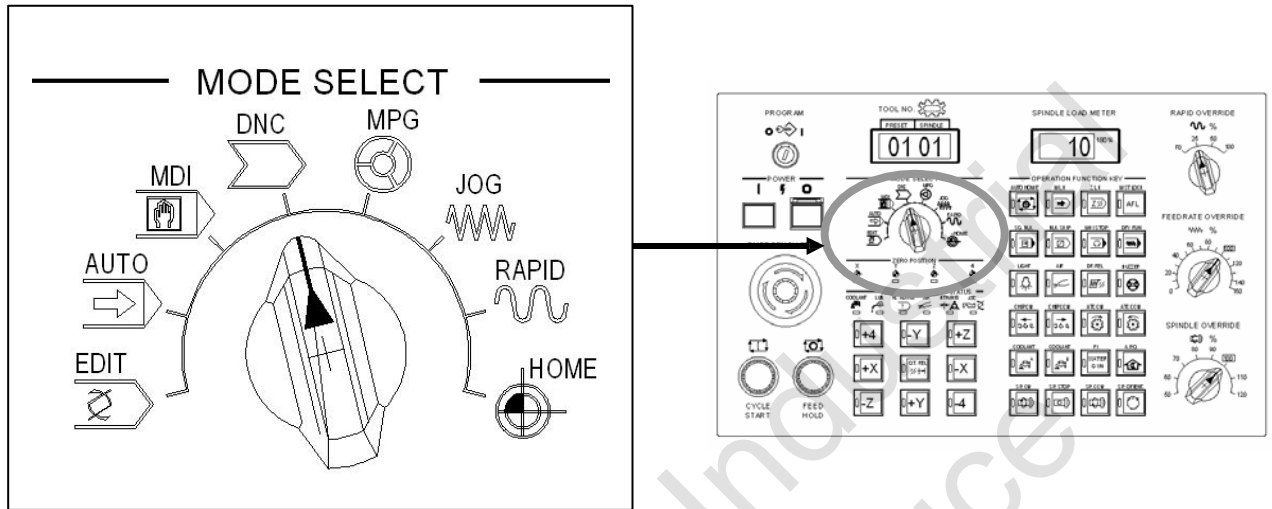
(1) A.T.C. Tool NO. / Spindle Load Meter Indication LED:



(2) Spindle Load Meter Indication LED:



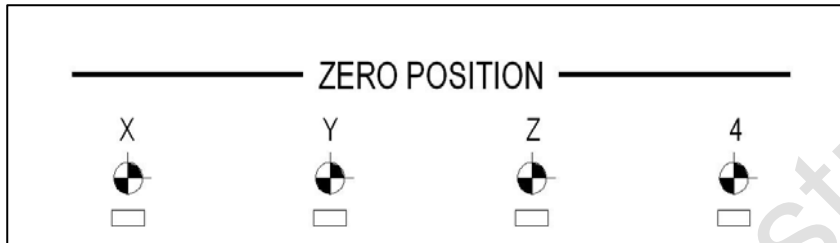
1-9 Mode Select Switch:



1. **Edit** (Program Editing Mode):
 1. Create an editing program.
 2. Editing, modifying, adding, and deleting original program.
 3. This is only for editing, not for executing.
2. **AUTO** (Program Executing Mode): Auto-executing program
3. **MDI** (Manual Data Input Mode):
4. **DNC** (DNC Mode):
5. **M.P.G.** (Handwheel Mode):
6. **JOG** (Jog Mode):
7. **RAPID** (RAPID Mode):
8. **HOME** (Zero Return Mode):

1-10 Indication Lamp:

(1) Axis Zero position Indication Lamp:



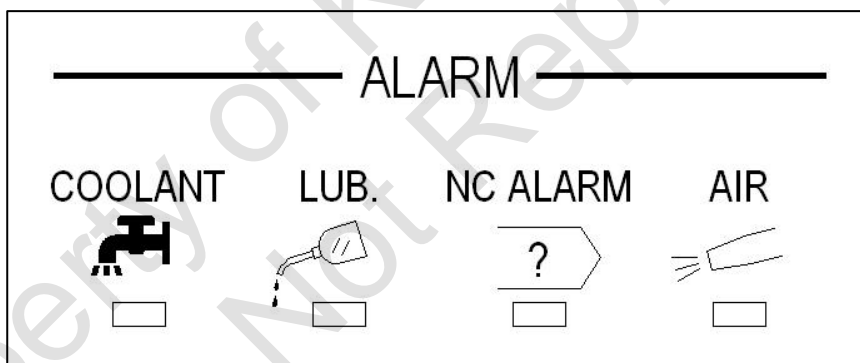
X –HOME: When on, the X-axis returns to the mechanical zero point.

Y –HOME: When on, the Y-axis returns to the mechanical zero point.

Z –HOME: When on, the Z-axis returns to the mechanical zero point.

4TH –HOME: When on, the 4th-axis returns to the mechanical zero point.

(2) ALARM MESSAGE Indication Lamp:



A. COOLANT (COOLANT ALARM) :

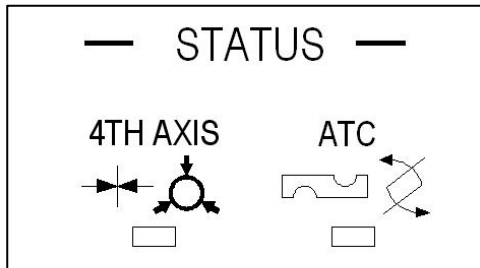
B. LUB. (LUB. FAULT): When on, the lubrication oil is low. However, the machine will only stop when the program has ended.

CAUTION: Please add lubrication oil immediately in order to protect the slide way and mechanical parts.

C. NC ALARM: When on, it means the control has alarm Occur, please check the alarm message in controller.

D. AIR (LOW PRESSURE): When on, the air pressure is low.

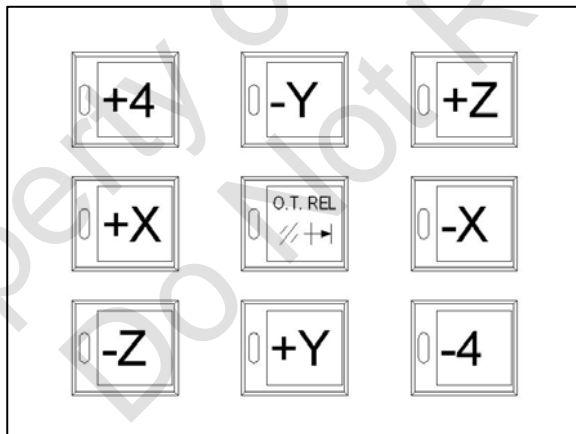
(3) STATUS Indication Lamp:



A. 4TH AXIS (4TH AXIS): When 4TH AXIS is clamped, the green LED will be “ON”.
When 4TH AXIS is unclamped, the green LED will be “OFF”.

B. ATC: When the tool changer is OK, the green LED will be “ON”. During a tool change, the green LED will flash.
When there is a tool change alarm, the green LED will be “OFF”.

1-11. AXIS SELECT:



O.T. Release: When the axis has over-traveled, the axis will not move forward in order to protect the machine.

Release Method: 1. Keep pressing the button.

2. Use the handwheel or jog switch to return into travel at the same time.

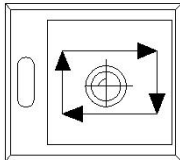
3. Release the button.

4. Press the “**RESET**” button to remove the over-travel alarm.

1-12. OPERATION FUNCTION SWITCH:

(1) AUTO Home (AUTO ZRN SWITCH):

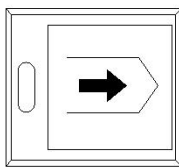
AUTO HOM E



When ON under ZRN mode, the Z-axis will return to zero first, then the others will return to zero at the same time.

(2) MLK (MACHINE LOCK):

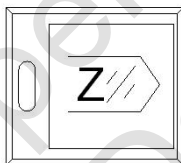
M.L.K



1. In the manual and auto mode, when the switch is ON, the position is run normally by the program, and each axes will not have any movement.
2. Under the auto mode, when the switch is ON, the M, S, T command will be executed normally.

(3) ZLK (Z- AXIS LOCK):

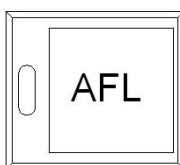
Z.L.K



When ON, the Z-axis is locked (The position is run by program).
The rest of the axes will be executed normally.

(4) M/S/T LOCK:

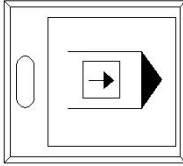
M ST LOCK



When on, the controller will not execute the M code, S code, and T code. It is useful when program test running.

(5). SG. BLK (Single Block):

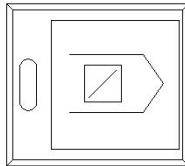
SG. BLK.



1. When ON, it will execute one single block when pressing the “**CYCLE START**” button each time.
2. When OFF, the program will proceed under normal conditions.

(6) BLK Skip (Block Skip)

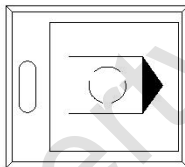
BLK. SKIP



When ON, the program containing a slash “/” will ignore the specified block.

(7) M01 STOP (OPTION STOP):

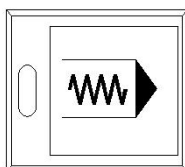
M 01 STOP



1. When “ON”:
When executing a single block including M01 (selected stop) command, the program will stop at the single block. If you want to proceed again, please press the “Cycle Start” button.
2. When “OFF”:
When executing a single block including M01, the program won’t stop.

(8) DRN RUN:

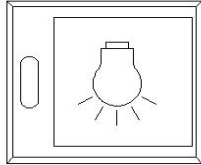
DRY RUN



1. When ON, the F (speed) is invalid. The feed rate is controlled by the “Feed Override” switch.
2. When ON, the command “tapping fixing cycle” is invalid.

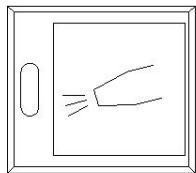
(9). LIGHT (LIGHT SWITCH):

LIGHT



(10) AIR (AIR BLOW SWITCH):

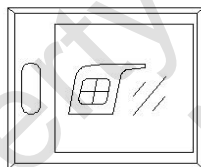
AIR



When ON, the workpiece air blow is on. It can be turned on automatically using M code.

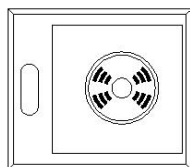
(11) DR. DTL (DOOR SWITCH):

DR.REL.

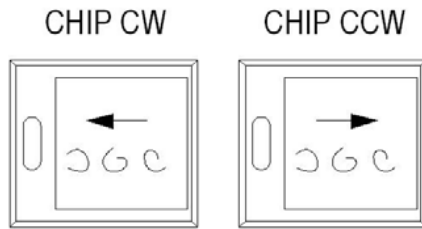


(12) BUZZER (BUZZER SWITCH): (OPTION)

BUZZER

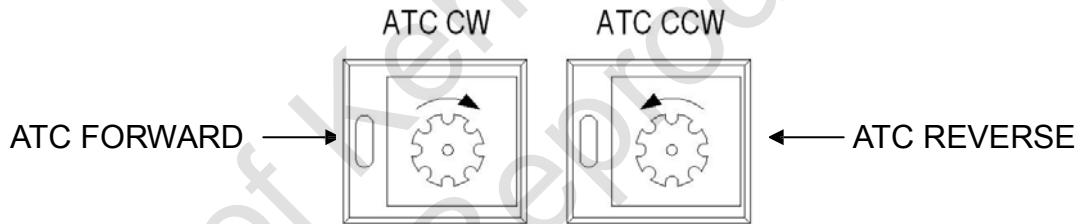


(13). CHIP CONVEYOR FORWARD / REVERSE SWITCH:



When running a program, the chip conveyer will be on automatically. It can be stopped manually. When the chips have piled up, the “BACK” button can reverse the chip conveyer in order to avoid jams.

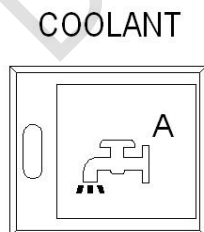
(14) ATC CW / CCW (ATC FORWARD / REVERSE SWITCH):



Under the manual mode, the ATC will rotate clockwise when it is “ON.”

1. The ATC will rotate one tool position when pressed each time.
2. The ATC will rotate continuously if the switch is not released.

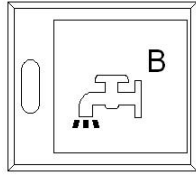
(15) COOLANT A (COOLANT SWITCH):



- 1 Under manual mode (JOG, ZRN, Hx1, Hx10, Hx100), the coolant pump is enabled when it is “ON.” Press the switch again to disable the pump.
2. Under Auto mode (MDI, AUTO), when the switch is released, the command M08 will start the coolant pump. The command M09 will stop the coolant pump.

(16) COOLANT B (CHIP FLUSHING SWITCH):

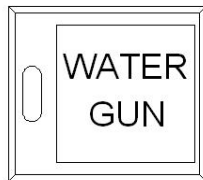
COOLANT



When ON, the chip flushing system will be on.
The coolant will come out from the back of the chip pan.

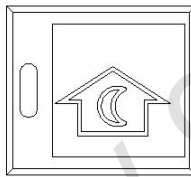
(17) F1 (WATER GUN SWITCH):

F1



(18) APO (AUTO POWER OFF SWITCH):

A.P.O.

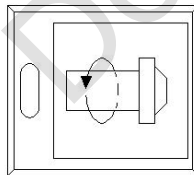


When ON, the machine's power will cut off automatically after a specified time after the program executes the M30 function.

(19) SP CW / SP STOP/ SP CCW (SPINDLE FORWARD / STOP / REVERSE):

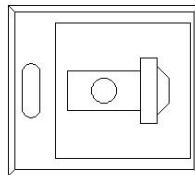
FORWARD

SP. CW



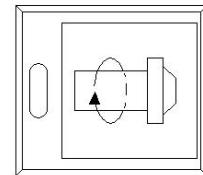
STOP

SP. STOP



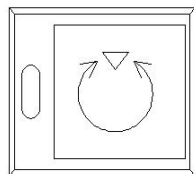
REVERSE

SP. CCW



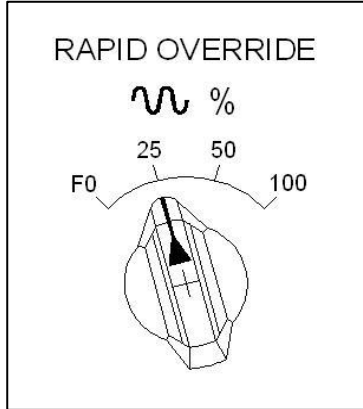
(20) SP ORIENT (SPINDLE ORIENTATION SWITCH):

SP. ORIENT.



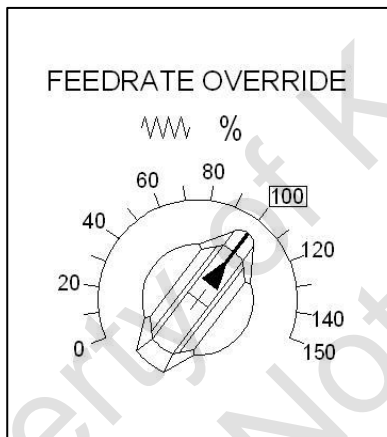
1-13. Speed Override Switch

(1) Rapid Override Switch:



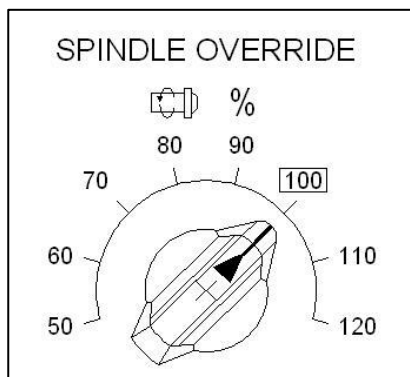
Displacement%	Metric (mm)	Inch (inch)
Low	500.0	20.0
25	5000.0	200.0
50	10000.0	250.0
100	20000.0	787.0

(2) Feed Override Switch:

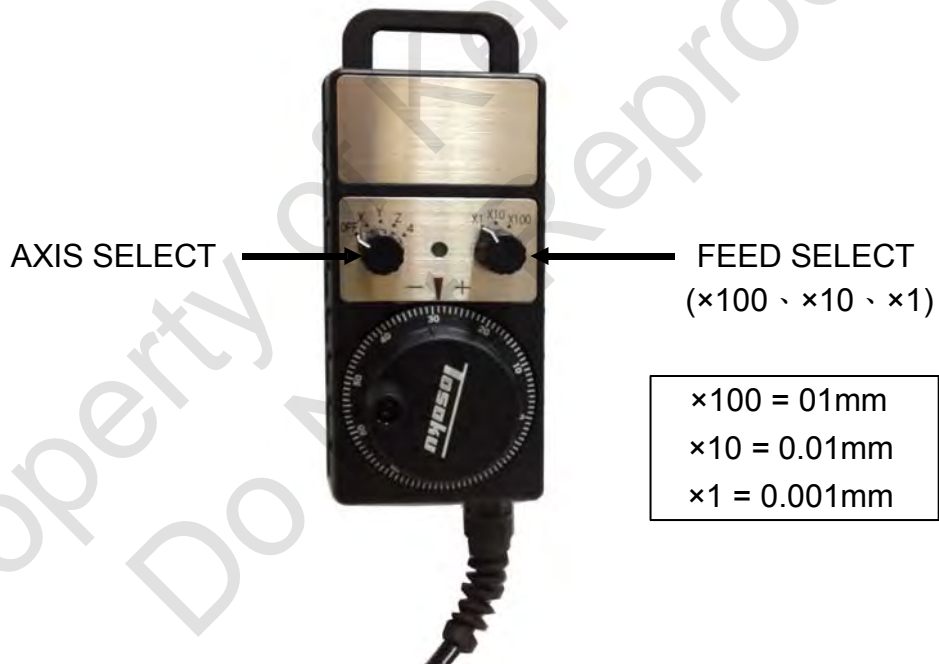
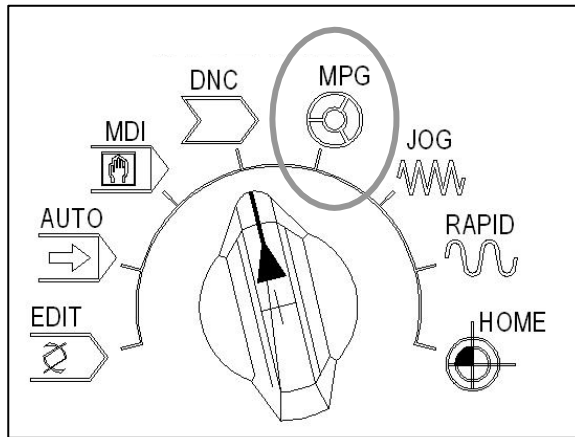


Displacement%	Metric (mm)	Inch (inch)
0	0	0
10	2.0	0.08
20	3.2	0.12
30	5.0	0.20
40	7.9	0.30
50	12.6	0.50
60	20.0	0.80
70	32.0	1.20
80	50.0	2.00
90	79.0	3.00
100	126.0	5.00
110	200.0	8.00
120	320.0	12.00
130	500.0	20.00
140	790.0	30.00
150	1260.0	50.00

(3) Spindle Speed Override Switch:



1-14. EXTERNAL MPG:



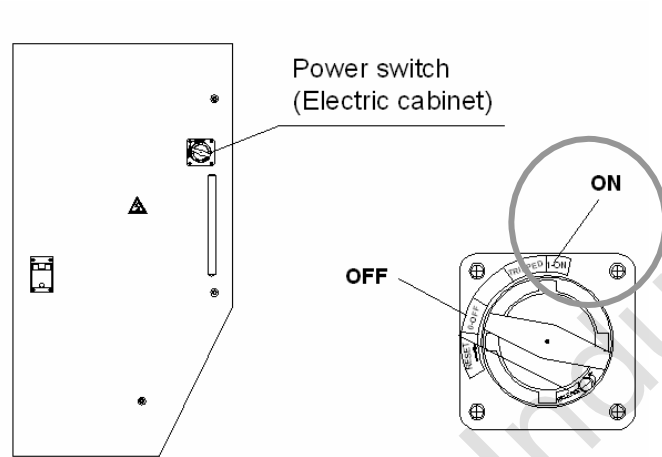
Chapter 2 - Warming Up and Shutting Down

2-1 Operating Notice before Warm Up

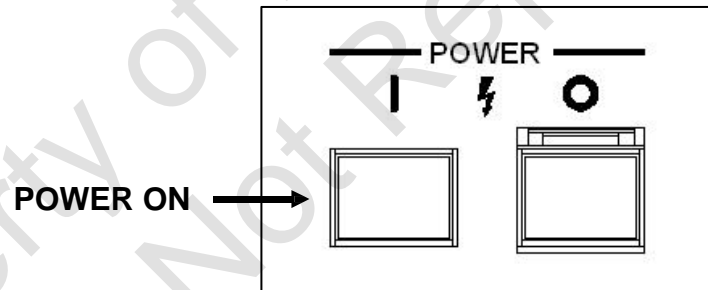
1. The operators have to read this manual's chapters carefully and understand the special prerequisites needing attention in order to protect themselves.
2. Check whether the door of the electrical box is closed or not.
3. Make sure each operating door and the door on each side is closed.
4. Check if the full enclosure is complete.
5. Check if the lubrication oil is sufficient.
6. Check if the air pressure is normal.
7. Check if the tools, mold scale, and working materials are correct.
8. No matter in what kind of produce procedure, it should be test driven to ensure everything is okay after changing the tool and editing the program.

2-2 Sequence of Warm Up

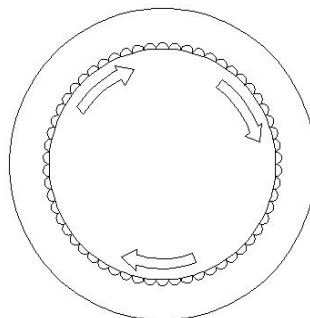
1. Turn on the electrical box's power to the **ON** position (input electricity).



2. Press the POWER ON switch on the control panel.

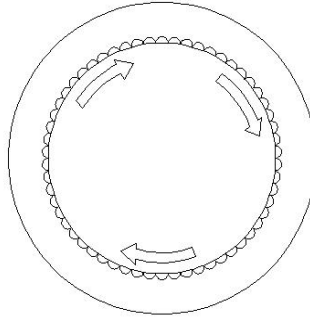


3. Release the EMG switch: Turn clockwise to release.

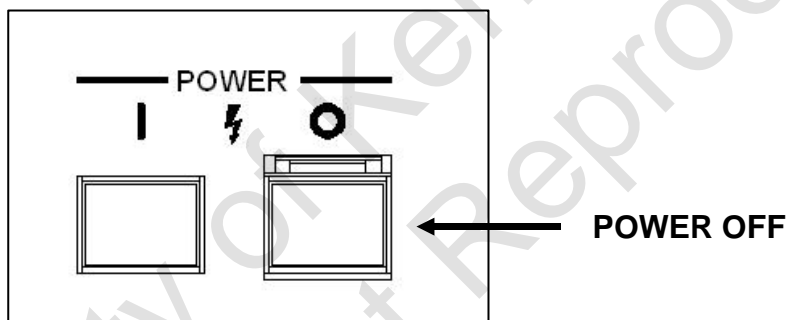


2-3 Sequence of Shut Down

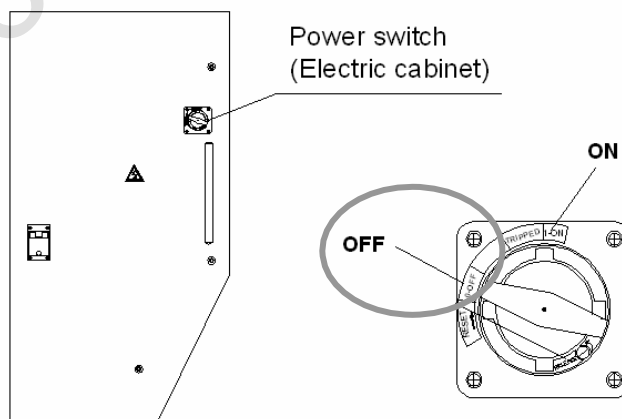
1. Push the EMG button



2. Press the POWER OFF button on the control panel.



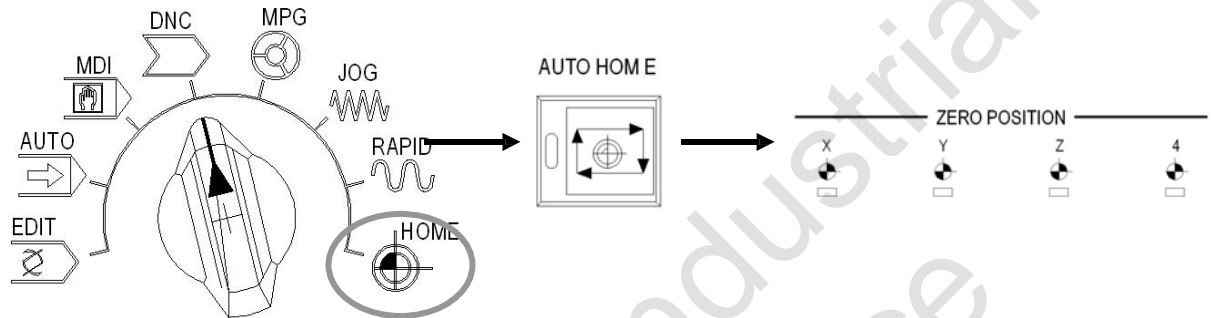
3. Turn off the electrical box's power to the **OFF** position (cuts the input electricity).



Chapter 3 Operation of Manual Mode

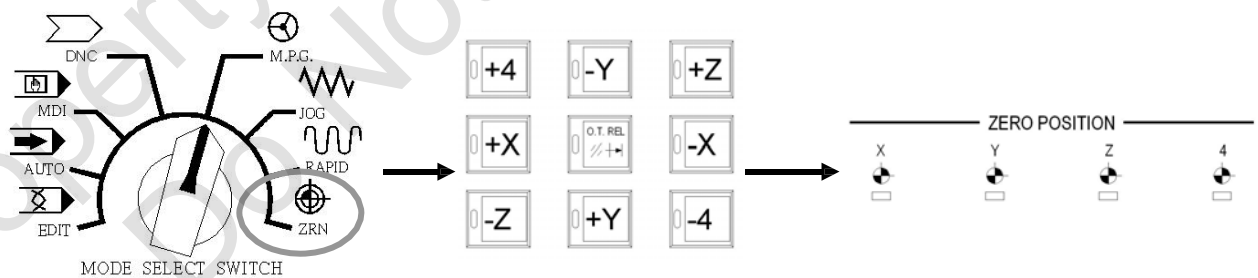
- 3-1 Zero Return:** 1. This machine has to execute this function before being used.
2. The ZRN has to tie in with the Rapid% switch to select the speed.

A. AUTO ZRN (Auto Mode)



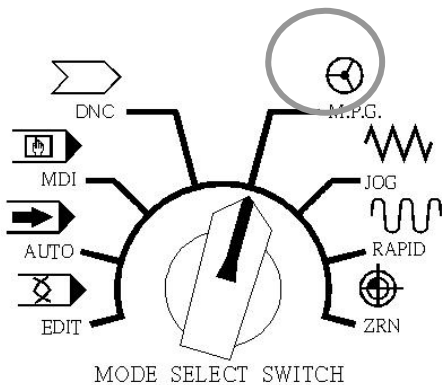
- (1) Turn the MODE SELECT knob to ZRN mode.
- (2) Use the RAPID% to select the feed speed.
- (3) Press the AUTO and ZRN button on the control panel at the same time to execute zero return.
- (4) The Z-axis will return to zero at the beginning, and wait for the Z-HOME indicator to light up.
- (5) The X and Y-axes will return simultaneously.
- (6) When the X, and Y-HOME indicator light up, the ZRN action is completed.

B. ZRN (Manual Mode)



- (1) Turn the MODE SELECT knob to ZRN
- (2) Select one axis (X, Y or Z)
- (3) Use the RAPID% to select the feed speed
- (4) Press +JOG button to return this axis rapidly.
- (5) Until the X, Y or Z-HOME indicator light up.
- (6) When the indicator lights up, the ZRN procedure of this axis is finished
- (7) Then repeat the procedure above to complete the ZRN procedure of others' axis

3-2 MPG Mode:



1. Turn the AXIS SELECT knob to select one axis.
 2. Use the MPG to move the axis
 - (1) Turning clockwise is toward positive.
 - (2) Turning anticlockwise is toward negative.
 3. Tie in with the H×1 / H×10 / H×100 to select the tool feed value.
- Please refer to the following value to make the tool feed

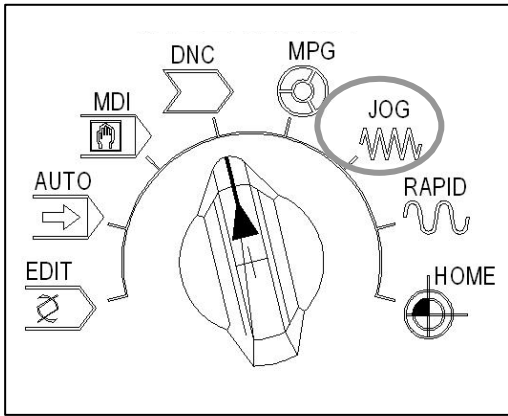
(In accordance with the tool feed value per scale.)



(1) Metric Input (mm)		
H × 1	=	0.001 mm
H × 10	=	0.01 mm
H × 100	=	0.1 mm
(2) Inch Input (inch)		
H × 1	=	0.0001 inch
H × 10	=	0.001 inch
H × 100	=	0.01 inch

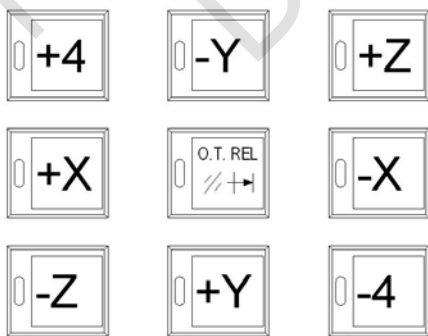
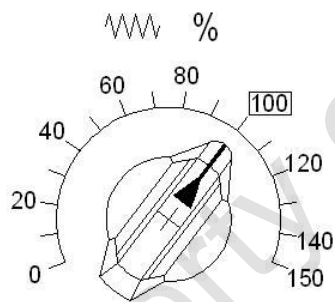
3-3 JOG Mode:

3-3-1. JOG FEED



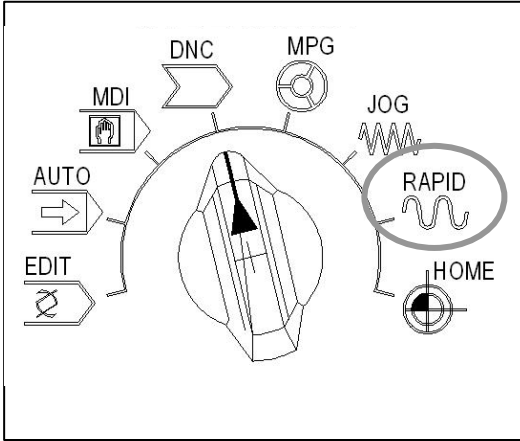
- (1) Turn the MODE SELECT knob to the JOG mode.
- (2) Turn the JOG FEEDRATE% knob to choose the Jog speed.
- (3) Press the **+X/+Y/+Z/+4TH** button to move in positive direction.
- (4) Press the **-X/-Y/-Z/-4TH** button to move in negative direction.
- (5) The JOG FEED RATE% selecting depends on the following value.

FEEDRATE OVERRIDE



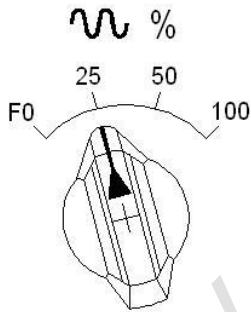
Displacement%	Metric (mm)	Inch (inch)
0	0	0
10	2.0	0.08
20	3.2	0.12
30	5.0	0.2
40	7.9	0.3
50	12.6	0.5
60	20.0	0.8
70	32.0	1.2
80	50.0	2.0
90	79.0	3.0
100	126.0	5.0
110	200.0	8.0
120	320.0	12.0
130	500.0	20.0
140	790.0	30.0
150	1260.0	50.0

3-3-2 RAPID FEED:

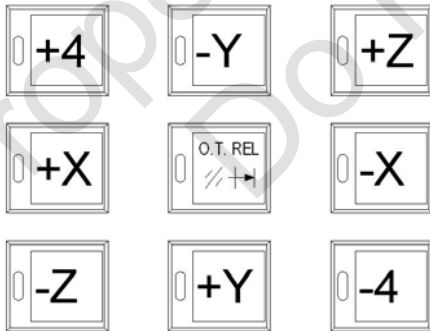


- (1) Turn the MODE SELECT knob to the RAPID mode.
- (2) Turning the RAPID% knob to select the speed;
Low / 25 / 50 / 100.
- (3) Press the **+X/+Y/+Z/+4TH** button to move in positive direction.
- (4) Press the **-X/-Y/-Z/-4TH** button to move in the negative direction.
- (5) The RAPID FEED% selection depends on the following value.

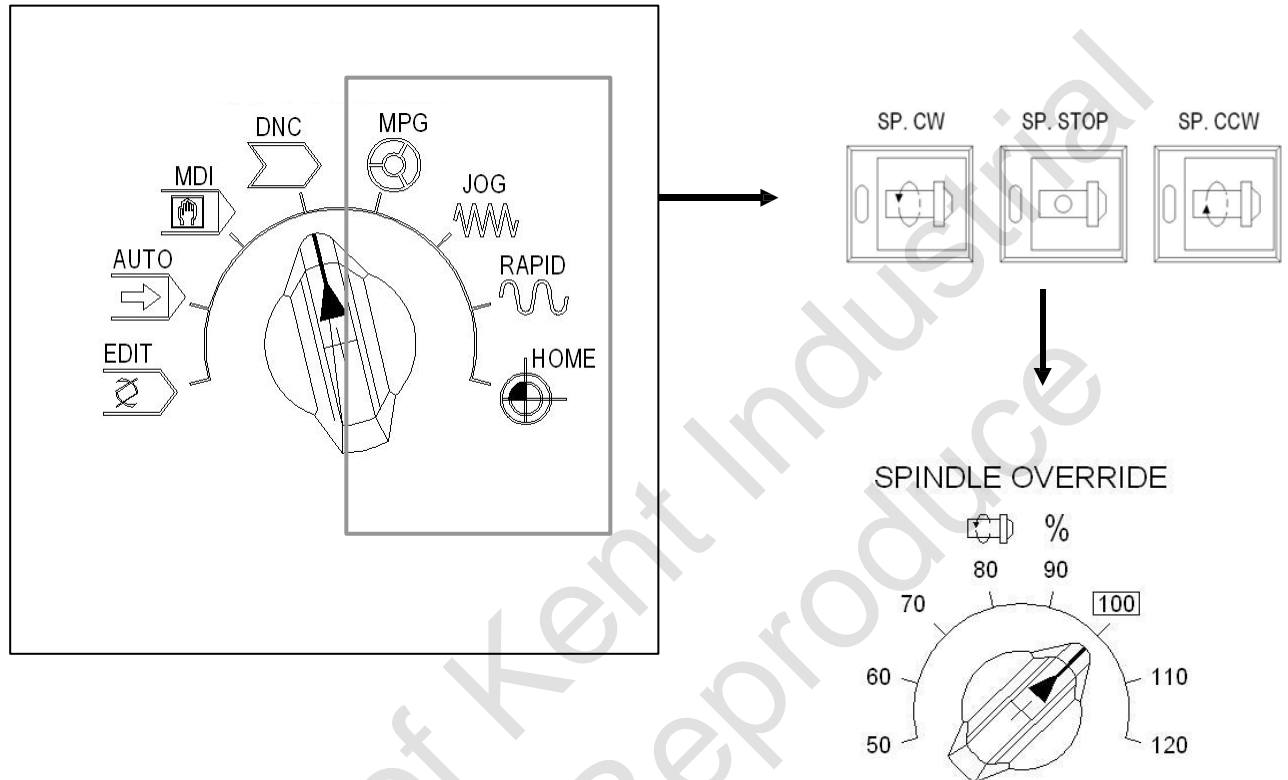
RAPID OVERRIDE



Displacement%	Metric (mm)	Inch (inch)
Low	500.0	20.0
25	5000.0	200.0
50	10000.0	250.0
100	20000.0	787.0

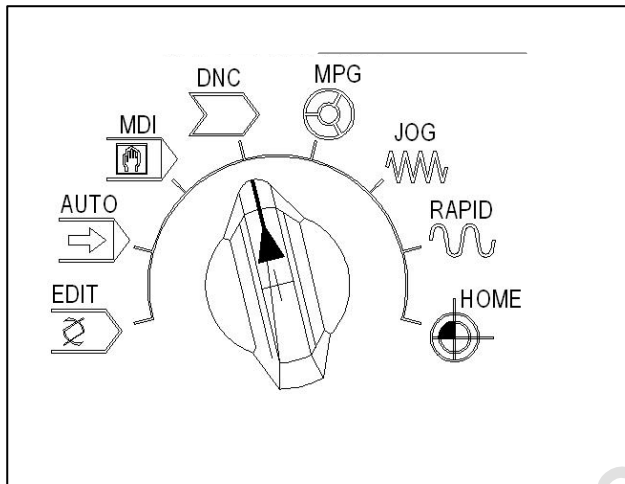


3-4 Manual Mode of spindle Running



- 1. Mode Select:** It should be under JOG, ZRN, MPG, manual mode
- 2. Press the FORWARD button:** the spindle will turn clockwise
- 3. Press the SPINDLE STOP button:** the spindle will be stop
- 4. The adjustment of spindle's speed:**
 - (1) Mode Select: MDI mode
 - (2) Input the spindle speed "S" value, which is the basic value as 100%.
 - (3) The spindle speed can be adjusted by turning the SPINDLE% knob.
 - (4) The speed rate is ranged from 50% to 120%
 - (5) You are NOT ALLOWED to touch the spindle while it is running, to avoid injury to the operator.

3-5 Manual Mode of Tool Clamping and Unclamping



(Notice: If there is a switch on the lower and right corner in front of the spindle, the control panel will not have the button to unclamp the tool)

1. Timing Use:

- (1) Use the switch to clamp the tool on the ATC.
- (2) Do not use this switch while the spindle is running.

2. Manual Mode of Tool Clamping

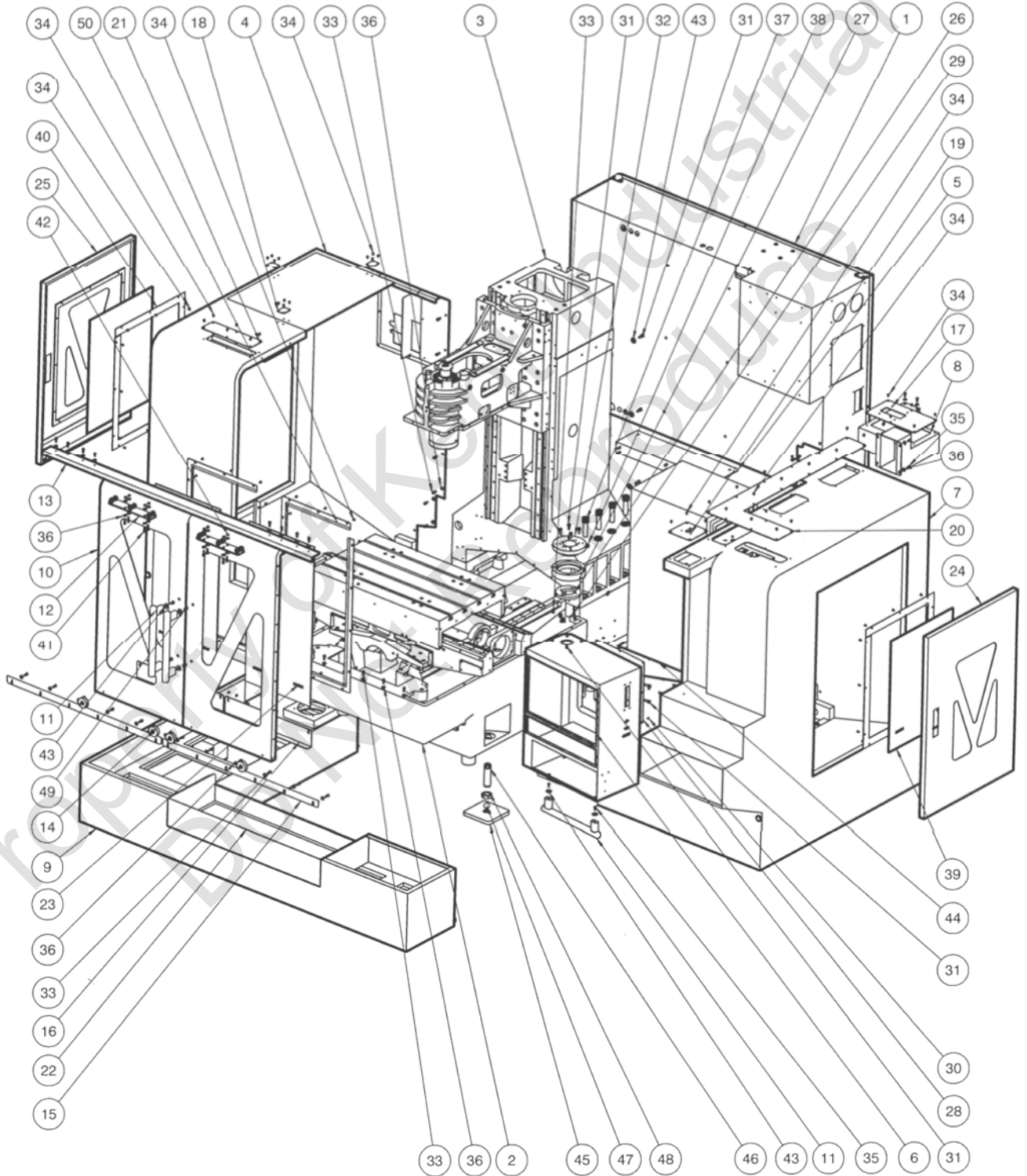
- (1) Mode Select: Manual Mode (such as JOG, ZRN, MPG)
- (2) The left hand holds the tool and inserts it into the inner hole of the spindle.
- (3) The spindle nose has to match the key way of the tool.
- (4) The right hand pushes the manual clamp / unclamp button in front of the spindle continuously, (or the TOOL UNCLAMP button on the control panel) for inserting the tool into the normal position.
- (5) After the tool is in position, release the clamp / unclamp button.
- (6) After releasing the button, shake the tool to make sure the tool is clamped correctly and tightly.
- (7) If the tool is not clamped tightly, please redo step 4.
- (8) Reconfirm the tool is clamped tightly.

3. Manual Mode of Tool Unclamping

- (1) Mode Select: Manual Mode (such as JOG, ZRN, MPG)
- (2) The left hand holds the tool.
- (3) The right hand pushes the manual clamp / unclamp button in front of the spindle continuously, (or the TOOL UNCLAMP button on the control panel). After the spindle releases the tool, take the tool out.
- (4) After the tool is removed from the spindle, the clamp / unclamp button can be released.
- (5) The unclamping process is complete.

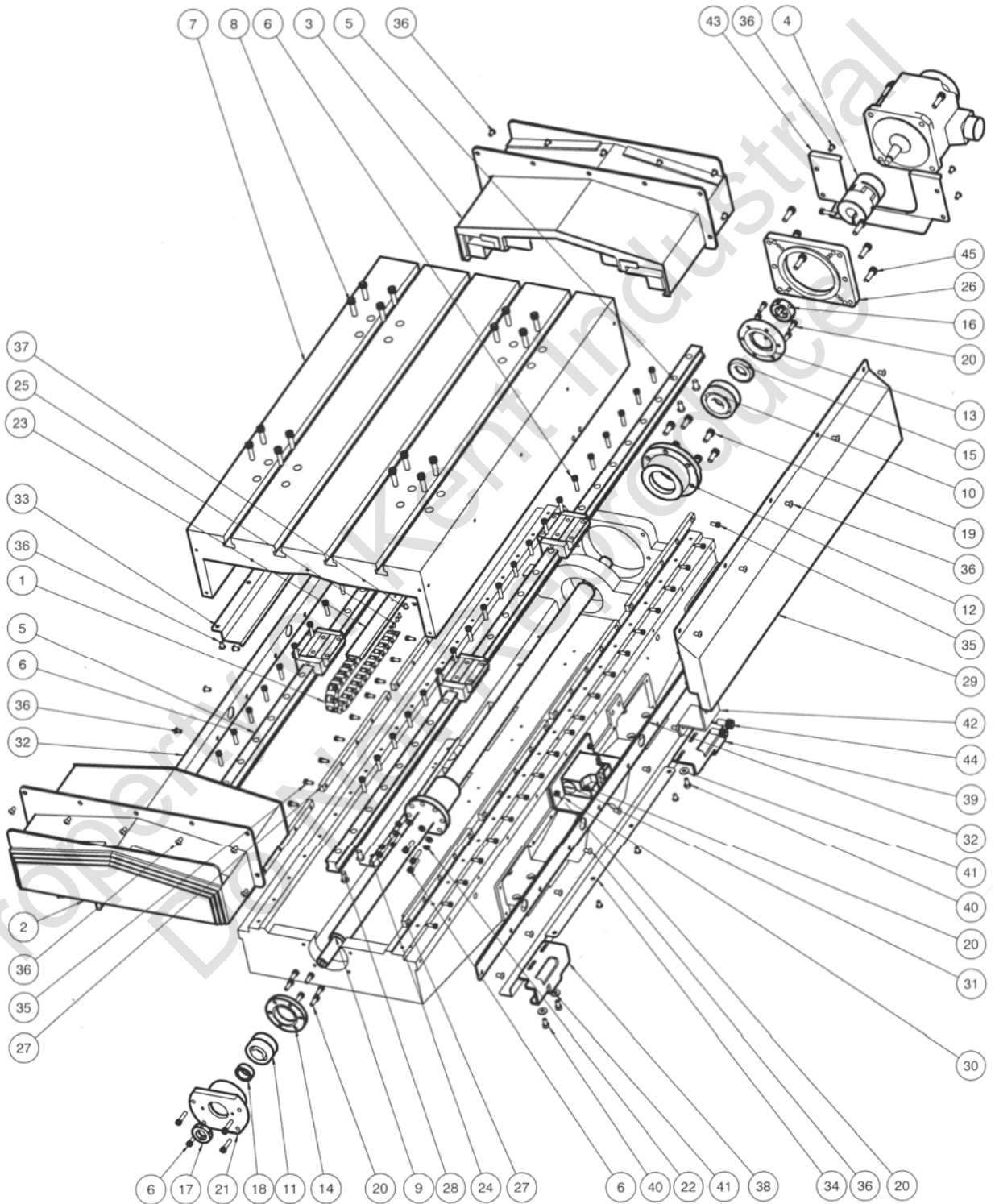
Chapter 4 Parts List

TW-24L EXTERNAL FULL ENCLOSURE



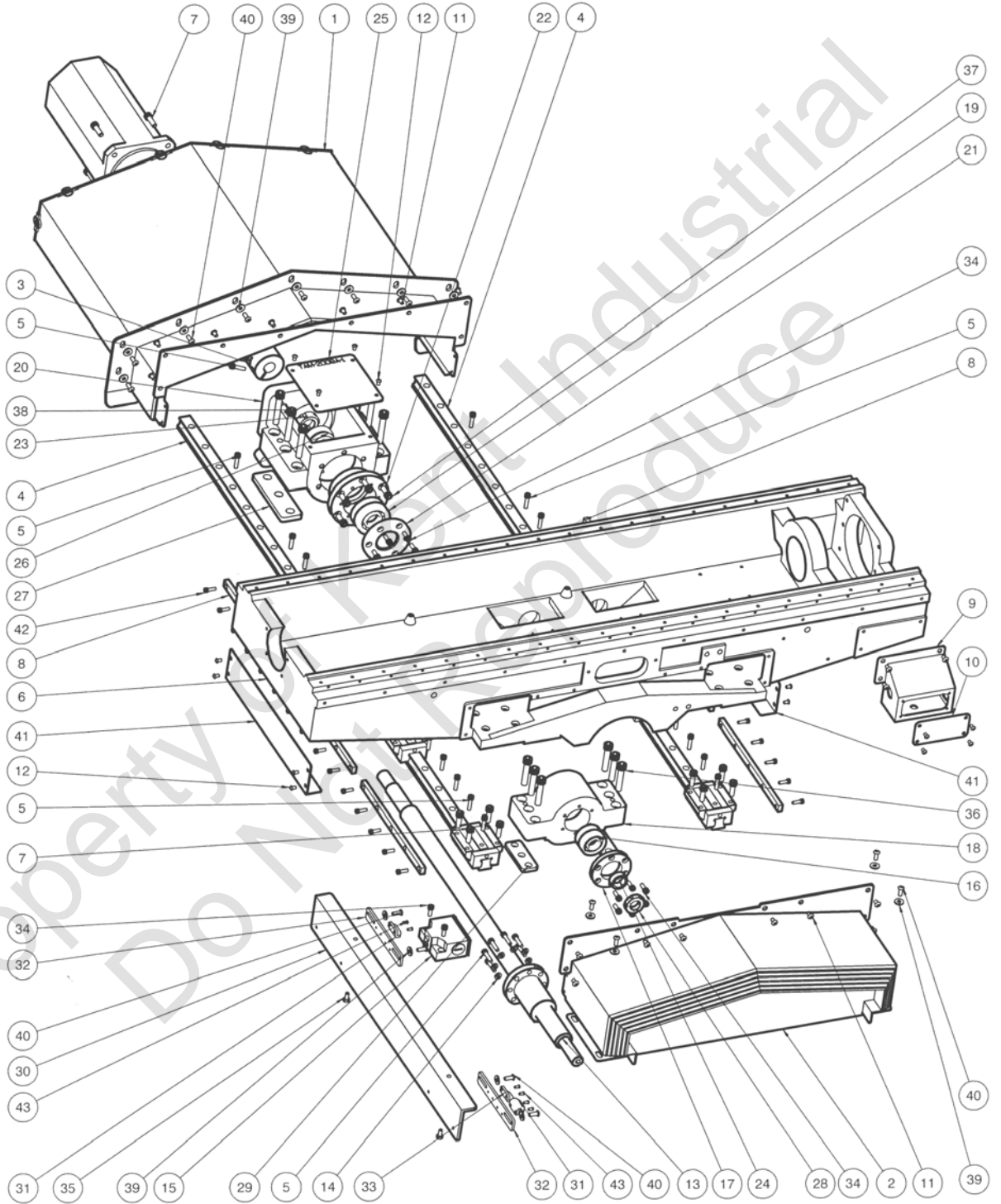
TW-24L EXTERNAL FULL ENCLOSURE		
ITEM NO.	PARTS NO.	DESCRIPTION
1	TK-1019HN	ELECTRIC CABINET
2	TK-1001L	BASE
3	TK-5001H	COLUMN
4	TK-1201A	LEFT COVER
5	TK-1019-4	COVER
6	TA-1021A	PENDANT BOX
7	TK-1202A	RIGHTH COVER
8	TK-1207	WIRING BOX
9	TK-1204	COOLANT TANK
10	TK-1203L	LEFT DOOR
11	030-00000001	HANDLE (3Req)
12	TK-1210A	DOOR WHEEL ASS. (2Req)
13	TK-1211A	UPPER GUIDE
14	030-00000002	WHEEL (5Req)
15	TK-1209A	LOWER GUIDE (2Req)
16	TK-1203L-1	COVER(2Req)
17	TK-1208	COVER
18	TK-1201A-2	COVER(3Req)
19	TK-1217A	COVER
20	TK-1202A-1	COVER
21	TK-1201A-1	COVER
22	TK-1216	CHIP TANK
23	TK-1203L-2	ENHANCED GLASS (2Req)
24	TK-1206A	RIGHT WINDOW
25	TK-1205A	LEFT WINDOW
26	TA-1022C	FIXTURE DISK
27	TA-1022A	LOWER ROTATION DISK
28	TA-1021-II-1	COVER
29	001-M0600035	SOCKET HEAD CAP SCREW (2Req)
30	002-M0400008	HEMISPHERE HEAD CAP SCREW (9Req)
31	001-M0800020	SOCKET HEAD CAP SCREW (22Req)
32	TA-1022B	UPPER ROTATION DISK
33	001-M0600016	SOCKET HEAD CAP SCREW (60Req)
34	002-M0500008	HEMISPHERE HEAD CAP SCREW (103Req)
35	002-M0600016	HEMISPHERE HEAD CAP SCREW (15Req)
36	011-M0000006	WASHER (95Req)
37	001-M2000075	SOCKET HEAD CAP SCREW (8Req)
38	TB-1012	WASHER (8Req)
39	TK-1220A	ENHANCED GLASS (2Req)
40	TK-1221A	RUBBER GLASS THEARD PLATE (2Req)
41	001-M0600020	SOCKET HEAD CAP SCREW (8Req)
42	009-M000006	NUT (12Req)
43	011-M000008	WASHER (6Req)
44	TK-1215	SPINDLE CHILLER SUPPORT
45	TB-1001-3	LEVELING PAD (6Req)
46	TB-1001-1(110L)	FOUNDATION BOLT (110L) (6Req)
47	TB-1001-4	STEEL BALL (6Req)
48	TB-1001-2	NUT (6Req)
49	002-M0800016	HEMISPHERE HEAD CAP SCREW (4Req)
50	TK-1203L-3	RUBBER GLASS THEARD PLATE (2Req)

TW-24L CNC X-AXIS ASSEMBLY



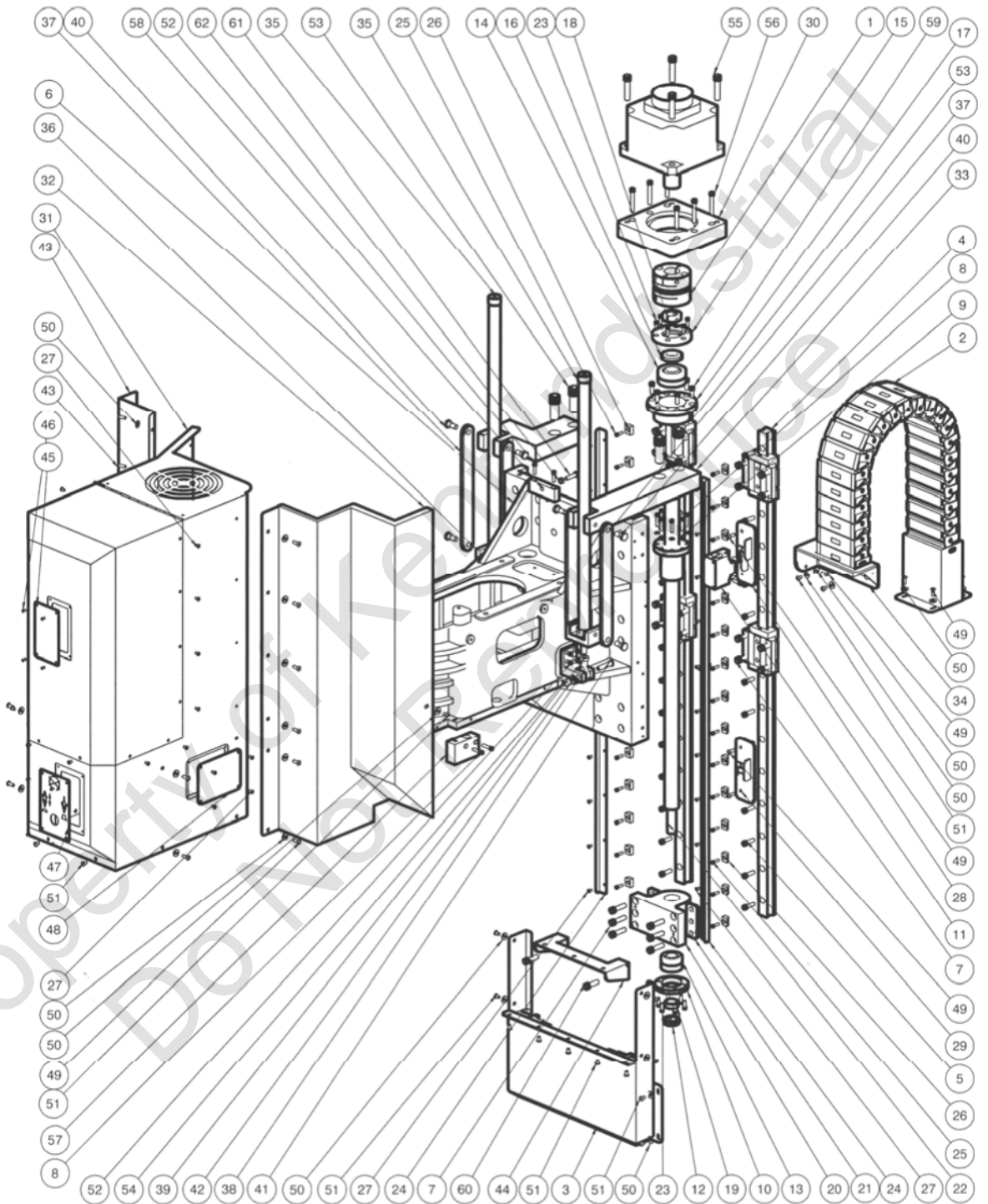
TW-24L CNC X-AXIS ASSEMBLY		
ITEM NO.	PARTS NO.	DESCRIPTION
1	TH-2038-28	CABLE DRAG CHAIN(PCF.10.10.-28P)
2	TK-2008L	LEFT TELESCOPIC
3	TK-2009L	RIGHT TELESCOPIC
4	TK-2006L	COUPLING-(24/28-22-24)
5	LGM-25-1438	LINEAR GUIDE WAY (2Req)
6	001-M0600025	SOCKET HEAD CAP SCREW (52Req)
7	TK-2001L	TABLE(760X460)
8	001-M0800030	SOCKET HEAD CAP SCREW (16Req)
9	TK-2002L	X-AXIS BALL SCREWS
10	020-0BST2562	PRECISION BALLSCREW BEARING (2Req)
11	020-0BST2047	PRECISION BALL SCREW BEARING (2Req)
12	TA-2020	BEARING BRACKET
13	TA-2011	BEARING RETAINER RING
14	3A-2011	BEARING RETAINER RING
15	TA-2013	DUST PROOF WASHER
16	021-0000MR25	LOCK NUT
17	021-0000MR20	LOCK NUT
18	TB-2011A-1	BEARING WASHER
19	001-M0800020	SOCKET HEAD CAP SCREW (6Req)
20	001-M0600016	SOCKET HEAD CAP SCREW (16Req)
21	TE-3012A	BEARING HOUSING
22	3025-3	WASHER (7Req)
23	TK-2018	SUPPORT FOR CABLE DRAG CHAIN
24	TK-2018L	SUPPORT FOR CABLE DRAG CHAN
25	002-M0400008	HEMISPHERE HEAD CAP SCREW (4Req)
26	TK-2005A	SERVO MOTOR BRACKKET
27	TK-2006	LINEAR GUIDE THREAD BLOCK (8Req)
28	002-M0800016	HEMISPHERE HEAD CAP SCREW (8Req)
29	TK-2007L	SUPPORT FOR TABLE GUARD
30	TK-2022L	X-AXIS LIMIT SWITCH BRACKET
31	022-00000001	LIMIT SWITCH
32	TK-2010L	SPLASH GUARD (2Req)
33	TK-2011L	SPLASH GUARD
34	TK-2011L-1	SPLASH GUARD
35	001-M0500016	SOCKET HEAD CAP SCREW (40Req)
36	002-M0600010	HEMISPHERE HEAD CAP SCREW (56Req)
37	002-M0500008	HEMISPHERE HEAD CAP SCREW (2Req)
38	TK-2015HA	LIMIT DOG
39	TK-2016A	LIMIT DOG
40	007-M0600016	HEX HD SCREW (4Req)
41	011-M0000006	WASHER (4Req)
42	TK-2001L-1	X-AXIS SHIPPING BRACKET
43	TK-2009L-3	CHIP COVER
44	001-M1000020	SOCKET HEAD CAP SCREW (2Req)
45	001-M0800025	SOCKET HEAD CAP SCREW (10Req)

TW-24L CNC Y-AXIS ASSEMBLY



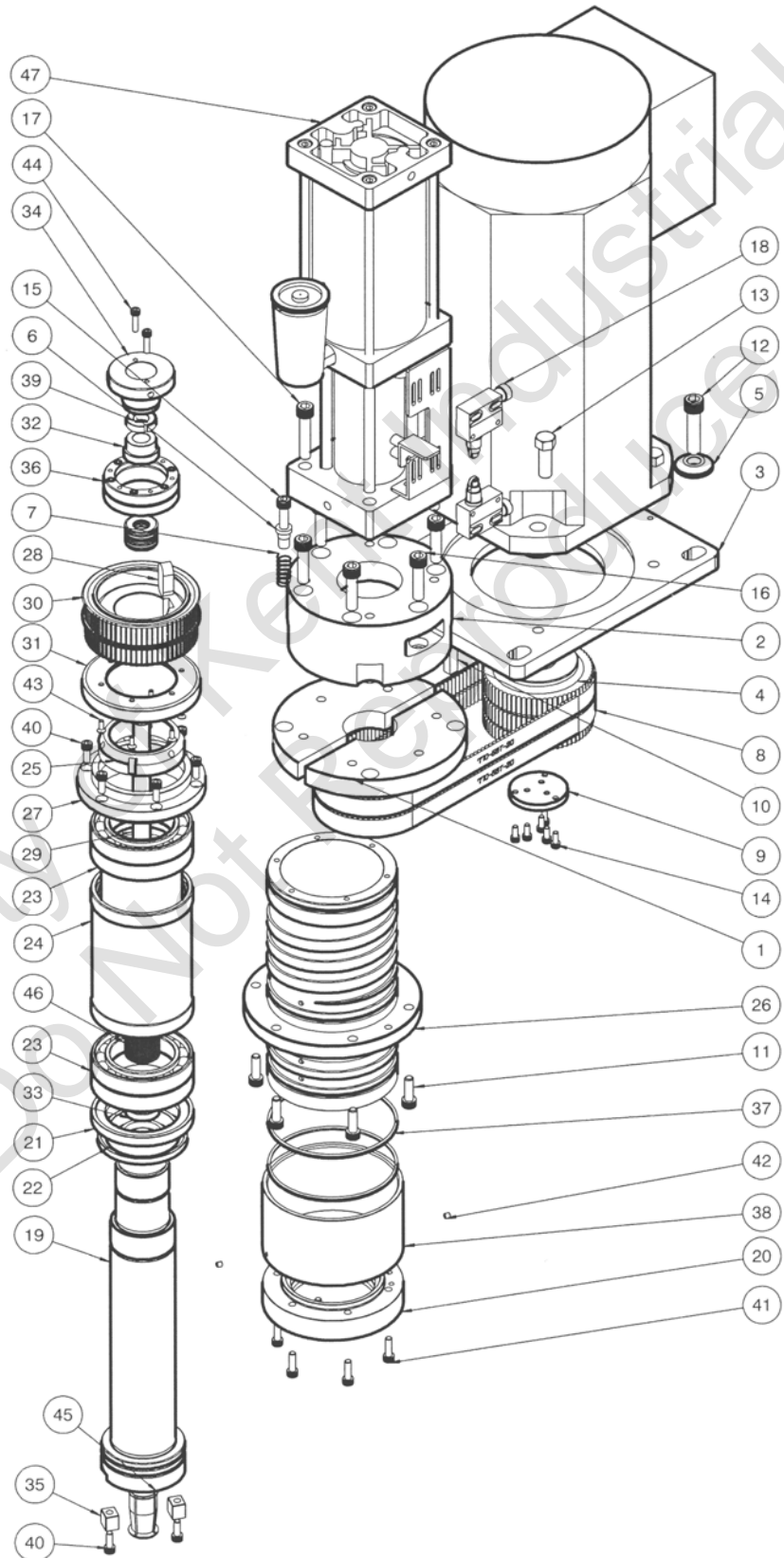
TW-24L CNC Y-AXIS ASSEMBLY		
ITEM NO.	PARTS NO.	DESCRIPTION
1	TK-3007AL	TELESCOPIC GUARD
2	TK-3008L	TELESCOPIC GUARD
3	TK-2006	COUPLING-24/28-22-24
4	LGW-25-1320	LINEAR GUIDE WAY (2Req)
5	001-M0600025	SOCKET HEAD CAP SCREW (40Req)
6	TK-3001L	SADDLE
7	001-M0800025	SOCKET HEAD CAP SCREW (20Req)
8	TK-2006L	LINEAR GUIDE THREAD BLOCK (6Req)
9	TK-2020	WIRE BOX
10	TK-2020-1	COVER
11	002-M0600010	HEMISPHERE HEAD CAP SCREW (19Req)
12	002-M0500008	HEMISPHERE HEAD CAP SCREW (16Req)
13	TK-3002	BALL SCREW 32-P12
14	3025-3	WASFER (7Req)
15	022-00000001	LIMIT SWITCH BNS-819-B02-D12-61-12-3B
16	020-0BST2047	PRECISION BALL SCREW BEARING (2Req)
17	3A-2011	BEARING RETAINER RING
18	HV-2007	BEARING HOUSING
19	020-0BST2562	PRECISION BALL SCREW BEARING (2Req)
20	TA-2009F	BEARING BRACKET
21	TA-2011	BEARING RETAINER RING
22	TA-2020	BEARING BRACKET
23	021-0000MR25	LOCK NUT
24	TB-2011A-1	BEARING WASHER
25	TAM-2009A-1	COVER
26	TJ-2002-1	BEARING WASHER
27	TL-2017	SPACER (2Req)
28	021-0000MR20	LOCK NUT
29	TP-3035A-1	SPACER (2Req)
30	TK-3005L	LIMIT DOG BRACKET
31	4B -2029	LIMIT DOG (2Req)
32	4B -2031	LIMIT DOG BRACKET (2Req)
33	4B -2029H	LIMIT DOG
34	001-M0600016	SOCKET HEAD CAP SCREW (14Req)
35	007-M0600016	HEX HD SCREW (2Req)
36	001-M1000050	SOCKET HEAD CAP SCREW (6Req)
37	001-M0800020	SOCKET HEAD CAP SCREW (6Req)
38	001-M1000060	SOCKET HEAD CAP SCREW (6Req)
39	011-M0000006	WASHER (17Req)
40	002-M0600016	HEMISPHERE HEAD CAP SCREW (17Req)
41	TK-3007AL-2	SPLASH GUARD (2Req)
42	001-M0500016	SOCKET HEAD CAP SCREW (30Req)
43	002-M0400008	HEMISPHERE HEAD CAP SCREW (6Req)

TW-24L CNC Z-AXIS ASSEMBLY

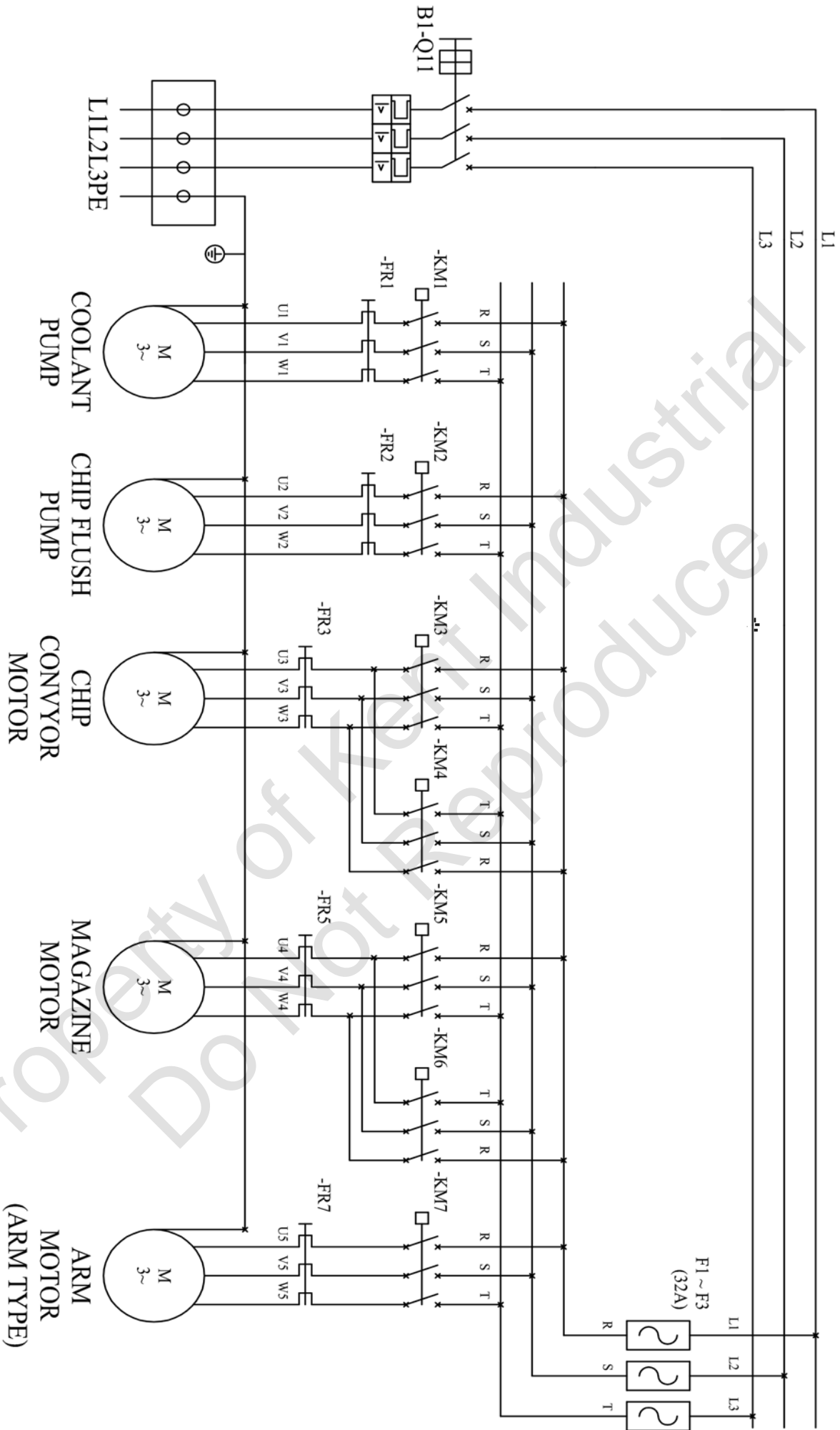


TW-24L CNC Z-AXIS ASSEMBLY		
IEEM NO.	PARTS NO.	DESCRIPTION
1	TH-2017	COUPLING-(SCF-080-SA-22B-35B)
2	HV-4046A	CABLE DRAG CHAIN (MP36-102-23P)
3	TK-4010L	TELESCOPIC GUARD
4	LGW-30-1198	LINEAR GUIDE WAY (2SETS)
5	001-M0800025	SOCKET HEAD CAP SCREW (30Req)
6	TK-4001	HEAD STORCK
7	001-M1000035	SOCKET HEAD CAP SCREW (22Req)
8	001-M0600025	SOCKET HEAD CAP SCREW (9Req)
9	3025-3	WASHER (7Req)
10	3A-2011	BEARING RETAINER RING
11	022-00000001	LIMIT SWITCH (BNS-819-B02-D12-61-12-3B)
12	021-0000MR20	LOCK NUT
13	020-0BST2047	PRECISION BALL SCREW BEARING (2Req)
14	020-0BST2562	PRECISION BALL SCREW BEARING (2Req)
15	TA-2011	BEARING RETAINER RING
16	TA-2013	DUST-PROOF WASHER
17	TA-2020	BEARING BRACKET
18	021-0000MR25	LOCK NUT
19	TB 2011A 1	BEARING WASHER
20	TK-4003	BEARING HOUSING
21	TP-3035A-1	SPACER (2Req)
22	TK-4002L	Z-AXIS BALL SCREW 32-P12
23	001-M0600016	SOCKET HEAD CAP SCREW (12Req)
24	TK-4011L	SPLASH GUARD (2Req)
25	001-M0500016	SOCKET HEAD CAP SCREW (30Req)
26	TK-2004	LINEAR GUIDE THREAD BLOCK(T1) (30Req)
27	002-M0500008	HEMISPHERE HEAD CAP SCREW (40Req)
28	TH-4010HA	LIMIT DOG
29	TH-4010B	LIMIT DOG
30	TK-2005	SERVO MOTOR BRACKET
31	TK-4050	HEAD -STOCK COVER
32	TK-4050-2	COVER
33	TK-5001-1	NITROGEN CYLINDER BRACKET
34	TAM-5001-1	BRACKET FOR CABLE DRAGE CHAIN
35	TK-5001-6	CYLINDER (2Req)
36	TK-5001-3	NITROGEN CYLINDER BRACKET (2Req)
37	TK-5001-4	SUPPORT PLATE (4Req)
38	TK-5001-5	BRACKET (2Req)
39	TK-5001-7	BULL-EYE CONTOUCTIONT (2Req)
40	TK-5001-8	POSITION SCREW (8Req)
41	TK-5001-9	PIN (2Req)
42	5K-6200-1	WASHER (2Req)
43	TK-4050-4	COVER
44	TK-4001-1	Z-AXIS SHIPPING BRACKET
45	TH-4050-5	OIL SIGHT
46	002-M0400008	HEMISPHERE HEAD CAP SCREW (8Req)
47	TM-4052	INSTRUSTION PLATE FOR TOOL CHAGED BUTTON
48	TK-4050-3	COVER
49	002-M0600016	HEMISPHERE HEAD CAP SCREW (29Req)
50	011-M0000006	WASHER (36Req)
51	002-M0600010	HEMISPHERE HEAD CAP SCREW (18Req)
52	001-M0600020	SOCKET HEAD CAP SCREW (12Req)
53	001-I0000017	SOCKET HEAD CAP SCREW (4Req)
54	003-M0600016	FLAT HEAD CAP SCREW (2Req)
55	001-M1200050	SOCKET HEAD CAP SCREW (4Req)
56	001-M0800050	SOCKET HEAD CAP SCREW (6Req)
57	TM-4045	TAP BRACKET
58	TH-4001-1	SPLASH GUARD
59	001-M0800020	SOCKET HEAD CAP SCREW (6Req)
60	001-M1000030	SOCKET HEAD CAP SCREW (2Req)
61	007-M0800030	HEX HD SCREW
62	009-M0000008	NUT

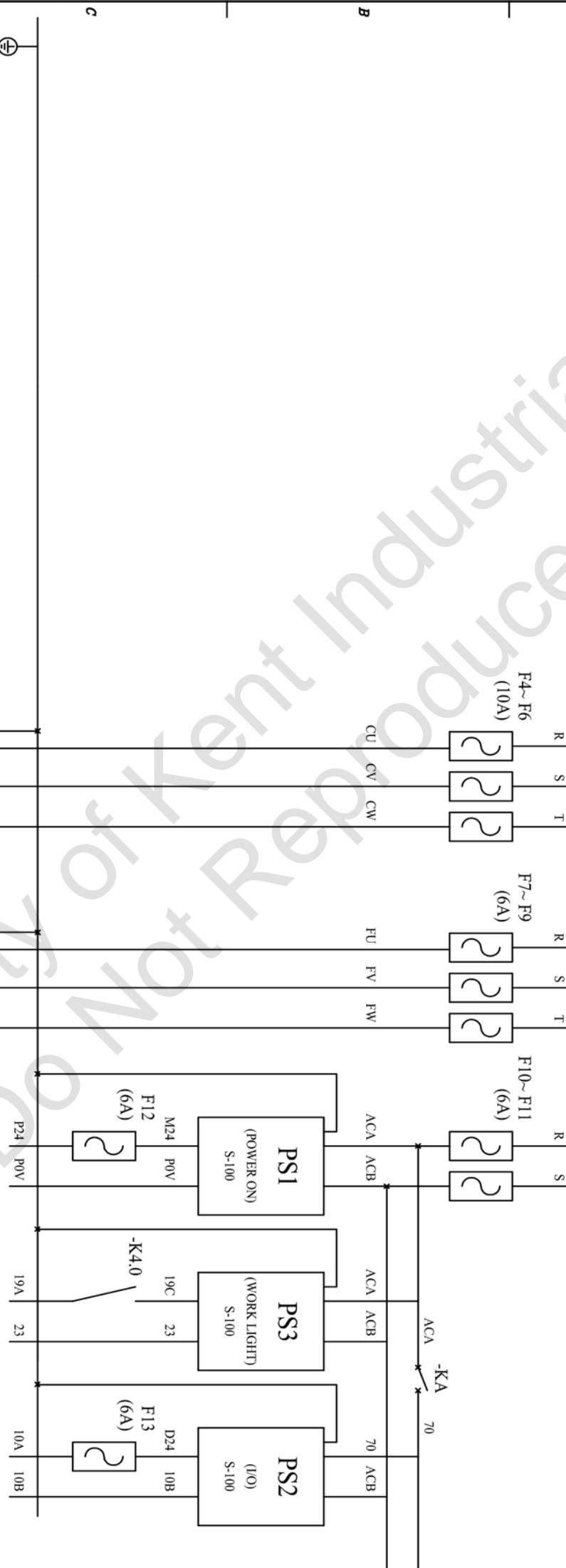
TW-24L CNC SPINDLE ASSEMBLY



TW-24L CNC SPINDLE ASSEMBLY		
ITEM NO.	PARTS NO.	DESCRIPTION
1	TK-4015	FLOATING HOLDER
2	TK-4013	OIL CYLINDER BRACKET
3	TM-4043	MOTOR BRACKET
4	TL-4050F	TIMING PULLEY
5	TH-4061	WASHER (4Req)
6	TL-4052	SLEEVE FOR SPRING (4Req)
7	5K-6242	COMPRESSION SPRING (4Req)
8	023-5GT77020	TIMING BELT 5GT-770-20 (2Req)
9	TA-4040	FIXING COLLAR FOR FLOATING HOLDER
10	013-010080055	KEY (10x8x55)
11	001-M0800025	SOCKET HEAD CAP SCREW (6Req)
12	001-M1200050	SOCKET HEAD CAP SCREW (4Req)
13	007-M1200035	HEX HD SCREW (4Req)
14	001-M0500012	SOCKET HEAD CAP SCREW (6Req)
15	001-M0800035	SOCKET HEAD CAP SCREW (4Req)
16	001-M1000040	SOCKET HEAD CAP SCREW (6Req)
17	001-M1000050	SOCKET HEAD CAP SCREW (4Req)
18	022-00000005	LIMIT SWITCH(D4E-1A20N) (2Req)
19	TK-4101	SPINDLE BT40# TAPER
20	TK-4103	BEARING RETAINER RING
21	TK-4104	DUST-DROOF RING
22	TK-4105	DUST WASHER
23	020-007012P4	SUPER PRECISION SPINDLE BEARING (4Req)
24	TK-4106	BEARING SPACER
25	TM-4018	LOCK NUT
26	TK-4102	SPINDLE CARTRIDGE
27	TK-4109	DUST-PROOF COLLAR
28	013-01610035	KEY (16x10x35)
29	TK-4114	DRAW BAR
30	TK-4113	TIMING PULLEY
31	TK-4116	DUST-PROOF COLLAR
32	TK-4110	DISK SPRING WASHER
33	TK-4111	WASHER
34	TK-4115	PRECISION LOCKNUT
35	TK-4120	KEEPER KEY (2Req)
36	021-0000MK50	LOCK NUT
37	024-0000G115	O-RING G115 (4Req)
38	TK-4117	O-RING COVER
39	021-0000MR15	LOCK NUT
40	001-M0600016	SOCKET HEAD CAP SCREW (8Req)
41	001-M0600020	SOCKET HEAD CAP SCREW (6Req)
42	008-M0500005	SET SCREW (2Req)
43	003-M0400012	FLAT HEAD CAP SCREW (6Req)
44	001-M0500020	SOCKET HEAD CAP SCREW (2Req)
45	TM-4022	4 JAWS GRIPPER
46	TH-4127	DISK SPRING (31.5x16.3x1.75) (96Req)
47	TM-4043	OIL CYLINDER (3Tx13)



TITLE		TW-24L	
MAIN POWER INPUT			
CH.	ALEX YU	PAGE	B01/01
DATE	10-12-2010	VERSION	TWH REV.1.0



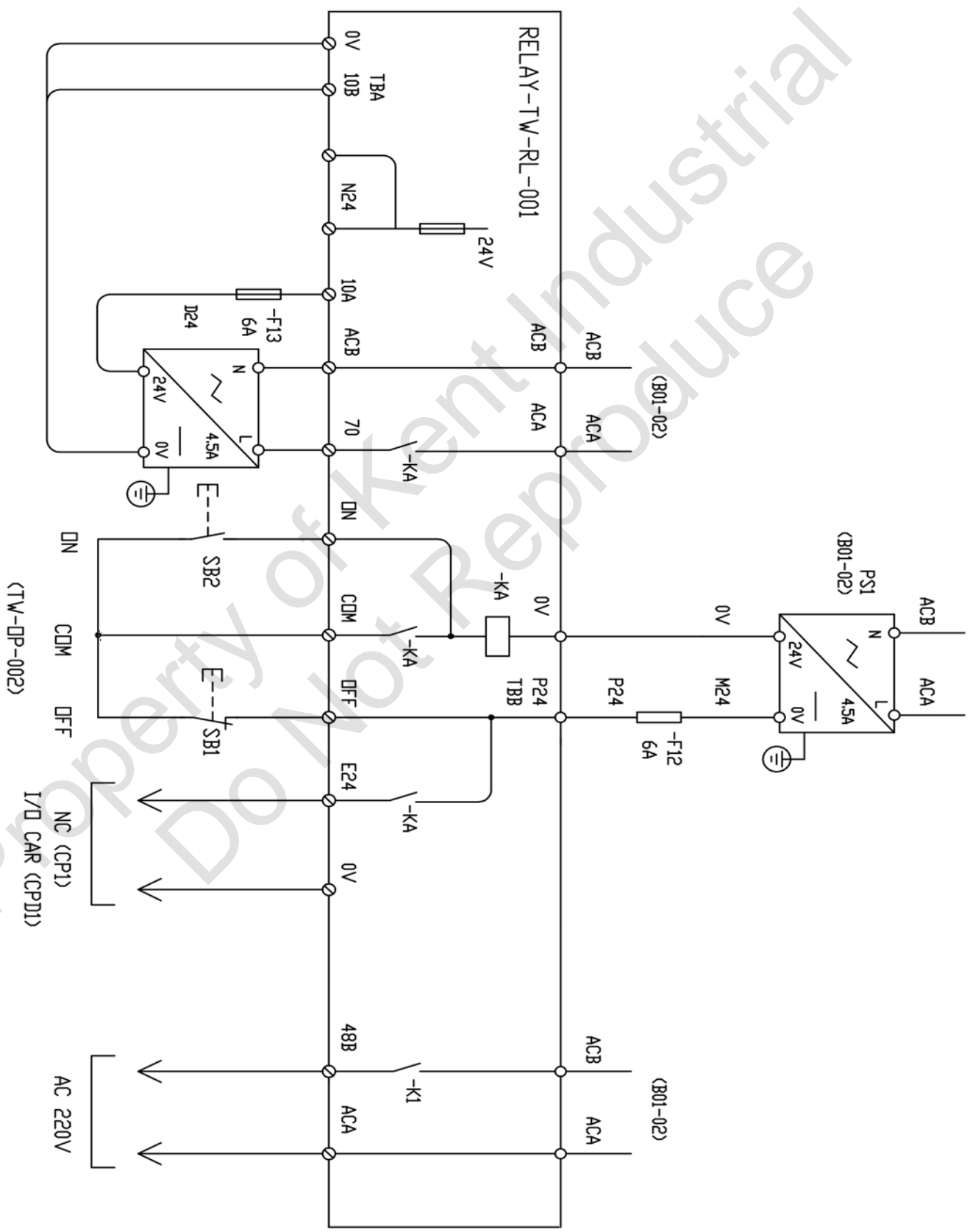
SPINDLE OIL CHILLER

SPINDLE MOTOR FAN



Property of Kent Industrial Do Not Reproduce

<p>TITLE</p> <p>TW-24L</p> <p>MAIN POWER INPUT</p>	<p>CH</p> <p>ALEX YU</p> <p>DATE</p> <p>10-12-2010</p>
<p>PAGE</p> <p>B01/02</p>	<p>VERSION</p> <p>TWH REV.1.0</p>

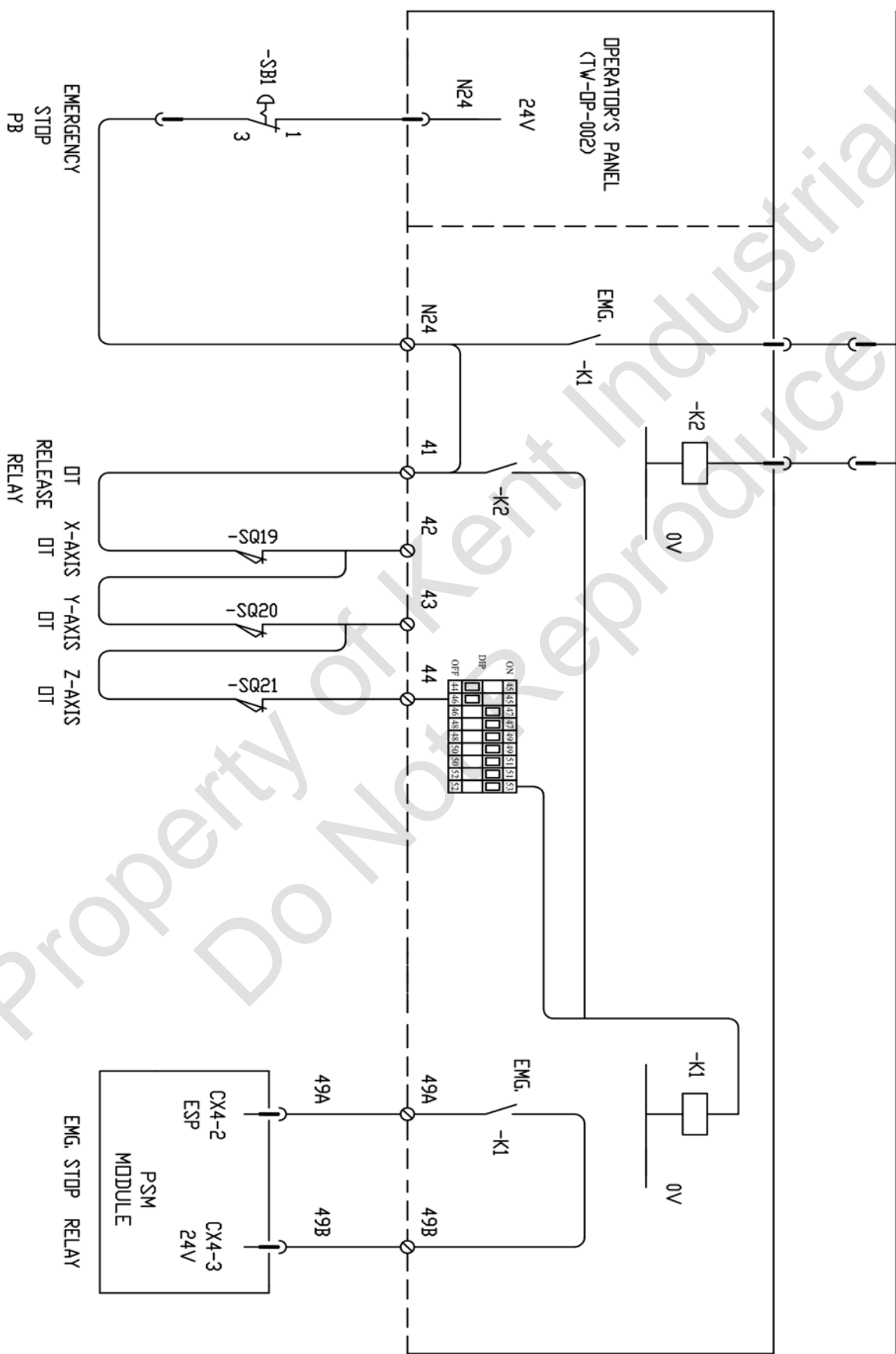


TITLE **TW-24L**
POWER ON CIRCUIT

CH	ALEX YU	PAGE	B02/01
DATE	10-12-2010	VERSION	TWL REV.1.0

CONTROL CIRCUIT OF THE EMERGENCY STOP

SYMBOL-NAME	EMG STOP	DT RELEASE
PLC-ADDRESS	X8.4	Y4.2
CONNECT-PIN NO.	CB105-A8	CB106-A17

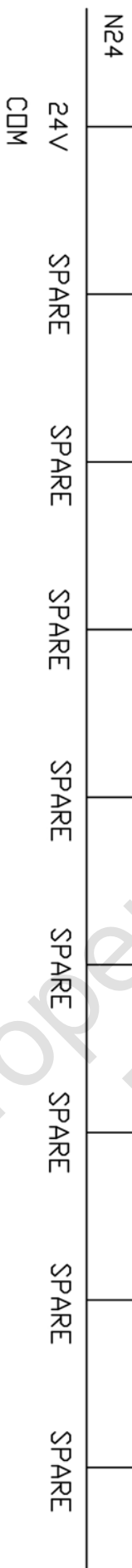


TITLE
TW-24L
OVER TRAVEL CIRCUIT

CH. ALEX YU	PAGE B03/01
DATE 10-12-2010	VERSION TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	24V	X1.0	X1.1	X1.2	X1.3	X1.4	X1.5	X1.6	X1.7
I/D CONNECT	ID1-CE57-B1 ID2-CE56-B1	ID1-CE56-A2	ID1-CE56-B2	ID1-CE56-A3	ID1-CE56-B3	ID1-CE56-A4	ID1-CE56-B4	ID1-CE56-A5	ID1-CE56-B5
PCB, TERMINAL	TB2-N24	X0T-1	X0T-2	X0T-3	X0T-4	X0T-5	X0T-6	X0T-7	X0T-8
LINE NUMBER	N24	X0.0	X0.1	X0.2	X0.3	X0.4	X0.5	X0.6	X0.7



TITLE		TW-24L	
INPUT SIGNAL (BASIC)			
CH	ALEX YU	PAGE	C01/01
DATE	10-12-2010	VERSION	TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	24V	X2.0	X2.1	X2.2	X2.3	X2.4	X2.5	X2.6	X2.7
I/D CONNECT	ID1-CE57-B1 ID2-CE56-B1	ID1-CE56-A6	ID1-CE56-B6	ID1-CE56-A7	ID1-CE56-B7	ID1-CE56-A8	ID1-CE56-B8	ID1-CE56-A9	ID1-CE56-B9
PCB, TERMINAL	TB2-N24	X1T-1	X1T-2	X1T-3	X1T-4	X1T-5	X1T-6	X1T-7	X1T-8
LINE NUMBER	N24	X1.0	X1.1	X1.2	X1.3	X1.4	X1.5	X1.6	X1.7



TITLE		CH	PAGE
TW-24L		ALEX YU	C02/01
INPUT SIGNAL (BASIC)		DATE	VERSION
		10-12-2010	TWH REV.1.0

I/O INTERFACE

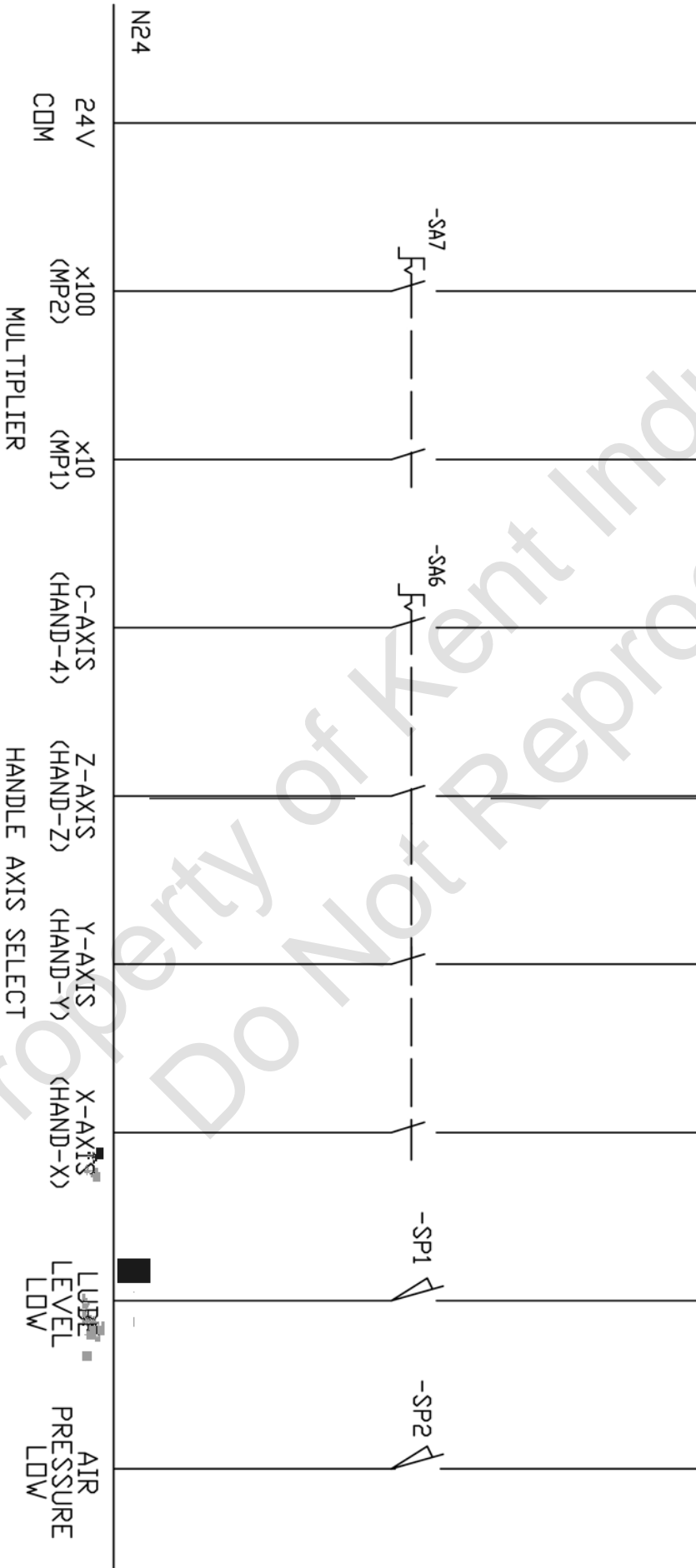
PLC ADDRESS	24V	X3.0	X3.1	X3.2	X3.3	X3.4	X3.5	X3.6	X3.7
I/D CONNECT	ID1-CE57-B1 ID2-CE56-B1	ID1-CE56-A10	ID1-CE56-B10	ID1-CE56-A11	ID1-CE56-B11	ID1-CE56-A12	ID1-CE56-B12	ID1-CE56-A13	ID1-CE56-B13
PCB, TERMINAL	TB2-N24	X2T-1	X2T-2	X2T-3	X2T-4	X2T-5	X2T-6	X2T-7	X2T-8
LINE NUMBER	N24	X2.0	X2.1	X2.2	X2.3	X2.4	X2.5	X2.6	X2.7



TITLE	TW-24L		CH	ALEX YU	PAGE	C03/01
	INPUT SIGNAL DIAGRAM		DATE	10-12-2010	VERSION	TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	24V	X7.0	X7.1	X7.2	X7.3	X7.4	X7.5	X7.6	X7.7
I/D CONNECT	ID1-CE57-B1 ID2-CE56-B1	I02-CE56-A2	ID2-CE56-B2	ID2-CE56-A3	ID2-CE56-B3	ID2-CE56-A4	ID2-CE56-B4	ID2-CE56-A5	ID2-CE56-B5
PCB, TERMINAL	TB2-N24							XYT-5	XYT-7
LINE NUMBER	N24	X3.0	X3.1	X3.2	X3.3	X3.4	X3.5	X3.6	X3.7



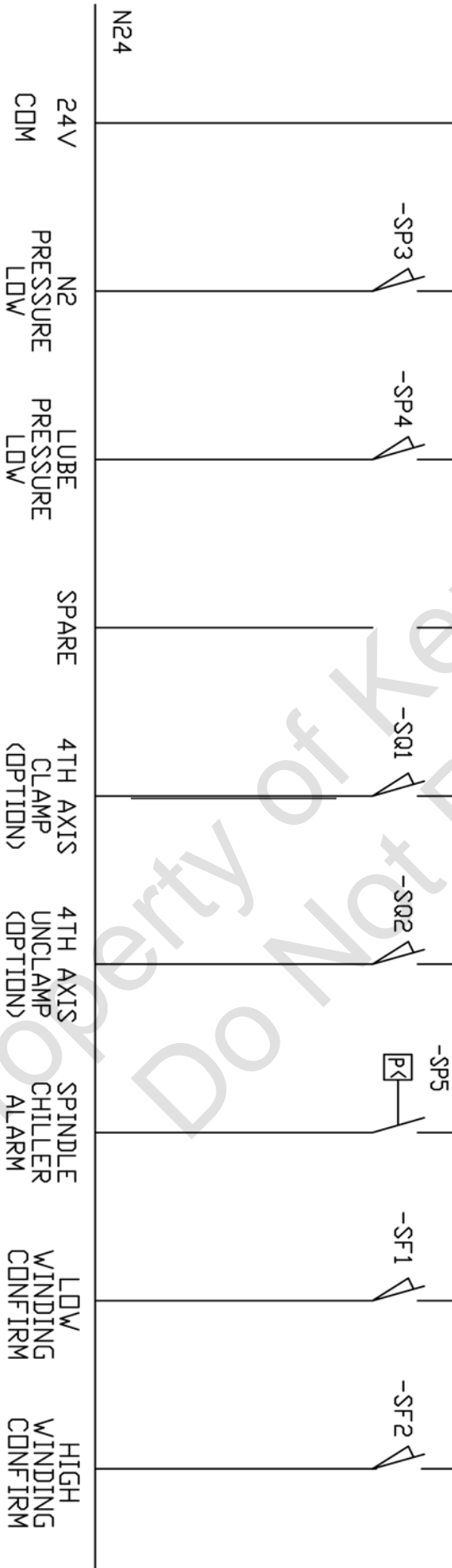
TITLE: TW-24L INPUT SIGNAL (BASIC)

CH: ALEX YU DATE: 10-12-2010

PAGE: C04/01 VERSION: TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	24V	X4.0	X4.1	X4.2	X4.3	X4.4	X4.5	X4.6	X4.7
I/D CONNECT	ID1-CE57-B1 ID2-CE56-B1	ID1-CE57-A2	ID1-CE57-B2	ID1-CE57-A3	ID1-CE57-B3	ID1-CE57-A4	ID1-CE57-B4	ID1-CE57-A5	ID1-CE57-B5
PCB. TERMINAL	TB2-N24	X4T-1	X4T-2	X4T-3	X4T-4	X4T-5	X4T-6	X4T-7	X4T-8
LINE NUMBER	N24	X4.0	X4.1	X4.2	X4.3	X4.4	X4.5	X4.6	X4.7

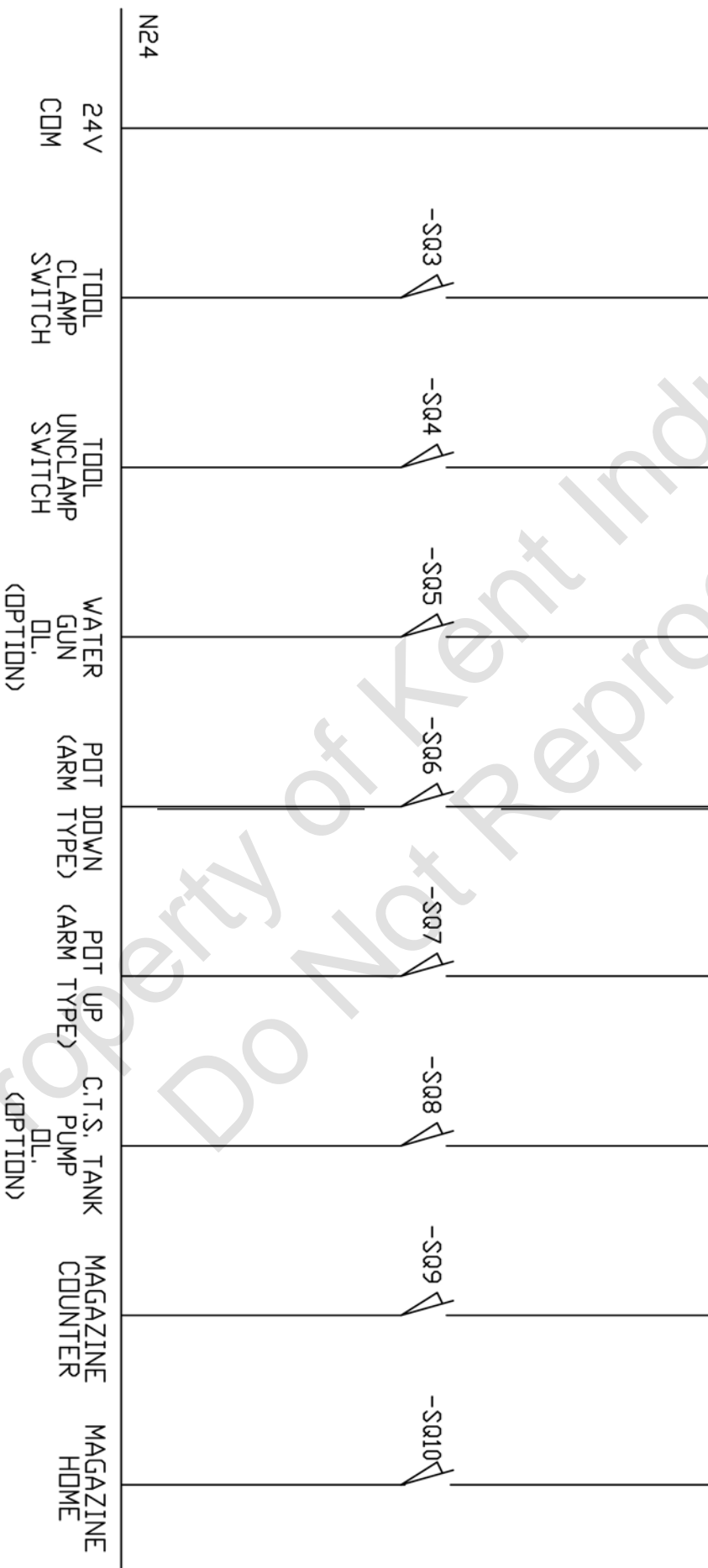


TITLE
TW-24L
INPUT SIGNAL (BASIC)

CHL ALEX YU DATE 10-12-2010	PAGE C05/01 VERSION TWH REV.1.0
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I/O INTERFACE

PLC ADDRESS	24V	X5.0	X5.1	X5.2	X5.3	X5.4	X5.5	X5.6	X5.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID1-CE57-A6	ID1-CE57-B6	ID1-CE57-A7	ID1-CE57-B7	ID1-CE57-A8	ID1-CE57-B8	ID1-CE57-A9	ID1-CE57-B9
PCB. TERMINAL	TB2-N24	X5T-1	X5T-2	X5T-3	X5T-4	X5T-5	X5T-6	X5T-7	X5T-8
LINE NUMBER	N24	X5.0	X5.1	X5.2	X5.3	X5.4	X5.5	X5.6	X5.7



24V
COM

TDDL
CLAMP
SWITCH

TDDL
UNCLAMP
SWITCH

WATER
GUN
DL.
(OPTION)

POT
DOWN
(ARM TYPE)

POT
UP
(ARM TYPE)

C.T.S. TANK
PUMP
DL.
(OPTION)

MAGAZINE
COUNTER

MAGAZINE
HOME

TITLE

TW-24L

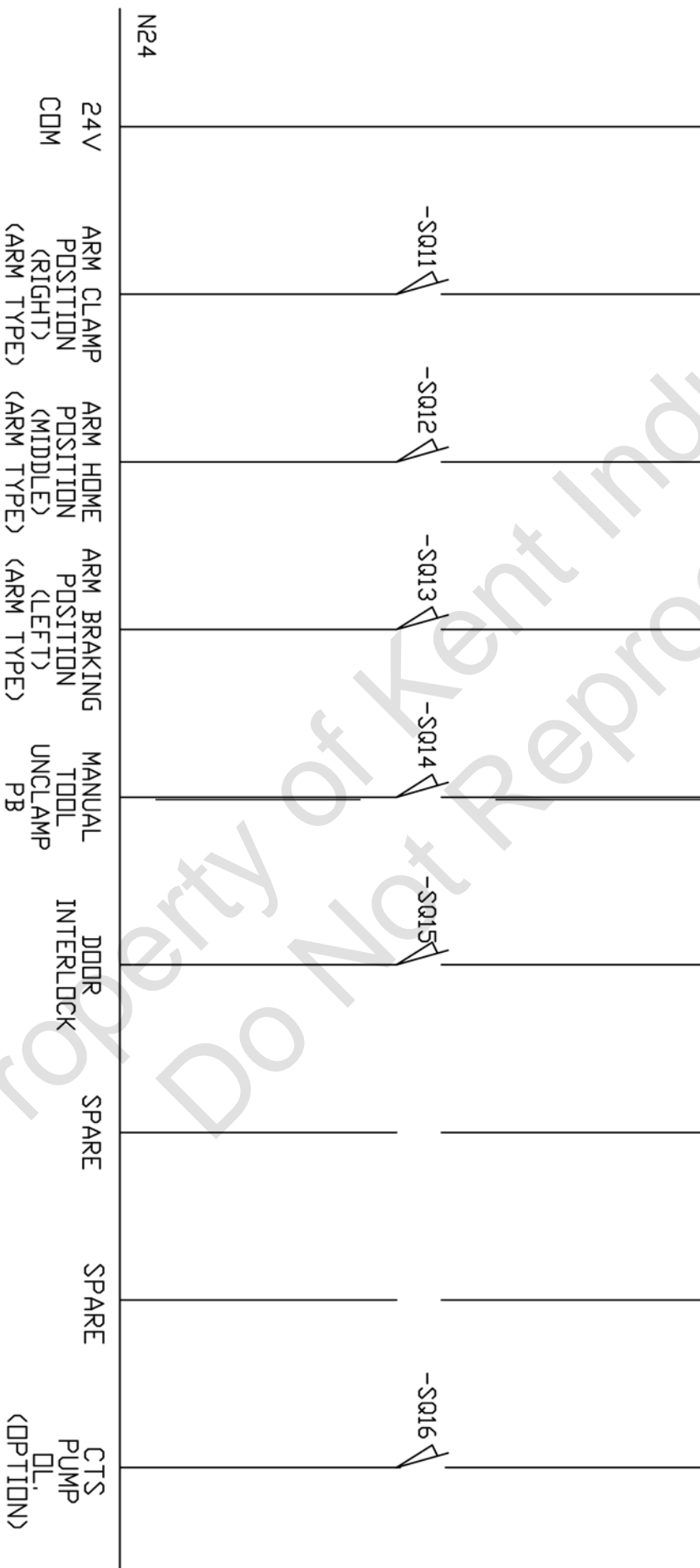
INPUT SIGNAL (BASIC)

CH. **ALEX YU** PAGE **C06/01**

DATE **10-12-2010** VERSION **TWH REV.1.0**

I/O INTERFACE

PLC ADDRESS	24V	X6.0	X6.1	X6.2	X6.3	X6.4	X6.5	X6.6	X6.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID1-CE57-A10	ID1-CE57-B10	ID1-CE57-A11	ID1-CE57-B11	ID1-CE57-A12	ID1-CE57-B12	ID1-CE57-A13	ID1-CE57-B13
PCB, TERMINAL	TB2-N24	X6T-1	X6T-2	X6T-3	X6T-4	X6T-5	X6T-6	X6T-7	X6T-8
LINE NUMBER	N24	X6.0	X6.1	X6.2	X6.3	X6.4	X6.5	X6.6	X6.7



TITLE	TW-24L		CH	ALEX YU	PAGE	C07/01
	INPUT SIGNAL (BASIC)		DATE	10-12-2010	VERSION	TWH REV.1.0

I/O INTERFACE

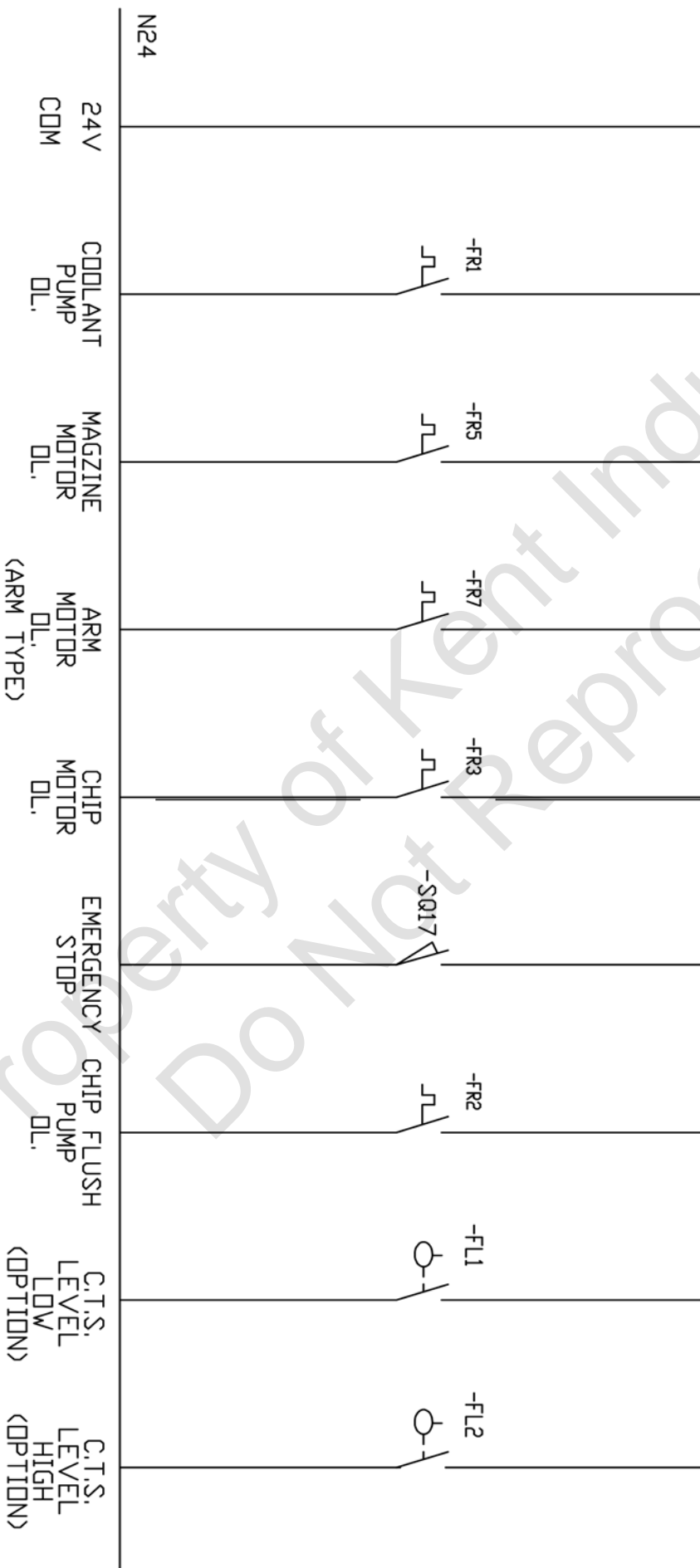
PLC ADDRESS	24V	X11.0	X11.1	X11.2	X11.3	X11.4	X11.5	X11.6	X11.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID2-CE57-A6	ID2-CE57-B6	ID2-CE57-A7	ID2-CE57-B7	ID2-CE57-A8	ID2-CE57-B8	ID2-CE57-A9	ID2-CE57-B9
PCB, TERMINAL	TB2-N24	TW-DP-002 SP/X-1	TW-DP-002 SP/X-2	TW-DP-002 SP/X-3	TW-DP-002 SP/X-4	TW-DP-002 SP/X-5	TW-DP-002 SP/X-6	TW-DP-002 SP/X-7	TW-DP-002 MST
LINE NUMBER	N24	X10.0	X10.1	X10.2	X10.3	X10.4	X10.5	X10.6	



TITLE		CH	PAGE
TW-24L		ALEX YU	C08/01
INPUT SIGNAL (BASIC)		DATE	VERSION
		10-12-2010	TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	24V	X8.0	X8.1	X8.2	X8.3	X8.4	X8.5	X8.6	X8.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID2-CE56-A6	ID2-CE56-B6	ID2-CE56-A7	ID2-CE56-B7	ID2-CE56-A8	ID2-CE56-B8	ID2-CE56-A9	ID2-CE56-B9
PCB. TERMINAL	TB2-N24	X8T-1	X8T-2	X8T-3	X8T-4	X8T-5	X8T-6	X8T-7	X8T-8
LINE NUMBER	N24	X8.0	X8.1	X8.2	X8.3	X8.4	X8.5	X8.6	X8.7



TITLE: TW-24L INPUT SIGNAL (BASIC)

CH: ALEX YU DATE: 10-12-2010

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I/O INTERFACE

PLC ADDRESS	24V	X9.0	X9.1	X9.2	X9.3	X9.4	X9.5	X9.6	X9.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID2-CE56-A10	ID2-CE56-B10	ID2-CE56-A11	ID2-CE56-B11	ID2-CE56-A12	ID2-CE56-B12	ID2-CE56-A13	ID2-CE56-B13
PCB, TERMINAL	TB2-N24	X9T-1	X9T-2	X9T-3	X9T-4	X9T-5	X9T-6	X9T-7	X9T-8
LINE NUMBER	N24	X9.0	X9.1	X9.2	X9.3	X9.4	X9.5	X9.6	X9.7



TITLE: **TW-24L**
 INPUT SIGNAL (BASIC)

CH: **ALEX YU** DATE: **10-12-2010**

PAGE: **C10/01** VERSION: **TWH REV.1.0**

I/O INTERFACE

PLC ADDRESS	24V	X10.0	X10.1	X10.2	X10.3	X10.4	X10.5	X10.6	X10.7
I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID2-CE57-A2	ID2-CE57-B2	ID2-CE57-A3	ID2-CE57-B3	ID2-CE57-A4	ID2-CE57-B4	ID2-CE57-A5	ID2-CE57-B5
PCB, TERMINAL	TB2-N24	X7T-8	X7T-7	X7T-6	X7T-5	X7T-4	X7T-3	X7T-2	X7T-1
LINE NUMBER	N24	X7.0	X7.1	X7.2	X7.3	X7.4	X7.5	X7.6	X7.7



24V M70 FINISH M71 FINISH M72 FINISH M73 FINISH M74 FINISH M75 FINISH M76 FINISH M77 FINISH

CDM

TITLE		CH	PAGE
TW-24L		ALEX YU	C11/01
INPUT SIGNAL (BASIC)		DATE	VERSION
		10-12-2010	TWH REV.1.0

I/O INTERFACE

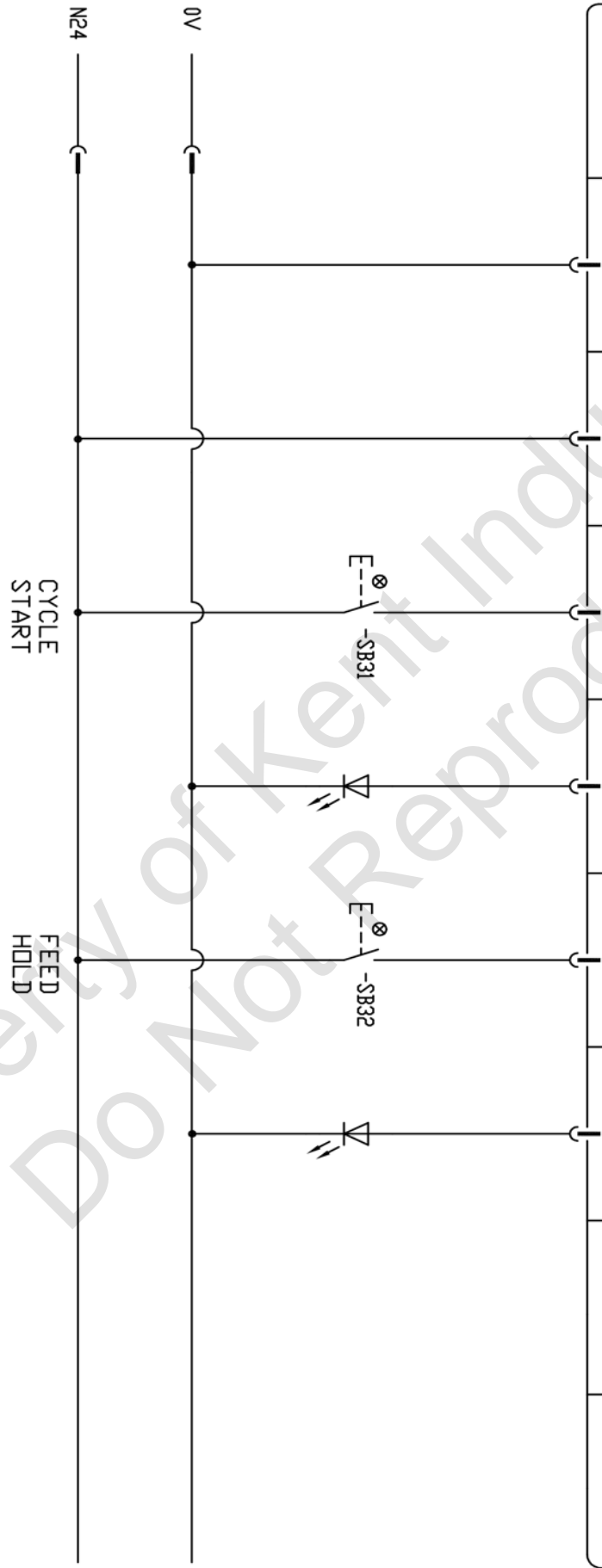
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I/D CONNECT	ID2-CE56-B1 ID1-CE57-B1	ID2-CE57-A10	ID2-CE57-B10	ID2-CE57-A11	ID2-CE57-B11	ID2-CE57-A12	ID2-CE57-B12	ID2-CE57-A13	ID2-CE57-B13
PCB, TERMINAL	TB2-N24	X11T-8	X11T-7	X11T-6	X11T-5	X11T-4	X11T-3	X11T-2	X11T-1
LINE NUMBER	N24	X11.0	X11.1	X11.2	X11.3	X11.4	X11.5	X11.6	X11.7



TITLE		CH	PAGE
TW-24L		ALEX YU	C12/01
INPUT SIGNAL (BASIC)		DATE	VERSION
		10-12-2010	TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	0V	24V	X30.0	Y30.0	X30.1	Y30.1
I/O CARD CONNECT	CE56(A1,A14) CE57(A1,B14)	CE56(B1) CE57(B1)	CE56-A2	CE56-A16	CE56-B2	CE56-B16
PANEL CONNECT			CYCLE-2	CYCLE-4	HOLD-2	HOLD-4

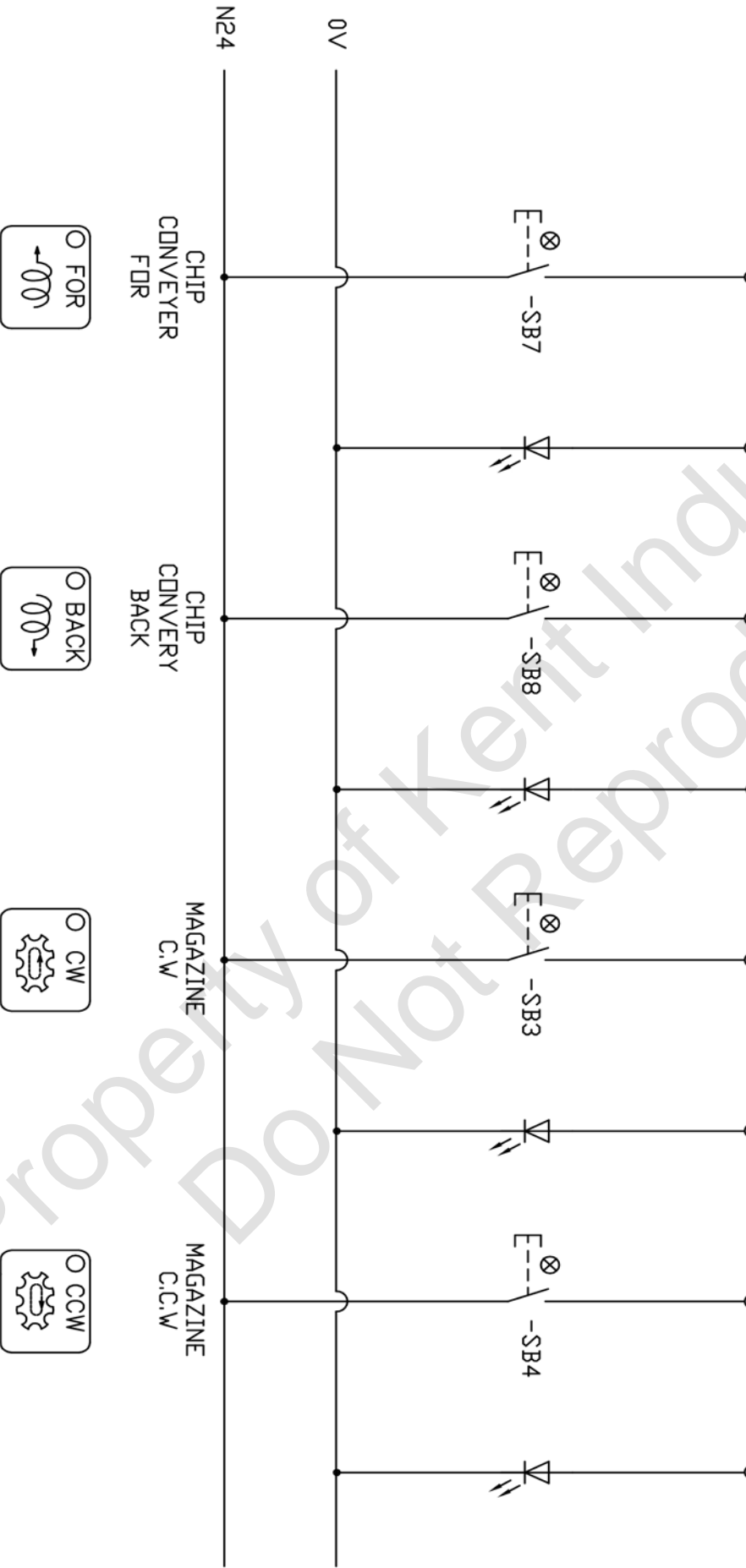


TITLE
TW-24L
PANEL INPUT

CH. ALEX YU
DATE 10-12-2010
PAGE D01/01
VERSION TWH REV.1.0

I/O INTERFACE

PLC ADDRESS	X35.1	Y33.4	X35.2	Y33.3	X34.6	Y33.7	X34.7	Y33.6
I/O CARD CONNECT	CE57-B10	CE57-A22	CE57-A11	CE57-B21	CE57-A9	CE57-B23	CE57-B9	CE57-A23

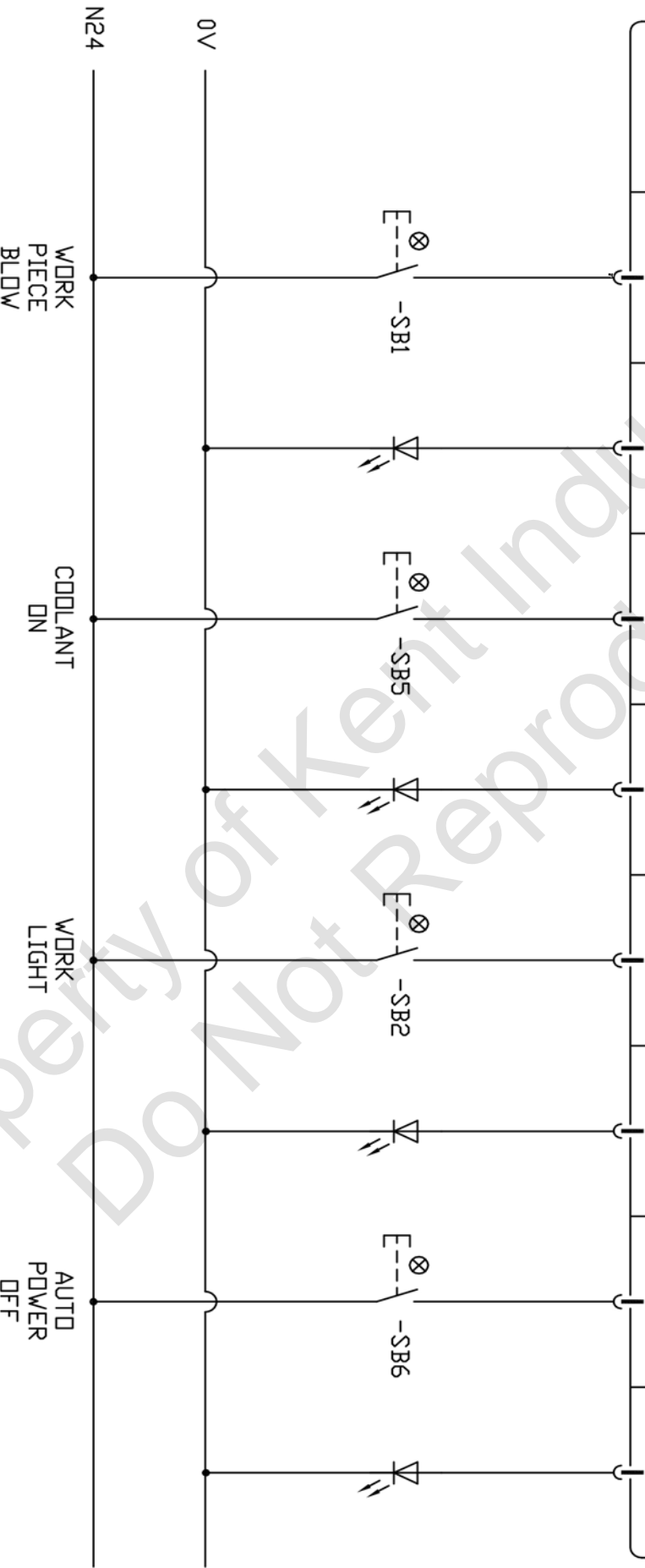


TITLE **TW-24L** CH. **ALEX YU** PAGE **D02/01**

PANEL I/O UNIT DATE **10-12-2010** VERSION **TWH REV.1.0**

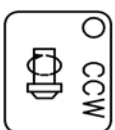
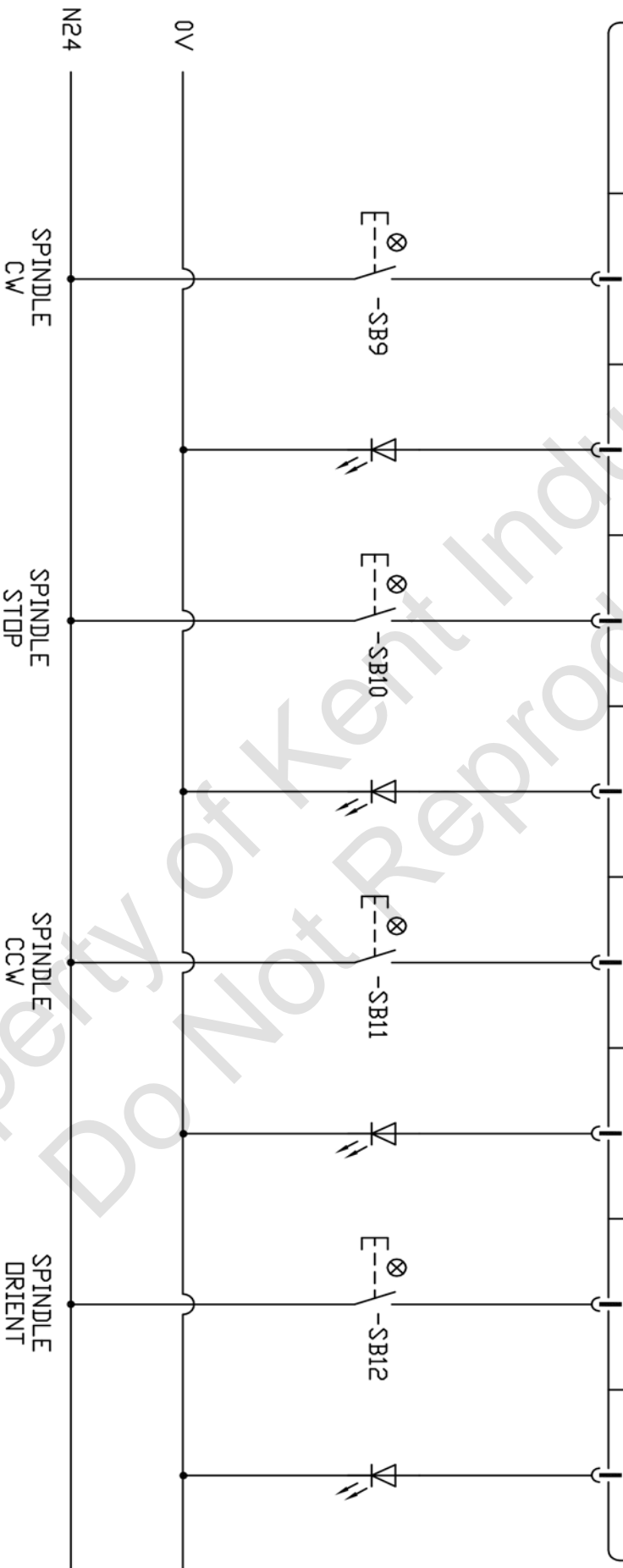
I/O INTERFACE

PLC ADDRESS	X35.3	Y33.2	X35.5	Y33.0	X35.0	Y33.5	X35.7	Y32.6
I/O CARD CONNECT	CE57-B11	CE57-A21	CE57-B12	CE57-A20	CE57-A10	CE57-B22	CE57-B13	CE57-A19



I/O INTERFACE

PLC ADDRESS	X32.0	Y31.2	X33.0	Y31.5	X32.1	Y30.5	X32.3	Y30.7
I/O CARD CONNECT	CE56-A10	CE57-A21	CE57-A2	CE56-B22	CE56-B9	CE56-B18	CE56-B11	CE56-B19

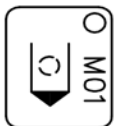
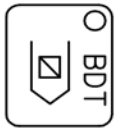
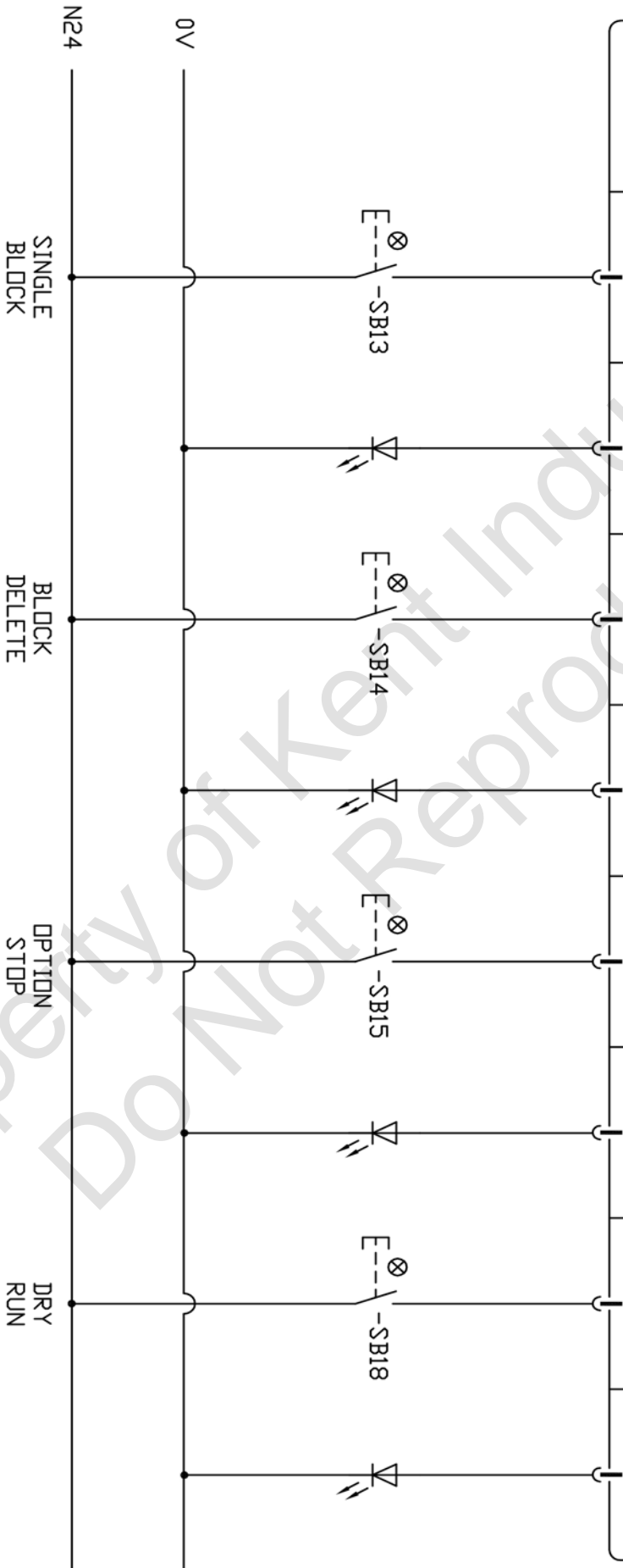


TITLE **TW-24L**
 PANEL I/O UNIT

CH. **ALEX YU** PAGE **D04/01**
 DATE **10-12-2010** VERSION **TWH REV.1.0**

I/O INTERFACE

PLC ADDRESS	X32.2	Y30.4	X32.4	Y30.6	X32.7	Y31.3	X31.7	Y31.4
I/O CARD CONNECT	CE56-A11	CE56-A18	CE56-A12	CE56-A19	CE56-B13	CE56-B21	CE56-B9	CE56-A22

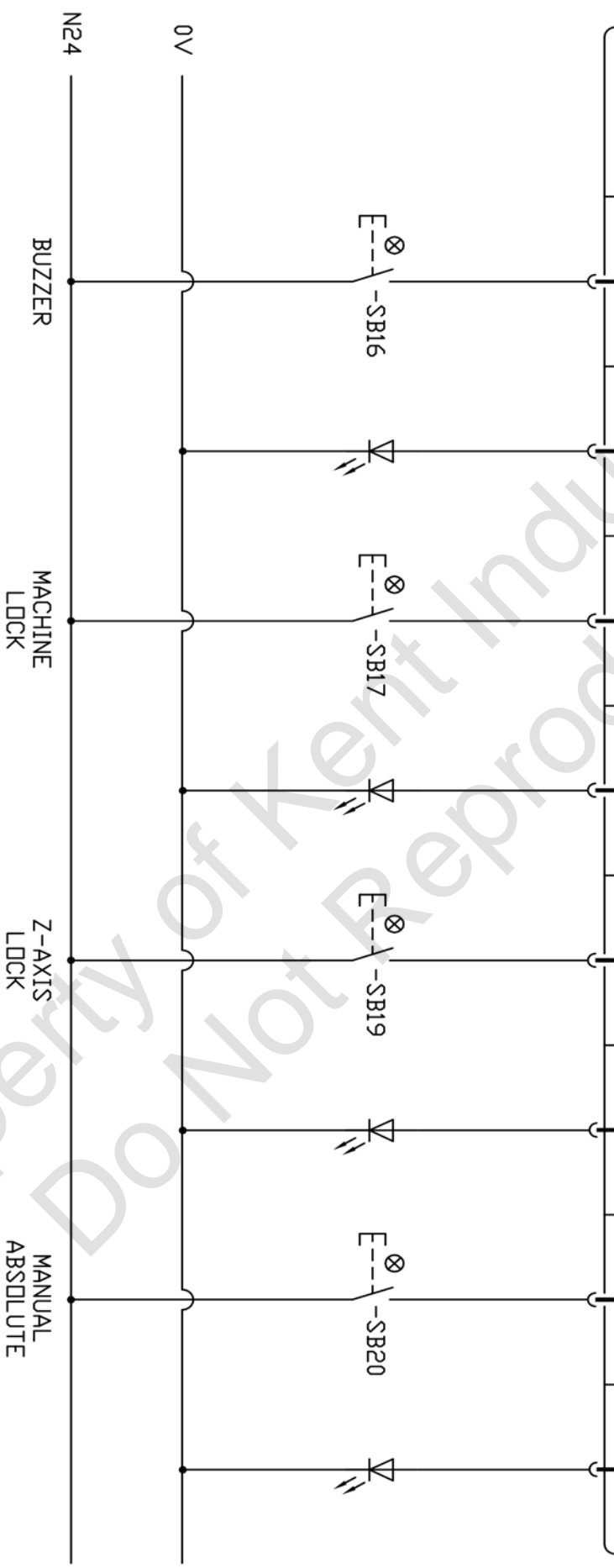


TITLE TW-24L
PANEL I/O UNIT

CH. ALEX YU
DATE 10-12-2010
PAGE D05/01
VERSION TWH REV.1.0

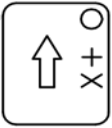
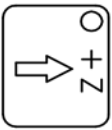
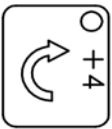
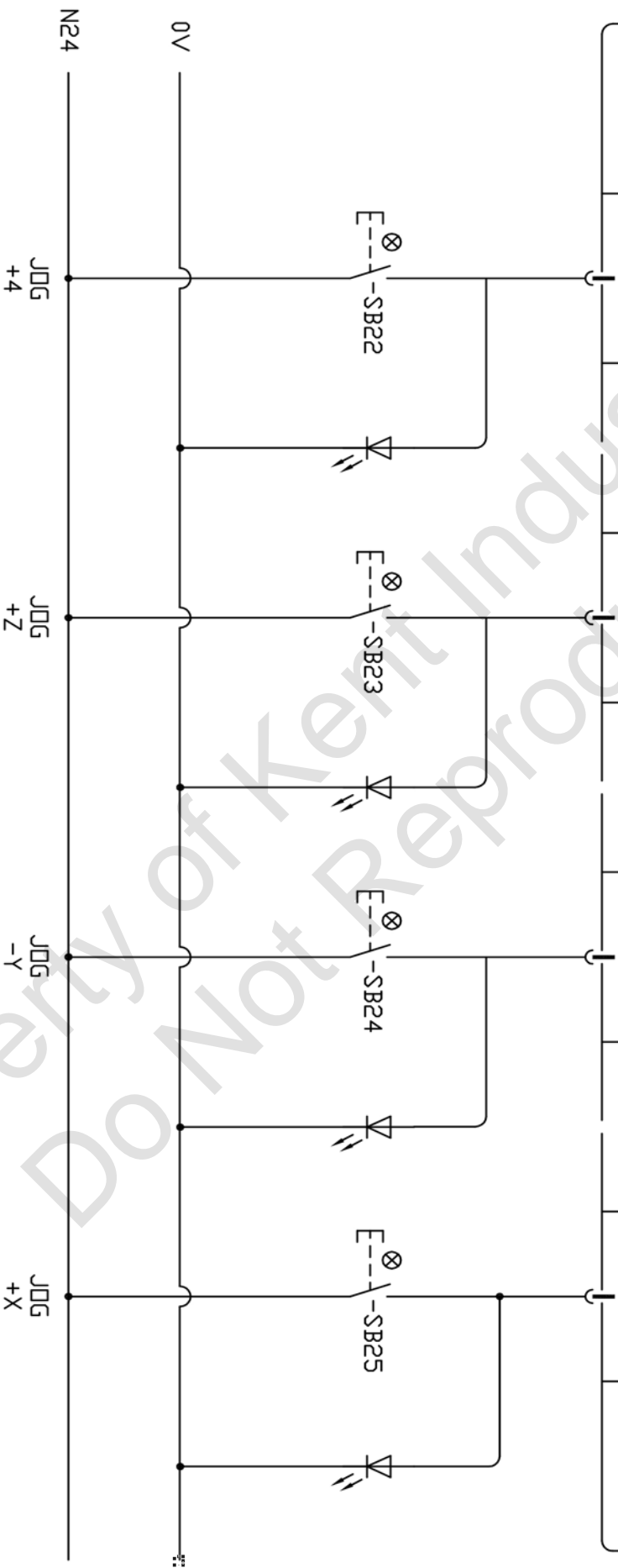
I/O INTERFACE

PLC ADDRESS	X32.6	Y31.0	X31.6	Y31.6	X32.5	Y31.1	X33.1	Y31.7
I/O CARD CONNECT	CE56-A13	CE56-A23	CE56-A9	CE56-A23	C72-B4	C74-B6	C71-A4	C74-B6
PANEL CONNECT	BI-7	BO-7	BI-9	BO-9	BI-13	BO-13	BI-15	BO-15



I/O INTERFACE

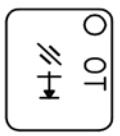
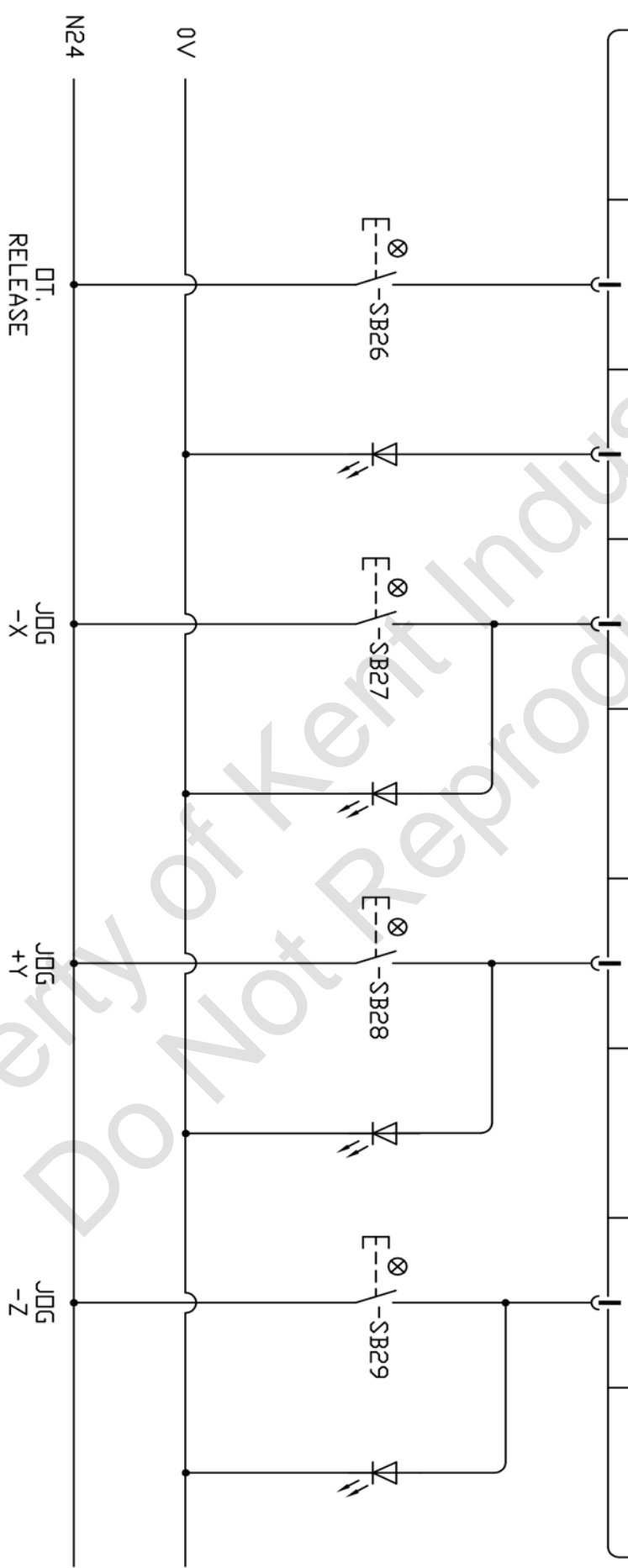
PLC ADDRESS	X31.1	X31.0	X30.6	X30.4
I/O CARD CONNECT	CE56-A7	CE56-B6	CE56-A6	CE56-B5
PANEL CONNECT	CI-1	CI-3	CI-5	CI-7



TITLE	TW-24L		CH	ALEX YU	PAGE	D07/01
	PANEL I/O UNUT		DATE	10-12-2010	VERSION	TWH REV.1.0

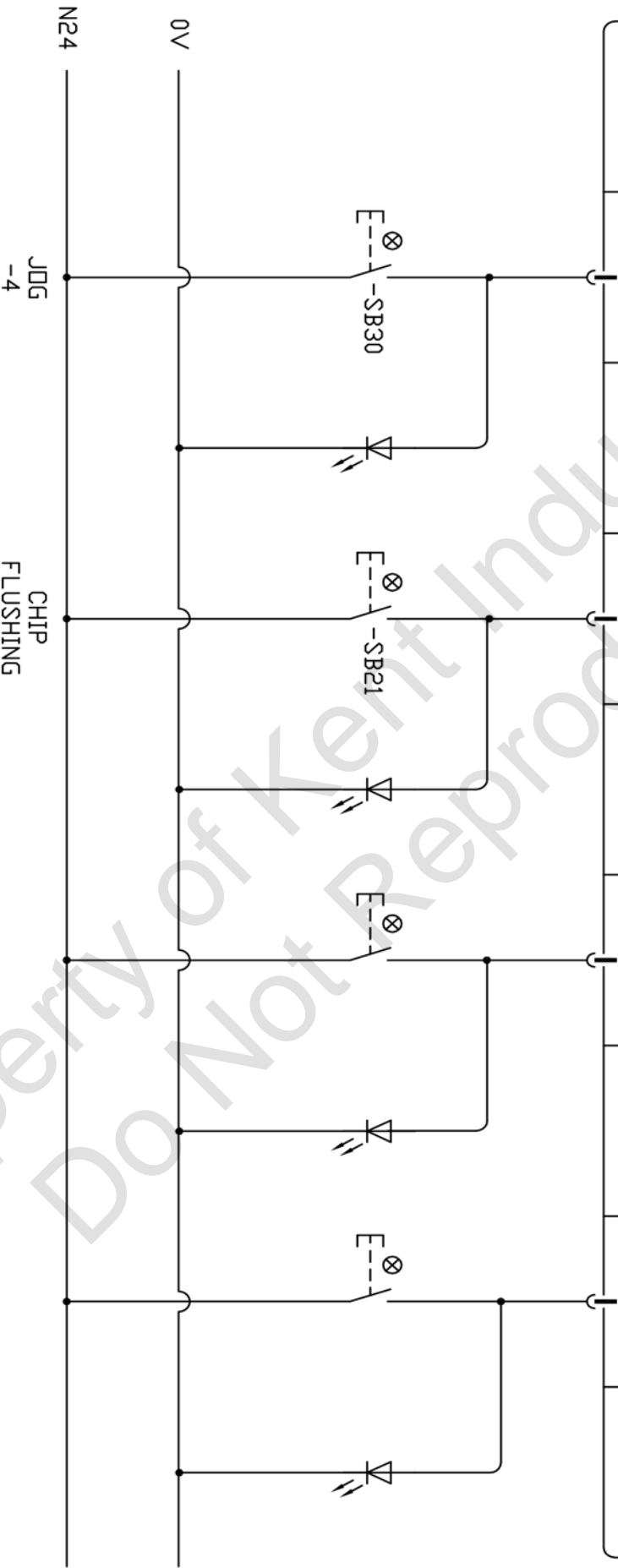
I/O INTERFACE

PLC ADDRESS	X30.2	Y30.2	X30.3	X30.5	X30.7
I/O CARD CONNECT	CE56-A5	CB106-A18	CE56-B4	CE56-A4	CE56-B3
PANEL CONNECT	CI-9	CD-9	CI-11	CI-13	CI-15
		PA-A5			



I/O INTERFACE

PLC ADDRESS	X31.2	X35.6	Y32.7				
I/O CARD CONNECT	CE56-A3	CE56-B13	CE57-A17				
PANEL CONNECT	CI-17	BI-17	BO-17				



TITLE

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CH

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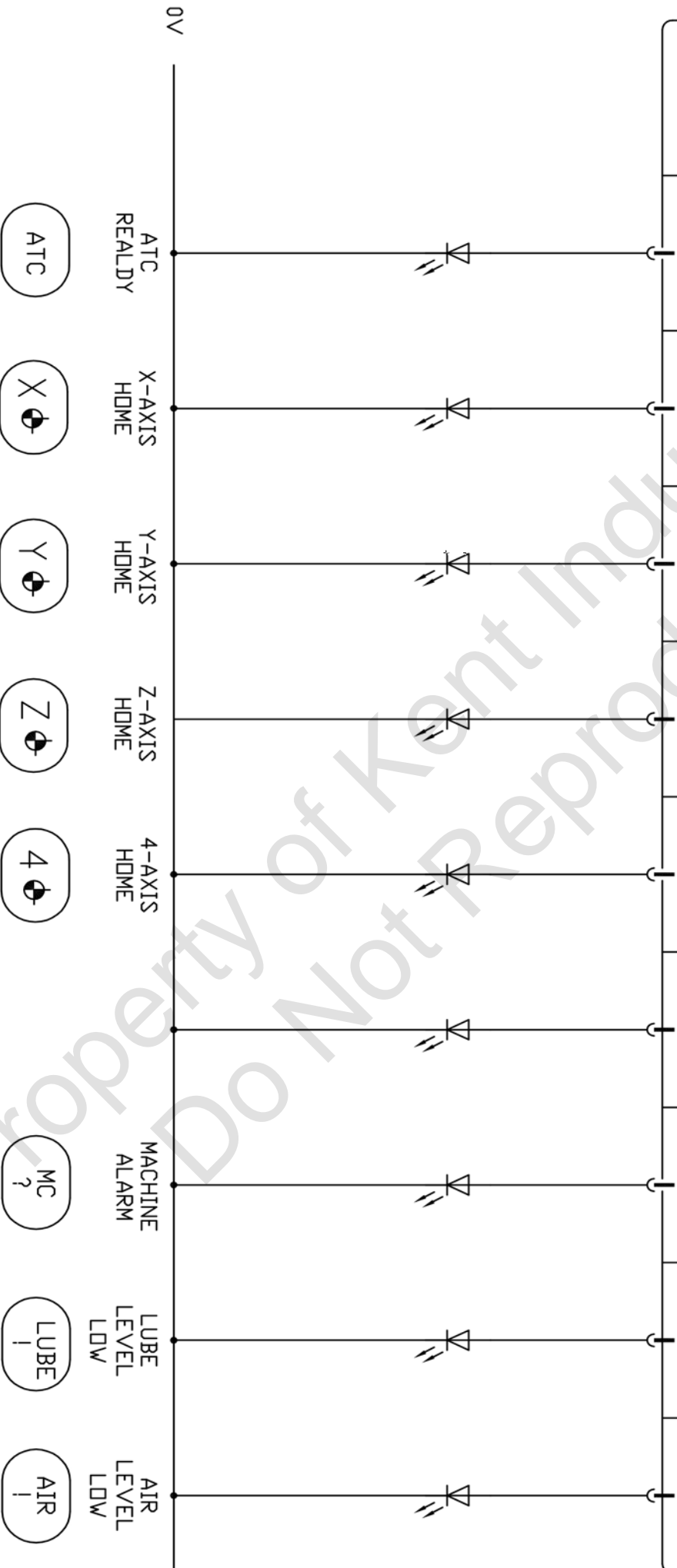
VERSION

TWH REV.1.0

PANEL I/O UNIT

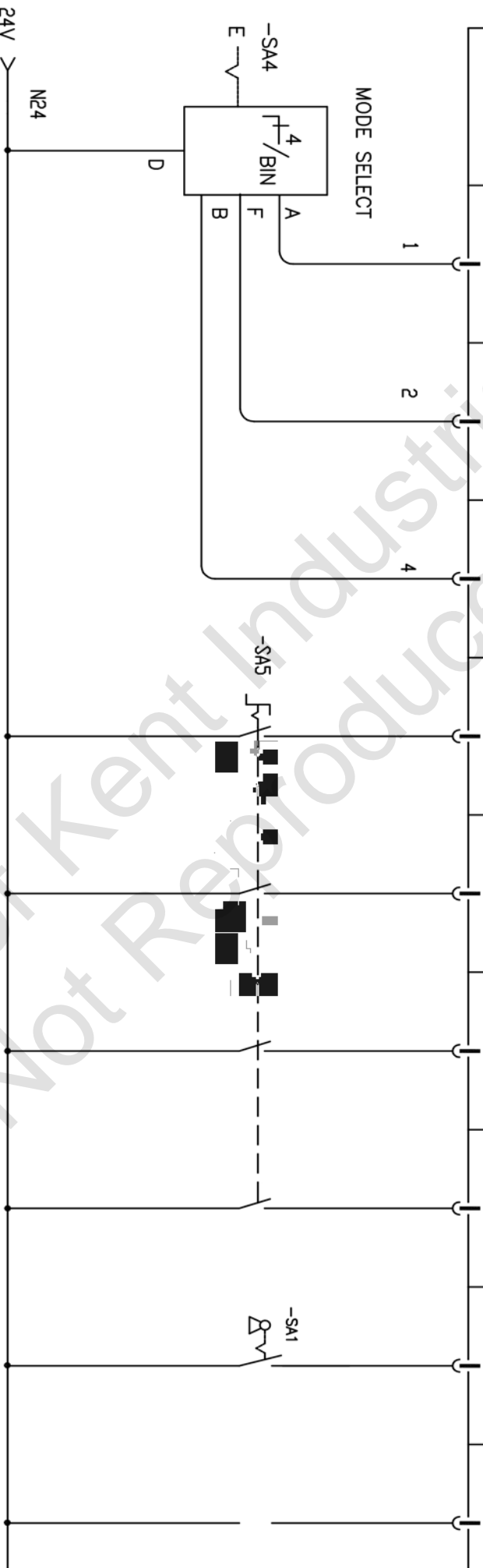
I/O INTERFACE

PLC ADDRESS	Y32.0	Y32.2	Y32.3	Y32.4	Y32.5	Y4.4	Y4.5	Y4.6
I/O CARD CONNECT	CB57-A16	CB57-A17	CB57-B17	CB57-A18	CB57-B18	CB106-A18	CB106-B18	CB106-A19

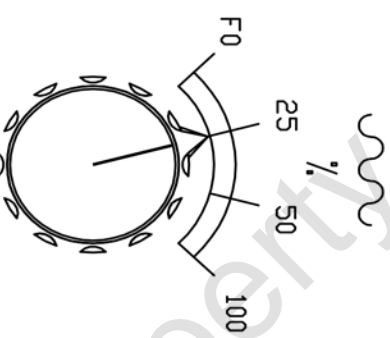
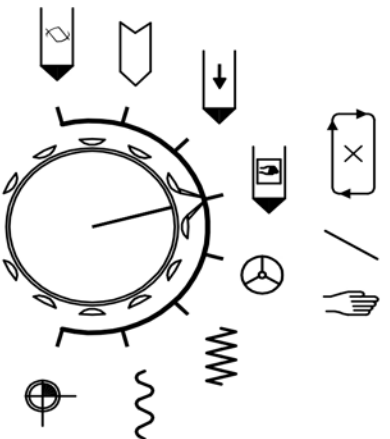


TITLE	PAGE
TW-24L	D10/01
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PLC ADDRESS	X31.3	X31.4	X31.5	X34.0	X34.1	X34.5
CONNECT PIN NO.	CE56-B7	CE56-AB	CE56-B8	CE57-B2	CE57-A5	CE57-B4
PANEL CONNECT PIN NUMBER	MODE-A	MODE-F	MODE-B	RAPID-C	RAPID-D	KEY-2

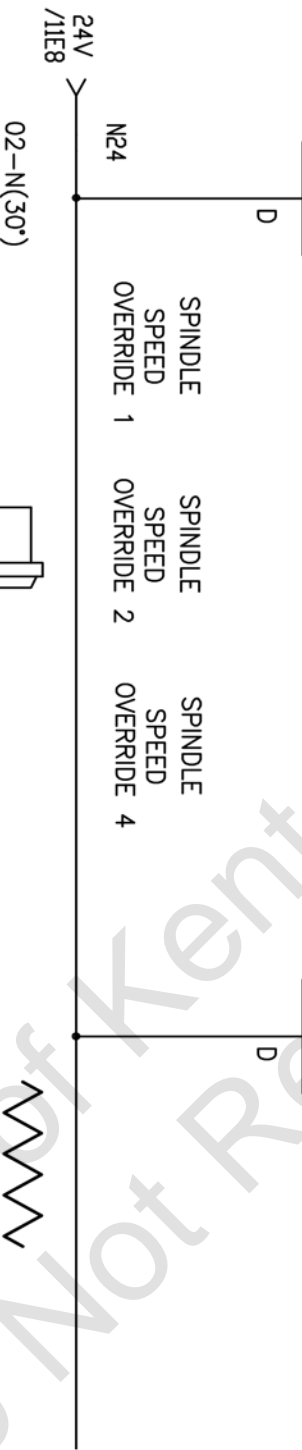
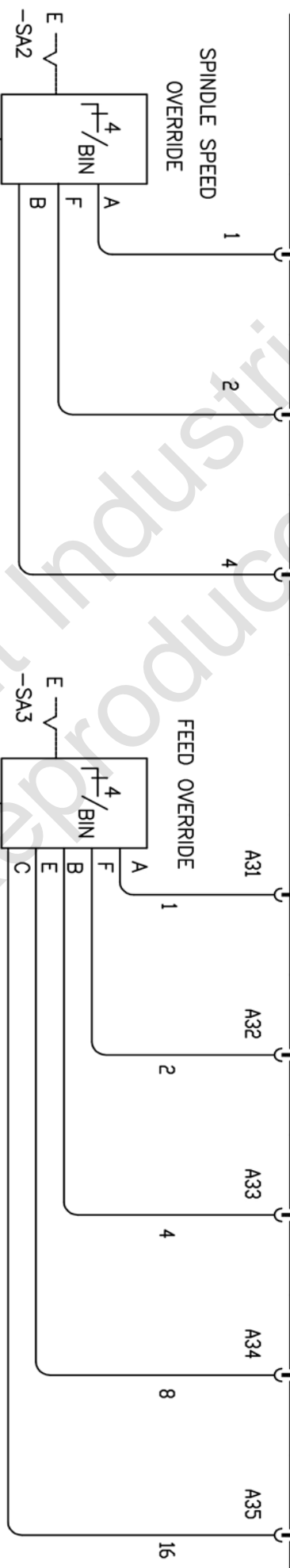


MODE	B	F	A
EDIT	1	1	1
DNC	1	1	0
AUTO	1	0	1
MDI	1	0	0
MPG	0	1	1
JOG	0	1	0
RAPID	0	0	1
ZRN	0	0	0

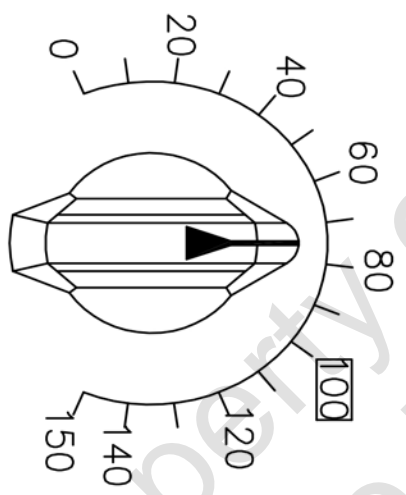
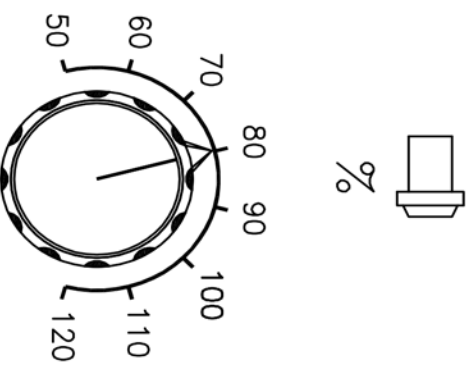


RAPID F0% RAPID F25% RAPID F50% RAPID F100% PROGRAM SPARE

PLC ADDRESS	X34.2	X34.3	X34.4	X33.2	X33.3	X33.4	X33.5	X33.6
CONNECT PIN NO.	CE57-A7	CE57-B7	CE57-A8	CE57-A3	CE57-B3	CE57-A4	CE57-B4	CE57-A5
PANEL CONNECT PIN NUMBER	SPEED-1(A)	SPEED-6(F)	SPEED-2(B)	FEED-A(I)	FEED-F(G)	FEED-B(K)	FEED-E(S)	FEED-C(3)
				PA-A1	PA-B1	PA-A2	PA-B2	PA-A3



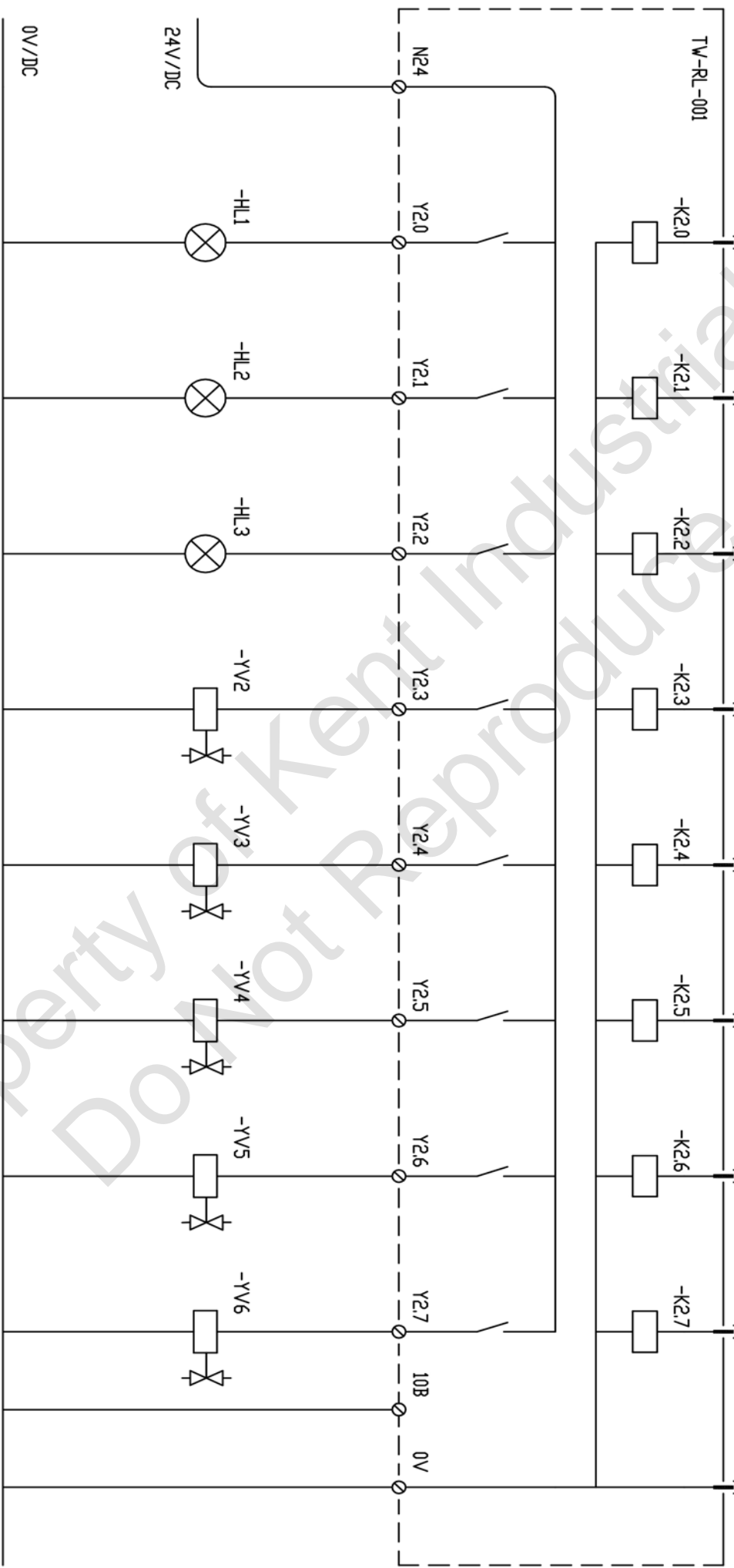
%	B	F	A
50	1	1	1
60	1	1	0
70	1	0	1
80	1	0	0
90	0	1	1
100	0	1	0
110	0	0	1
120	0	0	0



02-J(15°)

%	C	E	B	F	A
0	1	1	1	1	1
10	1	1	1	1	0
20	1	1	1	0	1
30	1	1	1	0	0
40	1	1	0	1	1
50	1	1	0	1	0
60	1	1	0	0	1
70	1	1	0	0	0
80	1	0	1	1	1
90	1	0	1	1	0
100	1	0	1	0	1
110	1	0	1	0	0
120	1	0	0	1	1
130	1	0	0	1	0
140	1	0	0	0	1
150	1	0	0	0	0

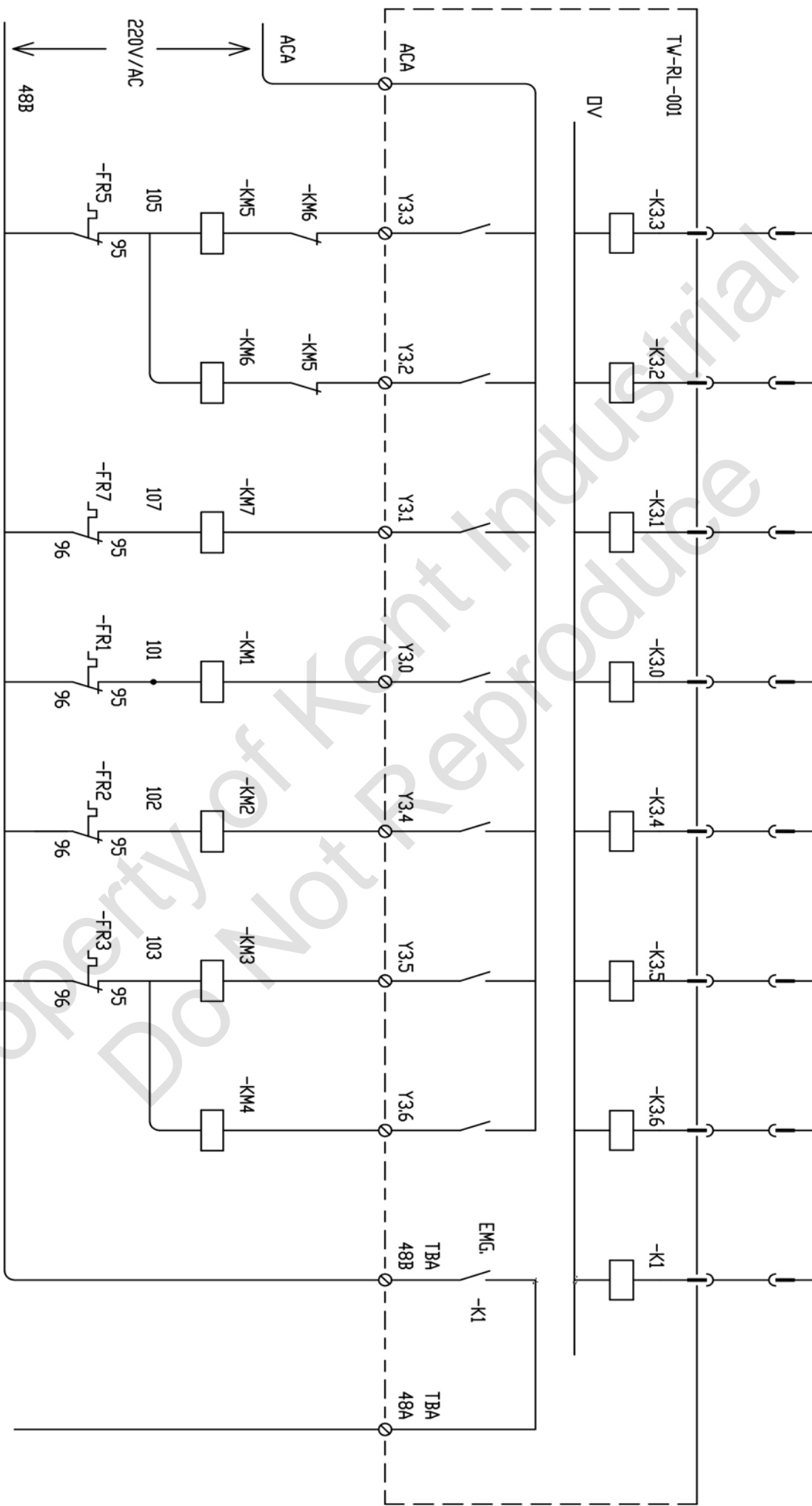
PLC ADDRESS	Y4.0	Y4.1	Y4.2	Y4.3	Y4.4	Y4.5	Y4.6	Y4.7	0V
I/O CONNECT PIN NO.	ID2-CE56-A16	ID2-CE56-B16	ID2-CE56-A17	ID2-CE56-B17	ID2-CE56-A18	ID2-CE56-B18	ID2-CE56-A19	ID2-CE56-B19	CB105-A1 CB106-A1/A14



- 24V/DC
- N24
- Y2.0
- Y2.1
- Y2.2
- Y2.3
- Y2.4
- Y2.5
- Y2.6
- Y2.7
- 10B
- 0V
- HL1
- HL2
- HL3
- YV2
- YV3
- YV4
- YV5
- YV6
- TW-RL-001
- K2.0
- K2.1
- K2.2
- K2.3
- K2.4
- K2.5
- K2.6
- K2.7
- 0V/DC
- CYCLE START GREEN LAMP
- M30 M00/M01 YELLDW LAMP
- ALARM STATUS RED LAMP
- MAGAZINE PRT UP
- MAGAZINE PRT DOWN
- TDDL UNCLAMP
- AIR BLAST
- UNCLAMP BLDW
- 0V

TITLE	TW-24L	
RELAY OUTPUT UNIT	CH1	ALEX YU
	DATE	10-12-2010
	PAGE	E01/02
	VERSION	TWH REV.1.0

PLC ADDRESS	Y5.3	Y5.2	Y5.1	Y5.0	Y5.4	Y5.5	Y5.6
I/O CONNECT PIN NO.	ID2-CE56-B21	ID2-CE56-A21	ID2-CE56-B20	ID2-CE56-A20	ID2-CE56-A22	ID2-CE56-B22	ID2-CE56-A23

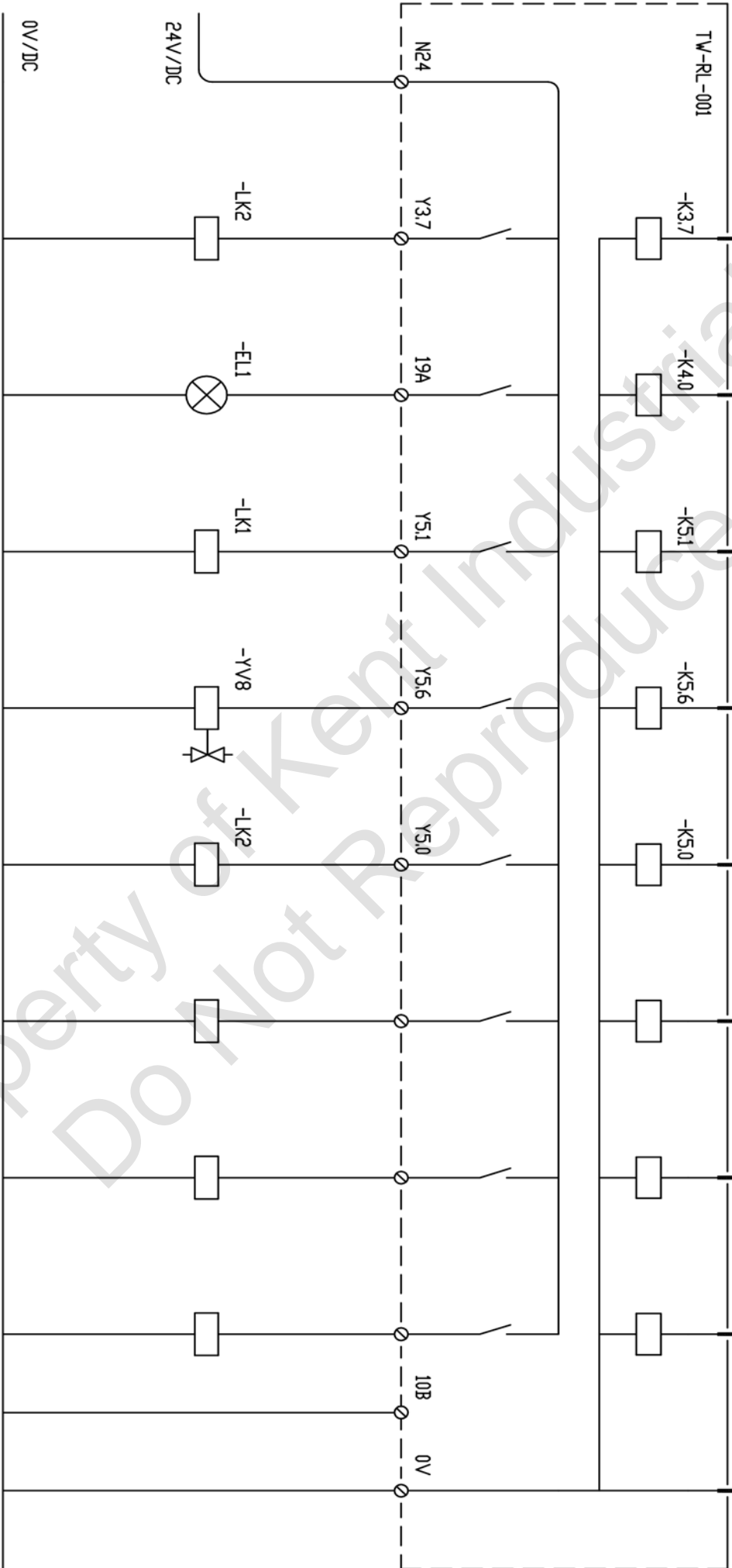


ATC MAGAZINE CW
 ATC MAGAZINE CCW
 ATC ARM MOTOR
 COOLANT PUMP MOTOR
 CHIP FLUSHING MOTOR
 CHIP CONVEYOR CW
 CHIP CONVEYOR CCW
 ACB (AC 220V)

TITLE: TW-24L RELAY OUTPUT UNIT

CH: ALEX YU
 DATE: 10-12-2010
 PAGE: E02/01
 VERSION: TWH REV.1.0

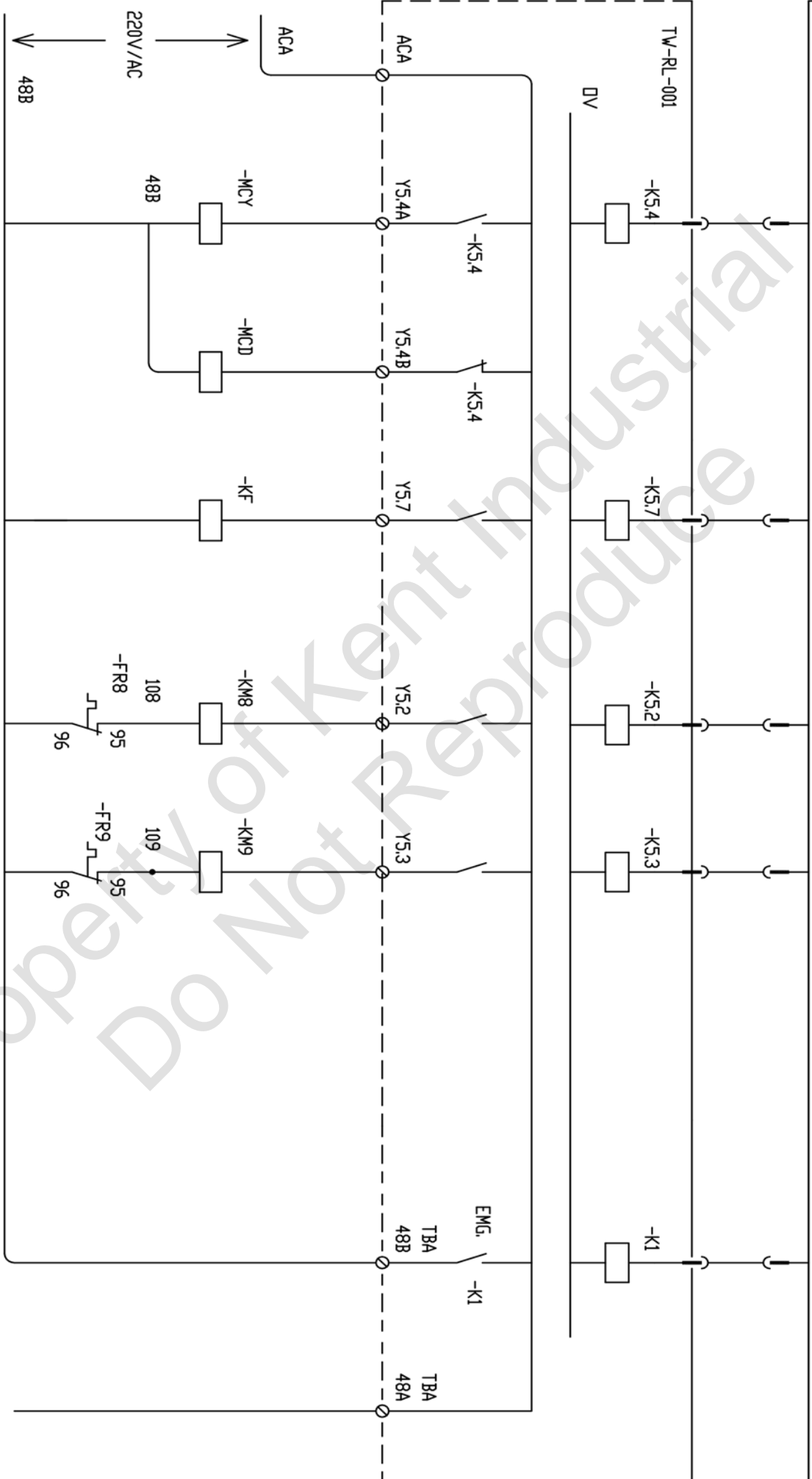
PLC ADDRESS	Y5.7	Y2.0	Y3.1	Y3.6	Y3.0	0V
I/O CONNECT PIN NO.	ID2-CE56-B23	ID1-CE57-A16	ID1-CE57-B20	ID1-CE57-A23	ID1-CE57-A20	CB105-A1 CB106-A1/A14



Z-AXIS BRAKE
WORK LIGHT
DDDR INTERLOCK RELEASE
4TH AXIS UNCLAMP SOLENOID
SPARE
0V CDM

TITLE	TW-24L		CHI	ALEX YU	PAGE	E03/01
	RELAY OUTPUT UNIT		DATE	10-12-2010	VERSION	TWH REV.1.0

PLC ADDRESS	Y34	Y37	Y32	Y33
I/O CONNECT PIN NO. ID1-CE57-A22	ID1-CE57-B23	ID1-CE57-A21	ID1-CE57-B21	



TITLE	TW-24L	CHI	ALEX YU	PAGE	E04/01
RELAY OUTPUT UNIT		DATE	10-12-2010	VERSION	TWH REV.1.0

PLC Diagram for
TW-1065 / TW-1268

with

24 Arm Type Tool
Changer

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Definition of Keep Relay for TW24L/TW-1065/TW-1268 ARM TYPE

- (1) K0.6 : FEED HOLD, COOLANT OFF
0 : When feed hold, coolant is off.
1 : When feed hold, coolant is not off.
- (2) K1.0 : 32 TOOLS MAGAZINE USED
0 : Tool magazine is 24 tools
1 : Tool magazine is 32 / 40 tools
- (3) K1.1: MOTOR HI-WINDING / LOW WINDING SELECTION
0 : The motor has no HI / LOW winding change.
1 : The motor has HI / LOW winding change.
- (4) K1.4: LUBRICATION SYSTEM PRESSURE CHECK
0 : The lubrication system pressure is not checked.
1 : The lubrication system pressure is checked.
- (5) K1.5: NITROGEN SYSTEM PRESSURE CHECK
0 : The Nitrogen tank system pressure is not checked.
1 : The Nitrogen tank system pressure is checked.
- (6) K1.6: AIR PRESSURE CHECK
0 : The air pressure is not checked.
1 : The air pressure is checked.
- (7) K2.0 : AUTO RUN CHIP CONVEYOR
0 : When program is running, the chip conveyor is ON.
1 : When program is running, the chip conveyor is not ON.
- (8) K2.1 : CHIP CONVEYOR WITH CHIP FLUSH SELECT
0 : When chip conveyor ON, the chip flush is not ON.
1 : When chip conveyor ON, the chip flush is ON.
- (9) K3.0 : CHIP CONVEYOR IS CONTROLLED BY M01 FUNCTION
0 : When K3.0 is 0, the chip conveyor is STOPPED by M01 function.
1 : When K3.0 is 1, the chip conveyor is NOT STOPPED by M01 function.
- (10) K3.4 : 4th AXIS SELECT
0 : 4th axis is not installed.
1 : 4th axis is installed.
- (11) K3.5 : ATC READY & AXES MOVEMENT
0 : When K3.5 is 0, the axes movement is prohibited by ATC ready signal.
1 : When K3.5 is 1, the axes movement is NOT prohibited by ATC ready signal.
- (12) K3.6 : X, Y, Z, HOME IGNORE assigned; DO NOT SET, (Reg. for M.S.T. Lock)
0 : X, Y, Z, home requirement is ignored, after the machine turn ON.
1 : X, Y, Z, home requirement is required, after the machine turn ON.
- (13) K4.2 : SPINDLE CHILLER ALARM OFF
0 : Spindle chiller alarm OFF.
1 : Spindle chiller alarm ON.

- (14) K4.3 : Z-AXIS INTERLOCK WHEN ARM IS NOT IN POSITION
0 : Z-axis is interlocked when the arm is not in position.
1 : Z-axis can move under HAND mode when the arm is not in position.
- (15) K4.4 : SPINDLE ORIENTATION ENABLE DURING ARM IS NOT IN POSITION
0 : When the arm is not in position, the spindle orientation is not performed.
1 : When the arm is not in position, the spindle orientation is performed.
- (16) K4.5 : 4TH AXIS ENBALE (WORK WITH K3.4)
0 : 4th axis is not enable.
1 : 4th axis is enable.
- (17) K4.5 : 4TH AXIS ENBALE (WORK WITH K3.4)
0 : 4th axis is not enable.
1 : 4th axis is enable.
- (18) K5.1 : MANUAL ABS FUNCTION
0 : Manual ABS function is disable.
1 : Manual ABS function is enable.
- (19) K5.4 : MAGAINE COUNTER STATUS
0 : Counter is NC status.
1 : Counter is NO status.
- (20) K5.5 : 4th AXIS CLAMP STATUS
0 : Clamp solenoid is NO status.
1 : Clamp solenoid is NC status.
- (21) K6.0 : MAGAZINE ALARM CONTROL TIMER
0 : The magazine rotation alarm is controlled by PLC timer
1 : The magazine rotation alarm is controlled by user setting timer (TMR 1).
- (22) K6.6 : AIR ALARM SINGLE BLOCK ON / OFF
0 : When air pressure alarm is issued, the single block function is enable.
1 : When air pressure alarm is issued, the single block function is disable.
- (23) K6.7 : LUBE LOW ALARM SINGLE BLOCK ON / OFF
0 : When lube level low alarm is issued, the single block function is enable.
1 : When lube level low alarm is issued, the single block function is disable.

Definition of TIMER for TW24L/TW-1065/TW-1268 ARM TYPE

- (1) TMR No. 1 : Magazine rotate overtime setting.
- (2) TMR No. 5 : Arm cam middle sensor delay.
- (3) TMR No. 6 : Arm cam right sensor delay.
- (4) TMR No. 7 : Arm stop delay time for clipping tool.
- (5) TMR No. 8 : Arm stop delay time for tool exchange.
- (6) TMR No. 9 : Arm stop delay time for returning home position.
- (7) TMR No. 10 : 4th axis detach delay for clamping
- (8) TMR No. 12 : 4th axis unclamp delay for axis moving.
- (9) TMR No. 21 : Magazine CW stop delay time.
- (10) TMR No. 22 : Magazine CCW stop delay time.
- (11) TMR No. 26 : Pot up delay time.
- (12) TMR No. 27 : Spindle tool unclamp delay time.
- (13) TMR No. 50 : Keep M82 arm moving.
- (14) TMR No. 51 : Keep M84 arm moving.
- (15) TMR No. 52 : Keep M86 arm moving.
- (16) TMR No. 53 : M82 arm stop delay.
- (17) TMR No. 54 : M84 arm stop delay.
- (18) TMR No. 55 : M86 arm stop delay.
- (19) TMR No. 56 : Auto tool clamp air through spindle OFF time.
- (20) TMR No. 100 : Spindle motor low winding faulty alarm.
- (21) TMR No. 102 : Spindle motor high winding faulty alarm.
- (22) TMR No. 107 : Magazine pin in alarm during magazine rotation.
- (23) TMR No. 108 : Manual magazine CW/CCW keep for 32 / 40 tool magazine.
- (24) TMR No. 109 : Pot down delay for waiting magazine in position.
- (25) TMR No. 150 : Tool display device cycle time (Setting : 8)
- (26) TMR No. 151 : Tool display device cycle time OFF (Setting : 30)
- (27) TMR No. 152 : Tool display device bit 0 scanning time (Setting : 8).
- (28) TMR No. 153 : Tool display device bit 1 scanning time (Setting : 8).
- (29) TMR No. 154 : Tool display device bit 2 scanning time (Setting : 8).
- (30) TMR No. 155 : Tool display device bit 3 scanning time (Setting : 8)
- (31) TMR No. 156 : Tool display device bit 4 scanning time (Setting : 8)
- (32) TMR No. 157 : Tool display device bit 5 scanning time (Setting : 8)
- (33) TMR No. 158 : Tool display device bit 6 scanning time (Setting : 8)
- (34) TMR No. 159 : Tool display device bit 7 scanning time (Setting : 8)

Definition of TIMERB for TW24L/TW-1065/TW-1268 ARM TYPE

- (1) TMRB No. 1 : Logic delay. (Setting : 2000)
- (2) TMRB No. 2 : Flash ON / OFF. (Setting : 800)
- (3) TMRB No. 3 : Rigid tapping ON delay. (Setting : 100)
- (4) TMRB No. 4 : Auto Power OFF delay. (Setting : 5000)
- (5) TMRB No. 5 : 4th axis clamp / unclamp faulty. (Setting : 2000)
- (6) TMRB No. 6 : Machine stop alarm delay. (Setting : 1000)
- (7) TMRB No. 7 : Spindle chiller alarm time (Setting : 3000)
- (8) TMRB No. 8 : Magazine rotation error. (Setting : 25000)
- (9) TMRB No. 9 : ATC alarm. (Setting : 10000)
- (10) TMRB No. 12 : Air through spindle during tool unclamp. (Setting : 200)
- (11) TMRB No. 14 : M06 tool change delay. (Setting : 100)
- (12) TMRB No. 15 : Rigid tapping OFF delay. (Setting : 100)
- (13) TMRB No. 16 : Tool search enable keep. (Setting : 200)
- (14) TMRB No. 17 : Spindle High / Low winding faulty. (Setting : 3000)
- (15) TMRB No. 18 : Pot down delay. (Setting : 100)
- (16) TMRB No. 19 : Spindle tool clamp delay. (Setting : 100)
- (17) TMRB No. 22 : Air pressure low alarm delay. (Setting : 2000)
- (18) TMRB No. 23 : Door open keep time (Setting : 5000)
- (19) TMRB No. 30 : Lubrication pressure check alarm. (Setting 3600000)
- (20) TMRB No. 31 : Nitrogen tank pressure alarm (Setting : 600000)
- (21) TMRB No. 32 : Lubrication hose error. (Setting : 600000)
- (22) TMRB Mo. 33 : Lubrication pressure low. (Setting : 7200000)

Definition of DATA Table for TW24L/TW-1065/TW-1268 ARM TYPE

(1) D0 : Tool number in spindle.

(2) D1 ~ D24 : Tool numbers for each pot

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Definition of ALARM for TW24L/TW-1065/TW-1268 ARM TYPE

Alarm :

- (1) 1000 :
ATC OVER TIME ALARM (A6.0)
- (2) 1001 :
X, Y, Z AXIS NOT GO HOME (A6.1)
- (3) 1002 :
X,Y,Z,4 AXIS NOT GO HOME (A6.2)
- (4) 1003 :
POT DOWN ERROR (A6.3)
- (5) 1004 :
Emergency stop (A6.4)
- (6) 1005 :
Spindle chiller alarm (A6.5)
- (7) 1006 :
ATC ARM 60 ERROR (A6.6)
- (8) 1007 :
ATC ARM 180 ERROR (A6.7)
- (9) 1008 :
ATC ARM 0 ERROR (A7.0)
- (10) 1009 :
SPINDLE UNCLAMP ERROR (A7.1)
- (11) 1010 :
SPINDLE CLAMP ERROR (A7.2)
- (12) 1011 :
POT UP ERROR (A7.3)
- (13) 1013 :
POT DOWN ERROR(A7.4)
- (14) 1015 :
X,Y,Z AXIS NOT ON 2REF. (A7.6)
- (15) 1016 :
MAGAZINE COUNTER ERROR (A7.7)
- (16) 1017 :
TOOL LIFE ALARM (A8.0)
- (17) 1018 :
SPINDLE GEAR ALARM (A8.1)
- (18) 1019 :
ATC NOT READY (A8.2)
- (19) 1020 :
4TH AXIS UN/CLAMP ERROR (A8.3)

- (20)1022:
COOLANT MOTOR OVERLOAD (A8.4)
- (21)1023:
CHIP MOTOR OVERLOAD (A8.5)
- (22)1024:
ARM MOTOR OVERLOAD (A8.6)
- (23)1027:
MAGAZINE MOTOR OVERLOAD (A8.7)
- (24)1028:
CTS MOTOR OVERLOAD (A9.5)
- (25)1030:
TOOL NO. NOT REGISTERED (A10.2)
- (26)1031:
LUBE SYSTEM FAIL.(A11.2)

Message:

- (1) 2002 :
LOW AIR PRESSURE (A9.2)
- (2) 2003 :
LOW LUBE LEVEL (A9.3)
- (3) 2004 :
DOOR OPEN (A9.4)
- (4) 2005 :
LOW COOLANT LEVEL (A10.1)
- (5) 2006 :
SPINDLE WINDING ERROR (A10.3)
- (6) 2007 :
CTS TANK COOLANT LOW (A10.4)
- (7) 2008 :
CTS TANK PUMP OVERLOAD (A10.5)
- (8) 2009 :
MAGAZINE PIN IN.(A10.6)
- (9) 2010 :
CTS FILTER NEEDS TO BE CLEAN(A10.7)
- (10)2011 :
LUBE SYSTEM FAIL.PLS CHK LUBE TUBE (A11.5)
- (11)2012 :
CALL SERVICE SOON!(A11.3)
- (12)2013 :
MACHINE MAY BE BAD DAMAGED(A11.4)
- (13)2014 :
NITROGEN LOW (A11.1)

(14)2015 :

HI LOW WIND CHANGE ERROR(A11.0)

(15)2018 :

LUBE PRESSURE SWITCH FAIL(A11.6)

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Definition of M-Code for TW24L/TW-1065/TW-1268 ARM TYPE

- (1) M00 / M02 : Program stop.
- (2) M03 : Spindle Clockwise run.
- (3) M04 : Spindle Counter-clockwise run.
- (4) M05 : Spindle stop.
- (5) M06 : Auto Tool Change.
- (6) M08 : Coolant ON.
- (7) M09 : Coolant / C.T.S. OFF.
- (8) M10 : Chip flush ON.
- (9) M11 : Chip flush OFF.
- (10) M19 : Spindle Orientation ON.
- (11) M21 : Workpiece air blow.
- (12) M22 : Workpiece air blow OFF.
- (13) M25 : 4th axis clamp.
- (14) M26 : 4th axis unclamp.
- (15) M29 : Rigid Tapping.
- (16) M60 : Magazine home return (Tool No. 1 return).
- (17) M80 : Auto tool No. write.
- (18) M81 : Magazine pot down. (Maintainance only)
- (19) M83 : Tool unclamp. (Maintain only)
- (20) M85 : Tool clamp. (Maintain only)
- (21) M87 : Magazine pot up. (Maintainance only)

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
X0003	AIR,AL @	LUB-AL @	HAND-X @	HAND-Y @	HAND-Z @	HAND-4 @	MP1,R @	MP2,R @
X0004	HICONF @	LOCONF @	OIL-AL @	4-UN-S @	4-CL-S @	ZAE	LUBRAL @	N2ALRM @
X0005	MAG-H @	MG-CTR @	CTSTOL @	POTUP @	POTDN @	WGOL	T-UN-S @	T-CL-S @
X0006	CTS-OV @	L-GEAR @	H-GEAR @	DO-INL @	M-U-PB @	ARM,SP @	ARM,60 @	ARM,0 @
X0007	M77FIN @	M76FIN @	M75FIN @	M74FIN @	M73FIN @	M72FIN @	M71FIN @	M70FIN @
X0008	CTSTHI @	CTSTL0 @	CBOL @	*EMG @	CHP-OV @	ARM-OV @	MAG-OV @	COL-OV @
X0009	CTSFR @	M63FIN @	PIN,OUT @	PIN,IN @	*DEC4	*DECZ	*DECY	*DECX
X0010	AFL-PB @							
X0030	-Z,PB @	-Y,PB @	+Y,PB @	+X,PB @	-X,PB @	O.T-PB @	FH-PB @	CS-PB @
X0031	DRN-PB @	MLK-PB @	MODE-B @	MODE-F @	MODE-A @	-4,PB @	+4,PB @	+Z,PB @
X0032	M01-PB @			BDT-PB @	SP-ORC @	SBK-PB @	SCCWP @	SPCWPB @
X0033	ZLK-PB	JOV-C @	JOV-E @	JOV-B @	JOV-F @	JOV-A @	ABS-PB @	SSTPPB @
X0034	MGCCWP @	MGCWPB @	PROKEY @	SPL-B @	SPL-F @	SPL-A @	RP25% @	RP50% @
X0035	APO-PB @	CB-PB @	COL-PB @	A-H-PB @	AIR-PB @	CVCCWP @	CVCW-P @	WK-L-P @

Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
Y0002	AT-BLW @	WRK-BL @	TU,CLP @	POT-DN @	POT-UP @	RED-L @	YELL-L @	GREN-L @
Y0003	Z-BRKE @	CH,CCW @	CH,CW @	COOL-B @	MGCW. @	MGCCW. @	ARM @	COOL-M @
Y0004	4CL-L @	AIR-AL @	LUBE-L @	NC-L @		O.T-RL @	WGUN @	WORK-L @
Y0005	AP-OFF @	4-CL-O @	M.PIN @	L,WIND @	CTSTM @	CTC-M @	DR-INL @	M24OUT @
Y0006	M23OUT @			PREOUT @	M76OUT @	M74OUT @	M72OUT @	M70OUT @
Y0007	AFL-L @							
Y0011							@	@
Y0015								@
Y0030	SPOR-L @	BDT-L @	SPCCWL @	SBK-L @		O.T-PL @	FH-L @	CS-L @
Y0031	ABS-L @	MLK-L @	SPTP-L @	DRN-L @	M01-L @	SPCW-L @		
Y0032	CB-PB.L @	APO-L @	B1-L @	Z1-L @	Y1-L @	X1-L @	ZLK-L @	ATCRYL @
Y0033	MGCW-L @	MGCCWL @	WK-L-L @	CHCW-L @	CHCCWL @	AIR-L @	A-H-L @	COL-PL @

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Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
F0000	OP @	SA @	STL @	SPL @				
F0001	MA @		TAP @	ENB @	DEN @		RST @	AL @
F0007					TF @	SF @		MF @
F0009			M2A @	M30 @				
F0010 M_CODE	@	@	@	@	@	@	@	@
F0026 T_CODE	@	@	@	@	@	@	@	@
F0034							GR20 @	GR10 @
F0045	ORARA @				SARA @	STDA @	SSLA @	SALM1 @
F0046						RCHPA @		
F0054								UO0 @
F0064								TLCH @
F0072	OUT7					OUT2	OUT1 @	OUT0
F0094					ZP4 @	ZPZ @	ZPY @	ZPX @
F0096					ZP24	ZP2Z @	ZP2Y @	ZP2X @
F0100					ZP44	ZP4Z @	ZP4Y	ZP4X
F0102					MOV4 @			
F0104					INP4 @			

ADDRESS	7	6	5	BIT NUMBER			USED ADDRESS	
				4	3	2	1	0
F0149							@	

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ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
G0004					FIN @			
G0005		AFL @						
G0006				OVC @		*ABSM @		SRN @
G0007						ST @		
G0008	ERS @		*SP @	*ESP @				*ILK @
G0010	*JV7 @	*JV6 @	*JV5 @	*JV4 @	*JV3 @	*JV2 @	*JV1 @	*JV0 @
G0012	*FV7 @	*FV6 @	*FV5 @	*FV4 @	*FV3 @	*FV2 @	*FV1 @	*FV0 @
G0014							ROV2 @	ROV1 @
G0018						HS1C @	HS1B @	HS1A @
G0019	RT @		MP2 @	MP1 @				
G0029		*SSTP @	SOR @	SAR @				
G0030	SOV7 @	SOV6 @	SOV5 @	SOV4 @	SOV3 @	SOV2 @	SOV1 @	SOV0 @
G0032	@	@	@	@	@	@	@	@
G0033	SIND @	@	@	@	@	@	@	@
G0043	ZRN @		DNCI @			MD4 @	MD2 @	MD1 @
G0044							MLK @	BDT @
G0046	DRN @		KEY3 @	KEY2 @	KEY1 @		SBK @	

Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
G0058			STRD @					
G0061								RG.TAP @
G0070	MRDYA @	ORCMA @	SFRA @	SRVA @	CTH1A @	@		TLMLA @
G0071	RCHA @	RSLA @					*ESPA @	ARSTA @
G0072	RCHHGA @			OVRA @				
G0100				+4 @	+Z @	+Y @	+X @	
G0102				-4 @	-Z @	-Y @	-X @	
G0106				MIR4 @		MIRY @	MIRX @	
G0108					MLKZ @			
G0124				DTCH4 @				
G0126				SVF4 @	SVFZ @	SVFY @	SVFX @	
G0130				*IT4 @	*ITZ @	*ITY @	*ITX @	

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Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							USED ADDRESS
	7	6	5	4	3	2	1	
R0000	MOTOL							MNKEY @
R0008								ATC-PR @
R0009			@	@				
R0014			>M38	>M37	>M36	>M35	>M33	M21OUT @
R0030								@
R0031						@		
R0035								CTSMK @
R0160	AL1240 @	@	AL1250 @	@	@	@	AL1210 @	@
R0161				@		@	AL1260 @	@
R0162								TMRB5 @
R0163	WK-B-A @	TMRB2 @	DOR-AX @	ABSPLS		ABS-A	AFLPLS @	AFL-A @
R0164	WK-LPS @	COL-ON @	COL-OF @	COL-PS @	COL-PA @	WKB-ON @	WKB-OF @	WK-B-P @
R0165				@	@	APO-PS @	APO-AX @	WKL-AX @
R0168								STDAR @
R0170	S120 @	S110 @	S100 @	S90 @	S80 @	S70 @	S60 @	S50 @
R0300		@	@	CTSTKOFF @	CTSTKMON @	WINDERR @	HIALARM @	LOALARM @
R0400							POP @	TB1 @

Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							USED ADDRESS
	7	6	5	4	3	2	1	
R0401	M77. @	M76. @	M75. @	M74. @	M73. @	M72. @	M71. @	M70. @
R0402						TMR56. @	A.TARK @	M17. @
R0436						@		
R0451					@	@	@	
R0460	@	@						
R0461	@	@	@	@	@	@	@	@
R0500	M06 @	M05 @	M04 @	M03 @	M02 @	M01 @	M00 @	L1 @
R0501	M14 @	M13 @			M22 @	M09 @	M08 @	M21 @
R0502	M32. @	M31. @		M19 @			M11 @	M10 @
R0503		M29 @		M27 @	M26 @	M25. @	M34. @	M33. @
R0504	M38 @	M37 @	M36 @	M35 @	M64. @	M63. @	M62. @	M61. @
R0506	M58. @			M51 @	M50 @		M07. @	
R0507			M60. @	M59 @	M58 @			M59. @
R0508	M80. @	M69 @	M68 @	M67 @	M66 @			
R0509		M87. @	M86. @	M85. @	M84. @	M83. @	M82. @	M81. @
R0511	M94 @		M92 @	M91 @		M89 @	M88 @	M87 @
R0512	TFIN @	SFIN @	MFIN @					M88. @

ADDRESS	BIT NUMBER							USED ADDRESS
	7	6	5	4	3	2	1	
R0513	AUTOLH @	FLTRG @	FLASH @	FLTMR @	ZRNLH	ZRNFIN @	MANUAL @	JOG @
R0515	STOP @						TMRB31	AP_DN2
R0516	LGCH1 @	ST+	JFSPOK	HGCH @	GCHSTB @	F.SW+	F.SW+A	RDY1 @
R0517	HGCH1 @	LGCH @	GRCHG @	GRLow @	GRHIGH @	O.S @	O.SA @	L1DL @
R0518	MAN- @	SPOK @	M06-A	M06- @	ORCM1 @	TMRB13 @	TMRB10 @	GEAROK @
R0519		SPDIR @	SP_REV @	SP_FOR @	SPOK1 @	SPNOP @	MSSTP @	MAN-A @
R0520	M29R @	TMRB15 @	RGDFIN @	RGDEND @	RGDENB @		RGDK @	SP_HLD @
R0521	SPROT @	ST+A	AUTO-A @	AUTO- @	M29DL @	GCHSTP @	RGDCW @	RGDCW @
R0522	JOGOK @	-4A @	+4A @	ACLN+A @	ACLN+ @	MCLN+A @	MCLN+ @	>25% @
R0523	<370	DRITL6 @	DRITL5 @	DRITL4 @	DRITL3 @	DRITL2 @	DRITL1 @	DRITL7 @
R0524	ZP4KEP @	ZPZKEP @	ZPYKEP @	ZPXKEP @	MCHKP @	SPTMP @	STTEMP @	>370
R0525	TMB29 @	SEMPW @	PT=BT @	SP=BT @	PT=EMP @	SP=POT @	SP=EMP @	NO-TOL @
R0526	TCH1 @	SRHEMP @	MEMPT @	S, PCK @	ORDCK @	EMPCK @	BTCK @	BTSTB @
R0527			SRHFIN @		M6TMP @	ATCEND @	TCH2 @	SRHMPT @
R0528	GRINP1 @	LBT+A	LBONT+ @	LUNOFT	LUBONT	SPR-A @	SPR- @	@
R0529	MGIP+ @	MGCTA @	TMR28 @	TMR8. @	TMR7. @	ESCASP @	MGINP @	ARMSTP @
R0530	MGCCW1 @	MGMCW1 @	MGCCWA @	MGCWA @	MGCTOP @	MGIP+A @	MGCT+ @	MGCT+A @

ADDRESS	BIT NUMBER							USED ADDRESS
	7	6	5	4	3	2	1	
R0531	MGCT- @	TMRB3 @	MCCWDE @	MAGOK @	MGCCW @	TMR29 @	MCWDEC @	MGCW @
R0532	TCLFA @	TUCLFA @	PTDNOK @		MAGCHK @	MAGOK1 @	MAGON2 @	MGRSTB @
R0533	AM0K @	AM0+A @	AM0+ @	AM0 @	AMIDK @	AMID+A @	AMID+ @	TMB5. @
R0534	RTO @		SHERR @	TSRH+A @	TSRH+ @	TSRHON @	TMRB16 @	TF1 @
R0535		TCOSP1 @	TCOSP @	TCOIN1 @	TCOIN @	TDECK @	TDEC @	MGROT @
R0536	A60 @	RDY2 @	MG_ERR @	TMRB8 @	MOVER2 @	MOVER1 @	MGACCW @	MGACW @
R0537	TUCLAU @	JIGUCL @	JGBCLK @	A180-A @	A180- @	A180 @	A60-A @	A60- @
R0538	ATCOK @	M6ENBK @	M06+A @	M06+ @	M06ENB @	MAGON @	ATUCL @	
R0539	ATCSTB @	TMR27. @	TMRB19 @	TMRB18 @	TMR26 @	TMR6. @	TCHP @	ATCOK1 @
R0540	A5 @	TMRB12 @	SPBLWK @	A4 @	A3 @	PRECLP @	A2 @	A1 @
R0541	STEP6 @	STEP5 @	STEP4 @	STEP3 @	STEP2 @	STEP1 @	A7 @	A6 @
R0542	M84A @	M84OK @	M82A @	M82OK @	SP_UNC @	SP_CLP @	ATFIN1 @	ATCFIN @
R0543	A4-1 @	MAGINP @	M74AR @	ASEQ3 @	ASEQ2 @	ASEQ1 @	M86A @	M86OK @
R0544	TMR4 @	ARJGPA @	ARJGSP @	ATCITL @	2NDREF @	TMRB9 @	ATCAL @	ARMSTB @
R0545	M6TMPA @	ATC+K @	MGON2 @	M6TMP+ @	A2_OK @			
R0546	ARMJOG @	F0+ @	F0+A @	0 @	ARMSPA @	AMIDA @	ARM0A @	M88KEP @
R0547		AM60+ @	AM60+A @	ARM0+ @	ARM0+A @		L1DL1 @	SPON @

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
R0548	M88-A @	M88- @					M88JOG @	
R0549					ARM60 @	ARM0 @		M88TCH @
R0550							ATSTB1 @	
R0551	GRINP @	GCHFAL @	4UCLP @	AP_RE1	AP_EX1		4AUCL @	4MUCL @
R0552	AMD- @	AMD+ @	AZR+A @	AZR- @	AZR+ @	TMR7	TMR6	TMR5
R0553	M94+A @	M94+ @	AM0A @	AM60A @	JOGOFD	M80+A @	M80+ @	AMD+A @
R0555	T1+ @	GCHOVR @	M80FIN @	WINFIN	Z>-30	Y>-30	X>30	X>-30
R0556	M0/1CL @	M2/M30 @	M0/M1 @	CL_OFS	KTON1	CL_FED @	CL_ON1 @	AP01 @
R0557	GCHEND @	T1+A @	M4R @	M3R @	SRNR1 @	MSTPR @	MSTPD @	MSTPV @
R0558	SPOK2 @	SPCCWP @	SPCWP @	CYST+A @	STON @	SPRFIN @	SPRES @	CYST+ @
R0559	CVOFDL	DRITL @	CVONDL	ALR @	WBOFDL	WBONDL	WKB_A @	OMSCHK
R0560	JIGCLK		4-MIR @	Y-MIR @	X-MIR @	OILAL @	MNTN @	O.S_2 @
R0561	CLNLDL	LVLERR	O.S_2A @	STL+ @	STL+A @	STL- @	JGCLOV	JGCLDL
R0563	DIFU4	DIFU3	JGCLCH	DROPOF @	STLKP @	KITON	CTSON	LVLOK
R0567	SBL_4_RI T @	APP_SBL_4_DA_MOV @	AP,ME'	TMRB30	>P_IN'	>P_OU'	>P_CL'	>P_OP'
R0571			\$ ABS		\$ AFL	\$ F0 @		
R0575			\$ F1		\$ MGON	\$ CL.A @	\$ F7	\$ CL.M @

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
R0576		RP0% @		\$]SRST @		\$]CCCW @	\$]CVSP @	
R0580			\$"ABS		\$"AFL	\$"F0 @	\$G1ONA	\$KG1ON
R0582	\$"INC	\$"DEC	\$"100%	TJOG @	THND @	HAND,M @	TAPE,M @	AUTO,M @
R0583	\$"H.2	\$"H.1		ZRN,M @	JOG,M @	RPD,M @	EDIT,M @	MDI,M @
R0584			\$"F1		MG-ON @	\$"CLA @	\$"F7	\$"CLM @
R0586	\$"LGL @	\$"HG @						
R0587 CUTBIN	@	@	@	@	@	@	@	@
R0589						\$"ARAL @	\$"CLAL	\$"SPAL @
R0591				TMR1 @	\$"ATC4	\$"ATC3	\$"ATC2	\$"ATC1
R0593					\$JFSEL @	@	@	@
R0600	@	@		MA.PB @	A.PININ @	PIN.A @	M.PINO @	H,WIND @
R0601		O.MCO @			M.O.IN	M.ON.D	MPKEP	APINON @
R0602								M.ON @
R0603								M06DE @
R0604								TMR108 @
R0605					@	@	@	@
R0606						@	@	@

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
R1150 FNCFD	@	@	@	@	@	@	@	@
R1154 DLFWD	@	@	@	@	@	@	@	@
R1156	@	@	@	@	@	@	@	@
R1160	@	@	@	@	@	@	@	@
R1170		TDWST1 @	TDWST2 @	TDWST3 @	TDWST4 @		TWOK @	
R1171					TDWST5 @		TWOKC @	TWOKP @
R9000							FUNOP1	FUNOP0 @

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ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
A0006			AL1005					
	@	@	@	@	@	@	@	@
A0007				AL1013				
	@	@		@	@	@	@	@
A0008			OP1021					
	@	@	@	@	@	@	@	@
A0009	OP2017	OP2016		OP2004		AIRAL	OP2001	
	@	@	@	@	@	@	@	@
A0010	OP2010	OP2009	OP2080	CTSTAL	WINDALM	NOTLAL	OP2005	AL1100
	@	@	@	@	@	@	@	@
A0011	OP1025	LBSWFI	OP2111	OP2113	OP2112	OP1031	OP2110	OP2015
	@	@	@	@	@		@	@

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Bit Address Map
TW-2260-VTC

ADDRESS	BIT NUMBER							
	7	6	5	4	3	2	1	0
K0000	@	@						
K0001	@	ARALDI	N2ALEN	LUALEN	PRMRST			32TOOL
K0002		@	@	@		K2.2	K2.1	K2.0
K0003	K3.7	K3.6	K3.5	K3.4		@	@	K3.0
K0004	@	@	K4.5	@	@			K4.0
K0005		@	@	@	@	@	@	@
K0006	@	@	@				@	@
K0007	@	@	@	CTSTON	@		ARM-J2	ARM-JOG
K0008							8.0IGN	LUBRLA
K0009	X7.7ON	X7.6ON	X7.5ON	X7.4ON	X7.3ON	X7.2ON	X7.1ON	X7.0ON
K0011	JGBCLL	AP,MOV	JGCLL	180-0	180	60-180	60	0-60

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NO.	ADDRESS	MESSAGE
0001	A000.0	
0002	A000.1	
0003	A000.2	
0004	A000.3	
0005	A000.4	
0006	A000.5	
0007	A000.6	
0008	A000.7	
0009	A001.0	
0010	A001.1	
0011	A001.2	
0012	A001.3	
0013	A001.4	
0014	A001.5	
0015	A001.6	
0016	A001.7	
0017	A002.0	
0018	A002.1	
0019	A002.2	
0020	A002.3	
0021	A002.4	
0022	A002.5	
0023	A002.6	
0024	A002.7	
0025	A003.0	
0026	A003.1	
0027	A003.2	
0028	A003.3	
0029	A003.4	
0030	A003.5	
0031	A003.6	
0032	A003.7	
0033	A004.0	
0034	A004.1	
0035	A004.2	
0036	A004.3	
0037	A004.4	
0038	A004.5	
0039	A004.6	
0040	A004.7	
0041	A005.0	
0042	A005.1	
0043	A005.2	
0044	A005.3	
0045	A005.4	
0046	A005.5	
0047	A005.6	
0048	A005.7	
0049	A006.0	1000 ATC OVER TIME ALARM (A6.0)
0050	A006.1	1001 X,Y,Z HOME REQUIRED (A6.1)
0051	A006.2	1002 X,Y,Z,4 AXIS HOME REQUIRED (A6.2)
0052	A006.3	1003 POT DOWN ERROR (A6.3)
0053	A006.4	1004 *EMERGENCY STOP (A6.4)
0054	A006.5	1005 SPINDLE COOLER ALARM (A6.5)
0055	A006.6	1006 ATC ARM 60 ERROR (A6.6)
0056	A006.7	1007 ATC ARM 180 ERROR (A6.7)
0057	A007.0	1008 ATC ARM 0 ERROR (A7.0)
0058	A007.1	1009 SPINDLE UNCLAMP ERROR (A7.1)
0059	A007.2	1010 SPINDLE CLAMP ERROR (A7.2)
0060	A007.3	1011 POT UP ERROR (A7.3)
0061	A007.4	1013 POT DOWN ERROR(A7.4)
0062	A007.5	1014 ATC ARM NOT READY (A7.5)
0063	A007.6	1015 X,Y,Z AXIS NOT ON 2REF. (A7.6)
0064	A007.7	1016 MAG COUNTER ERROR (A7.7)
0065	A008.0	1017 TOOL LIFE ALARM (A8.0)
0066	A008.1	1018 SPINDLE GEAR ALARM (A8.1)
0067	A008.2	1019 ATC NOT READY (A8.2)
0068	A008.3	1020 4TH AXIS UN/CLAMP ERROR (A8.3)
0069	A008.4	1022 COOLANT MOTOR OVERLOAD (A8.4)
0070	A008.5	1023 CHIP MOTOR OVERLOAD (A8.5)
0071	A008.6	1024 ARM MOTOR OVERLOAD (A8.6)

NO.	ADDRESS	MESSAGE
0072	A008.7	1027 MAGAZINE MOTOR OVERLOAD (A8.7)
0073	A009.0	2000 ARM RETURN (A9.0)
0074	A009.1	2001 CHECK TOOL NOUMBER (A9.1)
0075	A009.2	2002 LOW AIR PRESSURE (A9.2)
0076	A009.3	2003 LOW LUBE LEVEL (A9.3)
0077	A009.4	2004 DOOR OPEN (A9.4)
0078	A009.5	1028 CTS MOTOR OVERLOAD (A9.5)
0079	A009.6	2016 PLS TOOL UNCLAMP (A9.6)
0080	A009.7	2017 PLS TOOL CLAMP (A9.7)
0081	A010.0	1100 SET K7#0 TO 0/POWER OFF/ON
0082	A010.1	2005 LOW COOLANT LEVEL (A10.1)
0083	A010.2	1030 TOOL NO. NOT REGISTERED (A10.2)
0084	A010.3	2006 SPINDLE WINDING ERROR (A10.3)
0085	A010.4	2007 CTS TANK COOLANT LOW (A10.4)
0086	A010.5	2008 CTS TANK PUMP OVERLOAD (A10.5)
0087	A010.6	2009 MAG. PIN IN.(A10.6)
0088	A010.7	2010 FILTER NEEDS TO BE CLEAN(A10.7)
0089	A011.0	2015 HI LOW WIND CHANGE ERROR(A11.0)
0090	A011.1	2014 NITROGEN LOW (A11.1)
0091	A011.2	1031 LUBE SYSTEM FAIL.(A11.2)
0092	A011.3	2012 CALL SERVICE SOON!(A11.3)
0093	A011.4	2013 MACHINE MAY BE BAD DAMAGED(A11.4)
0094	A011.5	2011 LUBE SYSTEM FAIL.PLS CHK LUBE TUBE (A11.5)
0095	A011.6	2018 LUBE PRESSURE SWITCH FAIL(A11.6)
0096	A011.7	1025 PLS HOME MACHINE(A11.7)
0097	A012.0	
0098	A012.1	
0099	A012.2	
0100	A012.3	
0101	A012.4	
0102	A012.5	
0103	A012.6	
0104	A012.7	
0105	A013.0	
0106	A013.1	
0107	A013.2	
0108	A013.3	
0109	A013.4	
0110	A013.5	
0111	A013.6	
0112	A013.7	
0113	A014.0	
0114	A014.1	
0115	A014.2	
0116	A014.3	
0117	A014.4	
0118	A014.5	
0119	A014.6	
0120	A014.7	
0121	A015.0	
0122	A015.1	
0123	A015.2	
0124	A015.3	
0125	A015.4	
0126	A015.5	
0127	A015.6	
0128	A015.7	
0129	A016.0	
0130	A016.1	
0131	A016.2	
0132	A016.3	
0133	A016.4	
0134	A016.5	
0135	A016.6	
0136	A016.7	
0137	A017.0	
0138	A017.1	
0139	A017.2	
0140	A017.3	
0141	A017.4	
0142	A017.5	

NO.	ADDRESS	MESSAGE
0143	A017.6	
0144	A017.7	
0145	A018.0	
0146	A018.1	
0147	A018.2	
0148	A018.3	
0149	A018.4	
0150	A018.5	
0151	A018.6	
0152	A018.7	
0153	A019.0	
0154	A019.1	
0155	A019.2	
0156	A019.3	
0157	A019.4	
0158	A019.5	
0159	A019.6	
0160	A019.7	
0161	A020.0	
0162	A020.1	
0163	A020.2	
0164	A020.3	
0165	A020.4	
0166	A020.5	
0167	A020.6	
0168	A020.7	
0169	A021.0	
0170	A021.1	
0171	A021.2	
0172	A021.3	
0173	A021.4	
0174	A021.5	
0175	A021.6	
0176	A021.7	
0177	A022.0	
0178	A022.1	
0179	A022.2	
0180	A022.3	
0181	A022.4	
0182	A022.5	
0183	A022.6	
0184	A022.7	
0185	A023.0	
0186	A023.1	
0187	A023.2	
0188	A023.3	
0189	A023.4	
0190	A023.5	
0191	A023.6	
0192	A023.7	
0193	A024.0	
0194	A024.1	
0195	A024.2	
0196	A024.3	
0197	A024.4	
0198	A024.5	
0199	A024.6	
0200	A024.7	
0201	A025.0	
0202	A025.1	
0203	A025.2	
0204	A025.3	
0205	A025.4	
0206	A025.5	
0207	A025.6	
0208	A025.7	
0209	A026.0	
0210	A026.1	
0211	A026.2	
0212	A026.3	
0213	A026.4	

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NO.	ADDRESS	MESSAGE
0214	A026.5	
0215	A026.6	
0216	A026.7	
0217	A027.0	
0218	A027.1	
0219	A027.2	
0220	A027.3	
0221	A027.4	
0222	A027.5	
0223	A027.6	
0224	A027.7	
0225	A028.0	
0226	A028.1	
0227	A028.2	
0228	A028.3	
0229	A028.4	
0230	A028.5	
0231	A028.6	
0232	A028.7	
0233	A029.0	
0234	A029.1	
0235	A029.2	
0236	A029.3	
0237	A029.4	
0238	A029.5	
0239	A029.6	
0240	A029.7	
0241	A030.0	
0242	A030.1	
0243	A030.2	
0244	A030.3	
0245	A030.4	
0246	A030.5	
0247	A030.6	
0248	A030.7	
0249	A031.0	
0250	A031.1	
0251	A031.2	
0252	A031.3	
0253	A031.4	
0254	A031.5	
0255	A031.6	
0256	A031.7	
0257	A032.0	
0258	A032.1	
0259	A032.2	
0260	A032.3	
0261	A032.4	
0262	A032.5	
0263	A032.6	
0264	A032.7	
0265	A033.0	
0266	A033.1	
0267	A033.2	
0268	A033.3	
0269	A033.4	
0270	A033.5	
0271	A033.6	
0272	A033.7	
0273	A034.0	
0274	A034.1	
0275	A034.2	
0276	A034.3	
0277	A034.4	
0278	A034.5	
0279	A034.6	
0280	A034.7	
0281	A035.0	
0282	A035.1	
0283	A035.2	
0284	A035.3	

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NO.	ADDRESS	MESSAGE
0285	A035.4	
0286	A035.5	
0287	A035.6	
0288	A035.7	
0289	A036.0	
0290	A036.1	
0291	A036.2	
0292	A036.3	
0293	A036.4	
0294	A036.5	
0295	A036.6	
0296	A036.7	
0297	A037.0	
0298	A037.1	
0299	A037.2	
0300	A037.3	
0301	A037.4	
0302	A037.5	
0303	A037.6	
0304	A037.7	
0305	A038.0	
0306	A038.1	
0307	A038.2	
0308	A038.3	
0309	A038.4	
0310	A038.5	
0311	A038.6	
0312	A038.7	
0313	A039.0	
0314	A039.1	
0315	A039.2	
0316	A039.3	
0317	A039.4	
0318	A039.5	
0319	A039.6	
0320	A039.7	
0321	A040.0	
0322	A040.1	
0323	A040.2	
0324	A040.3	
0325	A040.4	
0326	A040.5	
0327	A040.6	
0328	A040.7	
0329	A041.0	
0330	A041.1	
0331	A041.2	
0332	A041.3	
0333	A041.4	
0334	A041.5	
0335	A041.6	
0336	A041.7	
0337	A042.0	
0338	A042.1	
0339	A042.2	
0340	A042.3	
0341	A042.4	
0342	A042.5	
0343	A042.6	
0344	A042.7	
0345	A043.0	
0346	A043.1	
0347	A043.2	
0348	A043.3	
0349	A043.4	
0350	A043.5	
0351	A043.6	
0352	A043.7	
0353	A044.0	
0354	A044.1	
0355	A044.2	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0356	A044.3	
0357	A044.4	
0358	A044.5	
0359	A044.6	
0360	A044.7	
0361	A045.0	
0362	A045.1	
0363	A045.2	
0364	A045.3	
0365	A045.4	
0366	A045.5	
0367	A045.6	
0368	A045.7	
0369	A046.0	
0370	A046.1	
0371	A046.2	
0372	A046.3	
0373	A046.4	
0374	A046.5	
0375	A046.6	
0376	A046.7	
0377	A047.0	
0378	A047.1	
0379	A047.2	
0380	A047.3	
0381	A047.4	
0382	A047.5	
0383	A047.6	
0384	A047.7	
0385	A048.0	
0386	A048.1	
0387	A048.2	
0388	A048.3	
0389	A048.4	
0390	A048.5	
0391	A048.6	
0392	A048.7	
0393	A049.0	
0394	A049.1	
0395	A049.2	
0396	A049.3	
0397	A049.4	
0398	A049.5	
0399	A049.6	
0400	A049.7	
0401	A050.0	
0402	A050.1	
0403	A050.2	
0404	A050.3	
0405	A050.4	
0406	A050.5	
0407	A050.6	
0408	A050.7	
0409	A051.0	
0410	A051.1	
0411	A051.2	
0412	A051.3	
0413	A051.4	
0414	A051.5	
0415	A051.6	
0416	A051.7	
0417	A052.0	
0418	A052.1	
0419	A052.2	
0420	A052.3	
0421	A052.4	
0422	A052.5	
0423	A052.6	
0424	A052.7	
0425	A053.0	
0426	A053.1	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0427	A053.2	
0428	A053.3	
0429	A053.4	
0430	A053.5	
0431	A053.6	
0432	A053.7	
0433	A054.0	
0434	A054.1	
0435	A054.2	
0436	A054.3	
0437	A054.4	
0438	A054.5	
0439	A054.6	
0440	A054.7	
0441	A055.0	
0442	A055.1	
0443	A055.2	
0444	A055.3	
0445	A055.4	
0446	A055.5	
0447	A055.6	
0448	A055.7	
0449	A056.0	
0450	A056.1	
0451	A056.2	
0452	A056.3	
0453	A056.4	
0454	A056.5	
0455	A056.6	
0456	A056.7	
0457	A057.0	
0458	A057.1	
0459	A057.2	
0460	A057.3	
0461	A057.4	
0462	A057.5	
0463	A057.6	
0464	A057.7	
0465	A058.0	
0466	A058.1	
0467	A058.2	
0468	A058.3	
0469	A058.4	
0470	A058.5	
0471	A058.6	
0472	A058.7	
0473	A059.0	
0474	A059.1	
0475	A059.2	
0476	A059.3	
0477	A059.4	
0478	A059.5	
0479	A059.6	
0480	A059.7	
0481	A060.0	
0482	A060.1	
0483	A060.2	
0484	A060.3	
0485	A060.4	
0486	A060.5	
0487	A060.6	
0488	A060.7	
0489	A061.0	
0490	A061.1	
0491	A061.2	
0492	A061.3	
0493	A061.4	
0494	A061.5	
0495	A061.6	
0496	A061.7	
0497	A062.0	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0498	A062.1	
0499	A062.2	
0500	A062.3	
0501	A062.4	
0502	A062.5	
0503	A062.6	
0504	A062.7	
0505	A063.0	
0506	A063.1	
0507	A063.2	
0508	A063.3	
0509	A063.4	
0510	A063.5	
0511	A063.6	
0512	A063.7	
0513	A064.0	
0514	A064.1	
0515	A064.2	
0516	A064.3	
0517	A064.4	
0518	A064.5	
0519	A064.6	
0520	A064.7	
0521	A065.0	
0522	A065.1	
0523	A065.2	
0524	A065.3	
0525	A065.4	
0526	A065.5	
0527	A065.6	
0528	A065.7	
0529	A066.0	
0530	A066.1	
0531	A066.2	
0532	A066.3	
0533	A066.4	
0534	A066.5	
0535	A066.6	
0536	A066.7	
0537	A067.0	
0538	A067.1	
0539	A067.2	
0540	A067.3	
0541	A067.4	
0542	A067.5	
0543	A067.6	
0544	A067.7	
0545	A068.0	
0546	A068.1	
0547	A068.2	
0548	A068.3	
0549	A068.4	
0550	A068.5	
0551	A068.6	
0552	A068.7	
0553	A069.0	
0554	A069.1	
0555	A069.2	
0556	A069.3	
0557	A069.4	
0558	A069.5	
0559	A069.6	
0560	A069.7	
0561	A070.0	
0562	A070.1	
0563	A070.2	
0564	A070.3	
0565	A070.4	
0566	A070.5	
0567	A070.6	
0568	A070.7	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0569	A071.0	
0570	A071.1	
0571	A071.2	
0572	A071.3	
0573	A071.4	
0574	A071.5	
0575	A071.6	
0576	A071.7	
0577	A072.0	
0578	A072.1	
0579	A072.2	
0580	A072.3	
0581	A072.4	
0582	A072.5	
0583	A072.6	
0584	A072.7	
0585	A073.0	
0586	A073.1	
0587	A073.2	
0588	A073.3	
0589	A073.4	
0590	A073.5	
0591	A073.6	
0592	A073.7	
0593	A074.0	
0594	A074.1	
0595	A074.2	
0596	A074.3	
0597	A074.4	
0598	A074.5	
0599	A074.6	
0600	A074.7	
0601	A075.0	
0602	A075.1	
0603	A075.2	
0604	A075.3	
0605	A075.4	
0606	A075.5	
0607	A075.6	
0608	A075.7	
0609	A076.0	
0610	A076.1	
0611	A076.2	
0612	A076.3	
0613	A076.4	
0614	A076.5	
0615	A076.6	
0616	A076.7	
0617	A077.0	
0618	A077.1	
0619	A077.2	
0620	A077.3	
0621	A077.4	
0622	A077.5	
0623	A077.6	
0624	A077.7	
0625	A078.0	
0626	A078.1	
0627	A078.2	
0628	A078.3	
0629	A078.4	
0630	A078.5	
0631	A078.6	
0632	A078.7	
0633	A079.0	
0634	A079.1	
0635	A079.2	
0636	A079.3	
0637	A079.4	
0638	A079.5	
0639	A079.6	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0640	A079.7	
0641	A080.0	
0642	A080.1	
0643	A080.2	
0644	A080.3	
0645	A080.4	
0646	A080.5	
0647	A080.6	
0648	A080.7	
0649	A081.0	
0650	A081.1	
0651	A081.2	
0652	A081.3	
0653	A081.4	
0654	A081.5	
0655	A081.6	
0656	A081.7	
0657	A082.0	
0658	A082.1	
0659	A082.2	
0660	A082.3	
0661	A082.4	
0662	A082.5	
0663	A082.6	
0664	A082.7	
0665	A083.0	
0666	A083.1	
0667	A083.2	
0668	A083.3	
0669	A083.4	
0670	A083.5	
0671	A083.6	
0672	A083.7	
0673	A084.0	
0674	A084.1	
0675	A084.2	
0676	A084.3	
0677	A084.4	
0678	A084.5	
0679	A084.6	
0680	A084.7	
0681	A085.0	
0682	A085.1	
0683	A085.2	
0684	A085.3	
0685	A085.4	
0686	A085.5	
0687	A085.6	
0688	A085.7	
0689	A086.0	
0690	A086.1	
0691	A086.2	
0692	A086.3	
0693	A086.4	
0694	A086.5	
0695	A086.6	
0696	A086.7	
0697	A087.0	
0698	A087.1	
0699	A087.2	
0700	A087.3	
0701	A087.4	
0702	A087.5	
0703	A087.6	
0704	A087.7	
0705	A088.0	
0706	A088.1	
0707	A088.2	
0708	A088.3	
0709	A088.4	
0710	A088.5	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0711	A088.6	
0712	A088.7	
0713	A089.0	
0714	A089.1	
0715	A089.2	
0716	A089.3	
0717	A089.4	
0718	A089.5	
0719	A089.6	
0720	A089.7	
0721	A090.0	
0722	A090.1	
0723	A090.2	
0724	A090.3	
0725	A090.4	
0726	A090.5	
0727	A090.6	
0728	A090.7	
0729	A091.0	
0730	A091.1	
0731	A091.2	
0732	A091.3	
0733	A091.4	
0734	A091.5	
0735	A091.6	
0736	A091.7	
0737	A092.0	
0738	A092.1	
0739	A092.2	
0740	A092.3	
0741	A092.4	
0742	A092.5	
0743	A092.6	
0744	A092.7	
0745	A093.0	
0746	A093.1	
0747	A093.2	
0748	A093.3	
0749	A093.4	
0750	A093.5	
0751	A093.6	
0752	A093.7	
0753	A094.0	
0754	A094.1	
0755	A094.2	
0756	A094.3	
0757	A094.4	
0758	A094.5	
0759	A094.6	
0760	A094.7	
0761	A095.0	
0762	A095.1	
0763	A095.2	
0764	A095.3	
0765	A095.4	
0766	A095.5	
0767	A095.6	
0768	A095.7	
0769	A096.0	
0770	A096.1	
0771	A096.2	
0772	A096.3	
0773	A096.4	
0774	A096.5	
0775	A096.6	
0776	A096.7	
0777	A097.0	
0778	A097.1	
0779	A097.2	
0780	A097.3	
0781	A097.4	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0782	A097.5	
0783	A097.6	
0784	A097.7	
0785	A098.0	
0786	A098.1	
0787	A098.2	
0788	A098.3	
0789	A098.4	
0790	A098.5	
0791	A098.6	
0792	A098.7	
0793	A099.0	
0794	A099.1	
0795	A099.2	
0796	A099.3	
0797	A099.4	
0798	A099.5	
0799	A099.6	
0800	A099.7	
0801	A100.0	
0802	A100.1	
0803	A100.2	
0804	A100.3	
0805	A100.4	
0806	A100.5	
0807	A100.6	
0808	A100.7	
0809	A101.0	
0810	A101.1	
0811	A101.2	
0812	A101.3	
0813	A101.4	
0814	A101.5	
0815	A101.6	
0816	A101.7	
0817	A102.0	
0818	A102.1	
0819	A102.2	
0820	A102.3	
0821	A102.4	
0822	A102.5	
0823	A102.6	
0824	A102.7	
0825	A103.0	
0826	A103.1	
0827	A103.2	
0828	A103.3	
0829	A103.4	
0830	A103.5	
0831	A103.6	
0832	A103.7	
0833	A104.0	
0834	A104.1	
0835	A104.2	
0836	A104.3	
0837	A104.4	
0838	A104.5	
0839	A104.6	
0840	A104.7	
0841	A105.0	
0842	A105.1	
0843	A105.2	
0844	A105.3	
0845	A105.4	
0846	A105.5	
0847	A105.6	
0848	A105.7	
0849	A106.0	
0850	A106.1	
0851	A106.2	
0852	A106.3	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0853	A106.4	
0854	A106.5	
0855	A106.6	
0856	A106.7	
0857	A107.0	
0858	A107.1	
0859	A107.2	
0860	A107.3	
0861	A107.4	
0862	A107.5	
0863	A107.6	
0864	A107.7	
0865	A108.0	
0866	A108.1	
0867	A108.2	
0868	A108.3	
0869	A108.4	
0870	A108.5	
0871	A108.6	
0872	A108.7	
0873	A109.0	
0874	A109.1	
0875	A109.2	
0876	A109.3	
0877	A109.4	
0878	A109.5	
0879	A109.6	
0880	A109.7	
0881	A110.0	
0882	A110.1	
0883	A110.2	
0884	A110.3	
0885	A110.4	
0886	A110.5	
0887	A110.6	
0888	A110.7	
0889	A111.0	
0890	A111.1	
0891	A111.2	
0892	A111.3	
0893	A111.4	
0894	A111.5	
0895	A111.6	
0896	A111.7	
0897	A112.0	
0898	A112.1	
0899	A112.2	
0900	A112.3	
0901	A112.4	
0902	A112.5	
0903	A112.6	
0904	A112.7	
0905	A113.0	
0906	A113.1	
0907	A113.2	
0908	A113.3	
0909	A113.4	
0910	A113.5	
0911	A113.6	
0912	A113.7	
0913	A114.0	
0914	A114.1	
0915	A114.2	
0916	A114.3	
0917	A114.4	
0918	A114.5	
0919	A114.6	
0920	A114.7	
0921	A115.0	
0922	A115.1	
0923	A115.2	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0924	A115.3	
0925	A115.4	
0926	A115.5	
0927	A115.6	
0928	A115.7	
0929	A116.0	
0930	A116.1	
0931	A116.2	
0932	A116.3	
0933	A116.4	
0934	A116.5	
0935	A116.6	
0936	A116.7	
0937	A117.0	
0938	A117.1	
0939	A117.2	
0940	A117.3	
0941	A117.4	
0942	A117.5	
0943	A117.6	
0944	A117.7	
0945	A118.0	
0946	A118.1	
0947	A118.2	
0948	A118.3	
0949	A118.4	
0950	A118.5	
0951	A118.6	
0952	A118.7	
0953	A119.0	
0954	A119.1	
0955	A119.2	
0956	A119.3	
0957	A119.4	
0958	A119.5	
0959	A119.6	
0960	A119.7	
0961	A120.0	
0962	A120.1	
0963	A120.2	
0964	A120.3	
0965	A120.4	
0966	A120.5	
0967	A120.6	
0968	A120.7	
0969	A121.0	
0970	A121.1	
0971	A121.2	
0972	A121.3	
0973	A121.4	
0974	A121.5	
0975	A121.6	
0976	A121.7	
0977	A122.0	
0978	A122.1	
0979	A122.2	
0980	A122.3	
0981	A122.4	
0982	A122.5	
0983	A122.6	
0984	A122.7	
0985	A123.0	
0986	A123.1	
0987	A123.2	
0988	A123.3	
0989	A123.4	
0990	A123.5	
0991	A123.6	
0992	A123.7	
0993	A124.0	
0994	A124.1	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
0995	A124.2	
0996	A124.3	
0997	A124.4	
0998	A124.5	
0999	A124.6	
1000	A124.7	
1001	A125.0	
1002	A125.1	
1003	A125.2	
1004	A125.3	
1005	A125.4	
1006	A125.5	
1007	A125.6	
1008	A125.7	
1009	A126.0	
1010	A126.1	
1011	A126.2	
1012	A126.3	
1013	A126.4	
1014	A126.5	
1015	A126.6	
1016	A126.7	
1017	A127.0	
1018	A127.1	
1019	A127.2	
1020	A127.3	
1021	A127.4	
1022	A127.5	
1023	A127.6	
1024	A127.7	
1025	A128.0	
1026	A128.1	
1027	A128.2	
1028	A128.3	
1029	A128.4	
1030	A128.5	
1031	A128.6	
1032	A128.7	
1033	A129.0	
1034	A129.1	
1035	A129.2	
1036	A129.3	
1037	A129.4	
1038	A129.5	
1039	A129.6	
1040	A129.7	
1041	A130.0	
1042	A130.1	
1043	A130.2	
1044	A130.3	
1045	A130.4	
1046	A130.5	
1047	A130.6	
1048	A130.7	
1049	A131.0	
1050	A131.1	
1051	A131.2	
1052	A131.3	
1053	A131.4	
1054	A131.5	
1055	A131.6	
1056	A131.7	
1057	A132.0	
1058	A132.1	
1059	A132.2	
1060	A132.3	
1061	A132.4	
1062	A132.5	
1063	A132.6	
1064	A132.7	
1065	A133.0	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1066	A133.1	
1067	A133.2	
1068	A133.3	
1069	A133.4	
1070	A133.5	
1071	A133.6	
1072	A133.7	
1073	A134.0	
1074	A134.1	
1075	A134.2	
1076	A134.3	
1077	A134.4	
1078	A134.5	
1079	A134.6	
1080	A134.7	
1081	A135.0	
1082	A135.1	
1083	A135.2	
1084	A135.3	
1085	A135.4	
1086	A135.5	
1087	A135.6	
1088	A135.7	
1089	A136.0	
1090	A136.1	
1091	A136.2	
1092	A136.3	
1093	A136.4	
1094	A136.5	
1095	A136.6	
1096	A136.7	
1097	A137.0	
1098	A137.1	
1099	A137.2	
1100	A137.3	
1101	A137.4	
1102	A137.5	
1103	A137.6	
1104	A137.7	
1105	A138.0	
1106	A138.1	
1107	A138.2	
1108	A138.3	
1109	A138.4	
1110	A138.5	
1111	A138.6	
1112	A138.7	
1113	A139.0	
1114	A139.1	
1115	A139.2	
1116	A139.3	
1117	A139.4	
1118	A139.5	
1119	A139.6	
1120	A139.7	
1121	A140.0	
1122	A140.1	
1123	A140.2	
1124	A140.3	
1125	A140.4	
1126	A140.5	
1127	A140.6	
1128	A140.7	
1129	A141.0	
1130	A141.1	
1131	A141.2	
1132	A141.3	
1133	A141.4	
1134	A141.5	
1135	A141.6	
1136	A141.7	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1137	A142.0	
1138	A142.1	
1139	A142.2	
1140	A142.3	
1141	A142.4	
1142	A142.5	
1143	A142.6	
1144	A142.7	
1145	A143.0	
1146	A143.1	
1147	A143.2	
1148	A143.3	
1149	A143.4	
1150	A143.5	
1151	A143.6	
1152	A143.7	
1153	A144.0	
1154	A144.1	
1155	A144.2	
1156	A144.3	
1157	A144.4	
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1159	A144.6	
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1164	A145.3	
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1167	A145.6	
1168	A145.7	
1169	A146.0	
1170	A146.1	
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1172	A146.3	
1173	A146.4	
1174	A146.5	
1175	A146.6	
1176	A146.7	
1177	A147.0	
1178	A147.1	
1179	A147.2	
1180	A147.3	
1181	A147.4	
1182	A147.5	
1183	A147.6	
1184	A147.7	
1185	A148.0	
1186	A148.1	
1187	A148.2	
1188	A148.3	
1189	A148.4	
1190	A148.5	
1191	A148.6	
1192	A148.7	
1193	A149.0	
1194	A149.1	
1195	A149.2	
1196	A149.3	
1197	A149.4	
1198	A149.5	
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1202	A150.1	
1203	A150.2	
1204	A150.3	
1205	A150.4	
1206	A150.5	
1207	A150.6	

NO.	ADDRESS	MESSAGE
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1211	A151.2	
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1213	A151.4	
1214	A151.5	
1215	A151.6	
1216	A151.7	
1217	A152.0	
1218	A152.1	
1219	A152.2	
1220	A152.3	
1221	A152.4	
1222	A152.5	
1223	A152.6	
1224	A152.7	
1225	A153.0	
1226	A153.1	
1227	A153.2	
1228	A153.3	
1229	A153.4	
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1231	A153.6	
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1236	A154.3	
1237	A154.4	
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1239	A154.6	
1240	A154.7	
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1242	A155.1	
1243	A155.2	
1244	A155.3	
1245	A155.4	
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1247	A155.6	
1248	A155.7	
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1250	A156.1	
1251	A156.2	
1252	A156.3	
1253	A156.4	
1254	A156.5	
1255	A156.6	
1256	A156.7	
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1259	A157.2	
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1261	A157.4	
1262	A157.5	
1263	A157.6	
1264	A157.7	
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1267	A158.2	
1268	A158.3	
1269	A158.4	
1270	A158.5	
1271	A158.6	
1272	A158.7	
1273	A159.0	
1274	A159.1	
1275	A159.2	
1276	A159.3	
1277	A159.4	
1278	A159.5	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1279	A159.6	
1280	A159.7	
1281	A160.0	
1282	A160.1	
1283	A160.2	
1284	A160.3	
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1287	A160.6	
1288	A160.7	
1289	A161.0	
1290	A161.1	
1291	A161.2	
1292	A161.3	
1293	A161.4	
1294	A161.5	
1295	A161.6	
1296	A161.7	
1297	A162.0	
1298	A162.1	
1299	A162.2	
1300	A162.3	
1301	A162.4	
1302	A162.5	
1303	A162.6	
1304	A162.7	
1305	A163.0	
1306	A163.1	
1307	A163.2	
1308	A163.3	
1309	A163.4	
1310	A163.5	
1311	A163.6	
1312	A163.7	
1313	A164.0	
1314	A164.1	
1315	A164.2	
1316	A164.3	
1317	A164.4	
1318	A164.5	
1319	A164.6	
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1324	A165.3	
1325	A165.4	
1326	A165.5	
1327	A165.6	
1328	A165.7	
1329	A166.0	
1330	A166.1	
1331	A166.2	
1332	A166.3	
1333	A166.4	
1334	A166.5	
1335	A166.6	
1336	A166.7	
1337	A167.0	
1338	A167.1	
1339	A167.2	
1340	A167.3	
1341	A167.4	
1342	A167.5	
1343	A167.6	
1344	A167.7	
1345	A168.0	
1346	A168.1	
1347	A168.2	
1348	A168.3	
1349	A168.4	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1350	A168.5	
1351	A168.6	
1352	A168.7	
1353	A169.0	
1354	A169.1	
1355	A169.2	
1356	A169.3	
1357	A169.4	
1358	A169.5	
1359	A169.6	
1360	A169.7	
1361	A170.0	
1362	A170.1	
1363	A170.2	
1364	A170.3	
1365	A170.4	
1366	A170.5	
1367	A170.6	
1368	A170.7	
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1396	A174.3	
1397	A174.4	
1398	A174.5	
1399	A174.6	
1400	A174.7	
1401	A175.0	
1402	A175.1	
1403	A175.2	
1404	A175.3	
1405	A175.4	
1406	A175.5	
1407	A175.6	
1408	A175.7	
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1417	A177.0	
1418	A177.1	
1419	A177.2	
1420	A177.3	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1421	A177.4	
1422	A177.5	
1423	A177.6	
1424	A177.7	
1425	A178.0	
1426	A178.1	
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1431	A178.6	
1432	A178.7	
1433	A179.0	
1434	A179.1	
1435	A179.2	
1436	A179.3	
1437	A179.4	
1438	A179.5	
1439	A179.6	
1440	A179.7	
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1443	A180.2	
1444	A180.3	
1445	A180.4	
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1447	A180.6	
1448	A180.7	
1449	A181.0	
1450	A181.1	
1451	A181.2	
1452	A181.3	
1453	A181.4	
1454	A181.5	
1455	A181.6	
1456	A181.7	
1457	A182.0	
1458	A182.1	
1459	A182.2	
1460	A182.3	
1461	A182.4	
1462	A182.5	
1463	A182.6	
1464	A182.7	
1465	A183.0	
1466	A183.1	
1467	A183.2	
1468	A183.3	
1469	A183.4	
1470	A183.5	
1471	A183.6	
1472	A183.7	
1473	A184.0	
1474	A184.1	
1475	A184.2	
1476	A184.3	
1477	A184.4	
1478	A184.5	
1479	A184.6	
1480	A184.7	
1481	A185.0	
1482	A185.1	
1483	A185.2	
1484	A185.3	
1485	A185.4	
1486	A185.5	
1487	A185.6	
1488	A185.7	
1489	A186.0	
1490	A186.1	
1491	A186.2	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1492	A186.3	
1493	A186.4	
1494	A186.5	
1495	A186.6	
1496	A186.7	
1497	A187.0	
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1499	A187.2	
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1501	A187.4	
1502	A187.5	
1503	A187.6	
1504	A187.7	
1505	A188.0	
1506	A188.1	
1507	A188.2	
1508	A188.3	
1509	A188.4	
1510	A188.5	
1511	A188.6	
1512	A188.7	
1513	A189.0	
1514	A189.1	
1515	A189.2	
1516	A189.3	
1517	A189.4	
1518	A189.5	
1519	A189.6	
1520	A189.7	
1521	A190.0	
1522	A190.1	
1523	A190.2	
1524	A190.3	
1525	A190.4	
1526	A190.5	
1527	A190.6	
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1532	A191.3	
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1534	A191.5	
1535	A191.6	
1536	A191.7	
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1538	A192.1	
1539	A192.2	
1540	A192.3	
1541	A192.4	
1542	A192.5	
1543	A192.6	
1544	A192.7	
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1546	A193.1	
1547	A193.2	
1548	A193.3	
1549	A193.4	
1550	A193.5	
1551	A193.6	
1552	A193.7	
1553	A194.0	
1554	A194.1	
1555	A194.2	
1556	A194.3	
1557	A194.4	
1558	A194.5	
1559	A194.6	
1560	A194.7	
1561	A195.0	
1562	A195.1	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1563	A195.2	
1564	A195.3	
1565	A195.4	
1566	A195.5	
1567	A195.6	
1568	A195.7	
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1570	A196.1	
1571	A196.2	
1572	A196.3	
1573	A196.4	
1574	A196.5	
1575	A196.6	
1576	A196.7	
1577	A197.0	
1578	A197.1	
1579	A197.2	
1580	A197.3	
1581	A197.4	
1582	A197.5	
1583	A197.6	
1584	A197.7	
1585	A198.0	
1586	A198.1	
1587	A198.2	
1588	A198.3	
1589	A198.4	
1590	A198.5	
1591	A198.6	
1592	A198.7	
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1594	A199.1	
1595	A199.2	
1596	A199.3	
1597	A199.4	
1598	A199.5	
1599	A199.6	
1600	A199.7	
1601	A200.0	
1602	A200.1	
1603	A200.2	
1604	A200.3	
1605	A200.4	
1606	A200.5	
1607	A200.6	
1608	A200.7	
1609	A201.0	
1610	A201.1	
1611	A201.2	
1612	A201.3	
1613	A201.4	
1614	A201.5	
1615	A201.6	
1616	A201.7	
1617	A202.0	
1618	A202.1	
1619	A202.2	
1620	A202.3	
1621	A202.4	
1622	A202.5	
1623	A202.6	
1624	A202.7	
1625	A203.0	
1626	A203.1	
1627	A203.2	
1628	A203.3	
1629	A203.4	
1630	A203.5	
1631	A203.6	
1632	A203.7	
1633	A204.0	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1634	A204.1	
1635	A204.2	
1636	A204.3	
1637	A204.4	
1638	A204.5	
1639	A204.6	
1640	A204.7	
1641	A205.0	
1642	A205.1	
1643	A205.2	
1644	A205.3	
1645	A205.4	
1646	A205.5	
1647	A205.6	
1648	A205.7	
1649	A206.0	
1650	A206.1	
1651	A206.2	
1652	A206.3	
1653	A206.4	
1654	A206.5	
1655	A206.6	
1656	A206.7	
1657	A207.0	
1658	A207.1	
1659	A207.2	
1660	A207.3	
1661	A207.4	
1662	A207.5	
1663	A207.6	
1664	A207.7	
1665	A208.0	
1666	A208.1	
1667	A208.2	
1668	A208.3	
1669	A208.4	
1670	A208.5	
1671	A208.6	
1672	A208.7	
1673	A209.0	
1674	A209.1	
1675	A209.2	
1676	A209.3	
1677	A209.4	
1678	A209.5	
1679	A209.6	
1680	A209.7	
1681	A210.0	
1682	A210.1	
1683	A210.2	
1684	A210.3	
1685	A210.4	
1686	A210.5	
1687	A210.6	
1688	A210.7	
1689	A211.0	
1690	A211.1	
1691	A211.2	
1692	A211.3	
1693	A211.4	
1694	A211.5	
1695	A211.6	
1696	A211.7	
1697	A212.0	
1698	A212.1	
1699	A212.2	
1700	A212.3	
1701	A212.4	
1702	A212.5	
1703	A212.6	
1704	A212.7	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
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1706	A213.1	
1707	A213.2	
1708	A213.3	
1709	A213.4	
1710	A213.5	
1711	A213.6	
1712	A213.7	
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1714	A214.1	
1715	A214.2	
1716	A214.3	
1717	A214.4	
1718	A214.5	
1719	A214.6	
1720	A214.7	
1721	A215.0	
1722	A215.1	
1723	A215.2	
1724	A215.3	
1725	A215.4	
1726	A215.5	
1727	A215.6	
1728	A215.7	
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1730	A216.1	
1731	A216.2	
1732	A216.3	
1733	A216.4	
1734	A216.5	
1735	A216.6	
1736	A216.7	
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1739	A217.2	
1740	A217.3	
1741	A217.4	
1742	A217.5	
1743	A217.6	
1744	A217.7	
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1747	A218.2	
1748	A218.3	
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1750	A218.5	
1751	A218.6	
1752	A218.7	
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1754	A219.1	
1755	A219.2	
1756	A219.3	
1757	A219.4	
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1759	A219.6	
1760	A219.7	
1761	A220.0	
1762	A220.1	
1763	A220.2	
1764	A220.3	
1765	A220.4	
1766	A220.5	
1767	A220.6	
1768	A220.7	
1769	A221.0	
1770	A221.1	
1771	A221.2	
1772	A221.3	
1773	A221.4	
1774	A221.5	
1775	A221.6	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1776	A221.7	
1777	A222.0	
1778	A222.1	
1779	A222.2	
1780	A222.3	
1781	A222.4	
1782	A222.5	
1783	A222.6	
1784	A222.7	
1785	A223.0	
1786	A223.1	
1787	A223.2	
1788	A223.3	
1789	A223.4	
1790	A223.5	
1791	A223.6	
1792	A223.7	
1793	A224.0	
1794	A224.1	
1795	A224.2	
1796	A224.3	
1797	A224.4	
1798	A224.5	
1799	A224.6	
1800	A224.7	
1801	A225.0	
1802	A225.1	
1803	A225.2	
1804	A225.3	
1805	A225.4	
1806	A225.5	
1807	A225.6	
1808	A225.7	
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1810	A226.1	
1811	A226.2	
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1813	A226.4	
1814	A226.5	
1815	A226.6	
1816	A226.7	
1817	A227.0	
1818	A227.1	
1819	A227.2	
1820	A227.3	
1821	A227.4	
1822	A227.5	
1823	A227.6	
1824	A227.7	
1825	A228.0	
1826	A228.1	
1827	A228.2	
1828	A228.3	
1829	A228.4	
1830	A228.5	
1831	A228.6	
1832	A228.7	
1833	A229.0	
1834	A229.1	
1835	A229.2	
1836	A229.3	
1837	A229.4	
1838	A229.5	
1839	A229.6	
1840	A229.7	
1841	A230.0	
1842	A230.1	
1843	A230.2	
1844	A230.3	
1845	A230.4	
1846	A230.5	

Property of Kent Industrial
Do Not Reproduce

NO.	ADDRESS	MESSAGE
1847	A230.6	
1848	A230.7	
1849	A231.0	
1850	A231.1	
1851	A231.2	
1852	A231.3	
1853	A231.4	
1854	A231.5	
1855	A231.6	
1856	A231.7	
1857	A232.0	
1858	A232.1	
1859	A232.2	
1860	A232.3	
1861	A232.4	
1862	A232.5	
1863	A232.6	
1864	A232.7	
1865	A233.0	
1866	A233.1	
1867	A233.2	
1868	A233.3	
1869	A233.4	
1870	A233.5	
1871	A233.6	
1872	A233.7	
1873	A234.0	
1874	A234.1	
1875	A234.2	
1876	A234.3	
1877	A234.4	
1878	A234.5	
1879	A234.6	
1880	A234.7	
1881	A235.0	
1882	A235.1	
1883	A235.2	
1884	A235.3	
1885	A235.4	
1886	A235.5	
1887	A235.6	
1888	A235.7	
1889	A236.0	
1890	A236.1	
1891	A236.2	
1892	A236.3	
1893	A236.4	
1894	A236.5	
1895	A236.6	
1896	A236.7	
1897	A237.0	
1898	A237.1	
1899	A237.2	
1900	A237.3	
1901	A237.4	
1902	A237.5	
1903	A237.6	
1904	A237.7	
1905	A238.0	
1906	A238.1	
1907	A238.2	
1908	A238.3	
1909	A238.4	
1910	A238.5	
1911	A238.6	
1912	A238.7	
1913	A239.0	
1914	A239.1	
1915	A239.2	
1916	A239.3	
1917	A239.4	

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NO.	ADDRESS	MESSAGE
1918	A239.5	
1919	A239.6	
1920	A239.7	
1921	A240.0	
1922	A240.1	
1923	A240.2	
1924	A240.3	
1925	A240.4	
1926	A240.5	
1927	A240.6	
1928	A240.7	
1929	A241.0	
1930	A241.1	
1931	A241.2	
1932	A241.3	
1933	A241.4	
1934	A241.5	
1935	A241.6	
1936	A241.7	
1937	A242.0	
1938	A242.1	
1939	A242.2	
1940	A242.3	
1941	A242.4	
1942	A242.5	
1943	A242.6	
1944	A242.7	
1945	A243.0	
1946	A243.1	
1947	A243.2	
1948	A243.3	
1949	A243.4	
1950	A243.5	
1951	A243.6	
1952	A243.7	
1953	A244.0	
1954	A244.1	
1955	A244.2	
1956	A244.3	
1957	A244.4	
1958	A244.5	
1959	A244.6	
1960	A244.7	
1961	A245.0	
1962	A245.1	
1963	A245.2	
1964	A245.3	
1965	A245.4	
1966	A245.5	
1967	A245.6	
1968	A245.7	
1969	A246.0	
1970	A246.1	
1971	A246.2	
1972	A246.3	
1973	A246.4	
1974	A246.5	
1975	A246.6	
1976	A246.7	
1977	A247.0	
1978	A247.1	
1979	A247.2	
1980	A247.3	
1981	A247.4	
1982	A247.5	
1983	A247.6	
1984	A247.7	
1985	A248.0	
1986	A248.1	
1987	A248.2	
1988	A248.3	

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NO.	ADDRESS	MESSAGE
1989	A248.4	
1990	A248.5	
1991	A248.6	
1992	A248.7	
1993	A249.0	
1994	A249.1	
1995	A249.2	
1996	A249.3	
1997	A249.4	
1998	A249.5	
1999	A249.6	
2000	A249.7	

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CHANNEL 1

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0000	0	0	01	CM16I	
X0001	0	0	01	CM16I	
X0002	0	0	01	CM16I	
X0003	0	0	01	CM16I	
X0004	0	0	01	CM16I	
X0005	0	0	01	CM16I	
X0006	0	0	01	CM16I	
X0007	0	0	01	CM16I	
X0008	0	0	01	CM16I	
X0009	0	0	01	CM16I	
X0010	0	0	01	CM16I	
X0011	0	0	01	CM16I	
X0012	0	0	01	CM16I	
X0013	0	0	01	CM16I	
X0014	0	0	01	CM16I	
X0015	0	0	01	CM16I	
X0016					
X0017					
X0018					
X0019					
X0020					
X0021					
X0022					
X0023					
X0024					
X0025					
X0026					
X0027					
X0028					
X0029					
X0030	1	0	01	CM16I	
X0031	1	0	01	CM16I	
X0032	1	0	01	CM16I	
X0033	1	0	01	CM16I	
X0034	1	0	01	CM16I	
X0035	1	0	01	CM16I	
X0036	1	0	01	CM16I	
X0037	1	0	01	CM16I	
X0038	1	0	01	CM16I	
X0039	1	0	01	CM16I	
X0040	1	0	01	CM16I	
X0041	1	0	01	CM16I	
X0042	1	0	01	CM16I	
X0043	1	0	01	CM16I	
X0044	1	0	01	CM16I	
X0045	1	0	01	CM16I	
X0046					
X0047					
X0048					
X0049					
X0050					
X0051					
X0052					
X0053					
X0054					
X0055					
X0056					
X0057					
X0058					
X0059					
X0060					
X0061					
X0062					
X0063					
X0064					
X0065					
X0066					
X0067					
X0068					
X0069					

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CHANNEL 1

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0070					
X0071					
X0072					
X0073					
X0074					
X0075					
X0076					
X0077					
X0078					
X0079					
X0080					
X0081					
X0082					
X0083					
X0084					
X0085					
X0086					
X0087					
X0088					
X0089					
X0090					
X0091					
X0092					
X0093					
X0094					
X0095					
X0096					
X0097					
X0098					
X0099					
X0100					
X0101					
X0102					
X0103					
X0104					
X0105					
X0106					
X0107					
X0108					
X0109					
X0110					
X0111					
X0112					
X0113					
X0114					
X0115					
X0116					
X0117					
X0118					
X0119					
X0120					
X0121					
X0122					
X0123					
X0124					
X0125					
X0126					
X0127					

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CHANNEL 1

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0000	0	0	01	CM080	
Y0001	0	0	01	CM080	
Y0002	0	0	01	CM080	
Y0003	0	0	01	CM080	
Y0004	0	0	01	CM080	
Y0005	0	0	01	CM080	
Y0006	0	0	01	CM080	
Y0007	0	0	01	CM080	
Y0008					
Y0009					
Y0010					
Y0011					
Y0012					
Y0013					
Y0014					
Y0015					
Y0016					
Y0017					
Y0018					
Y0019					
Y0020					
Y0021					
Y0022					
Y0023					
Y0024					
Y0025					
Y0026					
Y0027					
Y0028					
Y0029					
Y0030	1	0	01	/4	
Y0031	1	0	01	/4	
Y0032	1	0	01	/4	
Y0033	1	0	01	/4	
Y0034					
Y0035					
Y0036					
Y0037					
Y0038					
Y0039					
Y0040					
Y0041					
Y0042					
Y0043					
Y0044					
Y0045					
Y0046					
Y0047					
Y0048					
Y0049					
Y0050					
Y0051					
Y0052					
Y0053					
Y0054					
Y0055					
Y0056					
Y0057					
Y0058					
Y0059					
Y0060					
Y0061					
Y0062					
Y0063					
Y0064					
Y0065					
Y0066					
Y0067					
Y0068					
Y0069					

CHANNEL 1

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0070					
Y0071					
Y0072					
Y0073					
Y0074					
Y0075					
Y0076					
Y0077					
Y0078					
Y0079					
Y0080					
Y0081					
Y0082					
Y0083					
Y0084					
Y0085					
Y0086					
Y0087					
Y0088					
Y0089					
Y0090					
Y0091					
Y0092					
Y0093					
Y0094					
Y0095					
Y0096					
Y0097					
Y0098					
Y0099					
Y0100					
Y0101					
Y0102					
Y0103					
Y0104					
Y0105					
Y0106					
Y0107					
Y0108					
Y0109					
Y0110					
Y0111					
Y0112					
Y0113					
Y0114					
Y0115					
Y0116					
Y0117					
Y0118					
Y0119					
Y0120					
Y0121					
Y0122					
Y0123					
Y0124					
Y0125					
Y0126					
Y0127					

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CHANNEL 2

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0200					
X0201					
X0202					
X0203					
X0204					
X0205					
X0206					
X0207					
X0208					
X0209					
X0210					
X0211					
X0212					
X0213					
X0214					
X0215					
X0216					
X0217					
X0218					
X0219					
X0220					
X0221					
X0222					
X0223					
X0224					
X0225					
X0226					
X0227					
X0228					
X0229					
X0230					
X0231					
X0232					
X0233					
X0234					
X0235					
X0236					
X0237					
X0238					
X0239					
X0240					
X0241					
X0242					
X0243					
X0244					
X0245					
X0246					
X0247					
X0248					
X0249					
X0250					
X0251					
X0252					
X0253					
X0254					
X0255					
X0256					
X0257					
X0258					
X0259					
X0260					
X0261					
X0262					
X0263					
X0264					
X0265					
X0266					
X0267					
X0268					
X0269					

CHANNEL 2

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0270					
X0271					
X0272					
X0273					
X0274					
X0275					
X0276					
X0277					
X0278					
X0279					
X0280					
X0281					
X0282					
X0283					
X0284					
X0285					
X0286					
X0287					
X0288					
X0289					
X0290					
X0291					
X0292					
X0293					
X0294					
X0295					
X0296					
X0297					
X0298					
X0299					
X0300					
X0301					
X0302					
X0303					
X0304					
X0305					
X0306					
X0307					
X0308					
X0309					
X0310					
X0311					
X0312					
X0313					
X0314					
X0315					
X0316					
X0317					
X0318					
X0319					
X0320					
X0321					
X0322					
X0323					
X0324					
X0325					
X0326					
X0327					

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ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0200					
Y0201					
Y0202					
Y0203					
Y0204					
Y0205					
Y0206					
Y0207					
Y0208					
Y0209					
Y0210					
Y0211					
Y0212					
Y0213					
Y0214					
Y0215					
Y0216					
Y0217					
Y0218					
Y0219					
Y0220					
Y0221					
Y0222					
Y0223					
Y0224					
Y0225					
Y0226					
Y0227					
Y0228					
Y0229					
Y0230					
Y0231					
Y0232					
Y0233					
Y0234					
Y0235					
Y0236					
Y0237					
Y0238					
Y0239					
Y0240					
Y0241					
Y0242					
Y0243					
Y0244					
Y0245					
Y0246					
Y0247					
Y0248					
Y0249					
Y0250					
Y0251					
Y0252					
Y0253					
Y0254					
Y0255					
Y0256					
Y0257					
Y0258					
Y0259					
Y0260					
Y0261					
Y0262					
Y0263					
Y0264					
Y0265					
Y0266					
Y0267					
Y0268					
Y0269					

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CHANNEL 2

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0270					
Y0271					
Y0272					
Y0273					
Y0274					
Y0275					
Y0276					
Y0277					
Y0278					
Y0279					
Y0280					
Y0281					
Y0282					
Y0283					
Y0284					
Y0285					
Y0286					
Y0287					
Y0288					
Y0289					
Y0290					
Y0291					
Y0292					
Y0293					
Y0294					
Y0295					
Y0296					
Y0297					
Y0298					
Y0299					
Y0300					
Y0301					
Y0302					
Y0303					
Y0304					
Y0305					
Y0306					
Y0307					
Y0308					
Y0309					
Y0310					
Y0311					
Y0312					
Y0313					
Y0314					
Y0315					
Y0316					
Y0317					
Y0318					
Y0319					
Y0320					
Y0321					
Y0322					
Y0323					
Y0324					
Y0325					
Y0326					
Y0327					

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CHANNEL 3

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0400					
X0401					
X0402					
X0403					
X0404					
X0405					
X0406					
X0407					
X0408					
X0409					
X0410					
X0411					
X0412					
X0413					
X0414					
X0415					
X0416					
X0417					
X0418					
X0419					
X0420					
X0421					
X0422					
X0423					
X0424					
X0425					
X0426					
X0427					
X0428					
X0429					
X0430					
X0431					
X0432					
X0433					
X0434					
X0435					
X0436					
X0437					
X0438					
X0439					
X0440					
X0441					
X0442					
X0443					
X0444					
X0445					
X0446					
X0447					
X0448					
X0449					
X0450					
X0451					
X0452					
X0453					
X0454					
X0455					
X0456					
X0457					
X0458					
X0459					
X0460					
X0461					
X0462					
X0463					
X0464					
X0465					
X0466					
X0467					
X0468					
X0469					

CHANNEL 3

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0470					
X0471					
X0472					
X0473					
X0474					
X0475					
X0476					
X0477					
X0478					
X0479					
X0480					
X0481					
X0482					
X0483					
X0484					
X0485					
X0486					
X0487					
X0488					
X0489					
X0490					
X0491					
X0492					
X0493					
X0494					
X0495					
X0496					
X0497					
X0498					
X0499					
X0500					
X0501					
X0502					
X0503					
X0504					
X0505					
X0506					
X0507					
X0508					
X0509					
X0510					
X0511					
X0512					
X0513					
X0514					
X0515					
X0516					
X0517					
X0518					
X0519					
X0520					
X0521					
X0522					
X0523					
X0524					
X0525					
X0526					
X0527					

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ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT	CHANNEL 3
Y0400						
Y0401						
Y0402						
Y0403						
Y0404						
Y0405						
Y0406						
Y0407						
Y0408						
Y0409						
Y0410						
Y0411						
Y0412						
Y0413						
Y0414						
Y0415						
Y0416						
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Y0423						
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Y0428						
Y0429						
Y0430						
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Y0432						
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Y0434						
Y0435						
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Y0438						
Y0439						
Y0440						
Y0441						
Y0442						
Y0443						
Y0444						
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Y0448						
Y0449						
Y0450						
Y0451						
Y0452						
Y0453						
Y0454						
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Y0456						
Y0457						
Y0458						
Y0459						
Y0460						
Y0461						
Y0462						
Y0463						
Y0464						
Y0465						
Y0466						
Y0467						
Y0468						
Y0469						

CHANNEL 3

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0470					
Y0471					
Y0472					
Y0473					
Y0474					
Y0475					
Y0476					
Y0477					
Y0478					
Y0479					
Y0480					
Y0481					
Y0482					
Y0483					
Y0484					
Y0485					
Y0486					
Y0487					
Y0488					
Y0489					
Y0490					
Y0491					
Y0492					
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Y0496					
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Y0500					
Y0501					
Y0502					
Y0503					
Y0504					
Y0505					
Y0506					
Y0507					
Y0508					
Y0509					
Y0510					
Y0511					
Y0512					
Y0513					
Y0514					
Y0515					
Y0516					
Y0517					
Y0518					
Y0519					
Y0520					
Y0521					
Y0522					
Y0523					
Y0524					
Y0525					
Y0526					
Y0527					

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ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT	CHANNEL 4
X0600						
X0601						
X0602						
X0603						
X0604						
X0605						
X0606						
X0607						
X0608						
X0609						
X0610						
X0611						
X0612						
X0613						
X0614						
X0615						
X0616						
X0617						
X0618						
X0619						
X0620						
X0621						
X0622						
X0623						
X0624						
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X0627						
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X0639						
X0640						
X0641						
X0642						
X0643						
X0644						
X0645						
X0646						
X0647						
X0648						
X0649						
X0650						
X0651						
X0652						
X0653						
X0654						
X0655						
X0656						
X0657						
X0658						
X0659						
X0660						
X0661						
X0662						
X0663						
X0664						
X0665						
X0666						
X0667						
X0668						
X0669						

CHANNEL 4

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
X0670					
X0671					
X0672					
X0673					
X0674					
X0675					
X0676					
X0677					
X0678					
X0679					
X0680					
X0681					
X0682					
X0683					
X0684					
X0685					
X0686					
X0687					
X0688					
X0689					
X0690					
X0691					
X0692					
X0693					
X0694					
X0695					
X0696					
X0697					
X0698					
X0699					
X0700					
X0701					
X0702					
X0703					
X0704					
X0705					
X0706					
X0707					
X0708					
X0709					
X0710					
X0711					
X0712					
X0713					
X0714					
X0715					
X0716					
X0717					
X0718					
X0719					
X0720					
X0721					
X0722					
X0723					
X0724					
X0725					
X0726					
X0727					

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ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT	CHANNEL 4
Y0600						
Y0601						
Y0602						
Y0603						
Y0604						
Y0605						
Y0606						
Y0607						
Y0608						
Y0609						
Y0610						
Y0611						
Y0612						
Y0613						
Y0614						
Y0615						
Y0616						
Y0617						
Y0618						
Y0619						
Y0620						
Y0621						
Y0622						
Y0623						
Y0624						
Y0625						
Y0626						
Y0627						
Y0628						
Y0629						
Y0630						
Y0631						
Y0632						
Y0633						
Y0634						
Y0635						
Y0636						
Y0637						
Y0638						
Y0639						
Y0640						
Y0641						
Y0642						
Y0643						
Y0644						
Y0645						
Y0646						
Y0647						
Y0648						
Y0649						
Y0650						
Y0651						
Y0652						
Y0653						
Y0654						
Y0655						
Y0656						
Y0657						
Y0658						
Y0659						
Y0660						
Y0661						
Y0662						
Y0663						
Y0664						
Y0665						
Y0666						
Y0667						
Y0668						
Y0669						

CHANNEL 4

ADDRESS	GROUP	BASE	SLOT	MODULE NAME	COMMENT
Y0670					
Y0671					
Y0672					
Y0673					
Y0674					
Y0675					
Y0676					
Y0677					
Y0678					
Y0679					
Y0680					
Y0681					
Y0682					
Y0683					
Y0684					
Y0685					
Y0686					
Y0687					
Y0688					
Y0689					
Y0690					
Y0691					
Y0692					
Y0693					
Y0694					
Y0695					
Y0696					
Y0697					
Y0698					
Y0699					
Y0700					
Y0701					
Y0702					
Y0703					
Y0704					
Y0705					
Y0706					
Y0707					
Y0708					
Y0709					
Y0710					
Y0711					
Y0712					
Y0713					
Y0714					
Y0715					
Y0716					
Y0717					
Y0718					
Y0719					
Y0720					
Y0721					
Y0722					
Y0723					
Y0724					
Y0725					
Y0726					
Y0727					

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TW-2260-VTC

NO.	ADDRESS	SYMBOL	FIRST COMMENT
00001	X0000.5		
00002	X0000.6		
00003	X0001.0		
00004	X0001.1		
00005	X0001.2		
00006	X0001.3		
00007	X0002.1		
00008	X0002.3		
00009	X0003.0	MP2,R	
00010	X0003.1	MP1,R	
00011	X0003.2	HAND-4	
00012	X0003.3	HAND-Z	
00013	X0003.4	HAND-Y	
00014	X0003.5	HAND-X	
00015	X0003.6	LUB-AL	LUBE ALARM
00016	X0003.7	AIR,AL	AIR PRESSURE ALARM
00017	X0004.0	N2ALRM	
00018	X0004.1	LUBRAL	
00019	X0004.2	ZAE	
00020	X0004.3	4-CL-S	4TH AXIS CLAMP L.S
00021	X0004.4	4-UN-S	4TH AXIS UNCLAMP L.S
00022	X0004.5	OIL-AL	SPINDLE OIL ALARM
00023	X0004.6	LOCONF	LO WINDING CONFIRM
00024	X0004.7	HICONF	HI WINDING CONFIRM
00025	X0005.0	T-CL-S	TOOL CLAMP L.S
00026	X0005.1	T-UN-S	TOOL UNCLAMP L.S
00027	X0005.2	WGOL	
00028	X0005.3	POTDN	POT DOWN L.S
00029	X0005.4	POTUP	POT UP L.S
00030	X0005.5	CTSTOL	CTS TANK PUMP OL
00031	X0005.6	MG-CTR	MAG COUNTER
00032	X0005.7	MAG-H	MAG. HOME POSITION
00033	X0006.0	ARM,0	ARM RETURN POINT
00034	X0006.1	ARM,60	ARM MIDDLE POINT
00035	X0006.2	ARM,SP	ARM STOP POINT
00036	X0006.3	M-U-PB	MANUAL TOOL UNCLAMP P.B
00037	X0006.4	DO-INL	DOOR INTERLOCK S.W
00038	X0006.5	H-GEAR	HIGH GEAR L.S
00039	X0006.6	L-GEAR	LOW GEAR L.S
00040	X0006.7	CTS-OV	
00041	X0007.0	M70FIN	
00042	X0007.1	M71FIN	
00043	X0007.2	M72FIN	
00044	X0007.3	M73FIN	
00045	X0007.4	M74FIN	
00046	X0007.5	M75FIN	
00047	X0007.6	M76FIN	
00048	X0007.7	M77FIN	
00049	X0008.0	COL-OV	
00050	X0008.1	MAG-OV	
00051	X0008.2	ARM-OV	
00052	X0008.3	CHP-OV	
00053	X0008.4	*EMG	EMERGENCY STOP
00054	X0008.5	CBOL	COOLANT-B O.L.
00055	X0008.6	CTSTL0	CTS TANK LEVEL L0
00056	X0008.7	CTSTHI	CTS TANK HI ALARM
00057	X0009.0	*DECX	
00058	X0009.1	*DECY	
00059	X0009.2	*DECZ	
00060	X0009.3	*DEC4	
00061	X0009.4	PIN,IN	
00062	X0009.5	PIN,OUT	
00063	X0009.6	M63FIN	
00064	X0009.7	CTSFTTR	
00065	X0010.0		
00066	X0010.1		
00067	X0010.2		
00068	X0010.3		
00069	X0010.4		
00070	X0010.5		
00071	X0010.6		

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00072	X0010.7	AFL-PB	
00073	X0011.0		
00074	X0011.1		
00075	X0011.2		
00076	X0011.3		
00077	X0011.4		
00078	X0011.5		
00079	X0011.6		
00080	X0012.0		
00081	X0012.1		
00082	X0012.3		
00083	X0012.4		
00084	X0012.7		
00085	X0016.1		
00086	X0016.3		
00087	X0016.5		
00088	X0016.7		
00089	X0017.1		
00090	X0017.5		
00091	X0017.7		
00092	X0028.0		
00093	X0028.1		
00094	X0028.2		
00095	X0028.3		
00096	X0029.0		
00097	X0029.1		
00098	X0029.2		
00099	X0029.3		
00100	X0029.4		
00101	X0029.6		
00102	X0029.7		
00103	X0030.0	CS-PB	
00104	X0030.1	FH-PB	
00105	X0030.2	O.T-PB	
00106	X0030.3	-X,PB	
00107	X0030.4	+X,PB	
00108	X0030.5	+Y,PB	
00109	X0030.6	-Y,PB	
00110	X0030.7	-Z,PB	
00111	X0031.0	+Z,PB	
00112	X0031.1	+4,PB	
00113	X0031.2	-4,PB	
00114	X0031.3	MODE-A	
00115	X0031.4	MODE-F	
00116	X0031.5	MODE-B	
00117	X0031.6	MLK-PB	
00118	X0031.7	DRN-PB	
00119	X0032.0	SPCWPB	
00120	X0032.1	SCCWP	
00121	X0032.2	SBK-PB	
00122	X0032.3	SP-ORC	
00123	X0032.4	BDT-PB	
00124	X0032.5		
00125	X0032.6		
00126	X0032.7	M01-PB	
00127	X0033.0	SSTPPB	
00128	X0033.1	ABS-PB	
00129	X0033.2	JOV-A	
00130	X0033.3	JOV-F	
00131	X0033.4	JOV-B	
00132	X0033.5	JOV-E	
00133	X0033.6	JOV-C	
00134	X0033.7	ZLK-PB	
00135	X0034.0	RP50%	
00136	X0034.1	RP25%	
00137	X0034.2	SPL-A	
00138	X0034.3	SPL-F	
00139	X0034.4	SPL-B	
00140	X0034.5	PROKEY	
00141	X0034.6	MGCWPB	
00142	X0034.7	MGCCWP	

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00143	X0035.0	WK-L-P	
00144	X0035.1	CVCW-P	
00145	X0035.2	CVCCWP	
00146	X0035.3	AIR-PB	
00147	X0035.4	A-H-PB	
00148	X0035.5	COL-PB	
00149	X0035.6	CB-PB	
00150	X0035.7	APO-PB	
00151	Y0000.0		
00152	Y0000.1		
00153	Y0000.2		
00154	Y0000.3		
00155	Y0000.4		
00156	Y0000.5		
00157	Y0000.6		
00158	Y0000.7		
00159	Y0002.0	GREN-L	GREEN LAMP
00160	Y0002.1	YELL-L	YELLOW LAMP
00161	Y0002.2	RED-L	RED LAMP
00162	Y0002.3	POT-UP	POT UP
00163	Y0002.4	POT-DN	POT DOWN
00164	Y0002.5	TU,CLP	SPINDLE TOOL UNCLAMP
00165	Y0002.6	WRK-BL	WORKPIECE BLAST
00166	Y0002.7	AT-BLW	AUTO TOOL MRS AIR BLAST
00167	Y0003.0	COOL-M	COOLANT MOTOR
00168	Y0003.1	ARM	ARM MOTOR
00169	Y0003.2	MGCCW.	MAG CCW
00170	Y0003.3	MGCW.	MAG CW
00171	Y0003.4	COOL-B	ENCLOSURE COOLANT /COOLANT B
00172	Y0003.5	CH,CW	CHIP CONVEYOR CW
00173	Y0003.6	CH,CCW	CHIP CONVEYOR CCW
00174	Y0003.7	Z-BRKE	Z AXIS BRAKE
00175	Y0004.0	WORK-L	
00176	Y0004.1	WGUN	COOLANT GUN
00177	Y0004.2	O.T-RL	O.T.R. RELAY
00178	Y0004.4	NC-L	
00179	Y0004.5	LUBE-L	
00180	Y0004.6	AIR-AL	
00181	Y0004.7	4CL-L	
00182	Y0005.0	M24OUT	
00183	Y0005.1	DR-INL	DOOR INTERLOCK COILL
00184	Y0005.2	CTC-M	CTS MOTOR
00185	Y0005.3	CTSTM	CTS COOLANT TANK PUMP
00186	Y0005.4	L,WIND	SPINDLE LOW WINDING
00187	Y0005.5	M.PIN	MAG. POSITION PIN
00188	Y0005.6	4-CL-O	4 AXIS CLAMP
00189	Y0005.7	AP-OFF	AUTO POWER OFF
00190	Y0006.0	M70OUT	M70 SPARE CODE OUTPUT
00191	Y0006.1	M72OUT	M72 SPARE CODE OUTPUT
00192	Y0006.2	M74OUT	M74 SPARE CODE OUTPUT
00193	Y0006.3	M76OUT	M76 SPARE CODE OUTPUT
00194	Y0006.4	PREOUT	
00195	Y0006.5		
00196	Y0006.6		
00197	Y0006.7	M23OUT	
00198	Y0007.0		
00199	Y0007.1		
00200	Y0007.3		
00201	Y0007.4		
00202	Y0007.5		
00203	Y0007.7	AFL-L	
00204	Y0028.1		
00205	Y0028.4		
00206	Y0028.5		
00207	Y0028.6		
00208	Y0028.7		
00209	Y0029.0		
00210	Y0029.2		
00211	Y0029.4		
00212	Y0029.5		
00213	Y0029.6		

NO.	ADDRESS	SYMBOL	FIRST COMMENT
00214	Y0029.7		
00215	Y0030.0	CS-L	
00216	Y0030.1	FH-L	
00217	Y0030.2	O.T-PL	
00218	Y0030.3		
00219	Y0030.4	SBK-L	
00220	Y0030.5	SPCCWL	
00221	Y0030.6	BDT-L	
00222	Y0030.7	SPOR-L	
00223	Y0031.0		
00224	Y0031.1		
00225	Y0031.2	SPCW-L	
00226	Y0031.3	M01-L	
00227	Y0031.4	DRN-L	
00228	Y0031.5	SPTP-L	
00229	Y0031.6	MLK-L	MACHINE LOCK LED
00230	Y0031.7	ABS-L	
00231	Y0032.0	ATCRYL	
00232	Y0032.1	ZLK-L	
00233	Y0032.2	X1-L	
00234	Y0032.3	Y1-L	
00235	Y0032.4	Z1-L	
00236	Y0032.5	B1-L	
00237	Y0032.6	APO-L	
00238	Y0032.7	CB-PB.L	COOLANT-B P.B LAMP
00239	Y0033.0	COL-PL	
00240	Y0033.1	A-H-L	
00241	Y0033.2	AIR-L	
00242	Y0033.3	CHCCWL	
00243	Y0033.4	CHCW-L	
00244	Y0033.5	WK-L-L	
00245	Y0033.6	MGCCWL	
00246	Y0033.7	MGCW-L	
00247	Y0034.0		
00248	Y0035.0		
00249	F0000.4	SPL	FEED HOLD LAMP SIGNAL
00250	F0000.5	STL	CYCLE START LAMP SIGNAL
00251	F0000.6	SA	SERVO READY SIGNAL
00252	F0000.7	OP	AUTOMATIC OPERATION
00253	F0001.0	AL	ALARM SIGNAL
00254	F0001.1	RST	RESET SIGNAL
00255	F0001.3	DEN	DISTRIBUTION END SIGNAL
00256	F0001.4	ENB	SPINDLE ENABLE SIGNAL
00257	F0001.5	TAP	TAPPING SIGNAL
00258	F0001.7	MA	NC READY SIGNAL
00259	F0007.0	MF	M FUNCTION CODE READ SIGNAL
00260	F0007.2	SF	S FUNCTION CODE READ SIGNAL
00261	F0007.3	TF	T FUNCTION CODE READ SIGNAL
00262	F0009.4	M30	PROGRAM END AND RESET
00263	F0009.5	M2A	PROGRAM END SIGNAL
00264	F0034.0	GR10	GEAR SELECT SIGNAL
00265	F0034.1	GR20	GEAR SELECT SIGNAL
00266	F0045.0	SALM1	SPINDLE ALARM SIGNAL
00267	F0045.1	SSLA	SPINDLE ZERO SPEED
00268	F0045.2	STDA	SPINDLE PAR 4023
00269	F0045.3	SARA	SPINDLE ARRIVED
00270	F0045.7	ORARA	SPINDLE ORIENTATE FINISH
00271	F0046.2	RCHPA	
00272	F0054.0	U00	ATLM MACRO SIGNAL
00273	F0064.0	TLCH	TOOL LIFE CHANGE SIGNAL
00274	F0072.0	OUT0	SOFTWARE S.W FOR ABS
00275	F0072.1	OUT1	SOFTWARE S.W FOR SRN
00276	F0072.2	OUT2	SOFTWARE S.W FOR AFL
00277	F0072.7	OUT7	SOFTWARE S.W FOR TEACH
00278	F0094.0	ZPX	X AXIS 1ST. POINT
00279	F0094.1	ZPY	X AXIS 1ST. POINT
00280	F0094.2	ZPZ	Z AXIS 1ST. POINT
00281	F0094.3	ZP4	4 AXIX 1ST. POINT
00282	F0096.0	ZP2X	X AXIS 2ND. POINT
00283	F0096.1	ZP2Y	Y AXIS 2ND. POINT
00284	F0096.2	ZP2Z	Z AXIS 2ND. POINT

NO.	ADDRESS	SYMBOL	FIRST COMMENT
00285	F0096.3	ZP24	
00286	F0098.0	ZP3X	X AXIS 3RD. POINT
00287	F0098.1	ZP3Y	Y AXIS 3RD. POINT
00288	F0098.2	ZP3Z	Z AXIS 3RD. POINT
00289	F0098.3	ZP34	4 AXIS 3RD. POINT
00290	F0100.0	ZP4X	X AXIS 4TH. POINT
00291	F0100.1	ZP4Y	Y AXIS 4TH. POINT
00292	F0100.2	ZP4Z	Z AXIS 4TH. POINT
00293	F0100.3	ZP44	4 AXIS 4TH. POINT
00294	F0102.3	MOV4	COMANDO MOV.4 ASSE
00295	F0104.3	INP4	4 ASSE IN POSIZIONE
00296	G0004.3	FIN	M,S,T FUNCTION FINISH SIGNAL
00297	G0005.6	AFL	AUXILIARY FUNCTION LOCK
00298	G0006.0	SRN	PROGRAM RESTART
00299	G0006.2	*ABSM	MANUAL ABSOLUTE SIGNAL
00300	G0006.4	OVC	OVERRIDE CANCEL SIGNAL
00301	G0007.2	ST	CYCLE START
00302	G0008.0	*ILK	INTERLOCK
00303	G0008.4	*ESP	EMERGENCY STOP
00304	G0008.5	*SP	FEED HOLD
00305	G0008.7	ERS	EXTERNAL RESET
00306	G0010.0	*JV0	
00307	G0010.1	*JV1	
00308	G0010.2	*JV2	
00309	G0010.3	*JV3	
00310	G0010.4	*JV4	
00311	G0010.5	*JV5	
00312	G0010.6	*JV6	
00313	G0010.7	*JV7	
00314	G0011.0	*JV8	
00315	G0011.1	*JV9	
00316	G0011.2	*JV10	
00317	G0011.3	*JV11	
00318	G0011.4	*JV12	
00319	G0011.5	*JV13	
00320	G0011.6	*JV14	
00321	G0011.7	*JV15	
00322	G0012.0	*FV0	
00323	G0012.1	*FV1	
00324	G0012.2	*FV2	
00325	G0012.3	*FV3	
00326	G0012.4	*FV4	
00327	G0012.5	*FV5	
00328	G0012.6	*FV6	
00329	G0012.7	*FV7	
00330	G0014.0	ROV1	RAPID TRAVERSE OVERRIDE ROV1
00331	G0014.1	ROV2	RAPID TRAVERSE OVERRIDE ROV2
00332	G0018.0	HS1A	MANUAL HANDLE FEED SEL HS1A
00333	G0018.1	HS1B	MANUAL HANDLE FEED SEL HS1B
00334	G0018.2	HS1C	MANUAL HANDLE FEED SEL HS1C
00335	G0019.4	MP1	INCREMENTAL FEED 1
00336	G0019.5	MP2	INCREMENTAL FEED 2
00337	G0019.7	RT	RAPID TRAVERSE
00338	G0029.4	SAR	SPINDLE SPEED ARRIVAL SIGNAL
00339	G0029.5	SOR	SPINDLE ORIENTATION SIGNAL
00340	G0029.6	*SSTP	SPINDLE STOP SIGNAL
00341	G0030.0	SOV0	
00342	G0030.1	SOV1	
00343	G0030.2	SOV2	
00344	G0030.3	SOV3	
00345	G0030.4	SOV4	
00346	G0030.5	SOV5	
00347	G0030.6	SOV6	
00348	G0030.7	SOV7	
00349	G0033.7	SIND	SPINDLE SPEED COMMAND SELECT
00350	G0041.0	HS1AID	M.P.G INTERRUPTION SIGNAL
00351	G0041.1	HS1BID	M.P.G INTERRUPTION SIGNAL
00352	G0041.2	HS1CID	M.P.G INTERRUPTION SIGNAL
00353	G0043.0	MD1	MODE SELECT 1
00354	G0043.1	MD2	MODE SELECT 2
00355	G0043.2	MD4	MODE SELECT 4

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00356	G0043.5	DNCI	TAPE OPERATION BY TAPE READER
00357	G0043.7	ZRN	REFERENCE POINT RETURN SIGNAL
00358	G0044.0	BDT	BLOCK SKIP
00359	G0044.1	MLK	ALL AXES MACHINE LOCK
00360	G0046.1	SBK	SINGLE BLOCK
00361	G0046.3	KEY1	PROGRAM PROTECT KEY 1
00362	G0046.4	KEY2	PROGRAM PROTECT KEY 2
00363	G0046.5	KEY3	PROGRAM PROTECT KEY 3
00364	G0046.7	DRN	DRY RUN
00365	G0055.1	UI9	PALLET B POSITION
00366	G0055.2	UI10	PALLET A POSITION
00367	G0055.3	UI11	SWING ARM TYPE
00368	G0055.4	UI12	ROTARY TYPE
00369	G0058.5	STRD	I/O SIMULTANEOUS OPERATION
00370	G0061.0	RG.TAP	RIGID TAPPING
00371	G0062.4		MANUAL GUIDE FUNCTION
00372	G0070.0	TLMLA	TORQUE LIMIT
00373	G0070.3	CTH1A	SPINDLE HIGH/LOW SPEED SIGNAL
00374	G0070.4	SRVA	SPINDLE C.C.W
00375	G0070.5	SFRA	SPINDLE C.W
00376	G0070.6	ORCMA	SPINDLE ORIENTATE COMMAND
00377	G0070.7	MRDYA	SPINDLE READY
00378	G0071.0	ARSTA	SPINDLE RESET
00379	G0071.1	*ESPA	EMERGENCY STOP SIGNAL
00380	G0071.6	RSLA	HI/LO REQUEST SIGNAL
00381	G0071.7	RCHA	LO WINDING CONTACT STATUS
00382	G0072.4	OVRA	ANALOG OVERRIDE COMMAND
00383	G0072.7	RCHGA	HI WINDING CONTACT STATUS
00384	G0100.0	+X	+JX
00385	G0100.1	+Y	+JY
00386	G0100.2	+Z	+JZ
00387	G0100.3	+4	+J4
00388	G0102.0	-X	-JX
00389	G0102.1	-Y	-JY
00390	G0102.2	-Z	-JZ
00391	G0102.3	-4	-J4
00392	G0106.0	MIRX	X AXIS MIRROR IMAGE SIGNAL
00393	G0106.1	MIRY	Y AXIS MIRROR IMAGE SIGNAL
00394	G0106.3	MIR4	4TH AXIS MIRROR IMAGE SIGNAL
00395	G0108.2	MLKZ	Z AXIS MACHINE LOCK
00396	G0124.3	DTCH4	4TH AXIS DETACH
00397	G0126.0	SVFX	SERVO OFF X
00398	G0126.1	SVFY	SERVO OFF Y
00399	G0126.2	SVFZ	SERVO OFF Z
00400	G0126.3	SVF4	SERVO OFF 4
00401	G0130.0	*ITX	INTERLOCK X
00402	G0130.1	*ITY	INTERLOCK Y
00403	G0130.2	*ITZ	INTERLOCK Z
00404	G0130.3	*IT4	INTERLOCK 4
00405	R0000.0	MNKEY	MAINTENANCE KEY
00406	R0000.7	MOTOL	MOTOR OVERLOAD
00407	R0001.5	DRIT1	DOOR INTERLOCK 1
00408	R0002.4	:PROIL	PRESSURE OIL AL FOR OIL MIST
00409	R0002.5	:OIL_L	OIL LOW AL FOR OIL MIST
00410	R0002.6	:THMAL	THERMAL ALARM FOR OIL MIST
00411	R0002.7	:SUPAR	SUPPLY AIR AL FOR OIL MIST
00412	R0003.0	:M35LS	M35 INPUT
00413	R0003.2	:M36LS	M36 INPUT
00414	R0003.4	:M37LS	M37 INPUT
00415	R0003.6	:M38LS	M38 INPUT
00416	R0004.7	SKIP	ATLM PROBE SIGNAL
00417	R0008.0	ATC-PR	ATC PRESSURE S.W
00418	R0012.1	>KIT	KIT/CTS
00419	R0012.3		WATER GUN
00420	R0013.0		
00421	R0013.1	>LUBE	LUBE MOTOR
00422	R0014.0	M21OUT	
00423	R0014.1	>M33	M33 OUTPUT
00424	R0014.2	>M35	M35 OUTPUT
00425	R0014.3	>M36	M36 OUTPUT
00426	R0014.4	>M37	M37 OUTPUT

NO.	ADDRESS	SYMBOL	FIRST COMMENT
00427	R0014.5	>M38	M38 OUTPUT
00428	R0014.7		SPL LAMP
00429	R0015.2		
00430	R0015.3		
00431	R0017.6	\$STL	STL LAMP
00432	R0035.0	CTSMK	CTS PUMP KEEP
00433	R0160.1	AL1210	ATC STANDBY FOR POT UP
00434	R0160.5	AL1250	ATC STANDBY FOR ARM 0
00435	R0160.7	AL1240	ATC STANDBY FOR TOOL UNCLAMP
00436	R0161.1	AL1260	ATC STANDBY FOR ARM 180
00437	R0162.0	TMRB5	
00438	R0163.0	AFL-A	
00439	R0163.1	AFLPLS	
00440	R0163.2	ABS-A	
00441	R0163.4	ABSPLS	
00442	R0163.5	DOR-AX	
00443	R0163.6	TMRB2	
00444	R0163.7	WK-B-A	
00445	R0164.0	WK-B-P	
00446	R0164.1	WKB-OF	
00447	R0164.2	WKB-ON	
00448	R0164.3	COL-PA	
00449	R0164.4	COL-PS	
00450	R0164.5	COL-OF	
00451	R0164.6	COL-ON	
00452	R0164.7	WK-LPS	
00453	R0165.0	WKL-AX	
00454	R0165.1	APO-AX	
00455	R0165.2	APO-PS	
00456	R0168.0	STDAR	SP SPEED DET. MEMORY
00457	R0170.0	S50	
00458	R0170.1	S60	
00459	R0170.2	S70	
00460	R0170.3	S80	
00461	R0170.4	S90	
00462	R0170.5	S100	
00463	R0170.6	S110	
00464	R0170.7	S120	
00465	R0300.0	LOALARM	LO WINDING INCORRECT ALARM
00466	R0300.1	HIALARM	HI WINDING INCORRECT ALARM
00467	R0300.2	WINDERR	WINDING CHANGE ERROR
00468	R0300.3	CTSTKMON	CTS TANK COOLANT ON
00469	R0300.4	CTSTKOFF	CTS TANK COOLANT OFF
00470	R0400.0	TB1	POP PULSE
00471	R0400.1	POP	POWER ON RESET
00472	R0401.0	M70.	M70 SPARE FUNCTION
00473	R0401.1	M71.	M70 OFF FUNCTION
00474	R0401.2	M72.	M72 SPARE FUNCTION
00475	R0401.3	M73.	M72 OFF FUNCTION
00476	R0401.4	M74.	M74 SPARE FUNCTION
00477	R0401.5	M75.	M74 OFF FUNCTION
00478	R0401.6	M76.	M76 SPARE FUNCTION
00479	R0401.7	M77.	M76 OFF FUNCTION
00480	R0402.0	M17.	AUTO UNCLAMP AIR
00481	R0402.1	A.TARK	AUTO TOOL CLAMP AIR KEEP
00482	R0402.2	TMR56.	AUTO TOOL CLAMP AIR OFF
00483	R0500.0	L1	LOGIC 1
00484	R0500.1	M00	PROGRAM STOP
00485	R0500.2	M01	PROGRAM OPTIONAL STOP
00486	R0500.3	M02	PROGRAM END
00487	R0500.4	M03	SPINDLE C.W
00488	R0500.5	M04	SPINDLE C.C.W
00489	R0500.6	M05	SPINDLE STOP
00490	R0500.7	M06	AUTOMATIC TOOL CHANGE
00491	R0501.0	M21	WORKPIECE BLAST ON
00492	R0501.1	M08	COOLANT ON
00493	R0501.2	M09	COOLANT/KIT OFF
00494	R0501.3	M22	WORKPIECE BLAST OFF
00495	R0501.6	M13	M03+M08
00496	R0501.7	M14	M04+M08
00497	R0502.0	M10	COOLANT B

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00498	R0502.1	M11	COOLANT B OFF
00499	R0502.4	M19	SPINDLE ORIENTATION
00500	R0502.6	M31.	X-AXIS MIRROR IMAGE
00501	R0502.7	M32.	Y-AXIS MIRROR IMAGE
00502	R0503.0	M33.	MIRROR IMAGE CANCEL
00503	R0503.1	M34.	4TH AXIS MIRROR IMAGE
00504	R0503.2	M25.	4TH CLAMP
00505	R0503.3	M26	4TH UNCLAMP
00506	R0503.4	M27	4TH INDEX
00507	R0503.6	M29	RIGID TAPPING FUNCTION
00508	R0504.0	M61.	4 M FUNCTION 1
00509	R0504.1	M62.	4 M FUNCTION 2
00510	R0504.2	M63.	4 M FUNCTION 3
00511	R0504.3	M64.	4 M FUNCTION 4
00512	R0504.4	M35	8 M FUNCTION 5
00513	R0504.5	M36	8 M FUNCTION 6
00514	R0504.6	M37	8 M FUNCTION 7
00515	R0504.7	M38	8 M FUNCTION 8
00516	R0505.6	M45	TOOL DETECT
00517	R0505.7	M46	*FV 100%
00518	R0506.1	M07.	KIT ON
00519	R0506.3	M50	CHIP CONVEYOR ON
00520	R0506.4	M51	CHIP CONVEYOR OFF
00521	R0506.7	M58.	ATLM BLOW RELAY ON
00522	R0507.0	M59.	ATLM BLOW RELAY OFF
00523	R0507.3	M58	JIG B CLAMP
00524	R0507.4	M59	JIG B UNCLAMP
00525	R0507.5	M60.	AUTO N0.1 TOOL POT RTN
00526	R0508.3	M66	JIG CLAMP
00527	R0508.4	M67	JIG UNCLAMP
00528	R0508.5	M68	HIGH TO LOW GEAR CHANGE
00529	R0508.6	M69	LOW TO HIGH GEAR CHANGE
00530	R0508.7	M80.	AUTOMATIC TOOL NUMBER SETTING
00531	R0509.0	M81.	POT DOWN
00532	R0509.1	M82.	ARM 60
00533	R0509.2	M83.	TOOL UNCLAMP
00534	R0509.3	M84.	ARM 180
00535	R0509.4	M85.	TOOL CLAMP
00536	R0509.5	M86.	ARM -60
00537	R0509.6	M87.	POT UP
00538	R0510.1	M80	AUTO PALLET CHANGE
00539	R0510.2	M81	APC STANDBY
00540	R0510.3	M82	APC PALLET UP
00541	R0510.4	M83	APC PALLET DOWN
00542	R0510.5	M84	APC PALLET EXTEND
00543	R0510.6	M85	APC PALLET RETRACT
00544	R0510.7	M86	APC DOOR OPEN
00545	R0511.0	M87	APC DOOR CLOSE
00546	R0511.1	M88	APC LOCK PIN OUT
00547	R0511.2	M89	APC LOCK PIN IN
00548	R0511.4	M91	APC TROUBLESHOOTING (RET.)
00549	R0511.5	M92	APC TROUBLESHOOTING (EXT.)
00550	R0511.7	M94	TCLP/TUCLP REVERSE
00551	R0512.0	M88.	ARM TROUBLESHOOTING
00552	R0512.5	MFIN	M CODE FINISH
00553	R0512.6	SFIN	S CODE FINISH
00554	R0512.7	TFIN	T CODE FINISH
00555	R0513.0	JOG	JOG MODE
00556	R0513.1	MANUAL	MANUAL MODE
00557	R0513.2	ZRNFIN	AXES REF. RETURN FINISH
00558	R0513.3	ZRN LH	ZERO RETURN ACTIVE
00559	R0513.4	FLTMR	FLASH ON/OFF TIMER
00560	R0513.5	FLASH	FLASH ON/OFF
00561	R0513.6	FLTRG	FLASH ON/OFF TRIGGER
00562	R0513.7	AUTOLH	AUTO LATCH
00563	R0515.0	AP_DN2	PALLET DOWN AFTER POWER ON
00564	R0515.1	TMRB31	
00565	R0515.7	STOP	EMG & RESET
00566	R0516.0	RDY1	NC READY
00567	R0516.1	F.SW+A	FOOT S/W ON PULSE AUX
00568	R0516.2	F.SW+	FOOT S/W ON PULSE

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00569	R0516.3	GCHSTB	GEAR CHANGE STANDBY
00570	R0516.4	HGCH	HIGH GEAR CHANGE
00571	R0516.5	JFSPOK	JIG FTSW PULSE OK
00572	R0516.6	ST+	CYCLE START ON PULSE
00573	R0516.7	LGCH1	LOW GEAR CHANGE 1
00574	R0517.0	L1DL	LOGIC 1 DELAY
00575	R0517.1	O.SA	POWER ON INITIAL PULSE AUX
00576	R0517.2	O.S	POWER ON INITIAL PULSE
00577	R0517.3	GRHIGH	GEAR HIGH
00578	R0517.4	GRLOW	GEAR LOW
00579	R0517.5	GRCHG	GEAR CHANGE
00580	R0517.6	LGCH	LOW GEAR CHANGE
00581	R0517.7	HGCH1	HIGH GEAR CHANGE 1
00582	R0518.0	GEAROK	GEAR OK
00583	R0518.1	TMRB10	HIGH GEAR CHANGE TIMER(9-10)
00584	R0518.2	TMRB13	LOW GEAR CHANGE TIMER(10-13)
00585	R0518.3	ORCM1	SPINDLE ORIENTATION
00586	R0518.4	M06-	M06 OFF PULSE
00587	R0518.5	M06-A	M06 OFF PULSE AUX
00588	R0518.6	SPOK	SPINDLE OK
00589	R0518.7	MAN-	MANUAL MODE OFF PULSE
00590	R0519.0	MAN-A	MANUAL MODE OFF PULSE AUX
00591	R0519.1	MSSTP	MANUAL SPINDLE STOP
00592	R0519.2	SPNOP	SPINDLE NO PAUSE
00593	R0519.3	SPOK1	SPINDLE OK 1
00594	R0519.4	SP_FOR	SPINDLE C.W
00595	R0519.5	SP_REV	SPINDLE C.C.W
00596	R0519.6	SPDIR	SPINDLE DIR FLAG
00597	R0520.0	SP_HLD	SPINDLE RESET HOLD
00598	R0520.1	RGDK	RIGID TAPPING KEEP
00599	R0520.3	RGDENB	RIGID TAPPING ENABLE
00600	R0520.4	RGDEND	RIGID TAPPING END
00601	R0520.5	RGDFIN	RIGID TAPPING FINISH
00602	R0520.6	TMRB15	RIGID TAPPING DELAY(11-15)
00603	R0520.7	M29R	M29 REGISTER
00604	R0521.0	RGDCW	RIGID TAPPING C.W
00605	R0521.1	RGDCCW	RIGID TAPPING C.C.W
00606	R0521.2	GCHSTP	GEAR CHANGE STOP
00607	R0521.3	M29DL	M29 FUNCTION DELAY
00608	R0521.4	AUTO-	AUTO MODE OFF PULSE
00609	R0521.5	AUTO-A	AUTO MODE OFF PULSE AUX
00610	R0521.6	ST+A	CYCLE START ON PULSE AUX
00611	R0521.7	SPROT	SP CW/CCW FOR GEAR CHANGE
00612	R0522.0	>25%	RAPID >25%
00613	R0522.1	MCLN+	CLNT MANUAL ON PULSE
00614	R0522.2	MCLN+A	CLNT MANUAL ON PULSE AUX
00615	R0522.3	ACLN+	CLNT AUTO ON PULSE
00616	R0522.4	ACLN+A	CLNT AUTO ON PULSE AUX
00617	R0522.5	+4A	+J4 AUX
00618	R0522.6	-4A	-J4 AUX
00619	R0522.7	JOGOK	JOG FEED OK
00620	R0523.0	DRITL7	DOOR INTERLOCK 7
00621	R0523.1	DRITL1	DOOR INTERLOCK 1
00622	R0523.2	DRITL2	DOOR INTERLOCK 2
00623	R0523.3	DRITL3	DOOR INTERLOC 3
00624	R0523.4	DRITL4	DOOR INTERLOCK 4
00625	R0523.5	DRITL5	DOOR INTERLOCK 5
00626	R0523.6	DRITL6	DOOR INTERLOCK 6
00627	R0523.7	<370	JOG FEEDRATE < 370MM
00628	R0524.0	>370	JOG FEEDRATE > 370MM
00629	R0524.1	STEMP	CYCLE START TEMP
00630	R0524.2	SPTMP	FEED HOLD TEMP
00631	R0524.3	MCHKEP	MODE CHANGE KEEP
00632	R0524.4	ZPXKEP	X HOME KEEP
00633	R0524.5	ZPYKEP	Y HOME KEEP
00634	R0524.6	ZPZKEP	Z HOME KEEP
00635	R0524.7	ZP4KEP	4 HOME KEEP
00636	R0525.0	NO-TOL	NO TOOL
00637	R0525.1	SP=EMP	SP TOOL =EMPTY
00638	R0525.2	SP=POT	SP TOOL NO=STANDBY POT NO
00639	R0525.3	PT=EMP	POT TOOL =EMPTY

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00640	R0525.4	SP=BT	SP TOOL = BIG TOOL
00641	R0525.5	PT=BT	POT TOOL = BIG TOOL
00642	R0525.6	SEMPW	SEARCH EMPTY TOOL
00643	R0525.7	TMB29	SPINDLE CW/CCW DELAY
00644	R0526.0	BTSTB	BIG TOOL STANDBY
00645	R0526.1	BTCK	WITH BIG TOOL?
00646	R0526.2	EMPCK	SP/STB T NO. =EMPTY ?
00647	R0526.3	ORDCK	SP/STB T NO. =ORDINARY ?
00648	R0526.4	S,PCK	SP TOOL = STANDBY POT TOOL ?
00649	R0526.5	MEMPT	MEMORIZE POT TOOL
00650	R0526.6	SRHEMP	SEARCH EMPTY TOOL
00651	R0526.7	TCH1	TOOL CHANGE 1
00652	R0527.0	SRHMPT	SEARCHING MEMORY POT
00653	R0527.1	TCH2	TOOL CHANGE 2
00654	R0527.2	ATCEND	ATC END
00655	R0527.3	M6TMP	TOOL CHANGE TEMP
00656	R0527.5	SRHFIN	TOOL SEARCH FIN
00657	R0528.1	SPR-	SPINDLE OFF PULSE
00658	R0528.2	SPR-A	SPINDLE OFF PULSE AUX
00659	R0528.3	LUBONT	LUBE ON TIMER
00660	R0528.4	LUNOFT	LUBE OFF TIMER
00661	R0528.5	LBONT+	LUBE ON TIMER PULSE
00662	R0528.6	LBT+A	LUBE ON TIMER PULSE AUX
00663	R0528.7	GRINP1	GEAR IN-POSITION 1
00664	R0529.0	ARMSTP	ARM STOP POINT
00665	R0529.1	MGINP	MAG IN-POSITION
00666	R0529.2	ESCASP	ESCAPE ARM STOP POINT
00667	R0529.3	TMR7.	ARM 60 ROTATION ARRIVAL(20-7)
00668	R0529.4	TMR8.	ARM 180 ROTATION ARRIVAL(21-8)
00669	R0529.5	TMR28	ARM -60 ROTATION ARRIVAL(22-28)
00670	R0529.6	MGCTA	MAG COUNTER A
00671	R0529.7	MGIP+	MAG IN-POSITION PULSE
00672	R0530.0	MGCT+A	MAG COUNT PULSE AUX
00673	R0530.1	MGCT+	MAG COUNT ON PULSE
00674	R0530.2	MGIP+A	MAG IN-POSITION PULSE AUX
00675	R0530.3	MGCTOP	MAG COUNT FUNCTION
00676	R0530.4	MGCWA	MAG CW AUX
00677	R0530.5	MGCCWA	MAG CCW AUX
00678	R0530.6	MGMCW1	MAG MANUAL CW ON
00679	R0530.7	MGCCW1	MAG MANUAL CCW ON
00680	R0531.0	MGCW	MAG CW
00681	R0531.1	MCWDEC	MAG CW DEC.
00682	R0531.2	TMR29	MAG CW DELAY(23-29)
00683	R0531.3	MGCCW	MAG CCW
00684	R0531.4	MAGOK	MAG OK
00685	R0531.5	MCCWDE	MAG CCW DEC
00686	R0531.6	TMRB3	MAG CCW DELAY(24-3)
00687	R0531.7	MGCT-	MAG COUNT OFF PULSE
00688	R0532.0	MGRSTB	MAG ROT STAND-BY
00689	R0532.1	MAGON2	MAG ON 2
00690	R0532.2	MAGOK1	MAG OK 1
00691	R0532.3	MAGCHK	MAG ROT CHECK
00692	R0532.5	PTDNOK	POT DOWN OK
00693	R0532.6	TUCLFA	AUTO TOOL UNCLAMP FAIL
00694	R0532.7	TCLFA	AUTO TOOL CLAMP FAIL
00695	R0533.0	TMB5.	ARM MIDDLE POINT DELAY(12-5)
00696	R0533.1	AMID+	ARM MIDDLE POINT ON PULSE
00697	R0533.2	AMID+A	ARM MID POINT ON PULSE AUX
00698	R0533.3	AMIDK	ARM MID POINT KEEP
00699	R0533.4	AMO	ARM RETURN POINT
00700	R0533.5	AMO+	ARM RETURN POINT ON PULSE
00701	R0533.6	AMO+A	ARM RTN POINT ON PULSE AUX
00702	R0533.7	AMOK	ARM RETURN POINT KEEP
00703	R0534.0	TF1	TOOL SEARCH ENABLE
00704	R0534.1	TMRB16	TOOL SEARCH ENABLE DELAY(13-16)
00705	R0534.2	TSRHON	TOOL SEARCH ON
00706	R0534.3	TSRH+	TOOL SEARCH ON PULSE
00707	R0534.4	TSRH+A	TOOL SEARCH ON PULSE AUX
00708	R0534.5	SHERR	TOOL ON. SEARCH ERROR
00709	R0534.7	RTO	MAG ROTATION 0
00710	R0535.0	MGROT	MAG ROTATION CW/CCW

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00711	R0535.1	TDEC	TOOL SEARCH DEC
00712	R0535.2	TDECK	TOOL SEARCH DEC KEEP
00713	R0535.3	TCOIN	T CODE = STANDBY TOOL
00714	R0535.4	TCOIN1	T CODE = STANDBY TOOL 1
00715	R0535.5	TCOSP	T CODE = SP TOOL
00716	R0535.6	TCOSP1	T CODE = SP TOOL 1
00717	R0536.0	MGACW	MAG AUTO CW
00718	R0536.1	MGACCW	MAG AUTO CCW
00719	R0536.2	MOVER1	DATA MOVE ERROR 1
00720	R0536.3	MOVER2	DATA MOVE ERROR 2
00721	R0536.4	TMRB8	MAG CHECK DELAY(1-8)
00722	R0536.5	MG_ERR	MAG ERROR
00723	R0536.6	RDY2	NC READY STATE
00724	R0536.7	A60	ARM 60 ROTATION
00725	R0537.0	A60-	ARM 60 ROTATION OFF PULSE
00726	R0537.1	A60-A	ARM 60 ROT OFF PULSE AUX
00727	R0537.2	A180	ARM 180 ROTATION
00728	R0537.3	A180-	ARM 180 ROT OFF PULSE
00729	R0537.4	A180-A	ARM 180 ROT OFF PULSE AUX
00730	R0537.5	JGBCLK	JIG B CLAMP KEEP
00731	R0537.6	JIGUCL	JIG UNCLAMP
00732	R0537.7	TUCLAU	TOOL UNCLAMP AUX
00733	R0538.0	ATUCL	AUTO TOOL UNCLAMP
00734	R0538.1	MAGON	MAG ON
00735	R0538.3	M06ENB	M06 ENABLE
00736	R0538.4	M06+	M06 ENB ON PULSE
00737	R0538.5	M06+A	M06 ENB ON PULSE AUX
00738	R0538.6	M6ENBK	M06 ENB KEEP
00739	R0538.7	ATCOK	ATC OK
00740	R0539.0	ATCOK1	ATC OK 1
00741	R0539.1	TCHP	TOOL CHANGE POINT
00742	R0539.2	TMR6.	ARM 0 POINT(14-6)
00743	R0539.3	TMR26	POT UP DELAY(15-26)
00744	R0539.4	TMRB18	POT DOWN DELAY(16-18)
00745	R0539.5	TMRB19	SPINDLE TOOL CLAMP DELAY(17-19)
00746	R0539.6	TMR27.	SP TOOL UNCLAMP DELAY(18-27)
00747	R0539.7	ATCSTB	ATC STANDBY
00748	R0540.0	A1	POT DOWN
00749	R0540.1	A2	ARM 60
00750	R0540.2	PRECLP	TOOL UNCLAMP WHEN ARM 60 ACTIV
00751	R0540.3	A3	SPINDLE TOOL UNCLAMP
00752	R0540.4	A4	ARM 180
00753	R0540.5	SPBLWK	SPINDLE AIR BLOW KEEP
00754	R0540.6	TMRB12	SPINDLE AIR BLOW DELAY(19-12)
00755	R0540.7	A5	SPINDLE TOOL CLAMP
00756	R0541.0	A6	ARM -60
00757	R0541.1	A7	POT UP
00758	R0541.2	STEP1	ATC STEP1 (ARM 60)
00759	R0541.3	STEP2	ATC STEP2 (ARM 180)
00760	R0541.4	STEP3	ATC STEP3 (SP AIR BLOW)
00761	R0541.5	STEP4	ATC STEP4 (ARM -60)
00762	R0541.6	STEP5	ATC STEP5 (POT UP)
00763	R0541.7	STEP6	ATC STEP6 (ATC END)
00764	R0542.0	ATCFIN	ATC FINISH
00765	R0542.1	ATFIN1	ATC FINISH 1
00766	R0542.2	SP_CLP	SPINDLE CLAMP
00767	R0542.3	SP_UNC	SPINDLE UNCLAMP
00768	R0542.4	M82OK	M82 OK
00769	R0542.5	M82A	M82 ACTIVE (ARM 60)
00770	R0542.6	M84OK	M84 OK
00771	R0542.7	M84A	M84 ACTIVE (ARM 180)
00772	R0543.0	M86OK	M86 OK
00773	R0543.1	M86A	M86 ACTIVE (ARM -60)
00774	R0543.2	ASEQ1	ARM SEQ1
00775	R0543.3	ASEQ2	ARM SEQ2
00776	R0543.4	ASEQ3	ARM SEQ3
00777	R0543.5	M74AR	M74 ROT ARRIVAL
00778	R0543.6	MAGINP	MAG. IN-POSITION
00779	R0543.7	A4-1	ARM 180
00780	R0544.0	ARMSTB	ARM STANDBY
00781	R0544.1	ATCAL	ATC ALARM

NO.	ADDRESS	SYMBOL	FIRST COMMENT
00782	R0544.2	TMRB9	ATC ALARM 1(2-9)
00783	R0544.3	2NDREF	2ND. REFERENCE POINT
00784	R0544.4	ATCITL	ATC INTERLOCK
00785	R0544.5	ARJGSP	ARM JOG STOP
00786	R0544.6	ARJGPA	ARM JOG PAUSE
00787	R0544.7	TMR4	ARM JOG DELAY(25-4)
00788	R0545.3	A2_OK	A2 OK
00789	R0545.4	M6TMP+	M06 PULSE STANDBY
00790	R0545.5	MGON2	MAG ON 2
00791	R0545.6	ATC+K	ATC PULSE KEEP
00792	R0545.7	M6TMPA	ATC PULSE AUX
00793	R0546.0	M88KEP	M88 KEEP STATE (LADDER TOP)
00794	R0546.1	ARM0A	ARM 0 POINT AUX
00795	R0546.2	AMIDA	ARM MID POINT AUX
00796	R0546.3	ARMSPA	ARM STOP POINT AUX
00797	R0546.4	0	ZERO POINT
00798	R0546.5	F0+A	F0 ON PULSE AUX
00799	R0546.6	F0+	F0 ON PULSE
00800	R0546.7	ARMJOG	ARM JOG
00801	R0547.0	SPON	SPINDLE ON
00802	R0547.1	L1DL1	LOGIC 1 DELAY 1
00803	R0547.3	ARM0+A	ARM 0 ON PULSE AUX
00804	R0547.4	ARM0+	ARM 0 ON PULSE
00805	R0547.5	AM60+A	ARM 60 ON PULSE AUX
00806	R0547.6	AM60+	ARM 60 ON PULSE
00807	R0548.1	M88JOG	M88 LADDER END
00808	R0548.6	M88-	M88 OFF PULSE
00809	R0548.7	M88-A	M88 OFF PULSE AUX
00810	R0549.0	M88TCH	M88 TOOL CHANGE PULSE
00811	R0549.2	ARM0	ARM RETURN POINT
00812	R0549.3	ARM60	ARM MIDDLE POINT
00813	R0550.1	ATSTB1	ATC STANDBY 1
00814	R0551.0	4MUCL	4TH. MANUAL UNCLAMP
00815	R0551.1	4AUCL	4TH. AUTO UNCLAMP
00816	R0551.3	AP_EX1	
00817	R0551.4	AP_RE1	
00818	R0551.5	4UCLP	4TH UNCLAMP
00819	R0551.6	GCHFAL	GEAR CHANGE FAILURE
00820	R0551.7	GRINP	GEAR IN-POSITION
00821	R0552.0	TMR5	M82/83 FINISH DELAY TIMER
00822	R0552.1	TMR6	M84/85 FINISH DELAY TIMER
00823	R0552.2	TMR7	M88/89 FINISH DELAY TIMER
00824	R0552.3	AZR+	ARM ZERO POINT ON PULSE
00825	R0552.4	AZR-	ARM ZERO POINT OFF PULSE
00826	R0552.5	AZR+A	ARM ZERO POINT PULSE AUX
00827	R0552.6	AMD+	ARM MID POINT ON PULSE
00828	R0552.7	AMD-	ARM MID POINT OFF PULSE
00829	R0553.0	AMD+A	ARM MID POINT PULSE AUX
00830	R0553.1	M80+	M80 ON PULSE
00831	R0553.2	M80+A	M80 ON PULSE AUX
00832	R0553.3	JOGOFD	JOG MODE OFF DELAY
00833	R0553.4	AM60A	ARM MIDDLE POINT
00834	R0553.5	AM0A	ARM RETURN POINT
00835	R0553.6	M94+	M94 ON PULSE
00836	R0553.7	M94+A	M94 ON PULSE AUX
00837	R0554.0	JBFS+	JIG B FTSW ON PULSE
00838	R0554.1	JBFS+A	JIG B FTSW ON PULSE AUX
00839	R0554.2	JGBUCL	JIG B UNCLAMP
00840	R0554.3	>JBCL'	JIG B CLAMP AUX
00841	R0554.4	>JBUC'	JIG B UNCLAMP AUX
00842	R0554.5	JBCLDL	JIG B CLAMP DELAY
00843	R0554.6	>M37'	M37 OUTPUT AUX
00844	R0554.7	>M38'	M38 OUTPUT AUX
00845	R0555.0	X>-30	X COORDINATE > -30MM
00846	R0555.1	X>30	X COORDINATE > 30MM
00847	R0555.2	Y>-30	Y COORDINATE > -30MM
00848	R0555.3	Z>-30	Z COORDINATE > -30MM
00849	R0555.4	WINFIN	WINDOW FUNCTION FIN
00850	R0555.5	M8OFIN	TOOL DATA WRITE FINISH
00851	R0555.6	GCHOVR	GEAR CHANGE OVER
00852	R0555.7	T1+	TMR01 ON PULSE

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00853	R0556.0	APO1	AUTO POWER OFF 1
00854	R0556.1	CL_ON1	COOLANT ON 1
00855	R0556.2	CL_FED	COOLANT FEED HOLD
00856	R0556.3	KTON1	KIT ON 1
00857	R0556.4	CL_OFS	COOLANT OFF SWITCH
00858	R0556.5	M0/M1	M00/M01 FUNCTION
00859	R0556.6	M2/M30	M02 M30 FUNCTION
00860	R0556.7	M0/1CL	M00/M01 RELEASE
00861	R0557.0	MSTPV	MACHINE STOP VALID
00862	R0557.1	MSTPD	MACHINE STOP DELAY
00863	R0557.2	MSTPR	MACHINE STOP RESET
00864	R0557.3	SRNR1	PROGRAM RESTART ON 1
00865	R0557.4	M3R	SPINDLE C.W REGISTER
00866	R0557.5	M4R	SPINDLE C.C.W REGISTER
00867	R0557.6	T1+A	TMR01 ON PULSE AUX
00868	R0557.7	GCHEND	GEAR CHANGE END
00869	R0558.0	CYST+	CYCLE START ON PULSE
00870	R0558.1	SPRES	SPINDLE RESTART
00871	R0558.2	SPRFIN	SP RESTART FINISH
00872	R0558.3	STON	CYCLE START VALID
00873	R0558.4	CYST+A	CYCLE START ON PULSE AUX
00874	R0558.5	SPCWP	SPINDLE C.W PULSE
00875	R0558.6	SPCCWP	SPINDLE CCW PULSE
00876	R0558.7	SPOK2	SPINDLE OK 2
00877	R0559.0	OMSCHK	SPINDLE OIL MIST CHECK DELAY
00878	R0559.1	WKB_A	WORKPIECE BLAST AUX
00879	R0559.2	WBONDL	WORK BLAST ON DELAY
00880	R0559.3	WBOFDL	WORK BLAST DELAY
00881	R0559.4	ALR	ALARM LAMP REGISTER
00882	R0559.5	CVONDL	CHIP CW ON DELAY
00883	R0559.6	DRITL	DOOR INTERLOCK
00884	R0559.7	CVOFDL	CHIP CW OFF DELAY
00885	R0560.0	O.S_2	EMG ONE SHOOT
00886	R0560.1	MNTN	MAINTENANCE MODE
00887	R0560.2	OILAL	SP OIL COOLER ALARM LATCH
00888	R0560.3	X-MIR	X-AXIS MIRROR IMAGE LATCH
00889	R0560.4	Y-MIR	Y-AXIS MIRROR IMAGE LATCH
00890	R0560.5	4-MIR	4TH AXIS MIRROR IMAGE LATCH
00891	R0560.7	JIGCLK	JIG CLAMP KEEP
00892	R0561.0	JGCLDL	JIG CLAMP DELAY
00893	R0561.1	JGCLOV	JIG CLAMP OVERTIME
00894	R0561.2	STL-	STL OFF PULSE
00895	R0561.3	STL+A	STL ON PULSE AUX
00896	R0561.4	STL+	STL ON PULSE
00897	R0561.5	O.S_2A	EMG O.S_2 AUX
00898	R0561.6	LVLERR	CTS SYSTEM LEVEL ERROR
00899	R0561.7	CLNLDL	COOLANT LOW DELAY
00900	R0562.0	CTSSTB	CTS STANDBY
00901	R0562.1	CLNFP	COOLANT TANK FULL PUMP
00902	R0562.2	FILLP	FILTER TANK LOW PUMP
00903	R0562.3	CLFPDL	COOLANT TANK FULL PUMP DELAY
00904	R0562.4	FILPDL	FILTER TANK LOW PUMP DELAY
00905	R0562.5	M48-1	M48 FOR CTS
00906	R0562.6	FILON	FILTER ON
00907	R0562.7	PUMP1	PUMP1 ON
00908	R0563.0	LVLOK	CTS SYSTEM LEVEL OK
00909	R0563.1	CTSON	CTS ON
00910	R0563.2	KITON	KIT ON
00911	R0563.3	STLKP	STL KEEP UNDER MDI
00912	R0563.4	DROPOF	M30 DOOR OPEN OFF
00913	R0563.5	JGCLCH	JIG CLAMP CHECK
00914	R0563.6	DIFU3	
00915	R0563.7	DIFU4	
00916	R0564.0	M84+A	APC M84/M91 ON PULSE AUX
00917	R0564.1	M84+	APC M84/M91 ON PULSE
00918	R0564.2	AP,ENA	APC ENABLE(AUTO CHANGE)
00919	R0564.3	AP,DIS	APC DISABLE(AUTO CHANGE)
00920	R0564.4	TMRB25	APC NOT READY DELAY
00921	R0564.5	TMRB26	APC UP/DOWN CHECK
00922	R0564.6	AP,MVA	APC M84,M85,M91,M92 AUX
00923	R0564.7	AP,MOE	APC EXT./RET. ENABLE

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TW-2260-VTC
NO.      ADDRESS  SYMBOL  FIRST COMMENT
00924    R0565.0  TMRB27  APC EXT./RET. CHECK
00925    R0565.1  TMRB28  APC OPEN/CLOSE CHECK
00926    R0565.2  AP,ITL  APC X,Y AXIS INTERLOCK
00927    R0565.3  AP,XI   APC X AXIS INTERLOCK
00928    R0565.4  AP,FIN  APC M CODE FINISH
00929    R0565.5  AP,MV+  APC EX/RE ON PULSE
00930    R0565.6  AP,M+A  APC EX/RE ON PULSE AUX
00931    R0565.7  A&T_M  AUTO & TAPE MODE
00932    R0566.0  AP,COP  APC COVER OPEN
00933    R0566.1  AP,ON   APC VALID
00934    R0566.2  AP_ST+  APC CYCLE START ON PULSE
00935    R0566.3  APST+A  APC CYCLE START PULSE AUX
00936    R0566.4  AP,ESS  ESC APC ROTOR STOP POINT
00937    R0566.5  AP,RAR  APC ROTATE ARRIVAL
00938    R0566.6  AP,AR'  APC ROT ARRIVAL AUX
00939    R0566.7  "P_RD'  APC READY LAMP AUX
00940    R0567.0  >P_OP'  APC DOOR OPEN AUX
00941    R0567.1  >P_CL'  APC DOOR CLOSE AUX
00942    R0567.2  >P_OU'  APC LOCK PIN OUT AUX
00943    R0567.3  >P_IN'  APC LOCK PIN IN AUX
00944    R0567.4  TMRB30  APC LOCK PIN CHECK
00945    R0567.5  AP,ME'  APC EXT/RET ENABLE AUX
00946    R0567.6  APP_SBL_4_DA_MOV  APP SBL 4 ASSE DA MOVING
00947    R0567.7  SBL_4_RIT  SBLOCCO 4 ASSE RITARDATO
00948    R0570.7  $]ST
00949    R0571.2  $]F0    ARM MOTOR  MANUAL JOG
00950    R0571.3  $]AFL
00951    R0571.5  $]ABS
00952    R0572.4  $]SRN
00953    R0573.0  $MD1
00954    R0573.1  $MD2
00955    R0573.2  $MD4
00956    R0573.3  $]RPD
00957    R0573.4  $]ZRN
00958    R0574.0  $]100%
00959    R0574.1  $]DEC
00960    R0574.2  $]INC
00961    R0574.4  $FV1
00962    R0574.5  $FV2
00963    R0574.6  $FV4
00964    R0574.7  $FV8
00965    R0575.0  $]CL.M
00966    R0575.1  $]F7
00967    R0575.2  $]CL.A
00968    R0575.3  $]MGON
00969    R0575.5  $]F1
00970    R0576.1  $]CVSP
00971    R0576.2  $]CCCW
00972    R0576.4  $]SRST
00973    R0576.6  RPO%
00974    R0577.1  $]F8
00975    R0577.2  $]F9
00976    R0578.0  $]*SP
00977    R0578.1  $MT2
00978    R0578.2  $MT1
00979    R0578.5  $]APO
00980    R0578.6  $KG2ON  KEY GROUP 2 ON
00981    R0578.7  $G2ONA  KEY GROUP 2 ON AUX
00982    R0579.1  $"X2
00983    R0579.3  $"Y2
00984    R0579.5  $"Z2
00985    R0579.7  $"B2
00986    R0580.0  $KG1ON  KEY GROUP 1 ON
00987    R0580.1  $G1ONA  KEY GROUP 1 ON AUX
00988    R0580.2  $"F0
00989    R0580.3  $"AFL
00990    R0580.5  $"ABS
00991    R0581.4  $"SRN
00992    R0581.5  $"DRN
00993    R0582.0  AUTO,M
00994    R0582.1  TAPE,M

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NO.	ADDRESS	SYMBOL	FIRST COMMENT
00995	R0582.2	HAND,M	
00996	R0582.3	THND	TEACH IN HANDLE
00997	R0582.4	TJOG	TEACH IN JOG
00998	R0582.5	\$"100%	
00999	R0582.6	\$"DEC	
01000	R0582.7	\$"INC	
01001	R0583.0	MDI,M	
01002	R0583.1	EDIT,M	
01003	R0583.2	RPD,M	
01004	R0583.3	JOG,M	
01005	R0583.4	ZRN,M	
01006	R0583.6	\$"H.1	
01007	R0583.7	\$"H.2	
01008	R0584.0	\$"CLM	
01009	R0584.1	\$"F7	
01010	R0584.2	\$"CLA	
01011	R0584.3	MG-ON	
01012	R0584.5	\$"F1	
01013	R0585.1	\$"CVSP	
01014	R0585.3	\$"SORI	
01015	R0585.4	\$"SRST	
01016	R0585.5	\$"SJOG	
01017	R0585.6	\$G1OFD	KEY GROUP 1 OFF DELAY
01018	R0585.7	\$G2OFD	KEY GROUP 2 OFF DELAY
01019	R0586.6	\$"HG	
01020	R0586.7	\$"LGL	
01021	R0589.0	\$"SPAL	
01022	R0589.1	\$"CLAL	
01023	R0589.2	\$"ARAL	
01024	R0590.1	\$"PGSP	
01025	R0590.3	\$"NCRD	
01026	R0590.4	\$LOG1	MEMBRANE LOGIC 1
01027	R0591.0	\$"ATC1	
01028	R0591.1	\$"ATC2	
01029	R0591.2	\$"ATC3	
01030	R0591.3	\$"ATC4	
01031	R0591.4	TMR1	
01032	R0592.0	\$"ATC5	
01033	R0592.1	\$"ATC6	
01034	R0592.2	\$"ATC7	
01035	R0592.7	\$"ATC8	
01036	R0593.3	\$JFSEL	
01037	R0598.0	\$MM/IN	MM/INCH
01038	R0598.1	\$10/1M	10M/1.26M
01039	R0598.2	\$PLCRD	
01040	R0598.3	\$SP.5%	SPINDLE 5%
01041	R0600.0	H.WIND	SPINDLE HIGH WINDING
01042	R0600.1	M.PINO	
01043	R0600.2	PIN.A	PIN OUT AUX
01044	R0600.3	A.PININ	AUTO PIN IN
01045	R0600.4	MA.PB	MANUAL CW/CW KEEP
01046	R0601.0	APINON	AUTO MODE PIN ON
01047	R0601.1	MPKEP	MANUAL PIN IN KEEP
01048	R0601.2	M.ON.D	MANUAL ON DELAY
01049	R0601.3	M.O.IN	MANUAL OUT INI.
01050	R0601.6	O.MCO	PIN OUT M CODE
01051	R0602.0	M.ON	MAG. ON
01052	R0603.0	M06DE	M06 DELAY ON
01053	R0604.0	TMR108	CW/CCW PB. KEEP
01054	R0610.7	POTDLY	POT DELAY FOR MAG IN POS
01055	R0612.2	APCTRB	APC TROUBLESHOOTING
01056	R0657.0	\$CVCW+	CV CW P.B ON PULSE
01057	R0657.1	\$CCW+A	CV CW P.B ON PULSE AUX
01058	R0657.2	CVCW+	CV CW ON PULSE
01059	R0657.3	>X10	INCREMENTAL FEED > X10
01060	R0658.0	MLK-ON	
01061	R0658.1	MLK+	MLK P.B ON PULSE
01062	R0658.2	SRN-ON	
01063	R0658.3	SRN+	SRN P.B ON PULSE
01064	R0658.4	BDT-ON	
01065	R0658.5	BDT+	BDT P.B ON PULSE

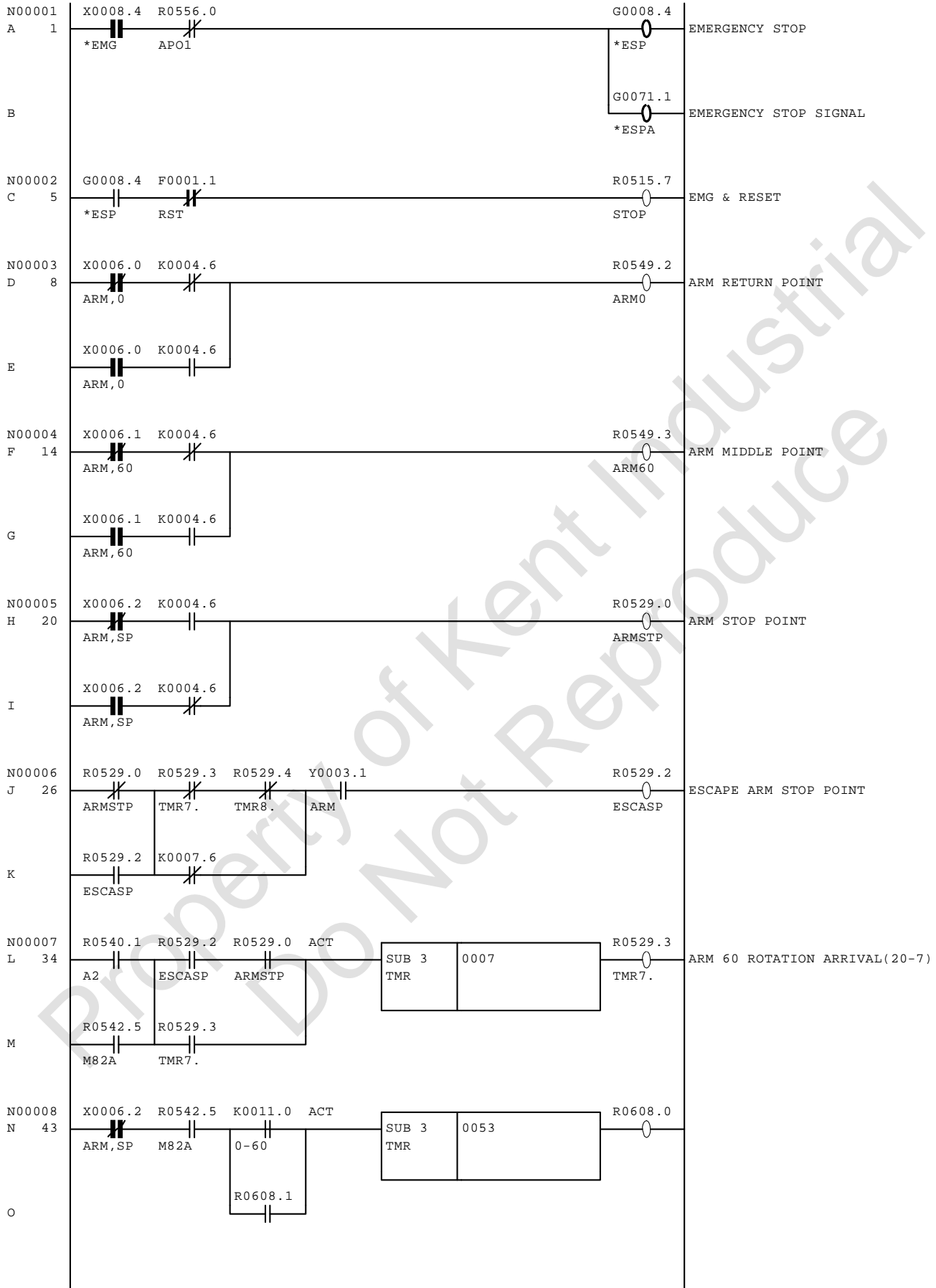
NO.	ADDRESS	SYMBOL	Symbol & Comment
			TW-2260-VTC
			FIRST COMMENT
01066	R0658.6	OSP-ON	
01067	R0658.7	OSP+	OSP P.B ON PULSE
01068	R0659.0	ZNG-ON	
01069	R0659.1	ZNG+	ZNG P.B ON PULSE
01070	R0659.2	SBK-ON	
01071	R0659.3	SBK+	SBK P.B ON PULSE
01072	R0659.4	DRN-ON	
01073	R0659.5	DRN+	DRN P.B ON PULSE
01074	R0659.6	ABS-ON	
01075	R0659.7	ABS+	ABS P.B ON PULSE
01076	R0660.0	AFL-ON	
01077	R0660.1	AFL+	AFL P.B ON PULSE
01078	R0660.2	MAG-ON	
01079	R0660.3	MGON+	MAG ON P.B ON PULSE
01080	R0660.4	OPKEP	AUTO OPERATION KEEP
01081	R0660.5	SPMCW	SPINDLE MANUAL CW
01082	R0660.7	SPMCCW	SPINDLE MANUAL CCW
01083	R0661.0	>3700	JOG FEEDRATE > 3700MM
01084	R0661.1	F1-ON	F1 P.B ON
01085	R0661.2	F1+	F1 P.B ON PULSE
01086	R0661.3	SSTPK	SPINDLE STOP KEEP
01087	R0662.0	N2REG	
01088	R0662.1	LBREG	LUBE BROKE REG.
01089	R0662.2	LBALRE	LUBE BR AL REG
01090	R0662.3	LBALFI	LU. BR. AL. SW FAIL
01091	R0662.4	LUALFH	LUBE BROKEN FEED HOLD
01092	R0666.0	JOV,A	JOG FEEDRATE 0
01093	R0666.1	JOV,F	
01094	R0666.2	JOV,B	
01095	R0666.3	JOV,E	
01096	R0666.4	JOV,C	
01097	R0666.5	\$J370	JOG FEEDRATE 370
01098	R0666.6	\$J520	JOG FEEDRATE 520
01099	R0666.7	\$J720	JOG FEEDRATE 720
01100	R0667.0	\$J1000	JOG FEEDRATE 1000
01101	R0667.1	\$J1400	JOG FEEDRATE 1400
01102	R0667.2	\$J2000	JOG FEEDRATE 2000
01103	R0667.3	\$J2700	JOG FEEDRATE 2700
01104	R0667.4	\$J3700	JOG FEEDRATE 3700
01105	R0667.5	\$J5200	JOG FEEDRATE 5200
01106	R0667.6	\$J7200	JOG FEEDRATE 7200
01107	R0667.7	J10000	JOG FEEDRATE 10000
01108	R0668.0	G10.6A	G10.6 TEMP
01109	R0668.1	G12.1A	G12.1 TEMP
01110	R0668.2	G12.2A	G12.2 TEMP
01111	R0668.3	G12.3A	G12.3 TEMP
01112	R0668.4	G12.4A	G12.4 TEMP
01113	R0668.5	*FV100	*FV 100% KEEP
01114	R0669.0	\$]INC+	SP INC ON PULSE
01115	R0669.1	\$]DEC+	SP DEC ON PULSE
01116	R0669.2	ERROP	
01117	R0669.3	INCACT	SP INC ACTIVE
01118	R0669.4	DECACT	SP DEC ACTIVE
01119	R0669.5	SOV100	SPINDLE OVERRIDE 100%
01120	R0669.6	SOV110	SPINDLE OVERRIDE 110%
01121	R0669.7	SOV120	SPINDLE OVERRIDE 120%
01122	R0671.0	\$KLDE0	KEY-LED DECODE OP0
01123	R0671.1	\$KLDE1	KEY-LED DECODE OP1
01124	R0671.2	\$KLDE2	KEY-LED DECODE OP2
01125	R0671.3	\$KLDE3	KEY-LED DECODE OP3
01126	R0671.4	\$KLDE4	KEY-LED DECODE OP4
01127	R0671.5	\$KLDE5	KEY-LED DECODE OP5
01128	R0671.6	\$KLDE6	KEY-LED DECODE OP6
01129	R0671.7	\$KLDE7	KEY-LED DECODE OP7
01130	R0673.0	\$MOD1'	\$MOD1 AUX
01131	R0673.1	\$MOD2'	\$MOD2 AUX
01132	R0673.2	\$MOD4'	\$MOD4 AUX
01133	R0673.3	MDK,EN	MODE KEEP ENABLE
01134	R0673.4	MDK1	MODE KEEP 1
01135	R0673.5	MDK2	MODE KEEP 2
01136	R0680.2	\$MP1	

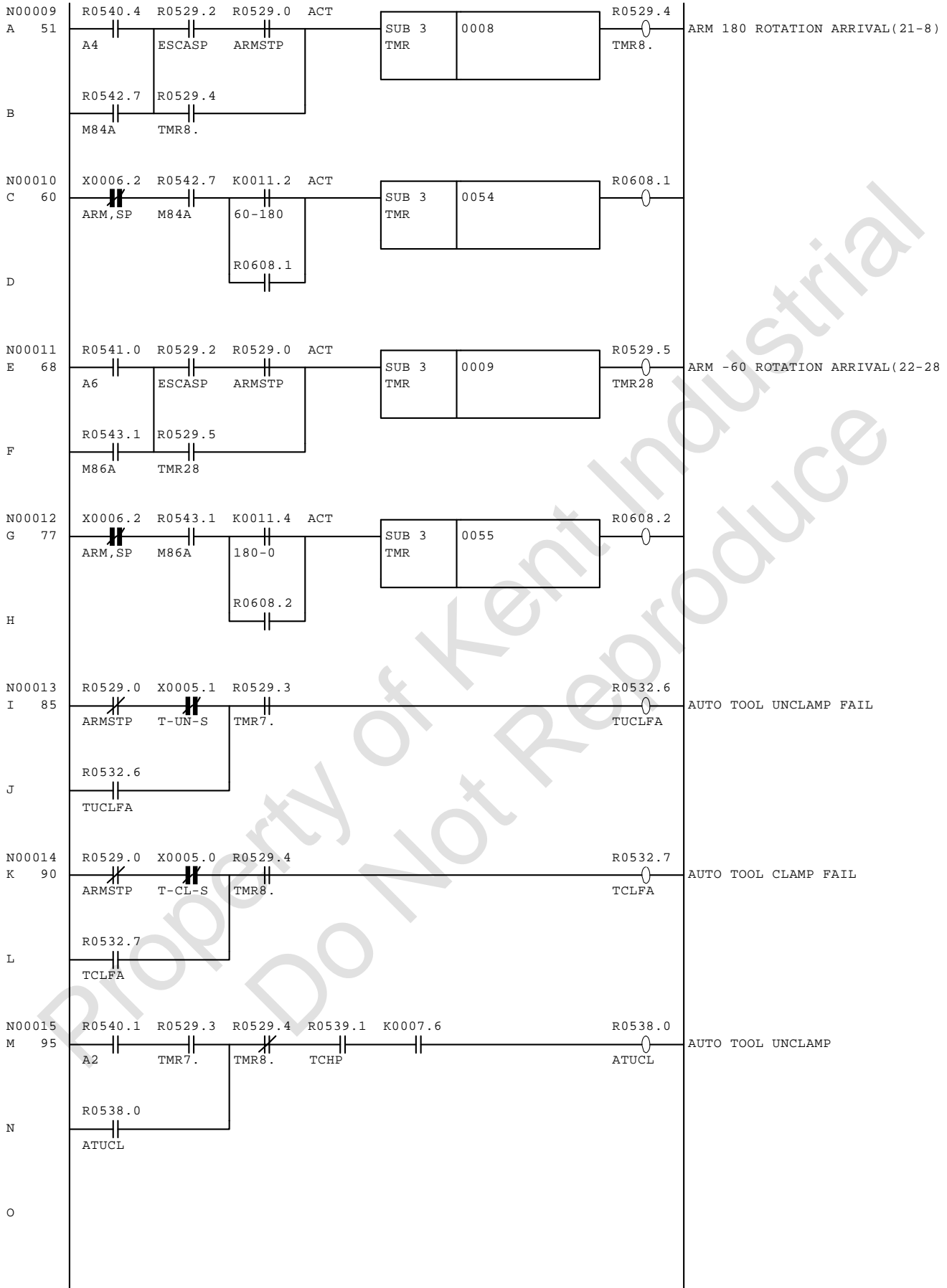
NO.	ADDRESS	SYMBOL	FIRST COMMENT
01137	R0680.3	\$MP2	
01138	R0681.0	\$HX	
01139	R0681.1	\$HY	
01140	R0681.2	\$HZ	
01141	R0681.3	\$H4	
01142	R0694.0	+XHOME	+X HOME
01143	R0694.1	-XHOME	-X HOME
01144	R0694.2	+YHOME	+Y HOME
01145	R0694.3	-YHOME	-Y HOME
01146	R0694.4	+ZHOME	+Z HOME
01147	R0694.5	-ZHOME	-Z HOME
01148	R0695.0	X_ZRN	X AXIS ZERO RETURN
01149	R0695.1	Y_ZRN	Y AXIS ZERO RETURN
01150	R0695.2	Z_ZRN	Z AXIS ZERO RETURN
01151	R0695.3	A.HM-K	AUTO-HOME KEEP
01152	R0695.4	A-H-AR	ALL AXIS HOMED
01153	R0695.5	MCW-H	MAG. CCW HOME
01154	R0695.6	MCCW-H	MAG. CCW. HOME
01155	R0695.7	A.MAG.H	AUTO MAGAZINE HOME
01156	R0700.1	A-JOG0	ARM JOG 0 ON PULSE
01157	R0700.2	K7#00FF	K7#0#1 OFF PULSE
01158	R0700.3	CH-CB	CHIP WITH COOLANT-B
01159	R0701.1	CS-OFF	CYCLE START OFF
01160	R0701.2	CB-ON	COOLANT B ON
01161	R0701.3	CB-PBOF	COOLANT-B OFF
01162	R0701.4	CB-PBON	COOLANT-B ON
01163	R0701.5	CB-PB.P	COOLANT-B PB PULSE
01164	R0701.6	CB-PB.M	COOLANT-B PB MEM
01165	R0705.0	MLK+R	MLK REGIST
01166	R0705.1	MLKALM	MLK ALARM
01167	R0800.0	SPBIT0	
01168	R0800.1	SPBIT1	
01169	R0800.2	SPBIT2	
01170	R0800.3	SPBIT3	
01171	R0800.4	SPBIT4	
01172	R0800.5	SPBIT5	
01173	R0800.6	SPBIT6	
01174	R0800.7	SPBIT7	
01175	R0801.0	PRBIT0	
01176	R0801.1	PRBIT1	
01177	R0801.2	PRBIT2	
01178	R0801.3	PRBIT3	
01179	R0801.4	PRBIT4	
01180	R0801.5	PRBIT5	
01181	R0801.6	PRBIT6	
01182	R0801.7	PRBIT7	
01183	R0810.0	CYLTIM	
01184	R0810.1	CLKON	
01185	R0810.2	CLKPLS	
01186	R0810.3	DSPCTR	
01187	R0820.0	BIT0	
01188	R0820.1	BIT1	
01189	R0820.2	BIT2	
01190	R0820.3	BIT3	
01191	R0820.4	BIT4	
01192	R0820.5	BIT5	
01193	R0820.6	BIT6	
01194	R0820.7	BIT7	
01195	R0821.0	B0DLON	
01196	R0821.1	B0DLOF	
01197	R0821.2	B2DLON	
01198	R0821.3	B2DLOF	
01199	R0821.4	B4DLON	
01200	R0821.5	B4DLOF	
01201	R0821.6	B6DLON	
01202	R0821.7	B6DLOF	
01203	R1170.1	TWOK	TOOL DISPLAY WRITE OK
01204	R1170.3	TDWST4	TOOL DISPLAY WRITE STEP 4
01205	R1170.4	TDWST3	TOOL DISPALY WRITE STEP 3
01206	R1170.5	TDWST2	TOOL DISPLAY WRITE STEP 2
01207	R1170.6	TDWST1	TOOL DISPLAY WRITE STEP 1

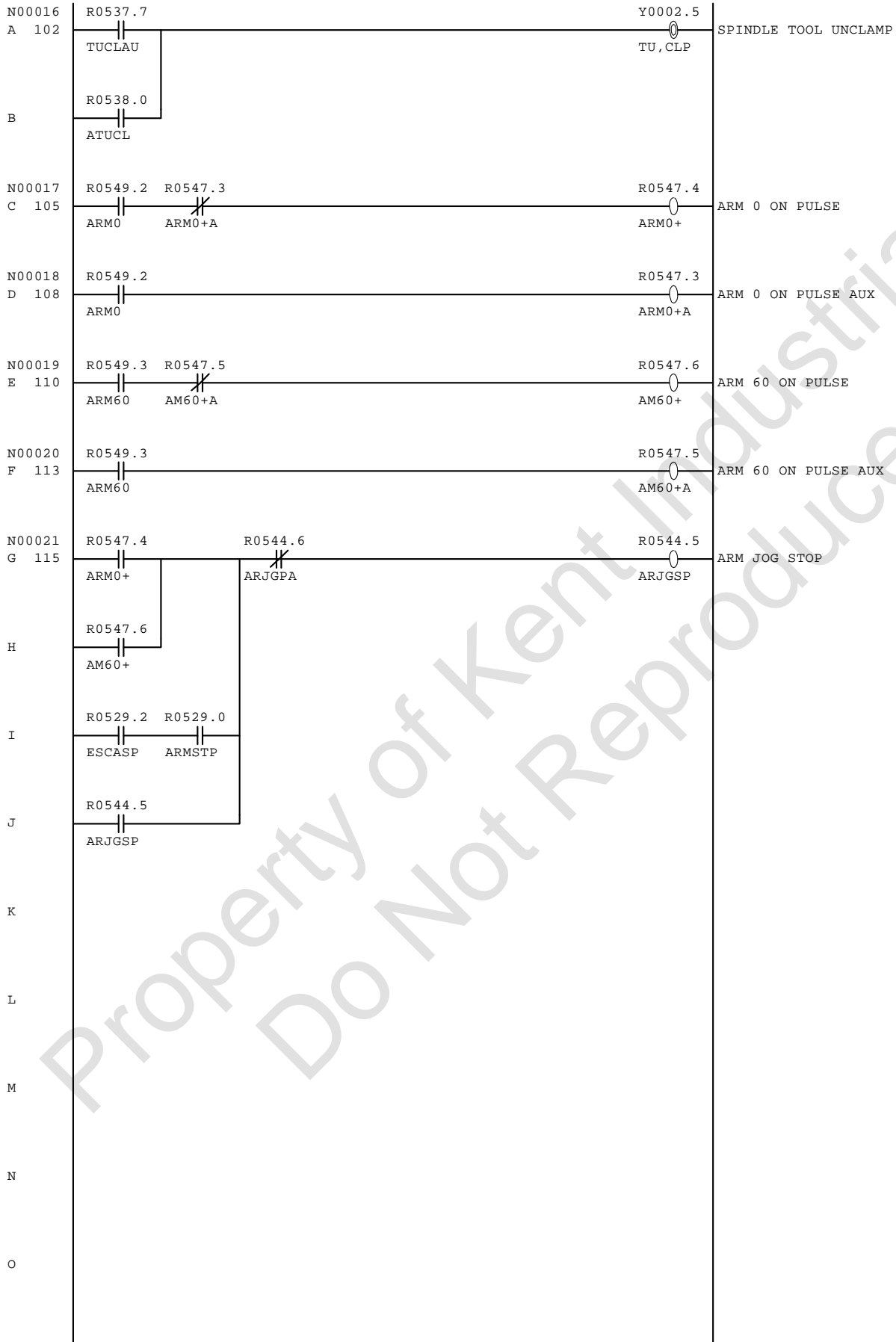
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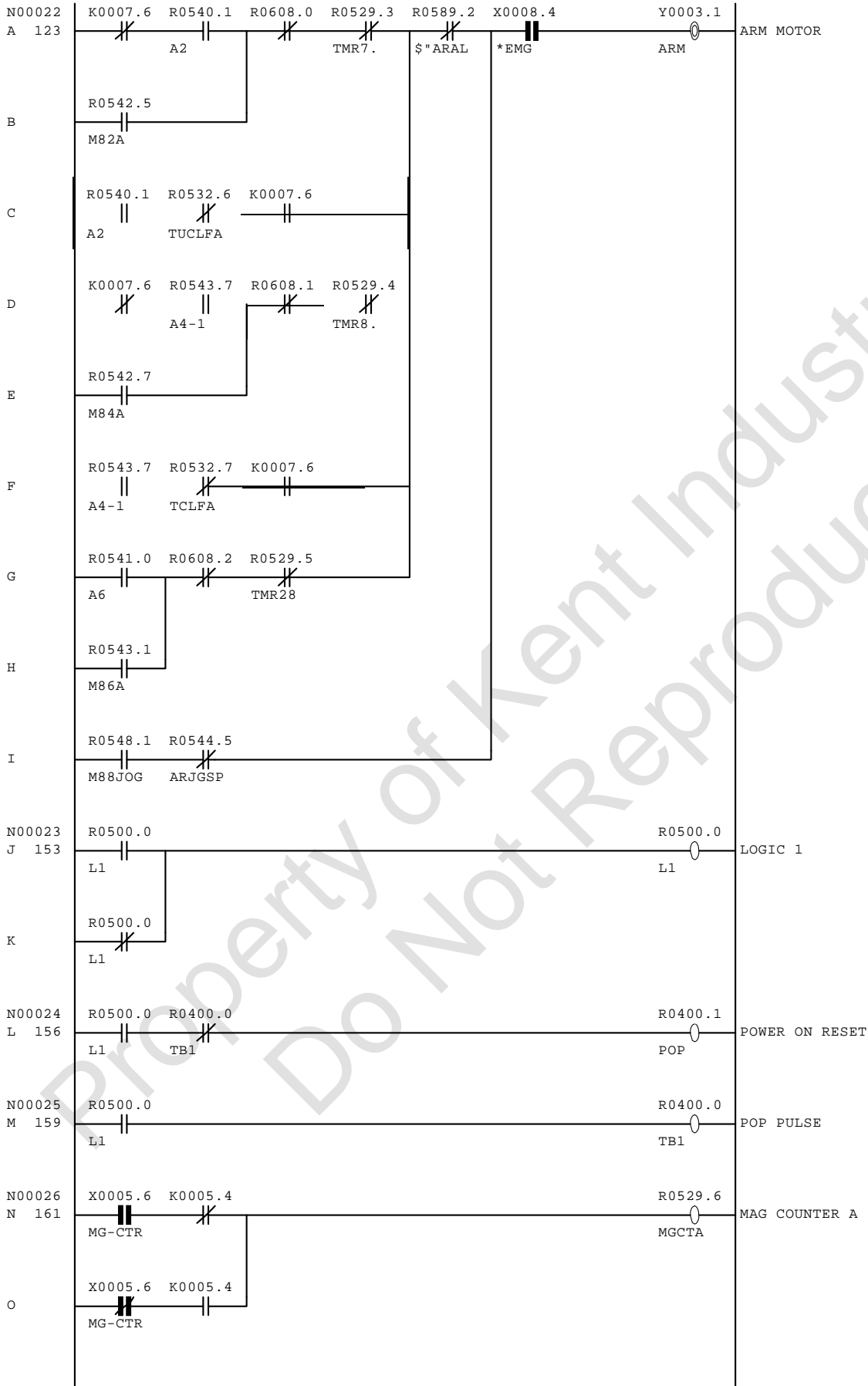
NO.	ADDRESS	SYMBOL	FIRST COMMENT
01208	R1171.0	TWOKP	TOOLDISPLAY WRITE OK PULSE
01209	R1171.1	TWOKC	TOOL DISPLAY WRITE OK CLICK
01210	R1171.3	TDWST5	TOOL DISPLAY WRITE STEP 5
01211	R9000.0	FUNOP0	FUNCTION OPERATION OUTPUT
01212	R9000.1	FUNOP1	FUNCTION OPERATION OUTPUT
01213	A0000.3	AL1040	NOT IN COOLANT AUTO MODE
01214	A0000.5	AL1060	A.T.L.M PRETECT
01215	A0001.2	AL1130	ATC ALARM FOR TOOL UNCLAMP
01216	A0001.4	AL1150	ATC ALARM FOR TOOL CLAMP
01217	A0001.5	AL1160	ATC ALARM FOR ARM -60
01218	A0001.6	AL1170	ATC ALARM FOR POT UP
01219	A0003.1	AL1320	MAG CTR NO. ERROR
01220	A0003.2	AL1330	MAG CTR SENSOR ERROR
01221	A0003.4	AL1350	JIG NOT CLAMPED
01222	A0003.5	AL1360	SPINDLE TOOL CLAMP ERROR
01223	A0004.0	AL1600	MOTOR OVERLOAD
01224	A0004.1	AL1630	ATC OIL LOW
01225	A0004.2	AL1640	MAG ALARM
01226	A0004.3	AL1610	SPINDLE OVERHEAT
01227	A0004.4	AL1620	SP OIL MIST ALARM
01228	A0005.0	AL1650	COOLANT LOW
01229	A0005.1	AL1660	CTS LEVEL ERROR
01230	A0005.2	AL1670	FILTER COVER OPEN
01231	A0005.3	AL1680	COOLANT TOO MUCH
01232	A0006.5	AL1005	1005 SPINDLE COOLER ALARM
01233	A0007.4	AL1013	1013 POT DOWN AL
01234	A0008.5	OP1021	MLK ALARM SET
01235	A0009.1	OP2001	2001 CHECK SP & CURRENT TOOL
01236	A0009.2	AIRAL	2002 LOW AIR PRESSURE (A9.2)
01237	A0009.4	OP2004	2004 DOOR OPEN
01238	A0009.6	OP2016	2016 PLS TOOL UNCLAMP
01239	A0009.7	OP2017	2017 PLS TOOL CLAMP
01240	A0010.0	AL1100	1100 ARM MAINTENANCE MODE
01241	A0010.1	OP2005	2005 LOW COOLANT LEVEL
01242	A0010.2	NOTLAL	T NO. NOT REGISTERED
01243	A0010.3	WINDALM	WINDING CHANGE ERROR ALARM
01244	A0010.4	CTSTAL	CTS TANK COOLANT LOW
01245	A0010.5	OP2080	2080 CTS FILTER ALARM
01246	A0010.6	OP2009	2009 MAG PIN IN
01247	A0010.7	OP2010	2010 PLS CLEAN CTS FILTER
01248	A0011.0	OP2015	2015 TELER.MN.NON OK
01249	A0011.1	OP2110	2110 N2 ALARM
01250	A0011.2	OP1031	OP1031 LUBE BROKEN ALARM
01251	A0011.3	OP2112	OP 2112 K8.0 IGNORE
01252	A0011.4	OP2113	OP 2113 MACHINE MAY DAMAGED
01253	A0011.5	OP2111	OP2111 LUBE BRK AL
01254	A0011.6	LBSWFI	OP2018 LU SW FAIL
01255	A0011.7	OP1025	MLK HOME ALRM
01256	K0001.0	32TOOL	
01257	K0001.3	PRMRST	
01258	K0001.4	LUALEN	
01259	K0001.5	N2ALEN	
01260	K0001.6	ARALDI	
01261	K0002.0	K2.0	
01262	K0002.1	K2.1	
01263	K0002.2	K2.2	
01264	K0003.0	K3.0	
01265	K0003.4	K3.4	
01266	K0003.5	K3.5	
01267	K0003.6	K3.6	
01268	K0003.7	K3.7	
01269	K0004.0	K4.0	
01270	K0004.5	K4.5	4TH AXIS ENABLE
01271	K0007.0	ARM-JOG	ARM JOG MAINTENANCE
01272	K0007.1	ARM-J2	ARM JOG MAINTENANCE ONE CYCLE
01273	K0007.4	CTSTON	CTS TANK PUMP ON
01274	K0008.0	LUBRLA	LUBE BROKEN LATCH
01275	K0008.1	8.0IGN	
01276	K0009.0	X7.0ON	
01277	K0009.1	X7.1ON	
01278	K0009.2	X7.2ON	

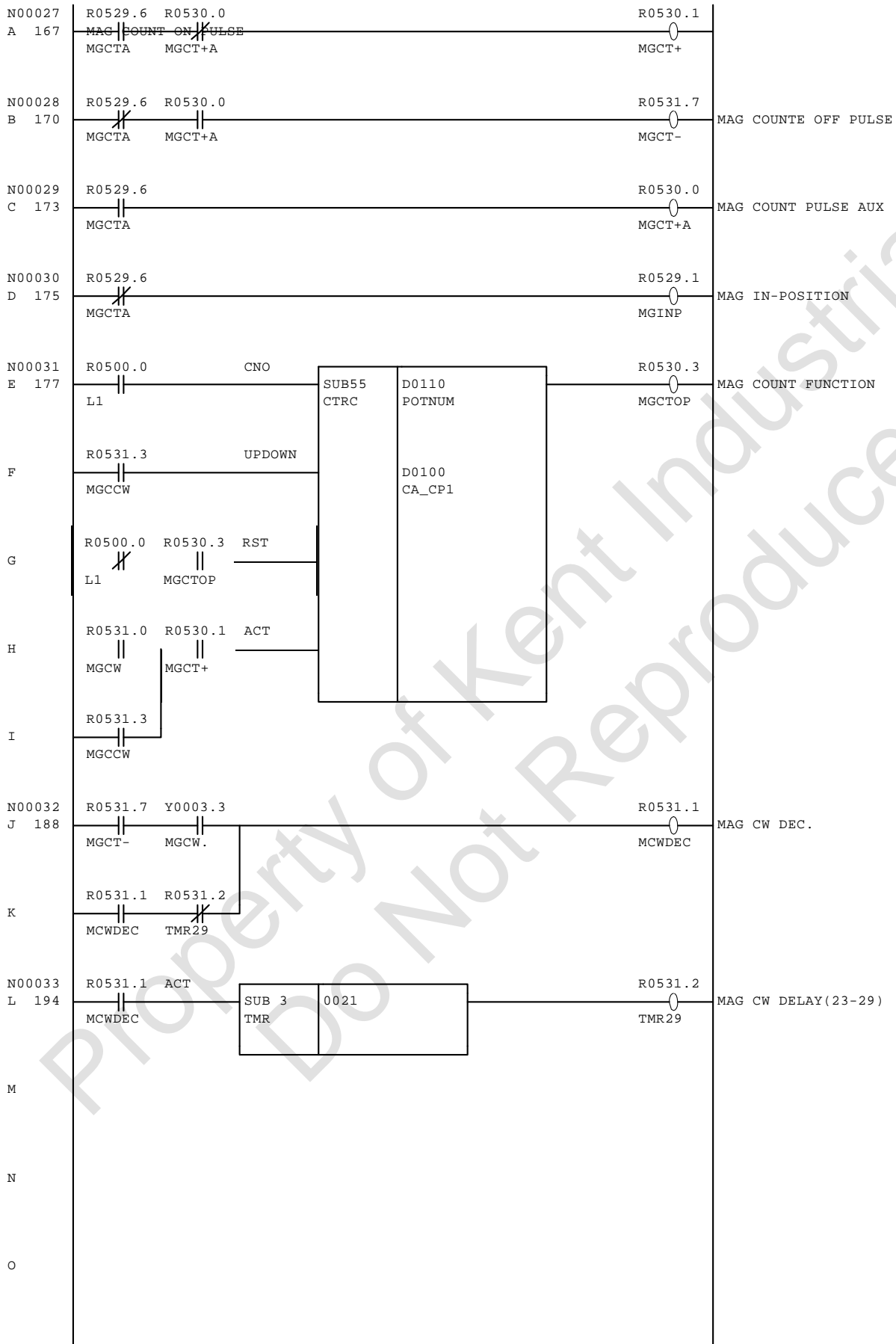
NO.	ADDRESS	SYMBOL	FIRST COMMENT
01279	K0009.3	X7.3ON	
01280	K0009.4	X7.4ON	
01281	K0009.5	X7.5ON	
01282	K0009.6	X7.6ON	
01283	K0009.7	X7.7ON	
01284	K0011.0	0-60	0->60
01285	K0011.1	60	60
01286	K0011.2	60-180	60->180
01287	K0011.3	180	180
01288	K0011.4	180-0	180->0
01289	K0011.5	JGCLL	JIG CLAMP LATCH
01290	K0011.6	AP,MOV	APC ARM MOVING
01291	K0011.7	JGBCLL	JIG B CLAMP LATCH
01292	F0010	M_CODE	M CODE(BIN)
01293	F0022	S_CODE	S CODE
01294	F0026	T_CODE	T CODE
01295	G0032		SP MOTOR SPEED COMMAND
01296	G0033		SP MOTOR SPEED COMMAND
01297	R0570		FOR MEMBRANE PANEL
01298	R0579		FOR MEMBRANE PANEL
01299	R0587	CUTBIN	CURRENT TOOL NO.(BIN)
01300	R0588	SPDS	SPINDLE TOOL NO. DISPLAY
01301	R0589		FOR MEMBRANE PANEL
01302	R0666		JOG FEEDRATE AUX
01303	R0667		JOG FEEDRATE AUX
01304	R0670		FOR MEMBRANE PANEL
01305	R0671		FOR MEMBRANE PANEL
01306	R0672		FOR MEMBRANE PANEL
01307	R0673		FOR MEMBRANE PANEL
01308	R0675		FOR MEMBRANE PANEL
01309	R0678		FOR MEMBRANE PANEL
01310	R0679		FOR MEMBRANE PANEL
01311	R0684	CUTBCD	CURRENT TOOL NO.(BCD)
01312	R0685	MCODE1	M CODE(BCD)
01313	R0686	TCODE1	T CODE(BCD)
01314	R0687	SPTBCD	SPINDLE TOOL NO.(BCD)
01315	R0689	ROSTBI	STEPS OF ROT(BIN)
01316	R0690	TPBIN	POT NO. OF T CODE(BIN)
01317	R0691	TPBCD	POT NO. OF T CODE(BCD)
01318	R0692	ROTSBC	STEPS OF ROT(BCD)
01319	R0693	TCTMP	TEMP FOR TOOL CHANGE
01320	R0800	SPDSBI	
01321	R0801	PRDSBI	
01322	R1000	SPTBIN	SPINDLE NO IN BIN
01323	R1150	FNCFD	
01324	R1154	DLFWD	
01325	D0000	SP.NO	SPINDLE TOOL NO.
01326	D0100	CA_CP1	CURRENT POT NO. FOR CTRA(BIN)
01327	D0104	CB_CP1	CURRENT POT NO. FOR CTRB(BIN)
01328	D0110	POTNUM	TOTAL POTS
01329	D0112	PTNUM1	TOTAL POT+1(BIN)
01330	D0114	CUPLAT	CURRENT POT NO. LATCH
01331	D0120	CA_CP2	CURRENT POT NO. FOR CTRA(BCD)
01332	D0122	CB_CP2	CURRENT POT NO. FOR CTRB(BCD)
01333	D0124	BGTNUM	NUMBERS OF BIG TOOL
01334	D0125	PTNUM2	TOTAL POT+1(BCD)
01335	D0126	GCHCHK	GEAR SHIFT CHECK
01336	D0160	CELIM1	CE MANUAL SPEED LIMIT 1
01337	D0161	CELIM2	CE MANUAL SPEED LIMIT 2
01338	D0162	SPLIM1	SP MANUAL SPEED LIMIT 1
01339	D0163	SPLIM2	SP MANUAL SPEED LIMIT 2
01340	D0164	SP%	SPINDLE INC/DEC %
01341	D0170	WINF28	READING MACHINE COORDINATE
01342	D0178	ALLPOS	READING ALL AXES COORDINATE
01343	D0180	X-MPOS	X AXIS MACHINE COORDINATE
01344	D0184	Y-MPOS	Y AXIS MACHINE COORDINATE
01345	D0188	Z-MPOS	Z AXIS MACHINE COORDINATE

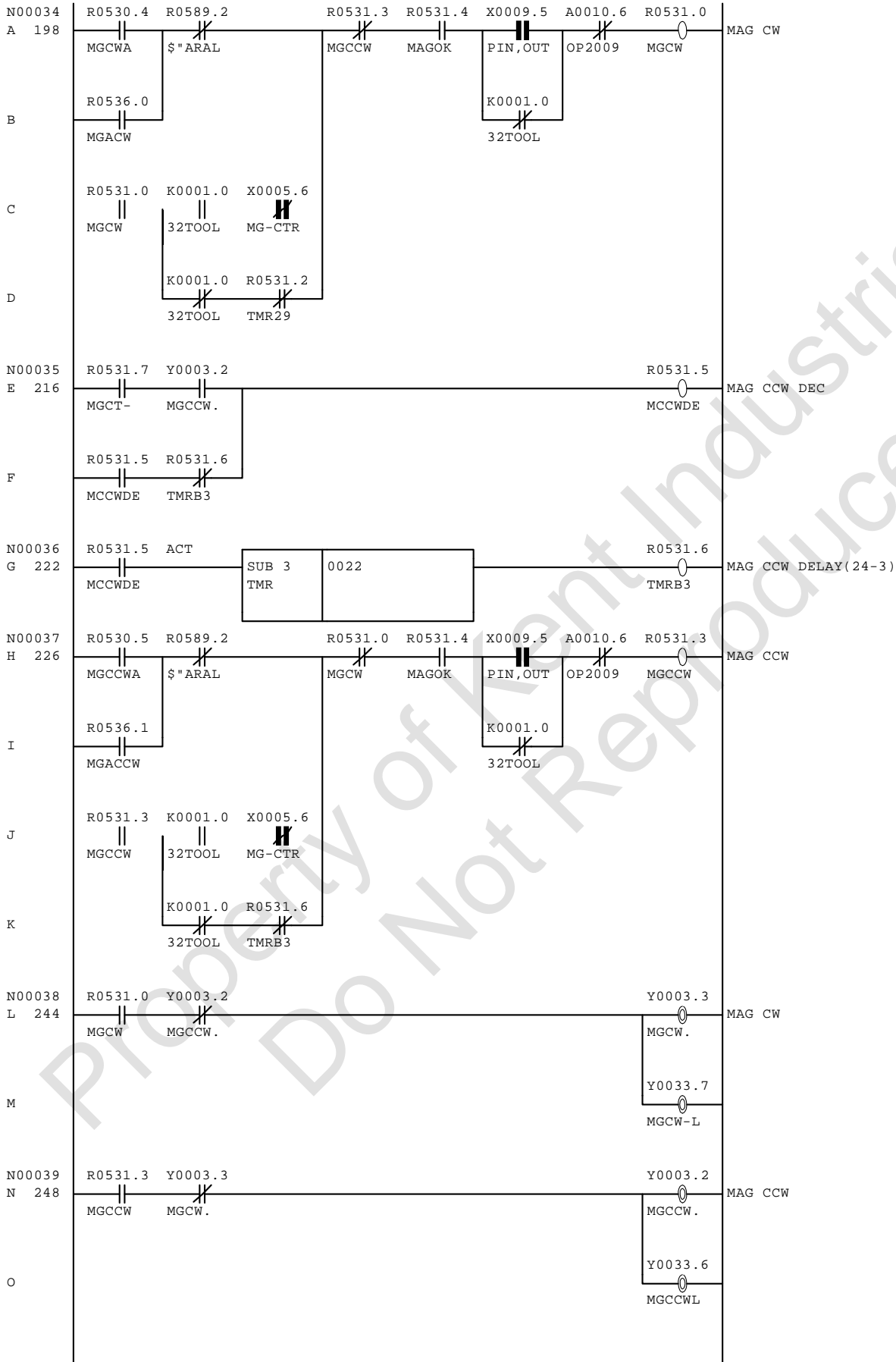


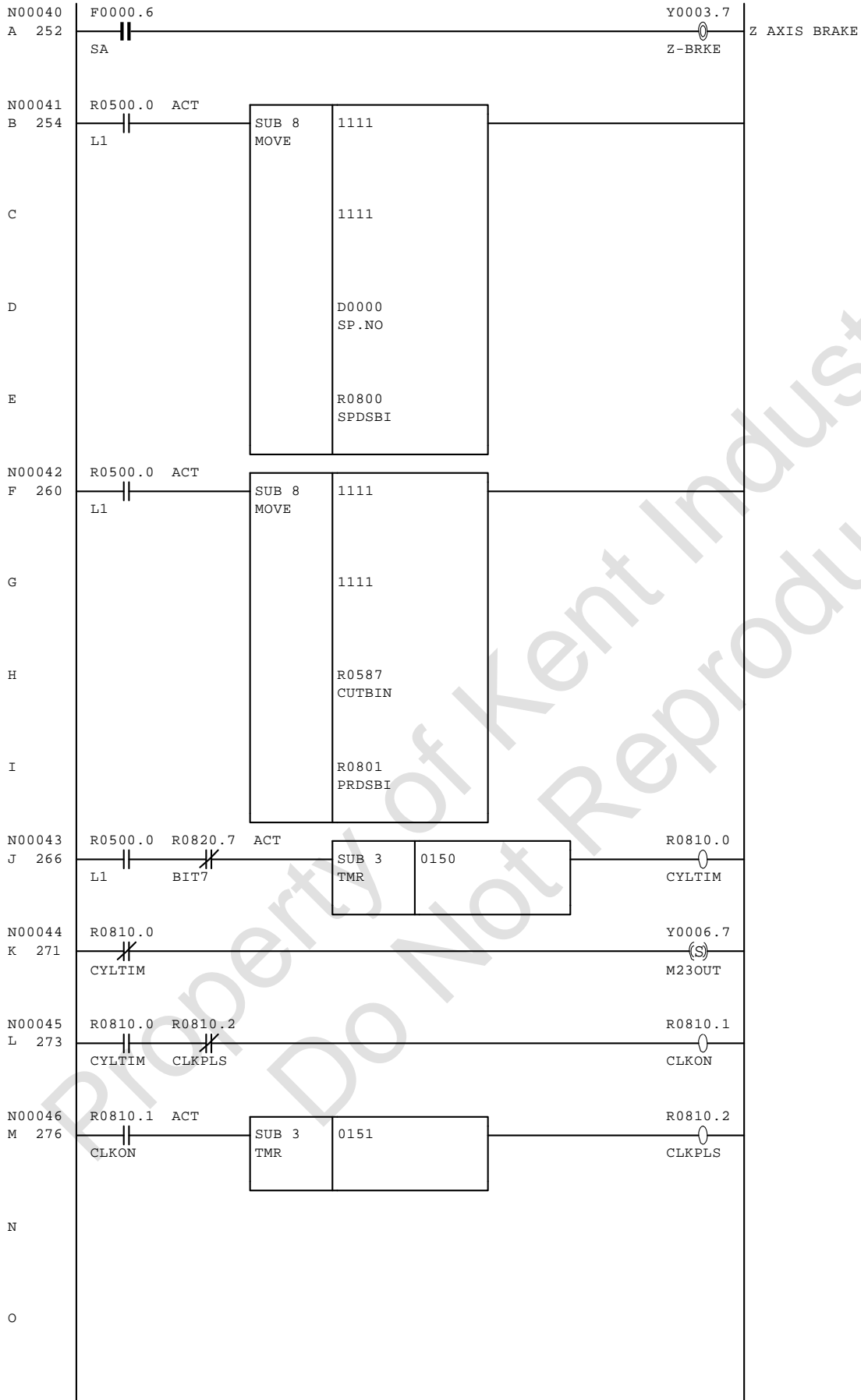


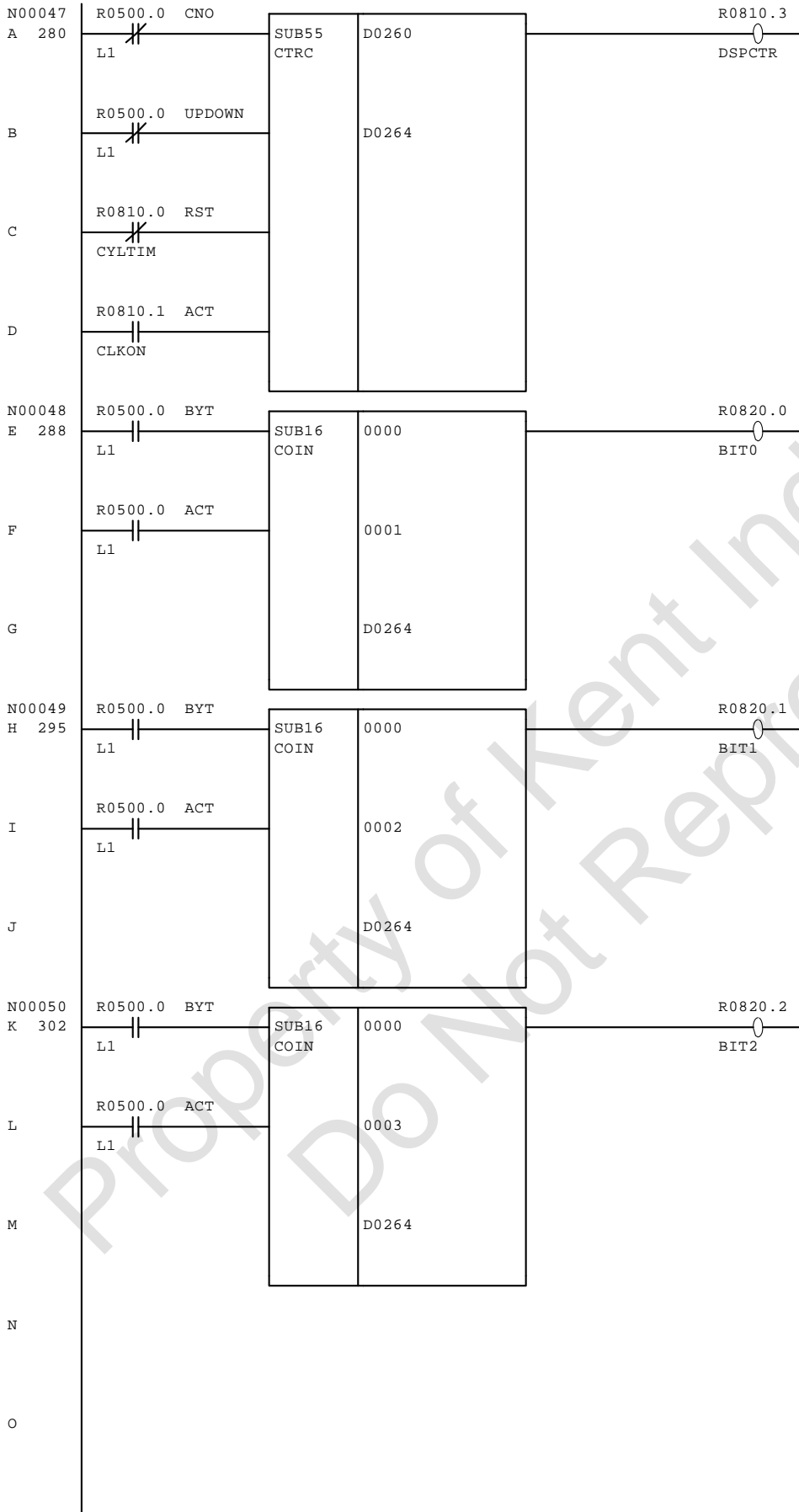


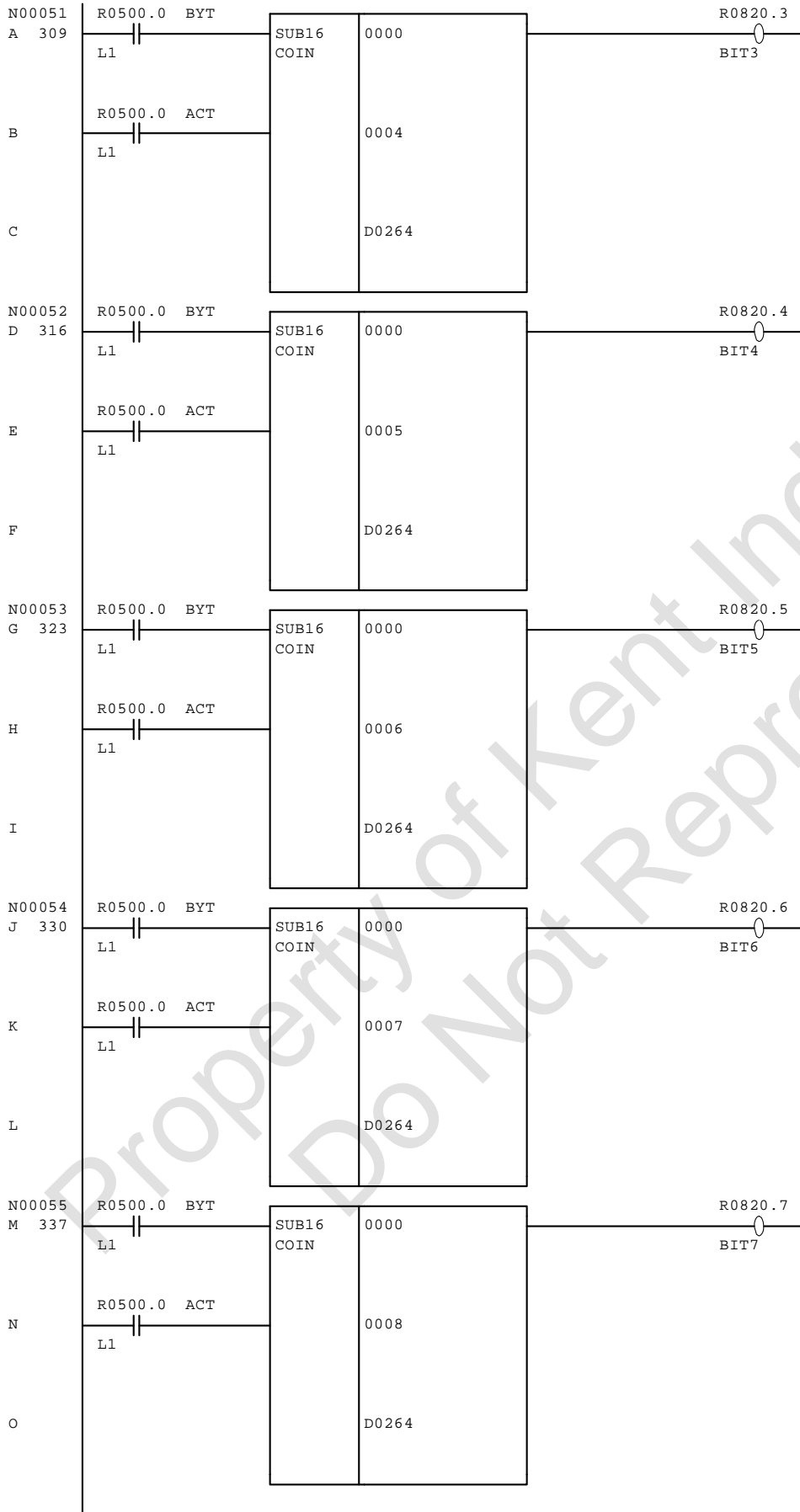


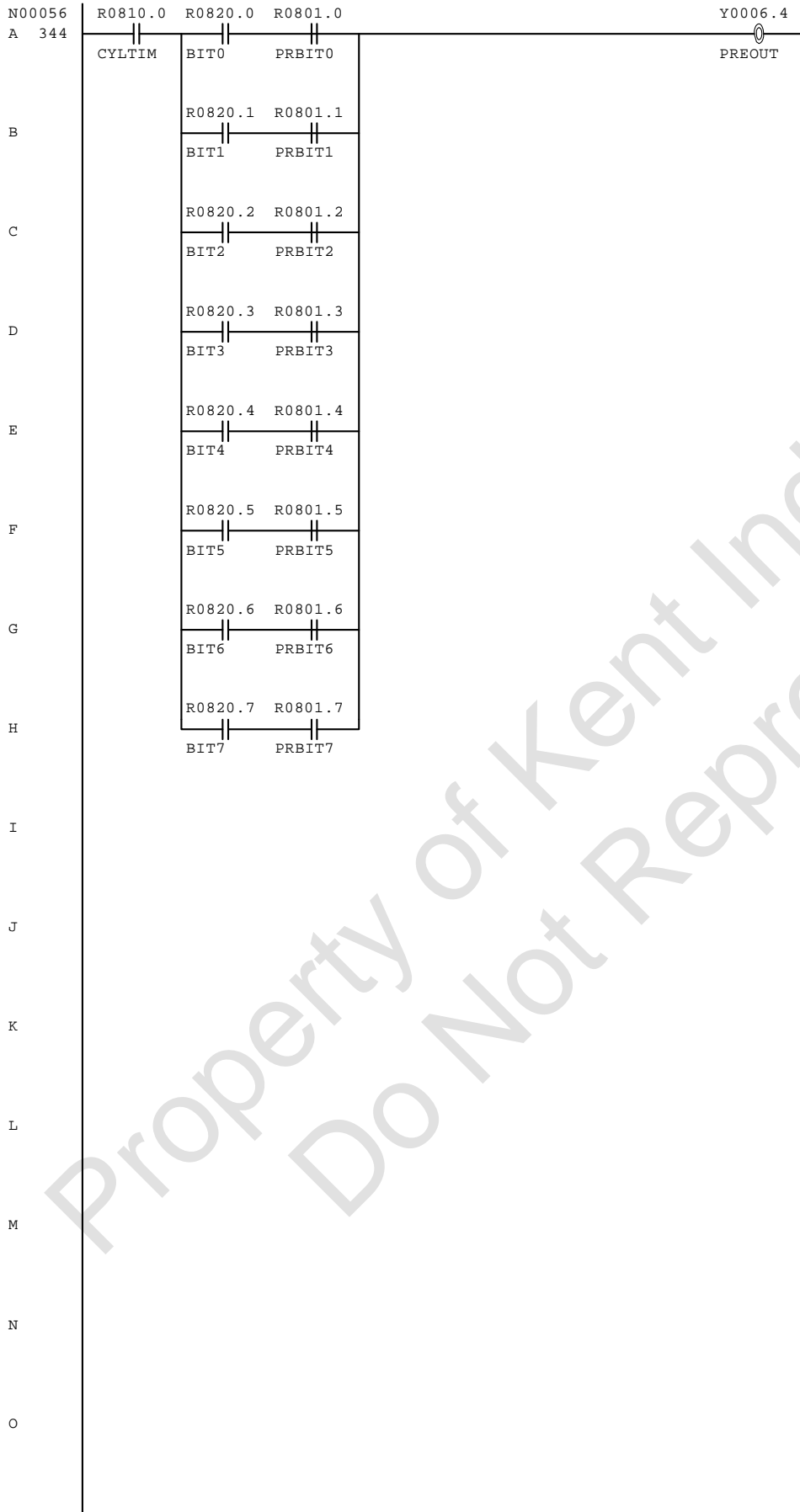


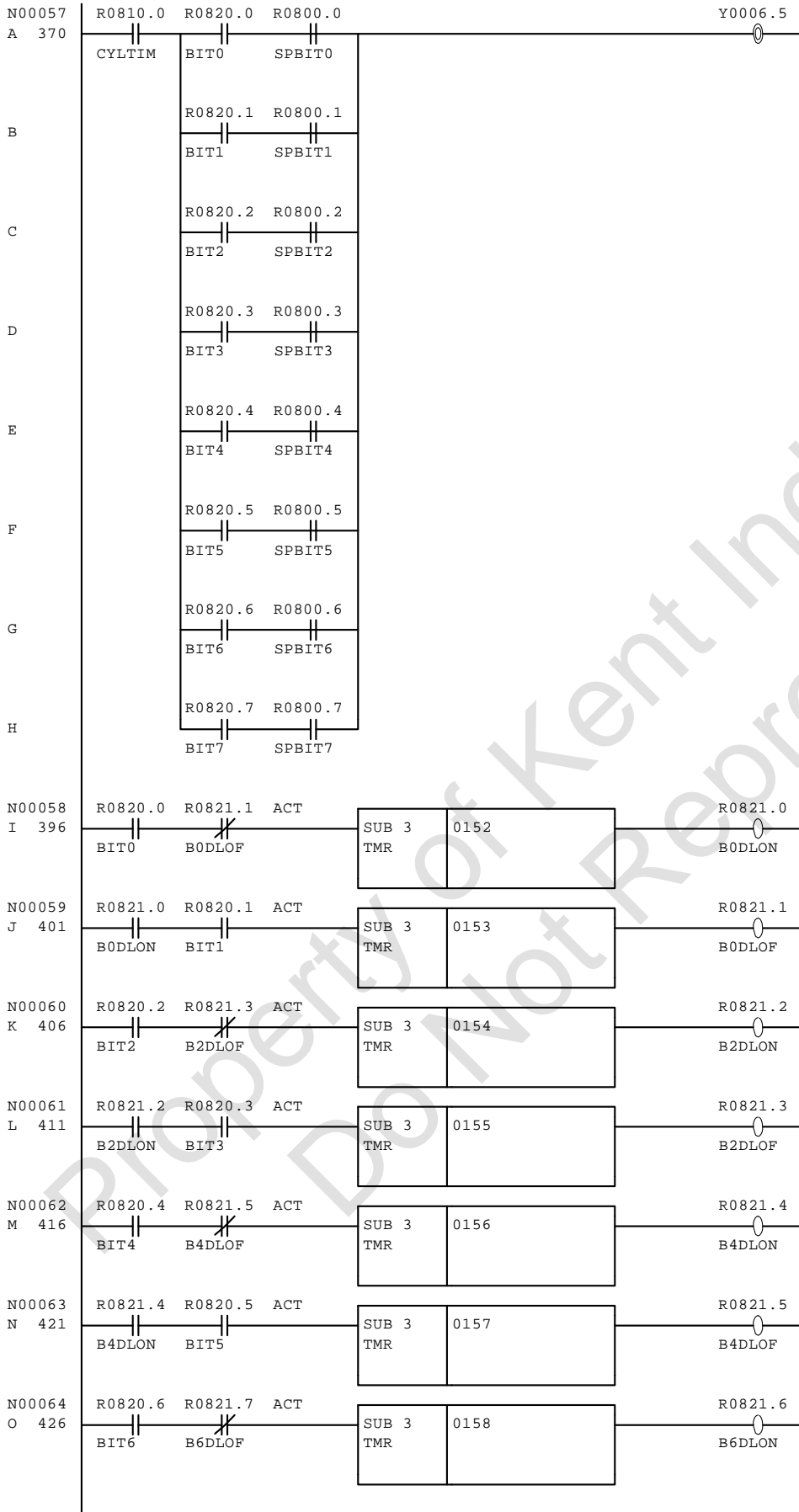


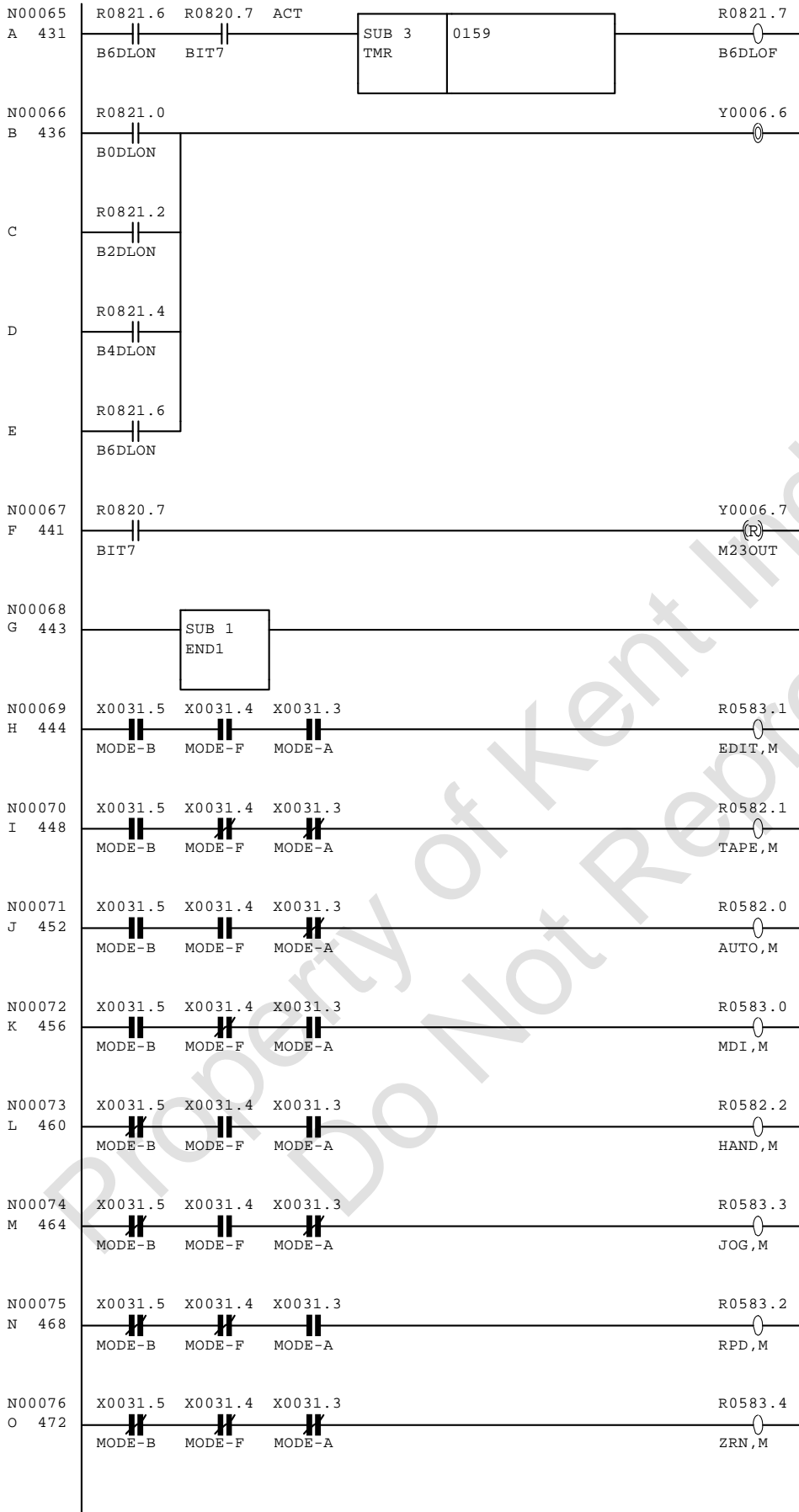


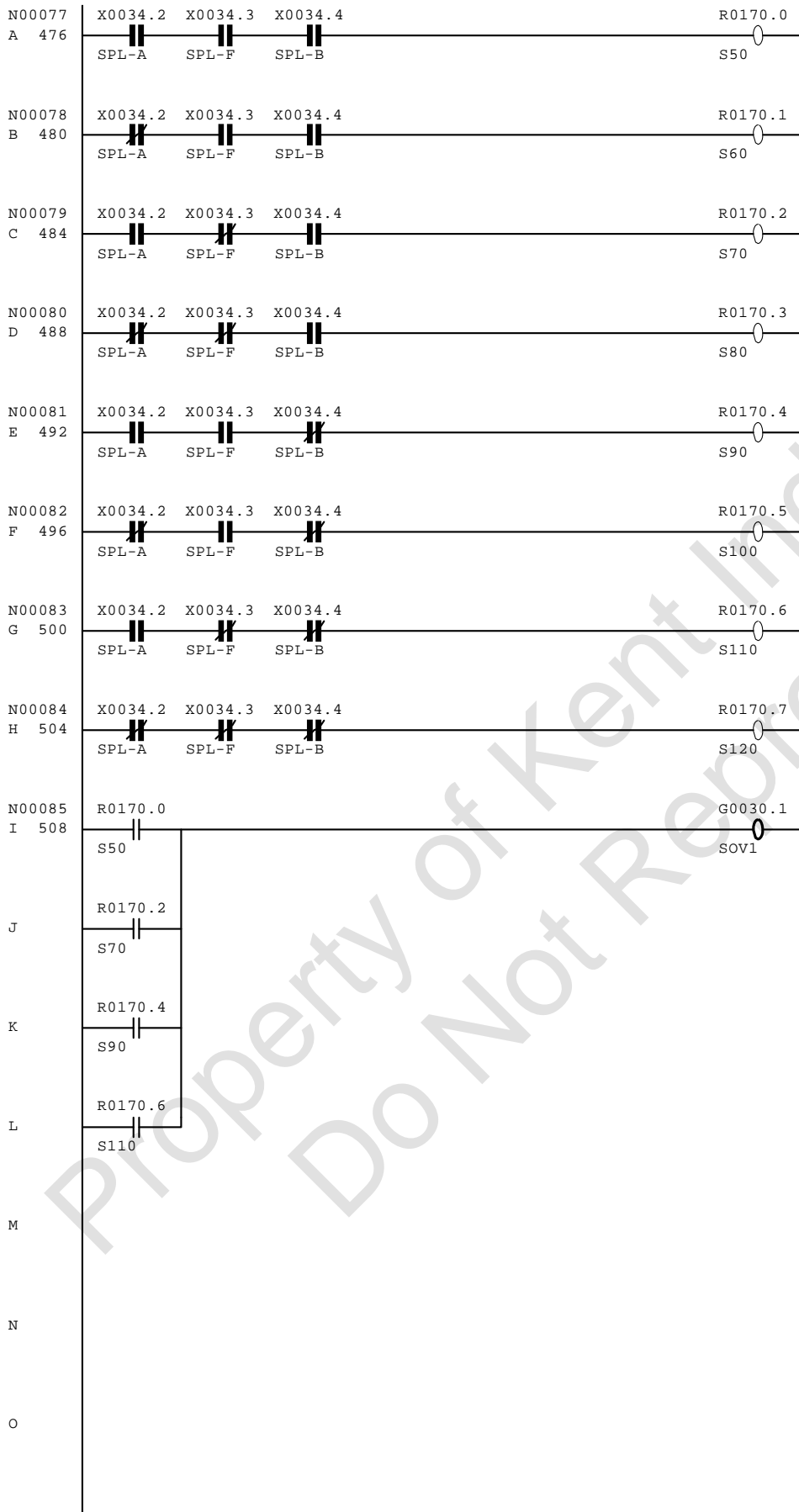


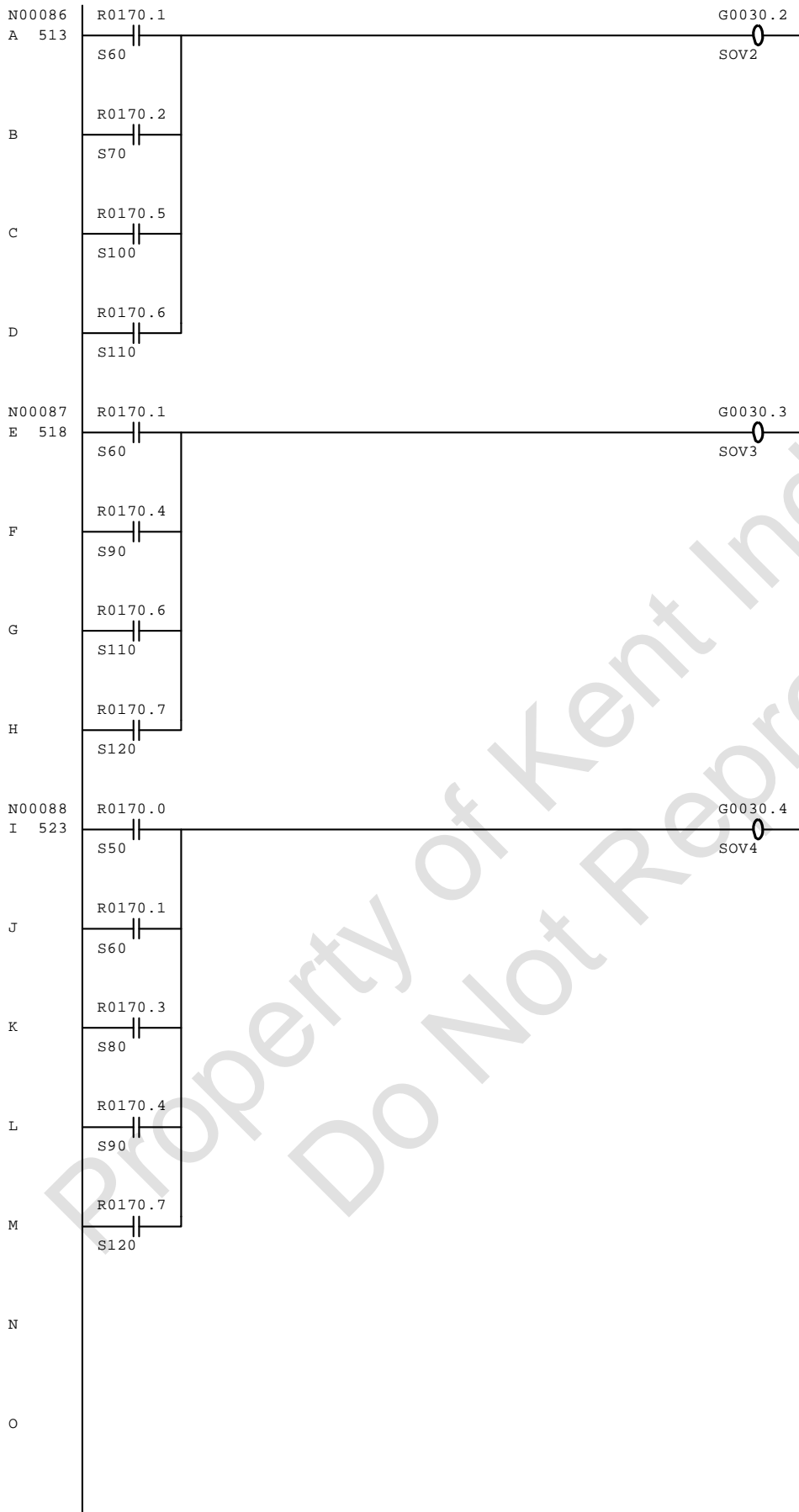


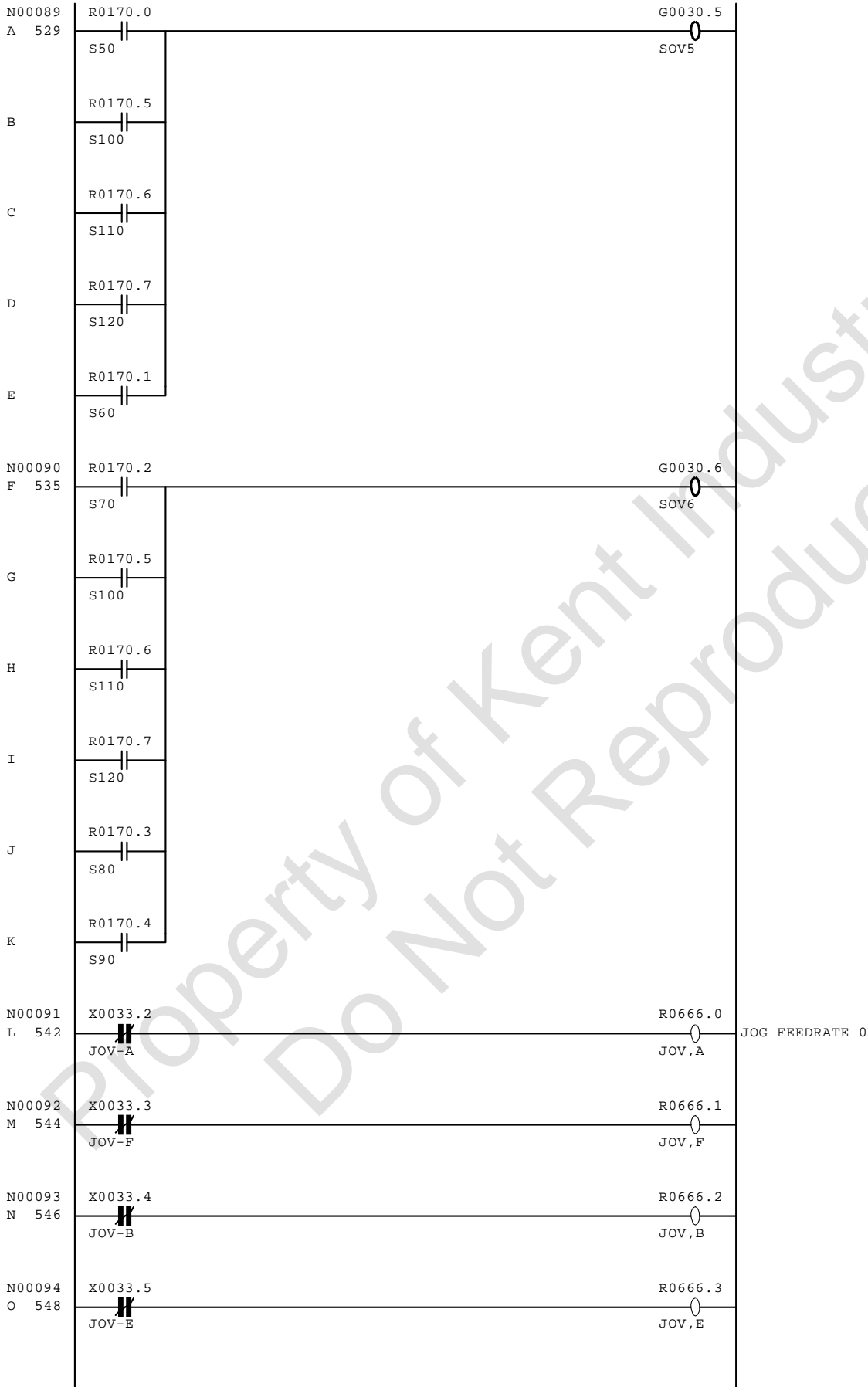


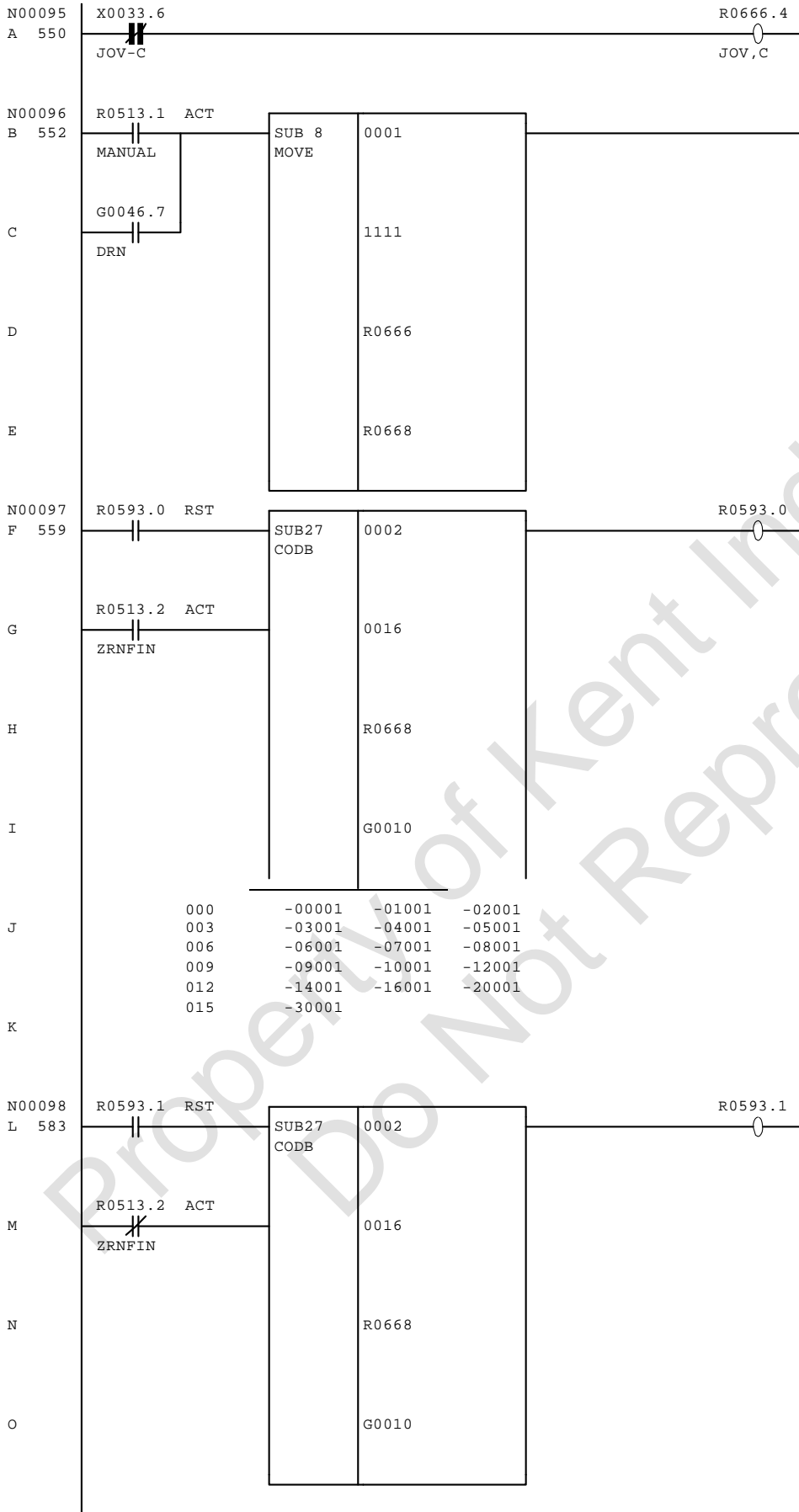


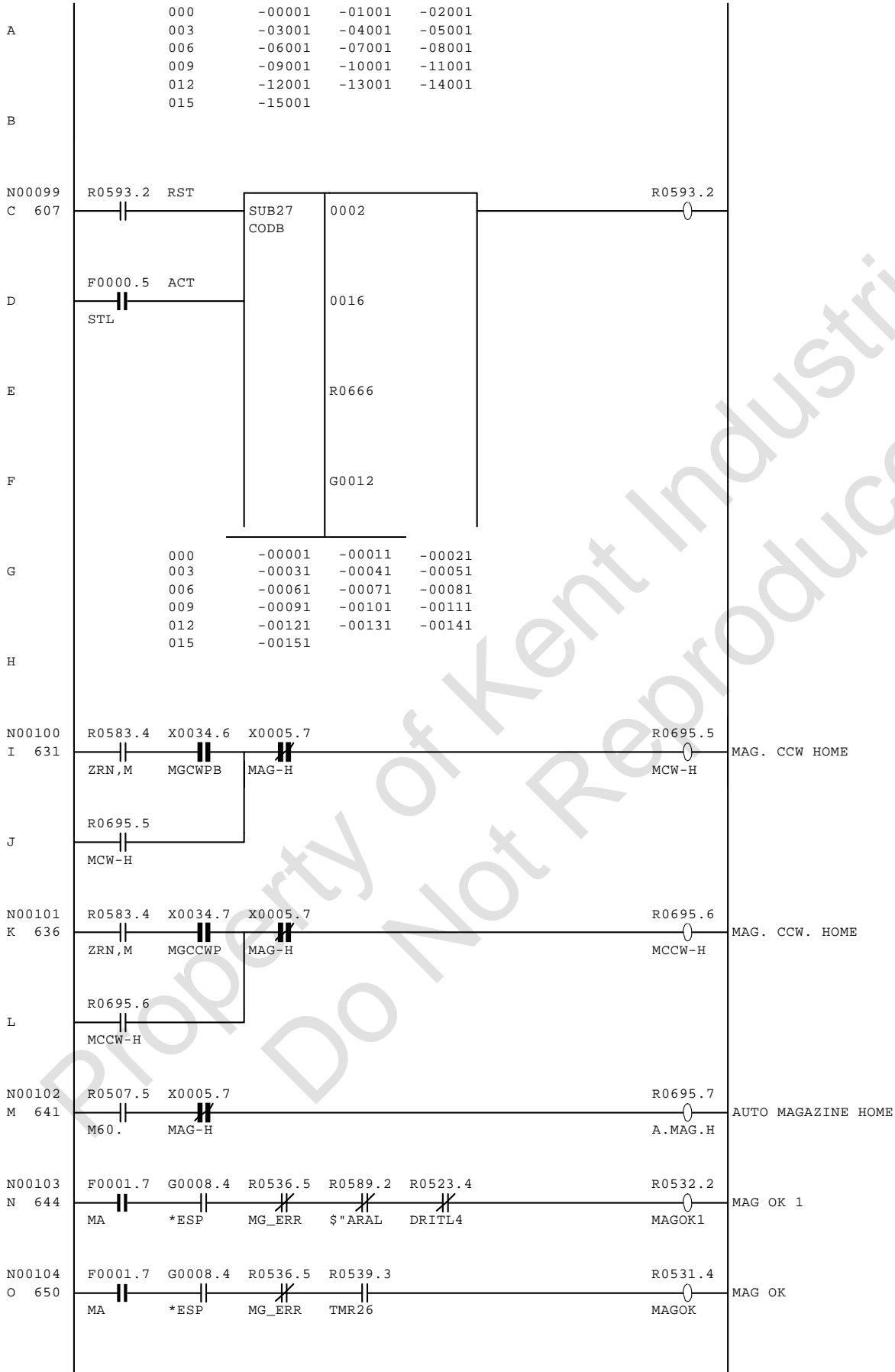


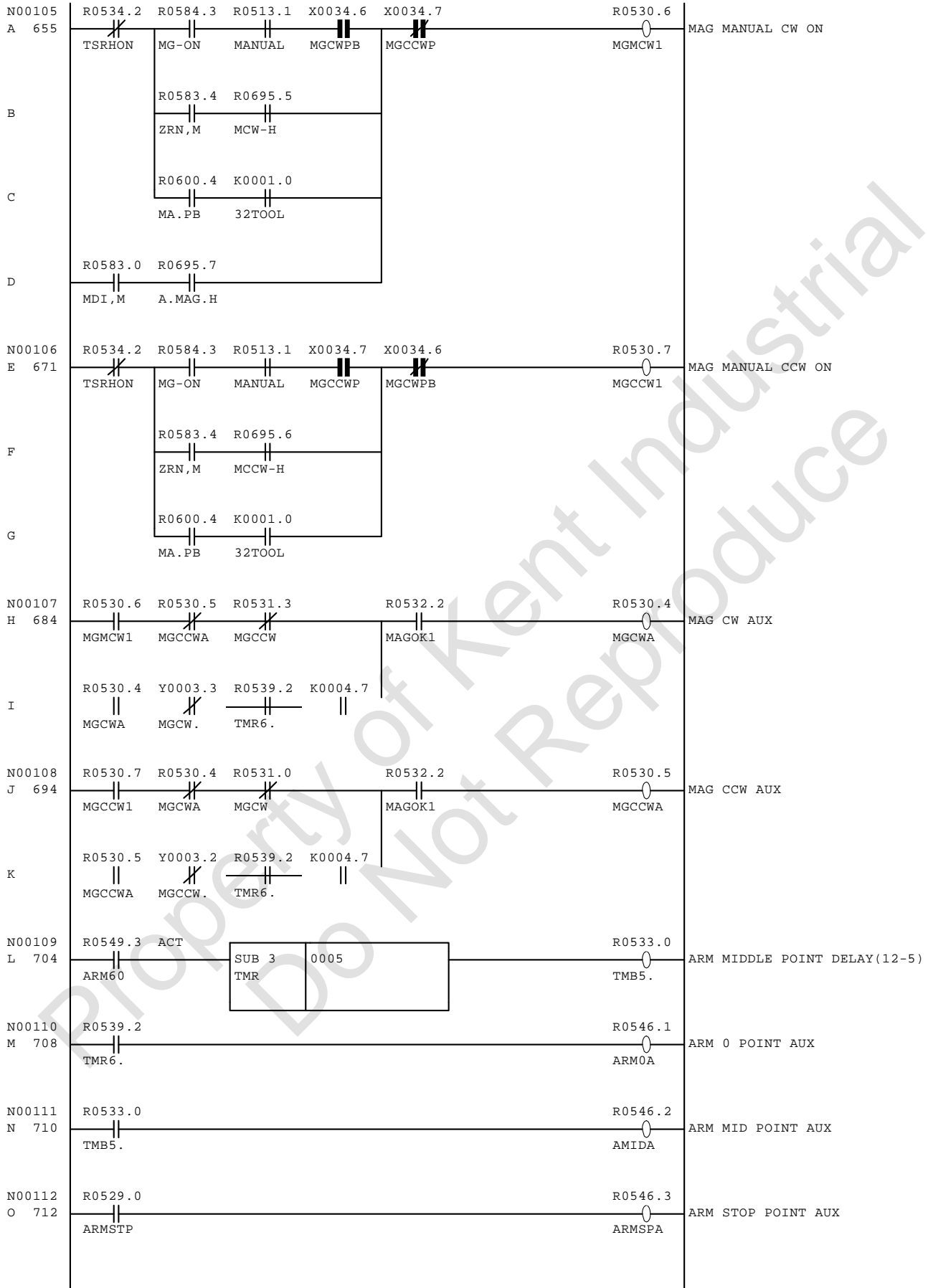


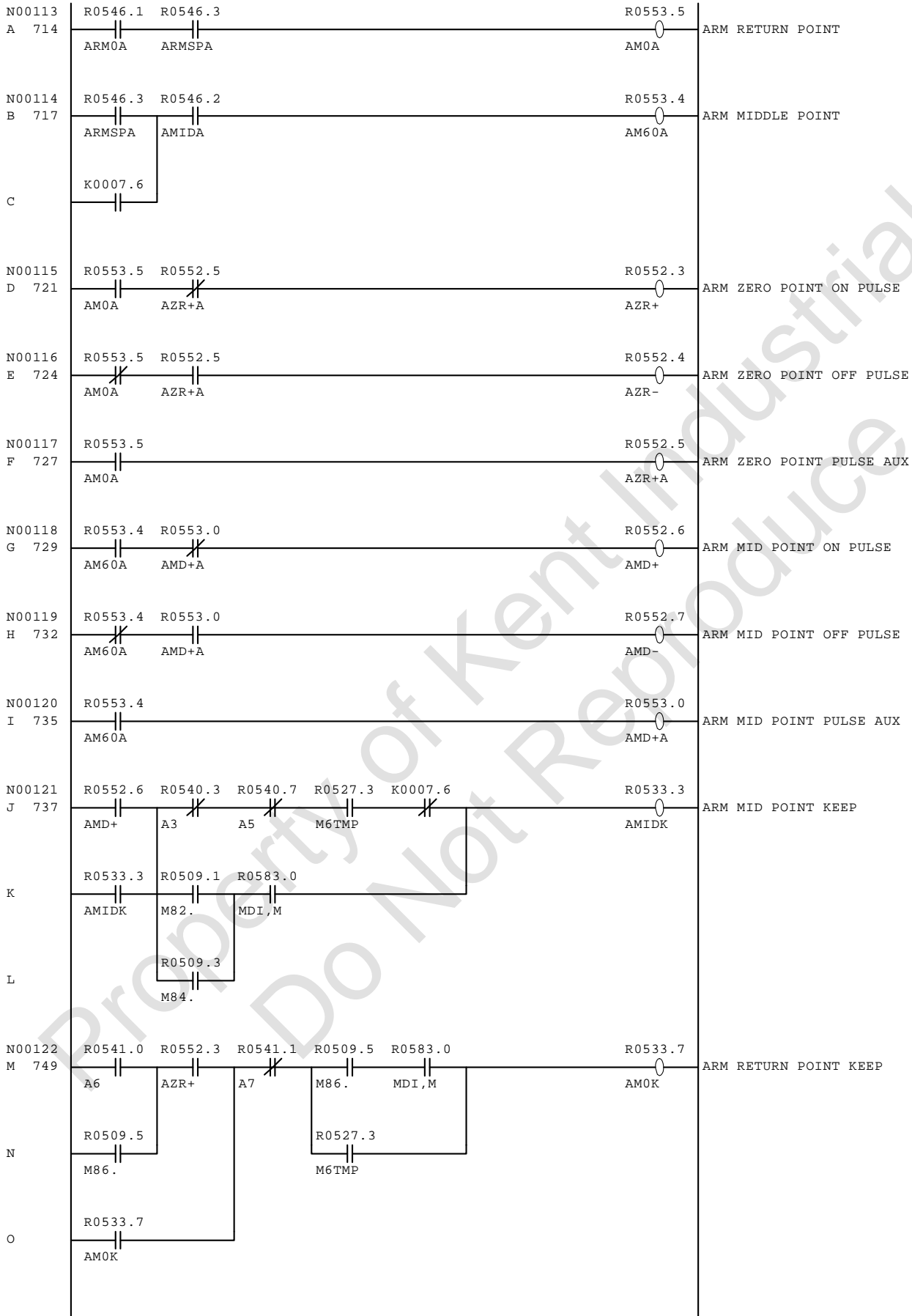


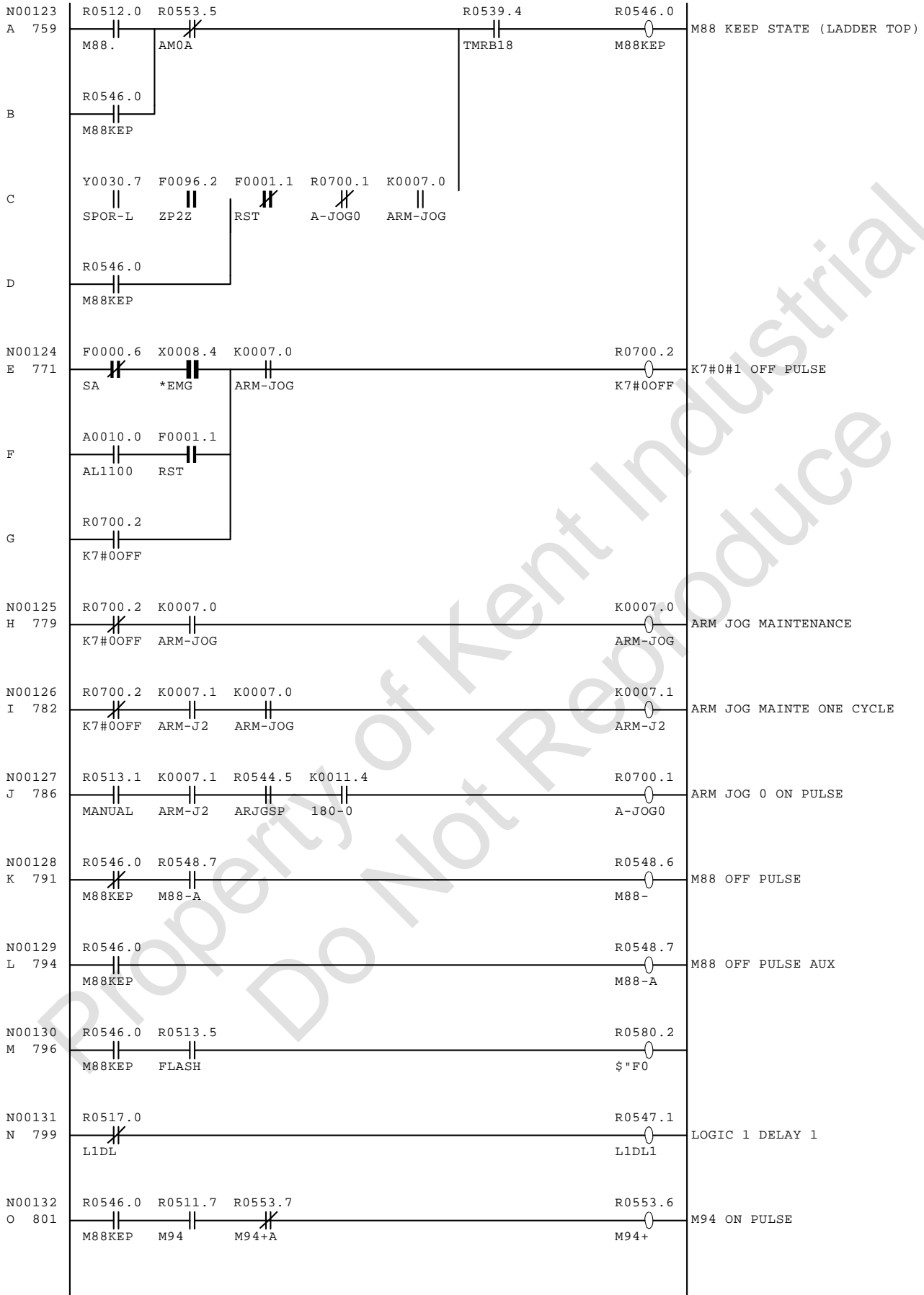


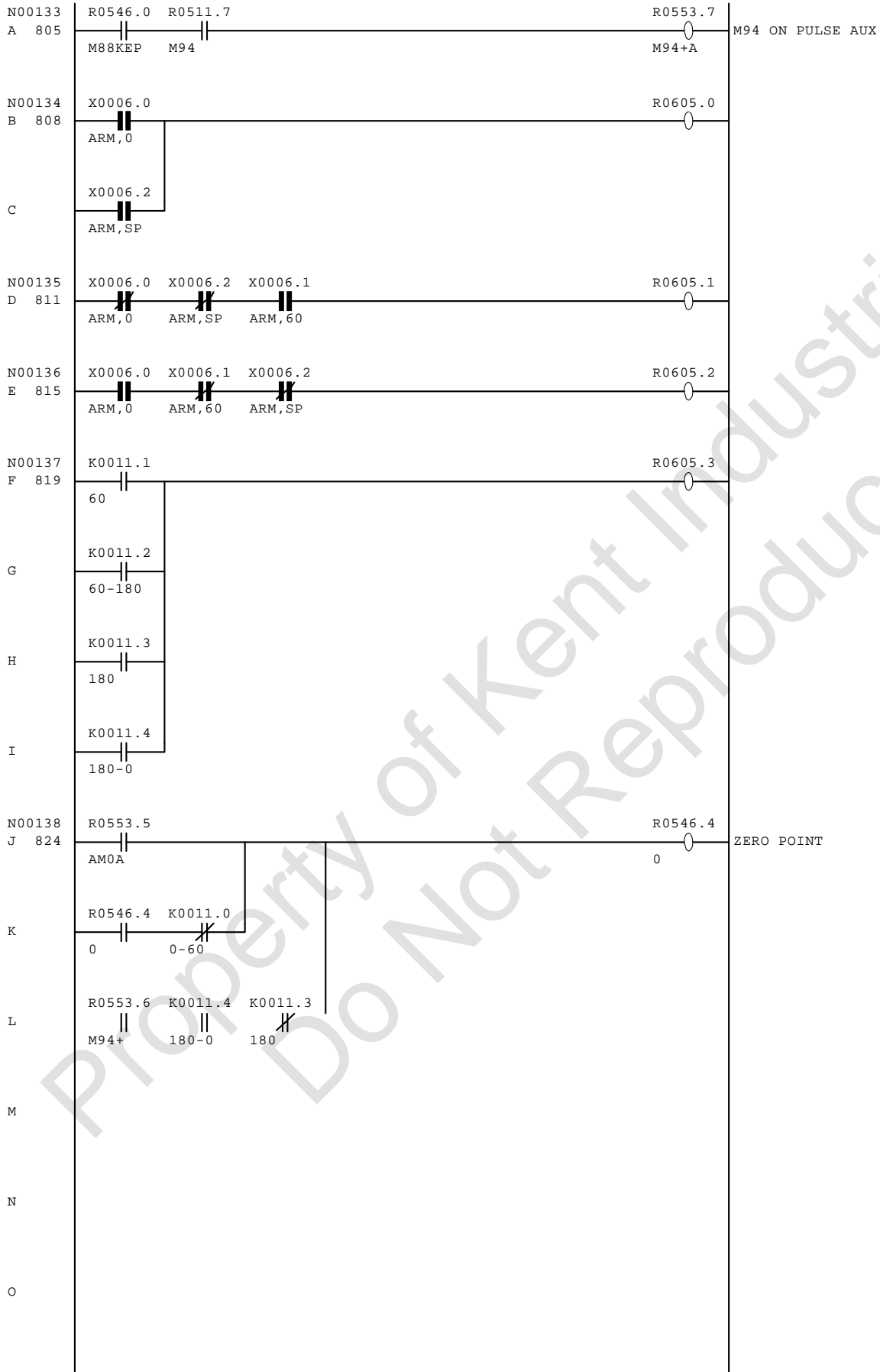


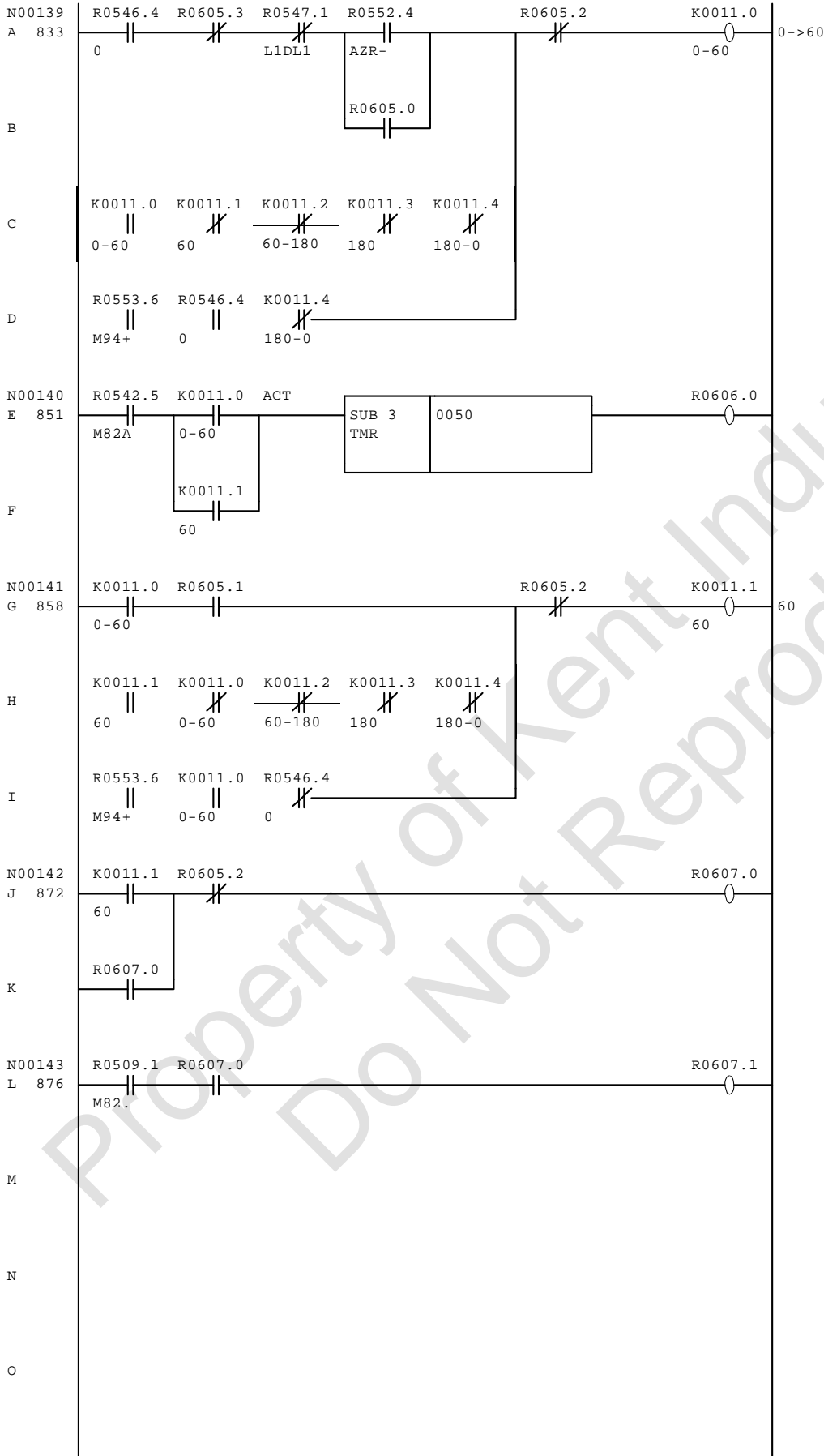


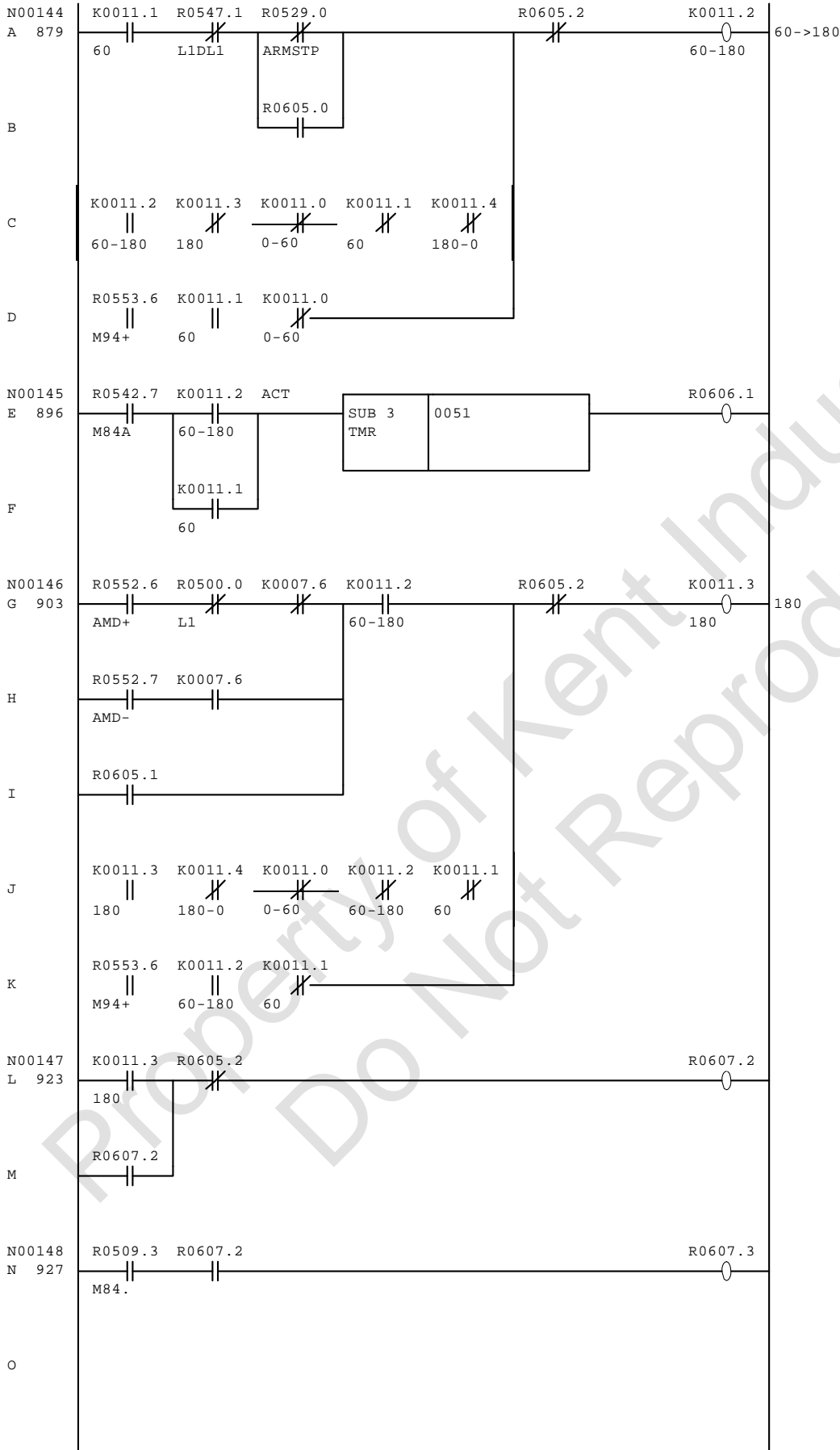


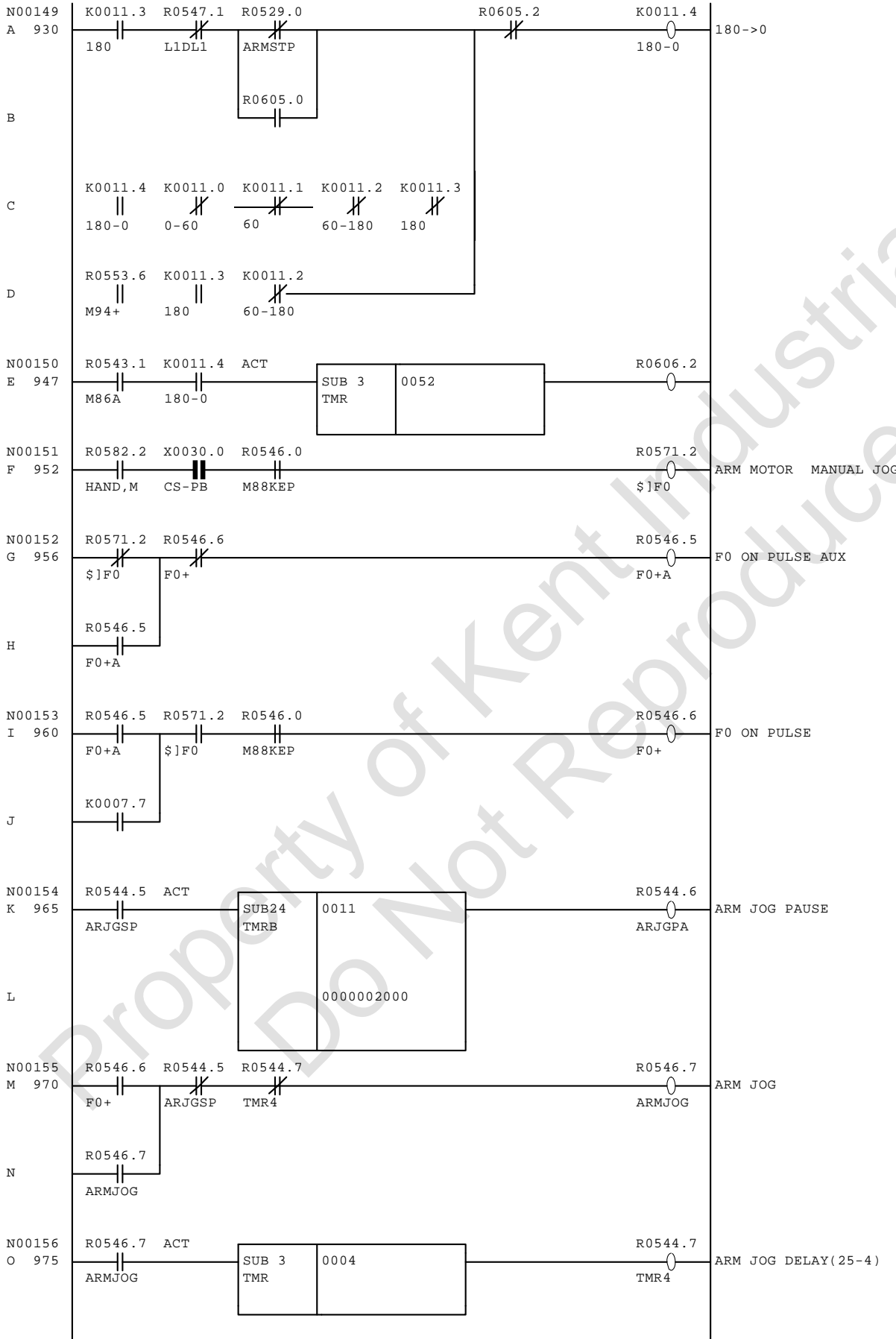


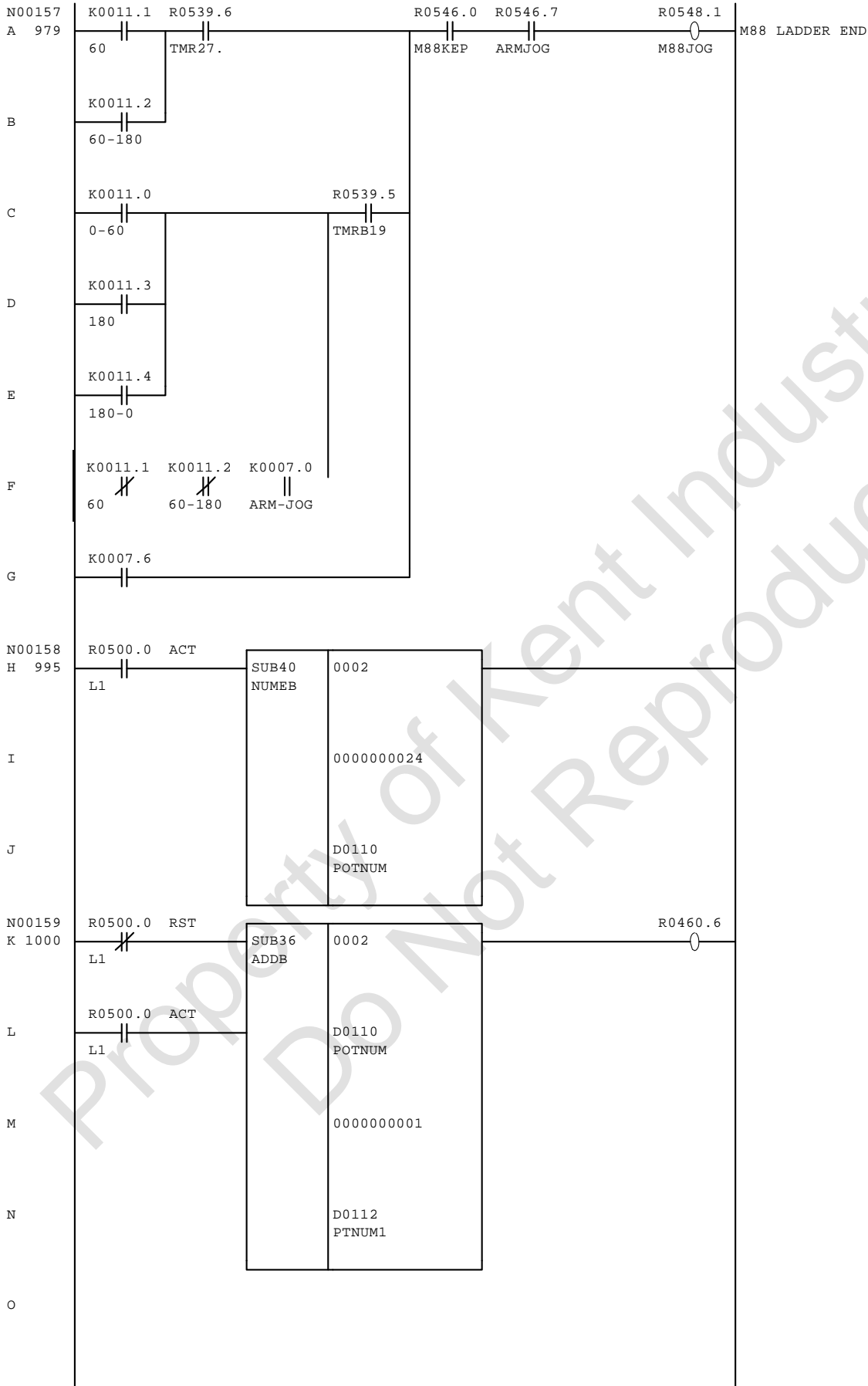


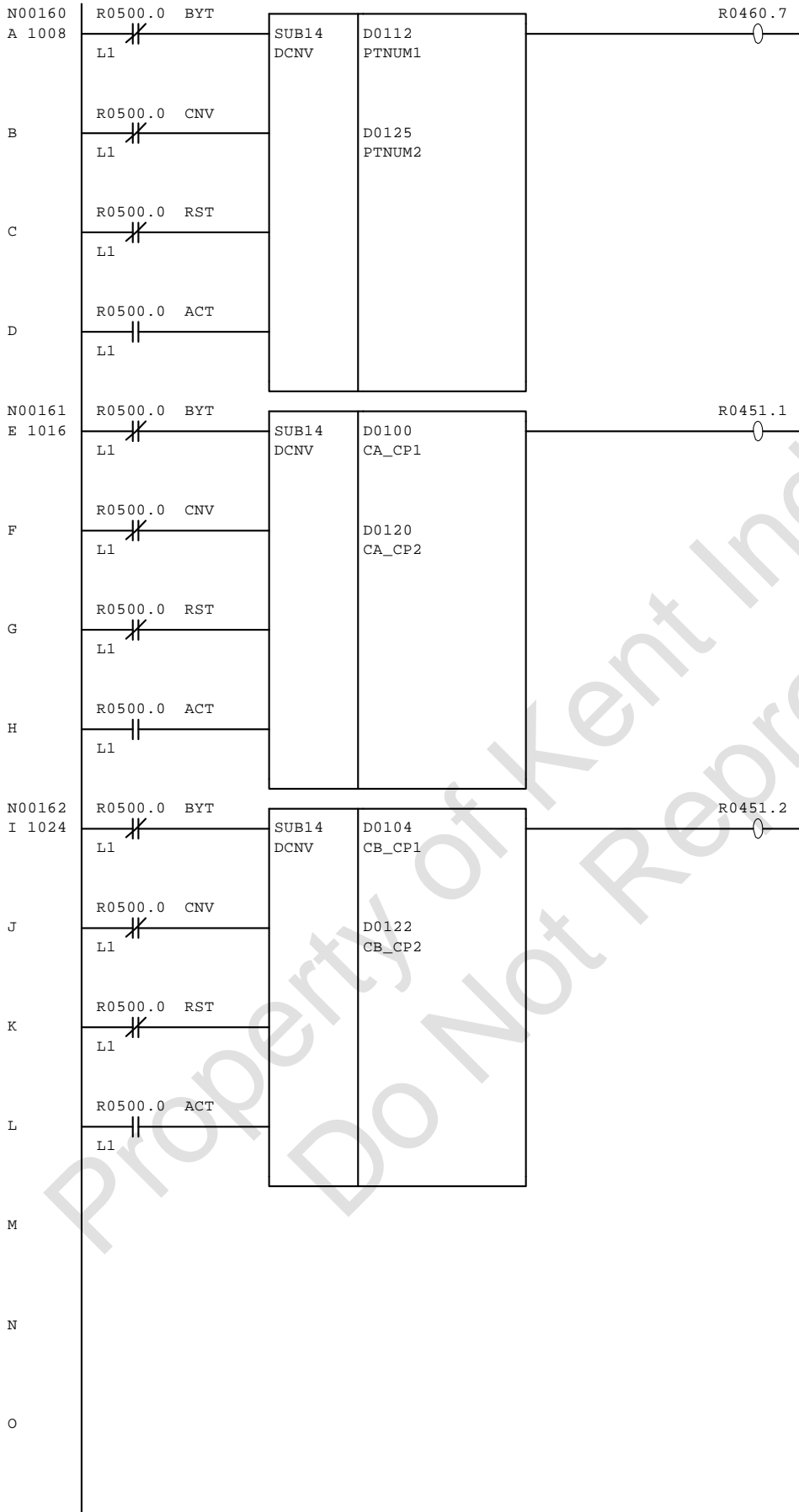


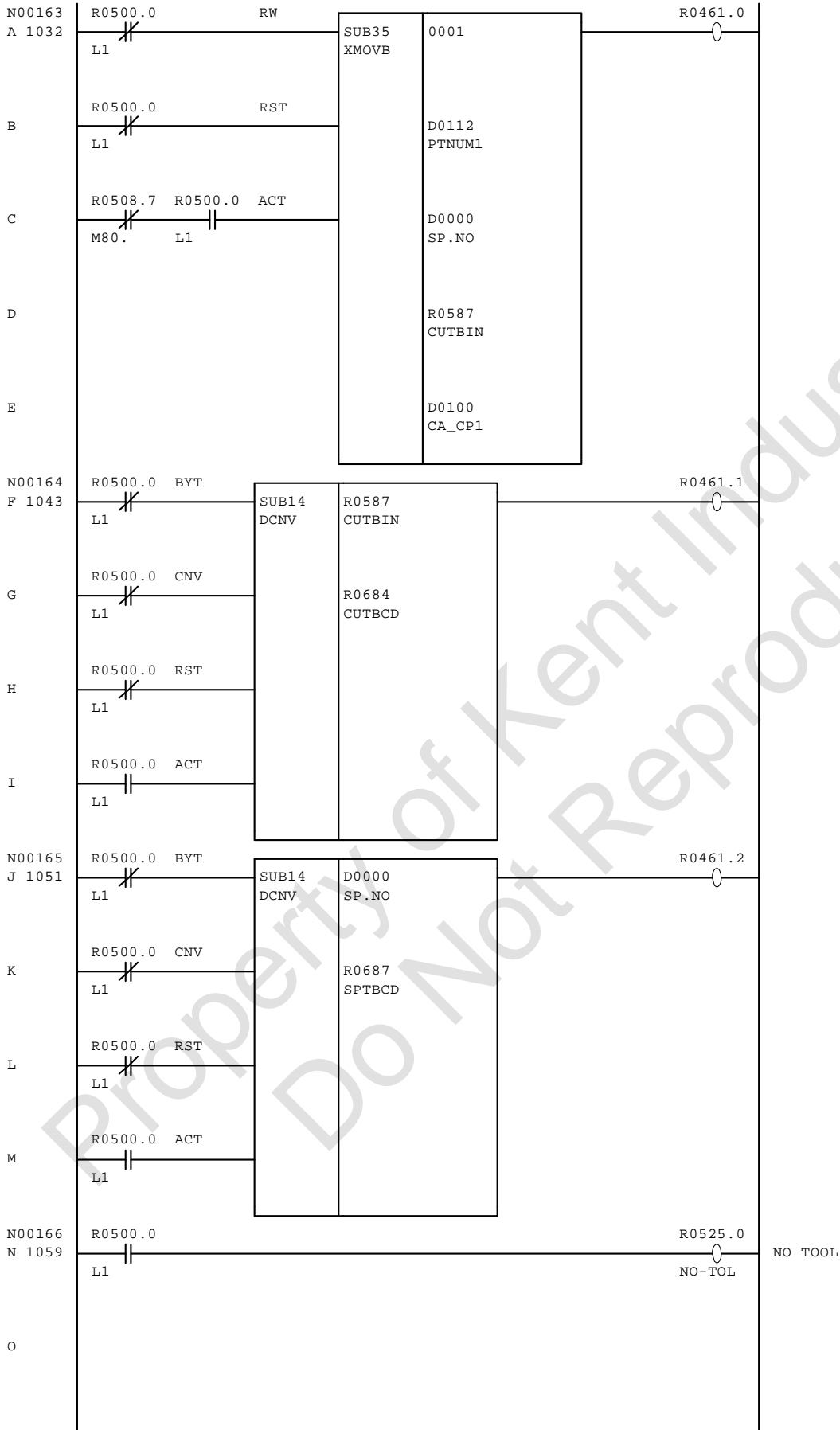


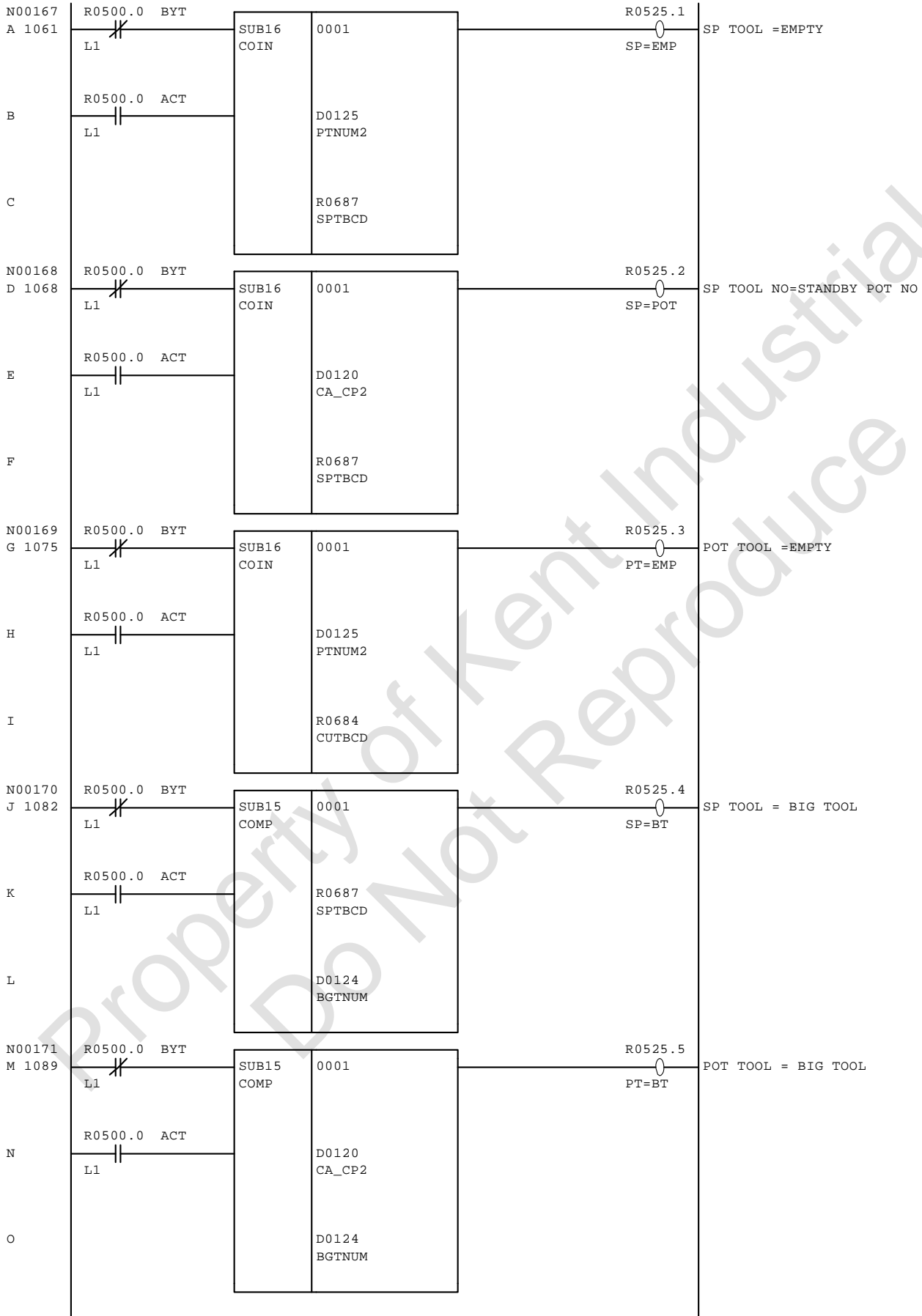


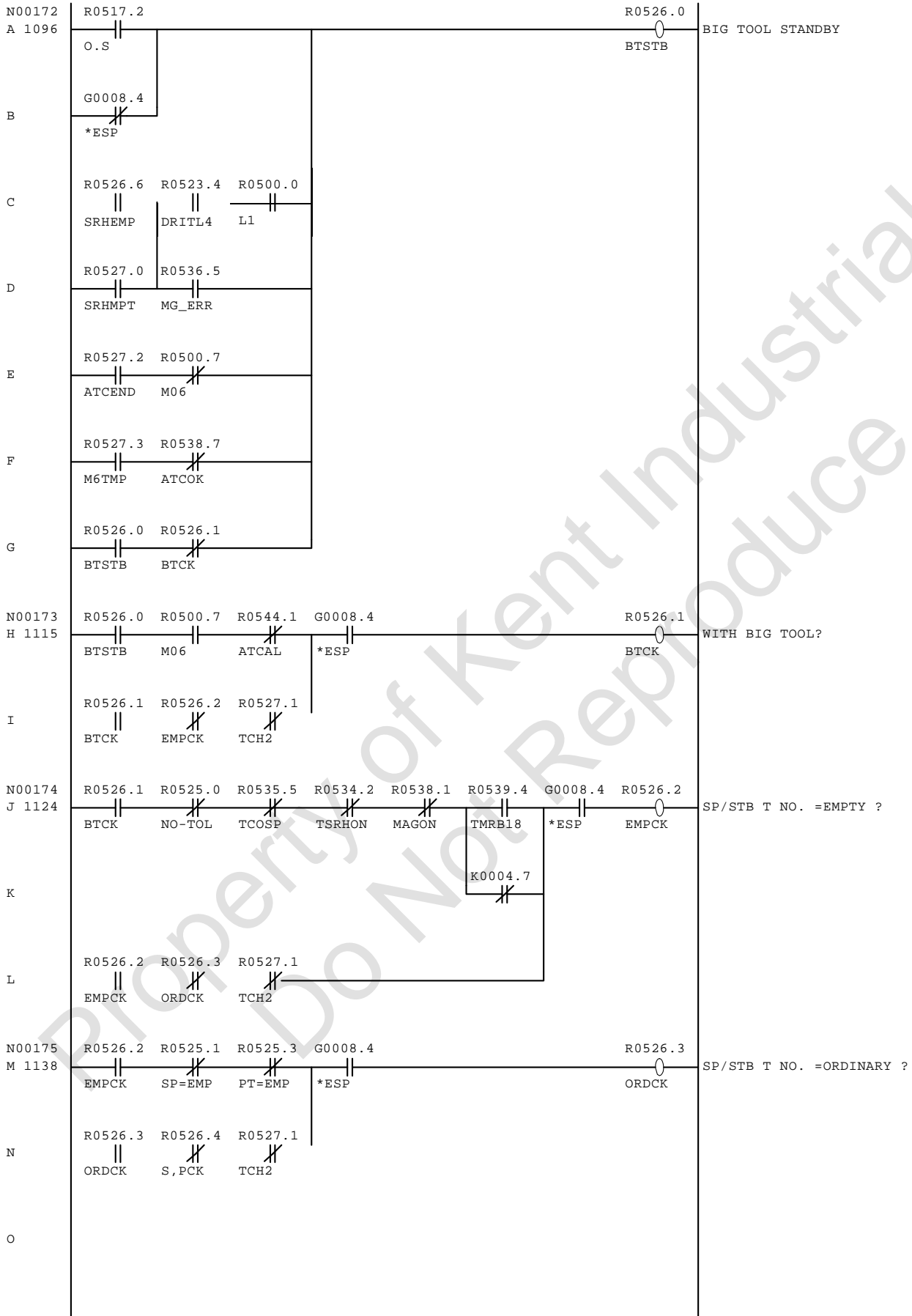


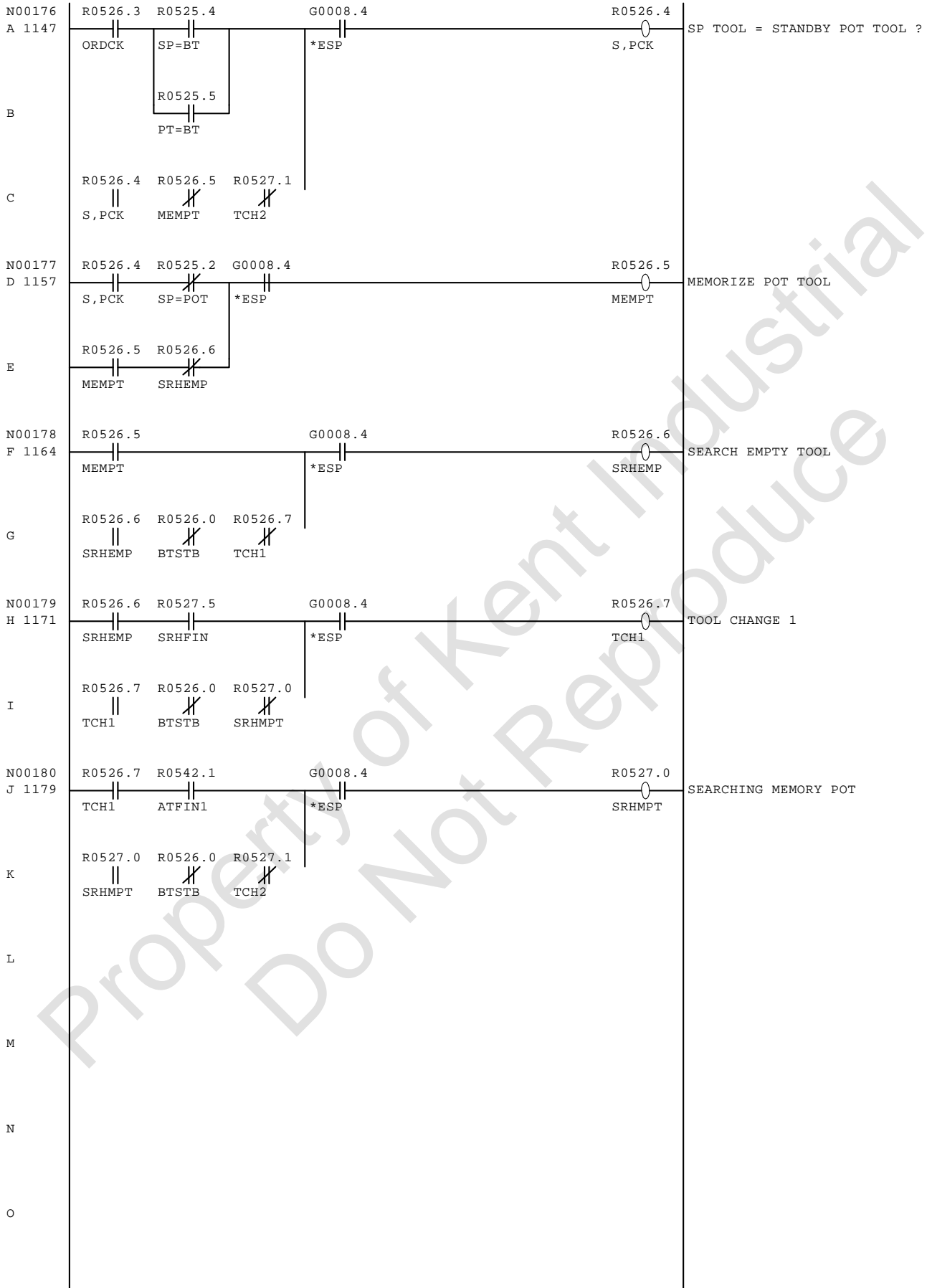


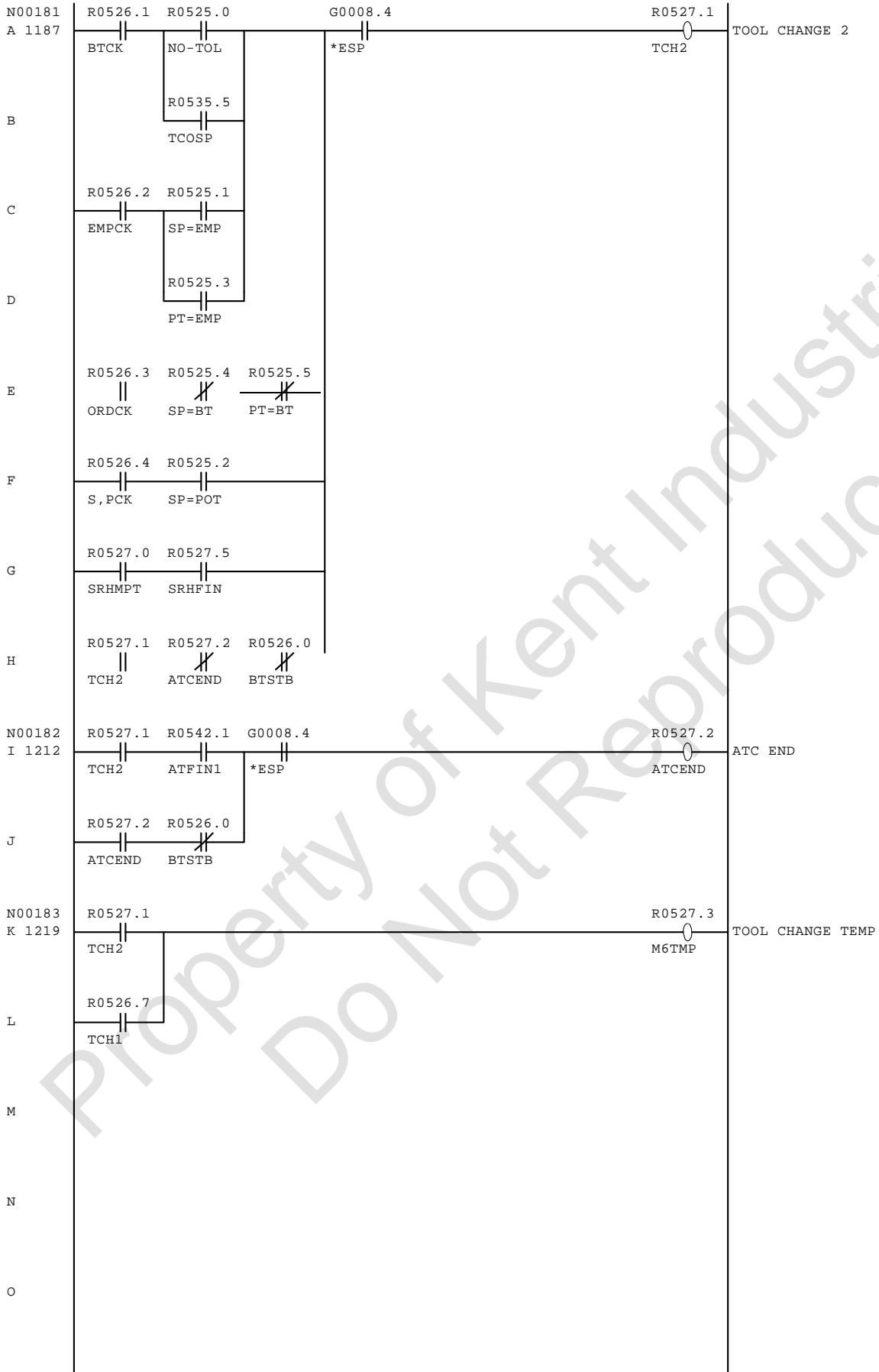


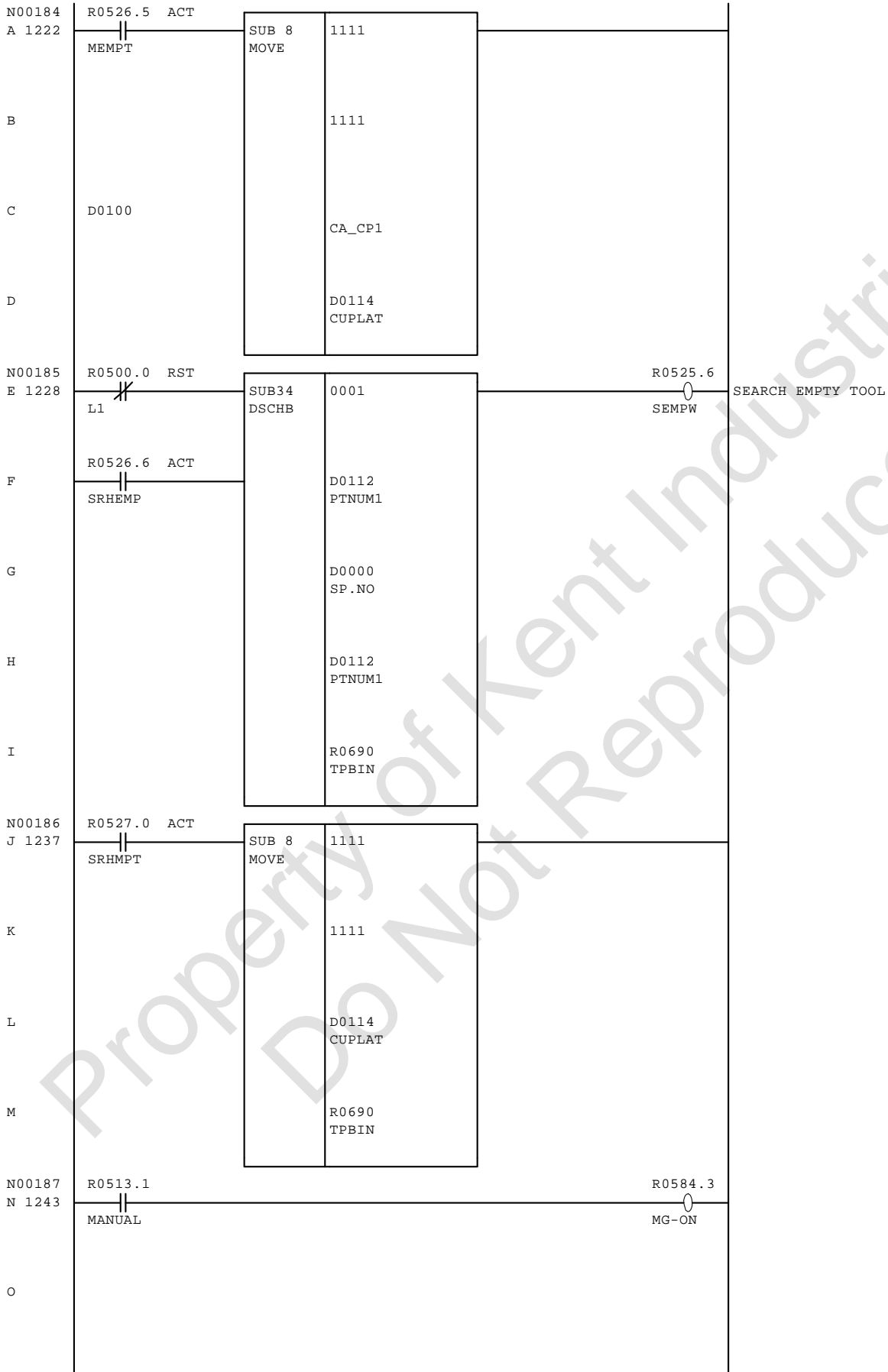


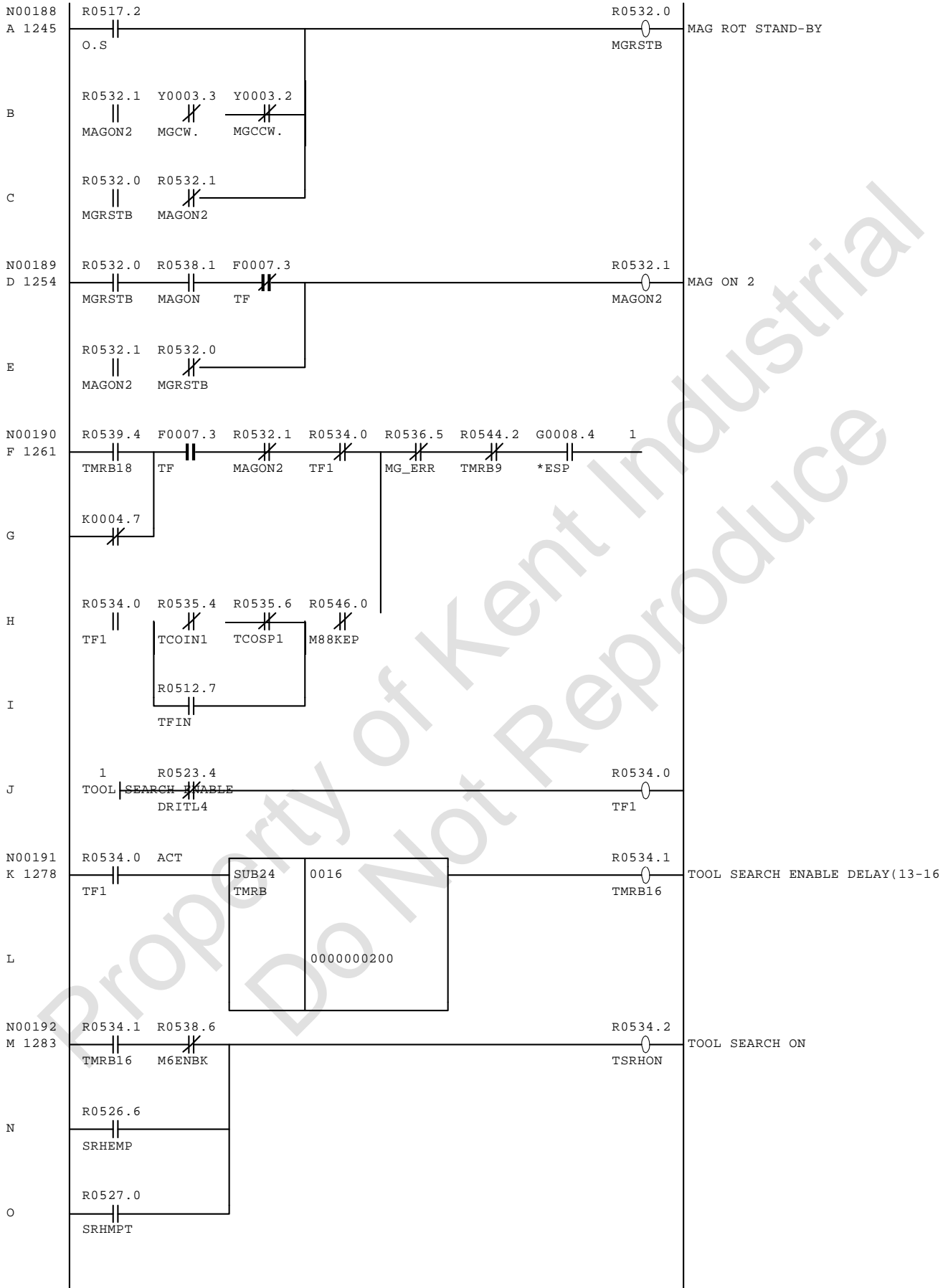


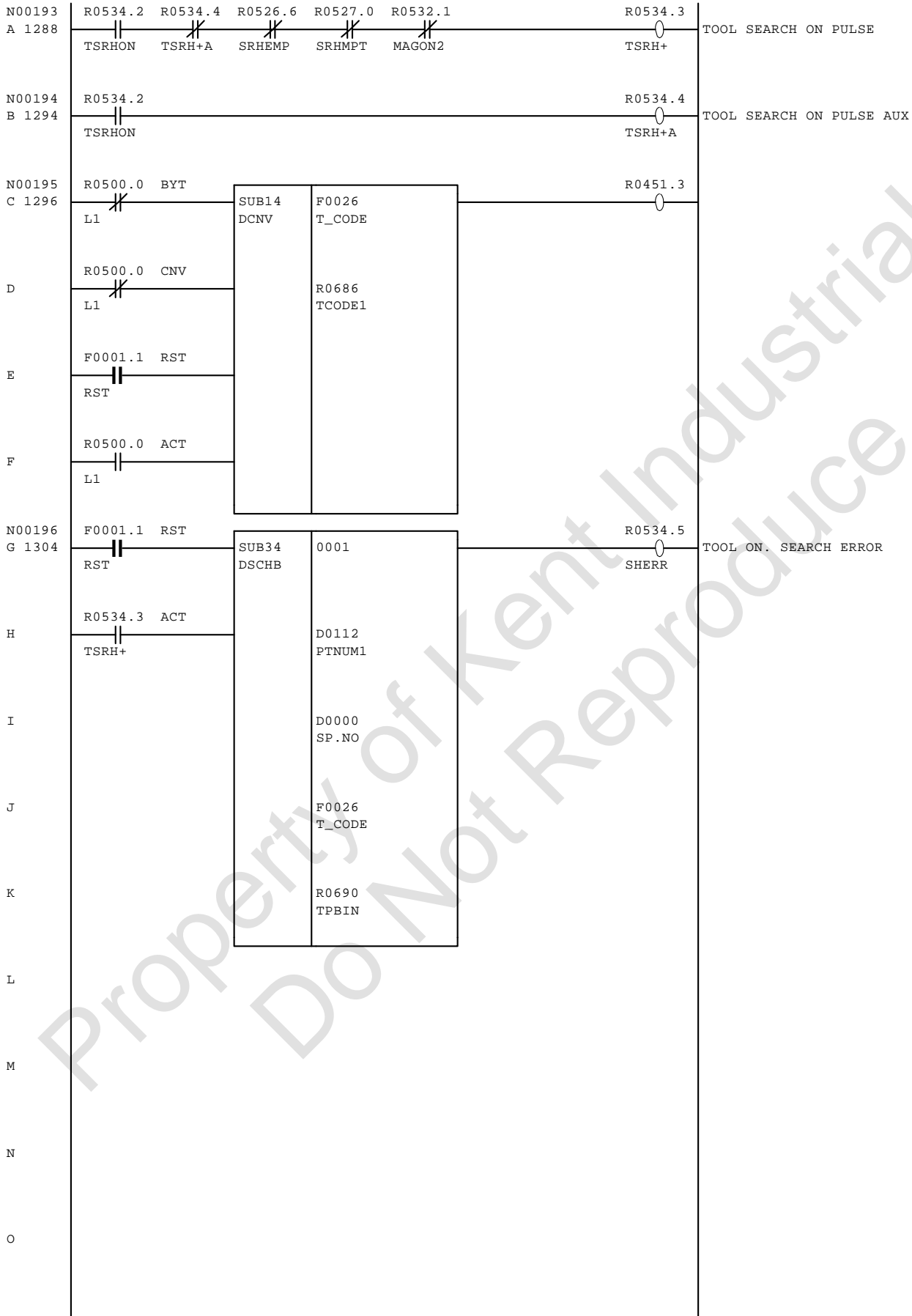


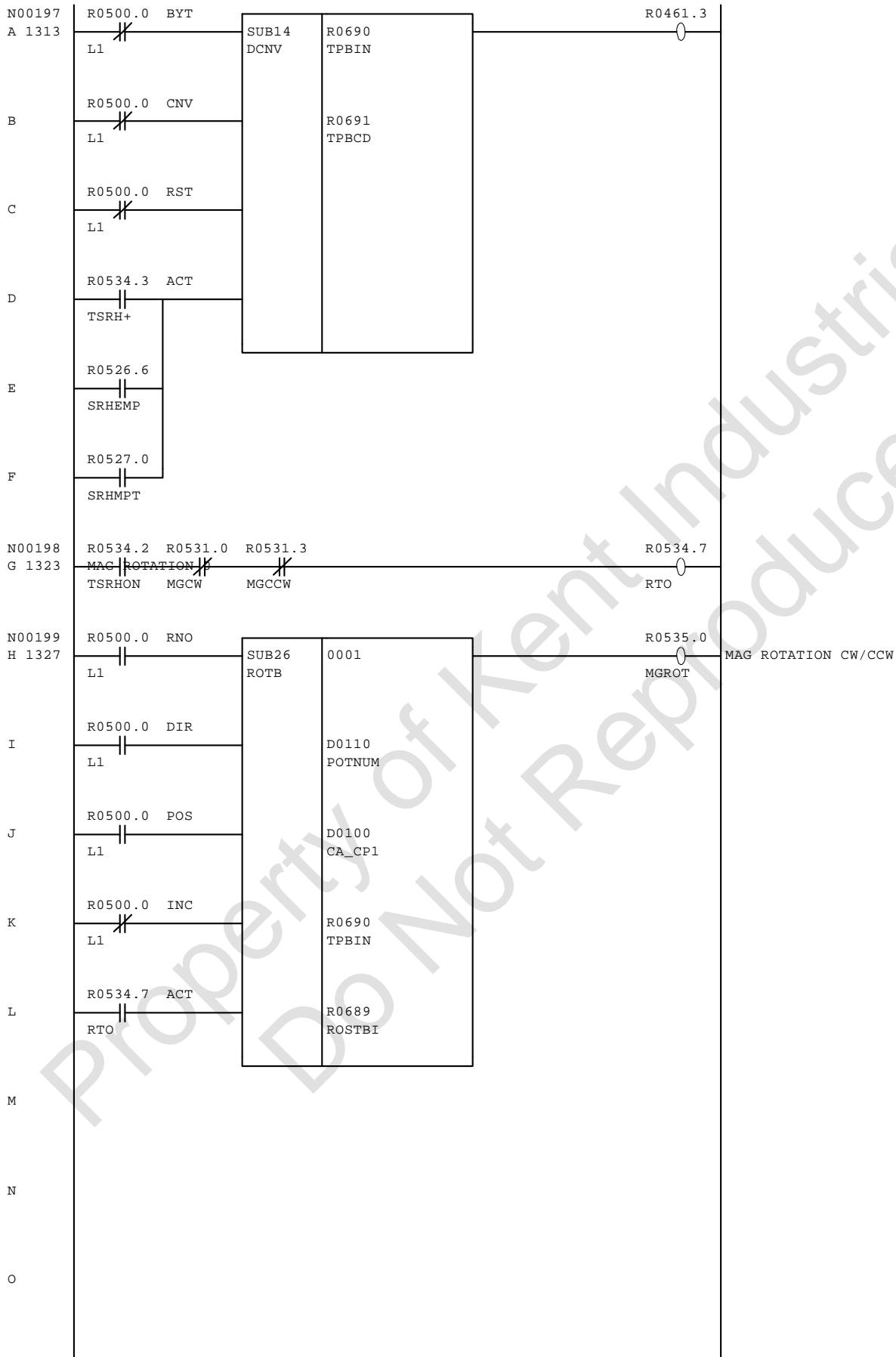


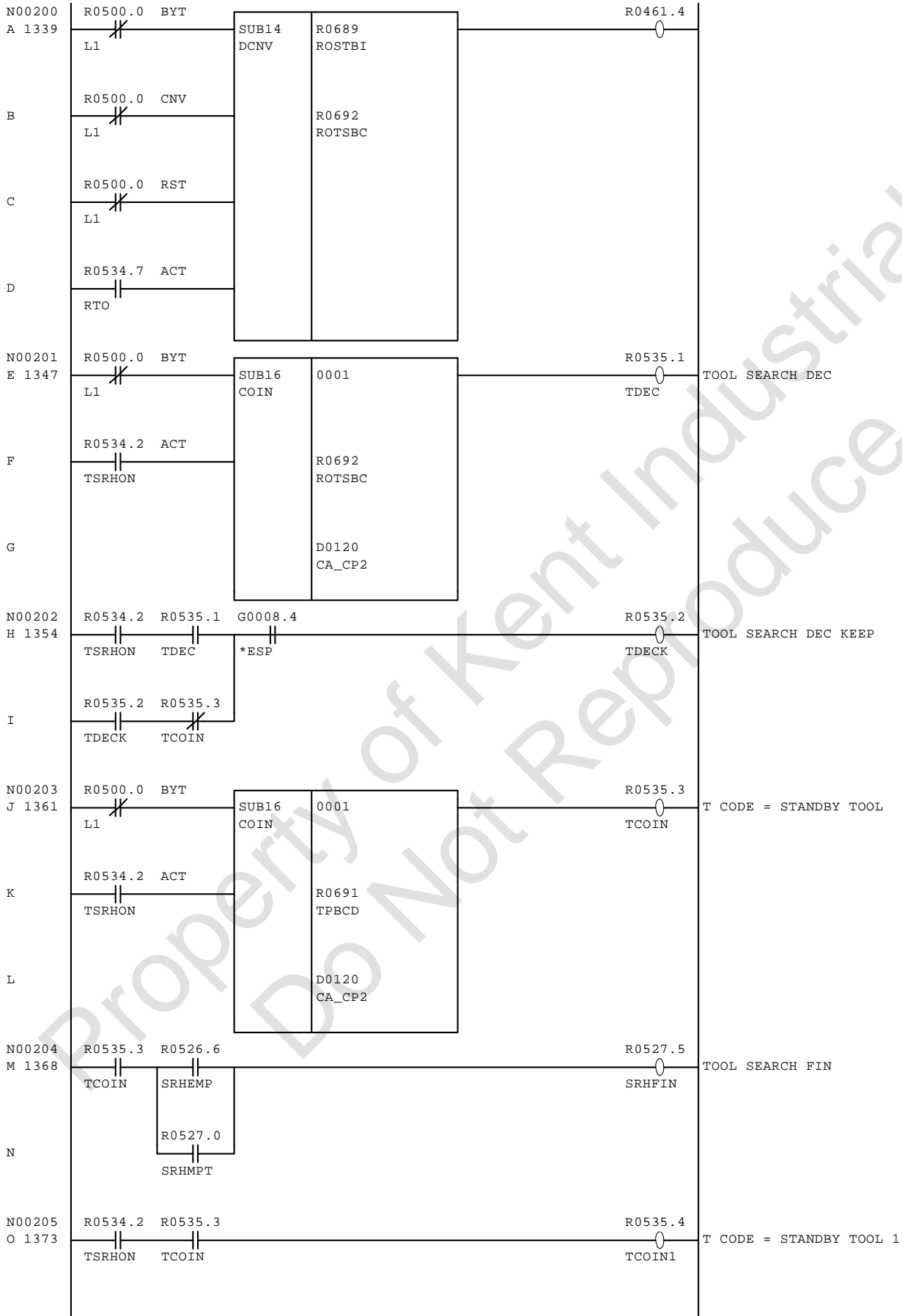


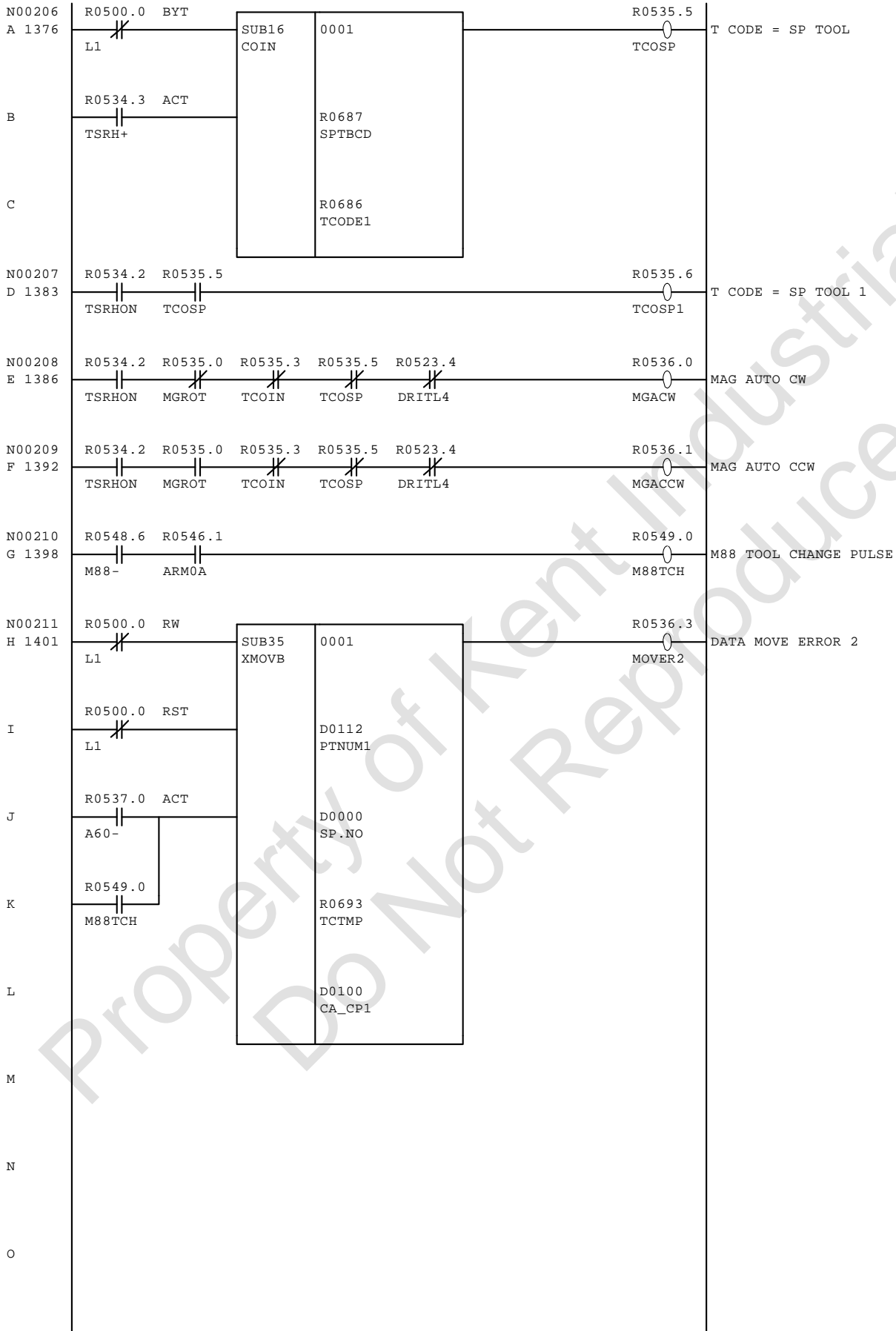


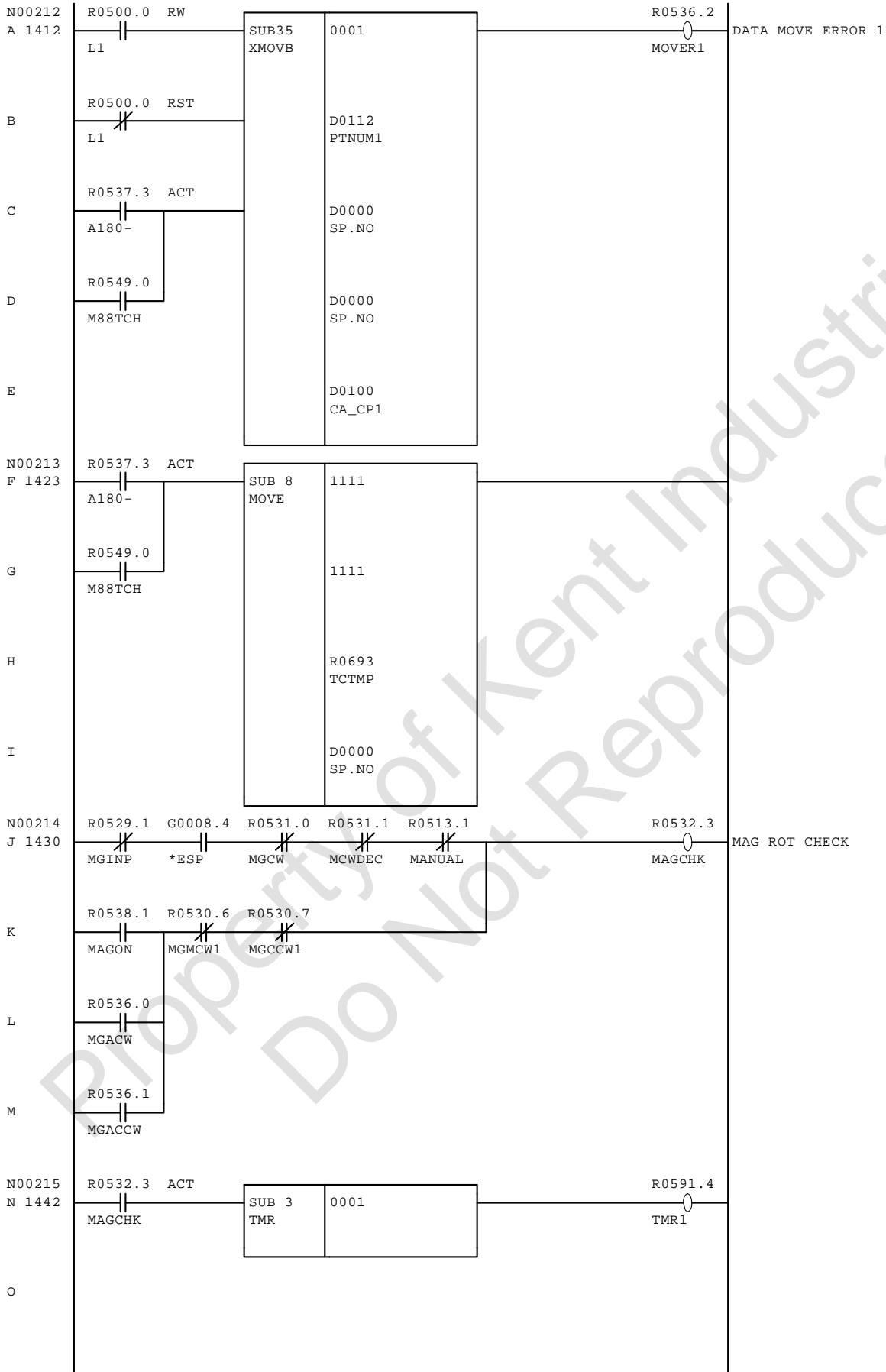


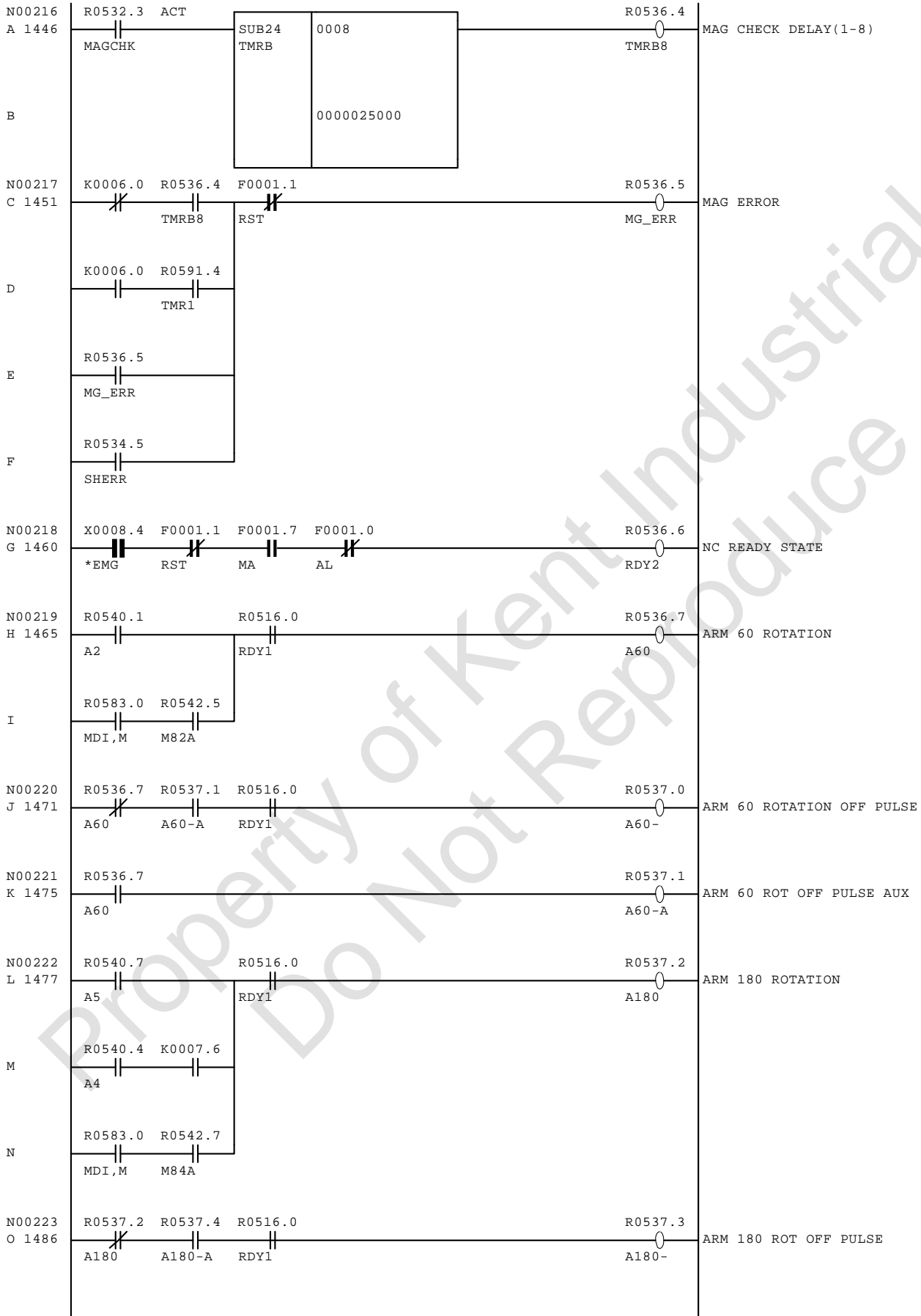


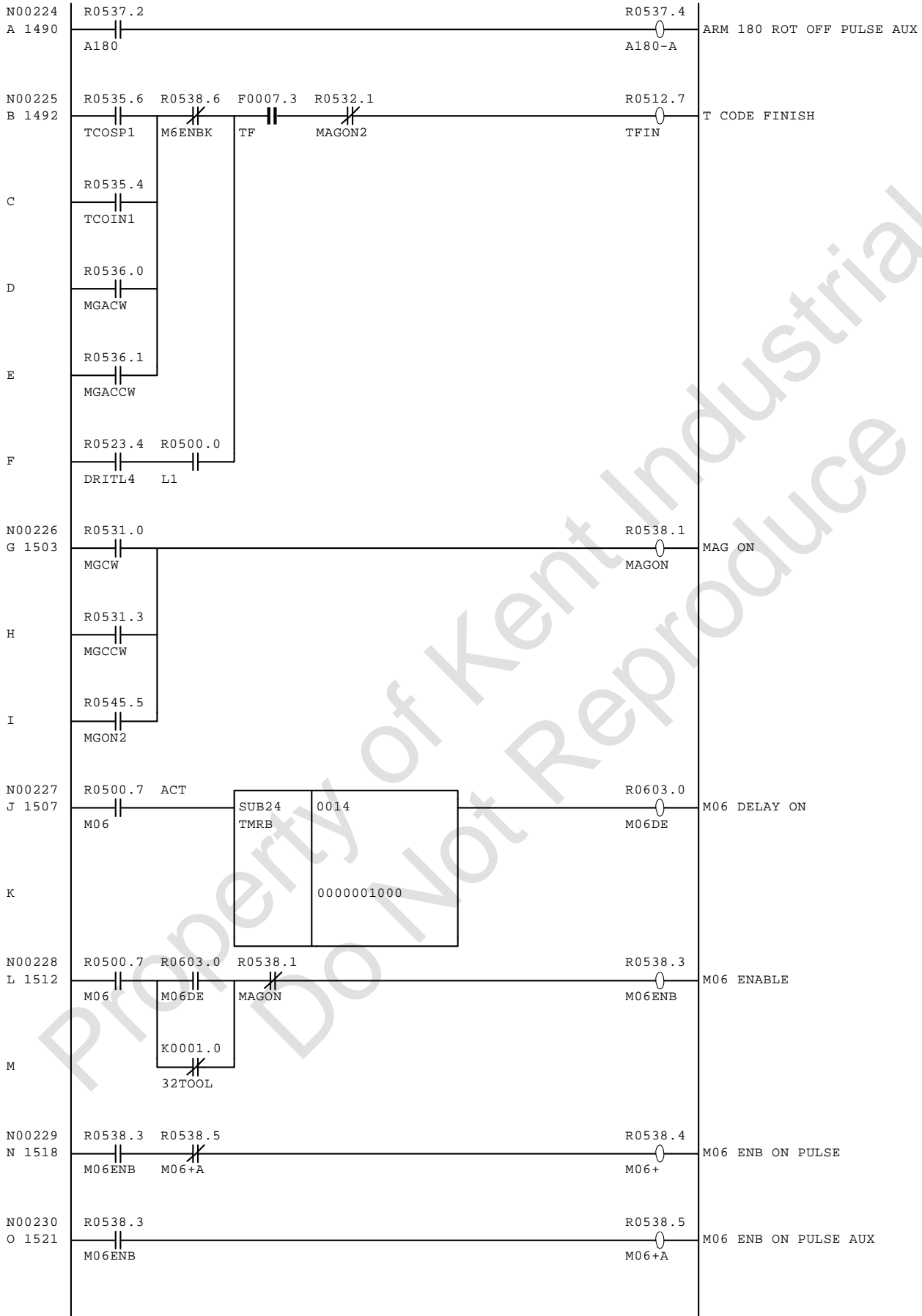


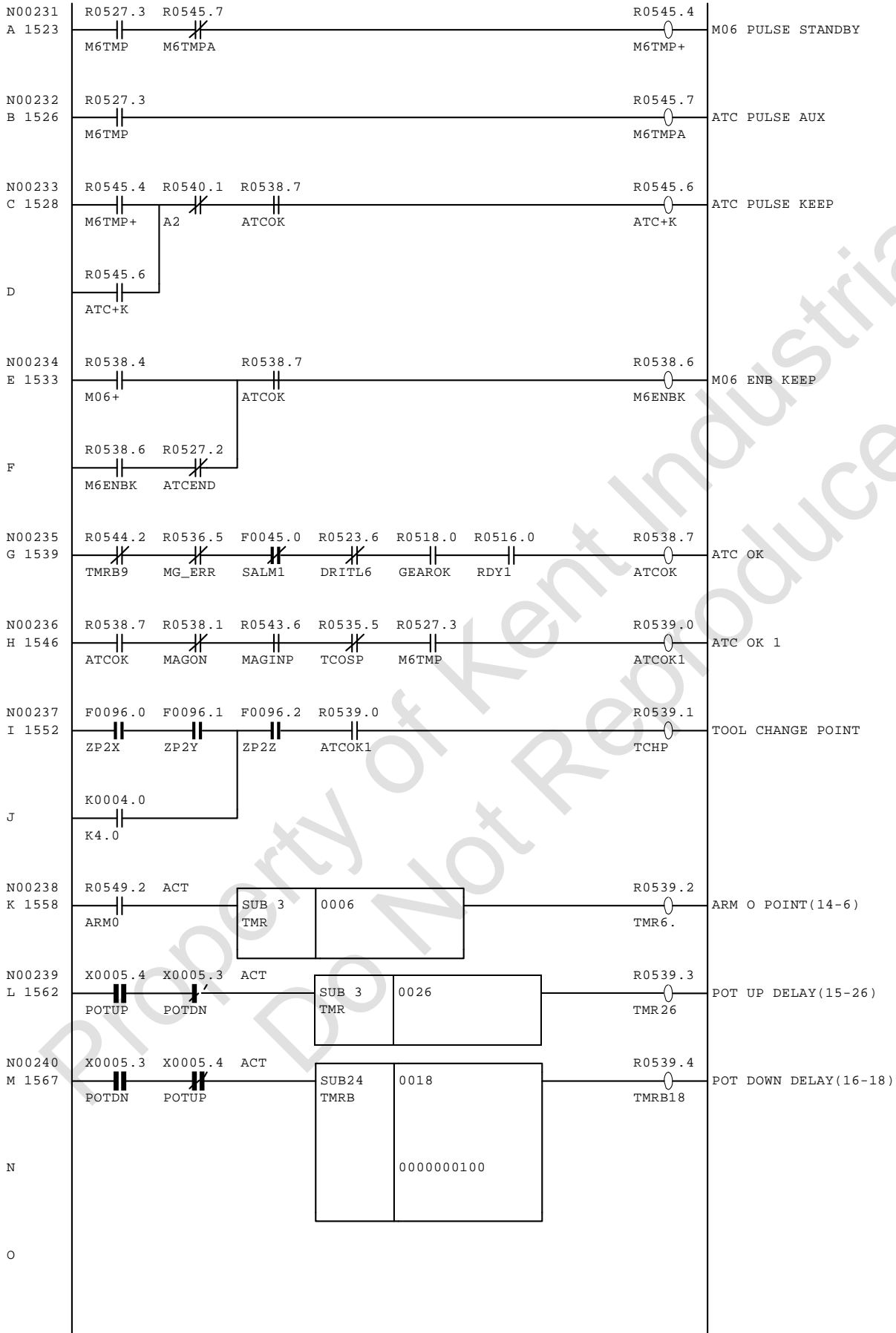


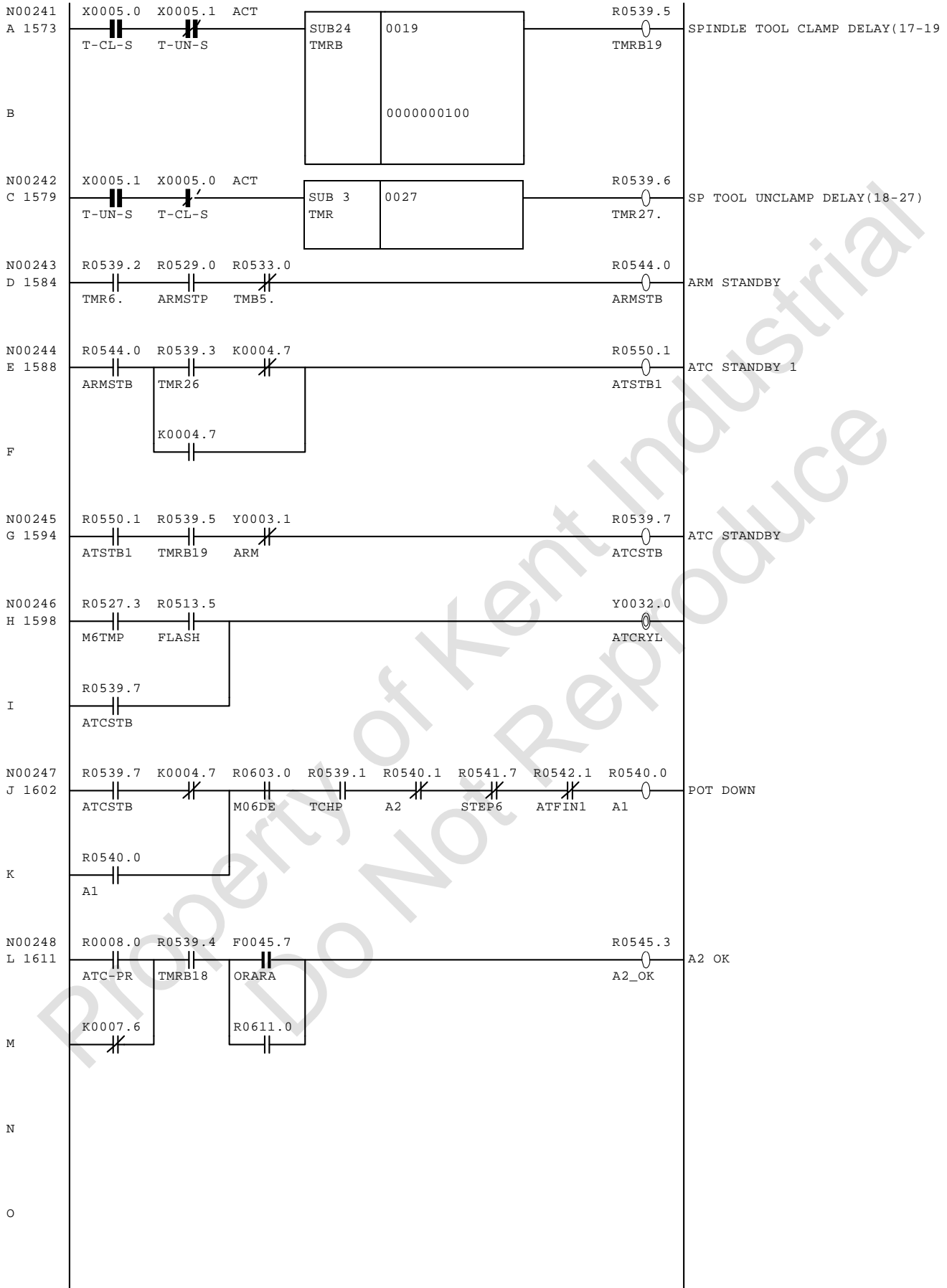


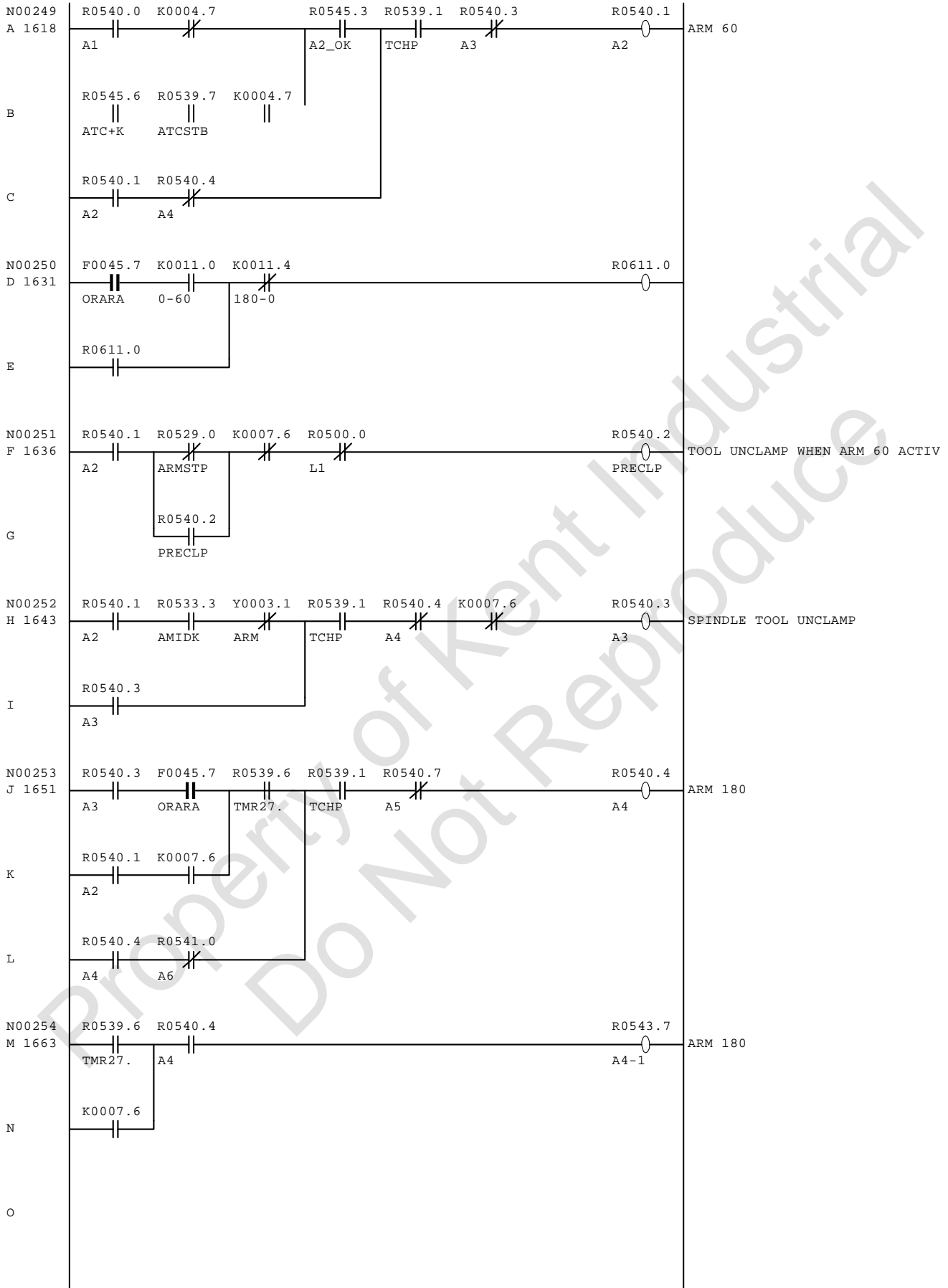


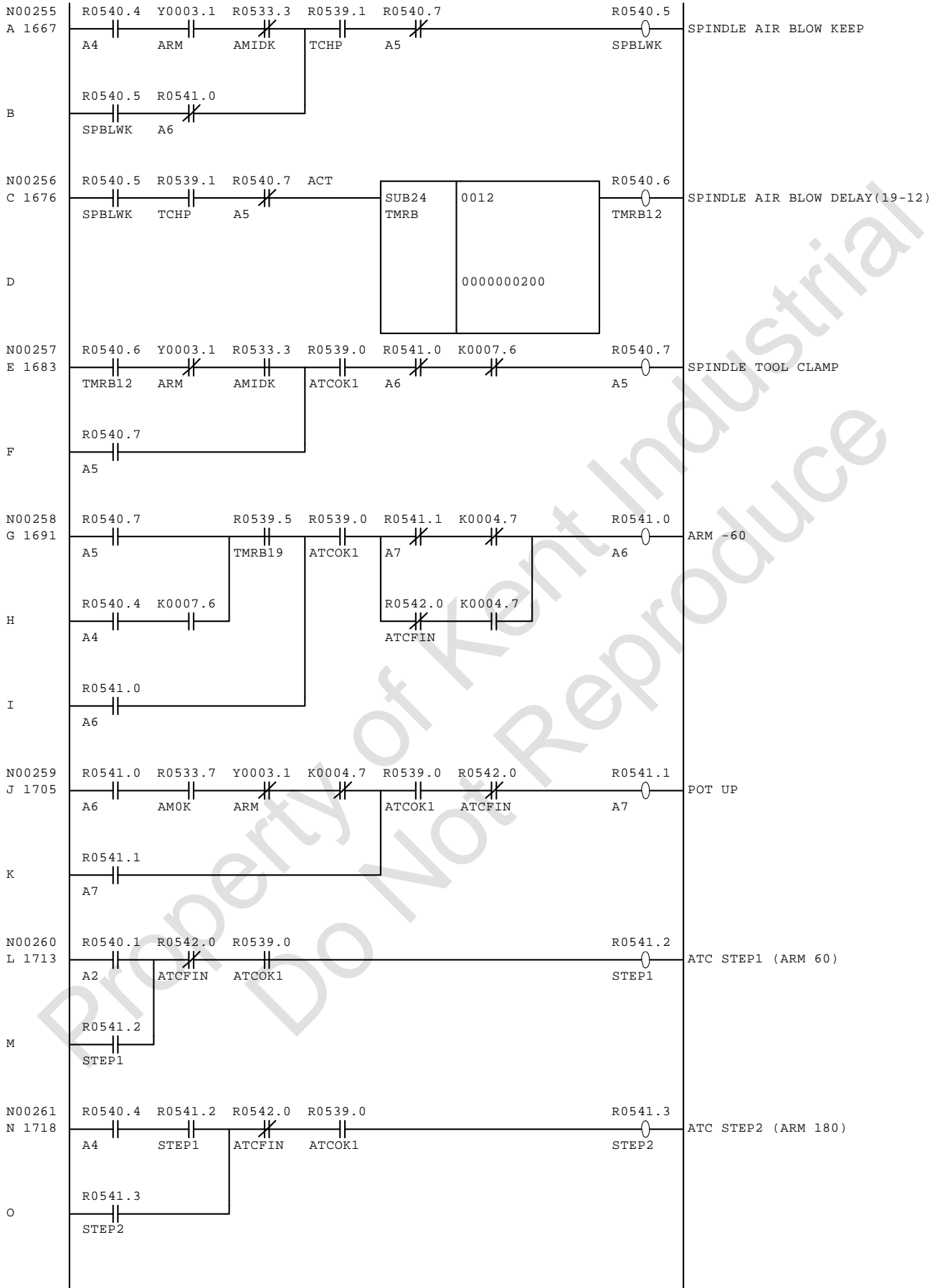


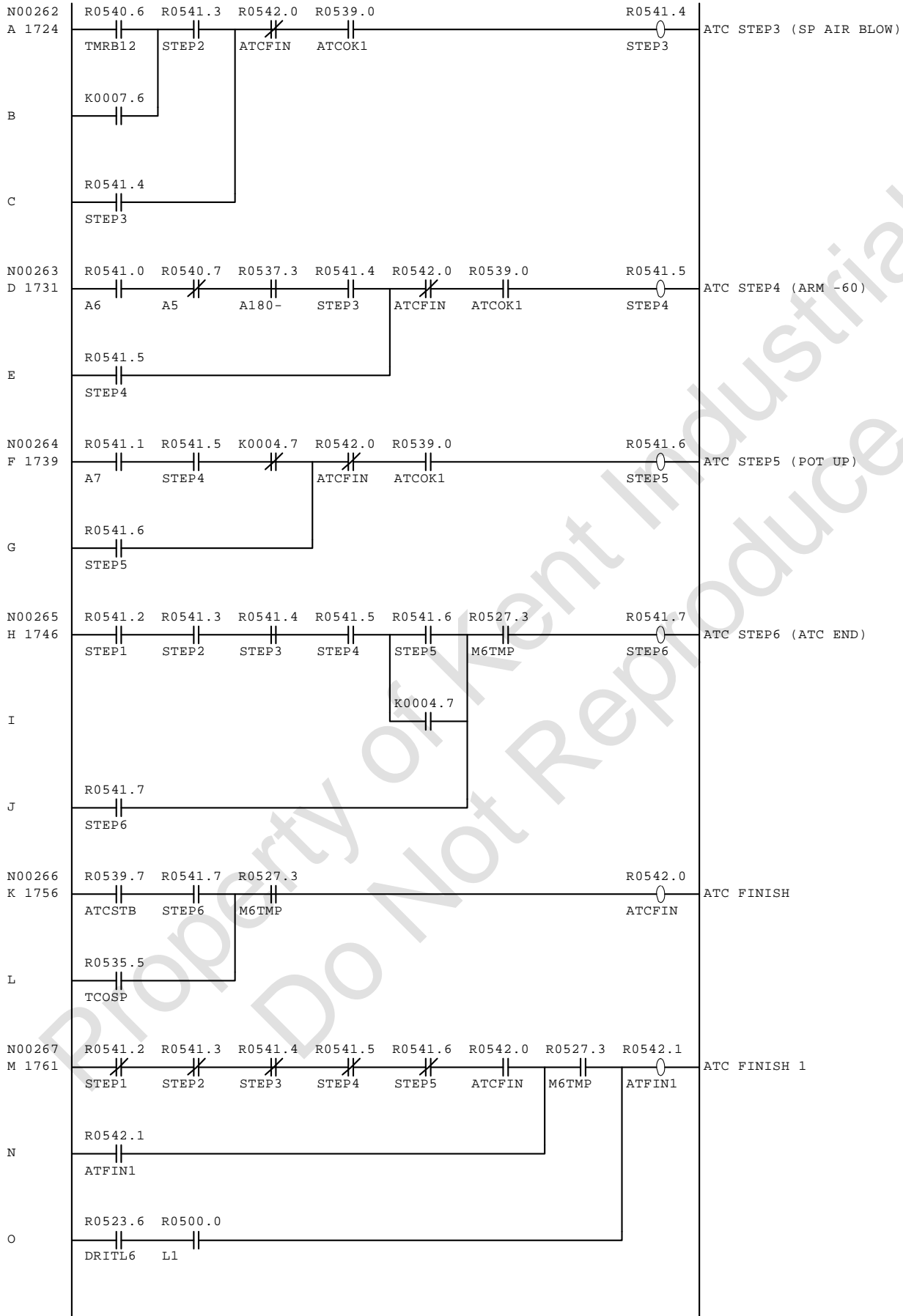


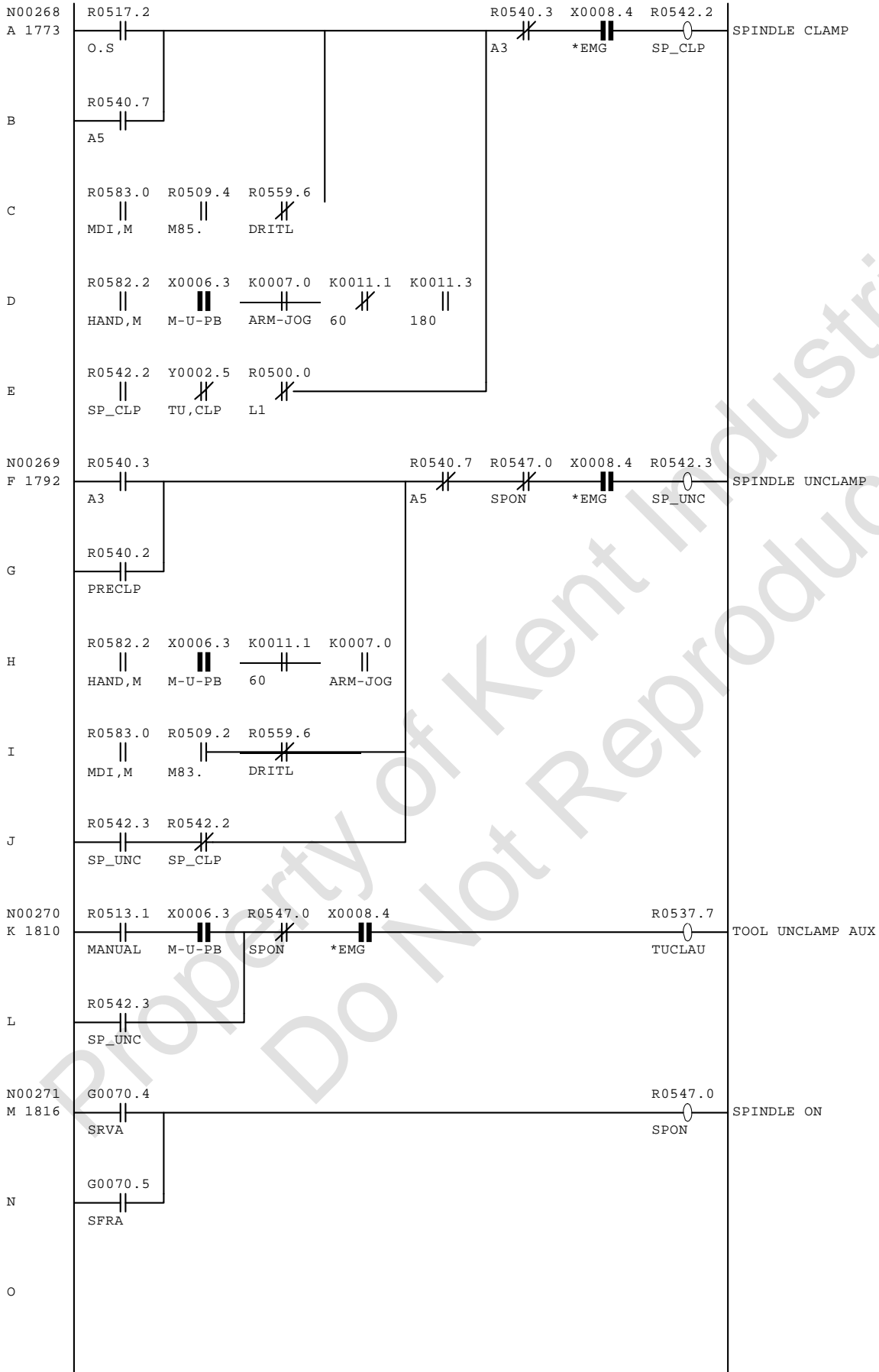


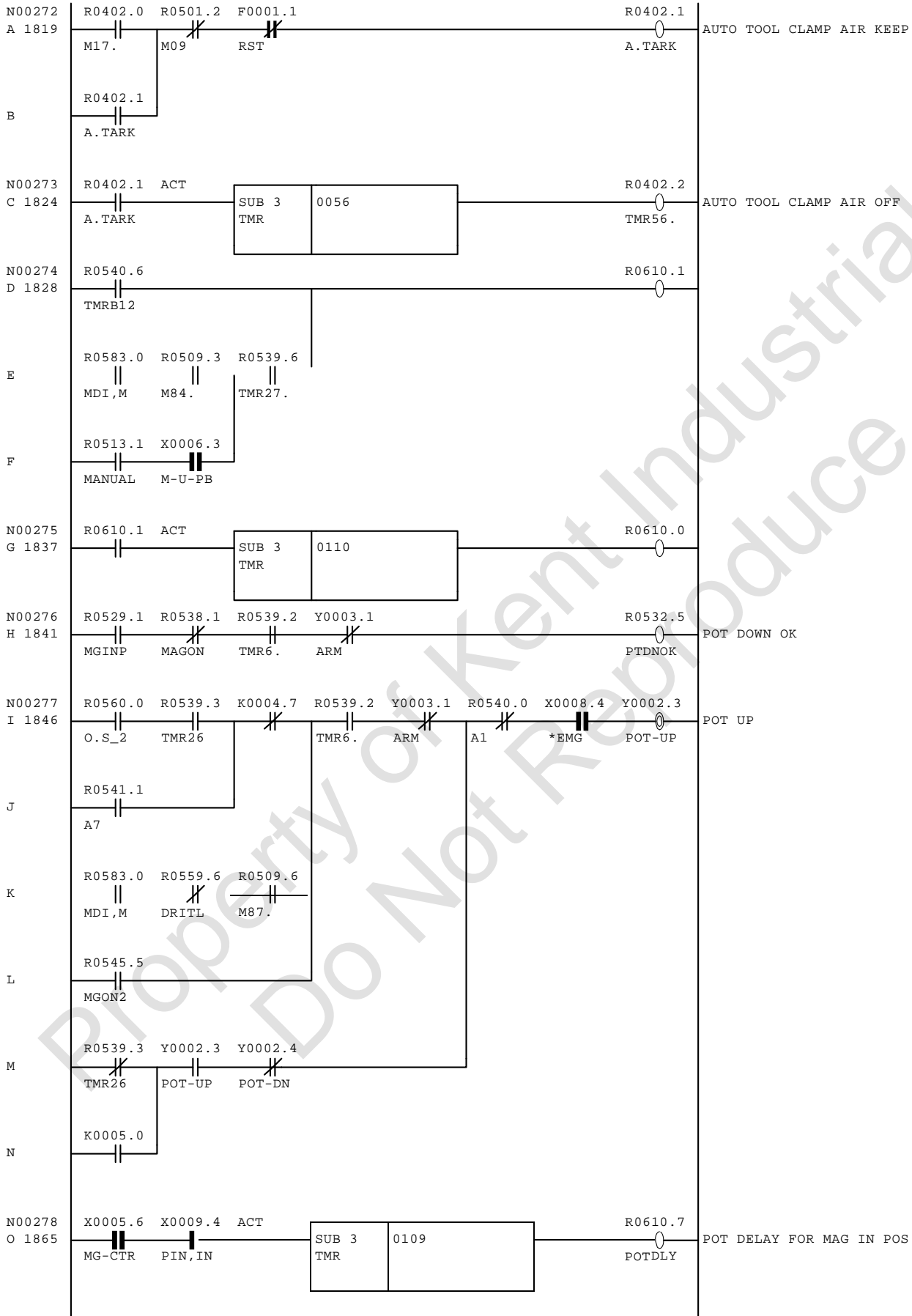


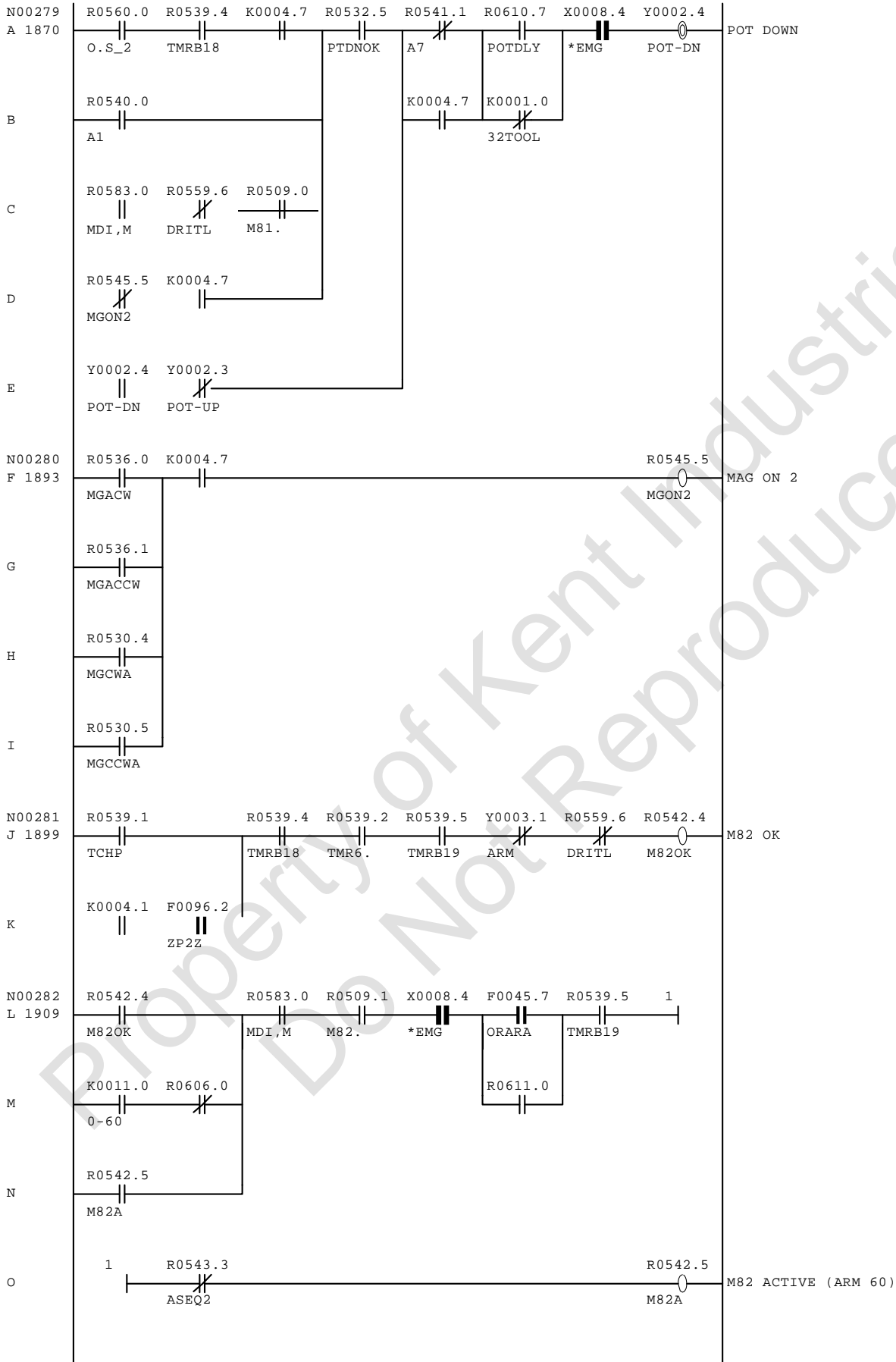


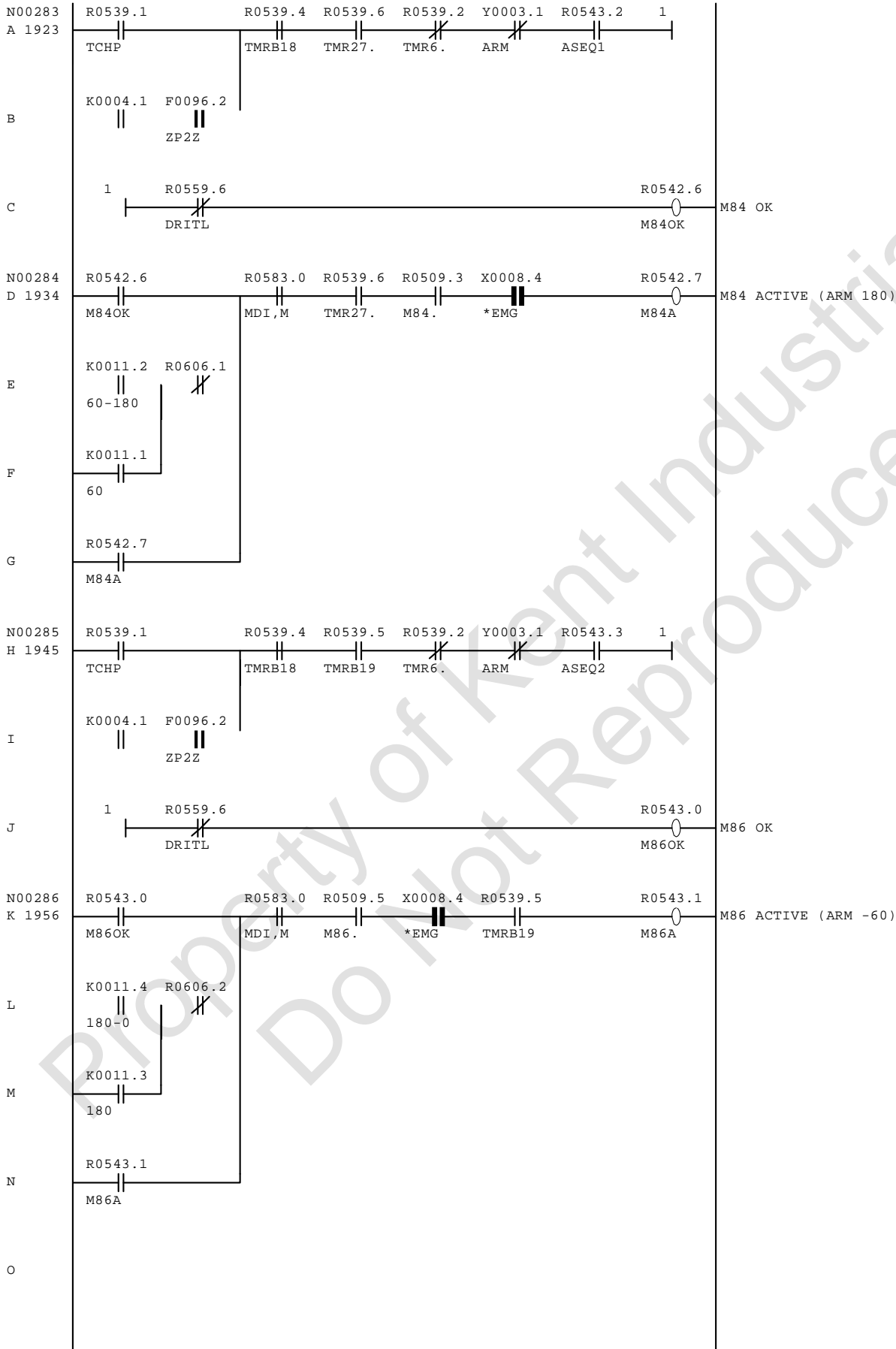


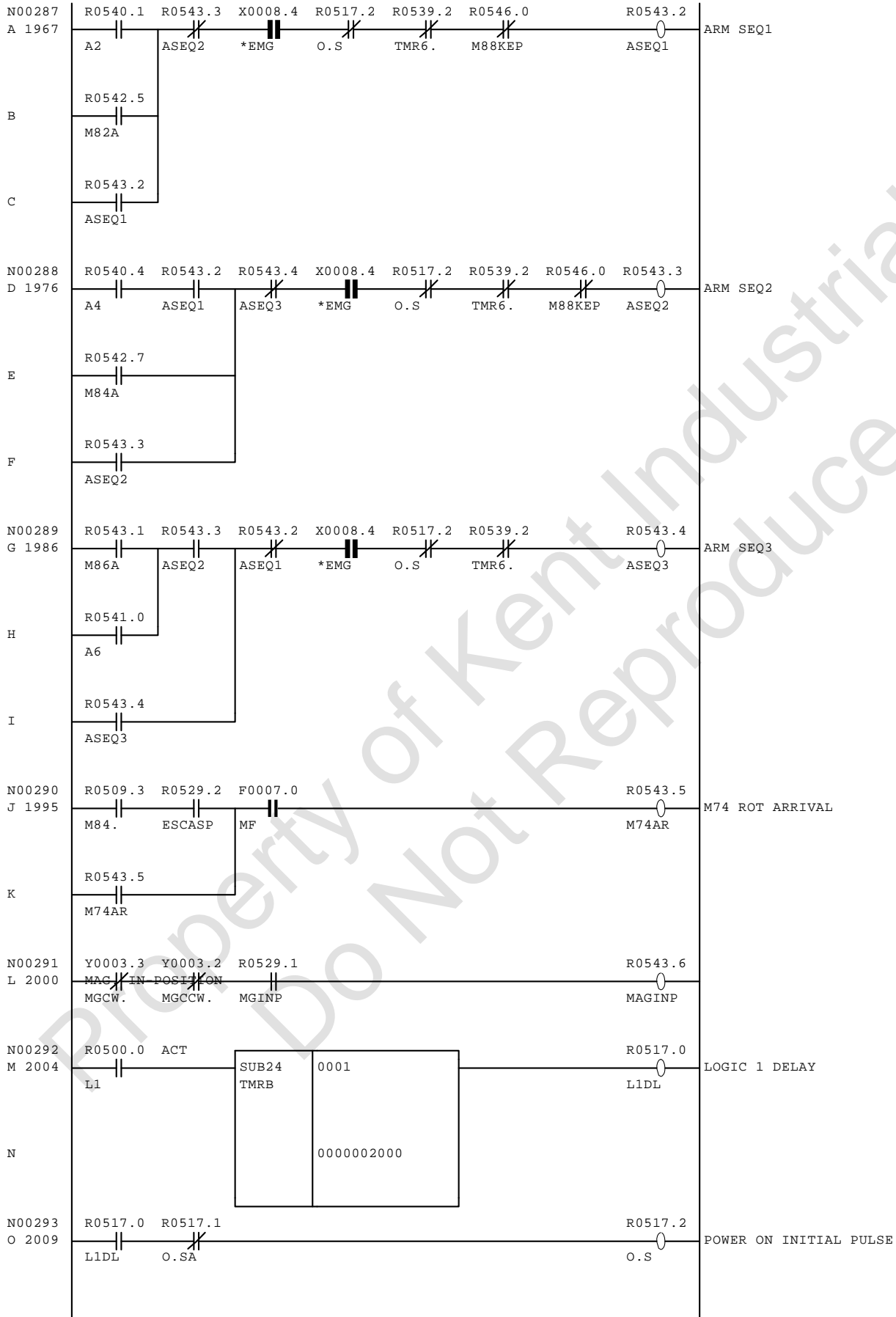


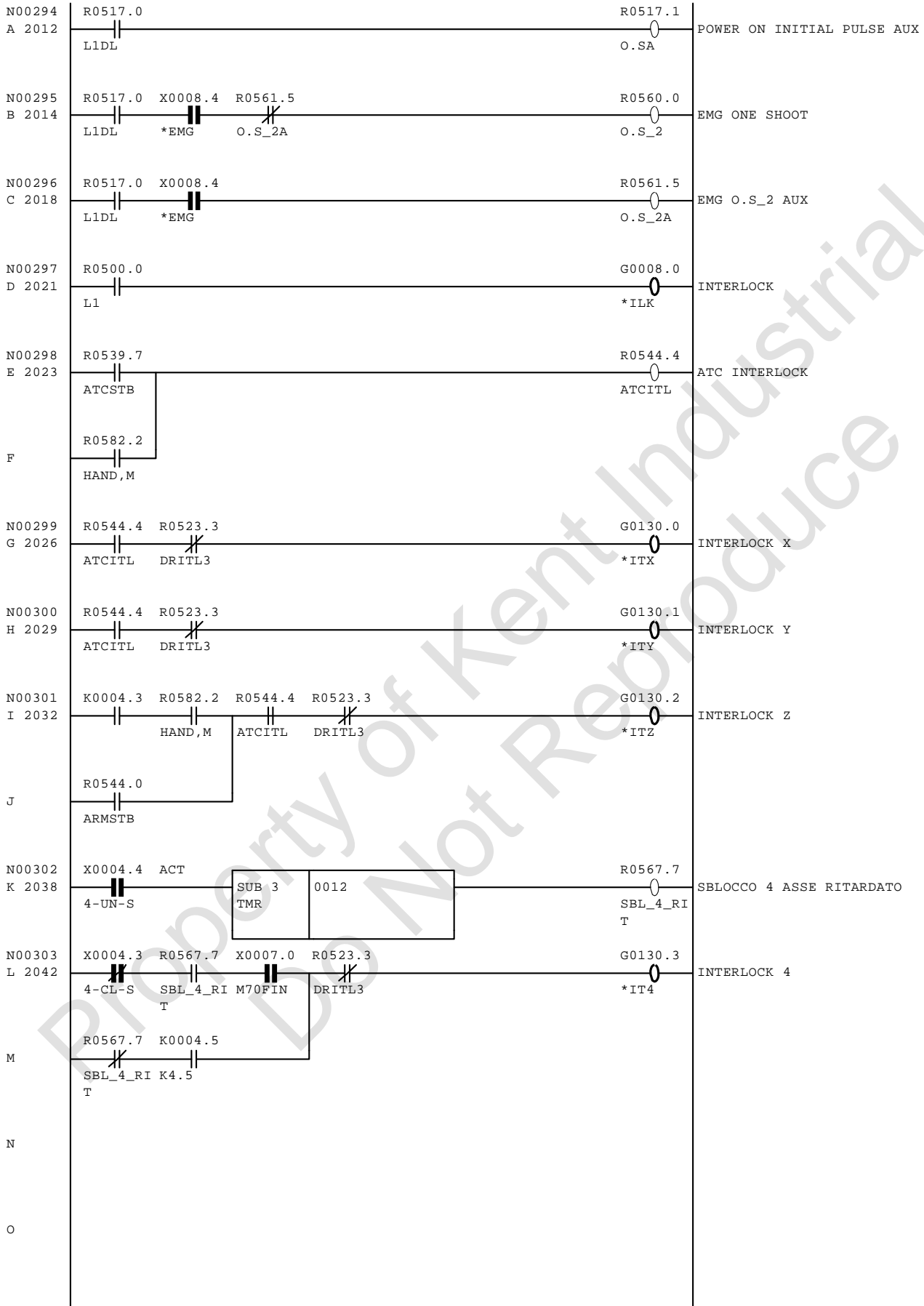


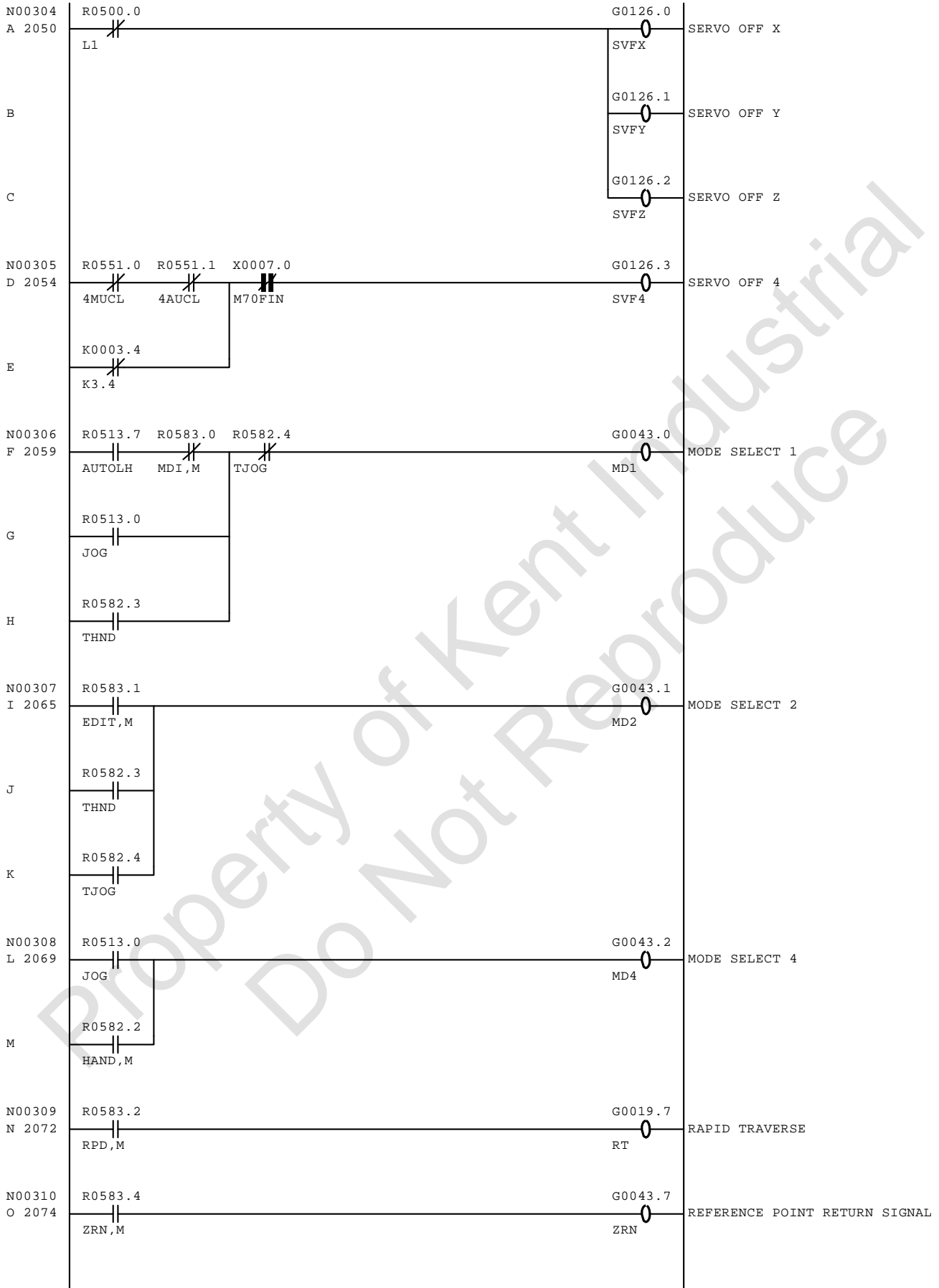


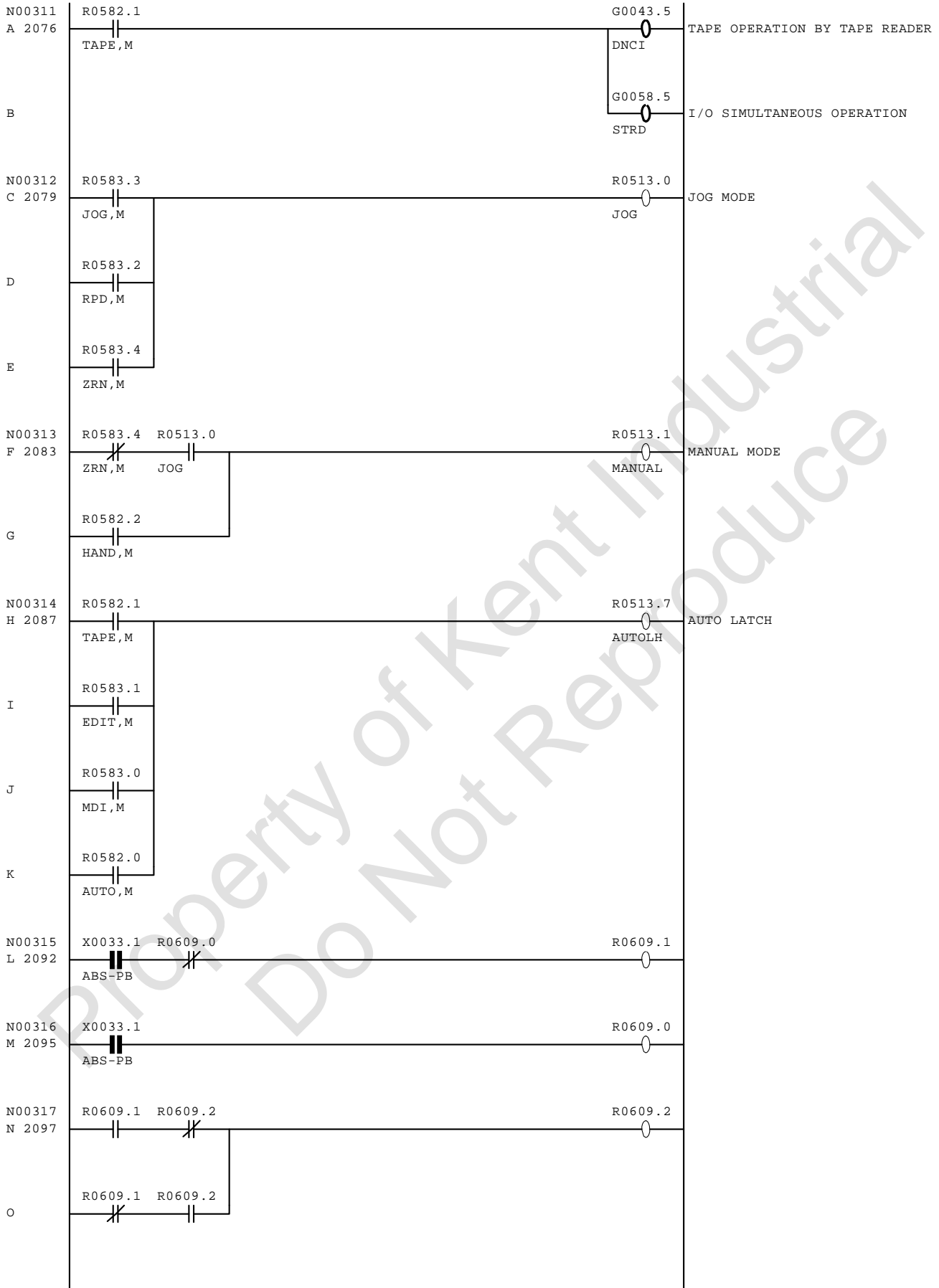


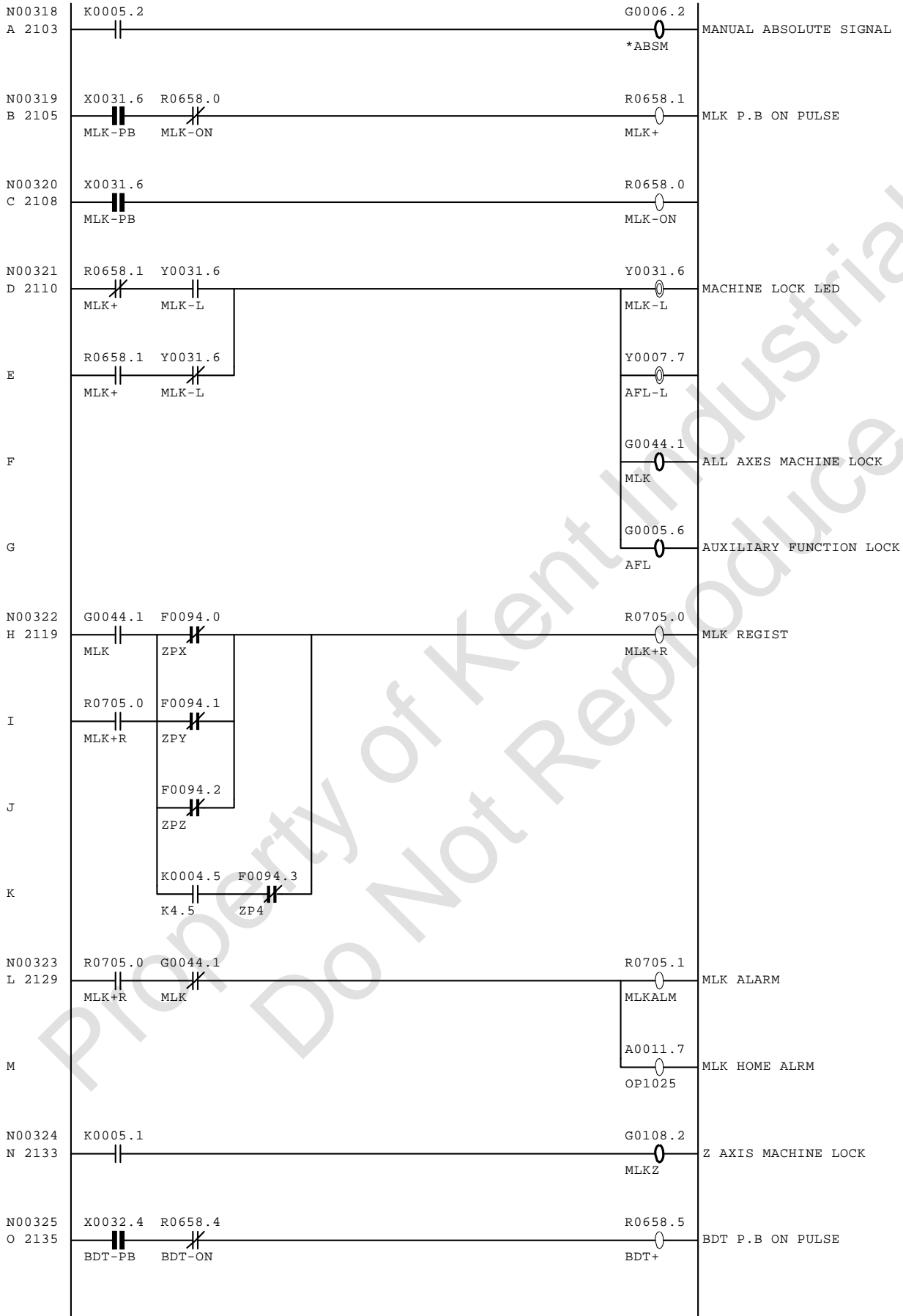


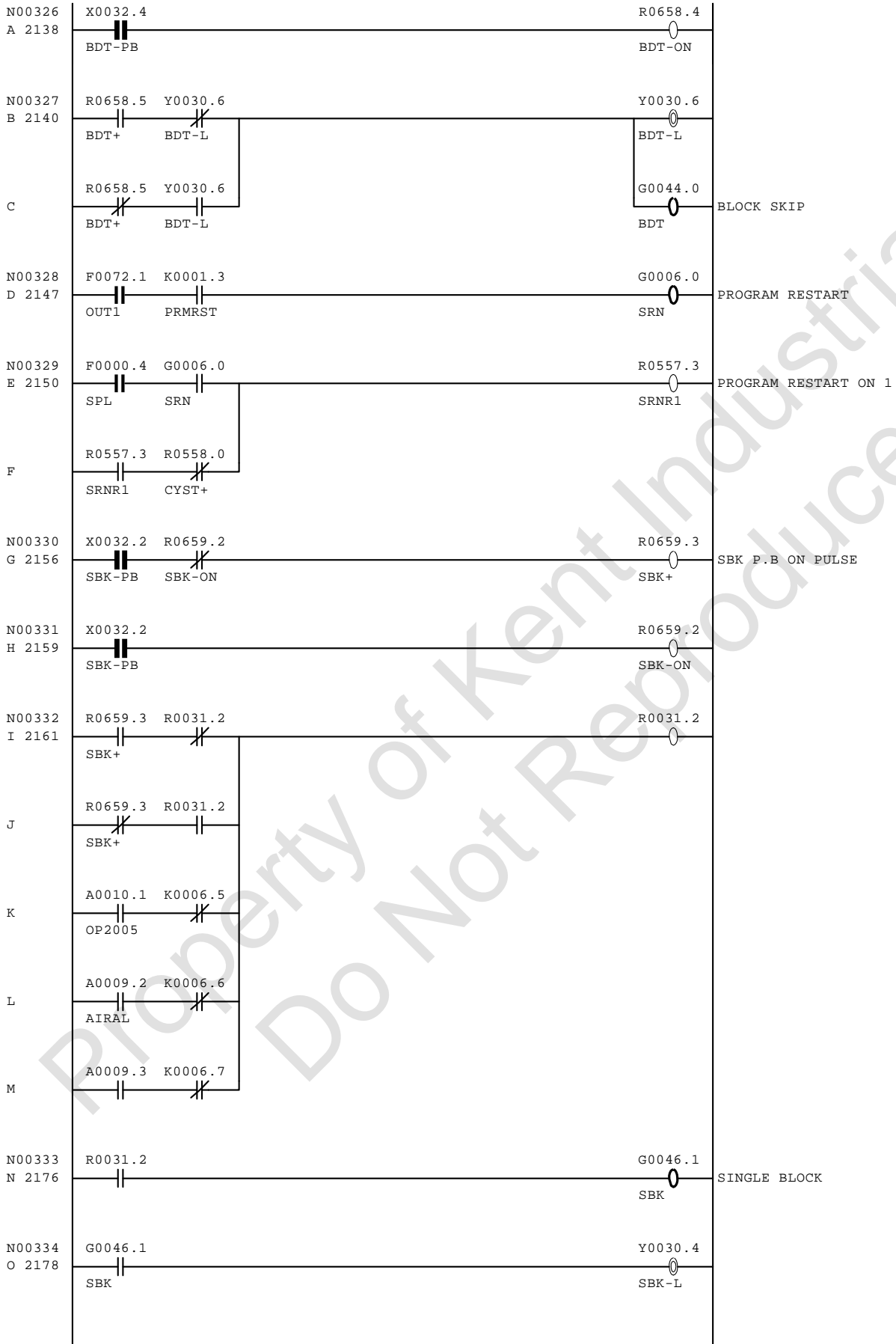


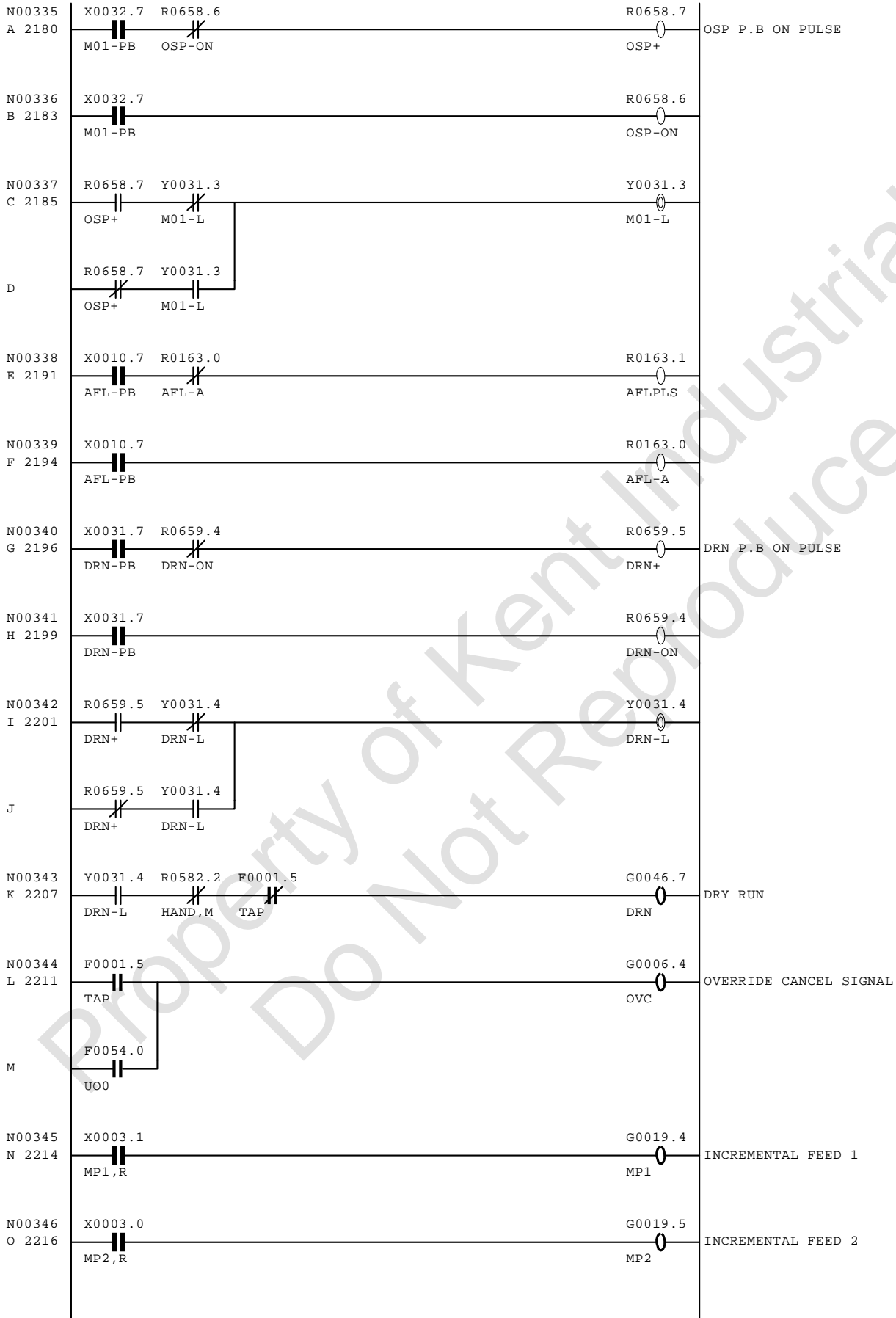


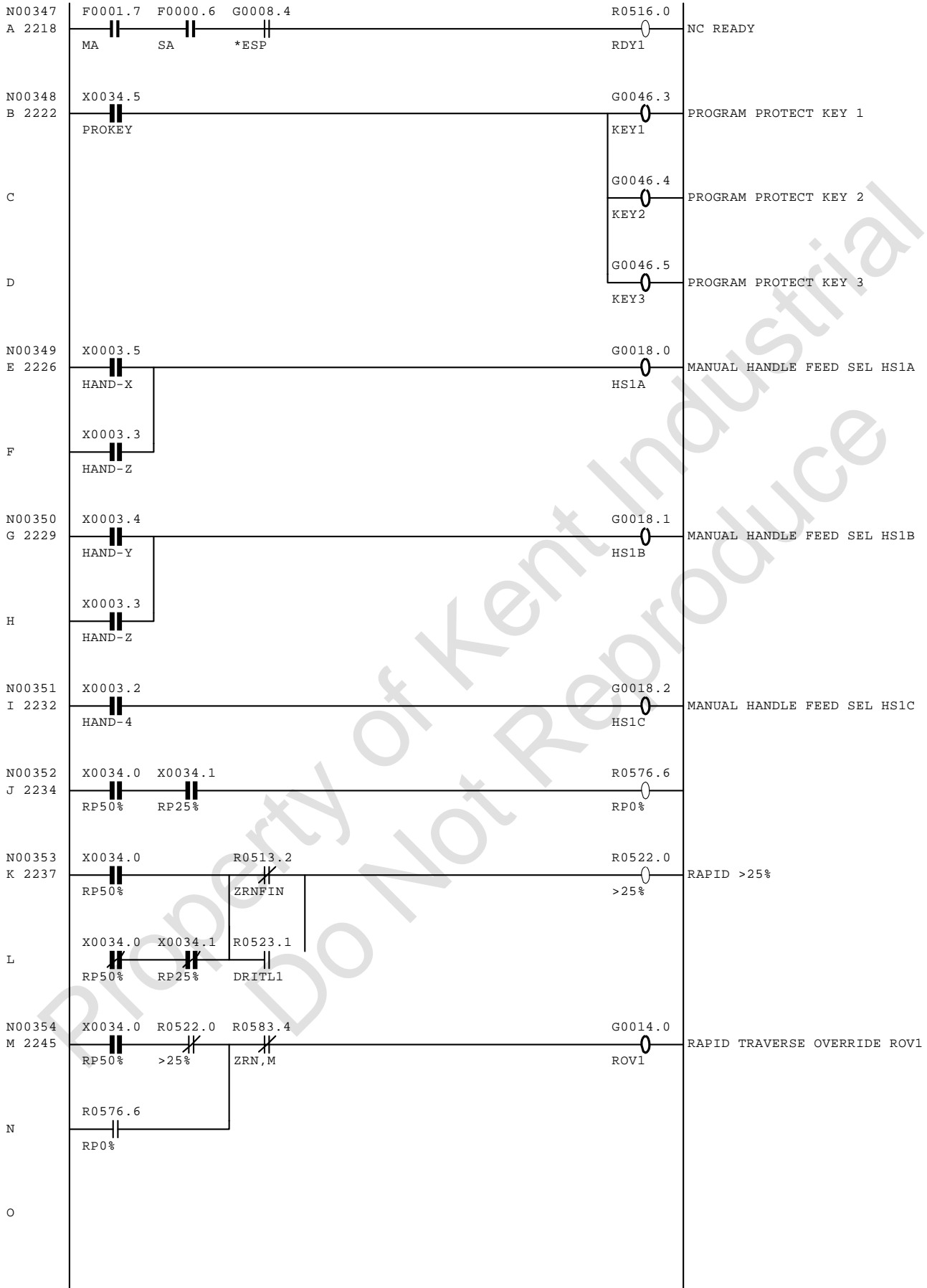


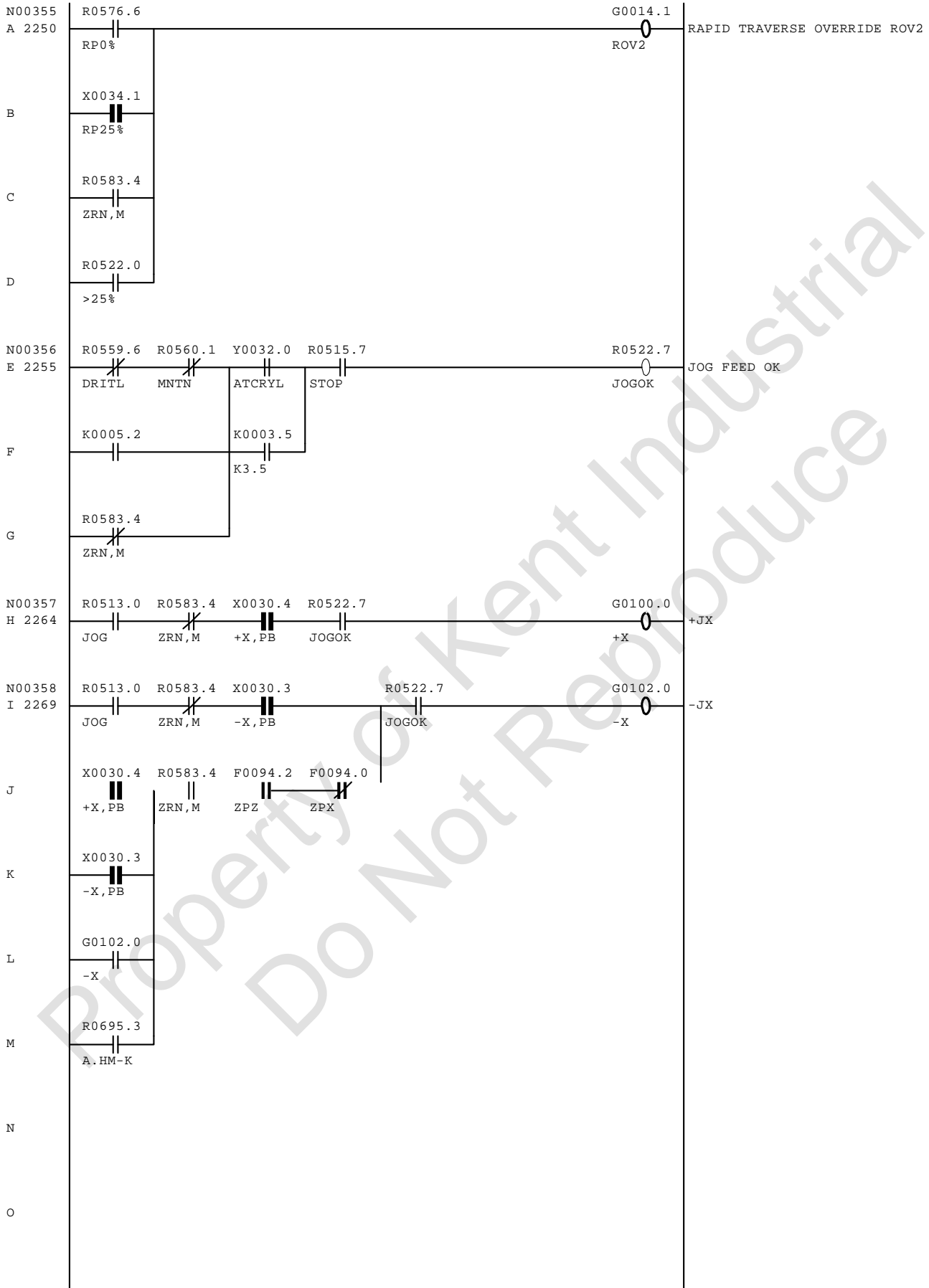


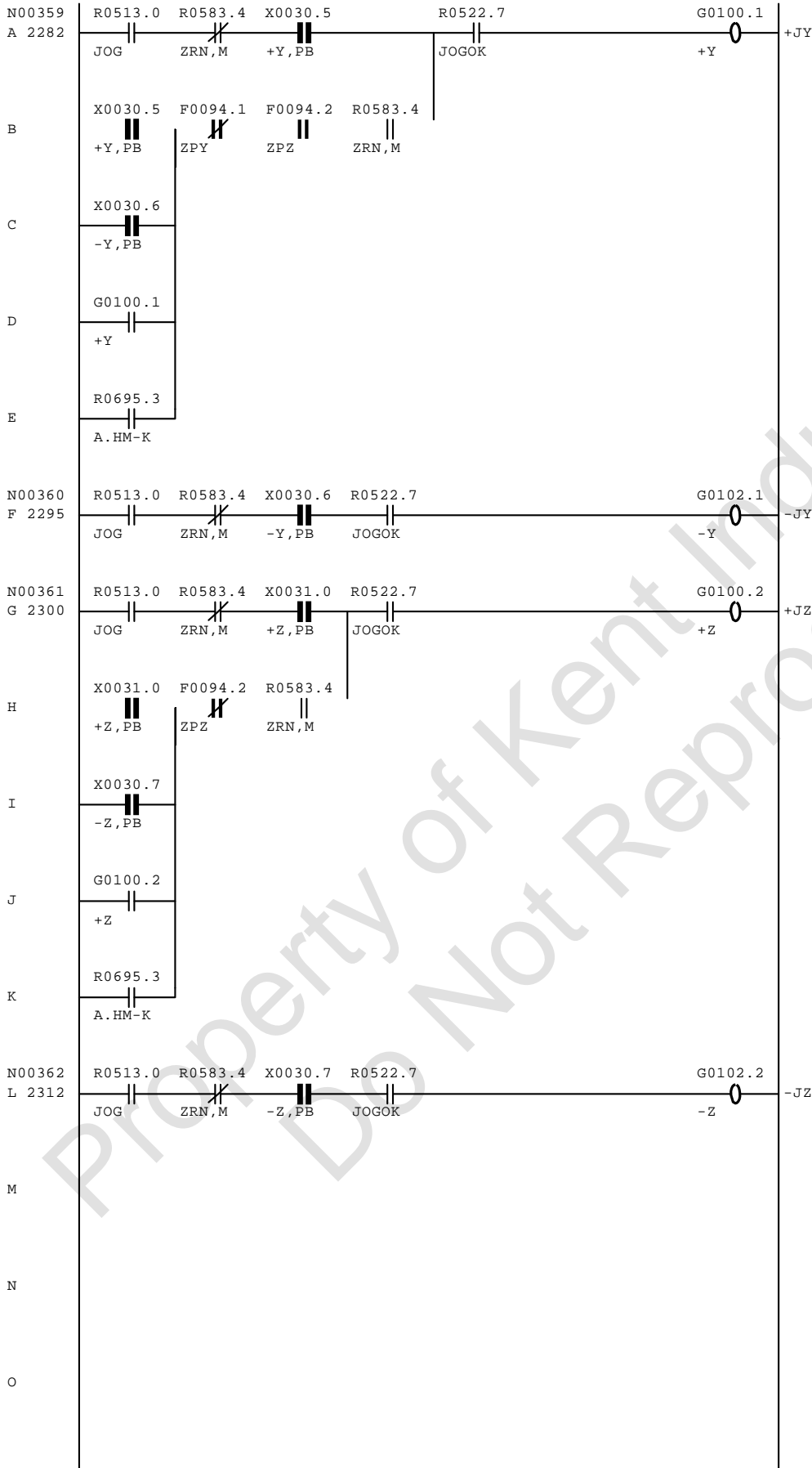


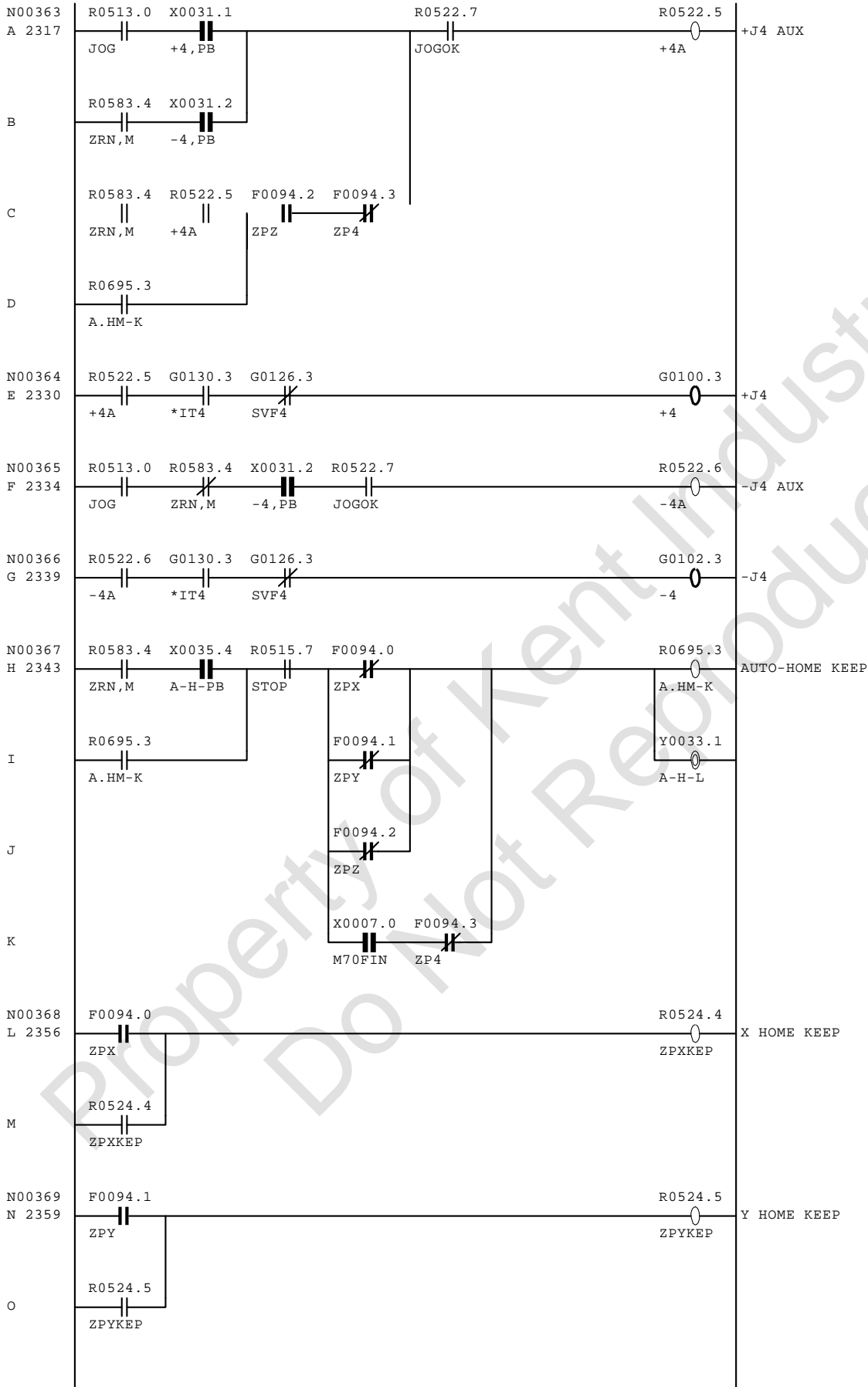


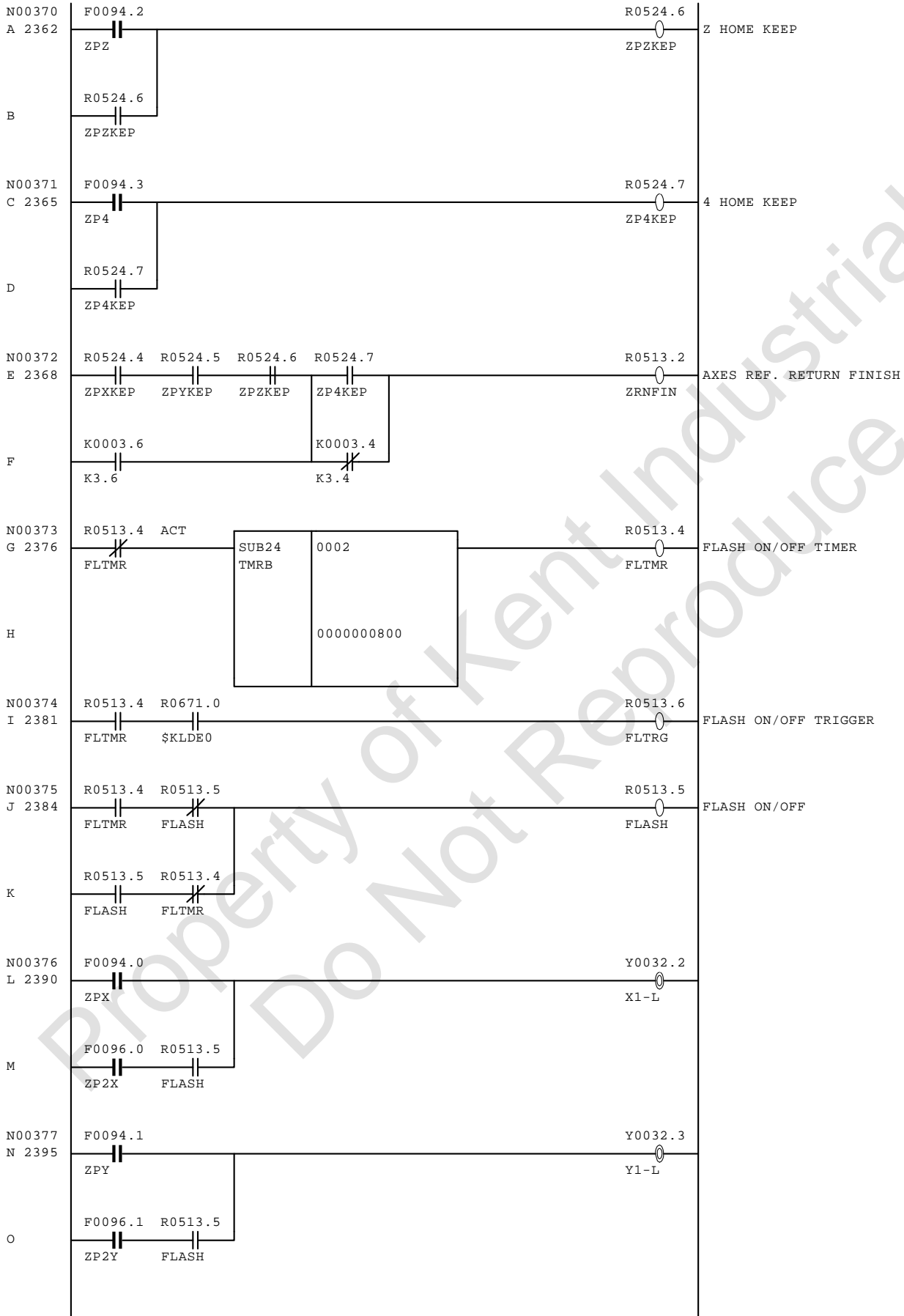


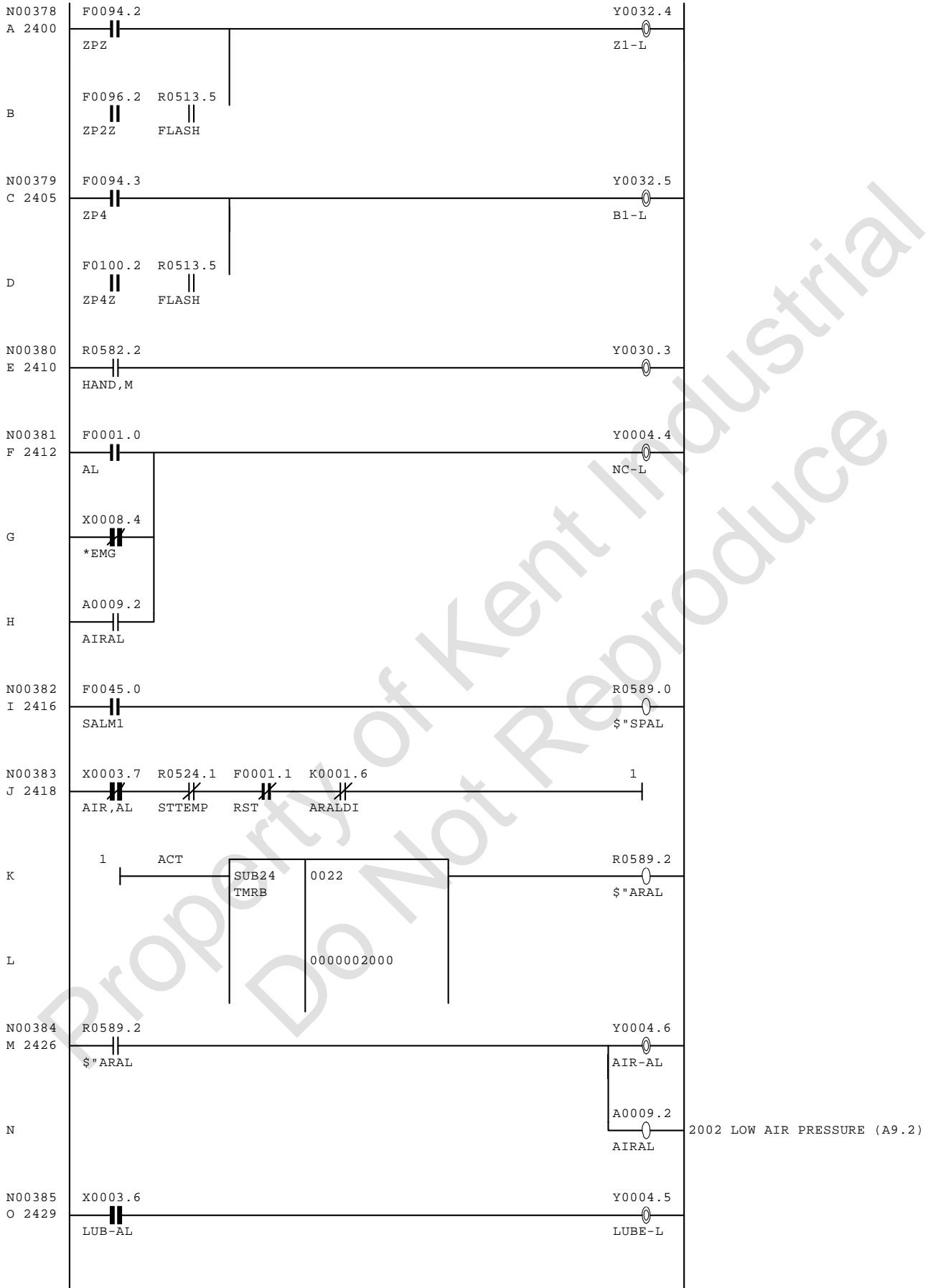


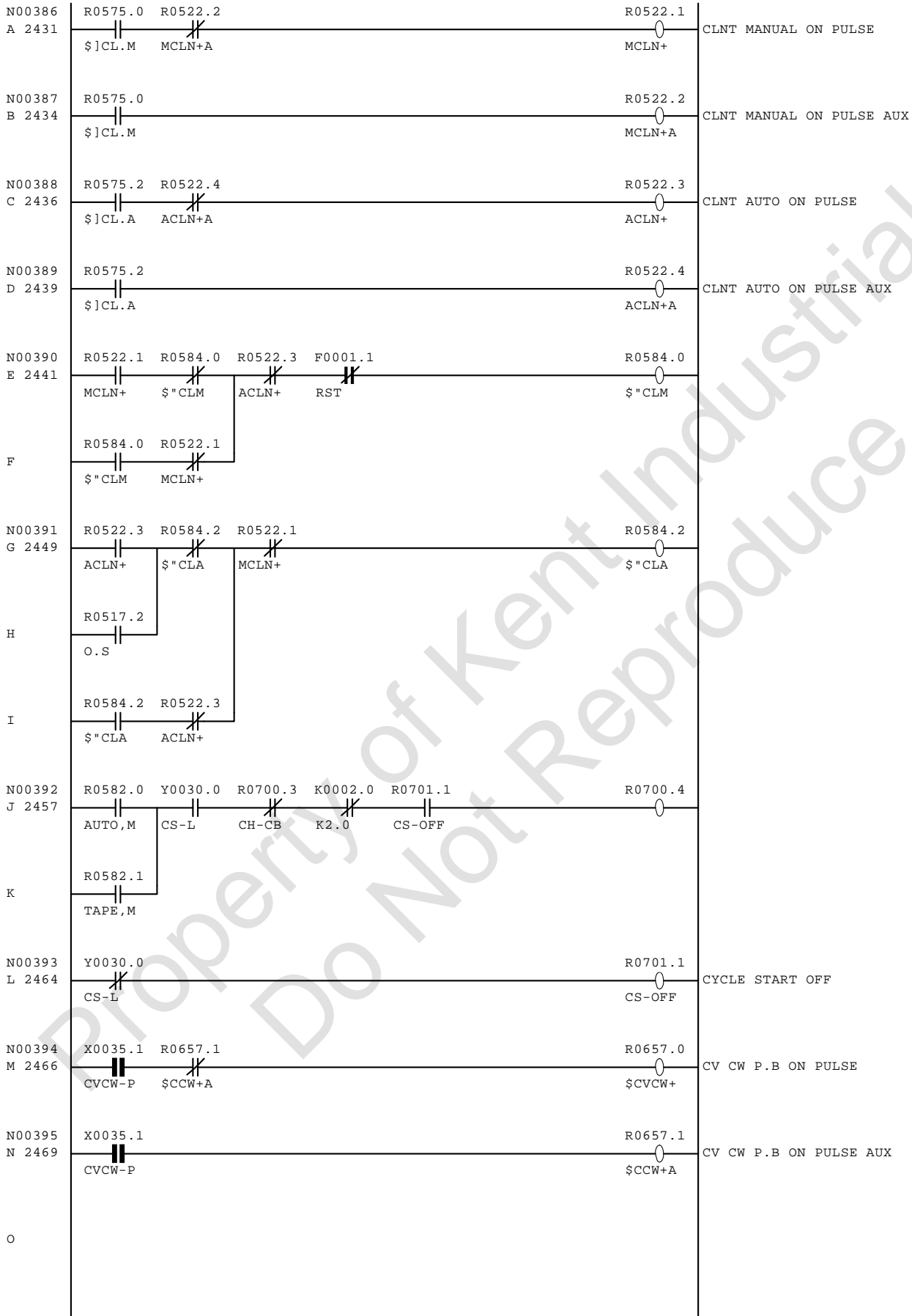


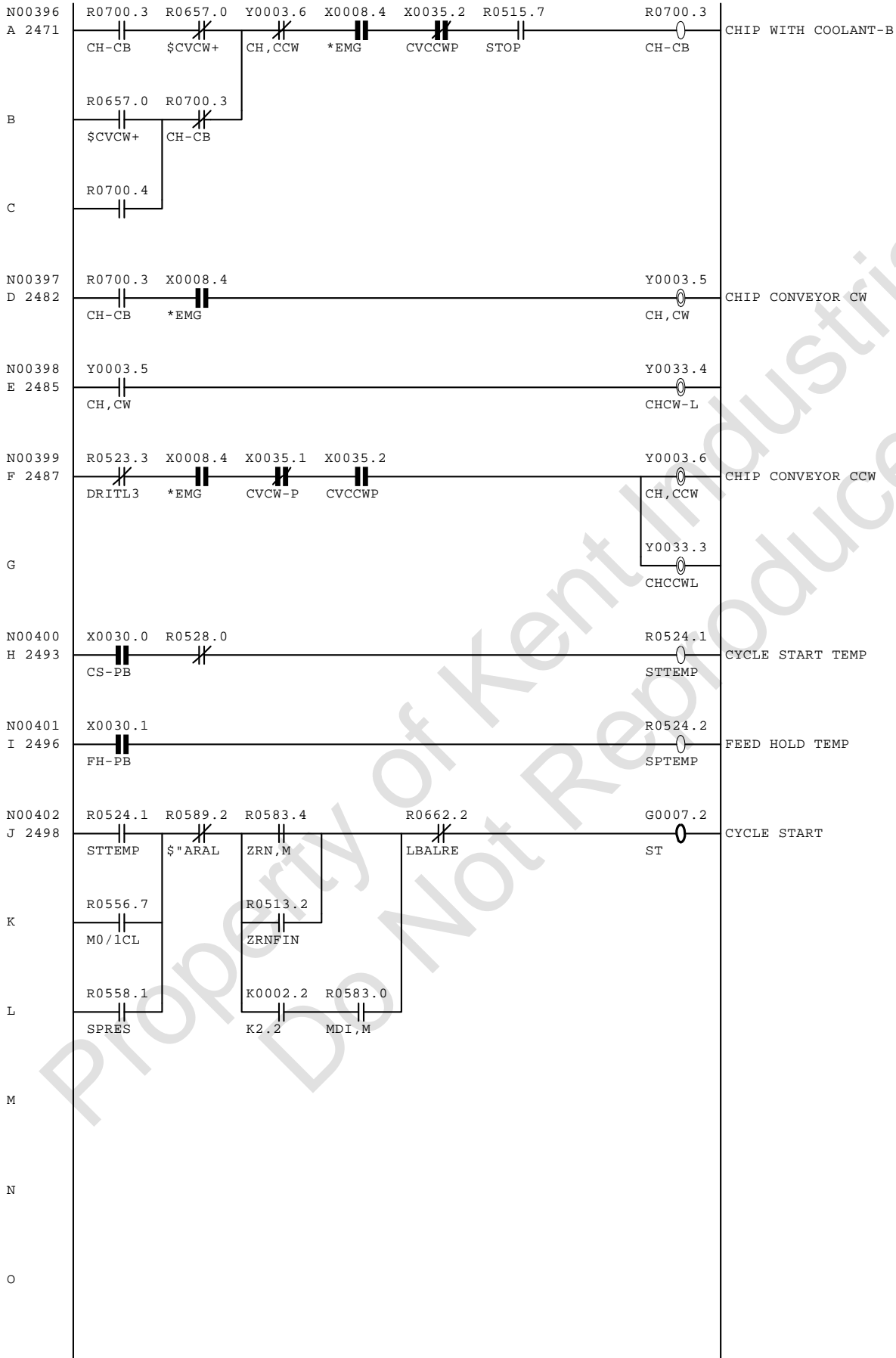


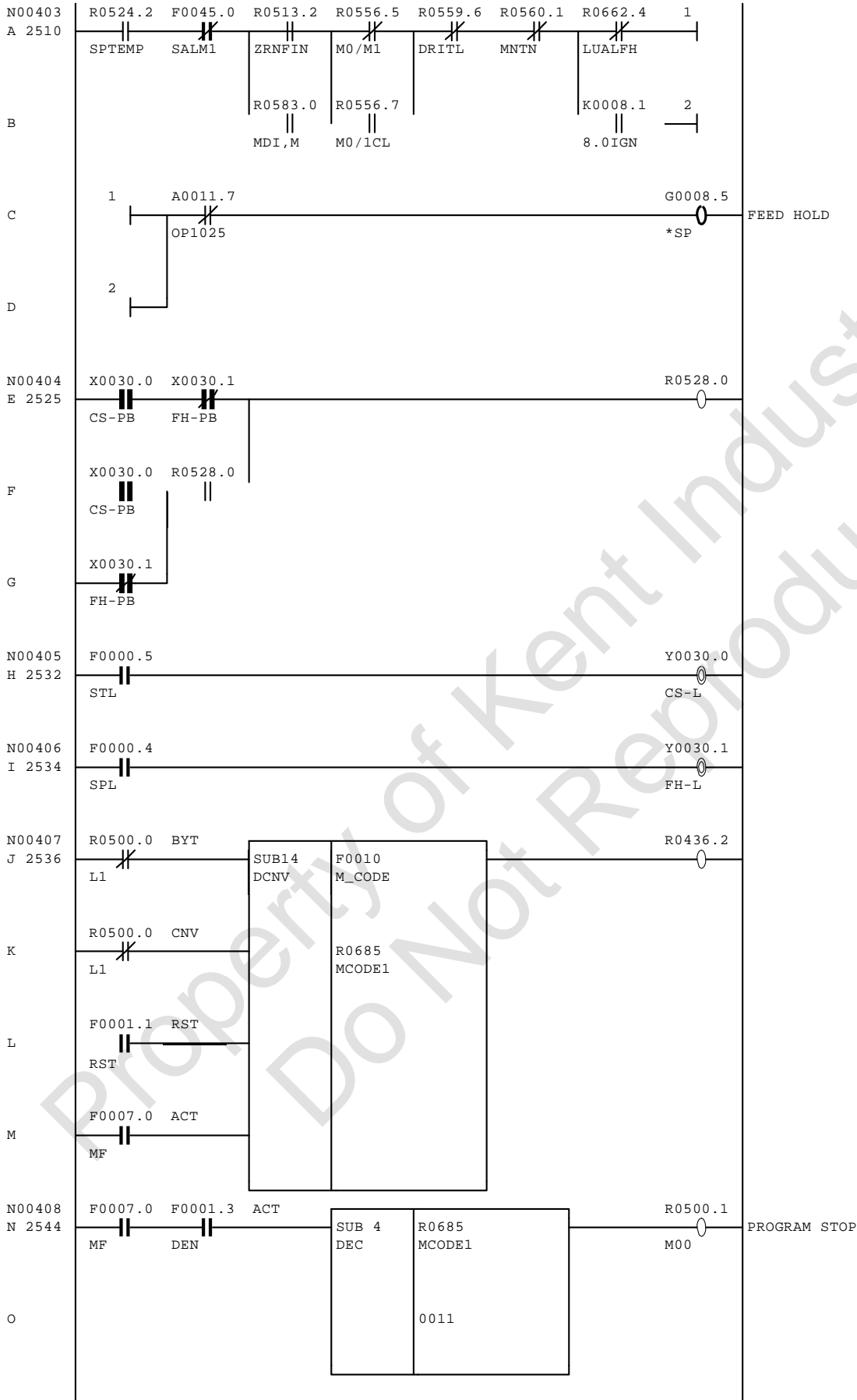


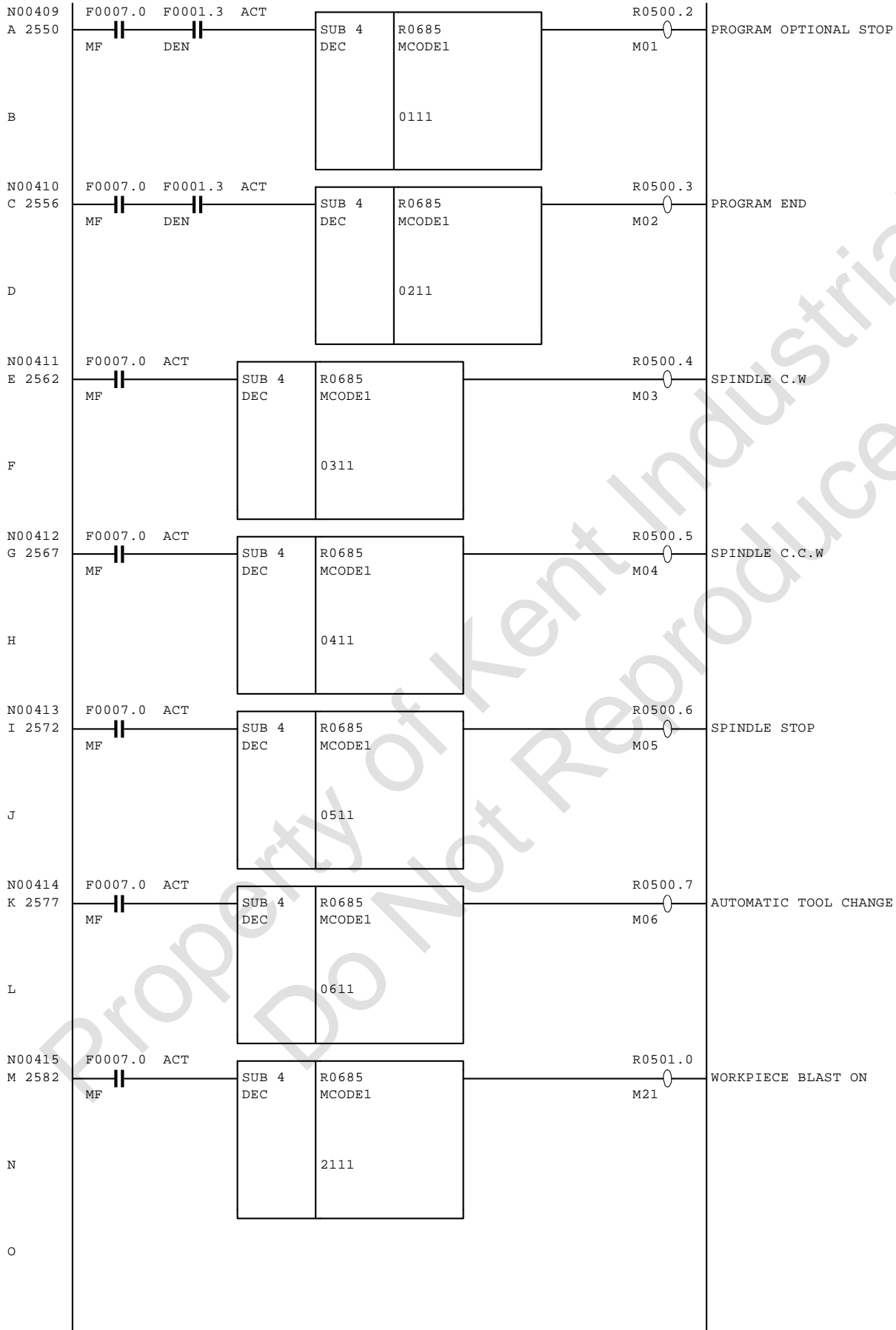


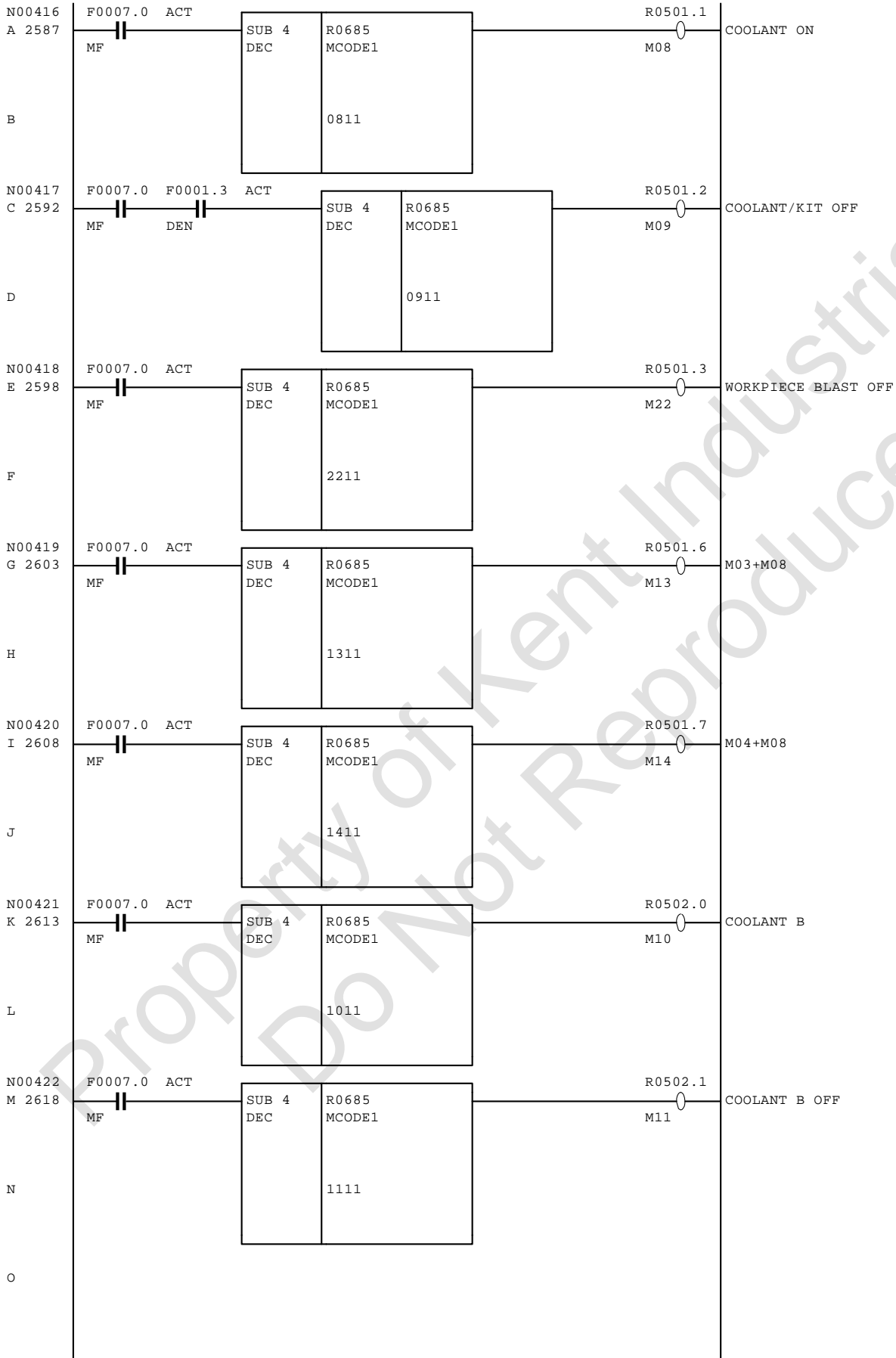


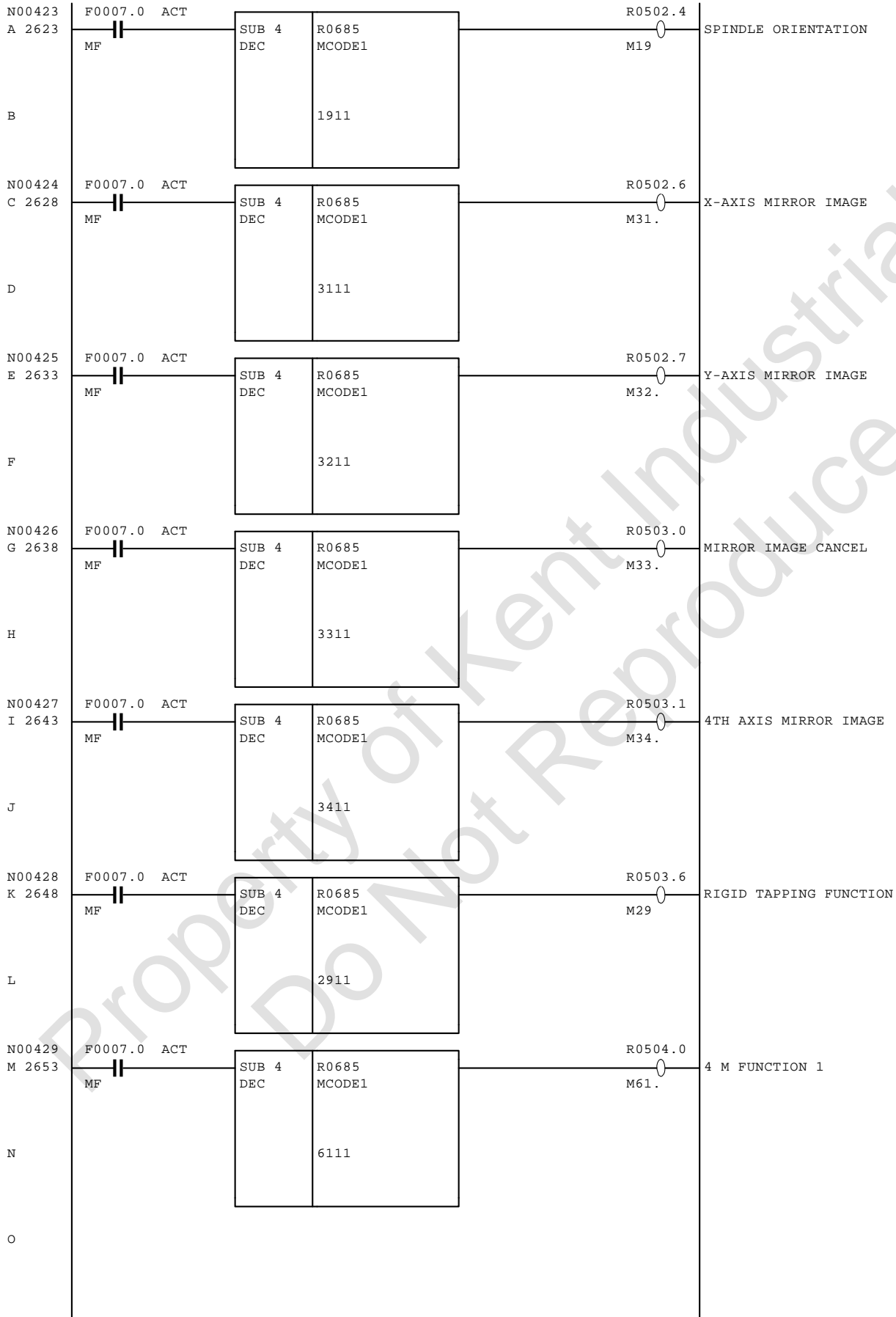


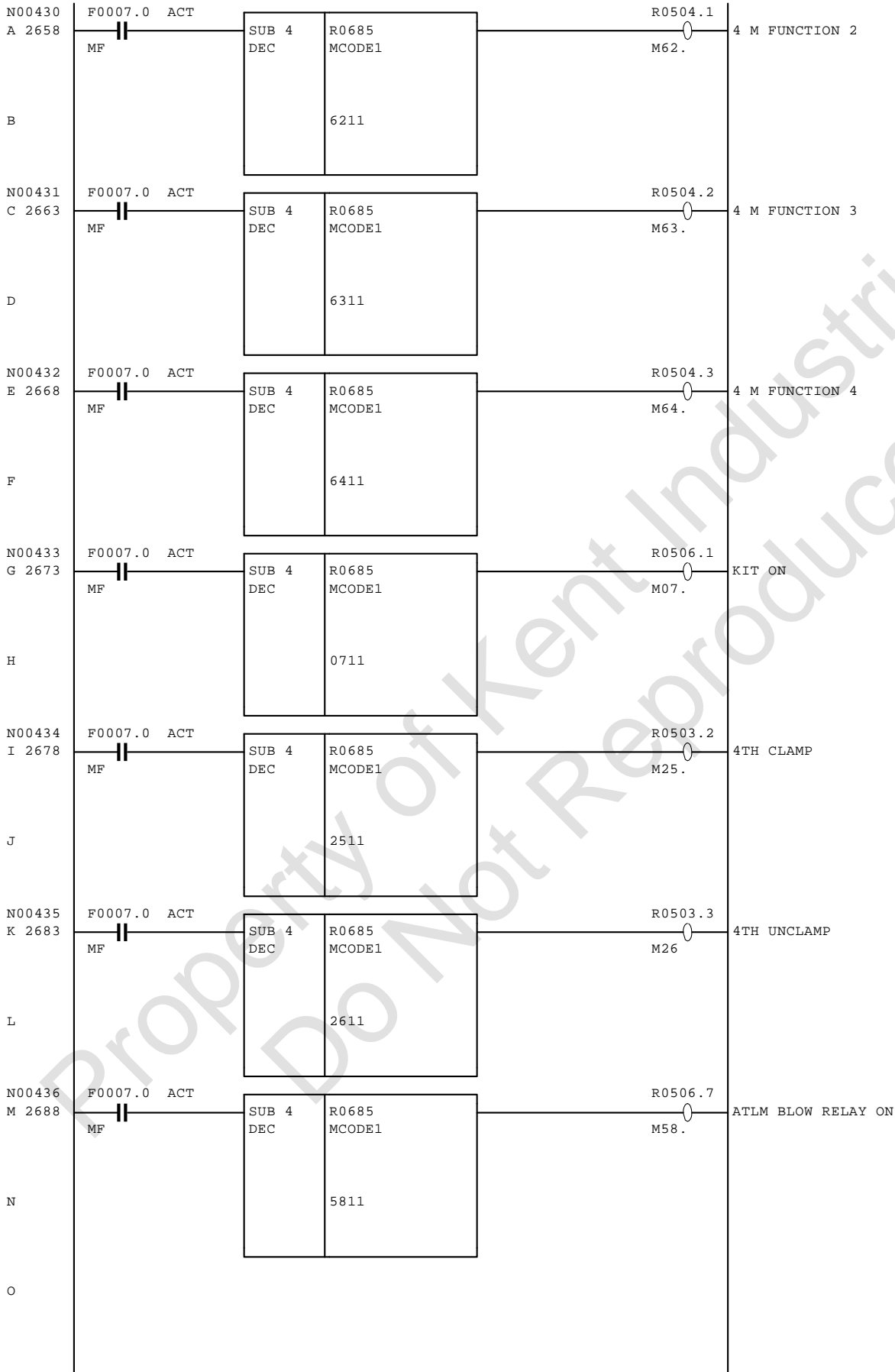


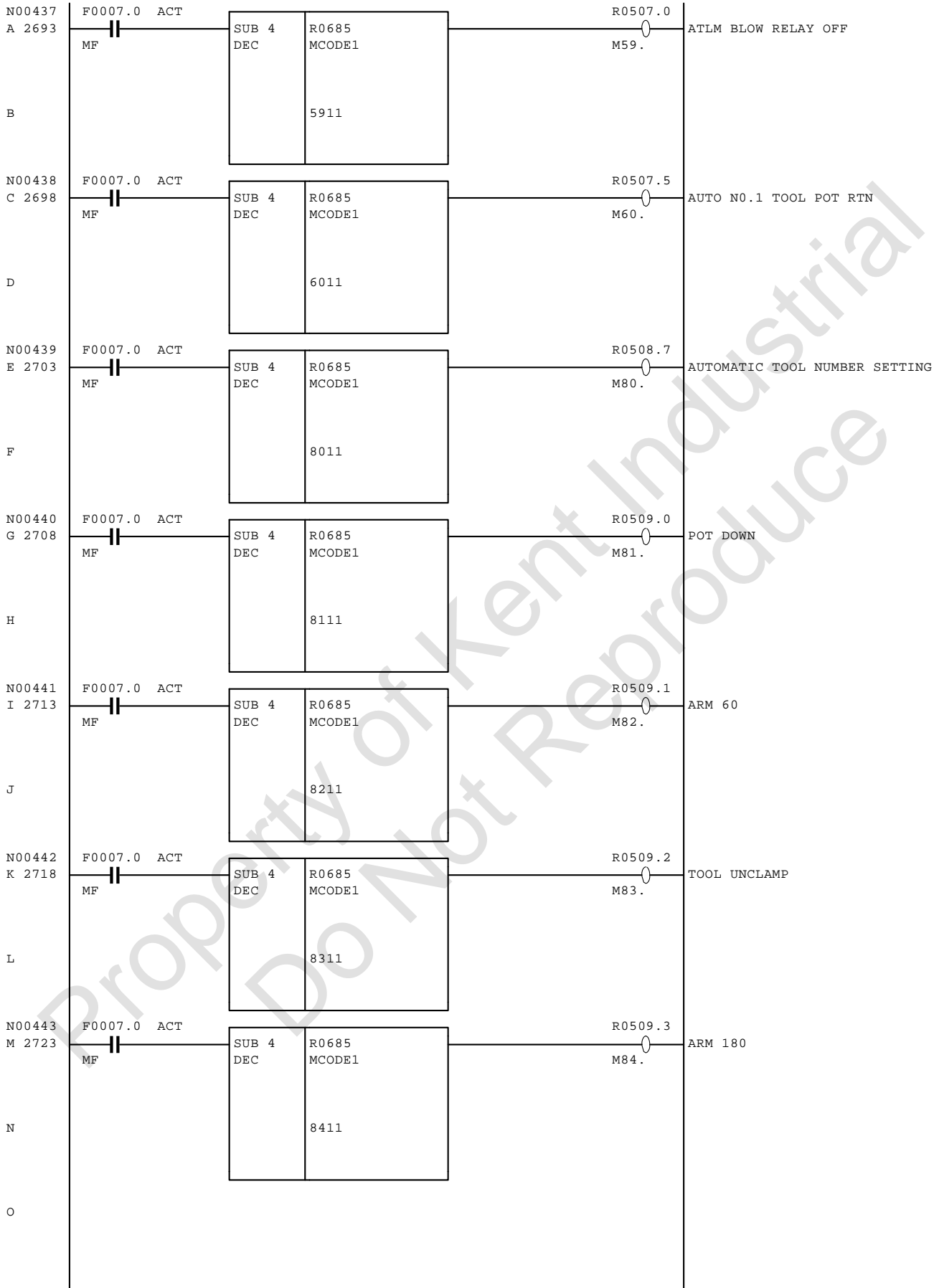


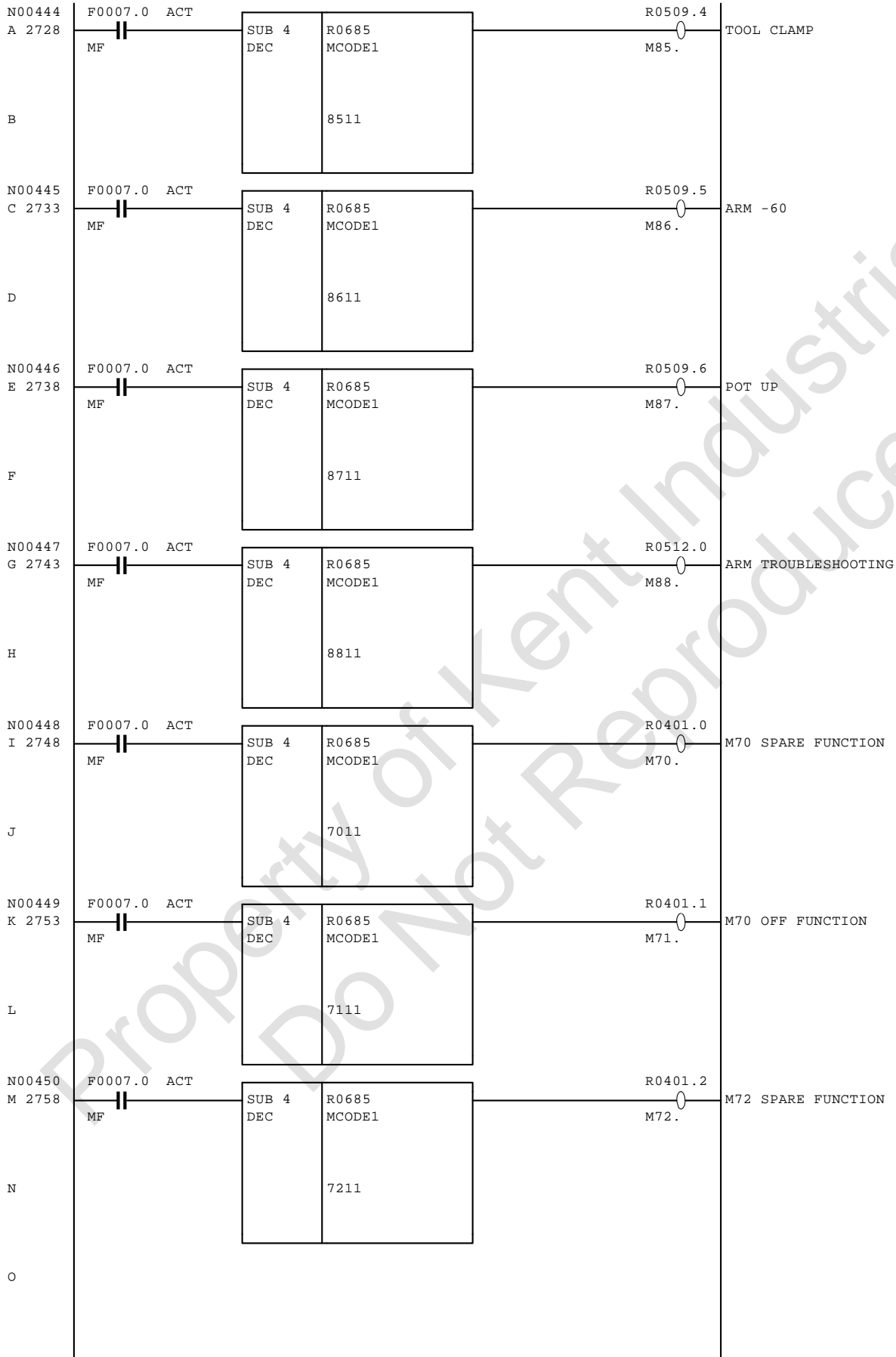


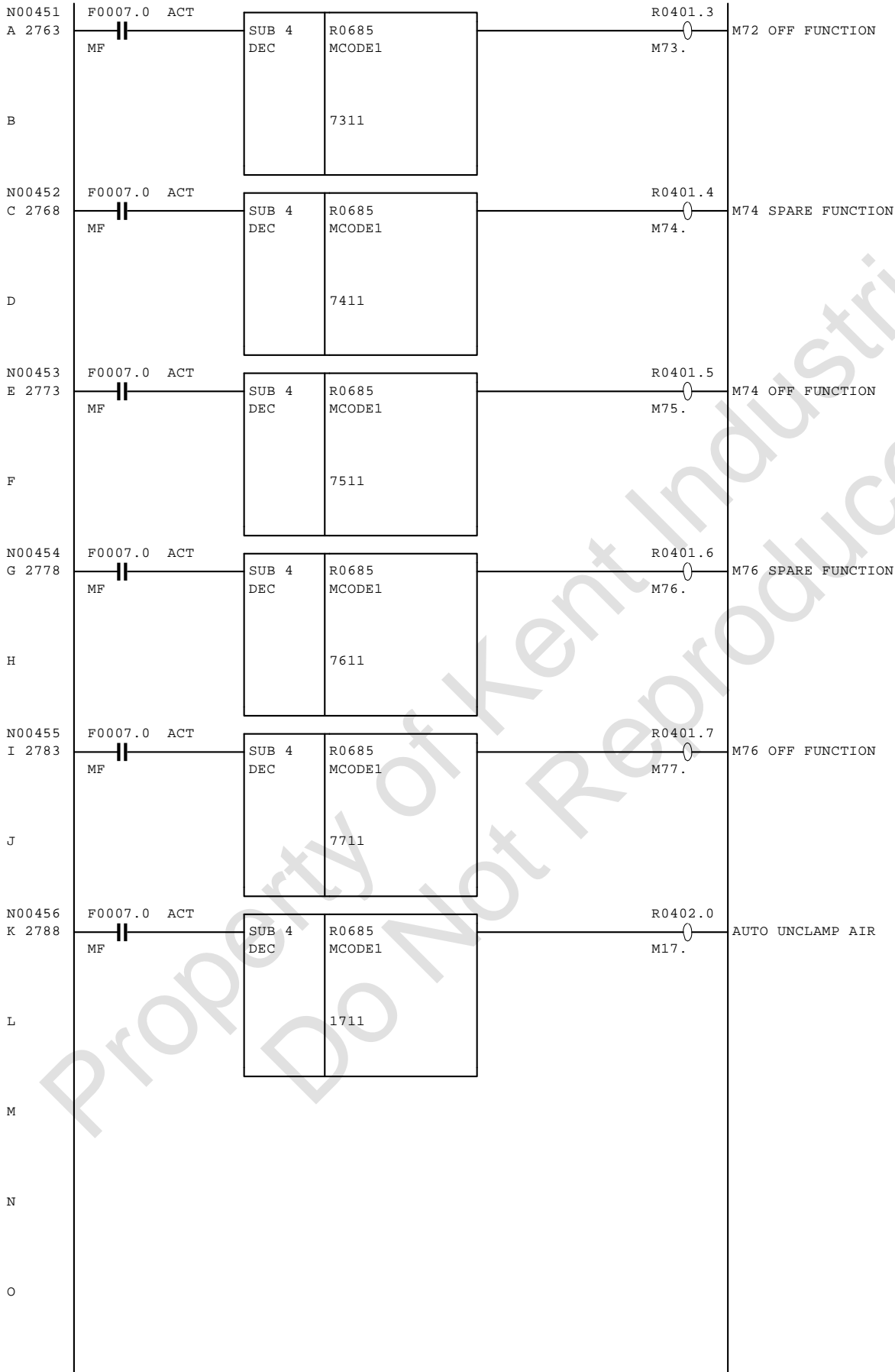


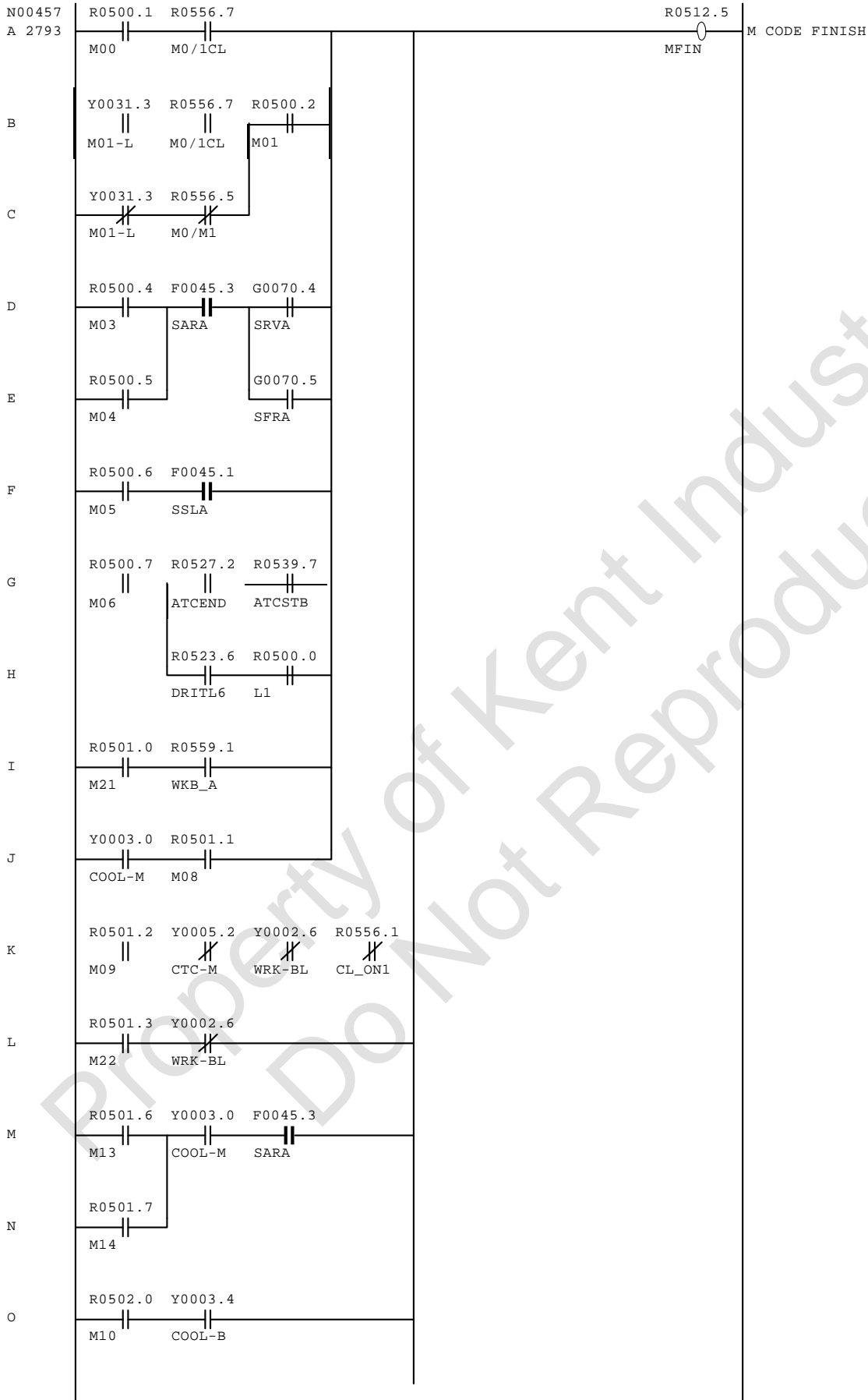


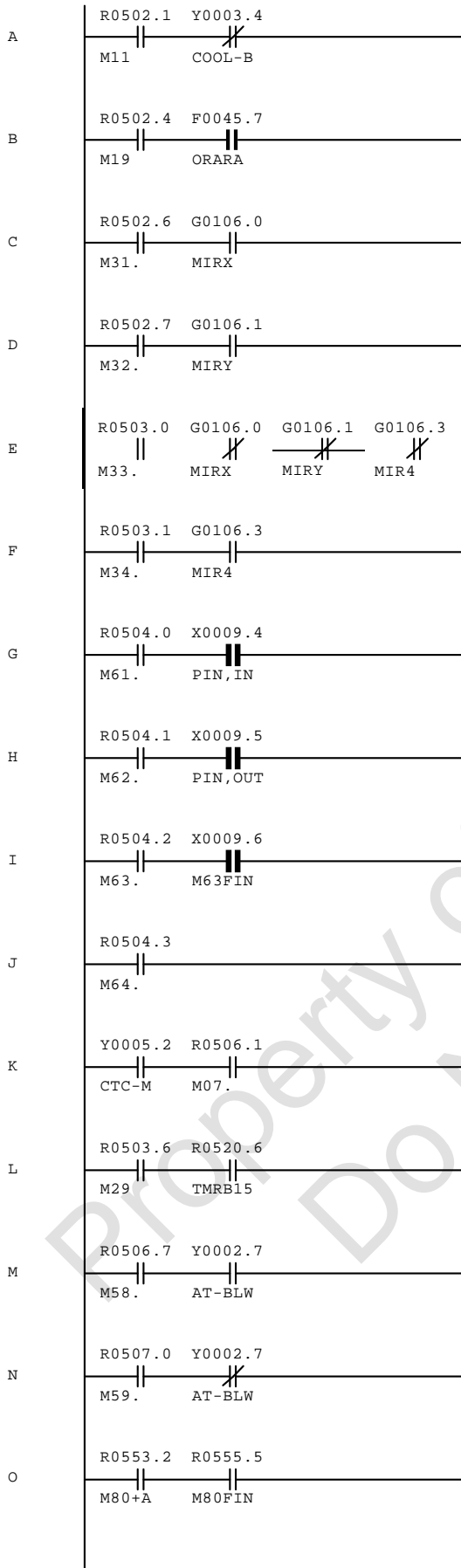




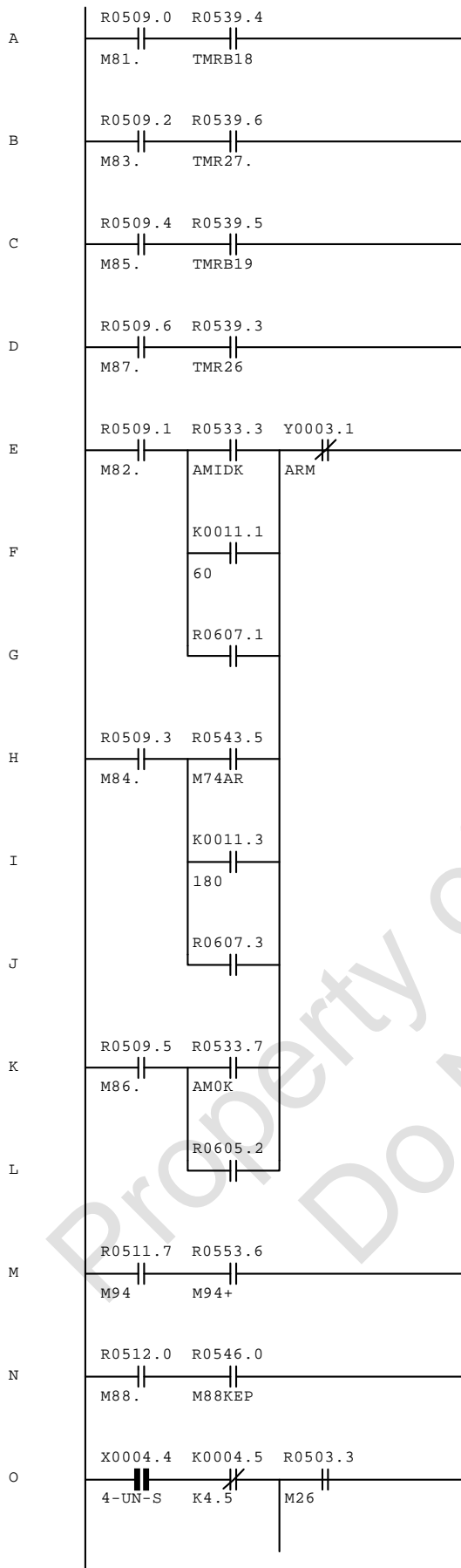




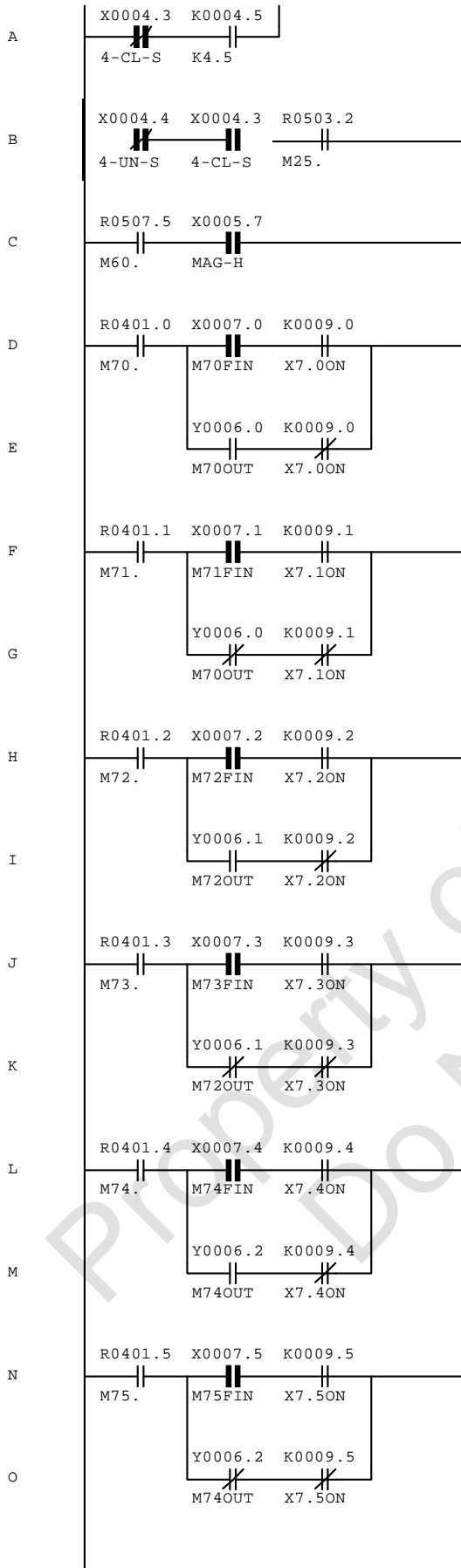




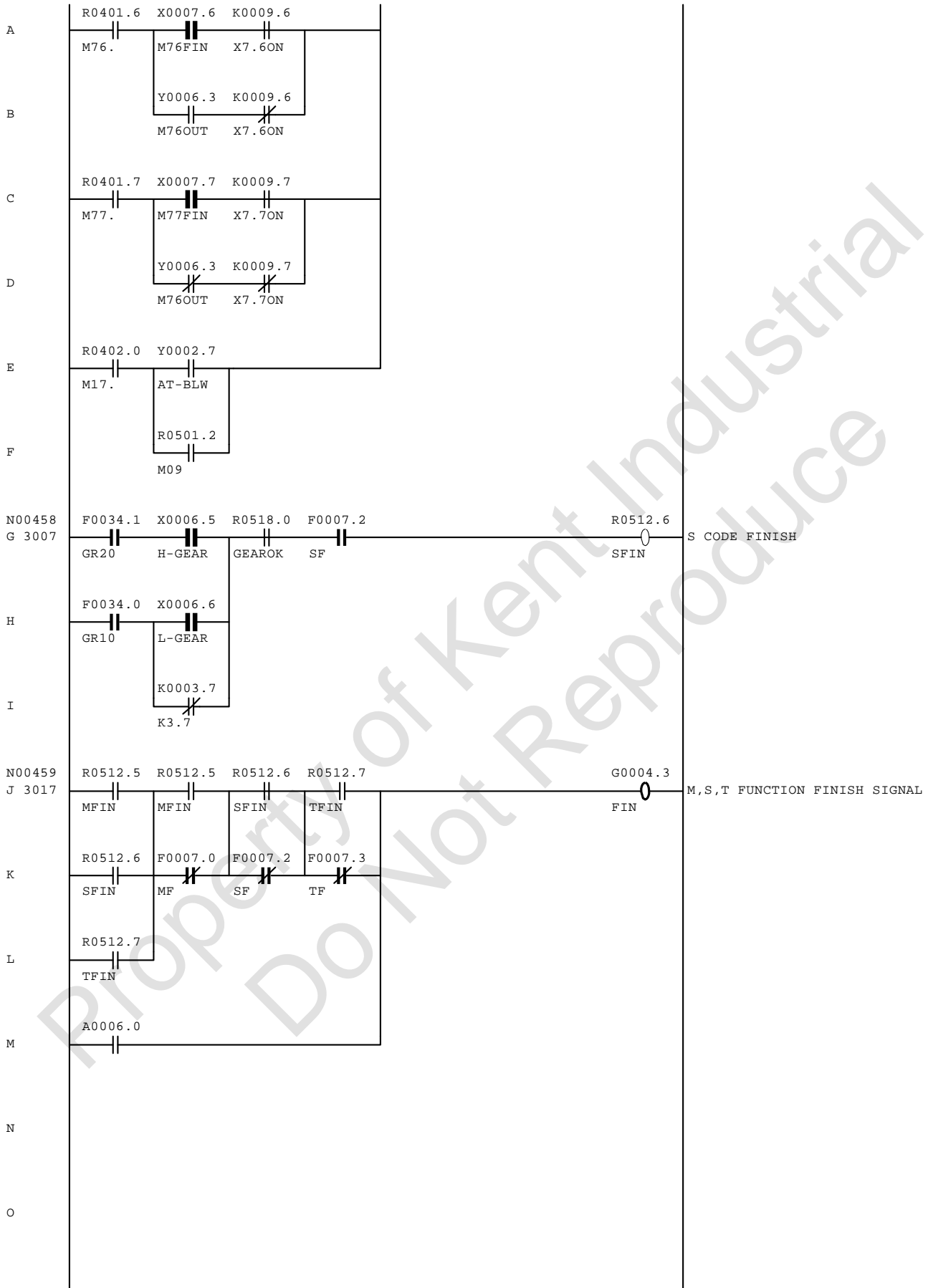
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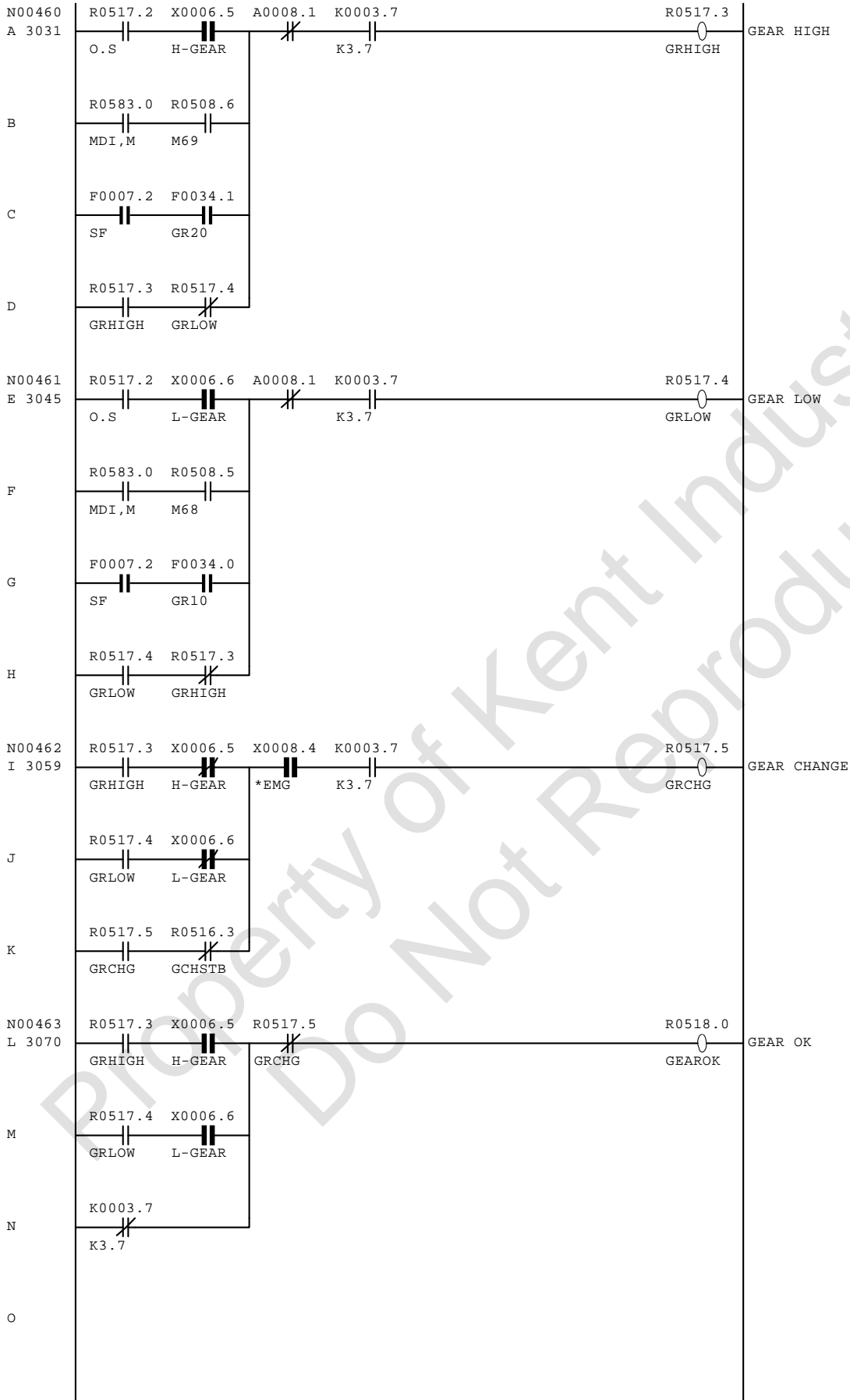


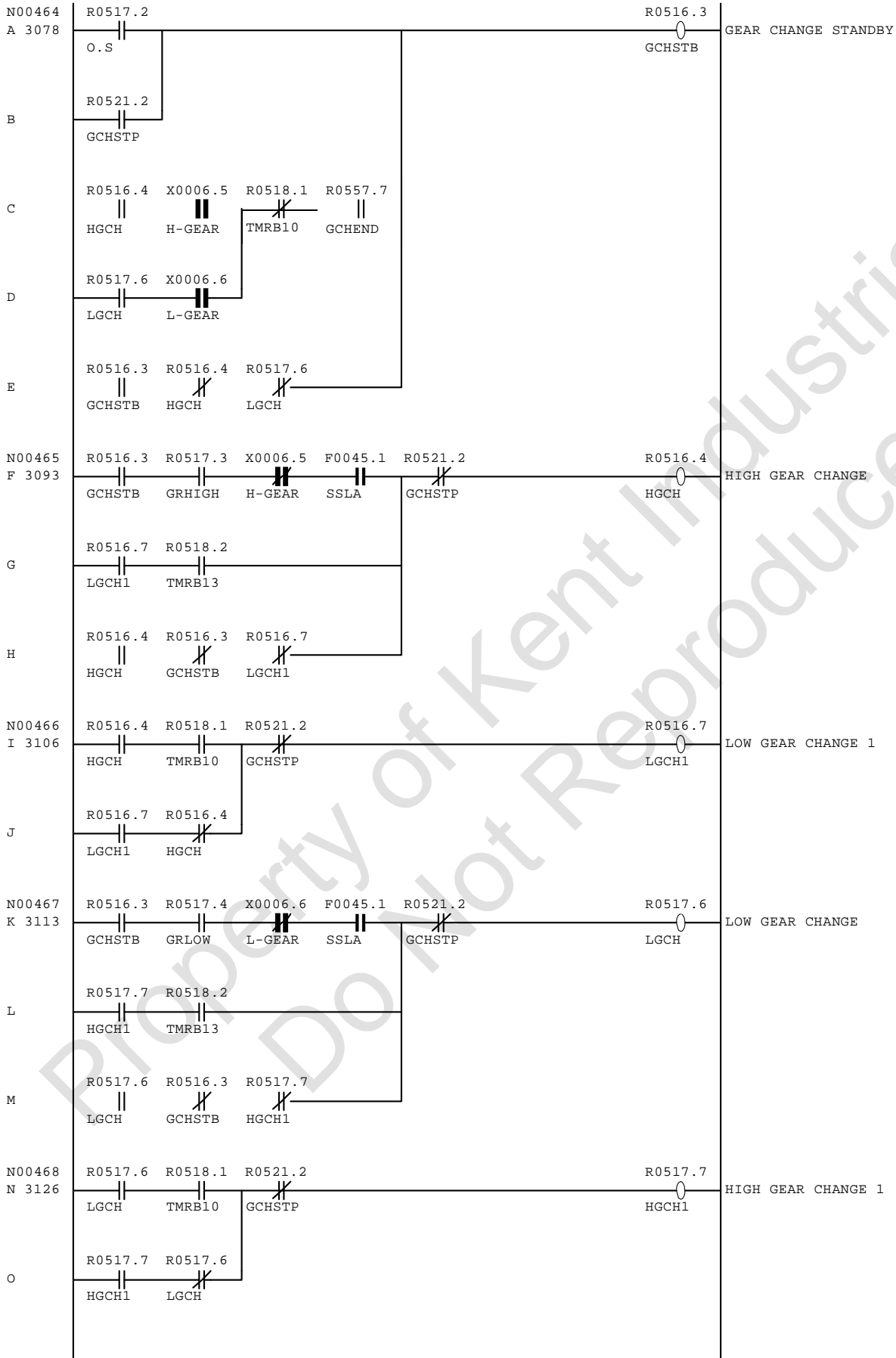
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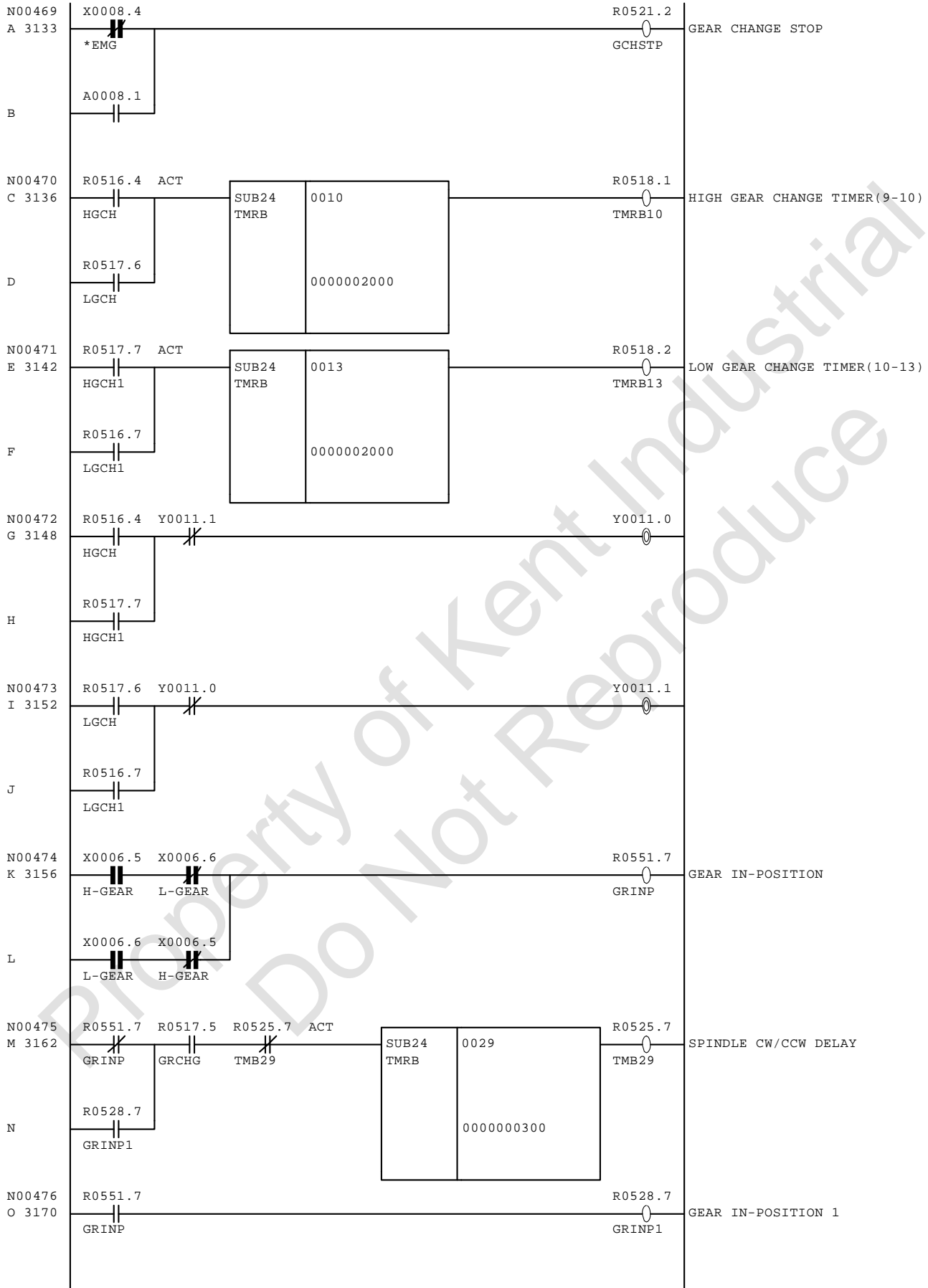


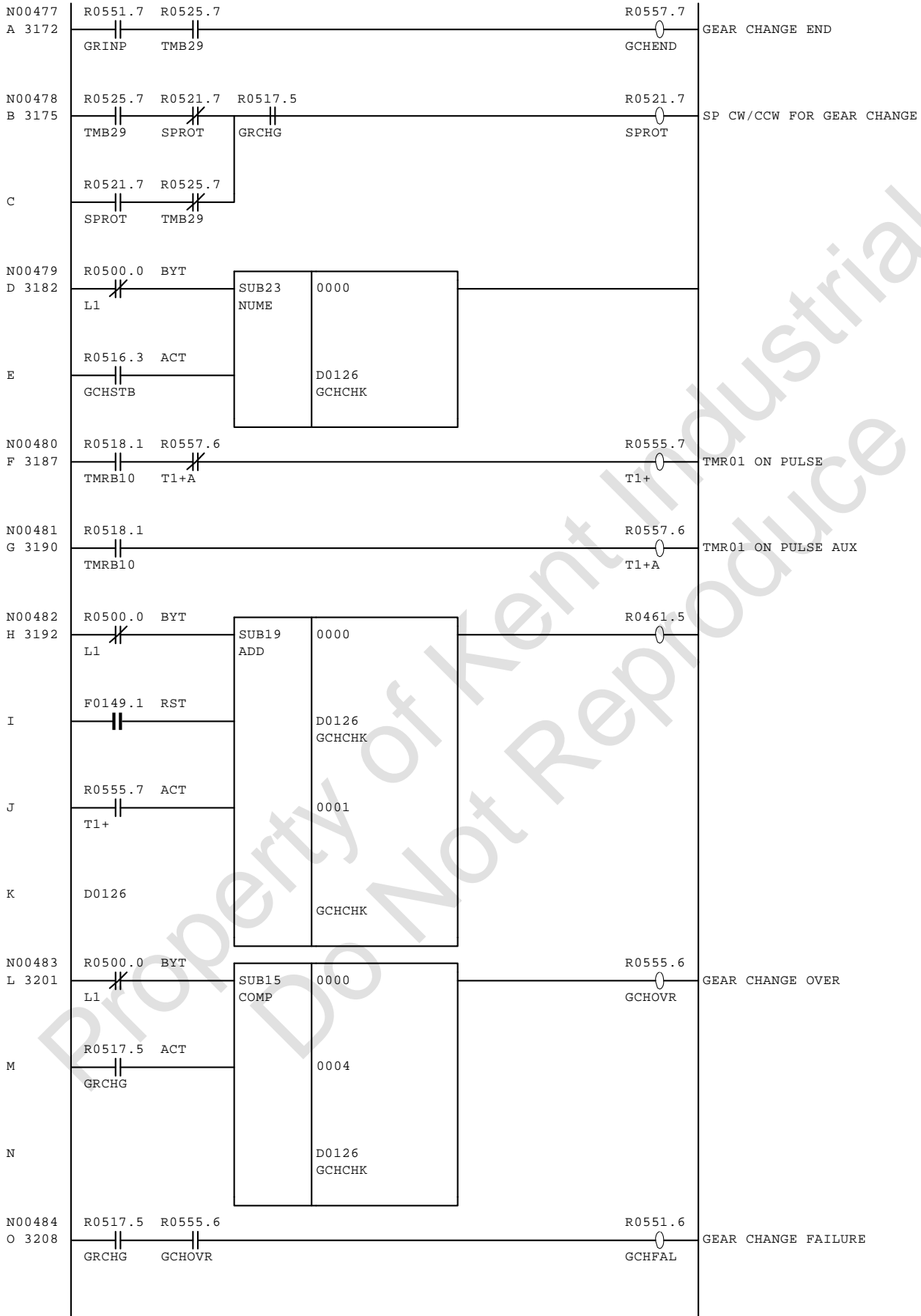
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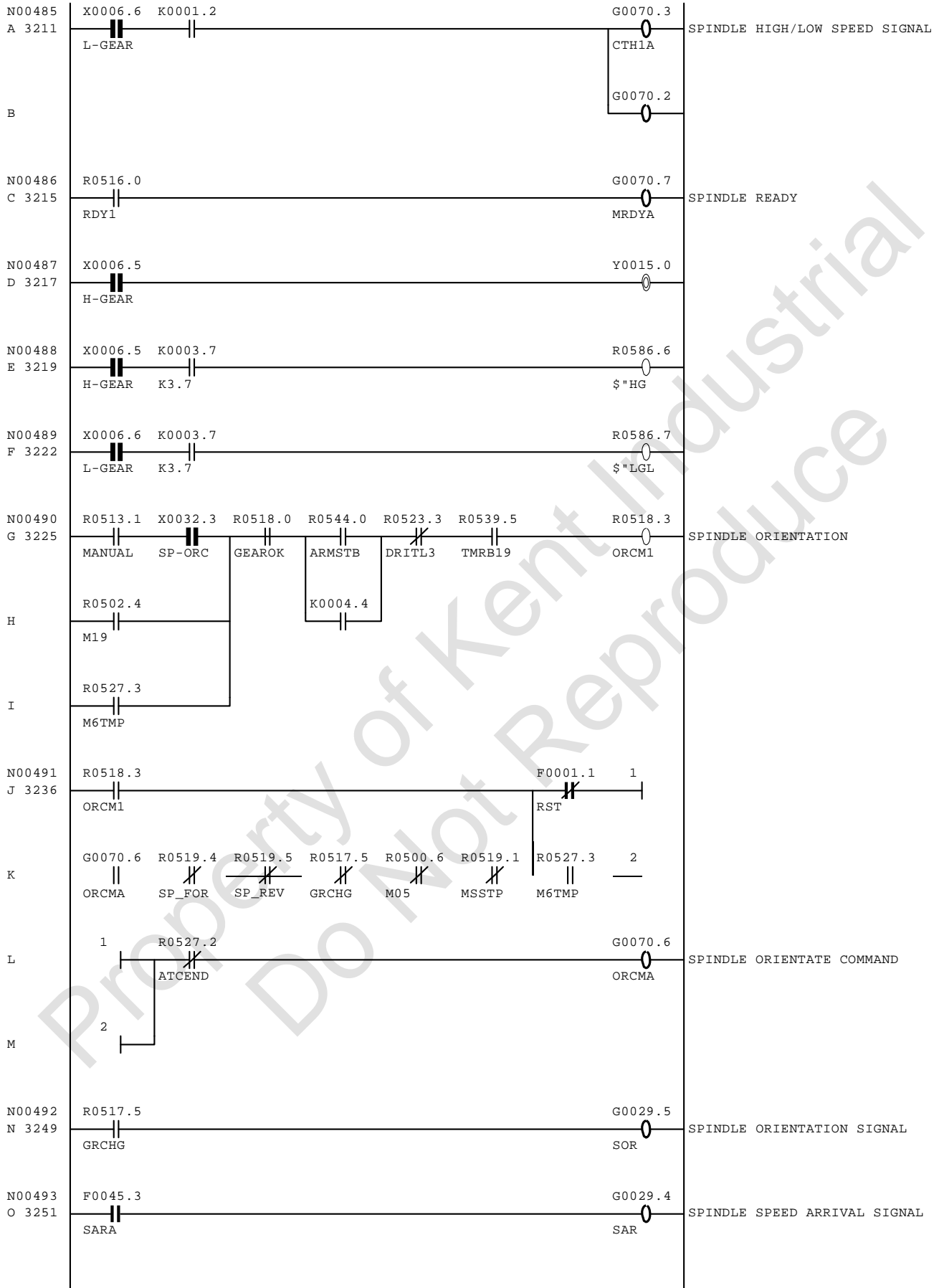


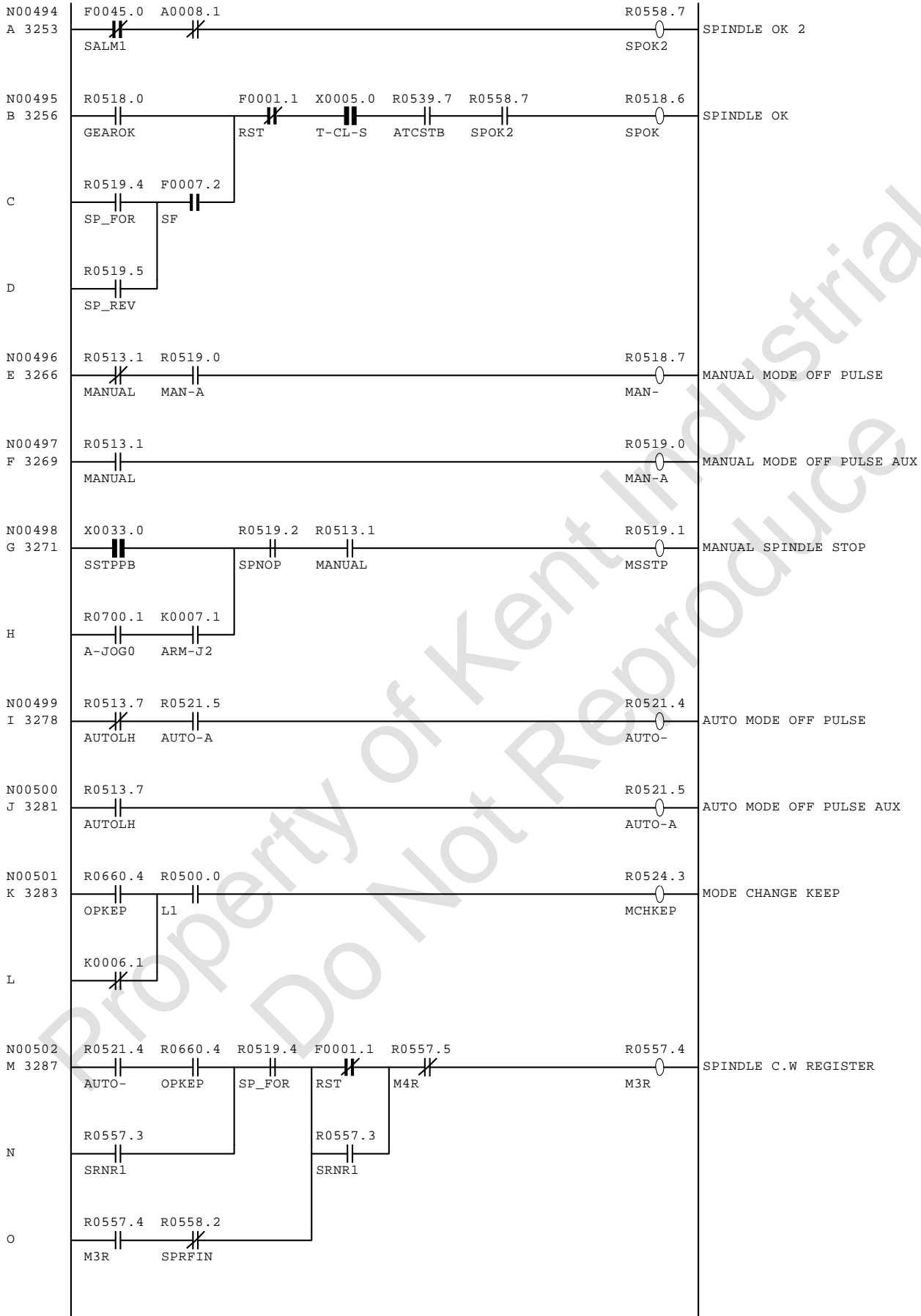


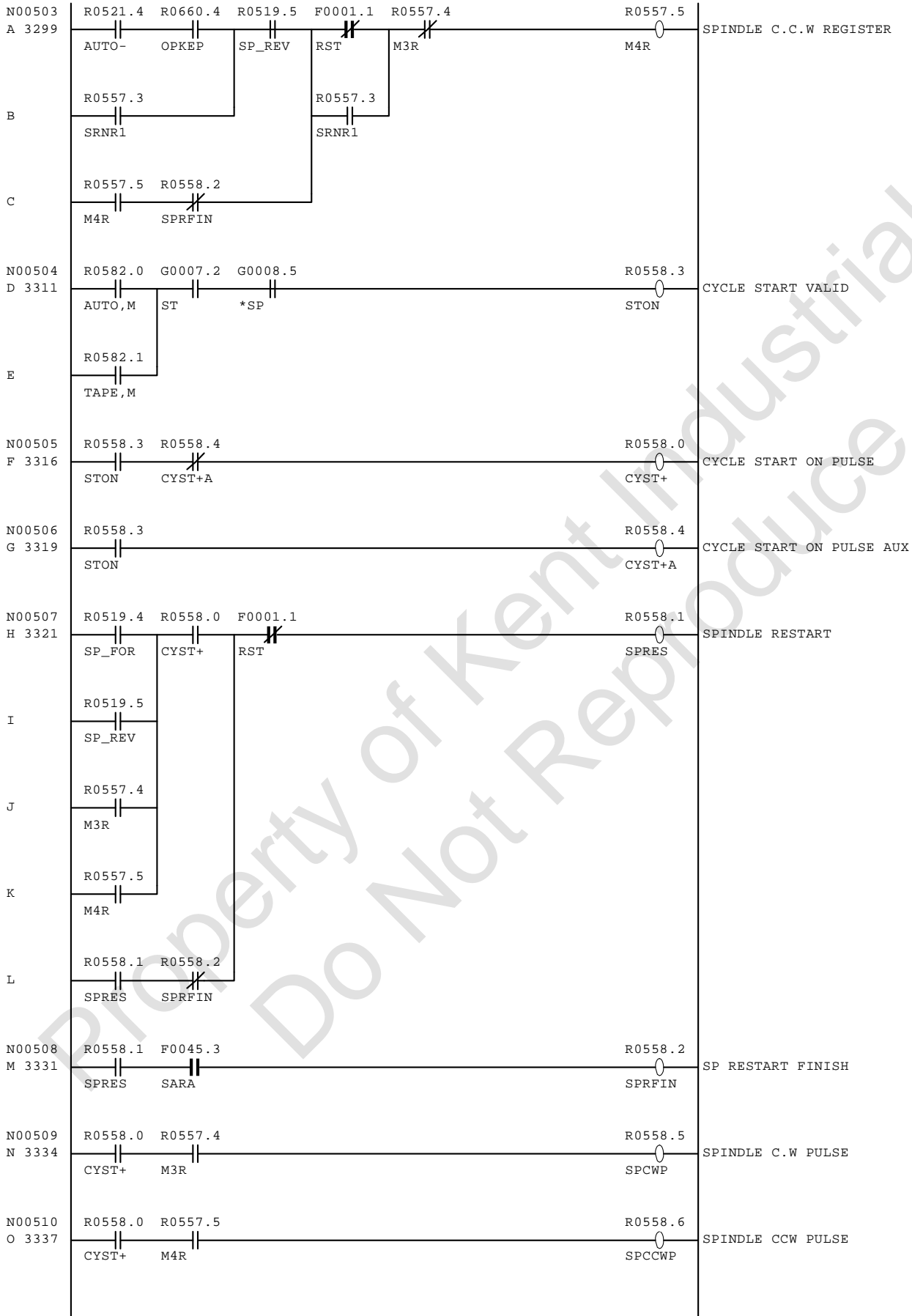


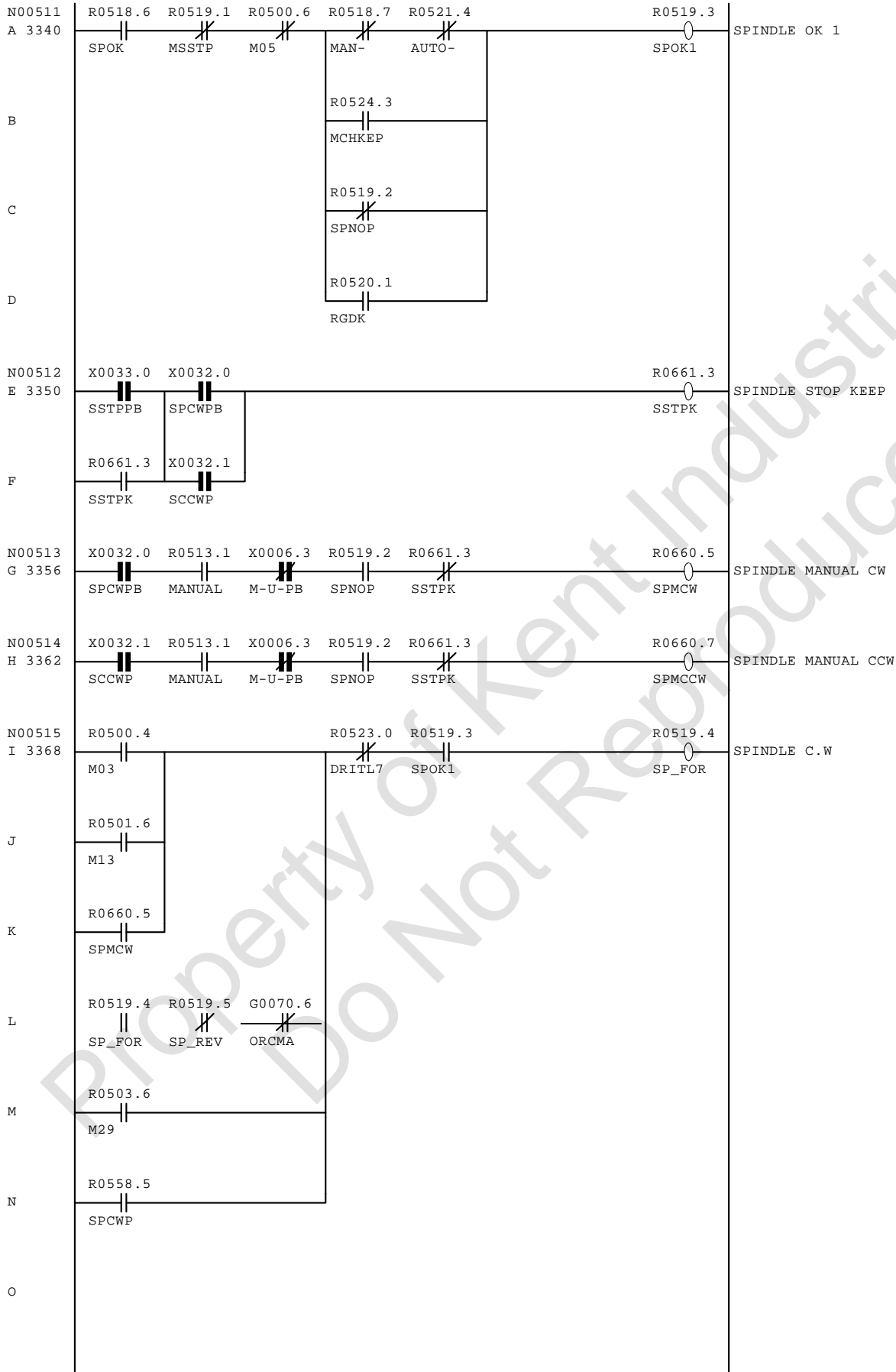


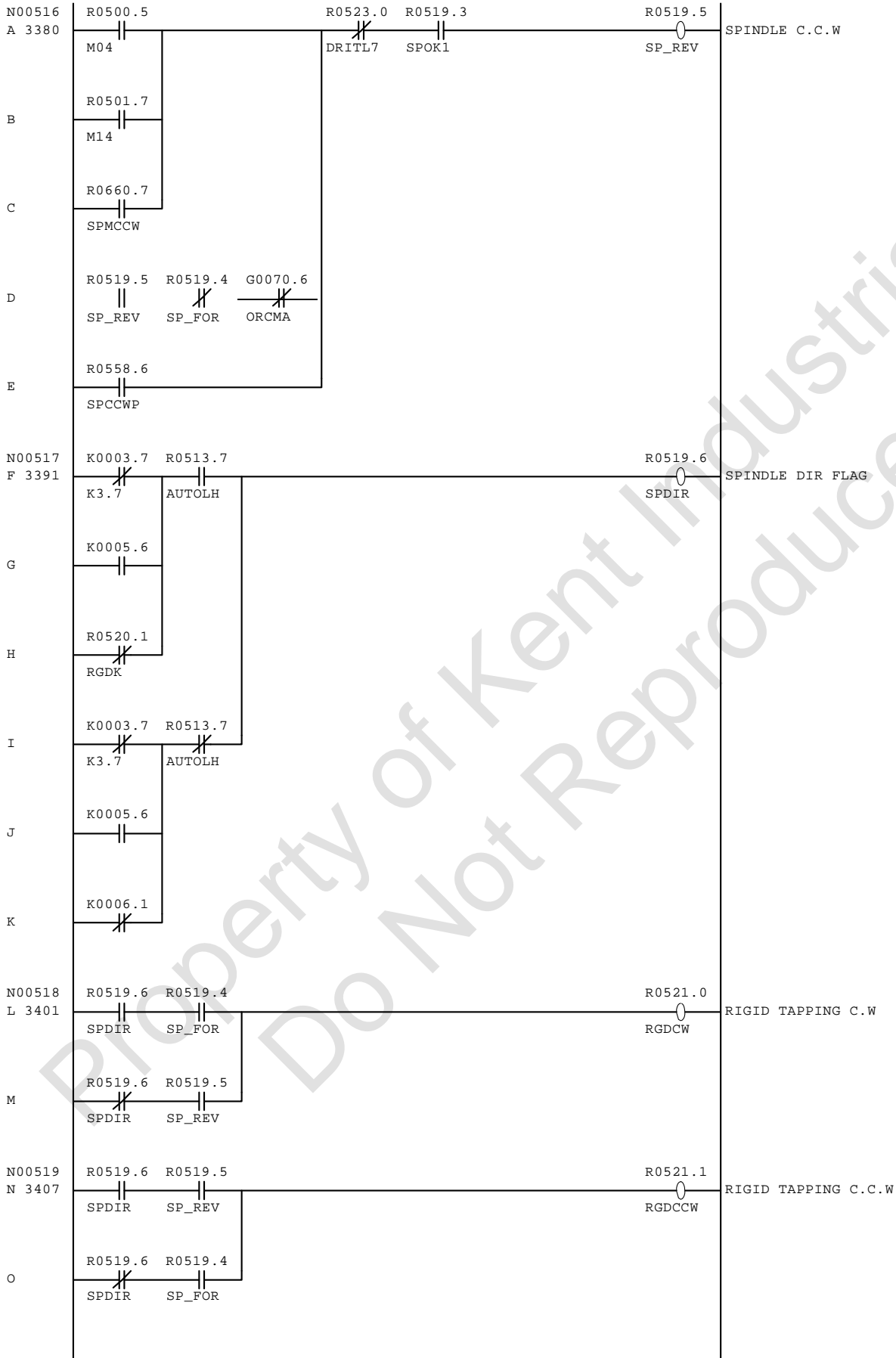


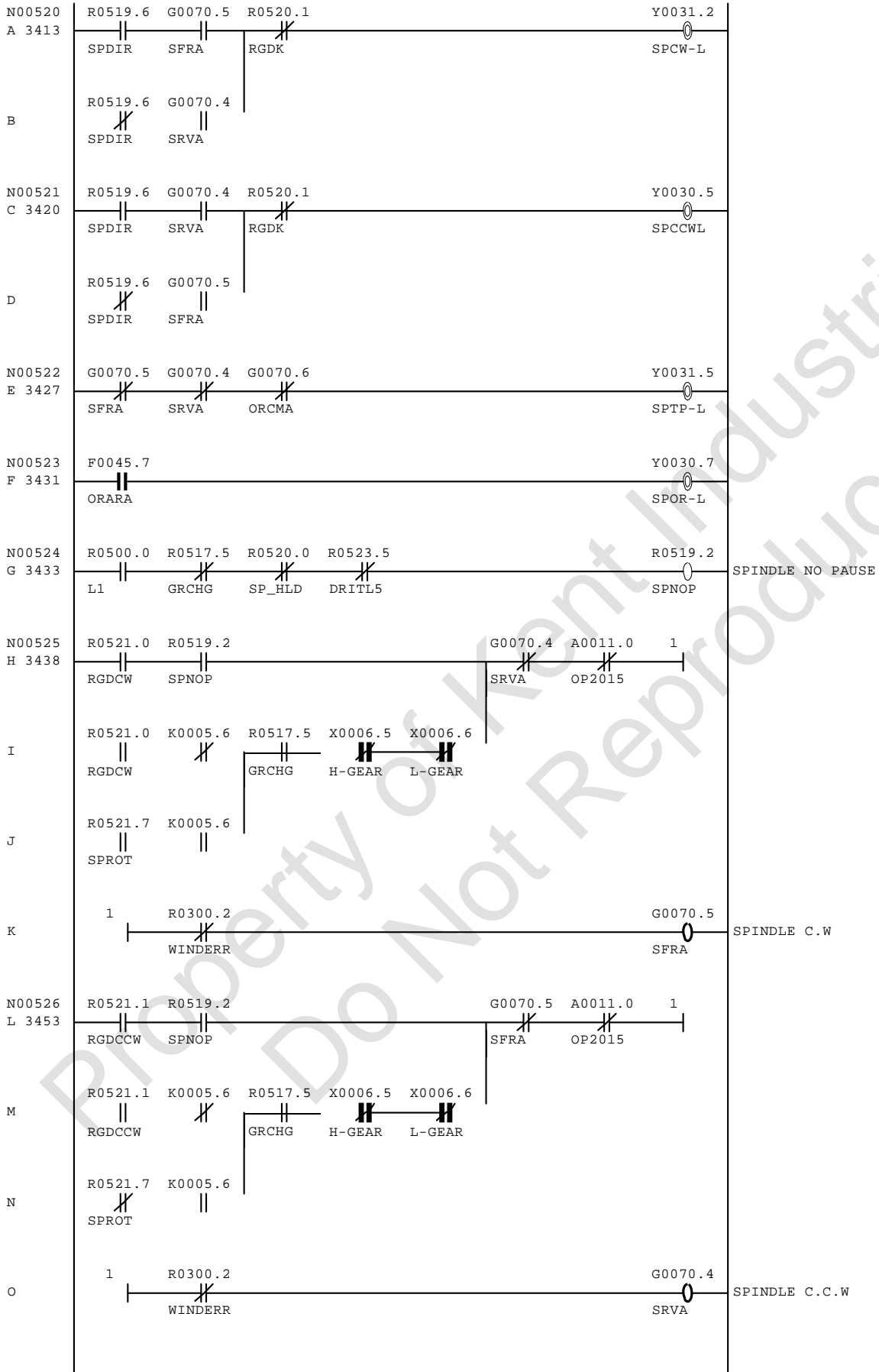


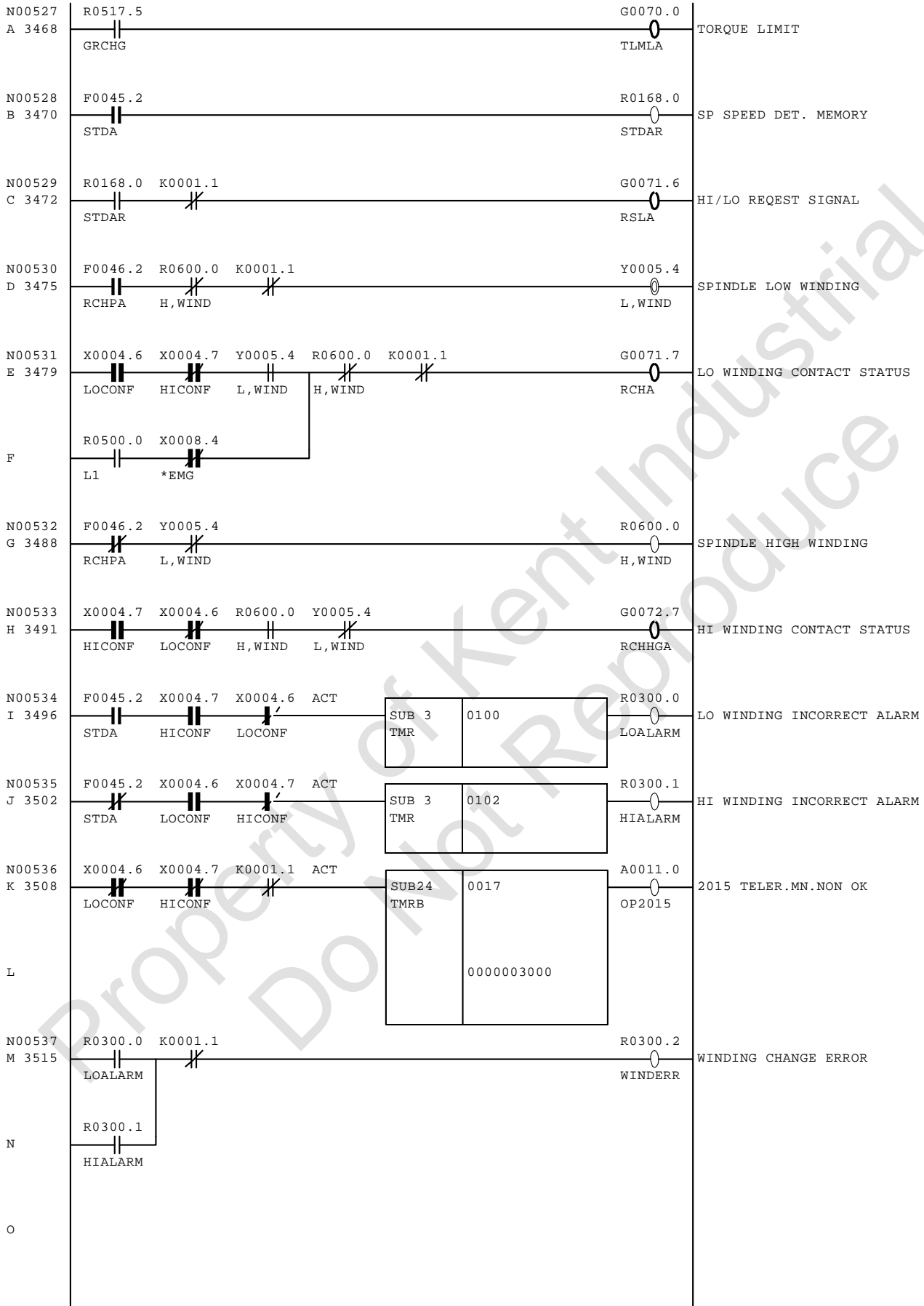


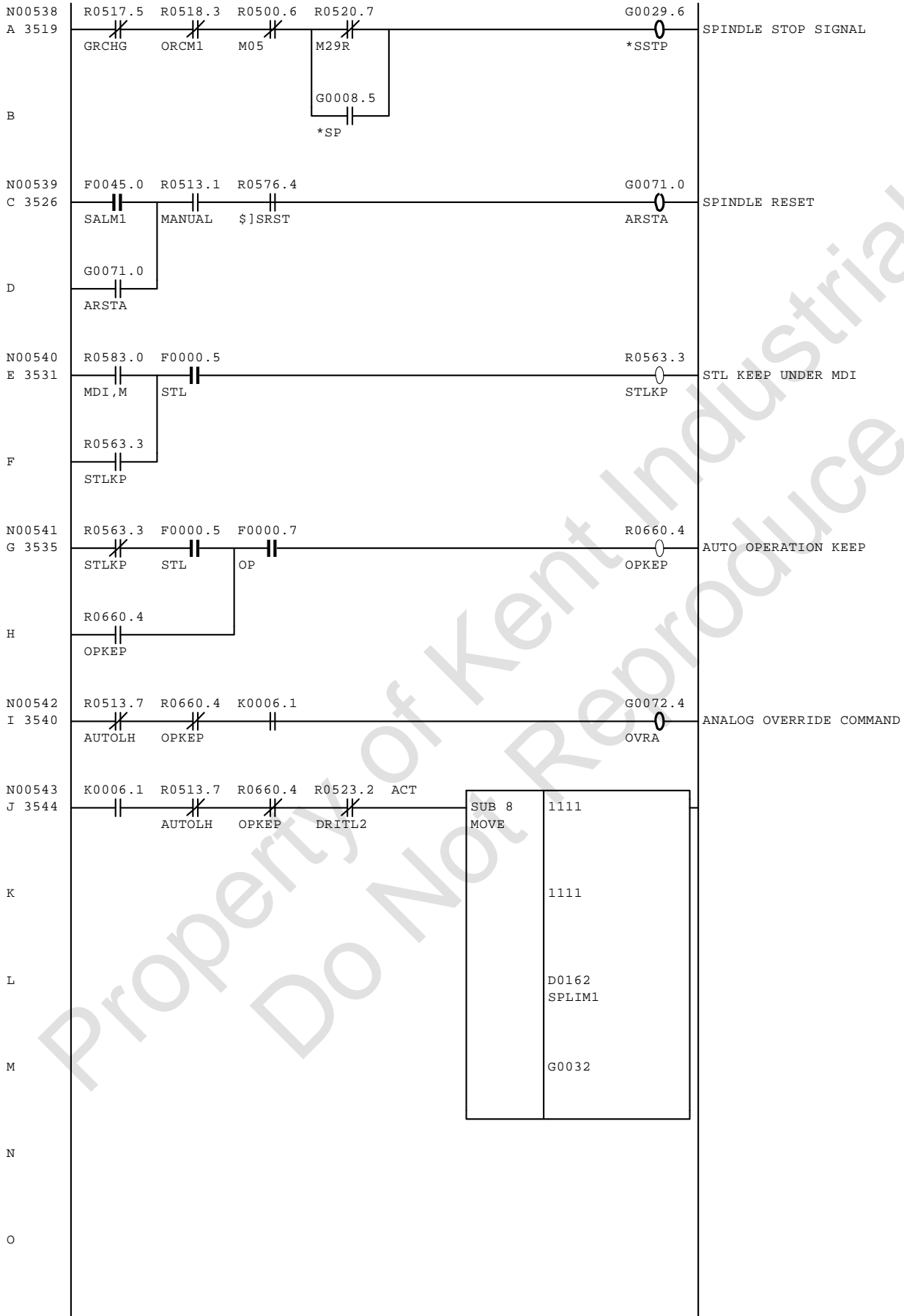


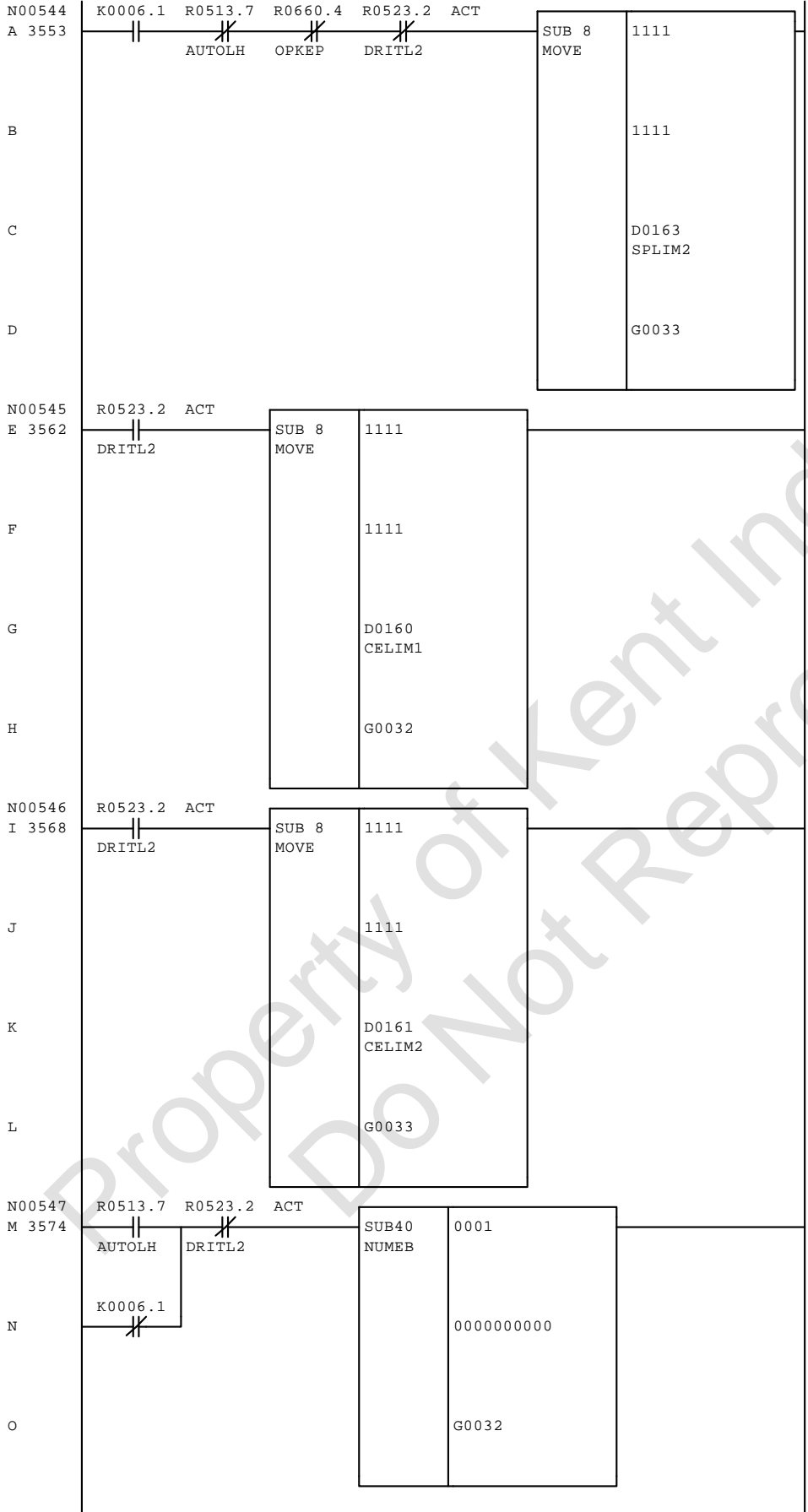


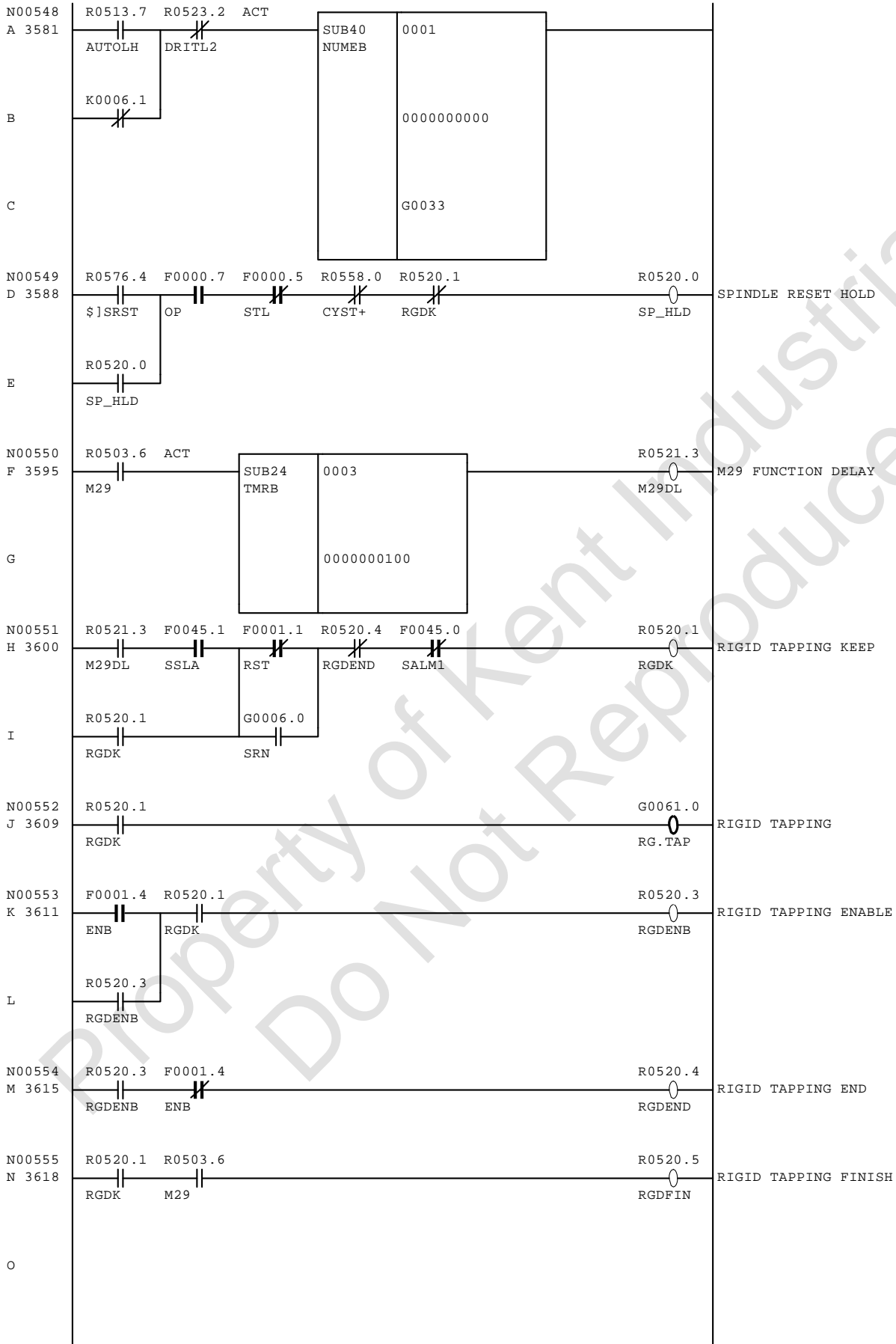


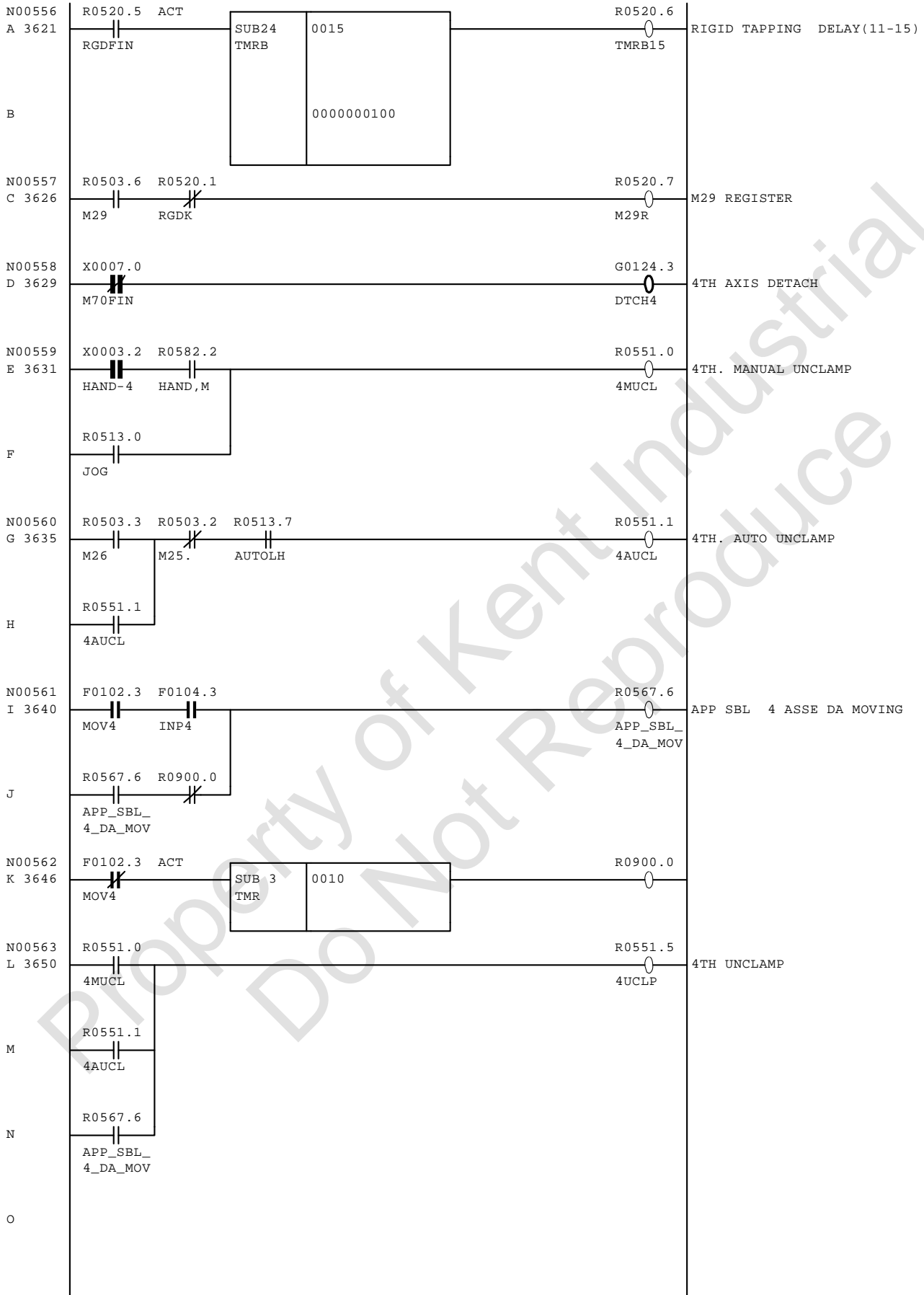


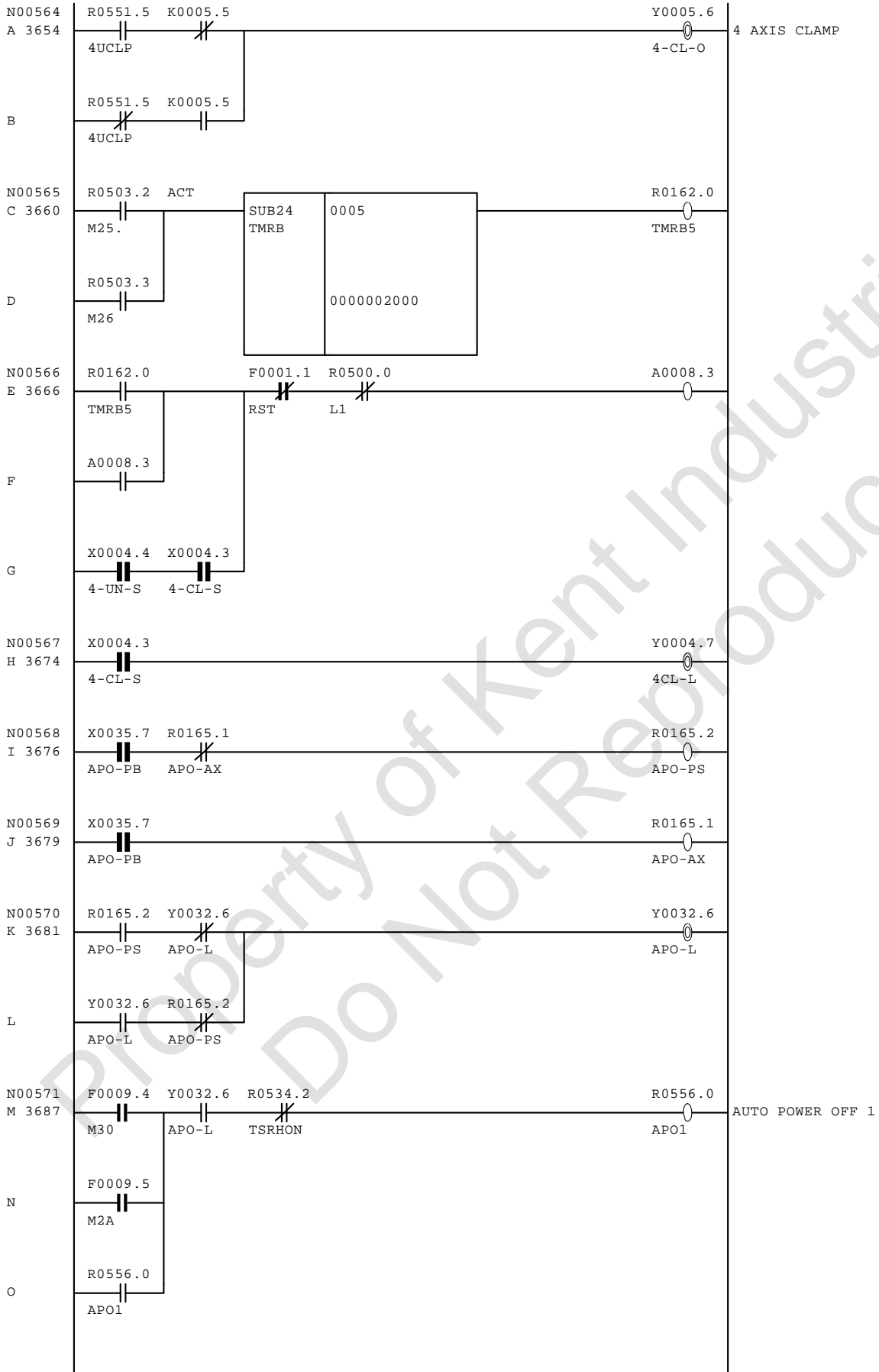


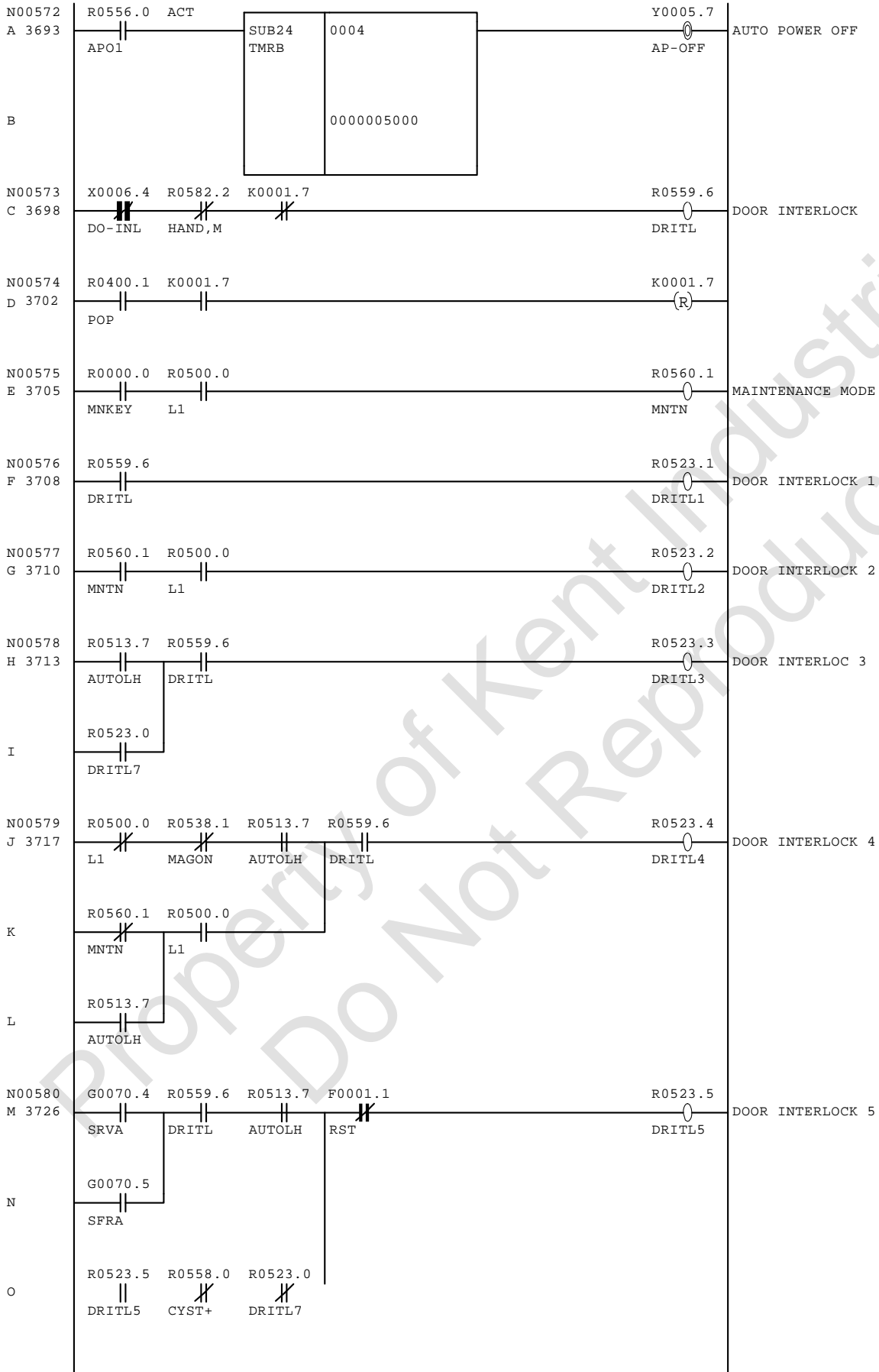


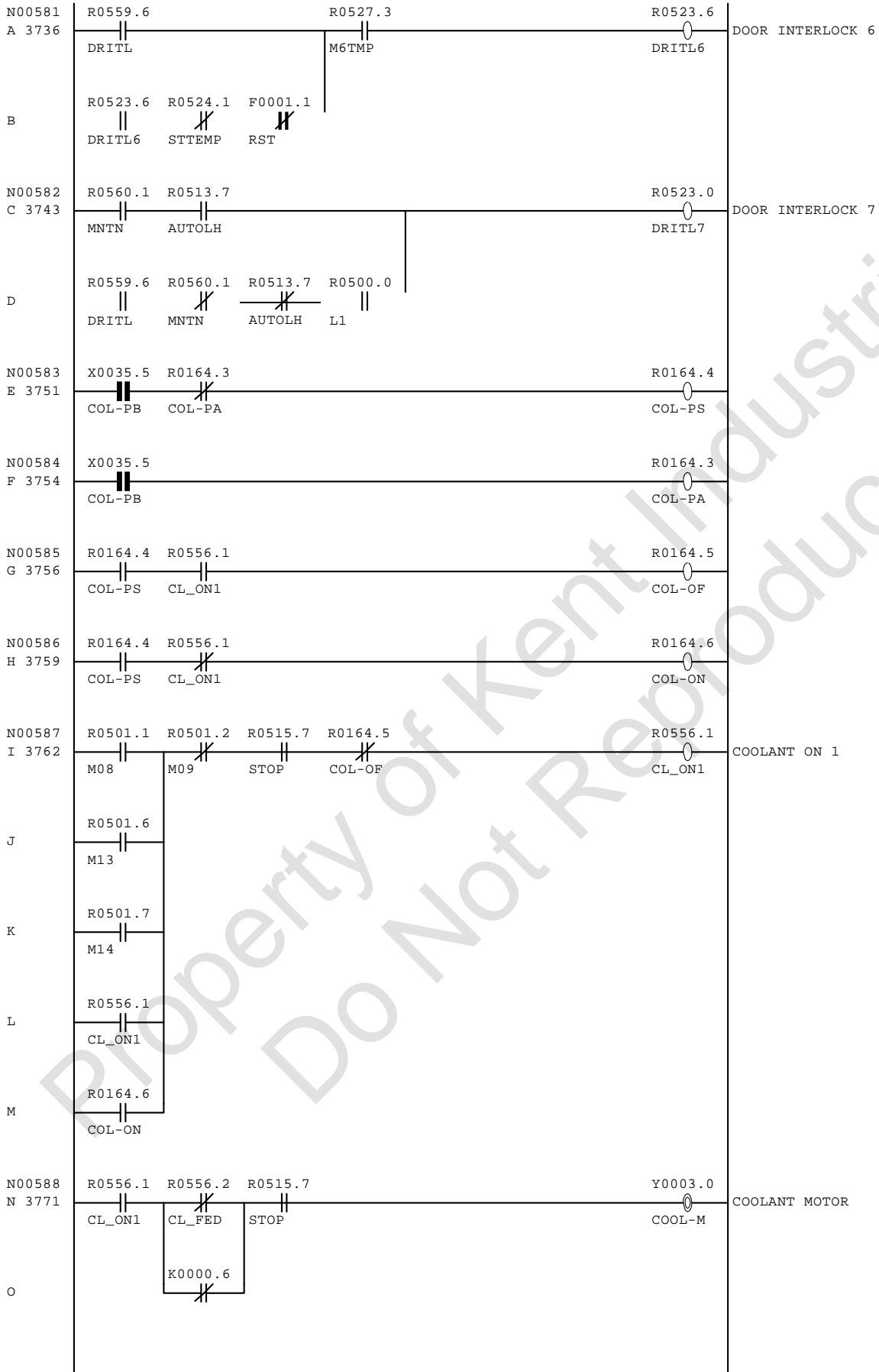


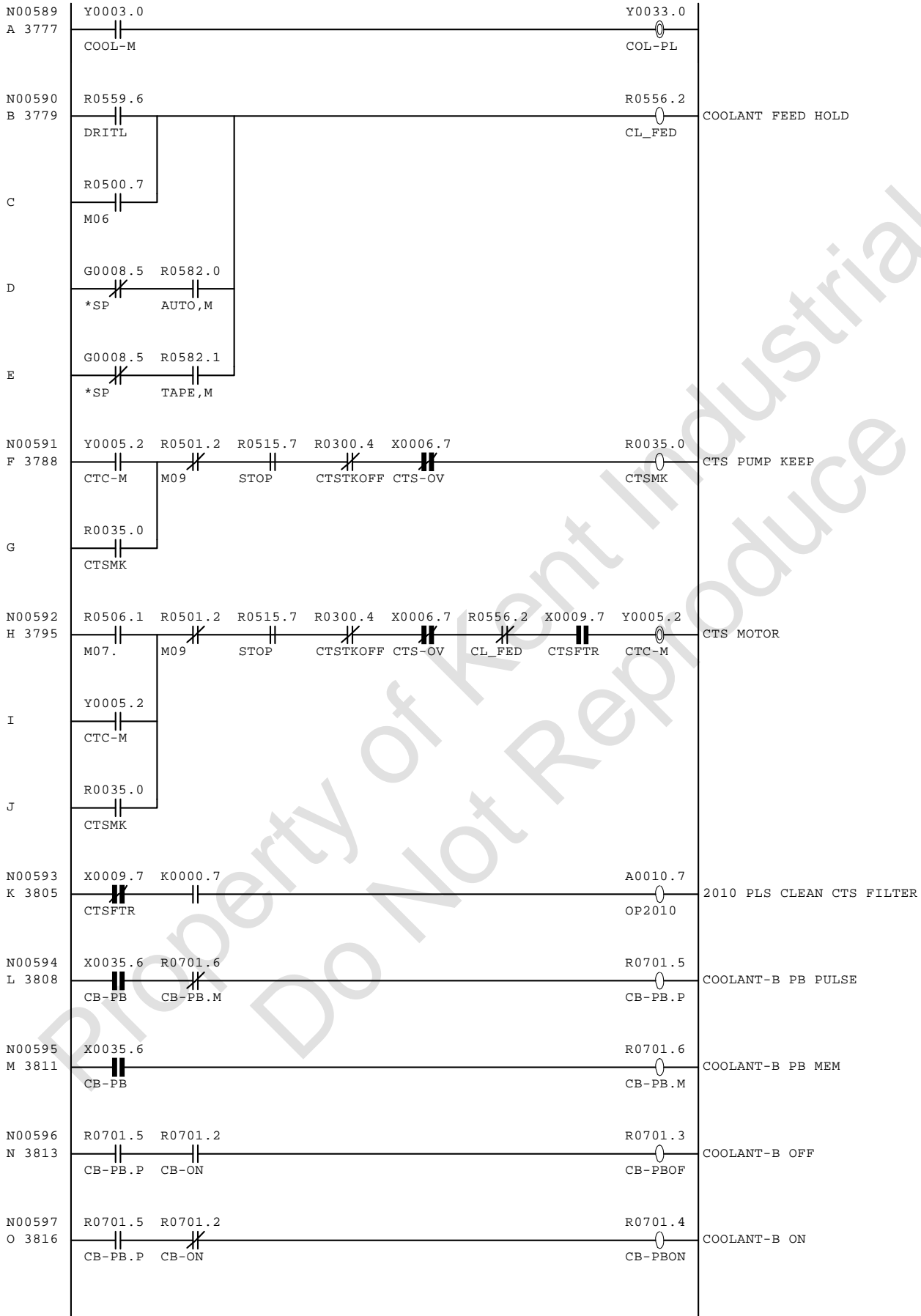


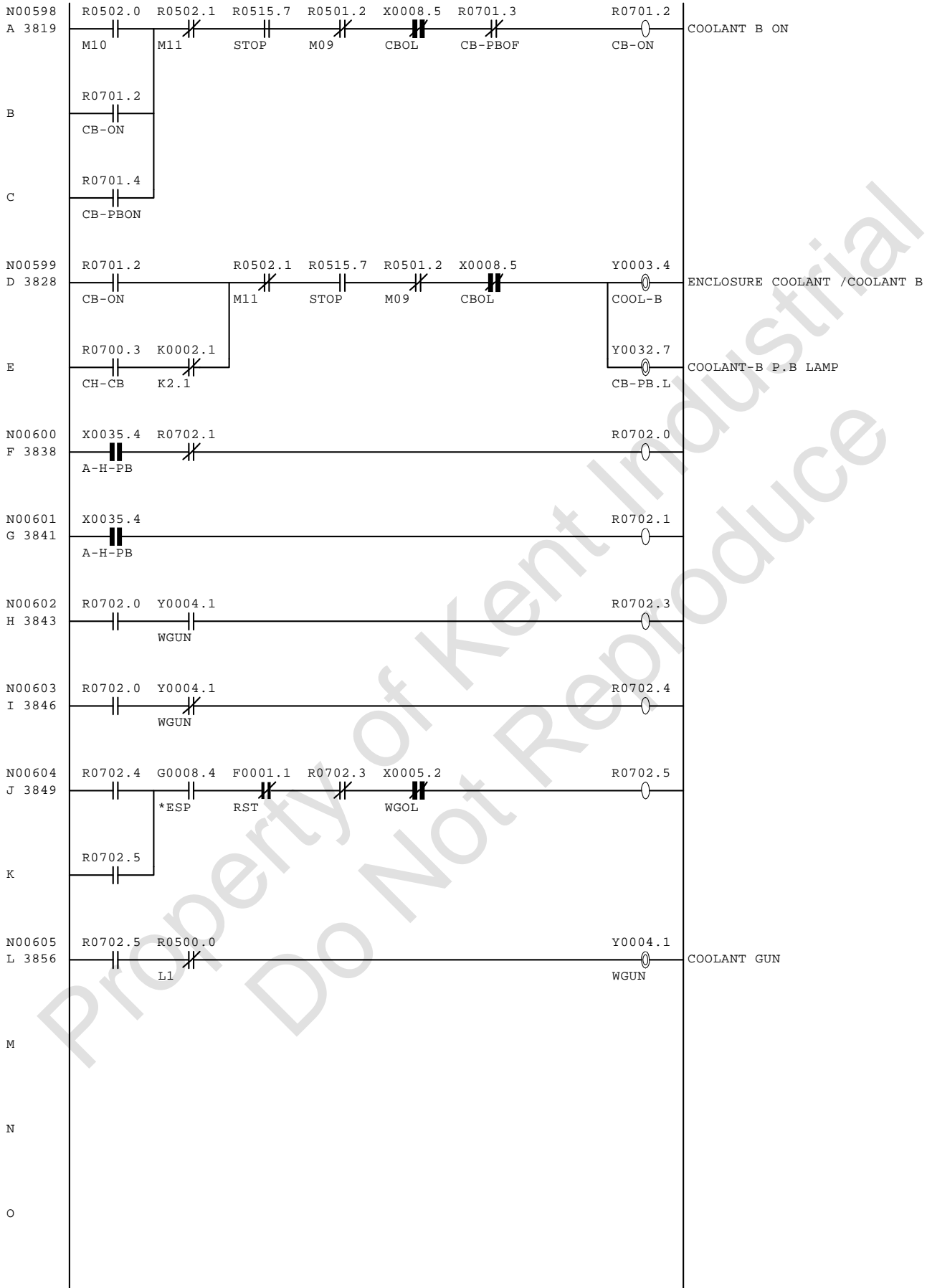


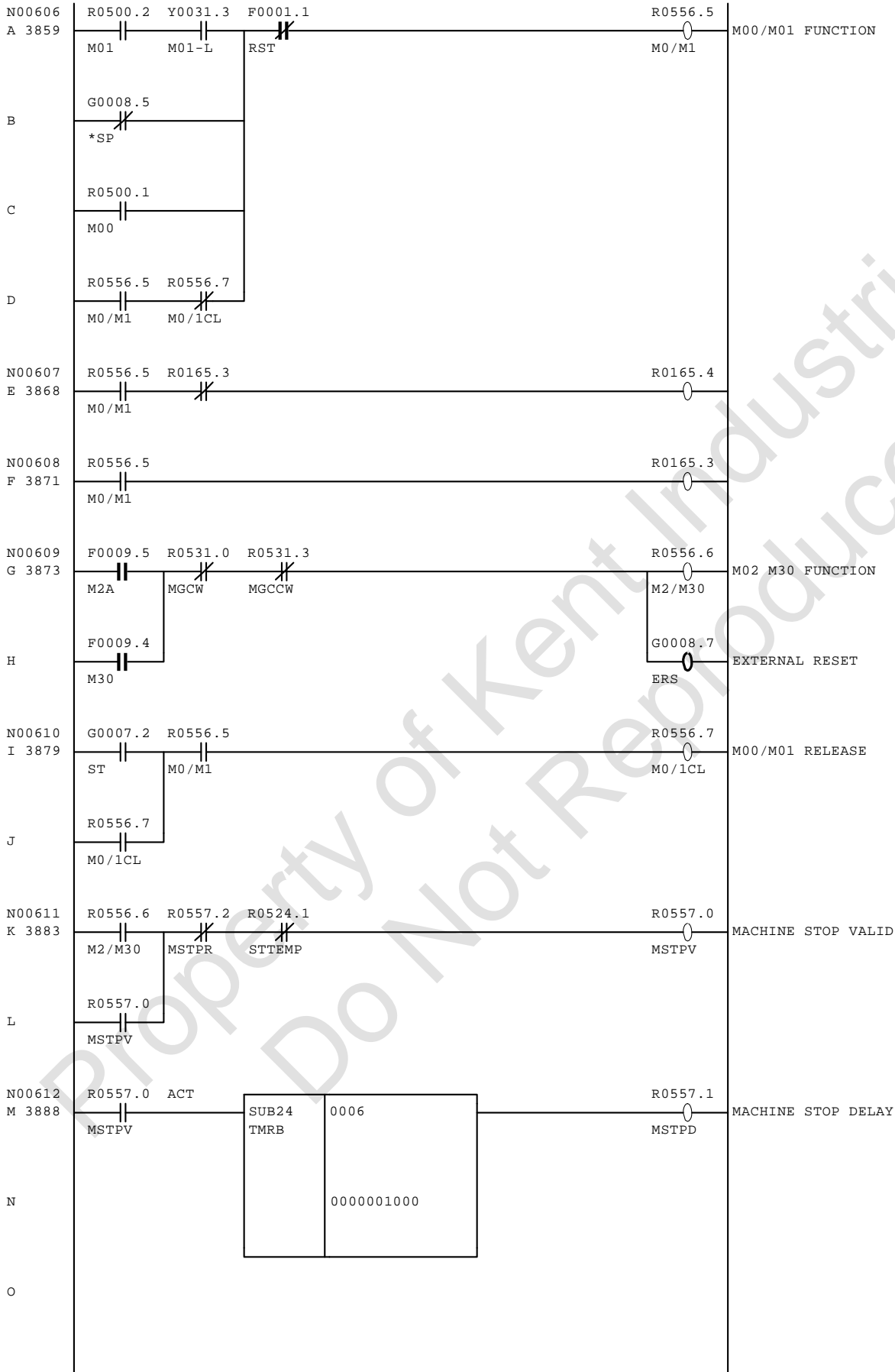


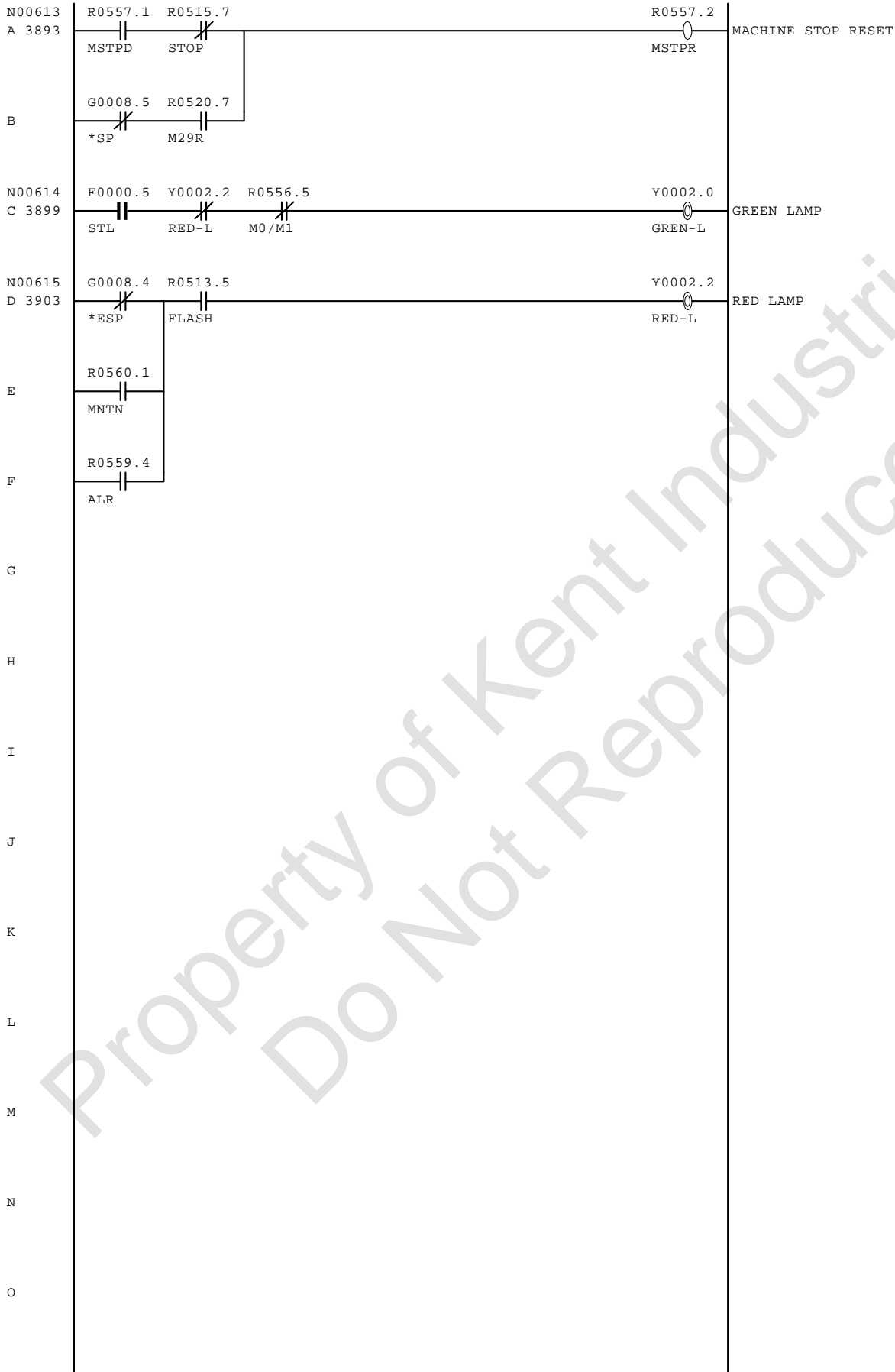


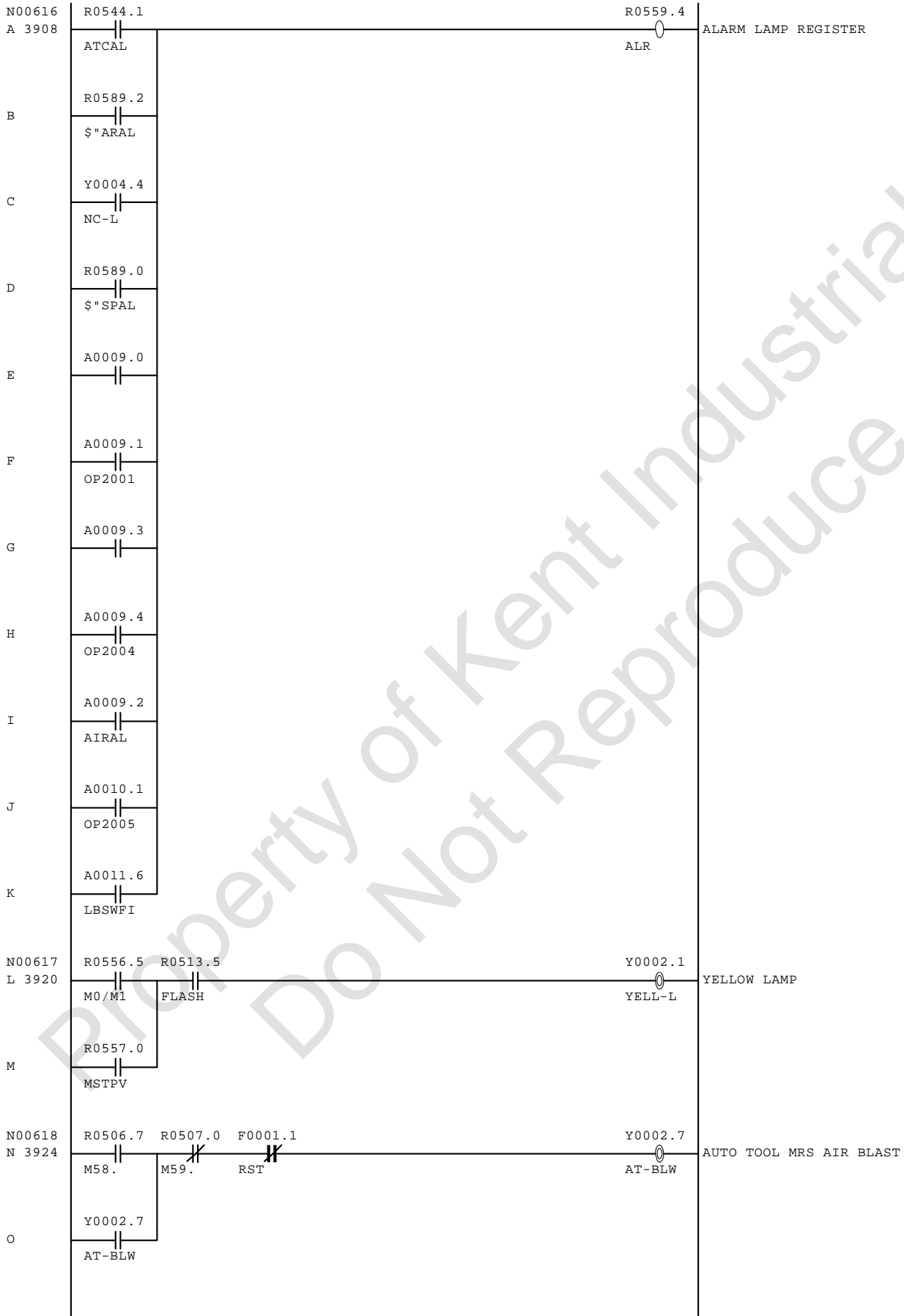


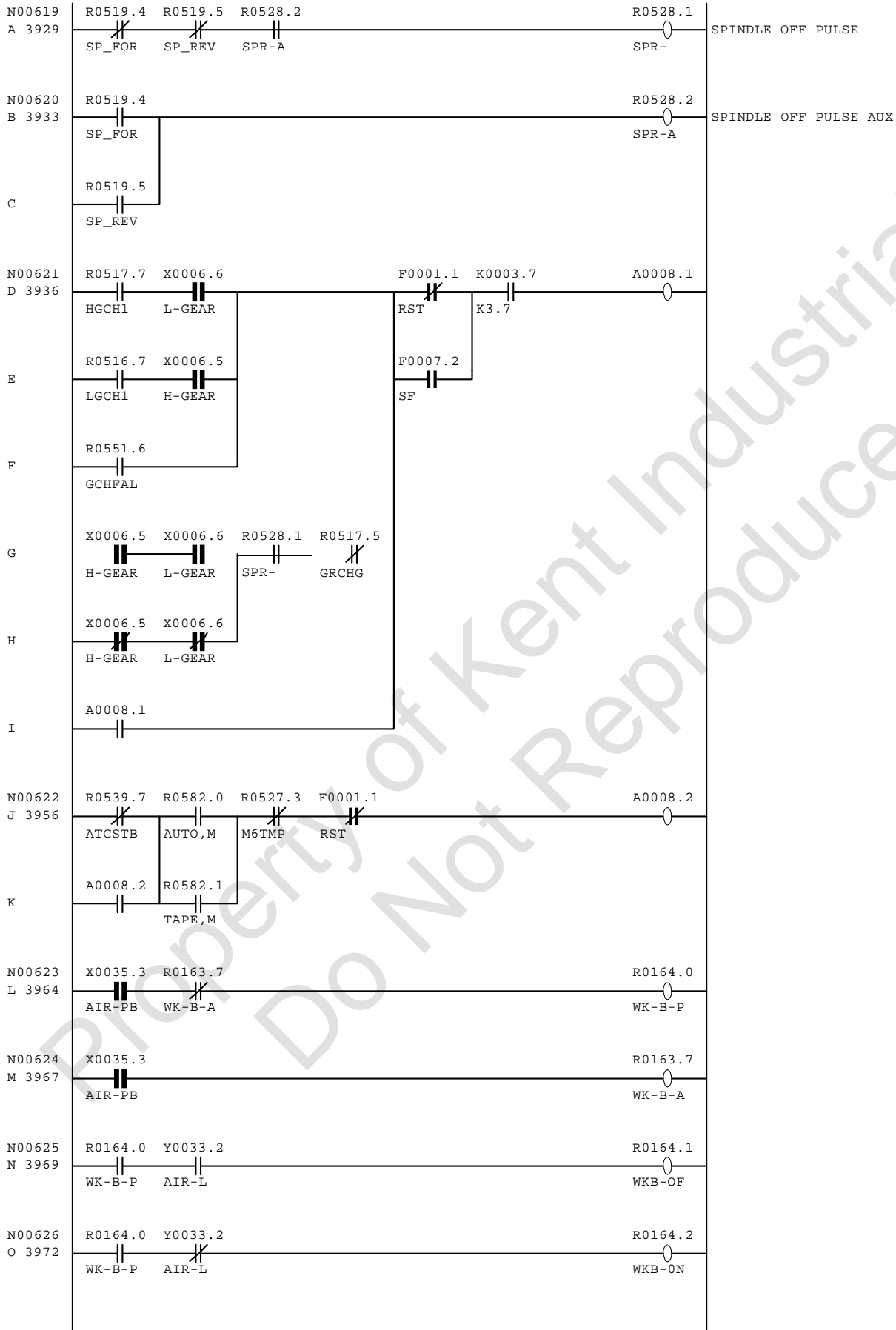


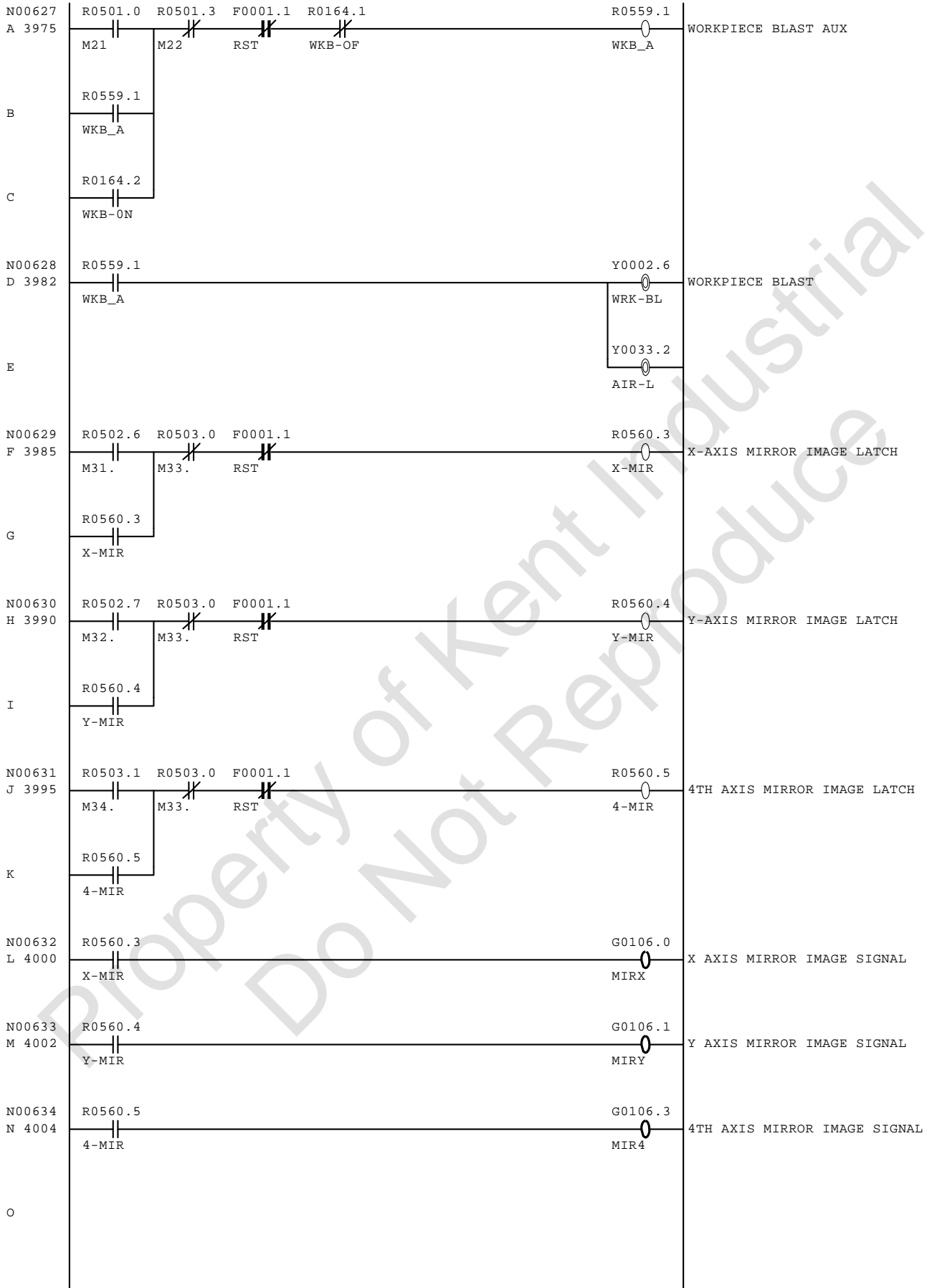


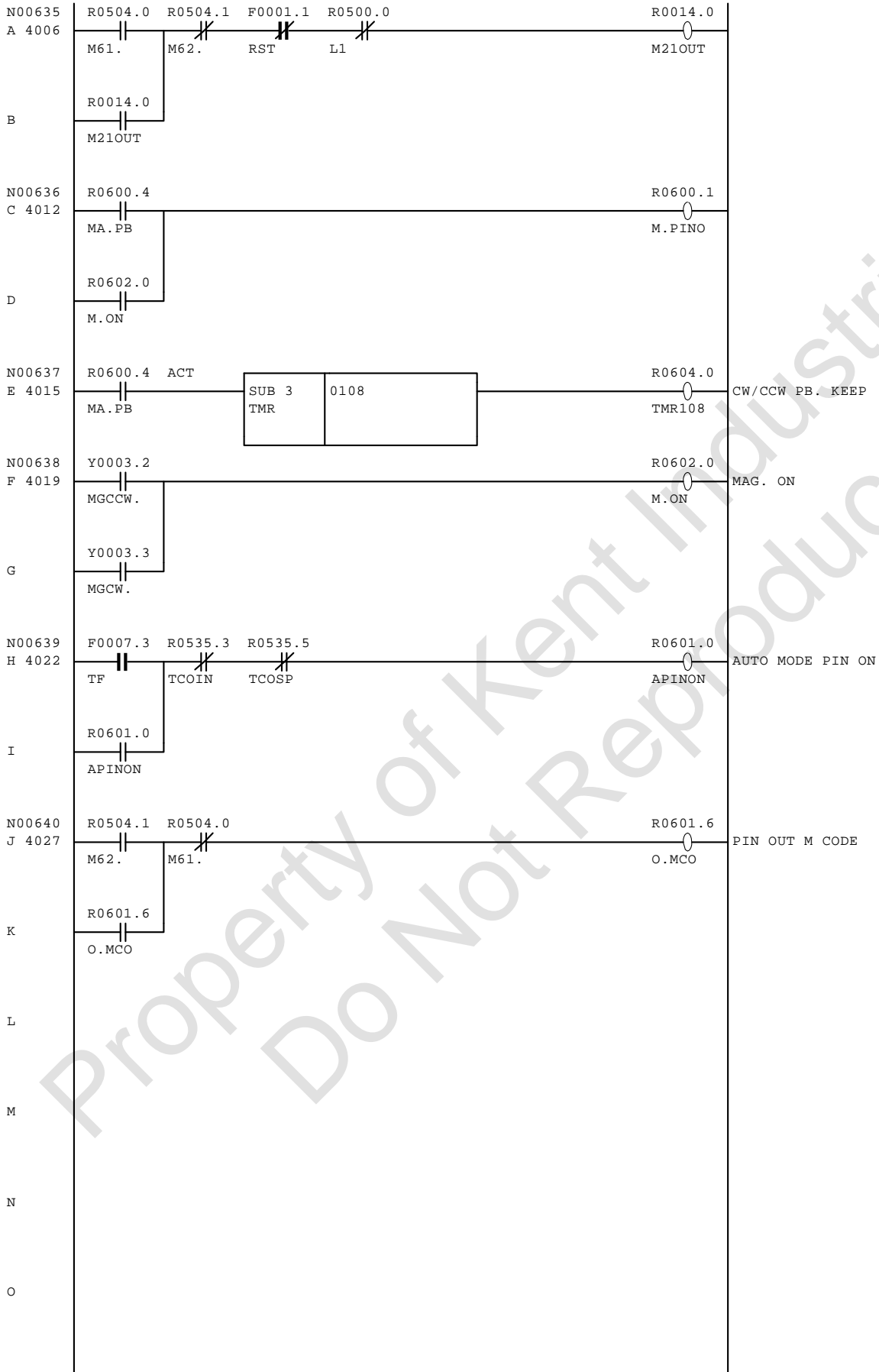


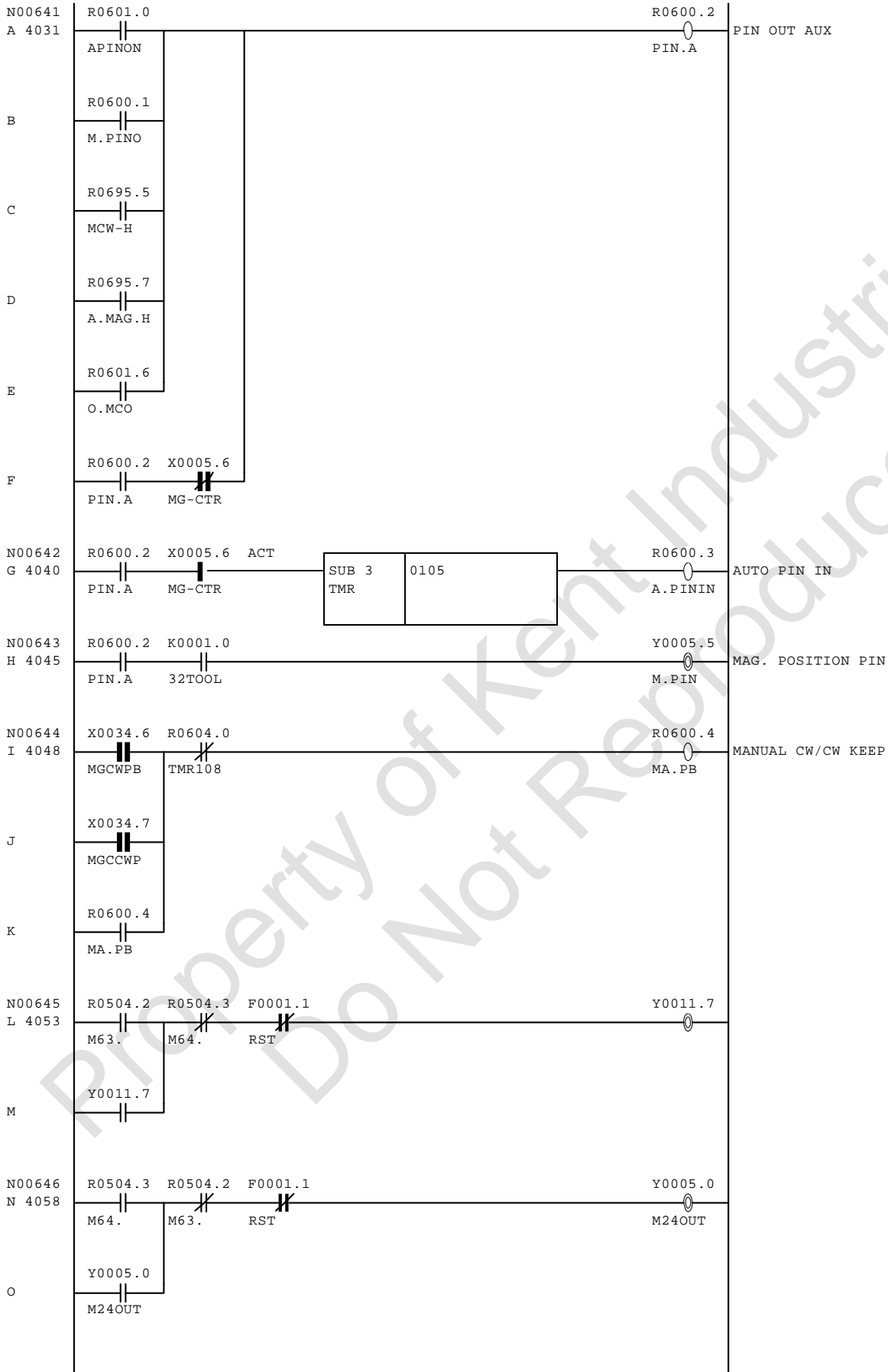


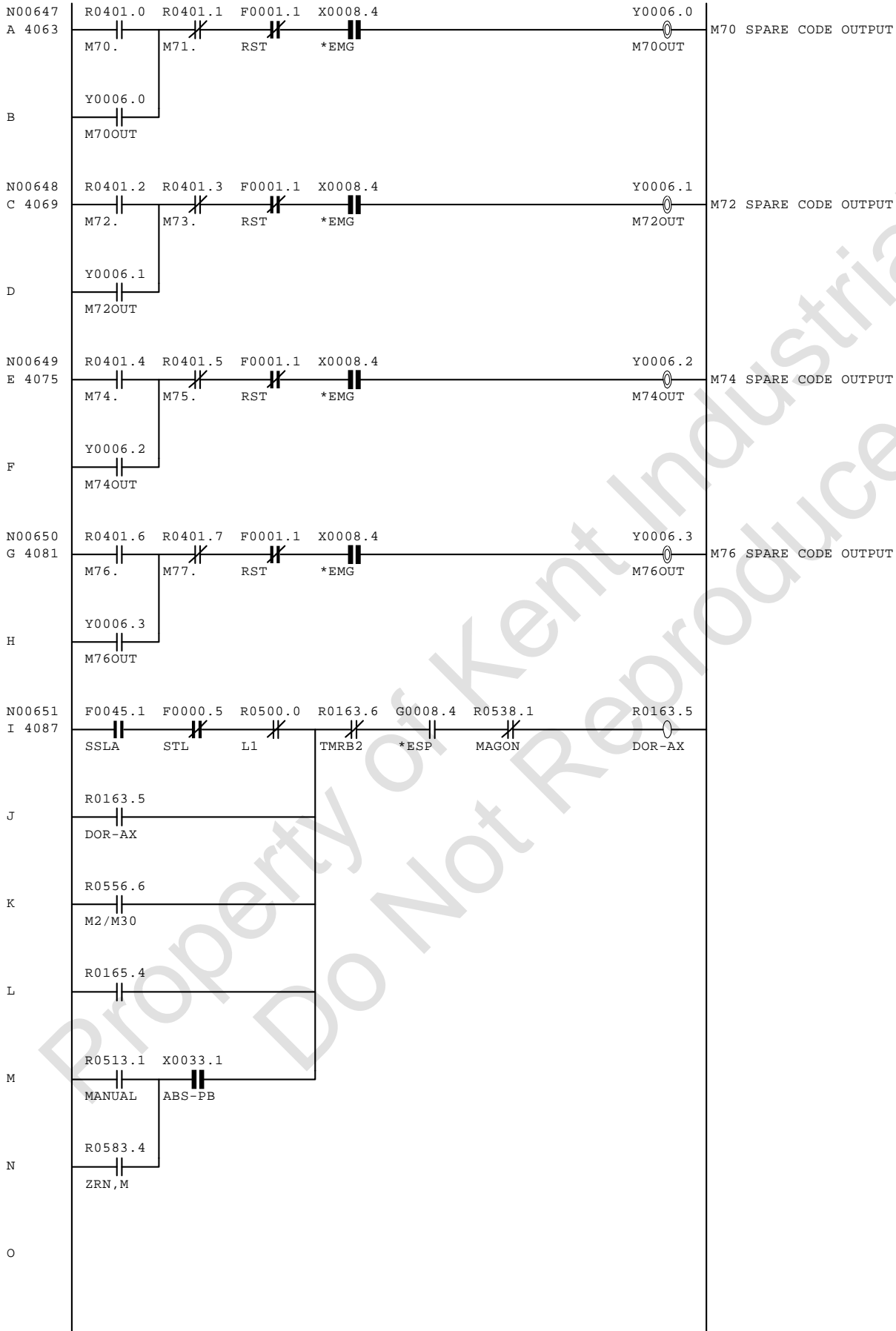


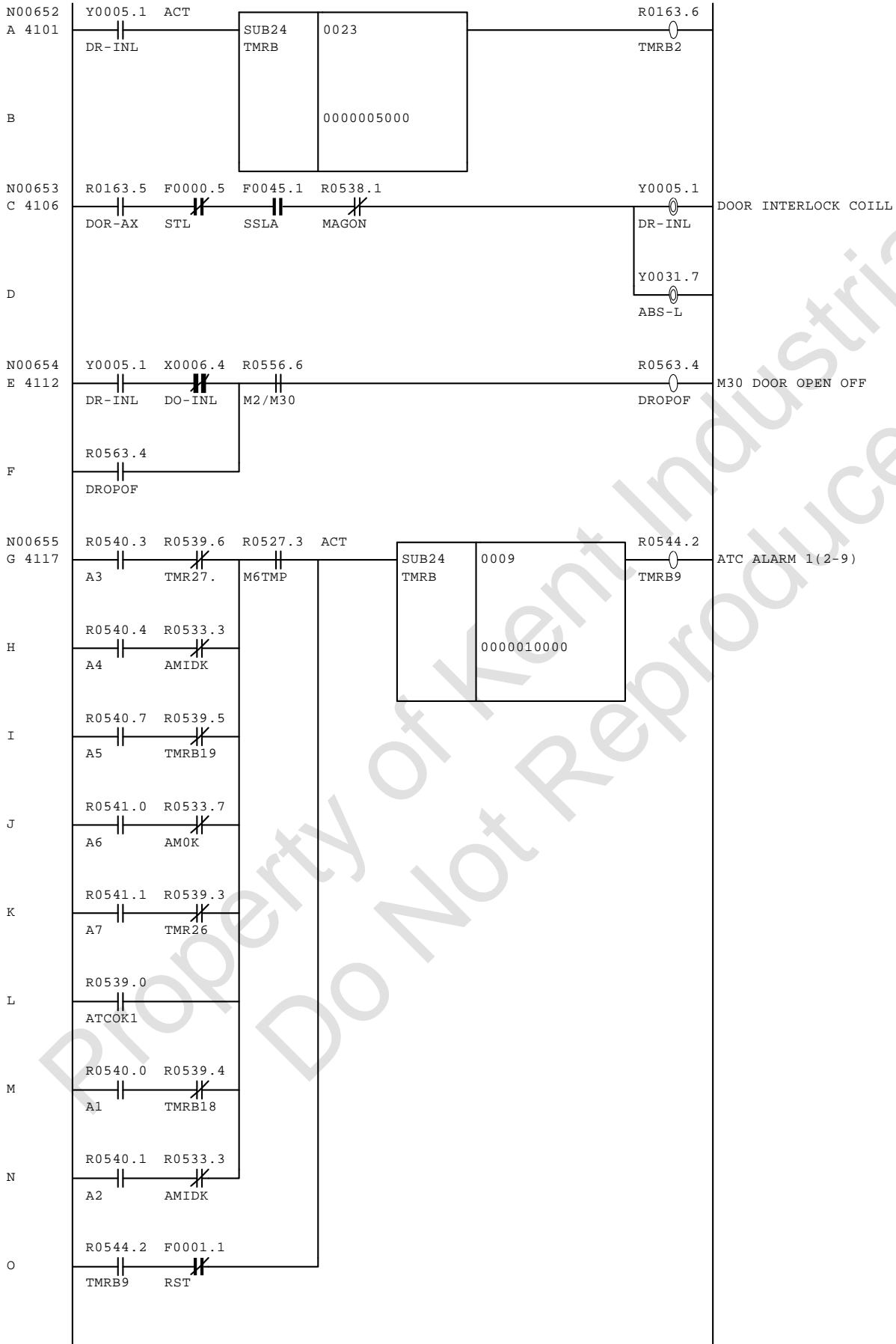


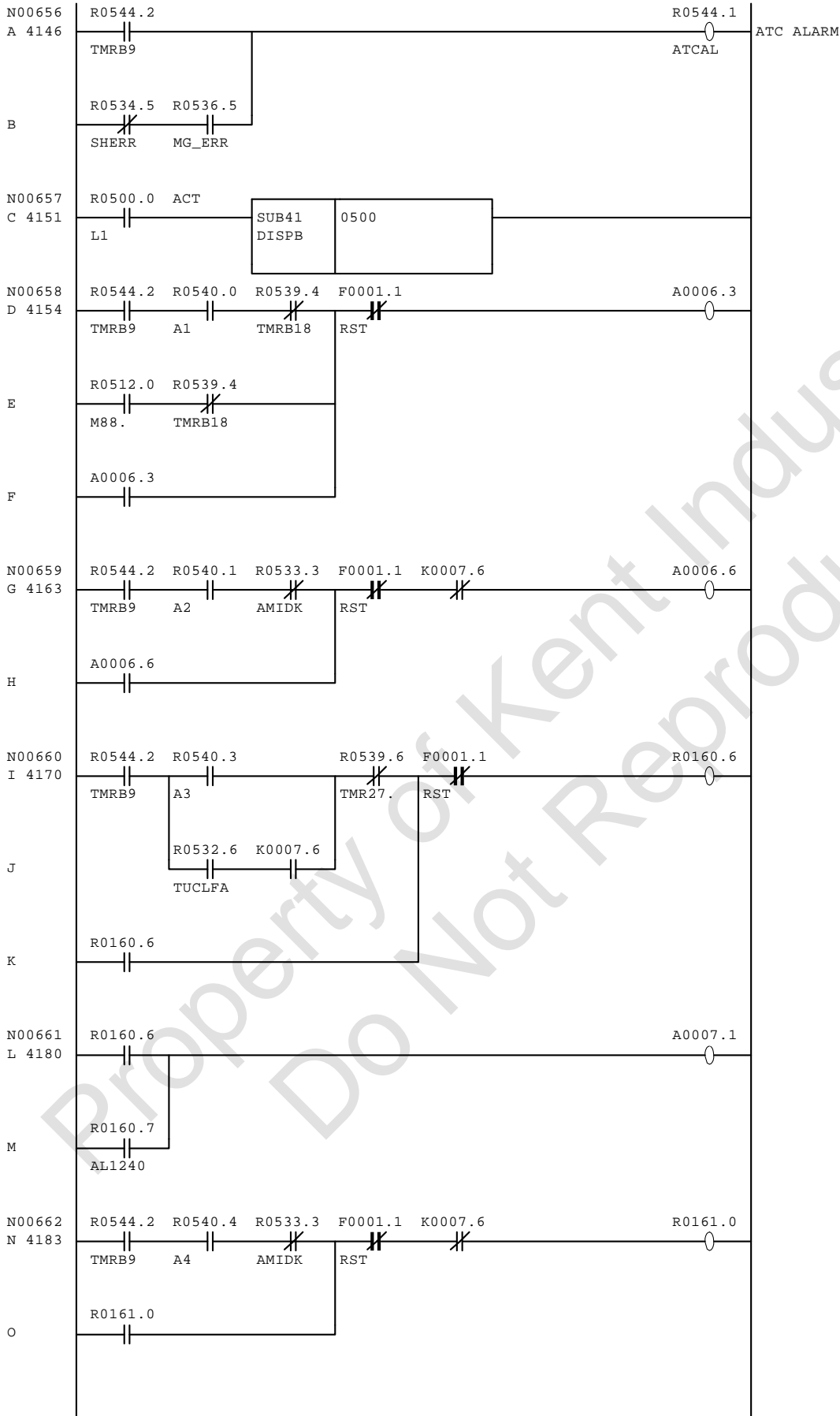


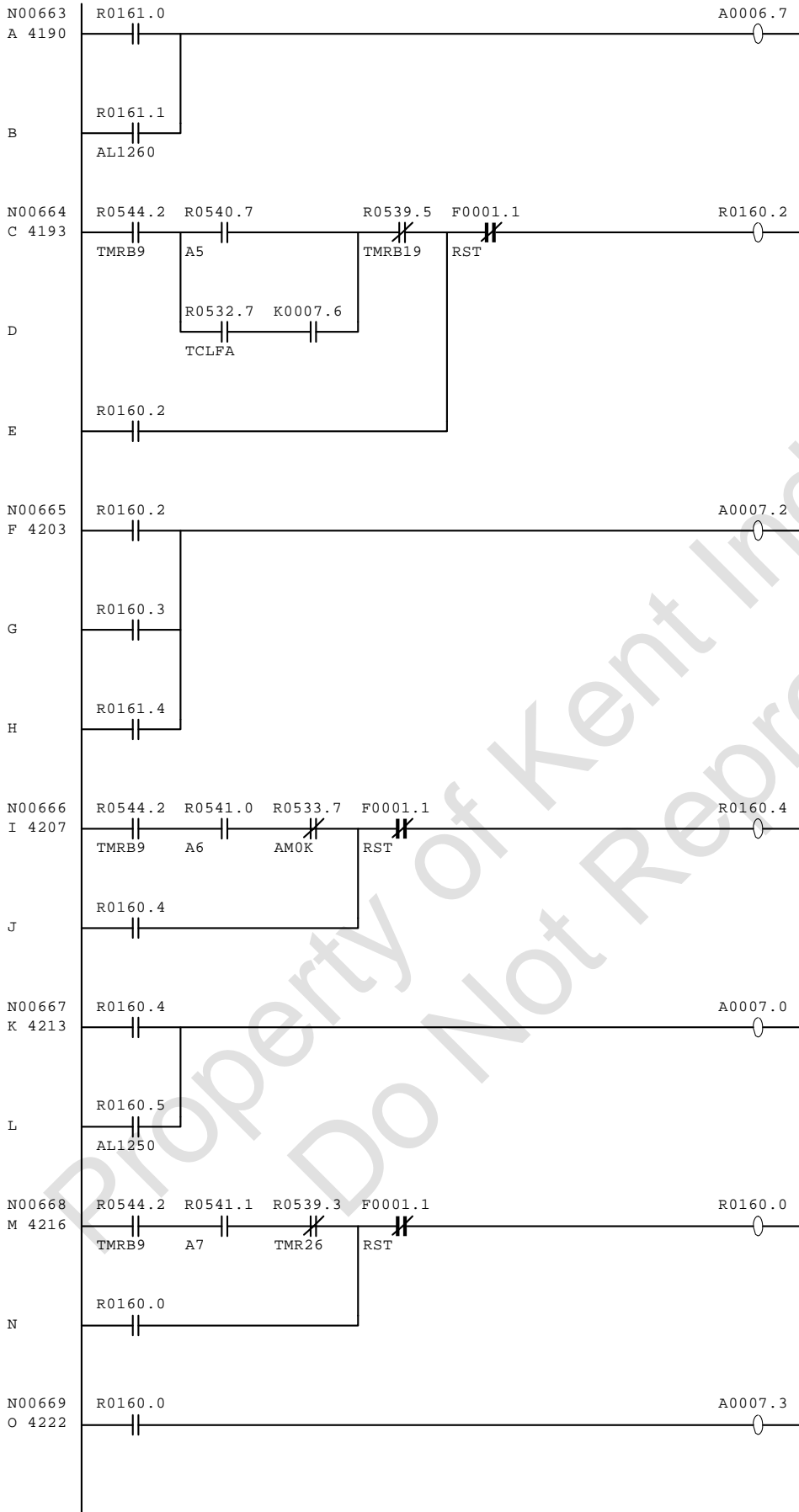


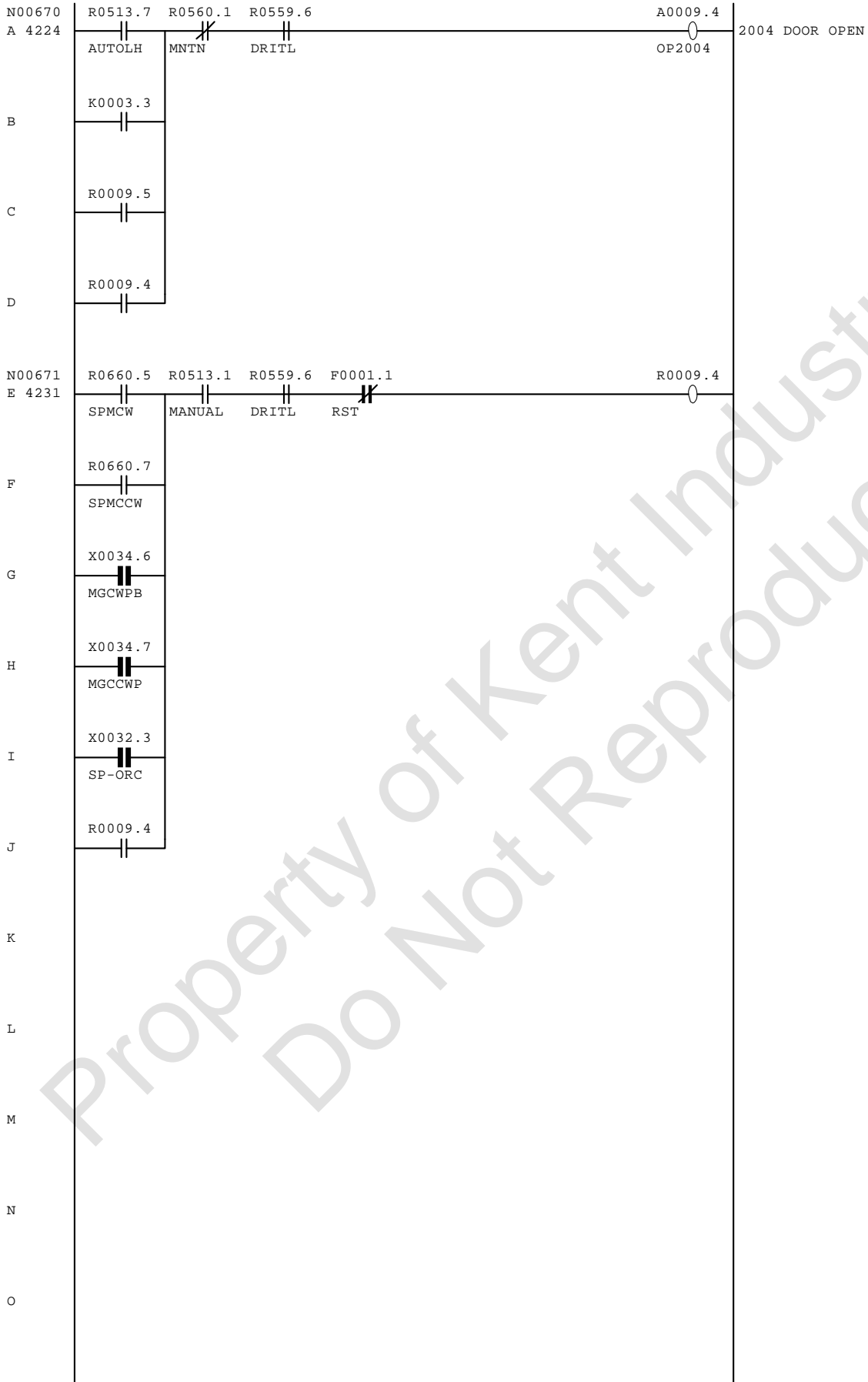


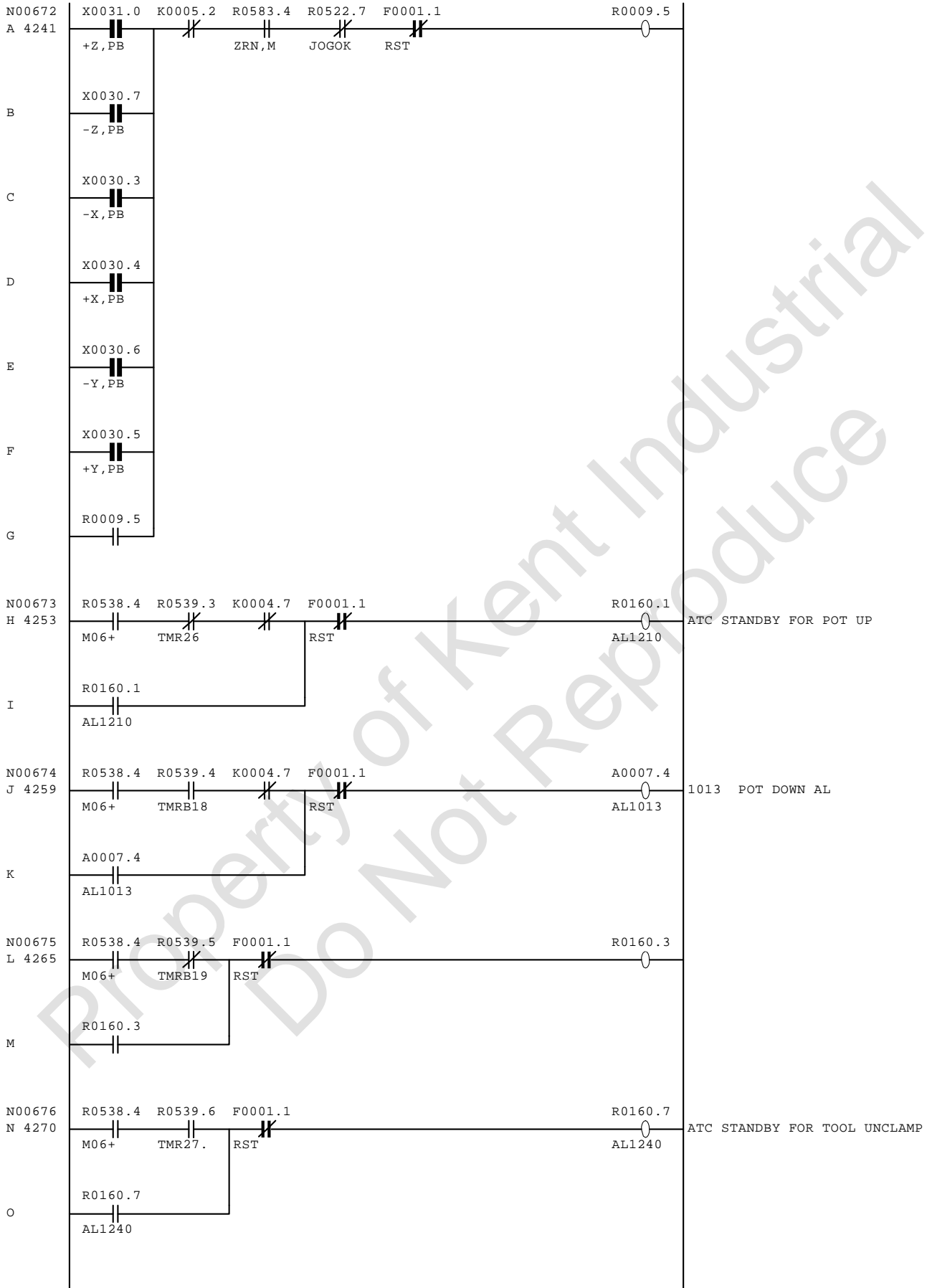


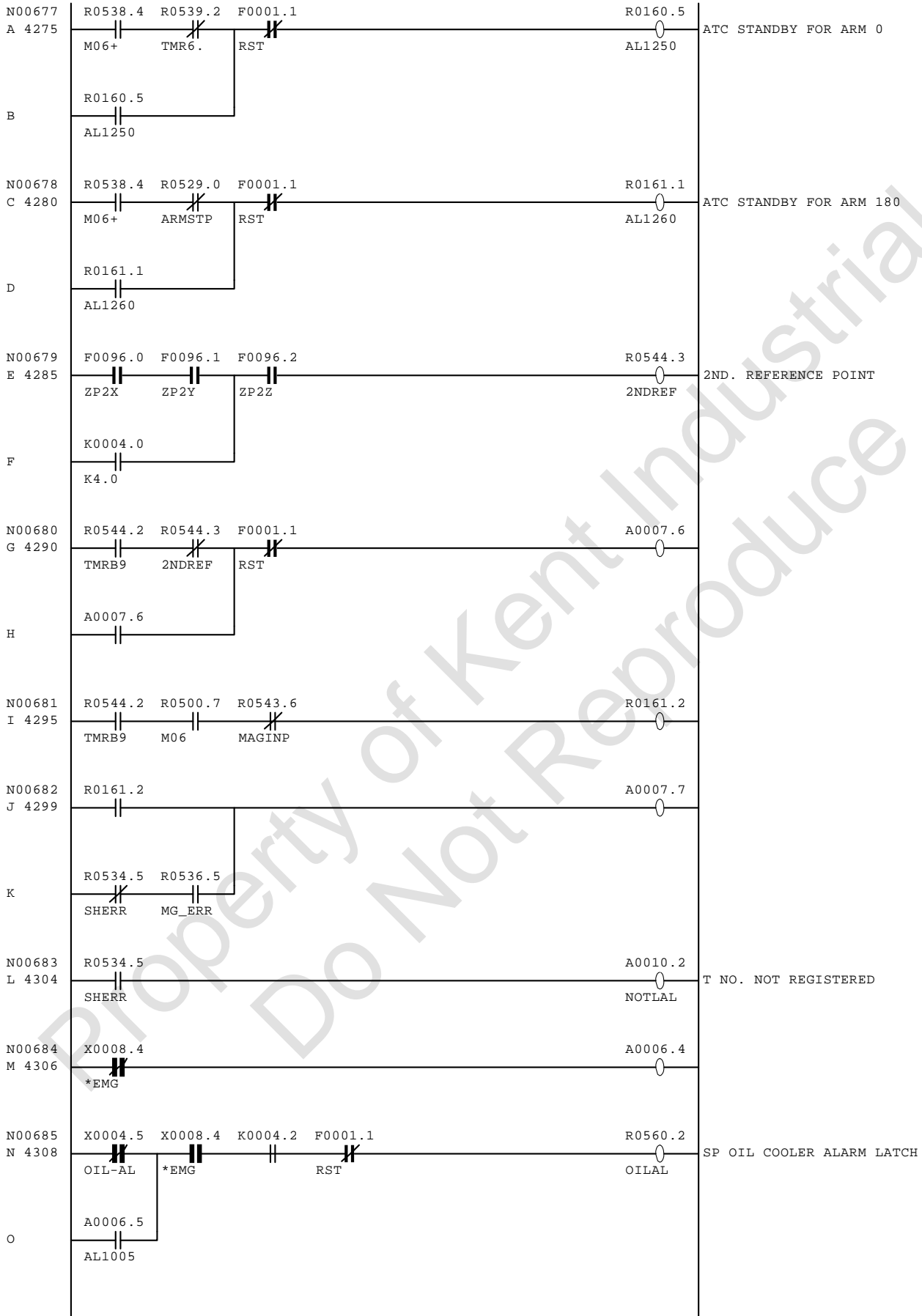


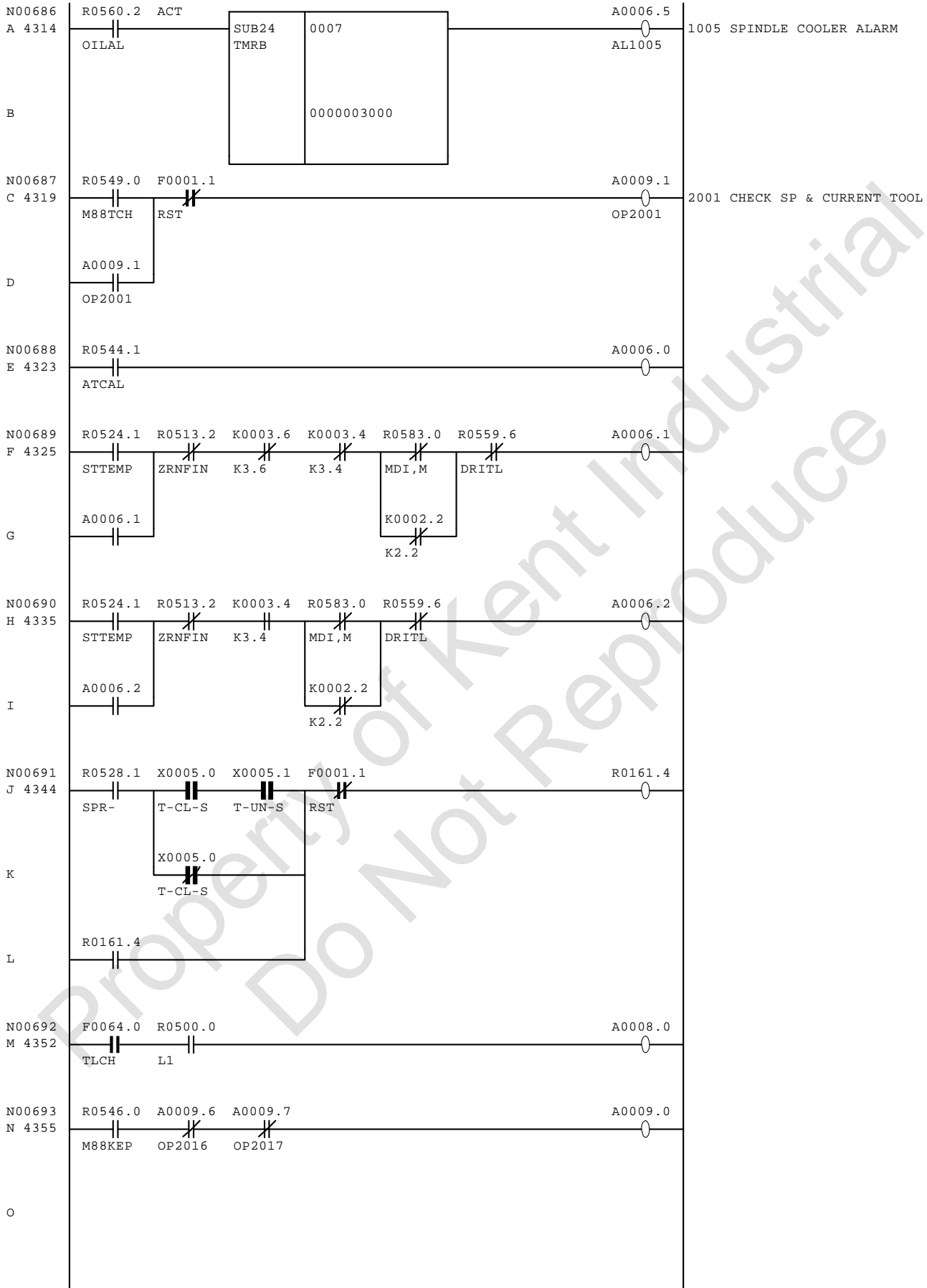


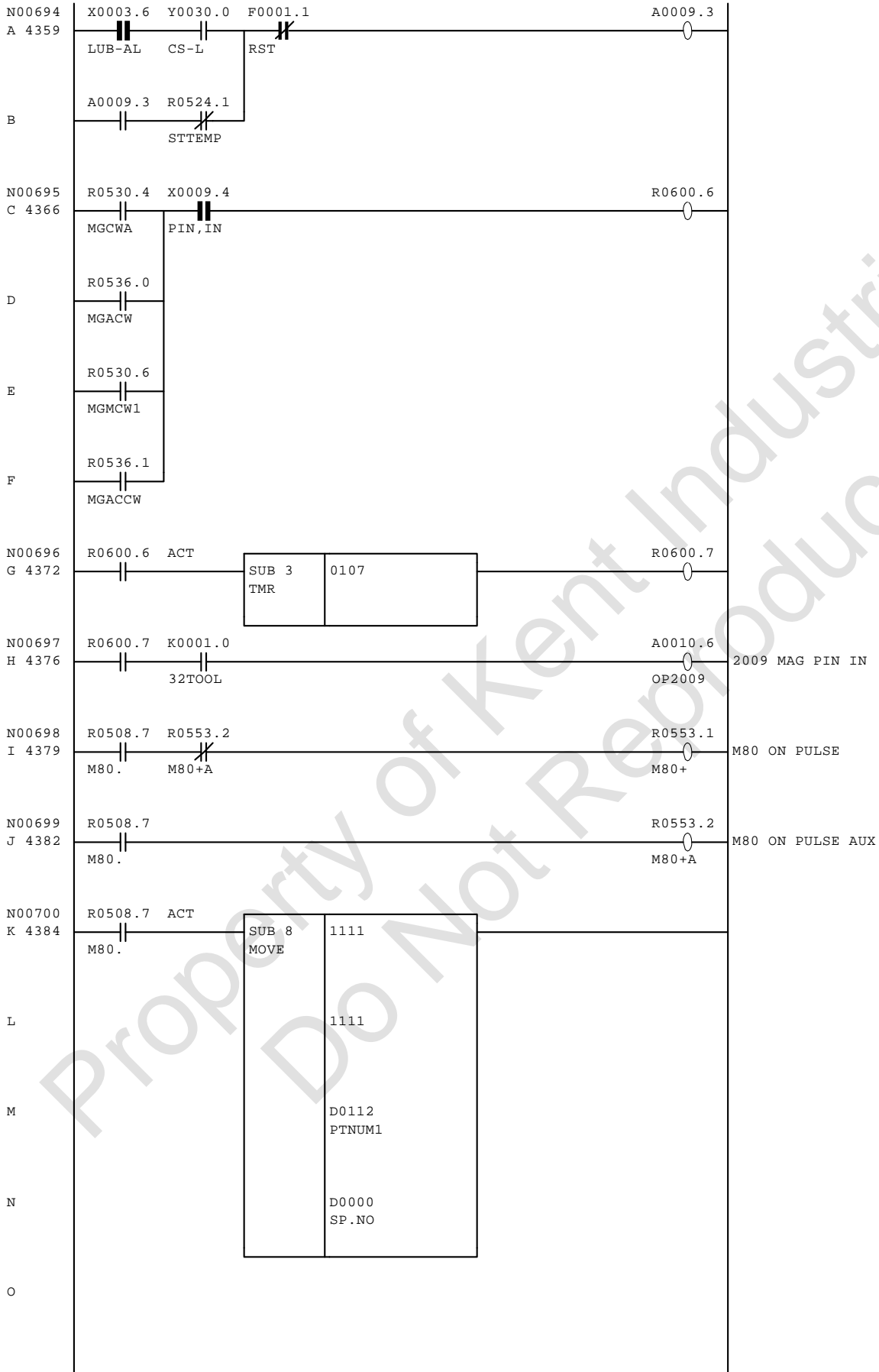


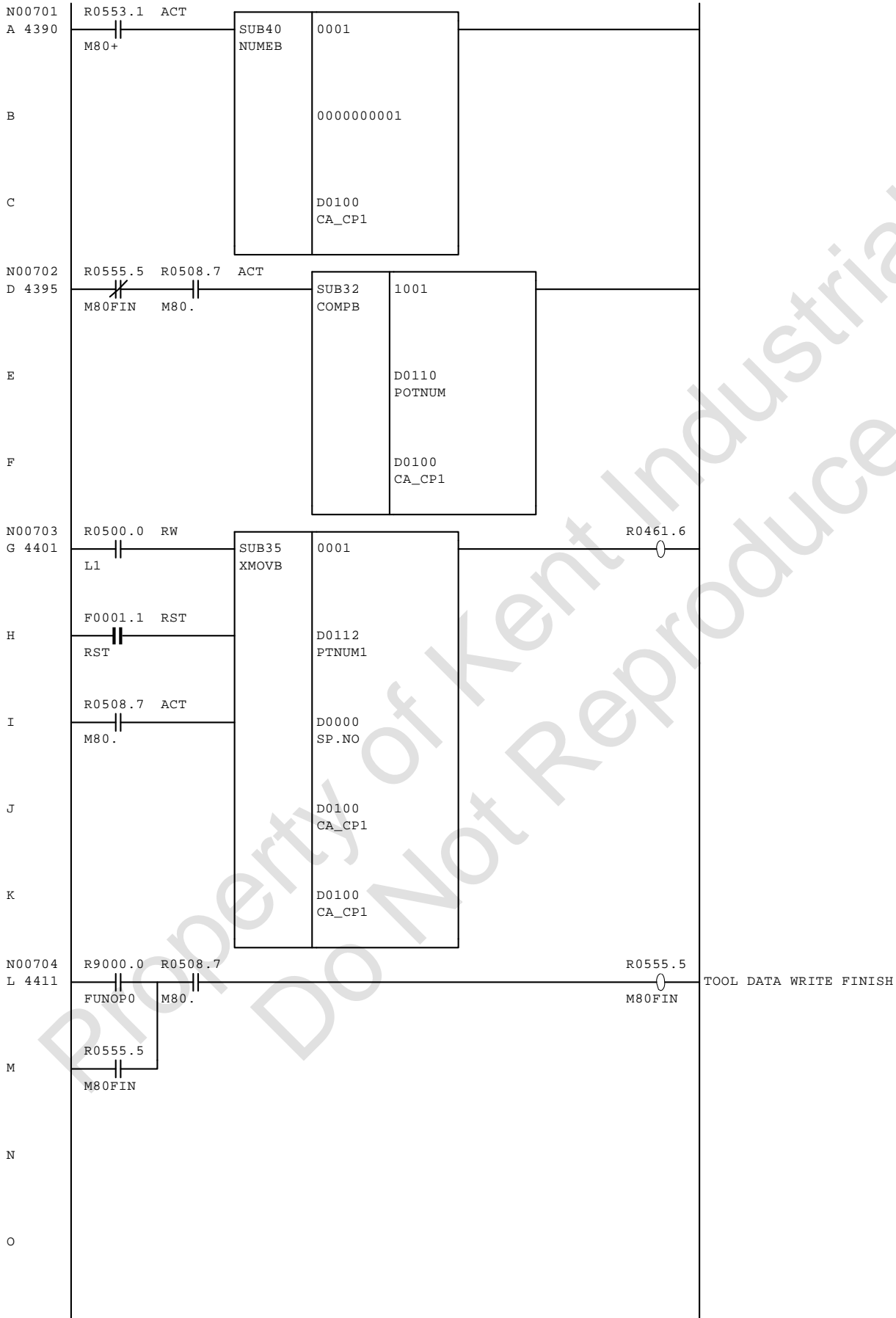


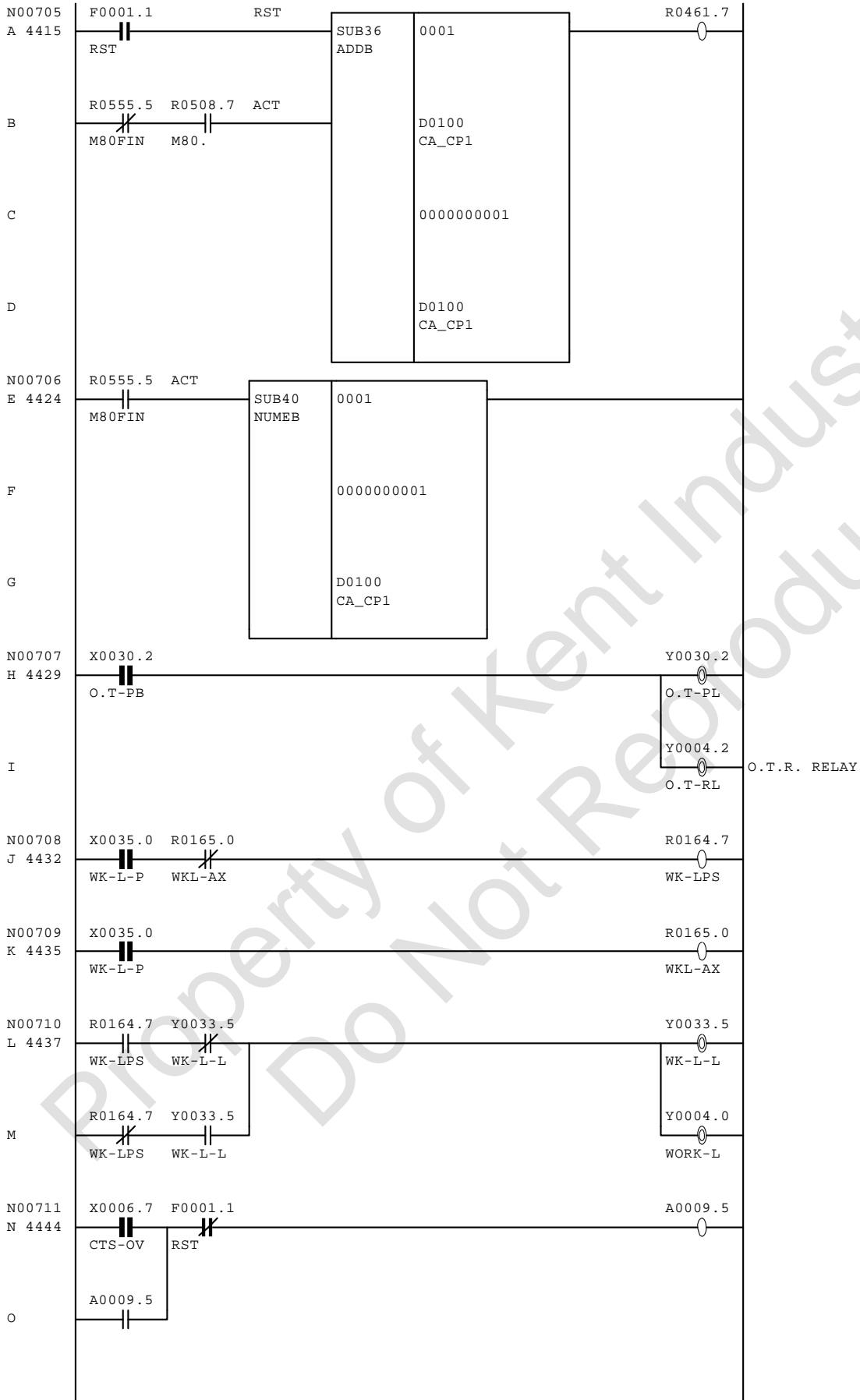


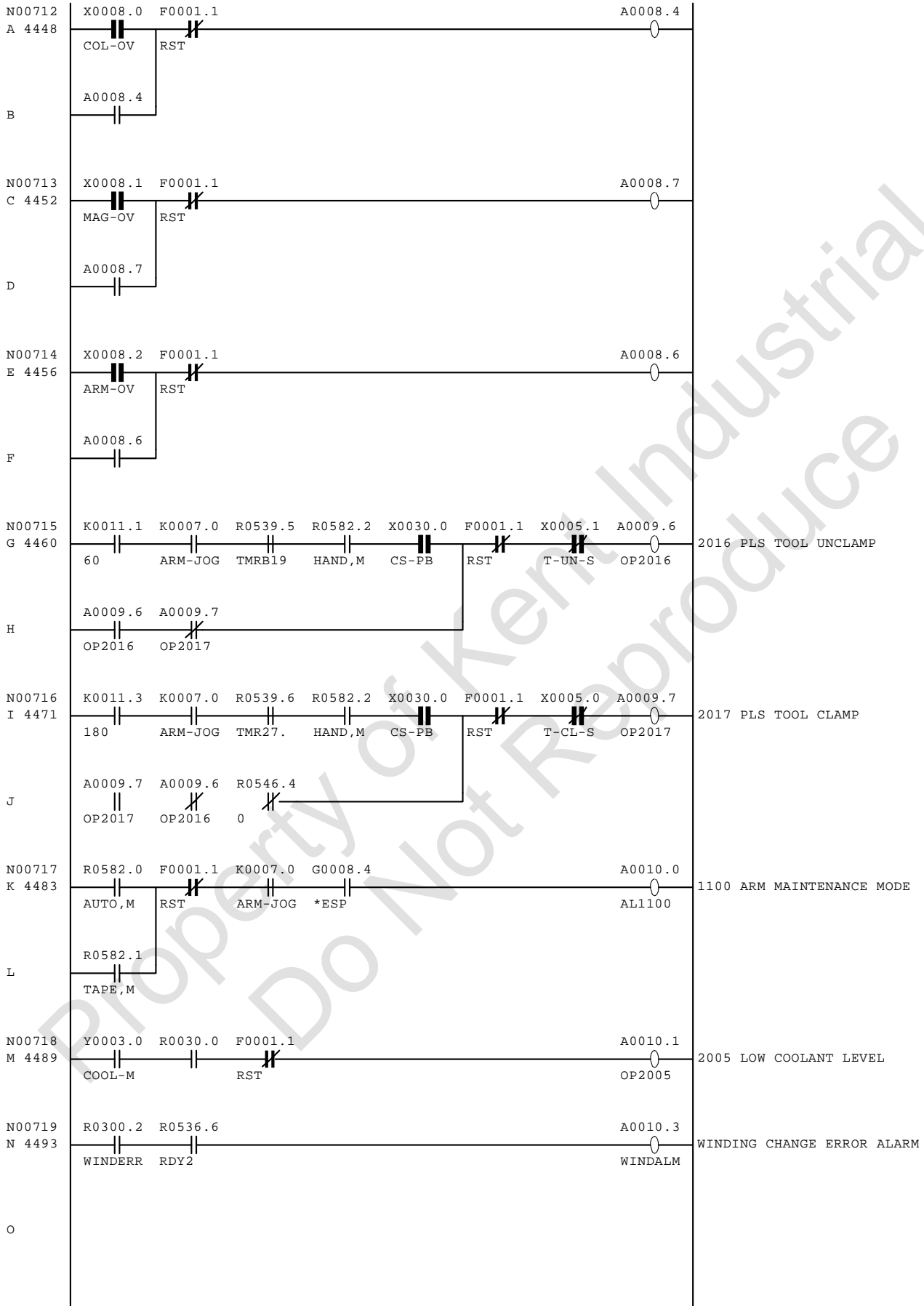


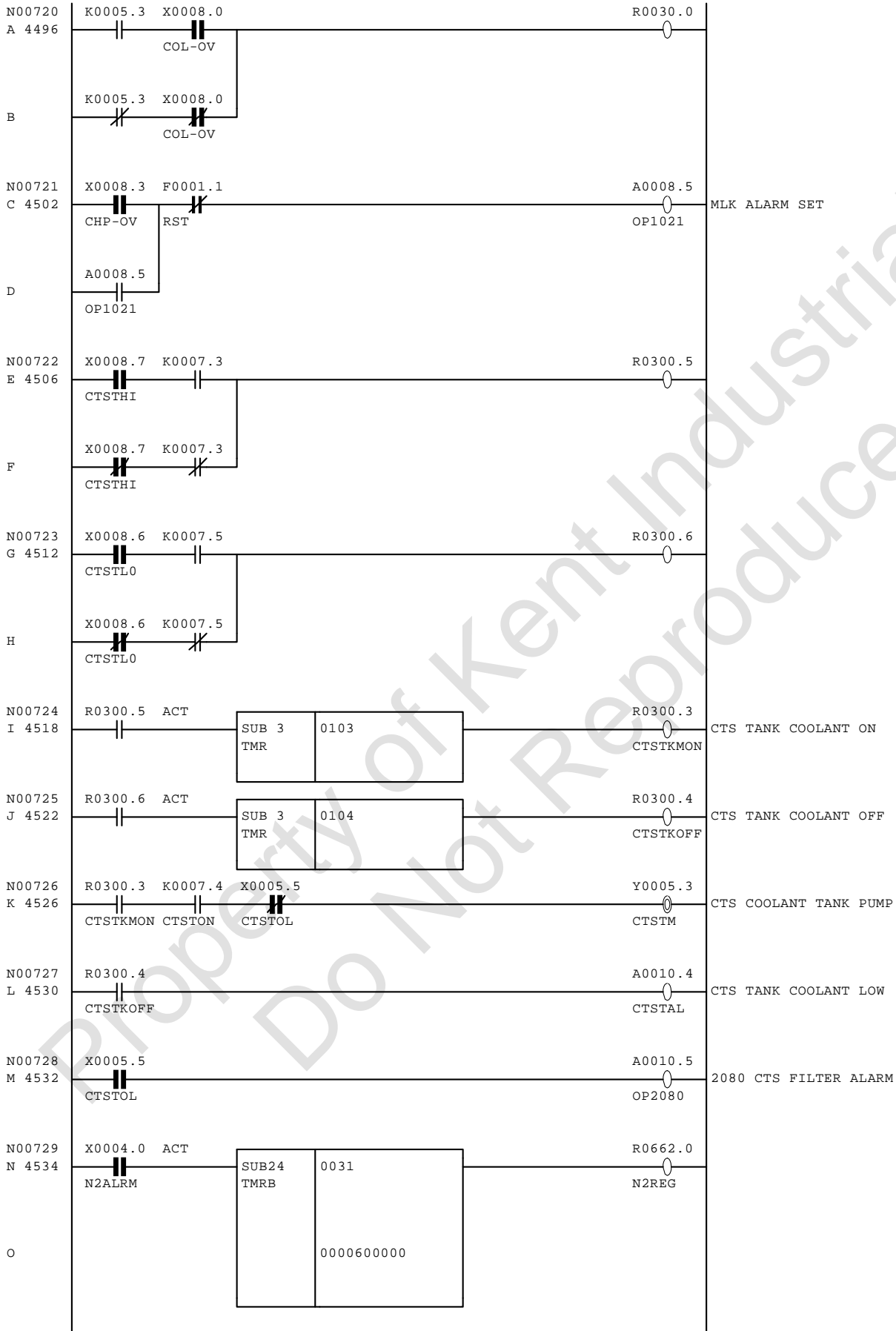


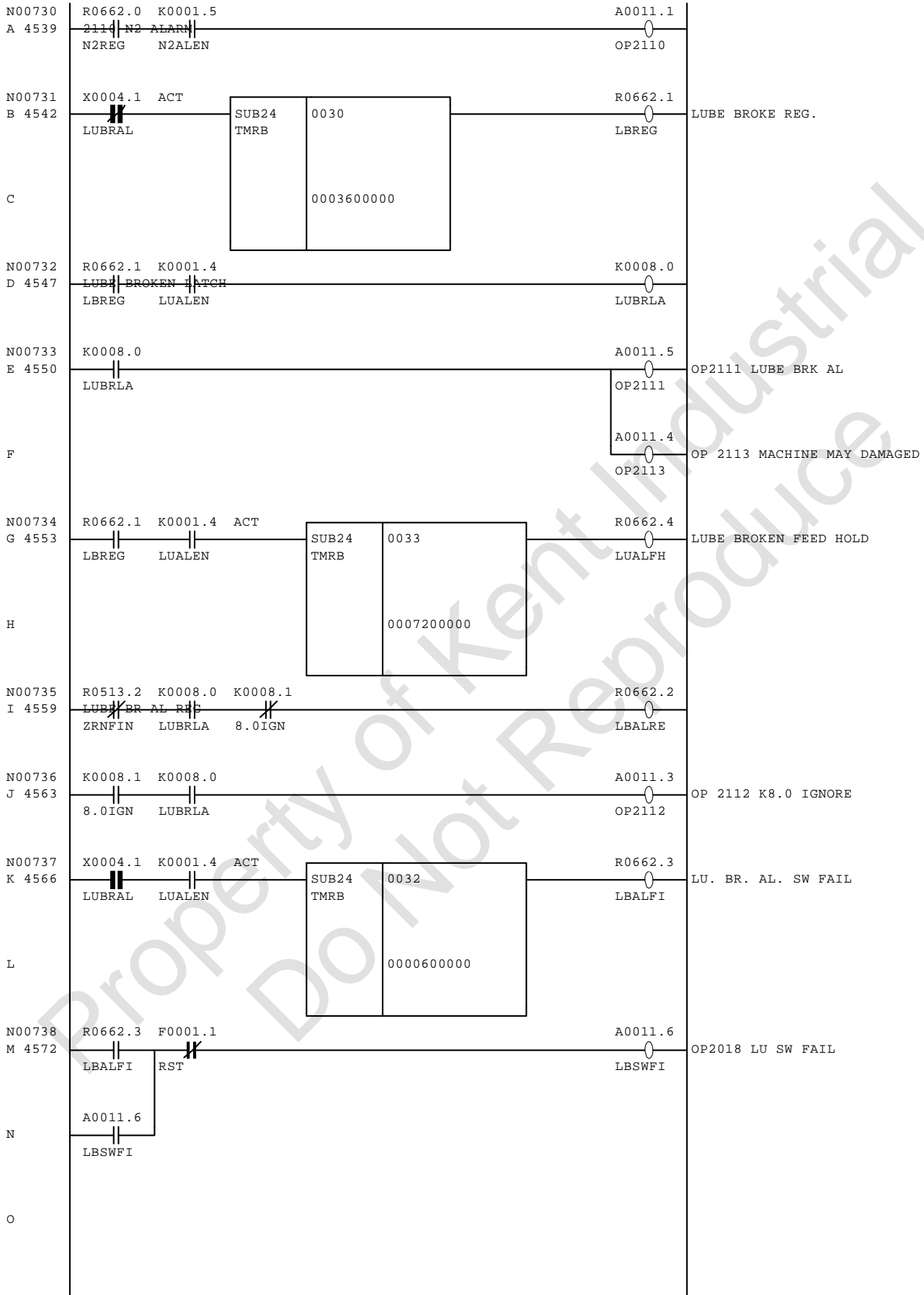


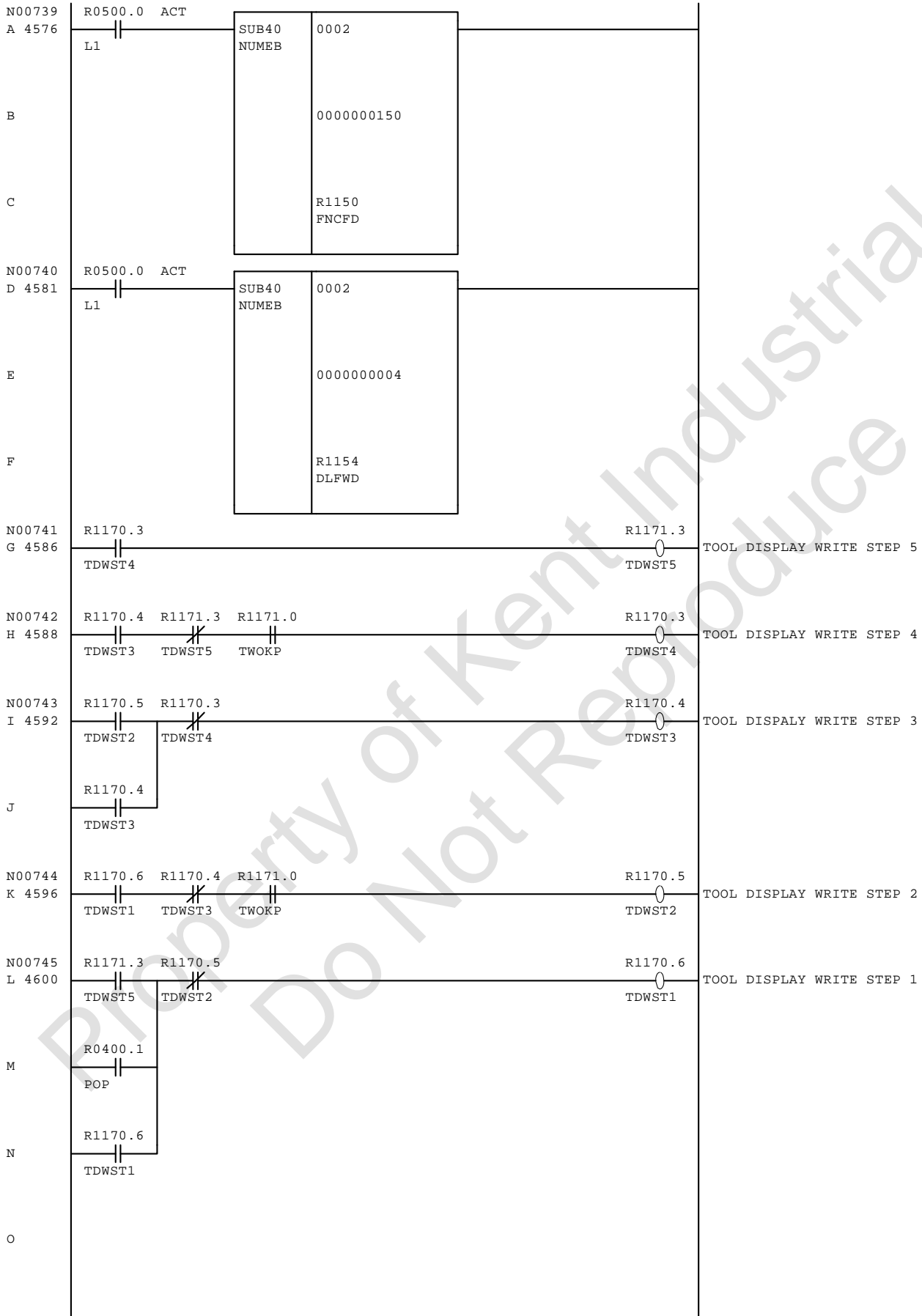


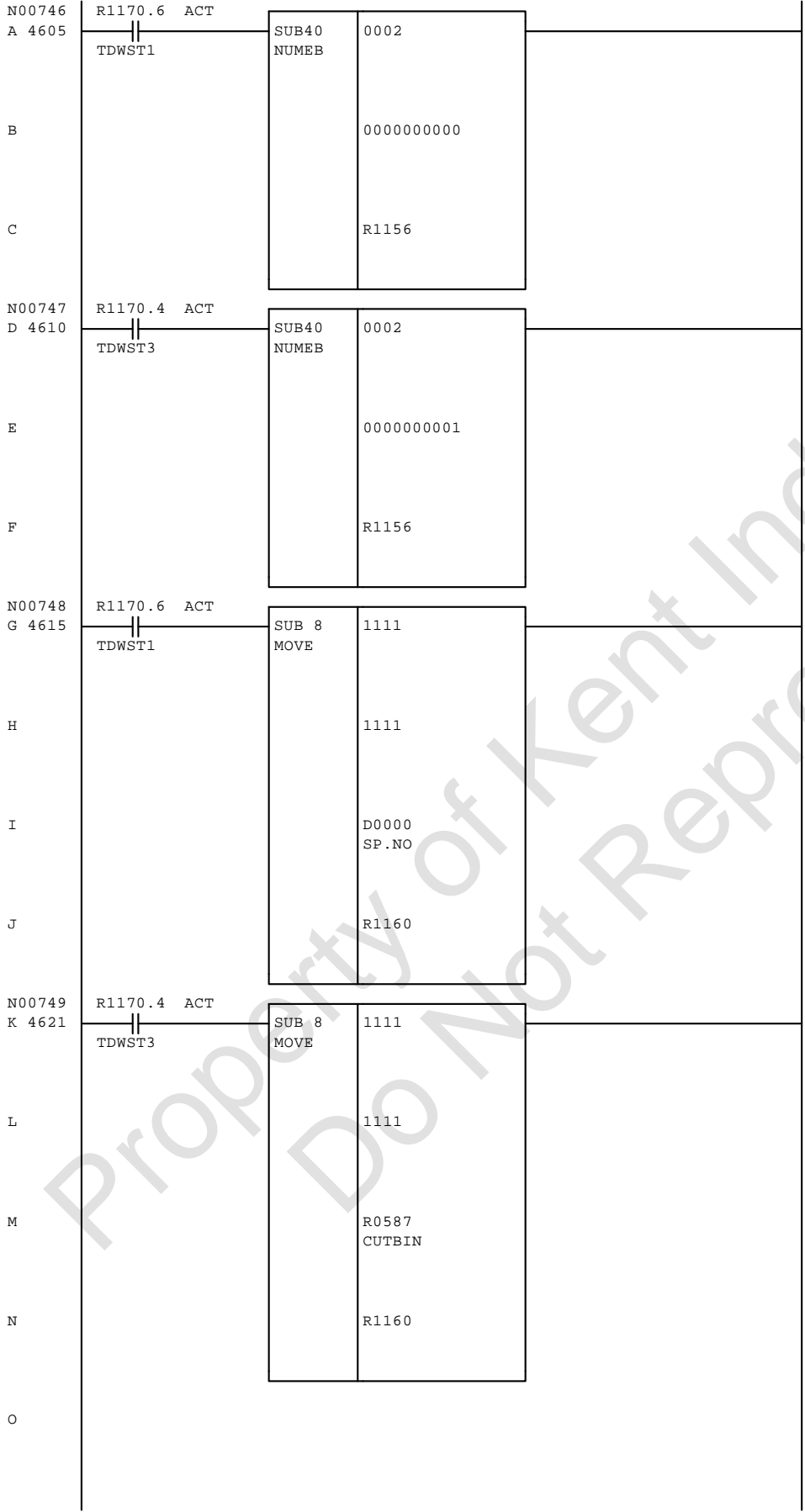




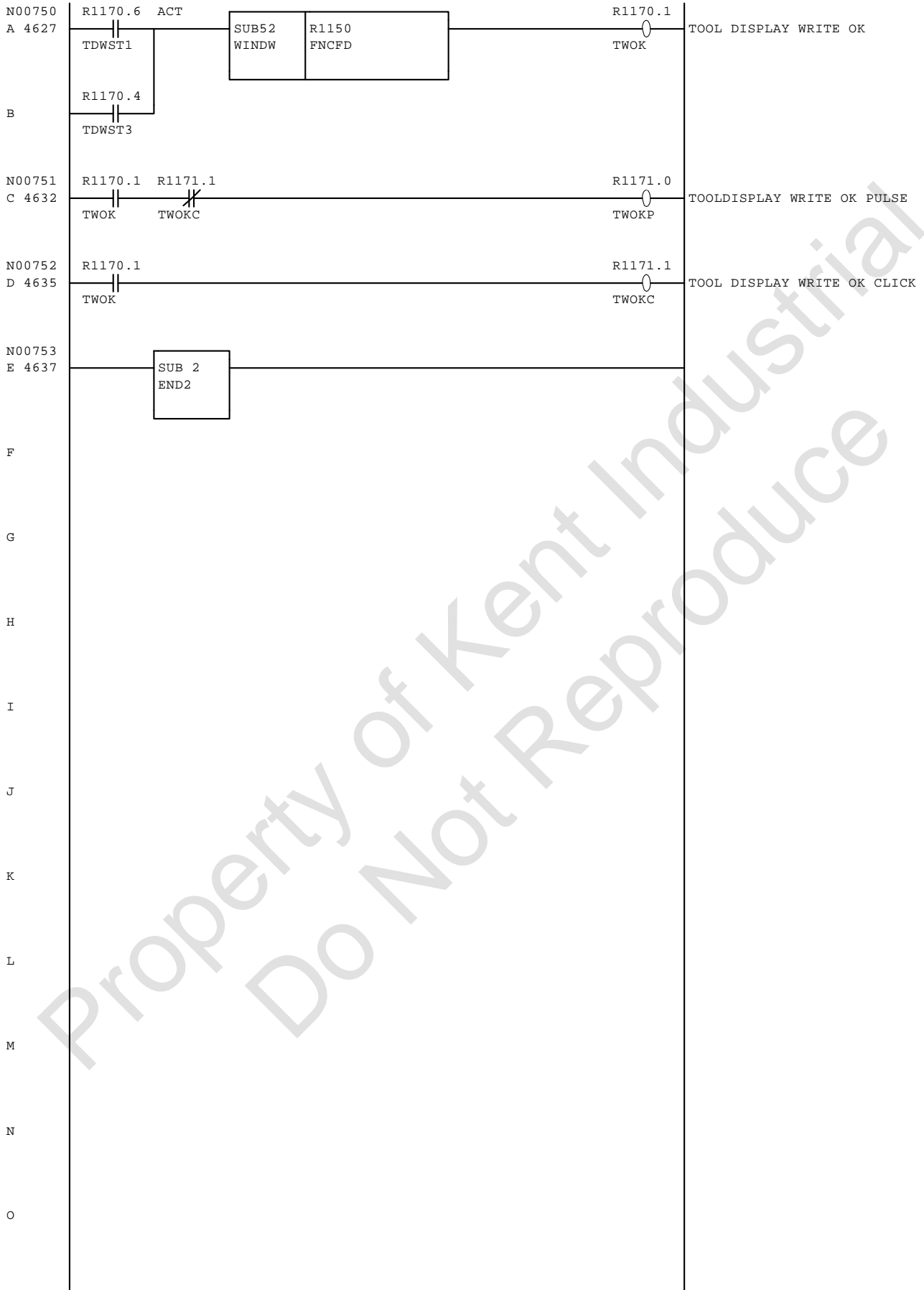








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#40 DISK TYPE TOOL CHANGER SYSTEM
USER MANUAL

This Manual is Applicable to

Model:

MR4AK/MR4BK/MR4CK/MR4DK

BT40/CAT40/DIN40/HSK50A/HSK63A

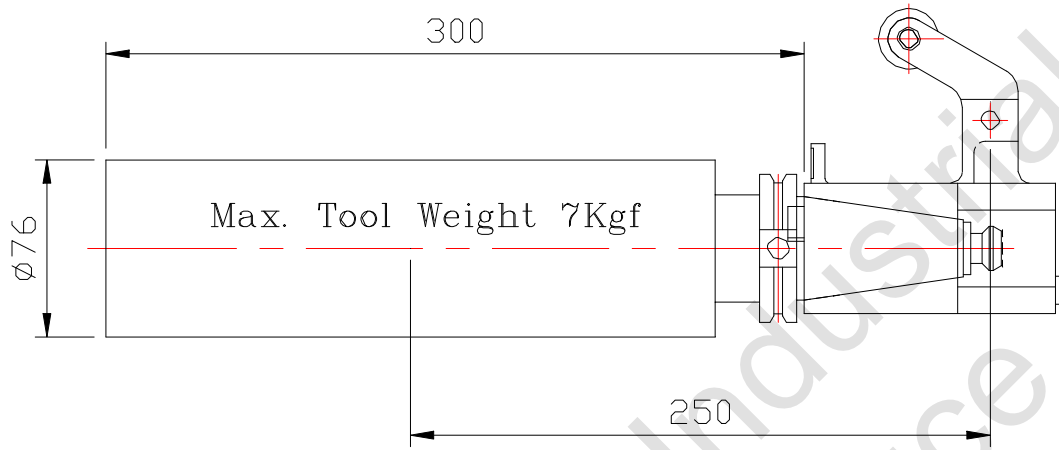
Contents	Page
1、Tool Changer System Mechanical Specification & Drawing.....	02
2、Bracket Design	04
3、Tool Changing Motion Flowchart	05
4、Power Supply Specification for Electrical Control	06
5、Electrical Control	07
6、Electrical Control Protection Programming	08
7、Installation Procedure	09
8、Original Setting	11
9、Trouble Shooting	12
10、Maintenance	17

1、Tool Changer System Mechanical Specification & Drawings:

1-1. Specification:

Item \ Model	MR4AK	MR4BK	MR4CK	MR4DK
Tool Capacity	24T	24T	30T	20T
Maximum Tool Diameter	76mm	90mm	75mm	90mm
Max. Tool Length	300mm			
Max. Tool Weight	7Kgf			
Total Tool Weight	120 Kgf			
Max. Unbalance on disk	870 Kgf-cm			
Max. Tool Inertia	210 Kgf-cm			
CAM BOX Speed (CAM BOX Only)	1.5 sec. (60Hz) / 1.8sec.(50Hz)			
Magazine Speed	0.6 sec. / tool (60Hz)			
Tool Selection	Two Way Random Tool Selection			

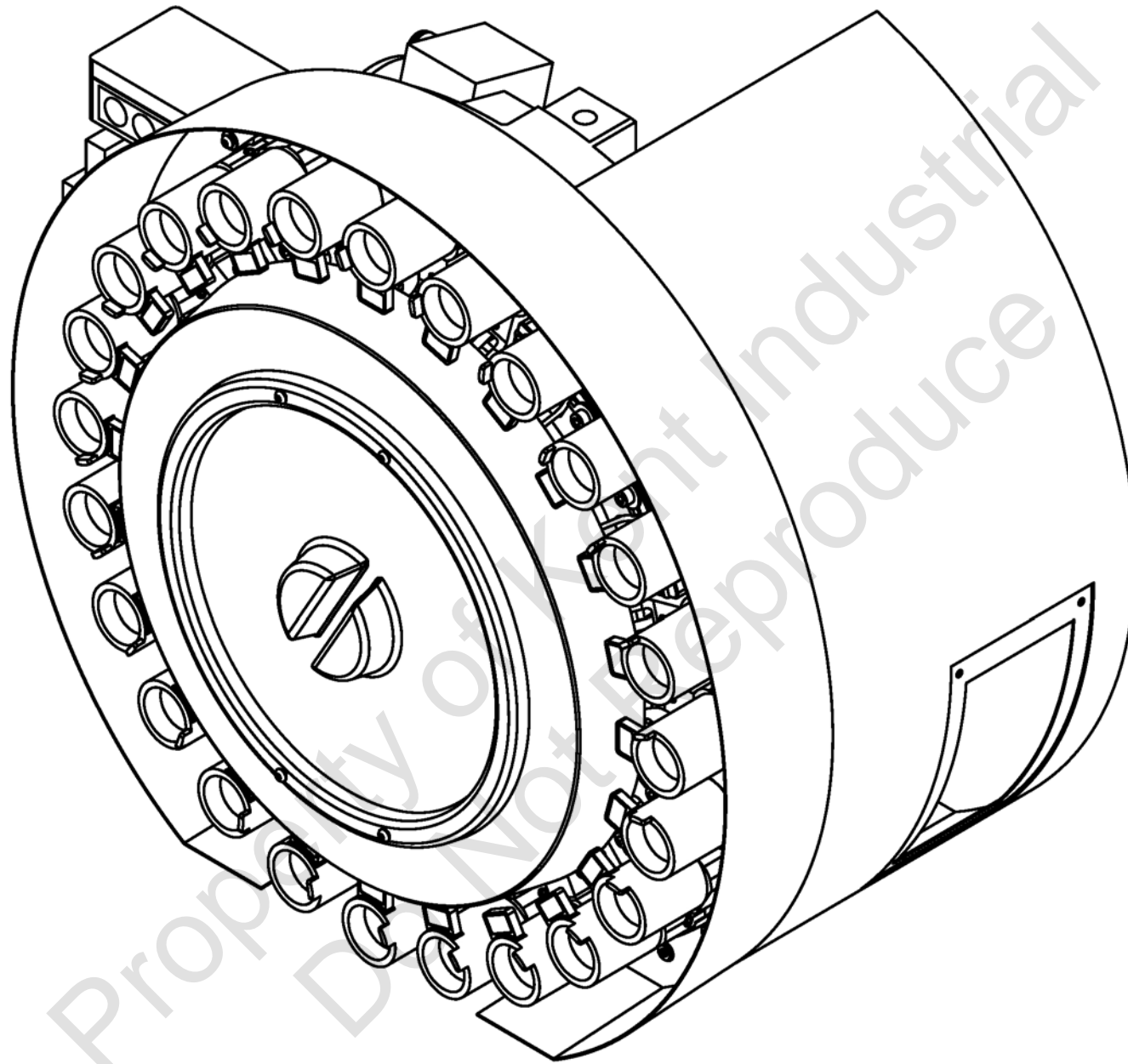
1-2. Maximum Tool Rotational Inertia Diagram:
Drawing:



1-3. Drawings:

Assembly drawing and part list for disk type tool magazine, CAM BOX and tool changing arm as per attached drawings and list.

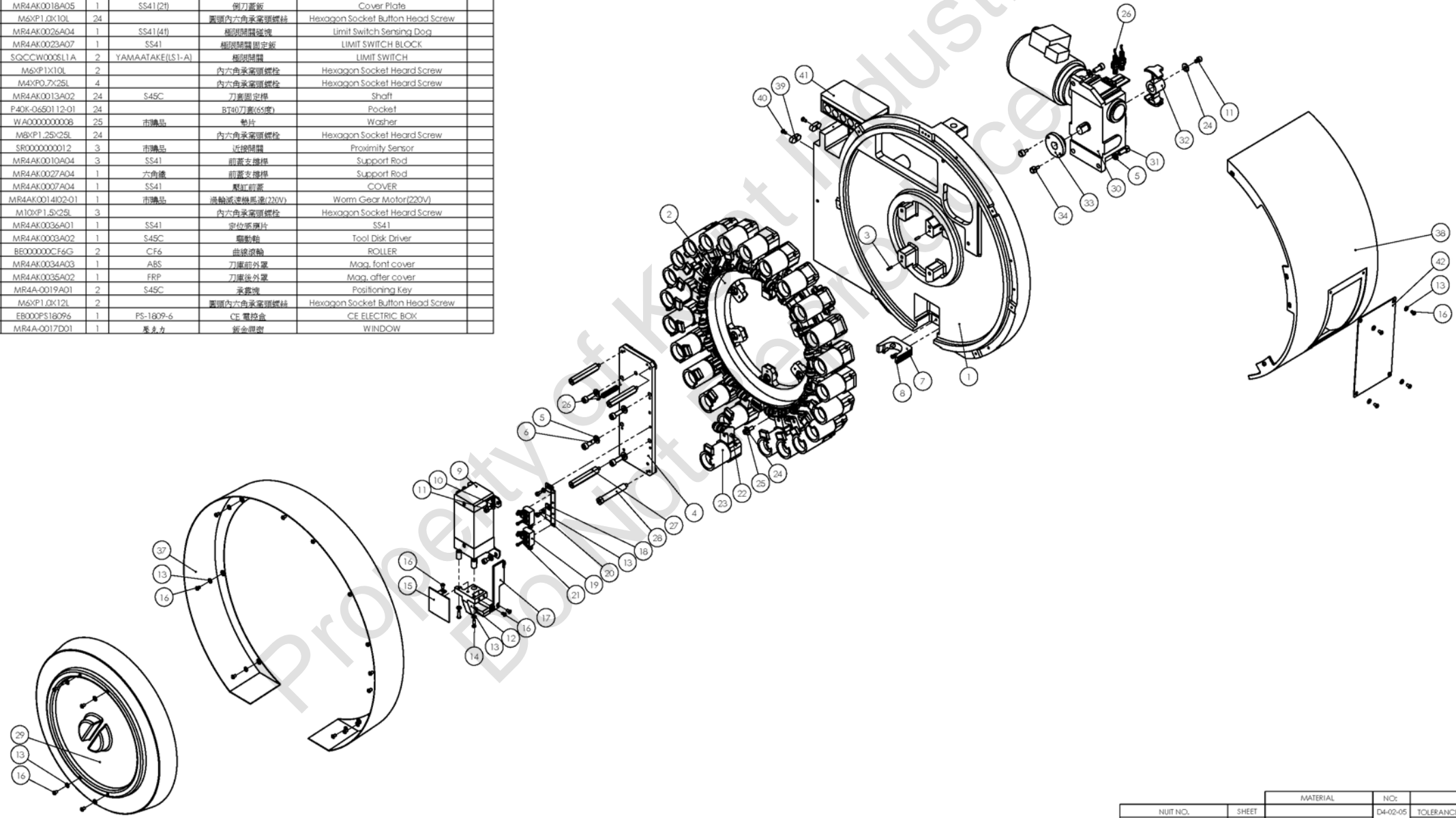
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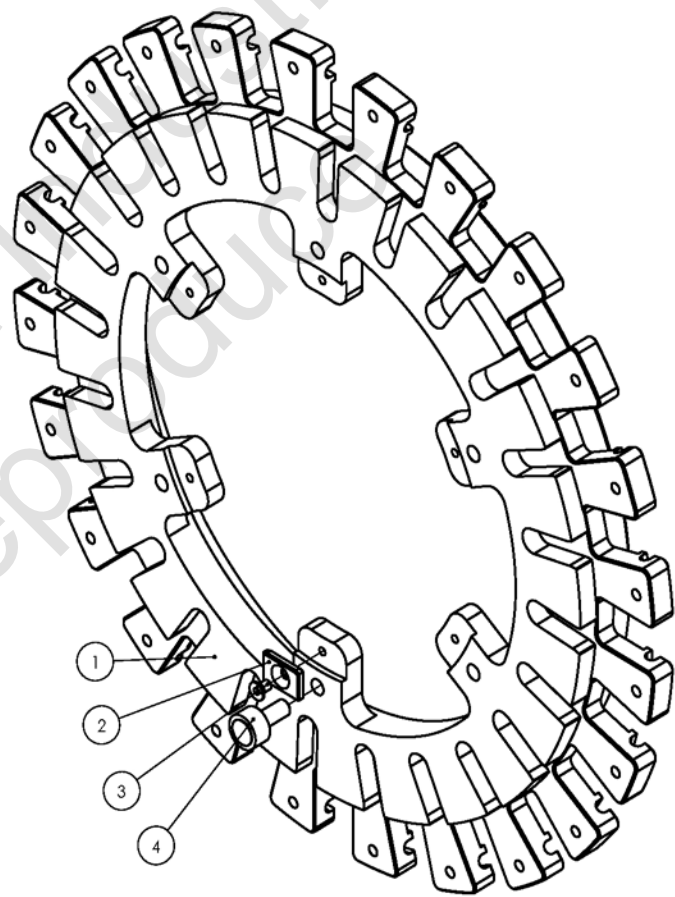
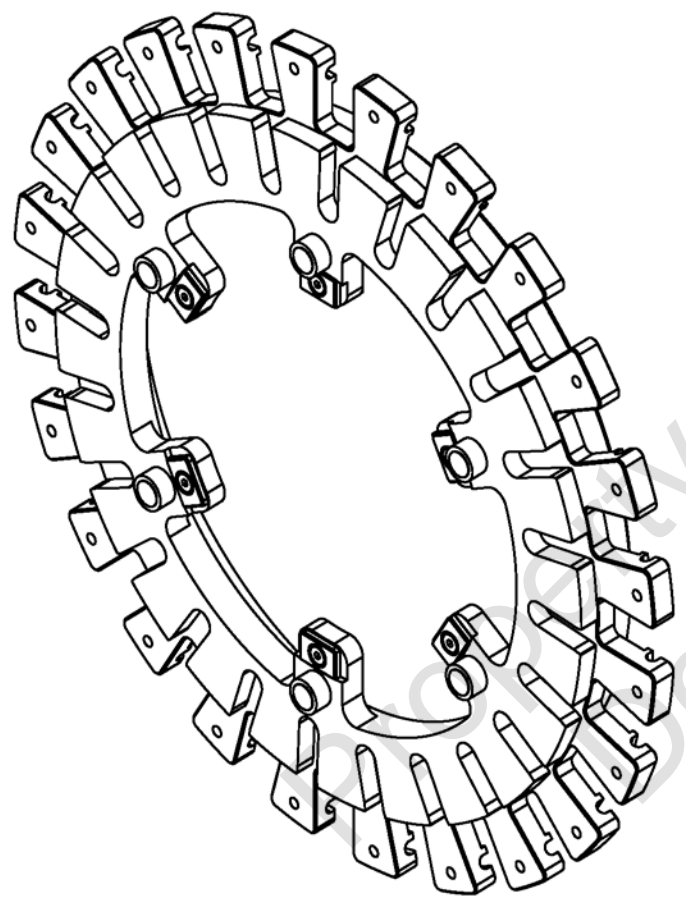
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	2 / 2	TITLE	D4-02-03 2001/12	
PART NO.	SCALE	MR4AK(#40X24T)P=80		>0 ±0.1
MR4AK0000A01	1:5	MR4AK(#40X24T)P=80		>6 ±0.2
				>30 ±0.3
				>120 ±0.5
				>315 ±0.8
				>1000 ±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4AK001A20	1	FC30	刀庫本體	Main Body	
2	MR4AK002A00	1		刀盤組	Tool disk module	
3	M5x1.6L	2		平行銷	Paralle Pin	
4	MR4AK0004A00	1		壓缸固定板組	Cylinder Mounting Plate Module	
5	M10	7		平墊圈	Finished Circular Plain Washer	
6	M10xP1.5x30L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
7	MR4AK0025A04	1	尼龍612纖維40%	側刀定位座	POCKET POSITIONING SEAT	
8	M6xP1.0x16L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
9	MR4AK0005A06	1	市購品	側刀壓缸	Pneumatic Cylinder	
10	M8	4		平墊圈	Finished Circular Plain Washer	
11	M8xP1.25x12L	5		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
12	MR4AK0006A06	1	S45C	側刀塊	TOOL TILT BLOCK	
13	M6	26		平墊圈	Finished Circular Plain Washer	
14	M6xP1.0x20L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
15	MR4AK0018A05	1	SS41(2t)	側刀蓋板	Cover Plate	
16	M6xP1.0x10L	24		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
17	MR4AK0026A04	1	SS41(4t)	極限開關磁塊	Limit Switch Sensing Dog	
18	MR4AK0023A07	1	SS41	極限開關固定板	LIMIT SWITCH BLOCK	
19	SQCCW0006L1A	2	YAMAATAKE(LS1-A)	極限開關	LIMIT SWITCH	
20	M6xP1X10L	2		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
21	M4xP0.7x25L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
22	MR4AK0013A02	24	S45C	刀庫固定桿	Shaft	
23	F40K-0650112-01	24		BT40刀套(65度)	Pocket	
24	WA0000000008	25	市購品	墊片	Washer	
25	M8xP1.25x25L	24		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
26	SR000000012	3	市購品	接近開關	Proximity Sensor	
27	MR4AK0010A04	3	SS41	前蓋支撐桿	Support Rod	
28	MR4AK0027A04	1		六角銷	Support Rod	
29	MR4AK007A04	1	SS41	壓缸前蓋	COVER	
30	MR4AK001402-01	1	市購品	齒輪或連機馬達(220V)	Worm Gear Motor(220V)	
31	M10xP1.5x25L	3		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
32	MR4AK0036A01	1	SS41	定位膠薄片	SS41	
33	MR4AK0038A02	1	S45C	驅動軸	Tool Disk Driver	
34	BE00000CF6G	2	CF6	曲線滾輪	ROLLER	
37	MR4AK0034A03	1	ABS	刀庫前外罩	Mag. front cover	
38	MR4AK0035A02	1	FRP	刀庫後外罩	Mag. after cover	
39	MR4A-0019A01	2	S45C	承盤塊	Positioning Key	
40	M6xP1.0x12L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
41	EB000F518096	1	PS-1809-6	CE 電檢盒	CE ELECTRIC BOX	
42	MR4A-0017D01	1	美克力	鋁金網窗	WINDOW	



DRAWING DESIGN		CHECK APPROVE		MATERIAL		NO:		TOLERANCE	
NAME	AWAY 2006/3/29								
NUT NO.		SHEET		TITLE		D4-02-05		2001/12	
PART NO.		SCALE		M/R4AK(#40x24)F=80		1 / 2		±0.1	
M/R4AK0000A01		1:7		M/R4AK(#40x24)F=80				±0.2	
				M/R4AK(#40x24)F=80				±0.3	
								±0.5	
								±0.8	
								±1.2	

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4AK0002A06	1	FC30	刀盤	Tool Disk	
2	MR4AK0011A02	6	POM聚縮醛樹脂CL-500CL	耐磨片(I)	Wear resistant Strip(I)	
3	M6XP1X10L	6		內六角皿頭螺絲	Socket Countersunk Head Screw	
4	BE00000CF10G	6	CF10	曲線滾輪軸承	ROLLER	



DRAWING DESIGN		CHECK APPROVE		MATERIAL		NO:	
NAME		NAME		NUIT NO.		D4-02-04	
AMAY 2006/3/29				SHEET		2001/12	
				1 / 1		TOLERANCE	
				PART NO.		± 0.1 >0 ± 0.2 >6 ± 0.3 >30 ± 0.5 >120 ± 0.8 >315 ± 1.2 >1000	
				MR4AK0002A00			
				SCALE		TITLE	
				1:3		刀盤組	
				Tool disk module			

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4AK0004A07	1	SS41	壓缸固定板	Cylinder Mounting Plate	
2	MR4AK0012A03	2	UP	耐磨片(II)	Wear resistant Strip(II)	
3	M6XP1X10L	4		內六角血頭螺絲	Socket Countersunk Head Screw	



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		MATERIAL		NO:	
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PART NO.		SCALE		2001/12	
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NAME		AMAY 2006/3/29		壓缸固定板組	
		MR4AK0004A00		1:2	
				TOLERANCE	
				± 0.1 >0 ± 0.2 >6 ± 0.3 >30 ± 0.5 >120 ± 0.8 >315 ± 1.2 >1000	

A

B

C

D

E

F

A

B

C

D

E

F

1

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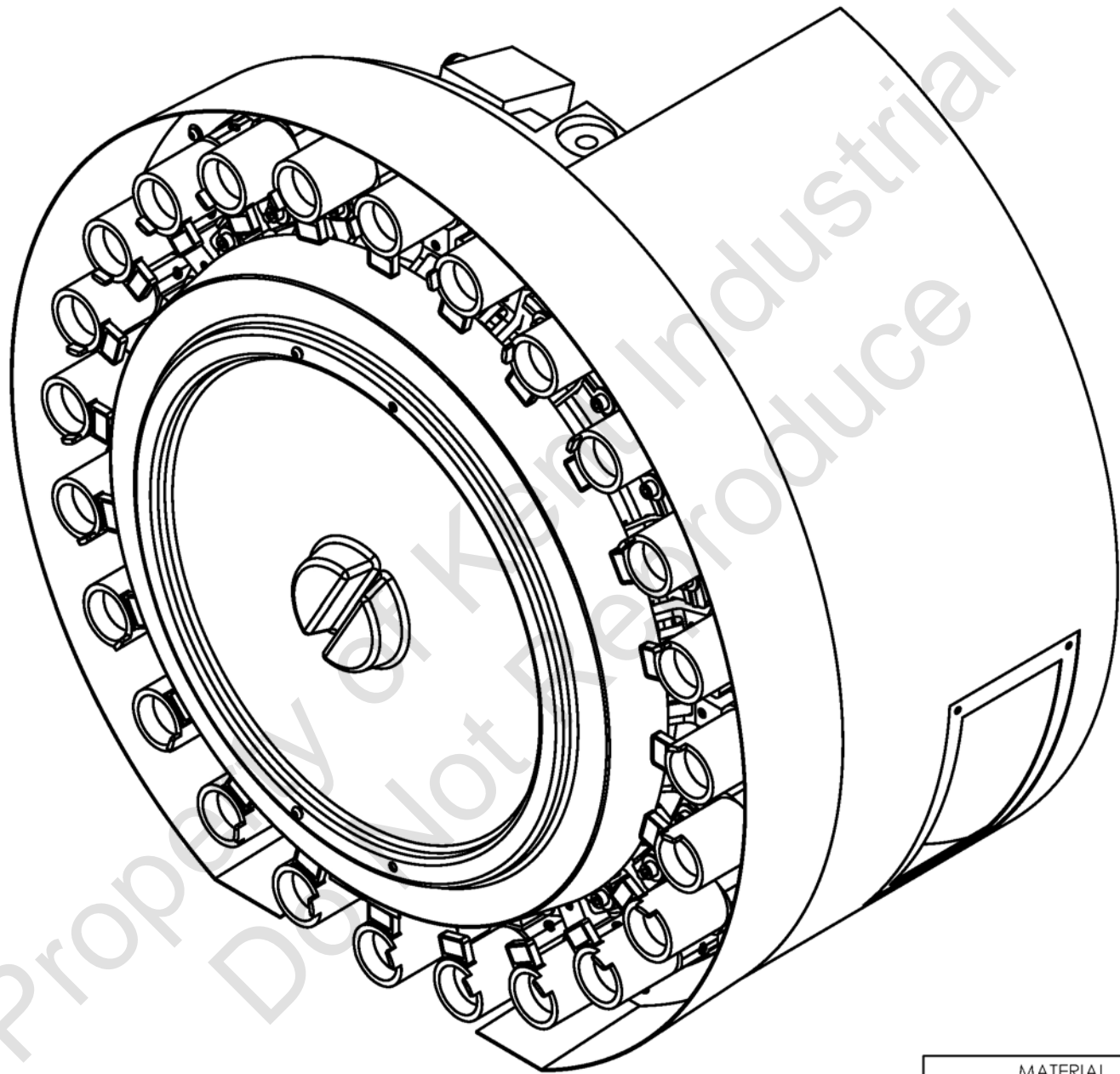
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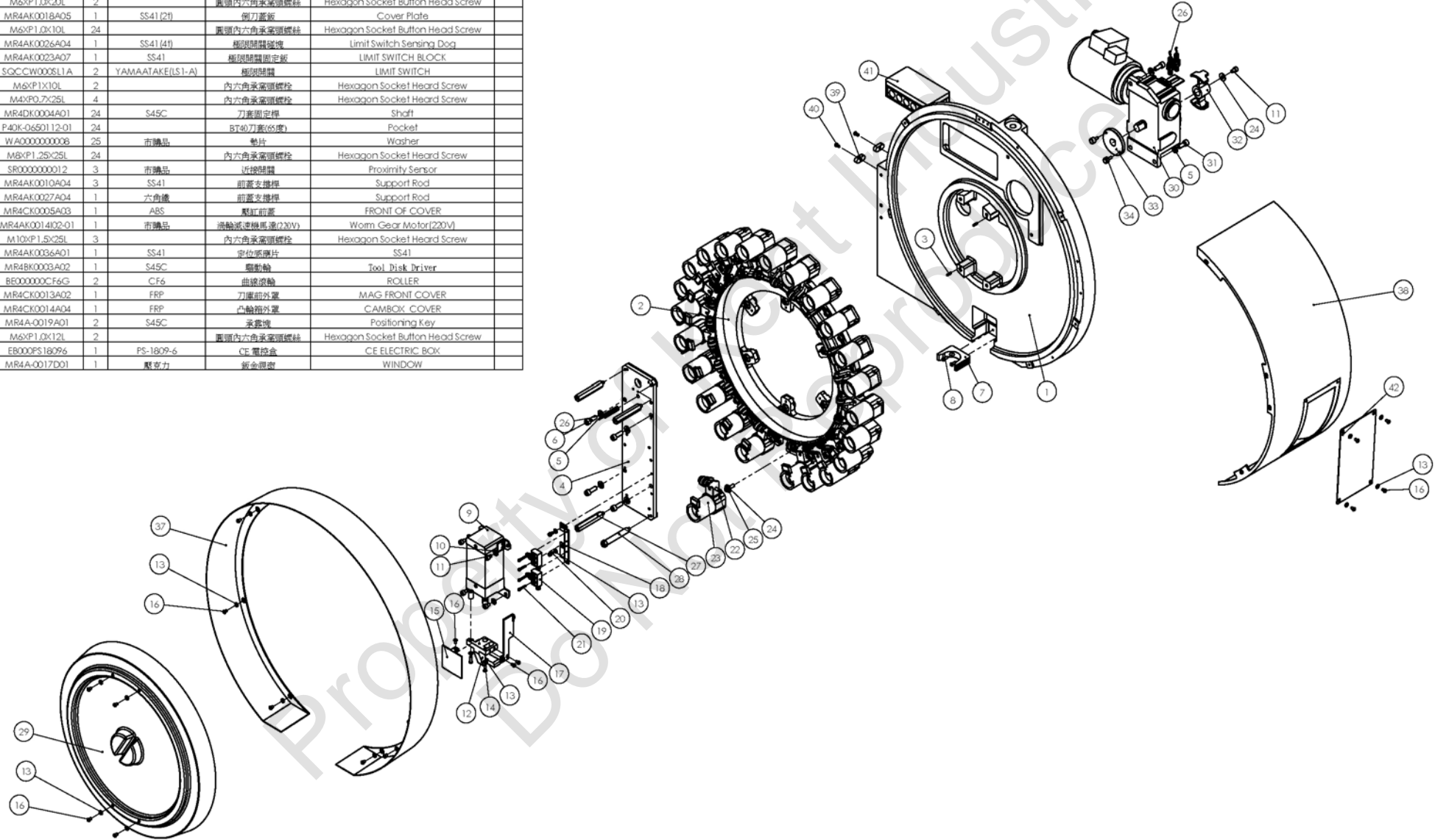
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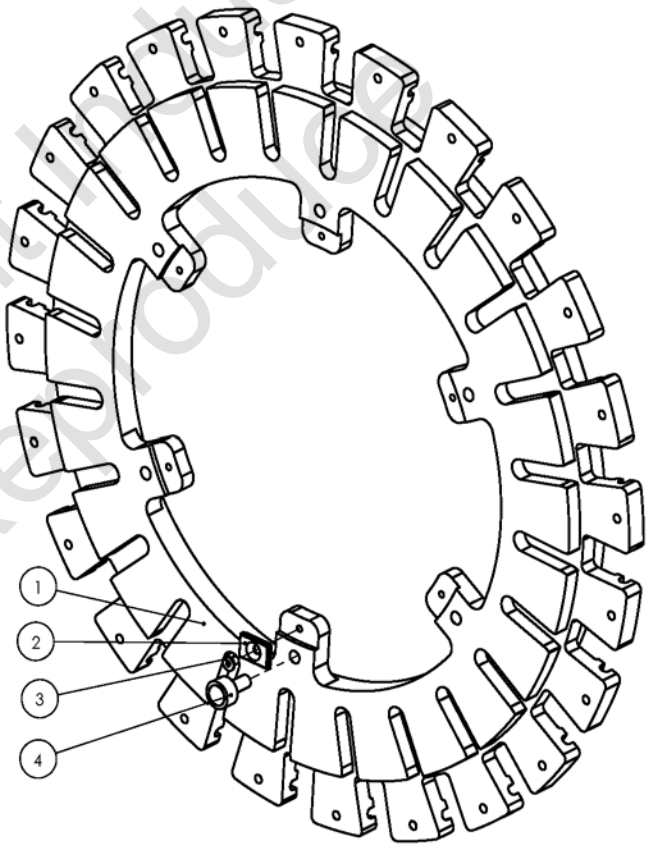
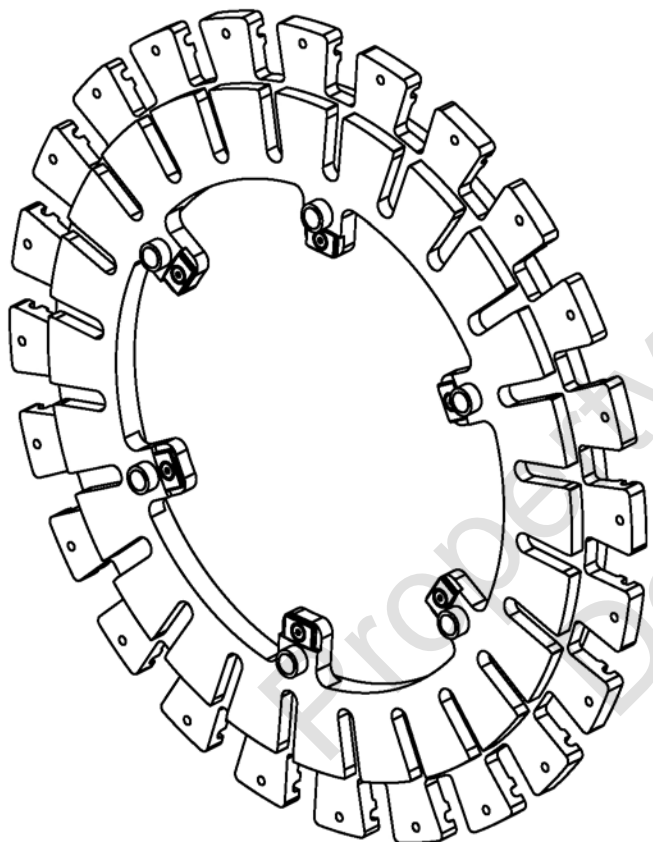
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PART NO.	SCALE	MR4BK(#40X24T)P=95		>0 ±0.1
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				>30 ±0.3
				>120 ±0.5
				>315 ±0.8
				>1000 ±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4CK001A18	1	FC30	本機	Body	
2	MR4BK002A00	1		刀盤組	Tool Disk Module	
3	M5x1.6L	2		平行銷	Paralle Pin	
4	MR4CK003A00	1		壓缸固定板組	Cylinder Mounting Plate Module	
5	M10	7		平墊圈	Finished Circular Plain Washer	
6	M10xP1.5x30L	4		內六角承蓋螺絲	Hexagon Socket Head Screw	
7	MR4AK002A04	1	尼龍61硬纖維40%	側刀定位座	POCKET POSITIONING SEAT	
8	M6xP1.0x1.6L	2		圓頭內六角承蓋螺絲	Hexagon Socket Button Head Screw	
9	MR4AK005A06	1	市購品	側刀壓缸	Pneumatic Cylinder	
10	M8	4		平墊圈	Finished Circular Plain Washer	
11	M8xP1.25x1.2L	5		內六角承蓋螺絲	Hexagon Socket Head Screw	
12	MR4CK004A04	1	S45C	側刀塊	TOOL TILT BLOCK	
13	M6	25		平墊圈	Finished Circular Plain Washer	
14	M6xP1.0x2.0L	2		圓頭內六角承蓋螺絲	Hexagon Socket Button Head Screw	
15	MR4AK0018A05	1	SS41 (2t)	側刀蓋板	Cover Plate	
16	M6xP1.0x1.0L	24		圓頭內六角承蓋螺絲	Hexagon Socket Button Head Screw	
17	MR4AK0026A04	1	SS41 (4t)	極限開關磁塊	Limit Switch Sensing Dog	
18	MR4AK0023A07	1	SS41	極限開關固定板	LIMIT SWITCH BLOCK	
19	SQCCW0006L1A	2	YAMAATAKE(LS1-A)	極限開關	LIMIT SWITCH	
20	M6xP1.5x1.0L	2		內六角承蓋螺絲	Hexagon Socket Head Screw	
21	M4xP0.7x25L	4		內六角承蓋螺絲	Hexagon Socket Head Screw	
22	MR4DK0004A01	24	S45C	刀架固定桿	Shaft	
23	F40K-0650112-01	24		BT40刀套(65度)	Pocket	
24	WA000000008	25	市購品	墊片	Washer	
25	M8xP1.25x25L	24		內六角承蓋螺絲	Hexagon Socket Head Screw	
26	SR000000012	3	市購品	接近開關	Proximity Sensor	
27	MR4AK0010A04	3	SS41	前蓋支撐桿	Support Rod	
28	MR4AK0027A04	1		六角銷	Support Rod	
29	MR4CK005A03	1	ABS	壓缸前蓋	FRONT OF COVER	
30	MR4AK001402-01	1	市購品	渦輪減速機馬達(220V)	Worm Gear Motor(220V)	
31	M10xP1.5x25L	3		內六角承蓋螺絲	Hexagon Socket Head Screw	
32	MR4AK0036A01	1	SS41	定位膠薄片	SS41	
33	MR4BK0003A02	1	S45C	驅動輪	Tool Disk Driver	
34	BE00000CF6G	2	CF6	曲線滾輪	ROLLER	
37	MR4CK0013A02	1	FFP	刀庫前外罩	MAG FRONT COVER	
38	MR4CK0014A04	1	FFP	凸輪箱外罩	CAMBOX COVER	
39	MR4A-0019A01	2	S45C	承蓋塊	Positioning Key	
40	M6xP1.0x1.2L	2		圓頭內六角承蓋螺絲	Hexagon Socket Button Head Screw	
41	EB000FS18096	1	PS-1809-6	CE 電控盒	CE ELECTRIC BOX	
42	MR4A-0017D01	1	蘇克力	鋁金屬窗	WINDOW	



DRAWING DESIGN		CHECK APPROVE		MATERIAL		NO:		TOLERANCE	
NAME	AWAY 2006/3/29			NUT NO.	SHEET	D4-02-05	2001/12	±0.1	±0.2
				PART NO.	SCALE	MR4BK(#40x24)P=95		>±0	±0.3
						MR4BK(#40x24)P=95		>±10	±0.5
								>±15	±0.8
								>±100	±1.2

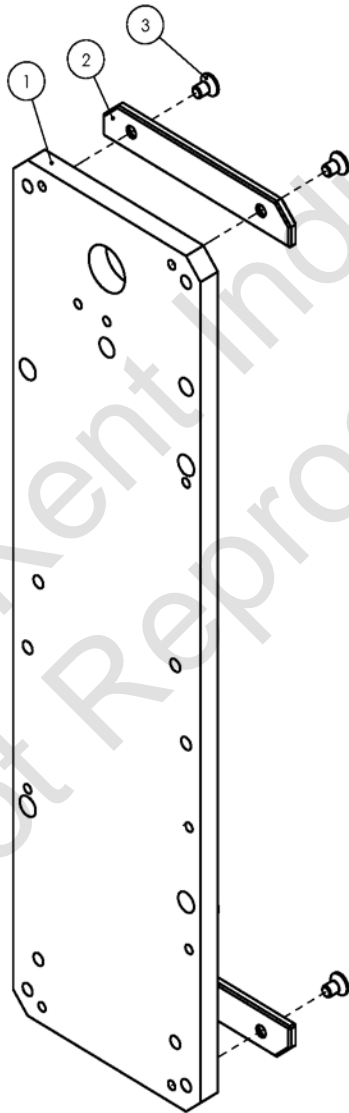
ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4BK0002A03	1	FC30	刀盤	Tool disk	
2	MR4AK0011A02	6	POM聚縮醛樹脂CL-500CL	耐磨片(I)	Wear resistant Strip(I)	
3	M6XP1X10L	6		內六角皿頭螺絲	Socket Countersunk Head Screw	
4	BE00000CF10G	6	CF10	曲線滾輪軸承	ROLLER	



NAME	DRAWING DESIGN	CHECK APPROVE
	AMAY 2006/3/29	

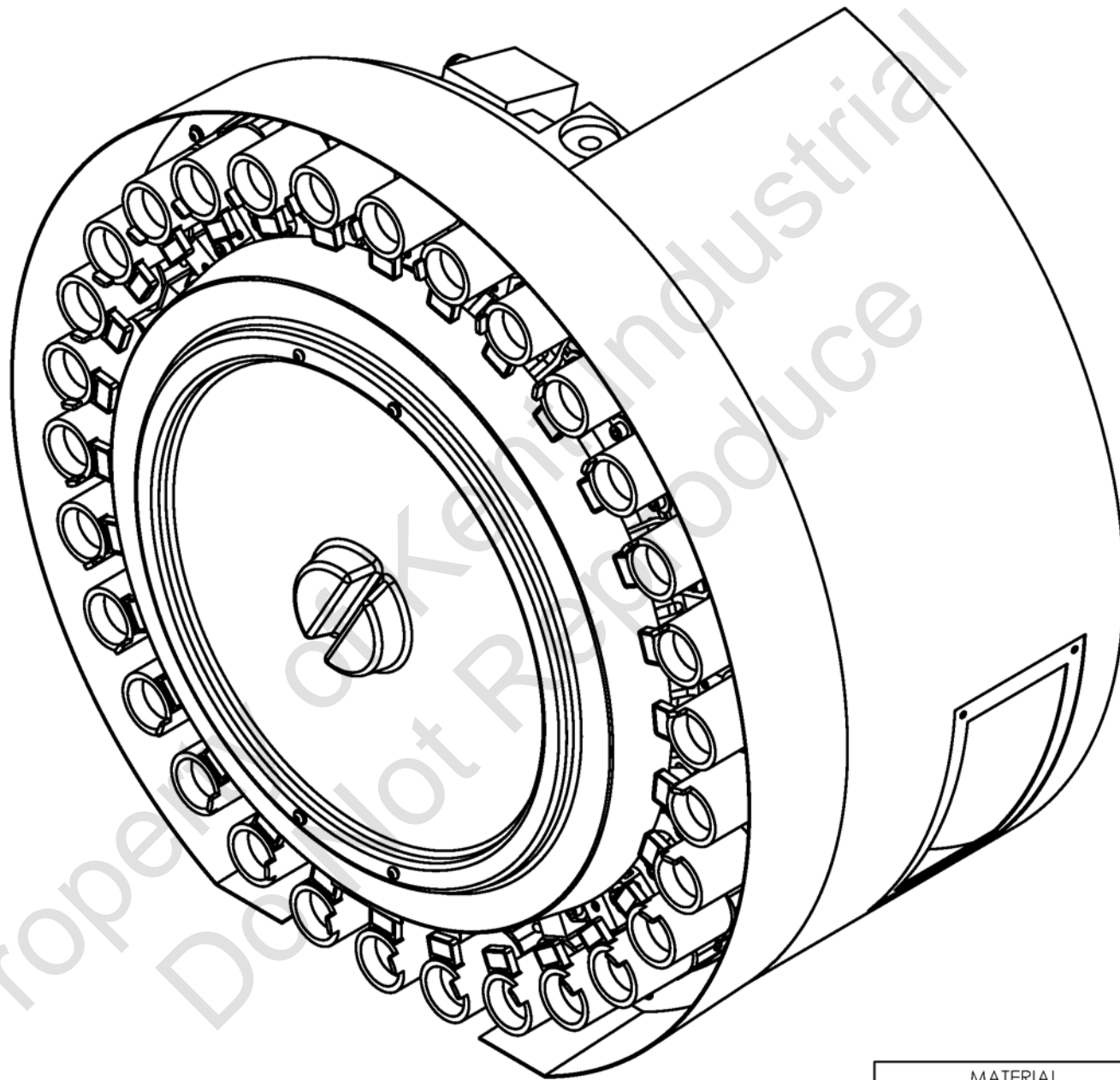
NUIT NO.	SHEET	MATERIAL	NO:	TOLERANCE
	1 / 1		D4-02-04	
PART NO.	SCALE	TITLE		>0 ±0.1
MR4BK0002A00	1:4	刀盤組		>6 ±0.2
		Tool Disk Module		>30 ±0.3
				>120 ±0.5
				>315 ±0.8
				>1000 ±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4CK0003A10	1	SS41	壓缸固定板	Cylinder Mounting Plate	
2	MR4AK0012A03	2	UP	耐磨片(I)	Wear resistant Strip(I)	
3	M6XP1X10L	4		內六角皿頭螺栓	Socket Countersunk Head Screw	




DRAWING DESIGN	CHECK APPROVE
NAME AMAY 2006/3/29	

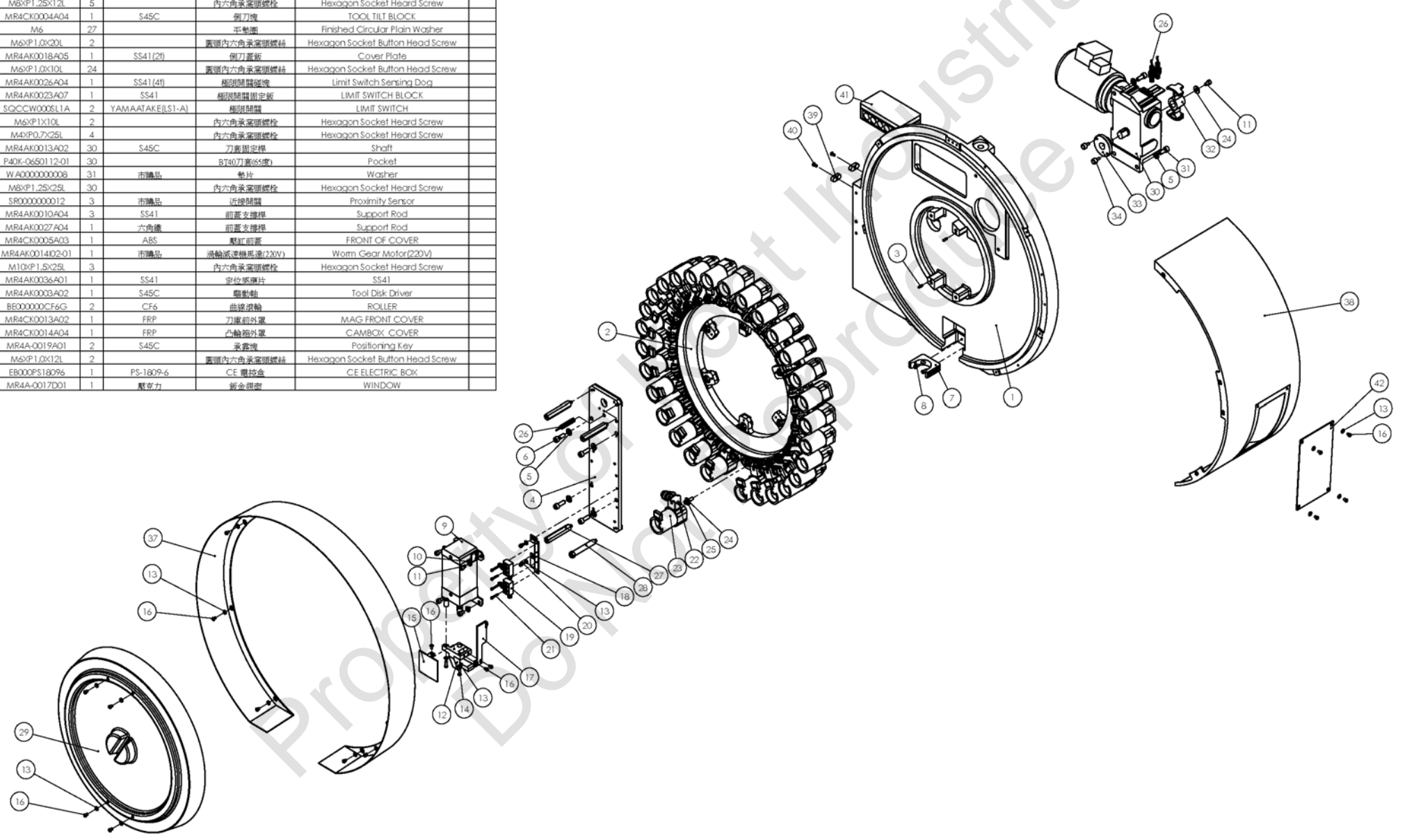
NUIT NO.	SHEET	MATERIAL	NO:	TOLERANCE
	1 / 1		D4-02-04	±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2
PART NO.	SCALE	TITLE		
MR4CK0003A00	1:2.5	壓缸固定板組 Cylinder Mounting Plate Module		



	DRAWING DESIGN	CHECK	APPROVE
NAME	AMAY 2006/3/29		

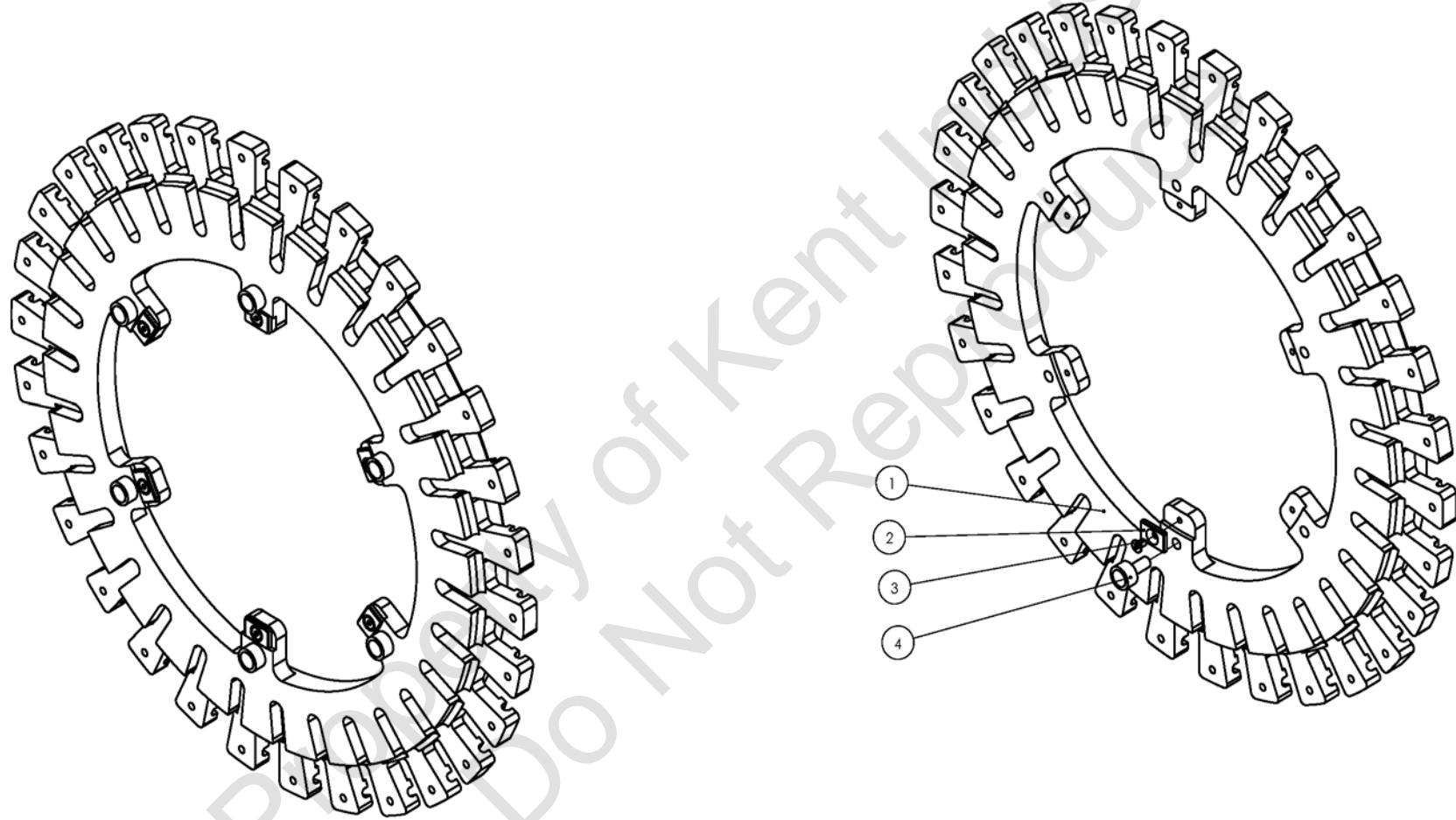
NUIT NO.	SHEET	MATERIAL	NO:	TOLERANCE
	2 / 2	TITLE	D4-02-03 2001/12	
PART NO.	SCALE	MR4CK(#40X30T)P=76		>0 ±0.1
MR4CK0000A01	1:5.5	MR4CK(#40X30T)P=76		>6 ±0.2
				>30 ±0.3
				>120 ±0.5
				>315 ±0.8
				>1000 ±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4CK001A18	1	FC30	本體	Body	
2	MR4CK002A00	1		刀盤組	Tool Disk Module	
3	M5x1.6L	2		平行銷	Paralle Pin	
4	MR4CK003A00	1		壓缸固定板組	Cylinder Mounting Plate Module	
5	M10	7		平墊圈	Finished Circular Plain Washer	
6	M10xP1.5x30L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
7	MR4AK002SA04	1	尼龍61 硬纖維40%	側刀定位座	POCKET POSITIONING SEAT	
8	M6xP1.0x16L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
9	MR4AK005A06	1	市購品	側刀壓缸	Pneumatic Cylinder	
10	M8	4		平墊圈	Finished Circular Plain Washer	
11	M8xP1.25x12L	5		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
12	MR4CK004A04	1	S45C	側刀塊	TOOL TILT BLOCK	
13	M6	27		平墊圈	Finished Circular Plain Washer	
14	M6xP1.0x20L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
15	MR4AK0018A05	1	SS41(2t)	側刀蓋板	Cover Plate	
16	M6xP1.0x10L	24		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
17	MR4AK002SA04	1	SS41(4t)	極限開關磁塊	Limit Switch Sensing Dog	
18	MR4AK0023A07	1	SS41	極限開關固定板	LIMIT SWITCH BLOCK	
19	SQCCW0006L1A	2	YAMAATAKE(LS1-A)	極限開關	LIMIT SWITCH	
20	M6xP1.5x10L	2		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
21	M4xP0.7x25L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
22	MR4AK0013A02	30	S45C	刀架固定桿	Shaft	
23	P40K-06S0112-01	30		BT40刀套(65度)	Pocket	
24	W A0000000008	31	市購品	墊片	Washer	
25	M8xP1.25x25L	30		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
26	SR000000012	3	市購品	接近開關	Proximity Sensor	
27	MR4AK0010A04	3	SS41	前蓋支撐桿	Support Rod	
28	MR4AK0027A04	1		六角銷	Support Rod	
29	MR4CK005A03	1	ABS	壓缸前蓋	FRONT OF COVER	
30	MR4AK0014Q2-01	1	市購品	渦輪減速機馬達(220V)	Worm Gear Motor(220V)	
31	M10xP1.5x25L	3		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
32	MR4AK0036A01	1	SS41	定位膠膜片	SS41	
33	MR4AK003A02	1	S45C	驅動軸	Tool Disk Driver	
34	BE00000CF6G	2	CF6	曲線滾輪	ROLLER	
37	MR4CK0013A02	1	FRP	刀庫前外罩	MAG FRONT COVER	
38	MR4CK0014A04	1	FRP	凸輪箱外罩	CAMBOX COVER	
39	MR4A-0019A01	2	S45C	承靠塊	Positioning Key	
40	M6xP1.0x12L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
41	EB000FS18096	1	PS-1809-6	CE 電控盒	CE ELECTRIC BOX	
42	MR4A-0017D01	1	壓克力	紙金銀窗	WINDOW	



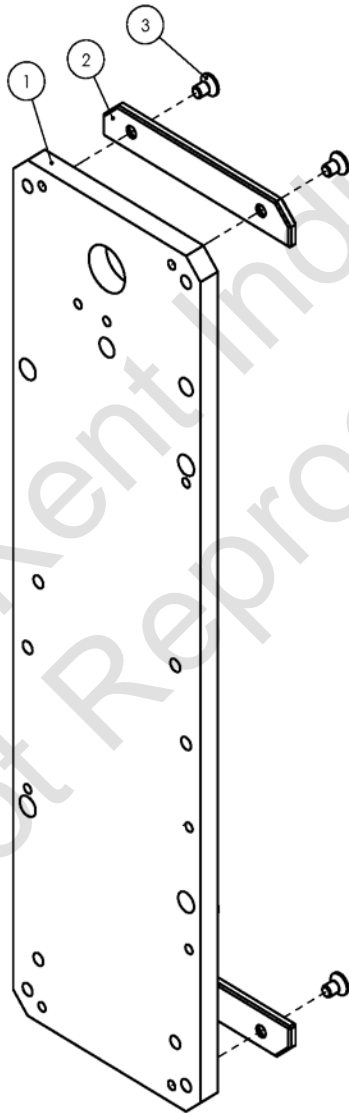
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NAME	AWAY 2006/3/29			NUT NO.	SHEET	D4-02-05	2001/12	±0.1	±0.2
				PART NO.	SCALE			>±0	±0.3
				MR4CK0000A01	1:8	MR4CK(#40x30)P=76		>±10	±0.5
						MR4CK(#40x30)P=76		>±15	±0.8
								>±100	±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4CK0002A05	1	FC30	刀盤	Tool disk	
2	MR4AK0011A02	6	POM聚縮醛樹脂CL-500CL	耐磨片(I)	Wear resistant Strip(I)	
3	M6XP1X10L	6		內六角皿頭螺絲	Socket Countersunk Head Screw	
4	BE00000CF10G	6	CF10	曲線滾輪軸承	ROLLER	



DRAWING DESIGN		CHECK APPROVE		MATERIAL		NO:	
NAME		NAME		NUIT NO.		D4-02-04	
AMAY 2006/3/29				SHEET		2001/12	
				1 / 1		TOLERANCE	
				PART NO.		TITLE	
				MR4CK0002A00		刀盤組	
				SCALE		TOLERANCE	
				1:4		± 0.1 >0 ± 0.2 >6 ± 0.3 >30 ± 0.5 >120 ± 0.8 >315 ± 1.2 >1000	

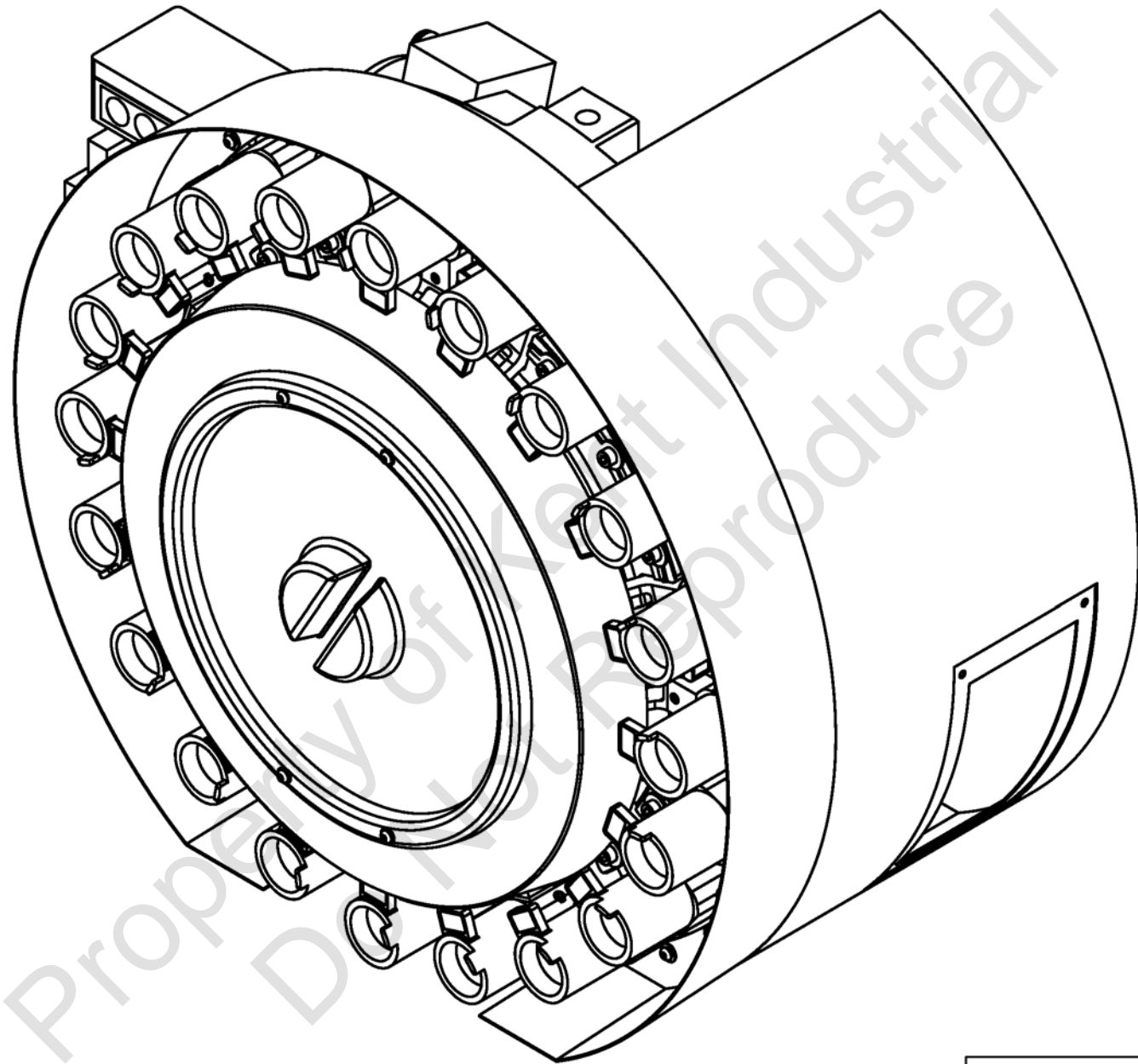
ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4CK0003A10	1	SS41	壓缸固定板	Cylinder Mounting Plate	
2	MR4AK0012A03	2	UP	耐磨片(I)	Wear resistant Strip(I)	
3	M6XP1X10L	4		內六角皿頭螺栓	Socket Countersunk Head Screw	



Property of Kent Industrial
Do Not Reproduce

DRAWING DESIGN		CHECK APPROVE		MATERIAL	NO:	TOLERANCE	
NAME	AMAY 2006/3/29				D4-02-04	>0	±0.1
					2001/12	>6	±0.2
						>30	±0.3
						>120	±0.5
						>315	±0.8
						>1000	±1.2

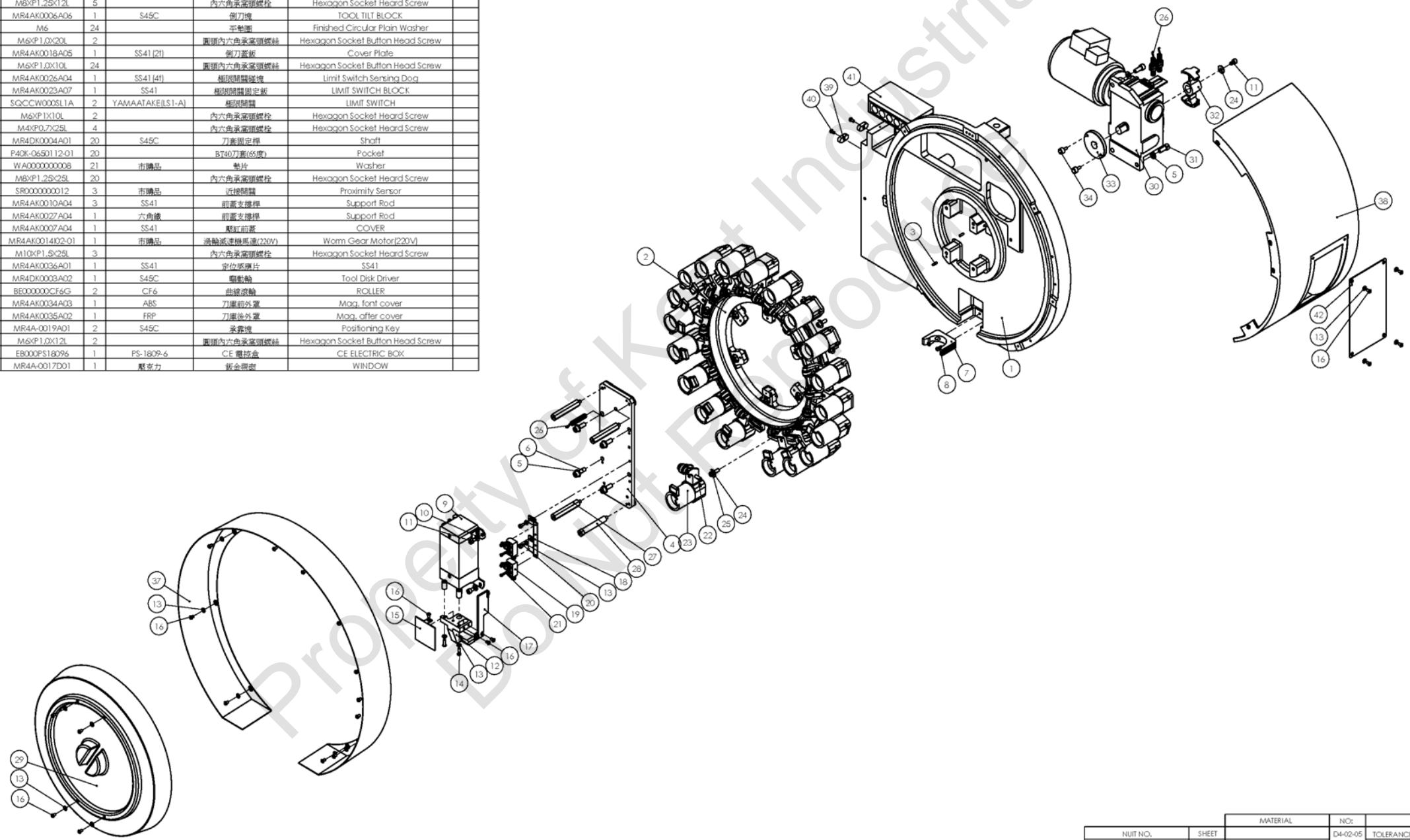
NUIT NO.	SHEET	TITLE	SCALE	MATERIAL	NO:
	1 / 1	壓缸固定板組	1:2.5	Cylinder Mounting Plate Module	



	DRAWING DESIGN	CHECK	APPROVE
NAME	AMAY 2006/3/29		

NUT NO.	SHEET	MATERIAL	NO:	TOLERANCE
	2 / 2	TITLE	D4-02-03 2001/12	
PART NO.	SCALE	MR4DK(#40X20T)P=96		>0 ±0.1
MR4DK0000A01	1:5	MR4DK(#40X20T)P=96		>6 ±0.2
				>30 ±0.3
				>120 ±0.5
				>315 ±0.8
				>1000 ±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4AK001A20	1	FC30	刀庫本體	Main Body	
2	MR4DK002A00	1		刀盤組	Tool Disk Module	
3	M5x1.6L	2		平行銷	Paralle Pin	
4	MR4AK004A00	1		壓缸固定板組	Cylinder Mounting Plate Module	
5	M10	7		平墊圈	Finished Circular Plain Washer	
6	M10xP1.5x30L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
7	MR4AK0025A04	1	尼龍66纖維40%	側刀定位座	POCKET POSITIONING SEAT	
8	M6xP1.0x1.6L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
9	MR4AK005A06	1	市購品	側刀壓缸	Pneumatic Cylinder	
10	M8	4		平墊圈	Finished Circular Plain Washer	
11	M8xP1.25x1.2L	5		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
12	MR4AK006A06	1	S45C	側刀塊	TOOL TILT BLOCK	
13	M6	24		平墊圈	Finished Circular Plain Washer	
14	M6xP1.0x20L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
15	MR4AK0018A05	1	SS41 (2)	側刀蓋板	Cover Plate	
16	M6xP1.0x10L	24		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
17	MR4AK0026A04	1	SS41 (4)	極限開關磁塊	Limit Switch Sensing Dog	
18	MR4AK0023A07	1	SS41	極限開關固定板	LIMIT SWITCH BLOCK	
19	SQCCW0005L1A	2	YAMAATAKE(LS1-A)	極限開關	LIMIT SWITCH	
20	M6xP1.5x25L	2		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
21	M4xP0.7x25L	4		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
22	MR4DK004A01	20	S45C	刀架固定桿	Shaft	
23	P40K-06S0112-01	20		BT40刀套(65度)	Pocket	
24	WA000000008	21	市購品	墊片	Washer	
25	M8xP1.25x25L	20		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
26	SR000000012	3	市購品	近接開關	Proximity Sensor	
27	MR4AK010A04	3	SS41	前蓋支撐桿	Support Rod	
28	MR4AK0027A04	1	六角銷	前蓋支撐桿	Support Rod	
29	MR4AK007A04	1	SS41	壓缸前蓋	COVER	
30	MR4AK0014Q2-01	1	市購品	過輪減速機(220V)	Worm Gear Motor(220V)	
31	M10xP1.5x25L	3		內六角承蓋頭螺絲	Hexagon Socket Head Screw	
32	MR4AK0036A01	1	SS41	定位膠薄片	SS41	
33	MR4DK003A02	1	S45C	驅動輪	Tool Disk Driver	
34	BE00000CF6G	2	CF6	曲線滾輪	ROLLER	
37	MR4AK0034A03	1	ABS	刀庫前外罩	Mag. front cover	
38	MR4AK0035A02	1	FRP	刀庫後外罩	Mag. after cover	
39	MR4A-0019A01	2	S45C	承靠塊	Positioning Key	
40	M6xP1.0x1.2L	2		圓頭內六角承蓋頭螺絲	Hexagon Socket Button Head Screw	
41	EB000F518096	1	PS-1809-6	CE 電路盒	CE ELECTRIC BOX	
42	MR4A-0017D01	1	壓克力	紙金銀窗	WINDOW	



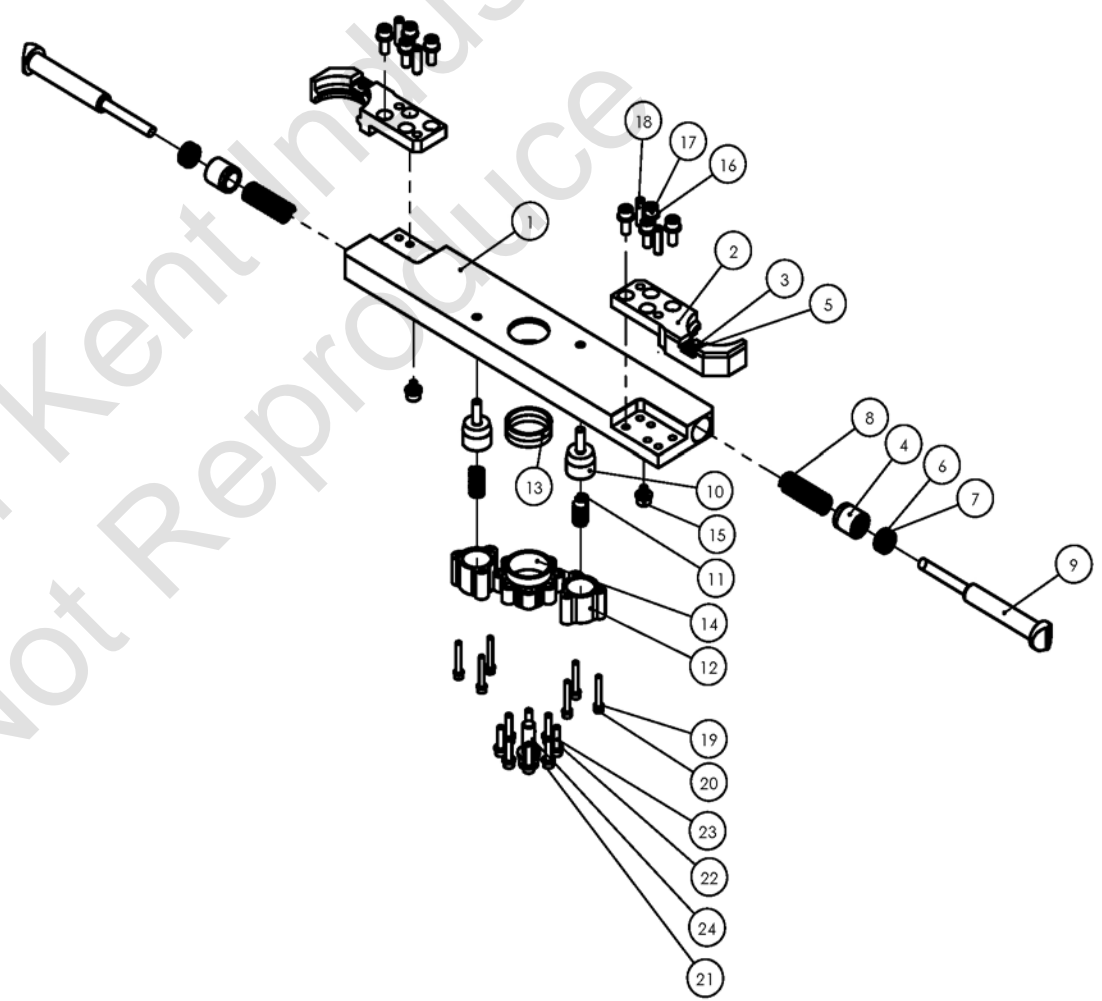
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NAME	AWAY 2006/3/29			NUT NO.	SHEET	D4-02-05	2001/12	>0	±0.1
				PART NO.	SCALE	MR4DK(#40x20)F=96		>10	±0.2
						MR4DK(#40x20)F=96		>315	±0.5
								>1000	±1.2

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	MR4AK0004A07	1	SS41	壓缸固定板	Cylinder Mounting Plate	
2	MR4AK0012A03	2	UP	耐磨片(II)	Wear resistant Strip(II)	
3	M6XP1X10L	4		內六角血頭螺絲	Socket Countersunk Head Screw	



		MATERIAL		NO:	
NUIT NO.		SHEET		D4-02-04	
PART NO.		SCALE		2001/12	
DRAWING DESIGN		CHECK APPROVE		TITLE	
NAME		AMAY 2006/3/29		壓缸固定板組	
		MR4AK0004A00		1:2	
				TOLERANCE	
				± 0.1 >0 ± 0.2 >6 ± 0.3 >30 ± 0.5 >120 ± 0.8 >315 ± 1.2 >1000	

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	A40C-0001B08	1	SS41	刀臂本體	MAIN BODY	
2	A40C-0002A03	2	S50C	扣刀爪	Gripper(BT)	
3	A40C-0004A01	2	S45C	定位鍵	KEY(BT,CAT,DIN)	
4	A40C-0020A06	2	粉末冶金	銅套	COPPER COVER	
5	M5XP0.8X12L	2		內六角皿頭螺絲	Socket Countersunk Head Screw	
6	OR0000000P18	2	P18	O型環	O-RNIG	
7	OT00000SER18	2	SER-18	刮刷環	SEAL	
8	A40C-0007A02	2	SWPB	頂刀爪彈簧	FINGER SPRING	
9	A40C-0003B06	2	S50C	頂刀爪(R265)	Finger	
10	A40C-0005A03	2	S45C	安全頂銷	SAFETY PIN	
11	A40C-0008A02	2	SWPB	安全頂銷彈簧	PIN SPRING	
12	A40C-0006A04	2	SS41	彈簧蓋板	SPRING COVER	
13	CX0000d40D45	2		迫緊環	TAPER SNAP RING	
14	A40C-0009A03	1	SCM4	迫緊環蓋	COX COVER	
15	A40C-0013A03	2	市購品	頂刀爪限位銷	SKT,HD,CAP SCR	
16	M8	10		彈簧墊圈	Spring Lock Washer	
17	M8XP1.25X20L	8		內六角承窩頭螺絲	Hexagon Socket Head Screw	
18	M8x28L	4		彈簧銷	Spring Pin	
19	M5	6		彈簧墊圈	Spring Lock Washer	
20	M5XP0.8X35L	6		內六角承窩頭螺絲	Hexagon Socket Head Screw	
21	M12	1		彈簧墊圈	Spring Lock Washer	
22	M6	8		彈簧墊圈	Spring Lock Washer	
23	M6XP1X25L	8		內六角承窩頭螺絲	Hexagon Socket Head Screw	
24	M12XP1.75X35L	1		內六角承窩頭螺絲	Hexagon Socket Head Screw	



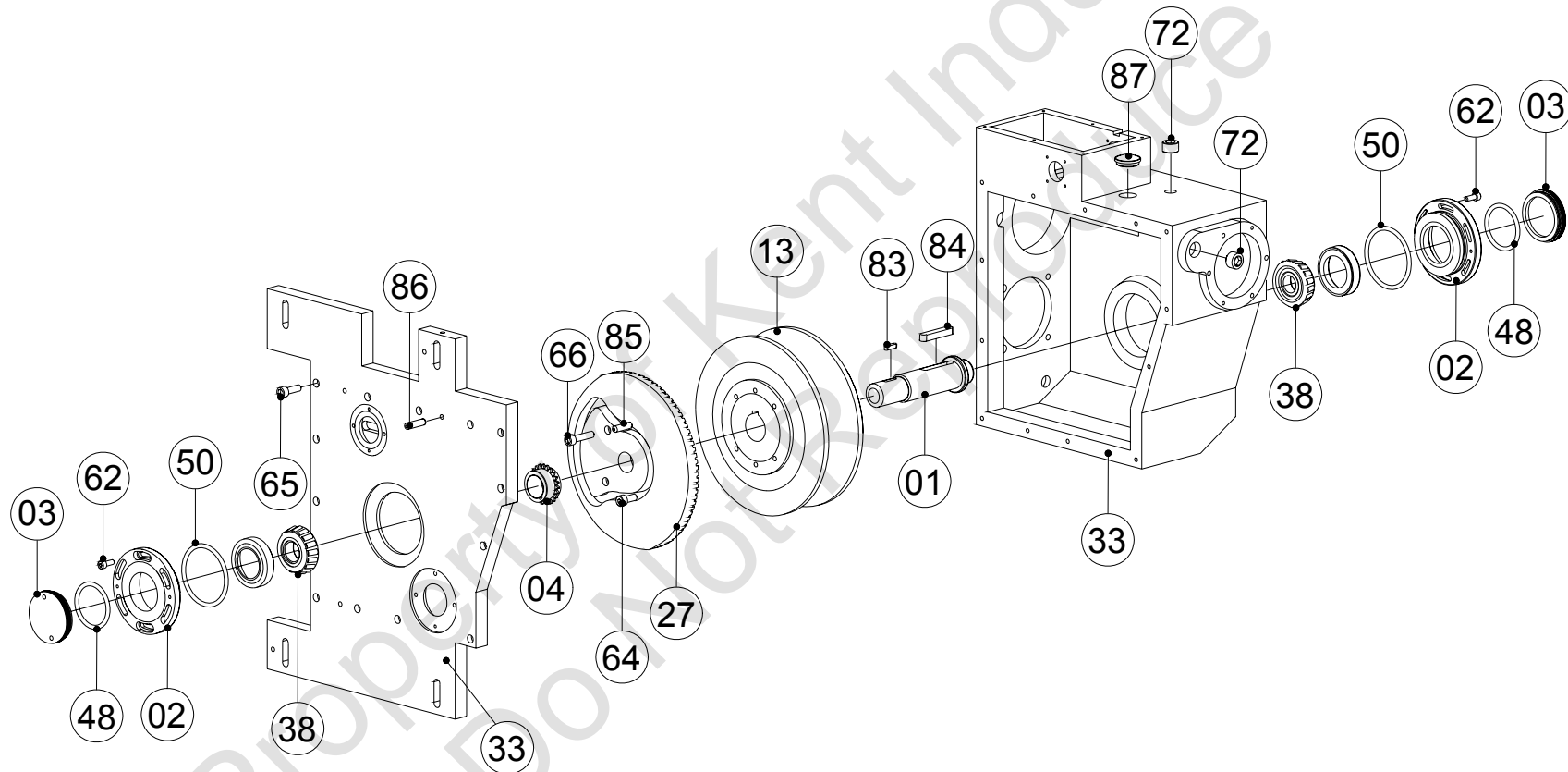
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NAME		TIM 2006/4/14		PART NO.		D4-02-04	
				A40K-265011-01		2001/12	
				SCALE		TOLERANCE	
				1:5		>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2	
				TITLE		ARM ASSEMBLY	
				#40刀臂組(R265)			

Deshi Cambox(A402) Part list

NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY
01	A402A101DEX001	Cam shaft	1	19	A402E200DEX001	Signal fixture	1	43	71102640	HK3516/Needle roller bearings	1
02	A402A209DEX001	Tune-up cap	2	20	A402E309DEX001	Signal wheel shaft	1	44	71105310	PFG-5029/Oil bush	1
03	A402A309DEX001	Tune-up screw	2	21	A402E409DEX005	Signal cap	1	45	71200100	15*24*5/TC type oil seals	1
04	A402A403DEX001	Chain wheel	1	22	A402E409DEX006	Signal cap	1	46	71200551	40*52*8/TC type oil seals	1
05	A402B101DEX001	Spline shaft	1	23	A402E509DEX001	Signal chain wheel	1	47	71201380	UHS50/UHS packings	1
06	A402B203DEX001	Bearings tube	1	24	A402E60YDEX001	Signal adjust slice	1	48	71203117	55*2/O ring	2
07	A402B303DEX001	Transmit wheel	1	25	A402E70ZDEX001	Dustproof cap	1	49	71204070	G50/O ring	1
08	A402B409DEX001	Front fix cap	1	26	A402F10CDEX002	Motor fixture	1	50	71204150	G75/O ring	2
09	A402B50CDEX001	Bearings tube fixture	1	27	A402F20313A115	Bevel gear (big)	1	51	71204160	G80/O ring	1
10	A402B600DEX001	Back fix cap	1	28	A402F303DEX002	Bevel gear (small)	1	52	71204190	G95/O ring	1
11	A402B809DEX001	Bearings tube gasket	1	29	A402F709DEX002	Motor tune-up loop	1	53	71300090	AN08/Locknut	2
12	A402B809DEX002	Gasket	1	30	A402J109DEX001	Idler pulley	1	54	71300091	AW08/Lock washer	2
13	A402C102-60L3-A	60° Cam	1	31	A402J201DEX002	Idler pulley shaft	1	55	71300120	AN11/Locknut	1
	A402C102-65L3-A	65° Cam		32	A402J409DEX001	Idler pulley cap	1	56	71300121	AW11/Lock washer	1
	A402C102-70L3-A	70° Cam		33	A402Z00CDEX001	Cam box	1	57	71301050	M4*8L/Hex socket cap screw	2
	A402C102-75L3-A	75° Cam		34	Y0A200X284X130	§ 20 Cam followers	6	58	71301060	M4*10L/Hex socket cap screw	8
	A402C102-80L3-A	80° Cam		35	Y0A220X345X115	§ 22 Cam followers	1	59	71301070	M4*12L/Hex socket cap screw	10
	A402C102-85L3-A	85° Cam		36	Y0B240X452X130	§ 24 Cam followers	1	60	71301160	M5*16L/Hex socket cap screw	2
	A402C102-90L3-A	90° Cam		37	71100130	6202zz/Ball bearings	2	61	71301290	M6*14L/Hex socket cap screw	4
14	A402D109DEX001	Rocker	1	38	71101070	HR30206/Tapered roller bearings	2	62	71301300	M6*16L/Hex socket cap screw	17
15	A402D209DEX001	Rocker shaft	1	39	71101290	HR32008/Tapered roller bearings	2	63	71301320	M6*25L/Hex socket cap screw	6
16	A402D301DEX001	Rocker fixture	1	40	71101320	HR32011/Tapered roller bearings	2	64	71301460	M8*20L/Hex socket cap screw	7
17	A402E11CDEX001	Brake signal wheel	1	41	71102210	NTB4060/Thrust bearings	2	65	71301470	M8*25L/Hex socket cap screw	13
18	A402E12CDEX001	Cam signal wheel	1	42	71102211	AS4060/Thrust bearings parcel	4	66	71301490	M8*35L/Hex socket cap screw	2

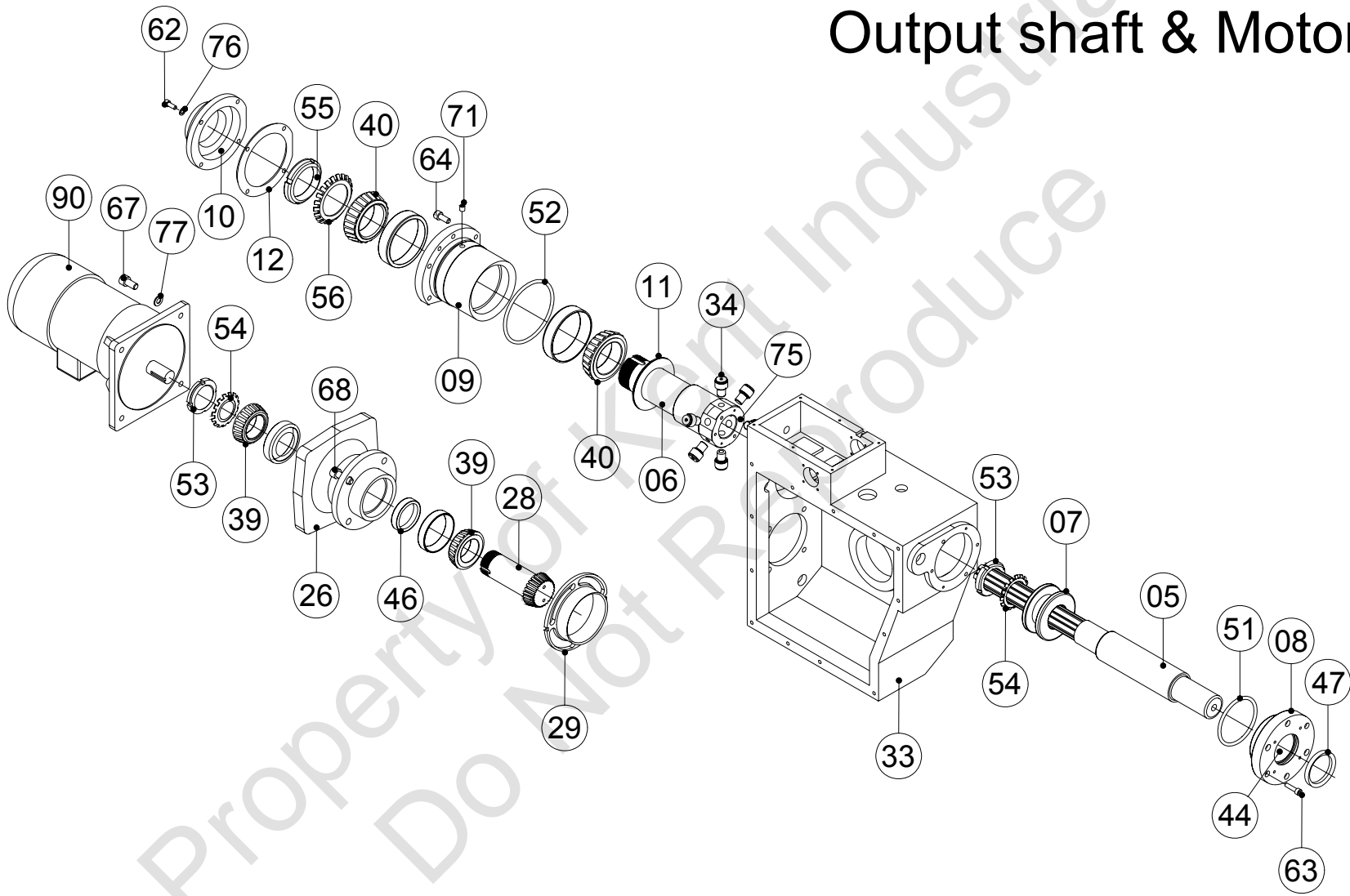
Deshi Cambox(A402)

Input shaft



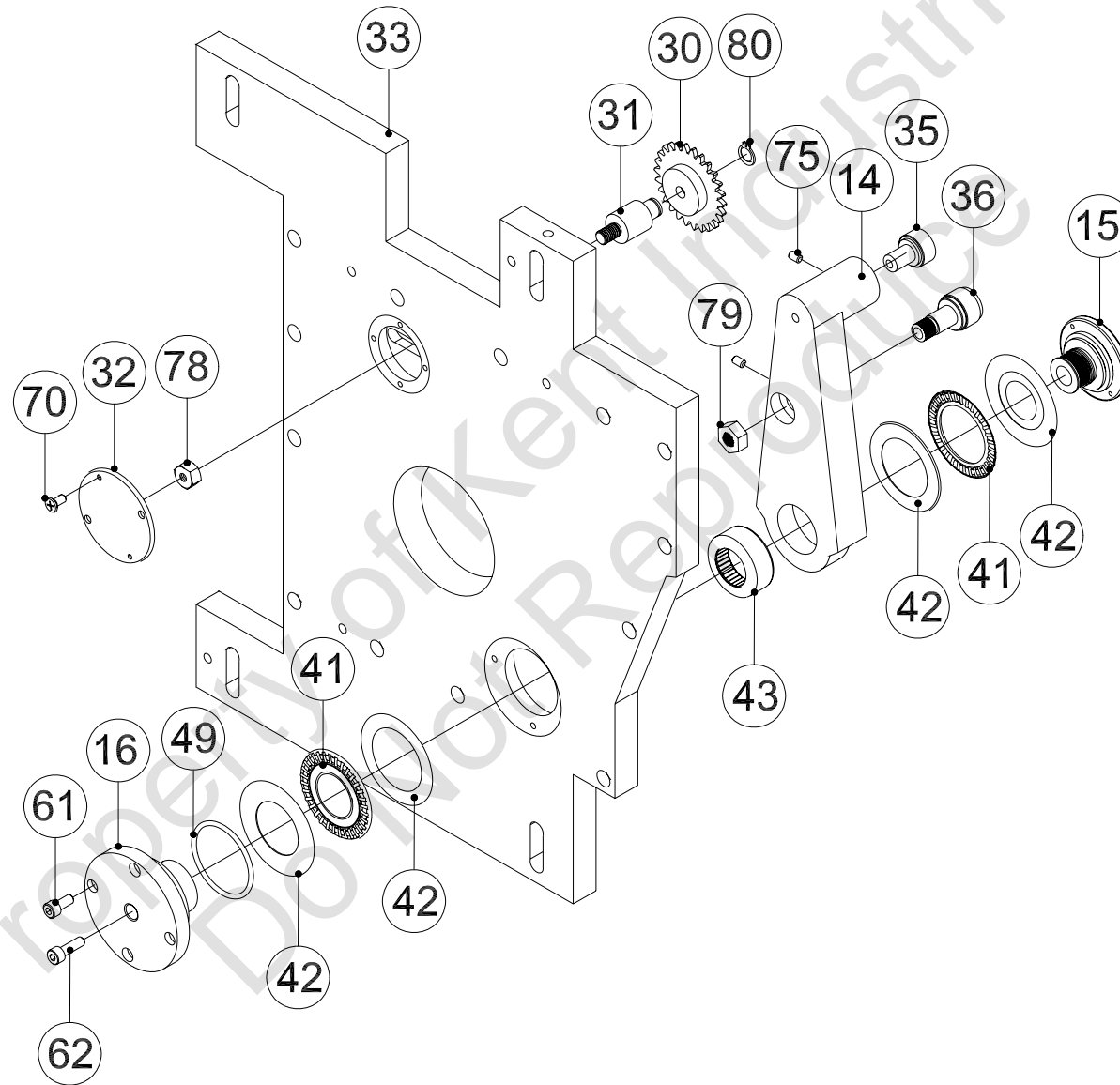
Deshi Cambox(A402)

Output shaft & Motor



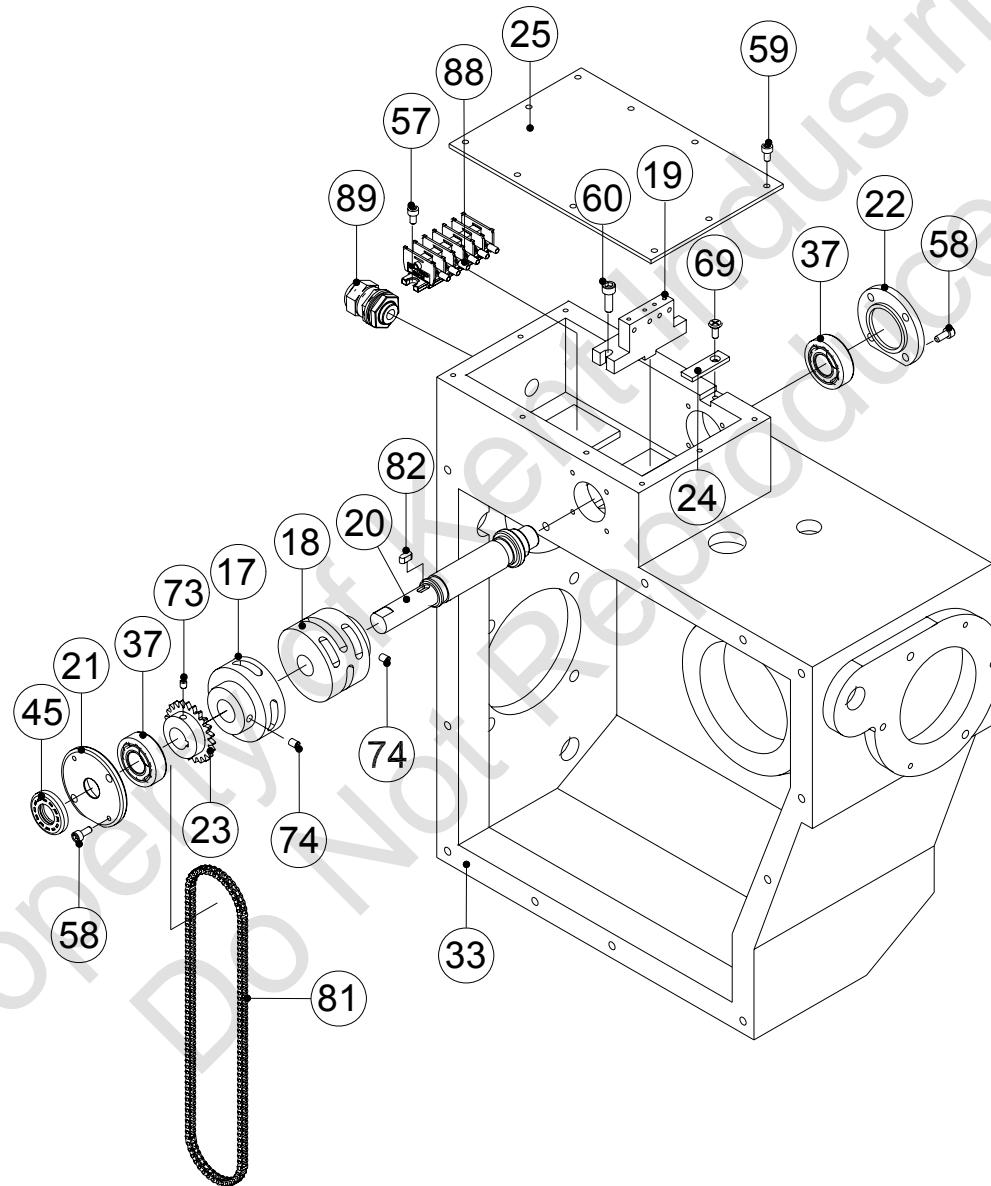
Deshi Cambox(A402)

Rocker



Deshi Cambox(A402)

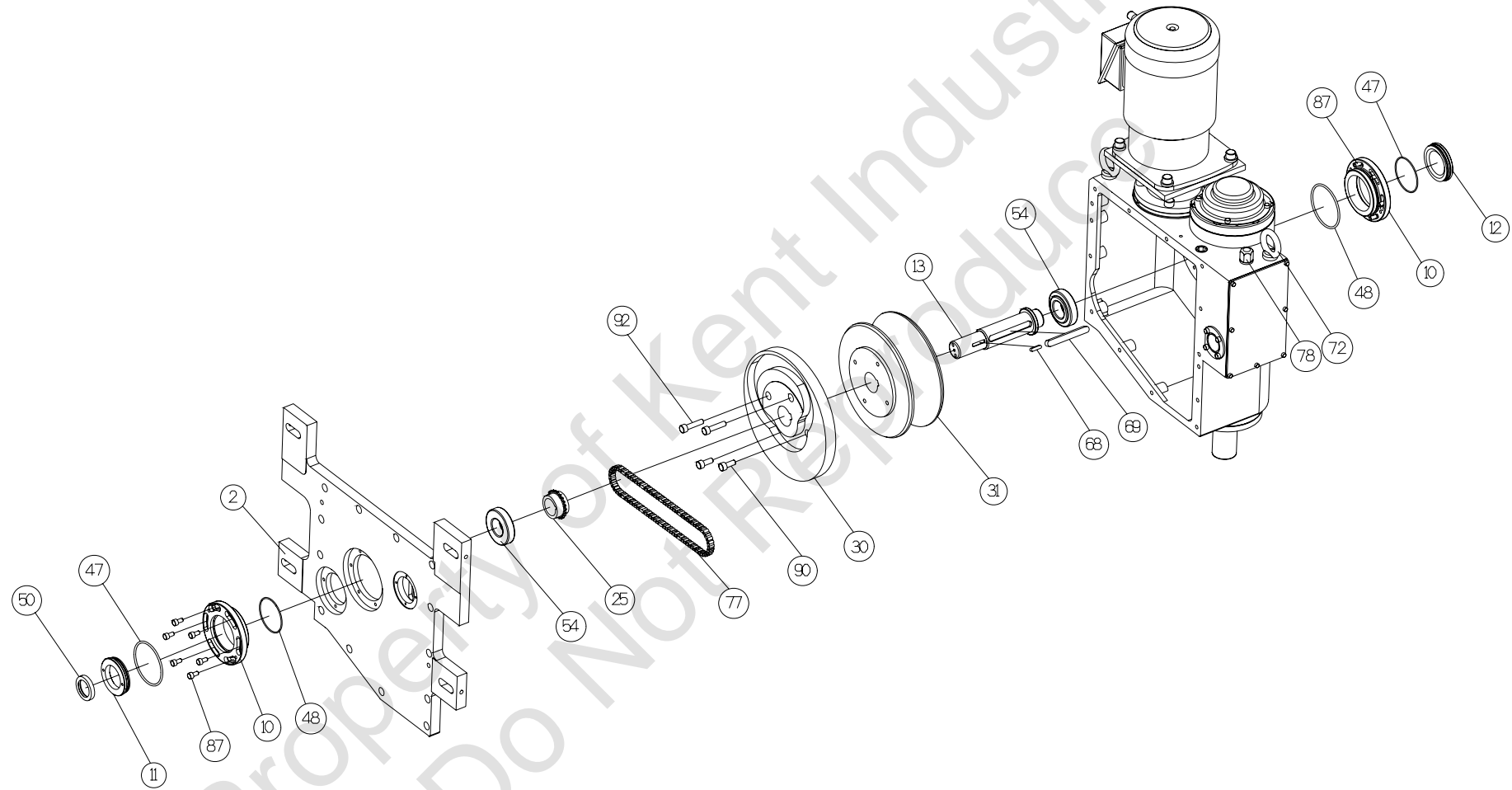
Signal



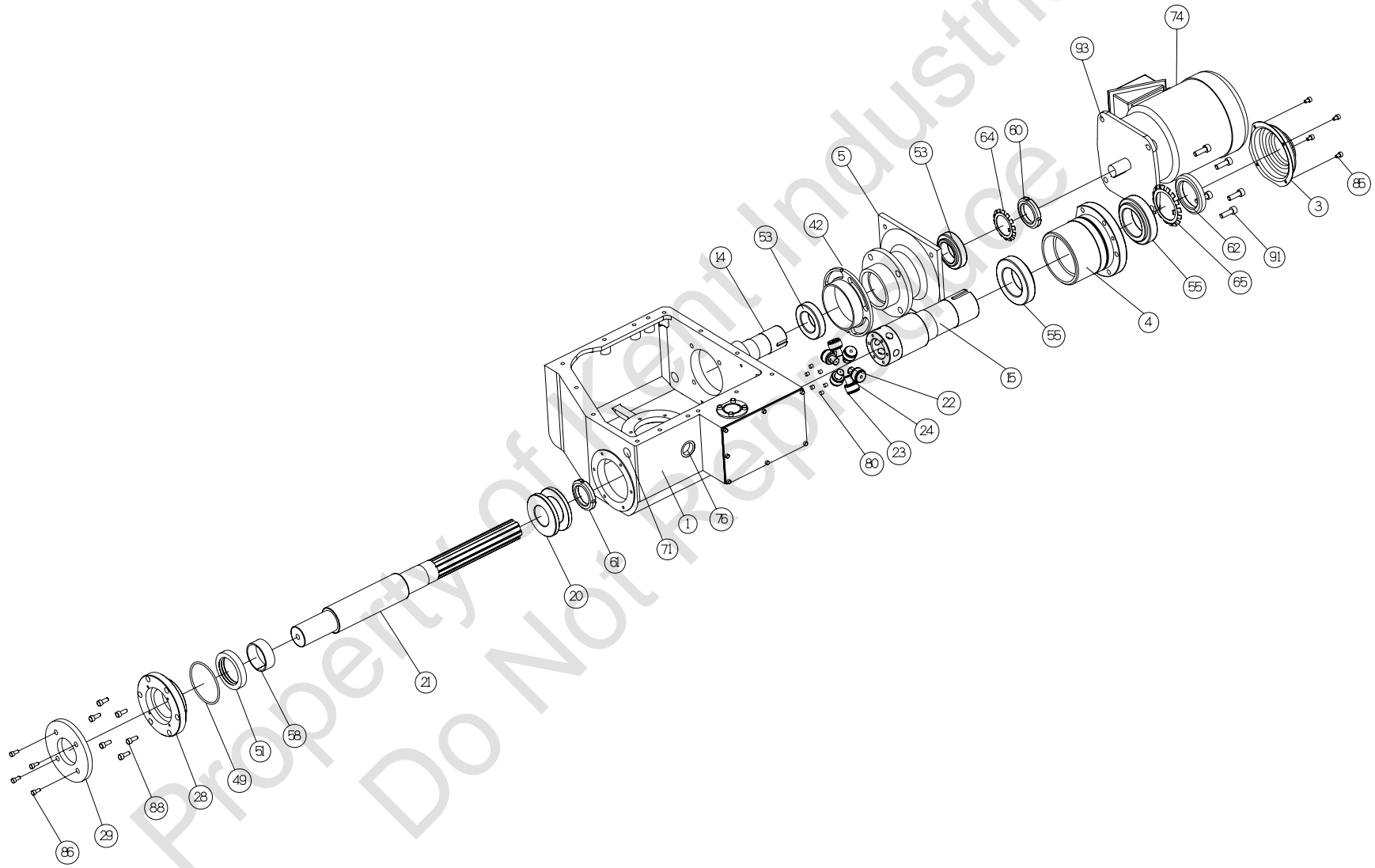
Gizin Cambox(GZ2) Part list

NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY
1	A01-001	Cambox	1	25	A01-023	Chain Wheel	1	49	G80	O Ring	1
2	A01-002	Box Cover	1	26	A01-024	Chain Wheel	1	50	TC30427	Oil Seal	1
3	A01-003	Cover	1	27	A01-025	Proximity Switch Holder	1	51	TB4 507212	Oil Seal	1
4	A01-004	Bearing Bracket	1	28	A01-126	Shaft Bracket	1	52	32005	Roller Bearing	1
5	A01-005	Motor Bracket	1	29	A01-027	Flange	1	53	32008	Roller Bearing	2
6	A01-006	Move Arm	1	30	A01-028	Plate Cam	1	54	30206	Roller Bearing	2
7	A01-007	Arm Shaft	1	31	A01-029	Roller Gear Cam	1	55	32011	Roller Bearing	2
8	A01-008	Arm Bracket	1	32	A01-031	Cover	1	56	6202ZZ	Ball Bearing	2
9	A01-009	Cover	1	33	A01-032	Position indicator	1	57	NTB40603	Thrust Bearing	1
10	A01-010	Bearing Bracket	2	34	A01-033	Needle Bearing	1	58	LBB5020	Bearing	1
11	A01-011	Cover	1	35	A01-133	Ring	1	59	AN05	Locking Nut	1
12	A01-012	Cover	1	36	A01-233	Washer	2	60	AN08	Locking Nut	1
13	A01-013	Cam Shaft	1	37	A01-034	Needle Bearing	1	61	AN08	Locking Nut	1
14	A01-014	Driving Gear	1	38	A01-134	Ring	1	62	AN11	Locking Nut	2
15	A01-015	Turret	1	39	A01-035	Dog Shaft	1	63	AW05	Washer	1
16	A01-016	Checking Dog	1	40	A01-036	Cover	2	64	AW08	Washer	1
17	A01-017	Braking Dog	1	41	A01-037	Needle Bearing Holder	1	65	AW11	Washer	1
18	A01-018	Idle Wheel Shaft	1	42	A01-038	Adjusting Ring	1	66	S12	Ring	1
19	A01-019	Idle Wheel	1	43	A01-040	Cover	1	67	4x8x4mm	Key	1
20	A01-020	Fork	1	44	A01-052	Rubber Seal	1	68	5x20x5mm	Key	1
21	A01-021	Spling Shaft	1	45	AS031	O Ring	1	69	10x85x8mm	Key	1
22	A01-022	Needle Bearing	6	46	AS033	O Ring	1	70	#6x38L	Taper Pins	2
23	A01-122	Ring	6	47	AS035	O Ring	2	71	1/2"10L	OIL Plug	2
24	A01-222	Washer	6	48	G75	O Ring	2	72	M12	Hook Ring	2

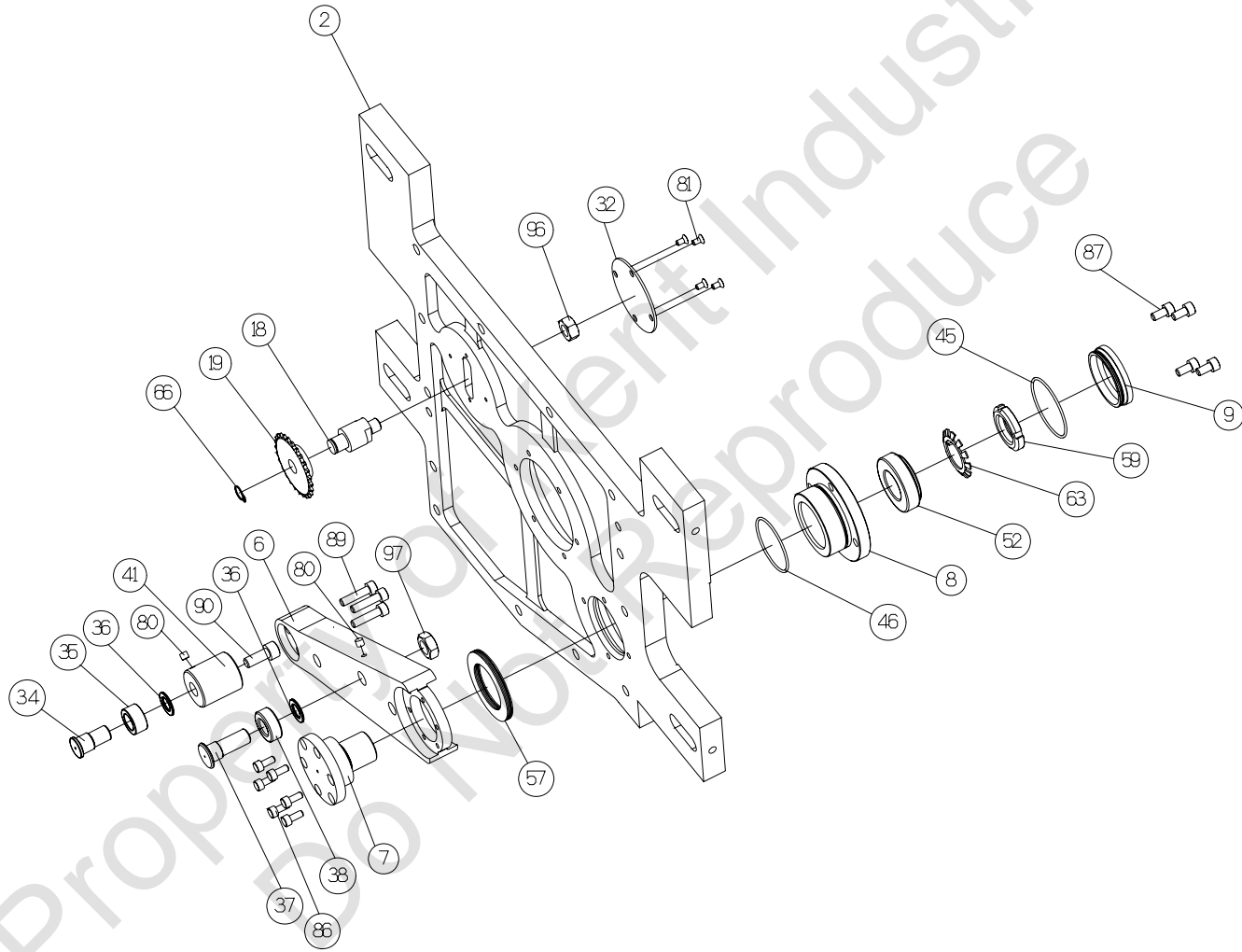
Gizin Cambox (GZ2)



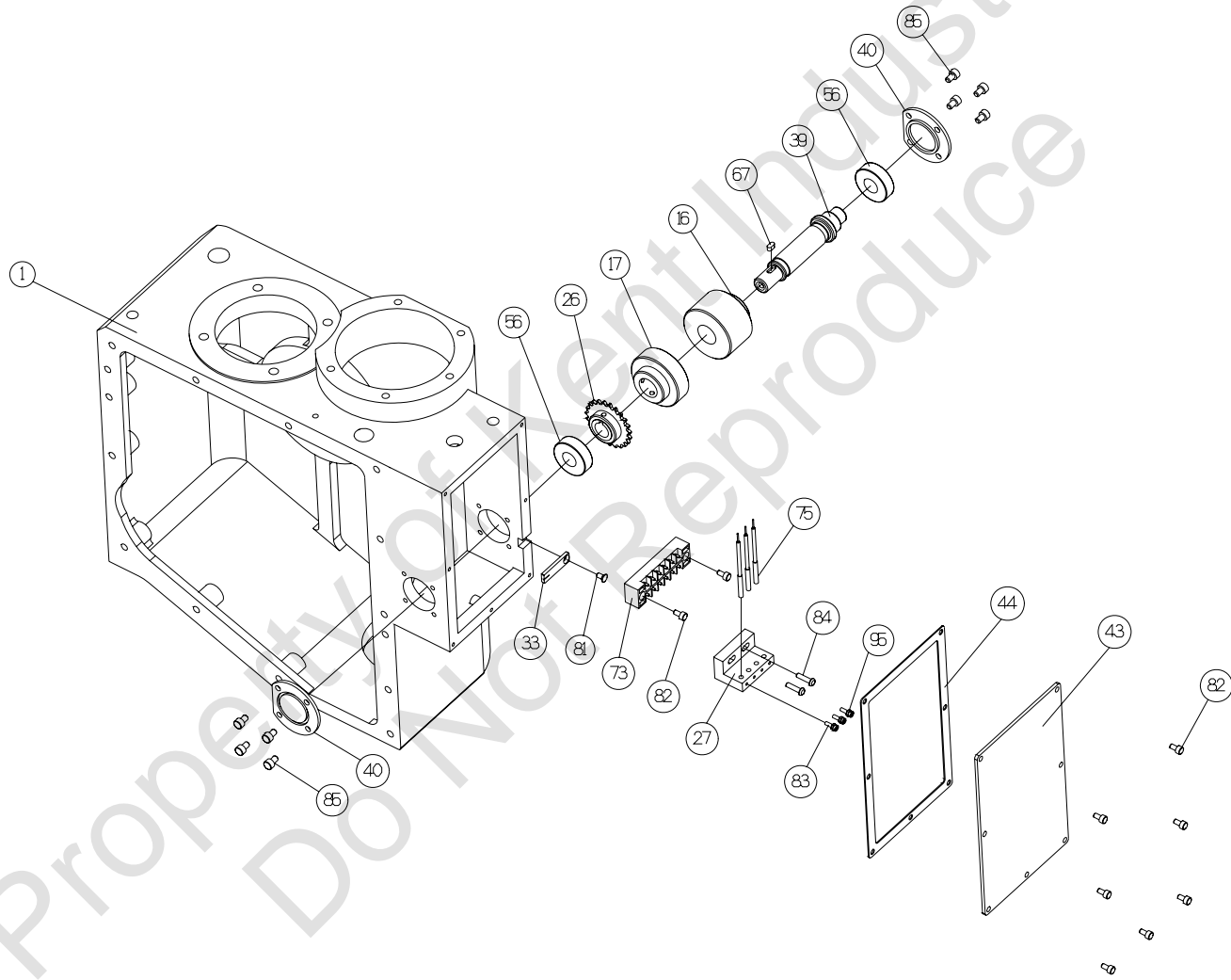
Gizin Cambox (GZ2)



Gizin Cambox (GZ2)



Gizin Cambox (GZ2)



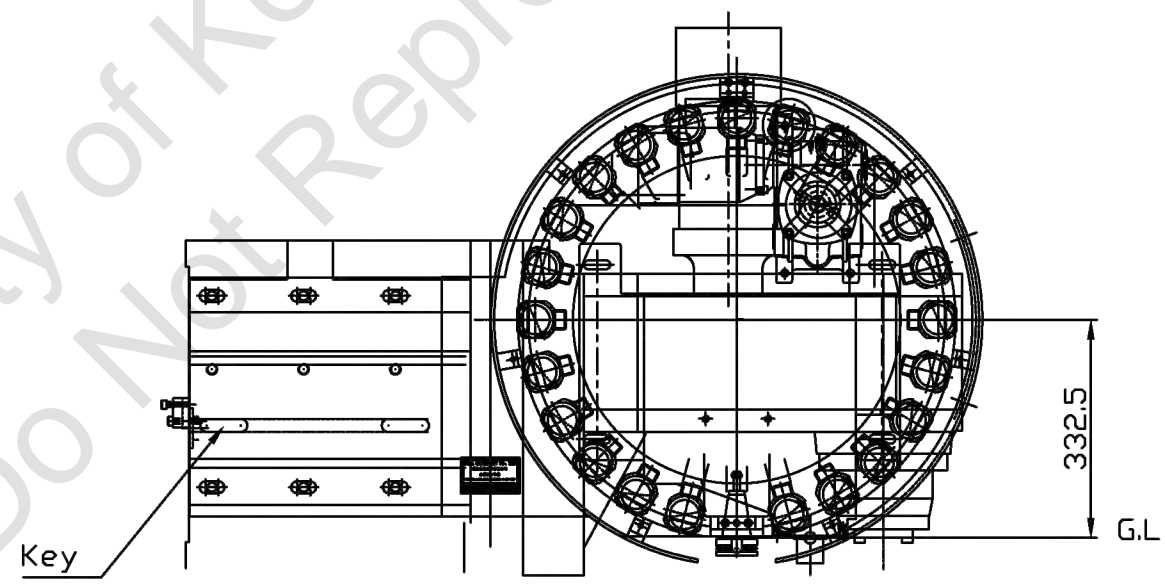
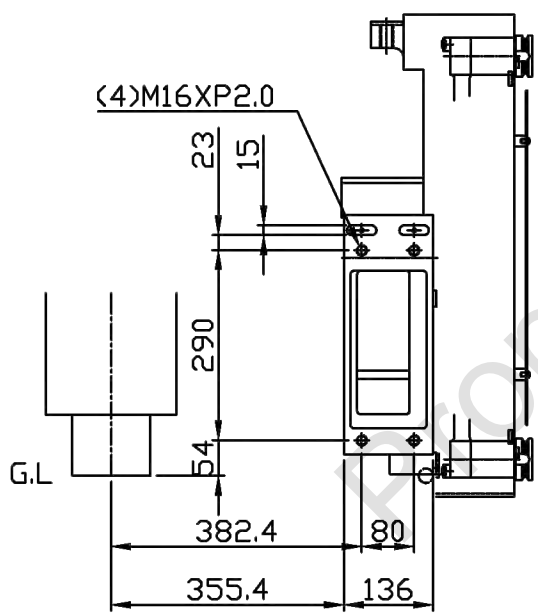
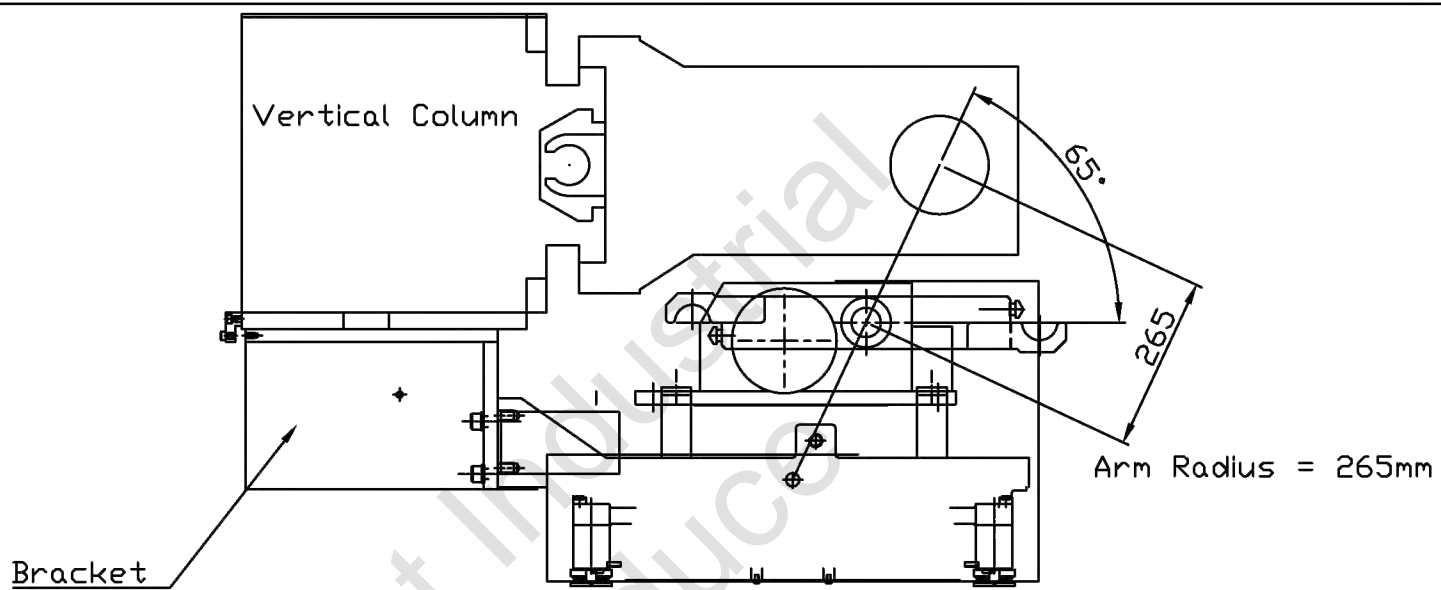
2 、 Bracket Design:

The integration of the tool magazine and the vertical column of the machine are via a bracket (as per attached drawing) as recommended by our company. Unless the measurement of the integrating surface between the bracket and the tool magazine is specifically designed and modified, it should remain the same as the attached drawing. However, the integrating surface of the vertical column should be designed according to the measurement of each individual user. The interface that we have recommended is closely related to the adjustment of the tool magazine, so, unless it is absolutely necessary, we would recommend users to adopt our interfacing bracket design.

The reference drawings for designing the interface bracket are as followed:

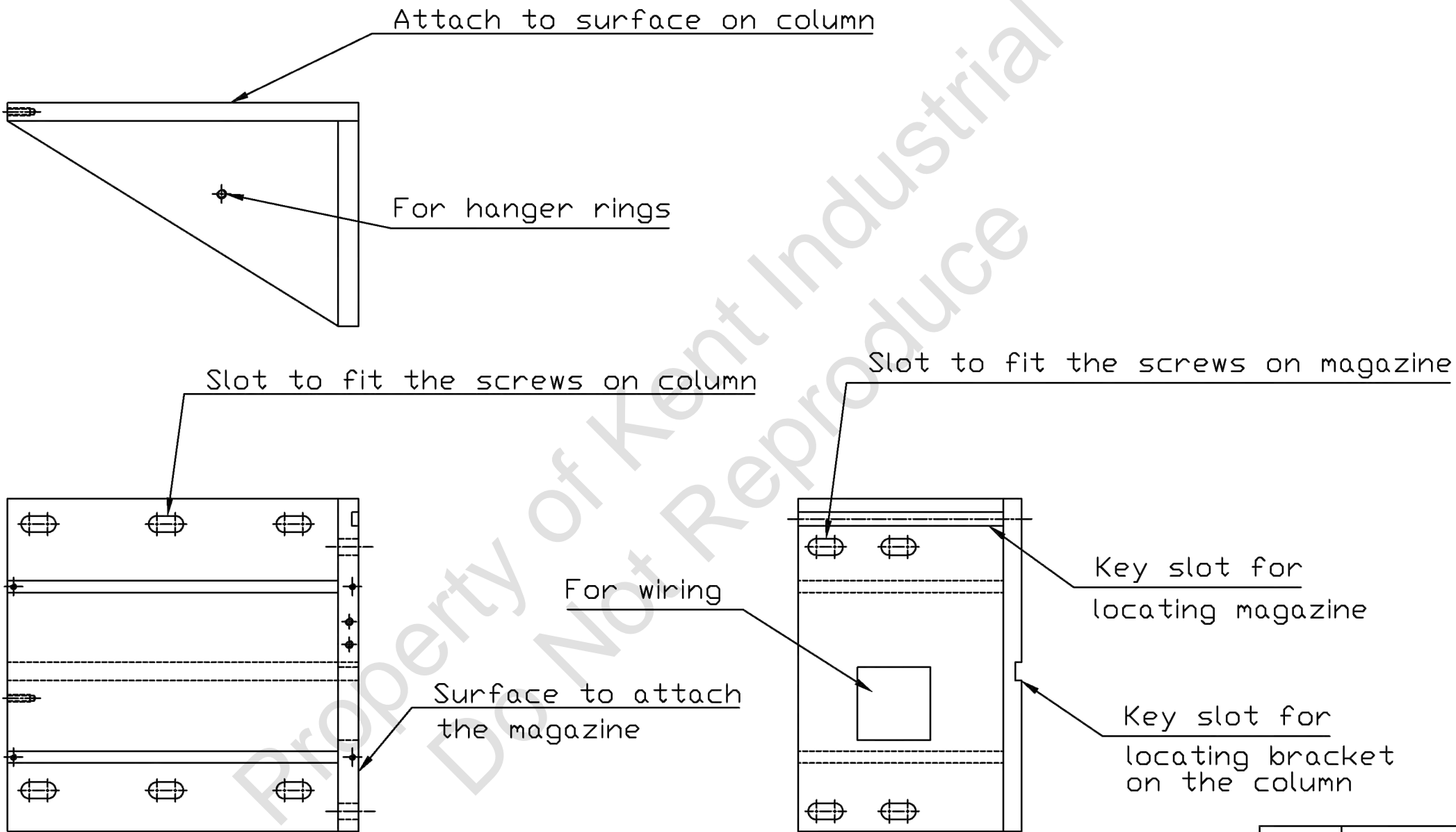
The Configuration Drawing for #40 Disk Type Tool Magazine and Vertical Column Interface Design..... DMR4K0015A01

The Drawing for #40 Disk Type Interface Design..... DMR4K0016A01



						NO:	
			UNIT NO.	QUANTITY	MATERIAL	04-02-03	TOLERANCE
						2001/12	>0 ±0.1
							>6 ±0.2
							>30 ±0.3
							>120 ±0.5
							>315 ±0.8
							>1000 ±1.2
	DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE		
NAME	A-MAY2004/1/15		DMR4K0015A01		Example of design of bracket for #40x24T DISK TYPE		

Example of Bracket



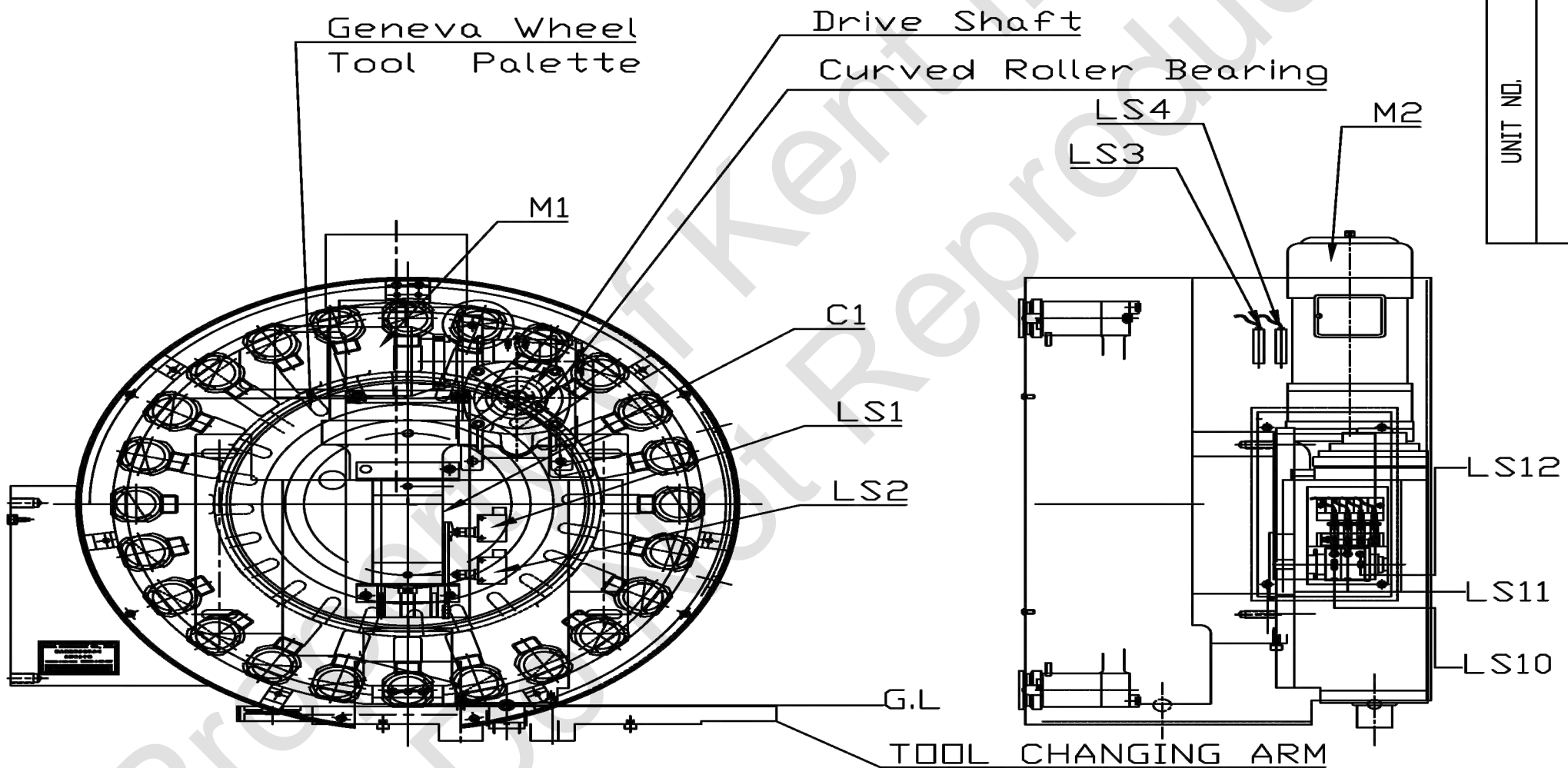
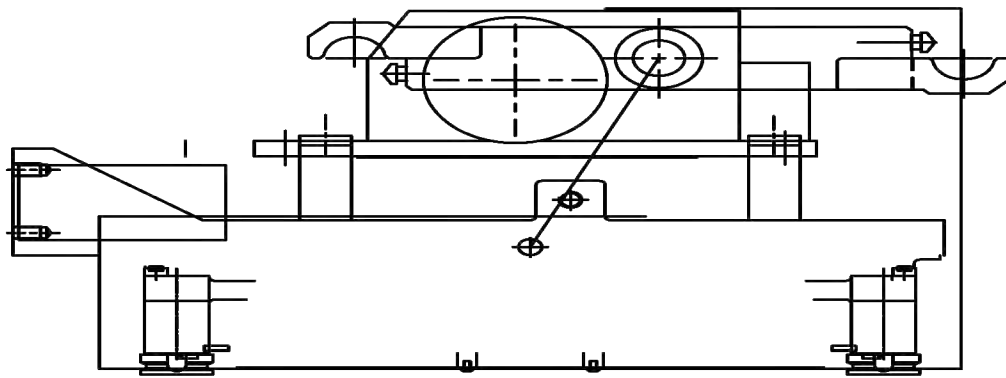
						NO:	
			UNIT NO.	QUANTITY	MATERIAL	04-02-03	TOLERANCE
						2001/12	>0 ±0.1
							>6 ±0.2
							>30 ±0.3
							>120 ±0.5
							>315 ±0.8
							>1000 ±1.2
	DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE		
NAME	A-MAY2004/1/15		DMR4K0016A01		Example of Bracket		

3 、 Tool Changing Motion Flowchart:

The following drawings describe the motion sequences of the CAM-BOX system:

#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –1	DMR4K0001A01
40 Disk Type Tool Magazine Tool Changing Motion Flowchart –2	DMR4K0002A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart-3.....	DMR4K0003A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –4.....	DMR4K0004A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –5	DMR4K0005A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –6.....	DMR4K0006A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –7.....	DMR4K0007A01
#40 Disk Type Tool Magazine Tool Changing Motion Flowchart –8.....	DMR4K0008A01

#40 DISK TYPE TOOL MAGAZINE TOOL CHANGING MOTION FLOWCHART-1



- When the tool pot returns the tool, the limits switch LS1 will be ON. This confirms immediately that the tool pot is at the horizontal position. Start the tool magazine motor M1 to allow the drive shaft up curved roller bearing to put the geneva wheel into motion, and enables the tool palette to rotate intermittently. As the drive shaft rotates semicircle, it causes the tool palette to rotate one division (i.e. the distance between two tool pots) and enables the tool palette to position itself accurately in the appropriate position.

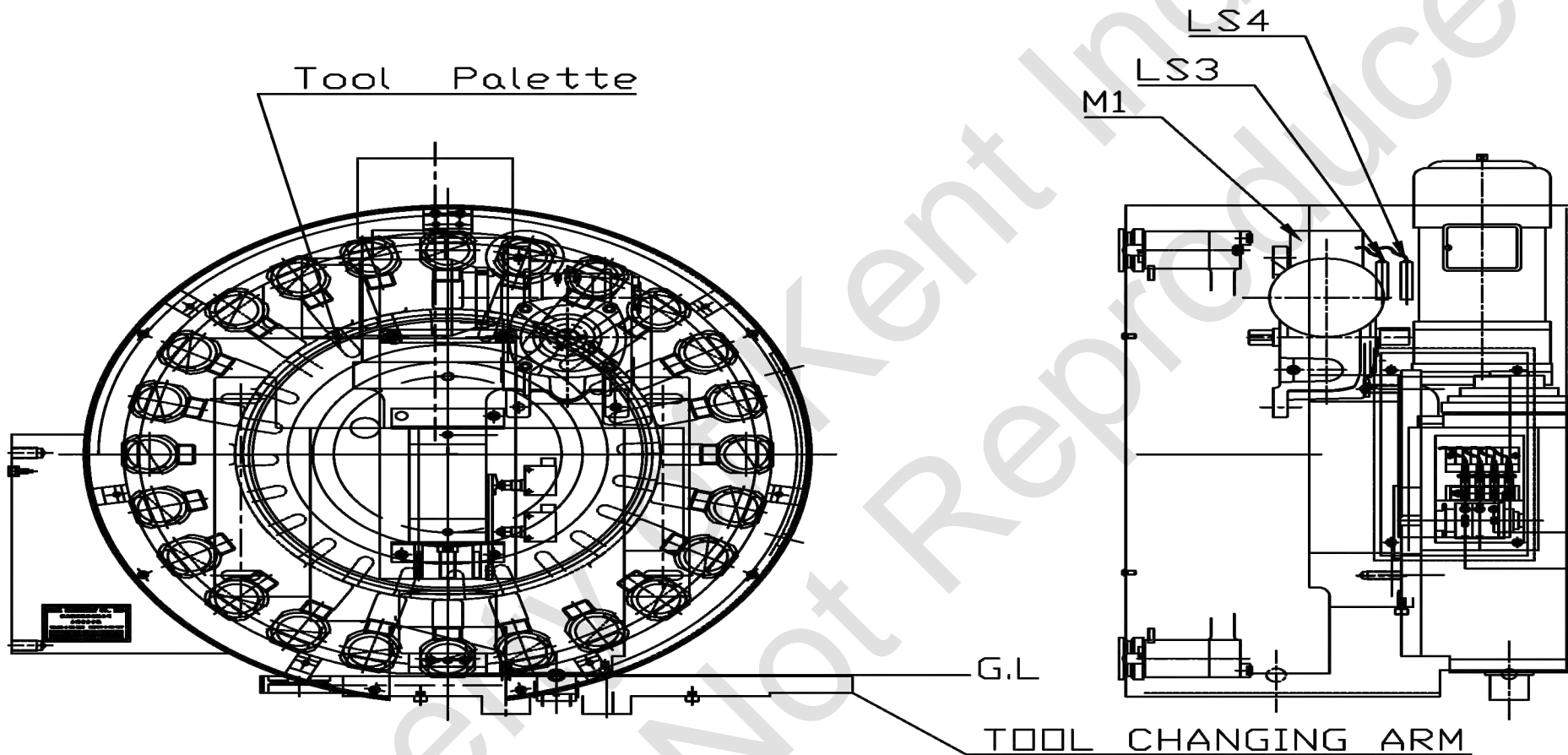
NO.	TOLERANCE	
	>0	±0.1
>6	±0.2	
>30	±0.3	
>120	±0.5	
>315	±0.8	
>1000	±1.2	

UNIT NO.	QUANTITY	MATERIAL	SCALE	TITLE

UNIT NO.	PART NO.	CHECK APPROVE
	DMR4K0001A01	

NAME	DRAWING DESIGN	CHECK APPROVE
A-MAY2004/1/15		

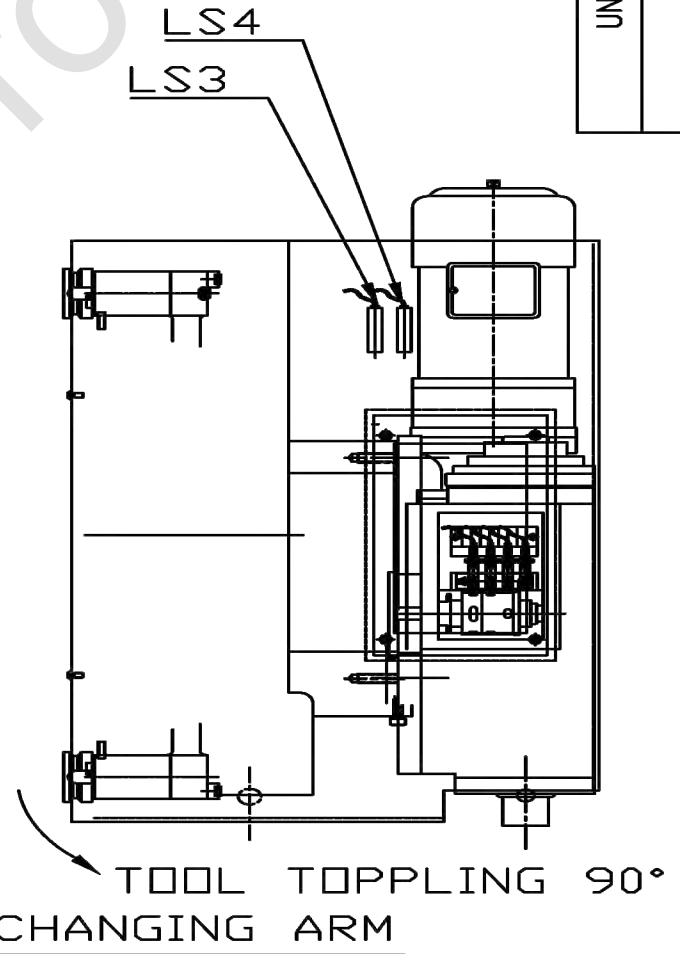
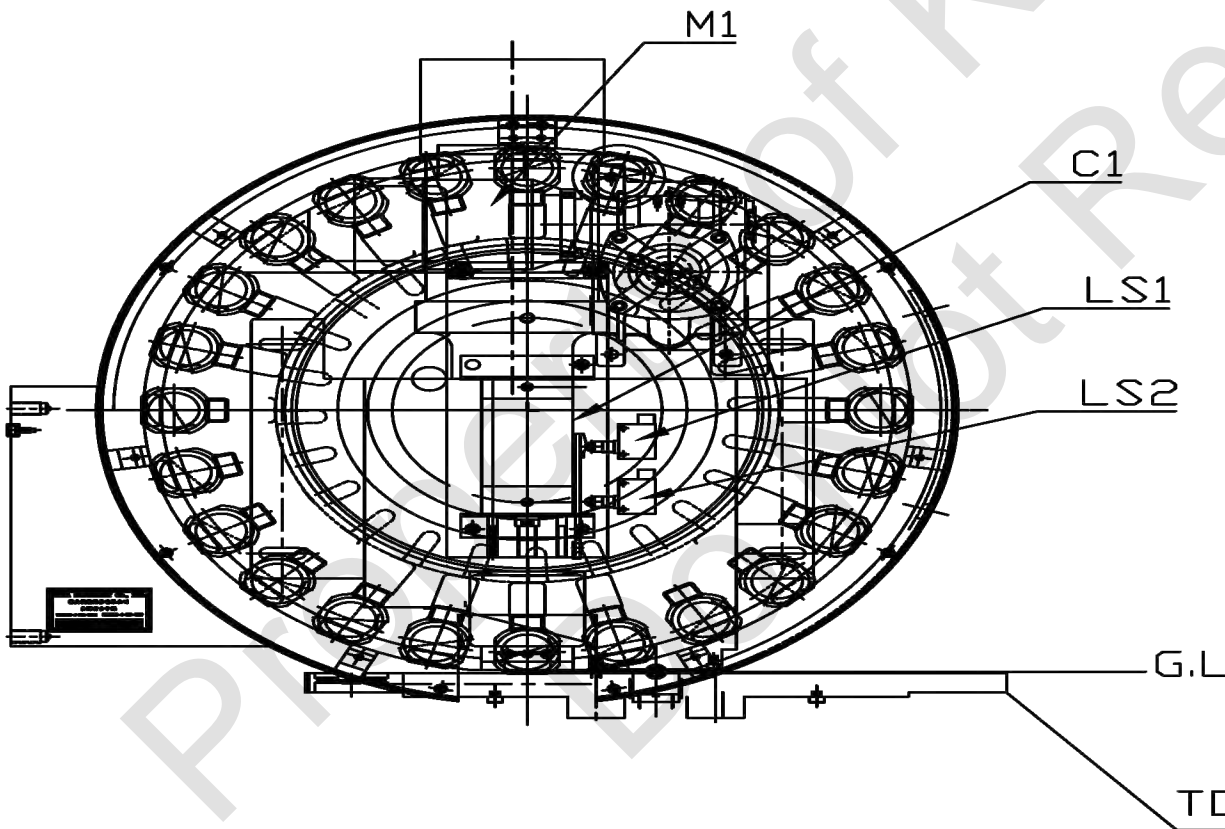
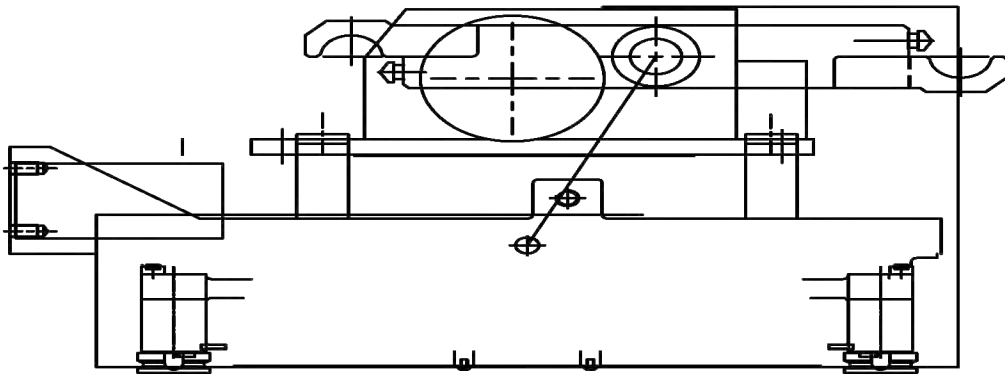
#40 DISK TYPE TOOL MAGAZINE TOOL CHANGING MOTION FLOWCHART-2



NO.		TOLERANCE	
	D4-02-03	>0	±0.1
	2001/12	>6	±0.2
		>30	±0.3
		>120	±0.5
		>315	±0.8
		>1000	±1.2
UNIT NO.	QUANTITY	MATERIAL	TITLE
PART NO.	SCALE		
DMR4K0002A01			
DRAWING DESIGN	CHECK APPROVE		
A-MAY2004/1/15			
NAME			

1. When the tool palette is in operation, when the tool pot reaches its pre-selected tool position, advance the time of sensor (LS3) and the tool magazine and the position sensor (LS4) will indicate the status as ON, and the tool magazine motor (M1) cuts off the power supply and stops, awaiting for the CNC tool changing command.

#40 DISK TYPE TOOL MAGAZINE TOOL CHANGING MOTION FLOWCHART-4



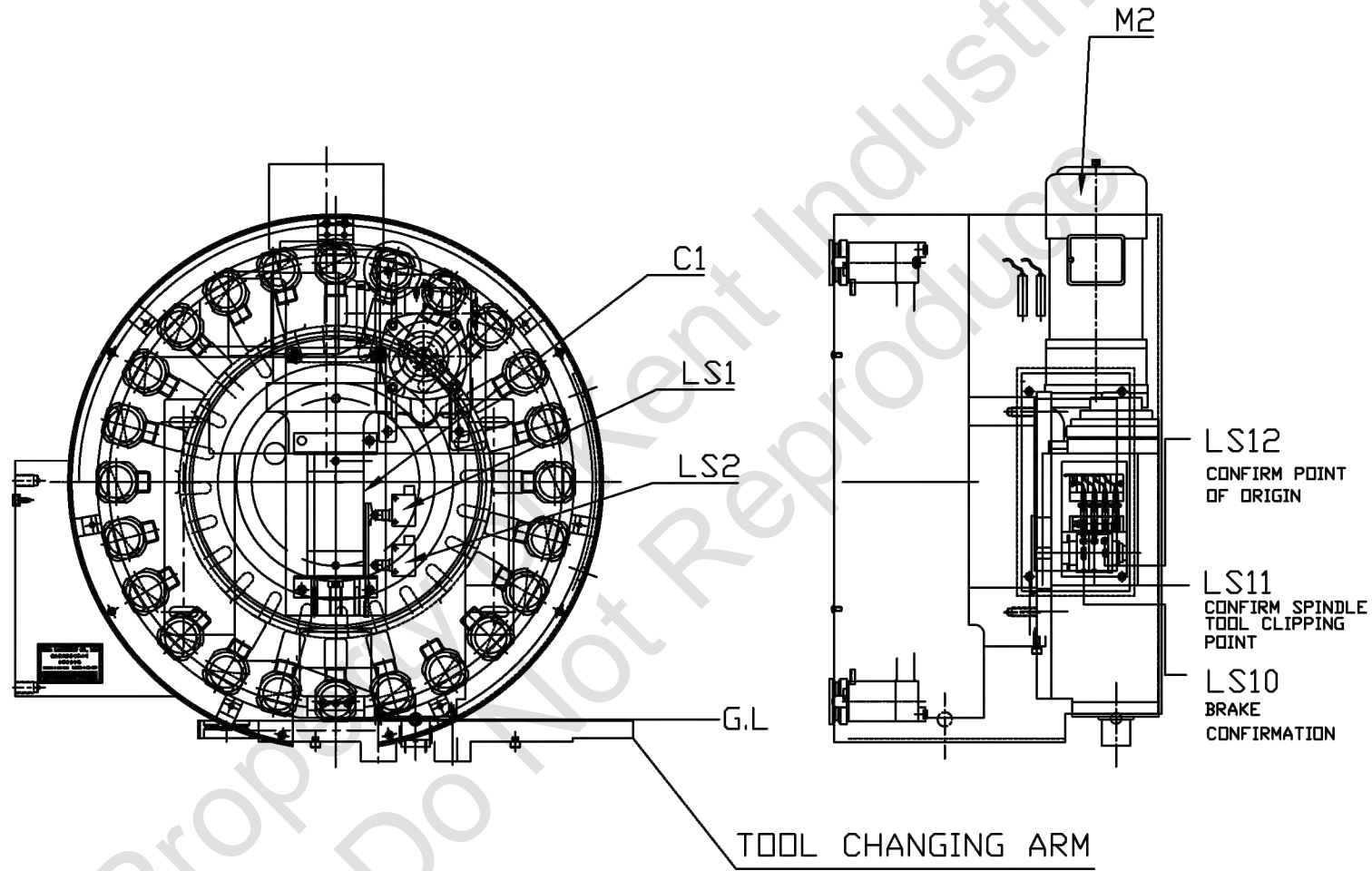
NO:	D4-02-03 2001/12	TOLERANCE	±0.1
			±0.2
			±0.3
			±0.5
			±0.8
			±1.2

UNIT NO.	QUANTITY	MATERIAL
PART NO.	SCALE	TITLE
DMR4K0004A01		

DRAWING DESIGN	CHECK APPROVE
NAME A-MAY2004/1/15	

1. When the CNC commands tool changing, execute the tool toppling motion.
2. Wait for the tool pot's tool toppling limits switch (LS2) to indicate the status as ON. This is to confirm the completion of tool toppling.

#40 DISK TYPE TOOL MAGAZINE TOOL CHANGING MOTION FLOWCHART-8



1. The exciter pneumatic directional valve starts off the tool-toppling cylinder and executes the tool returning motion.
2. Once the limits switch (LS1) of the returned tool is ON, it indicates that the tool changing motion has been completed.

UNIT NO.	QUANTITY	MATERIAL	NO.	TOLERANCE
			04-02-03 2001/12	>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2
PART NO.	SCALE	TITLE		
DMR4K0008A01				

	DRAWING DESIGN	CHECK APPROVE	
NAME	A-MAY2004/1/15		

4 、 Power Supply Specification for Electrical Control:

4-1. Follow the table listed below if disk type tool-changing system's power supply is not specified:

Power Supply Category	Electrical	Pneumatic
Specification	Electrical Power Supply: 3 Phase 220V (50/60Hz) Signal Power Supply: DC 24V	5 BAR (Filtered through three- points assembly)

4-2. Specification of Sensor Used In disk Type Tool Changer System Are as Followed:

Sensor	Tool Magazine Positioning and Counting	Tool-Changing Mechanism
Specification	M12 PNP 24V Normal Open Shielded Distance = 0.6mm	Φ 4 PNP DC24V Normal Open Shielded Distance = 0.8mm

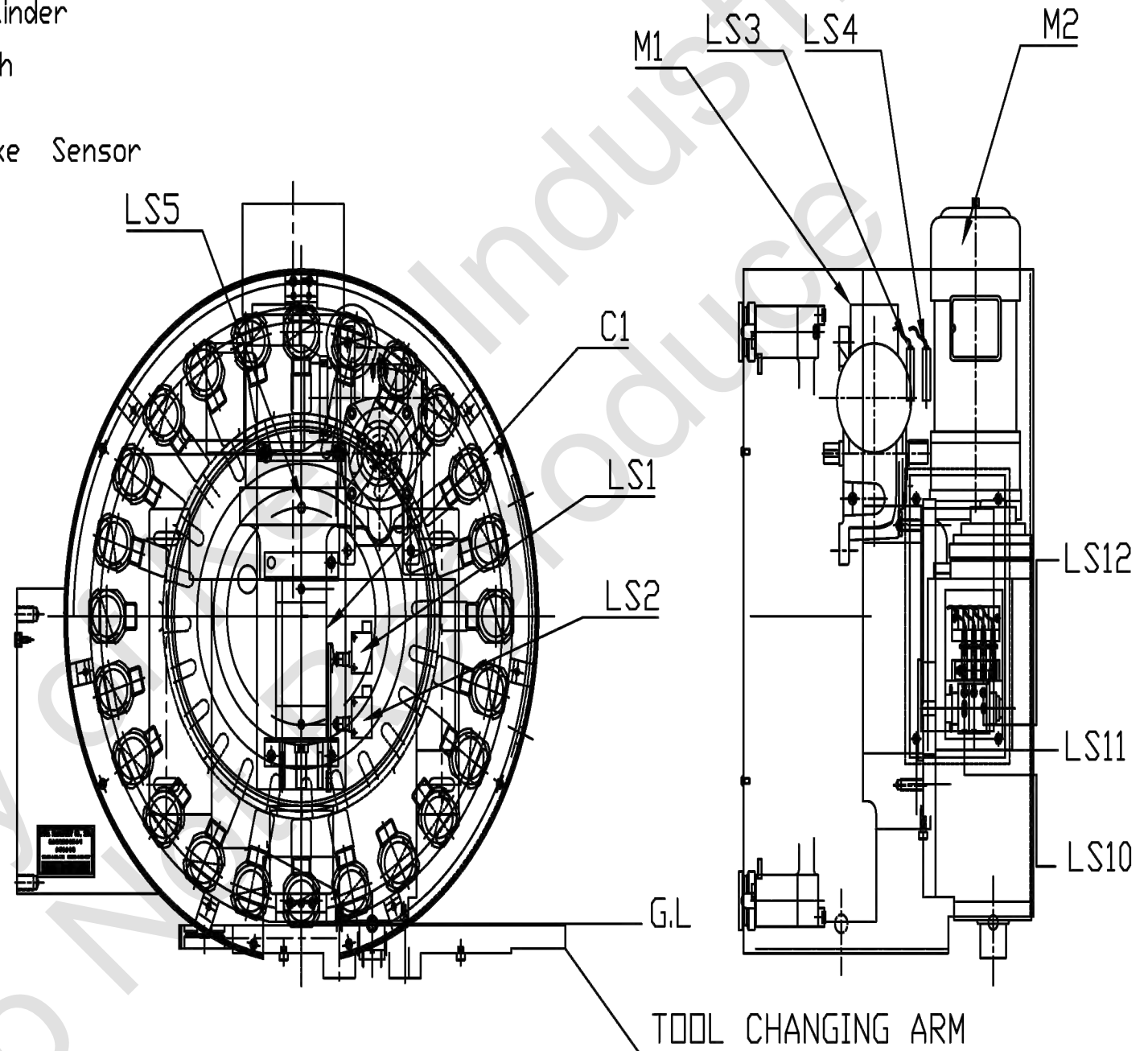
5 、 Electrical Control:

Configuration Drawing for Electronic Control Components.....	DMR4K0009A01
Sequence Drawing of Tool-Changing System.....	DMR4K0010A01
Standard Wiring Diagram.....	DMR4K0011A01
Motor Wiring Diagram for Tool Magazine.....	DMR4K0012A01
Motor Wiring Diagram for CAM BOX.....	DMR4K0013A01
Pneumatic Circuit Diagram.....	DMR4K0014A01

#40 DISK TYPE CONFIGURATION DRAWING FOR ELECTRONIC CONTROL COMPONENTS

Code Description:

- M1 :Tool Magazine Motor
- M2 :Cam box Motor
- C1 :Tool Pot Tool Toppling Pneumatic Cylinder
- LS1 :Tool Pot Tool Returning Limits Switch
- LS2 :Tool Pot Tool Toppling Limits Switch
- LS3 :Tool Magazine Counter & Motor Brake Sensor
- LS4 :Tool Magazine Positioning Sensor
- LS5 :Tool Magazine Point of Origin Sensor (Optional)
- LS10 :Cam box Brake Sensor
- LS11 :Cam box Tool Clipping Point Position Confirmation Sensor
- LS12 :CAM BOX Point of Origin Position

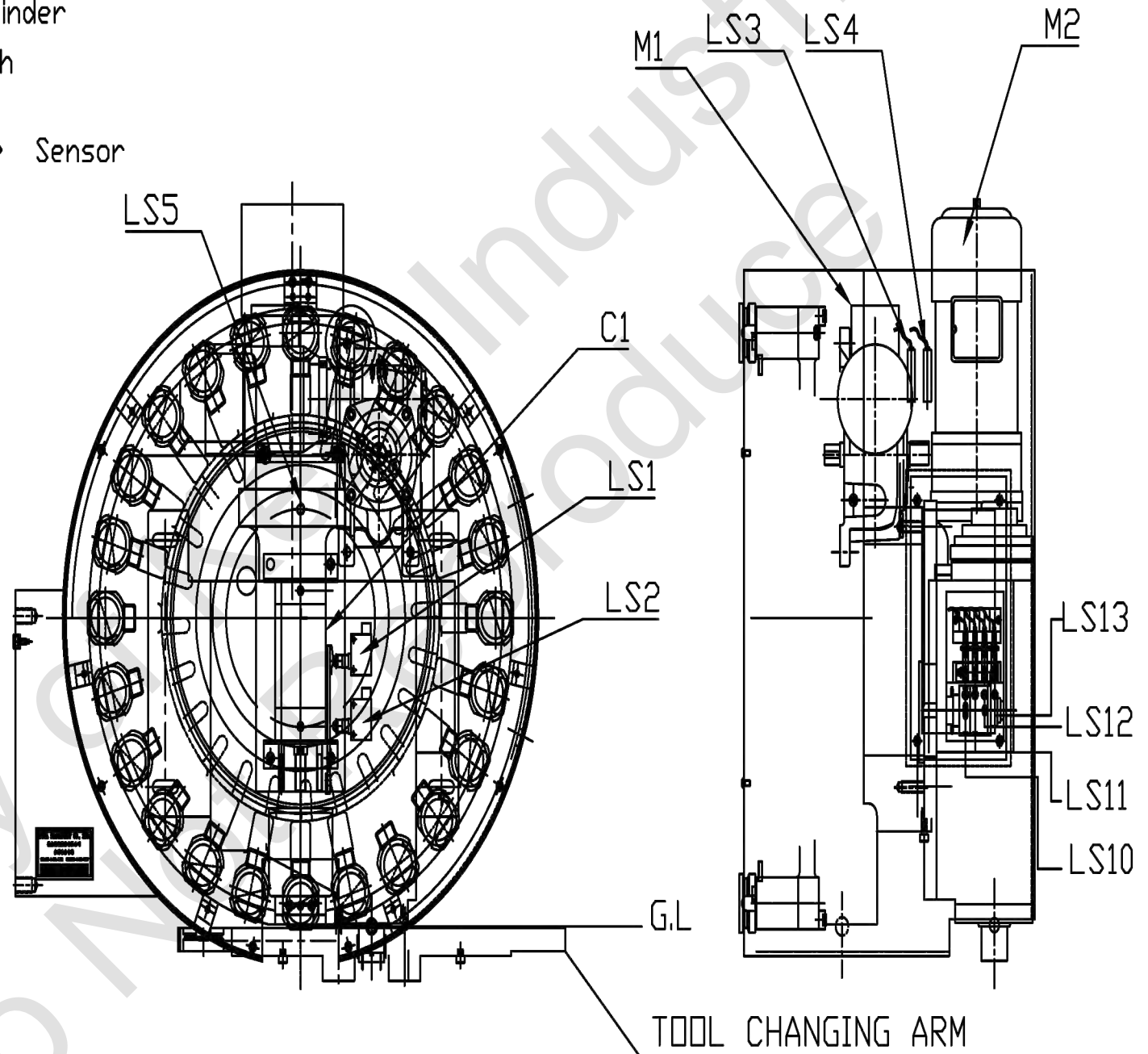


			NO:		
			D4-02-03	TOLERANCE	
			2001/12	>0	±0.1
				>6	±0.2
				>30	±0.3
				>120	±0.5
				>315	±0.8
				>1000	±1.2
DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE	
NAME A-MAY2004/1/15		DMR4K0009A01			

#40 DISK TYPE CONFIGURATION DRAWING FOR ELECTRONIC CONTROL COMPONENTS

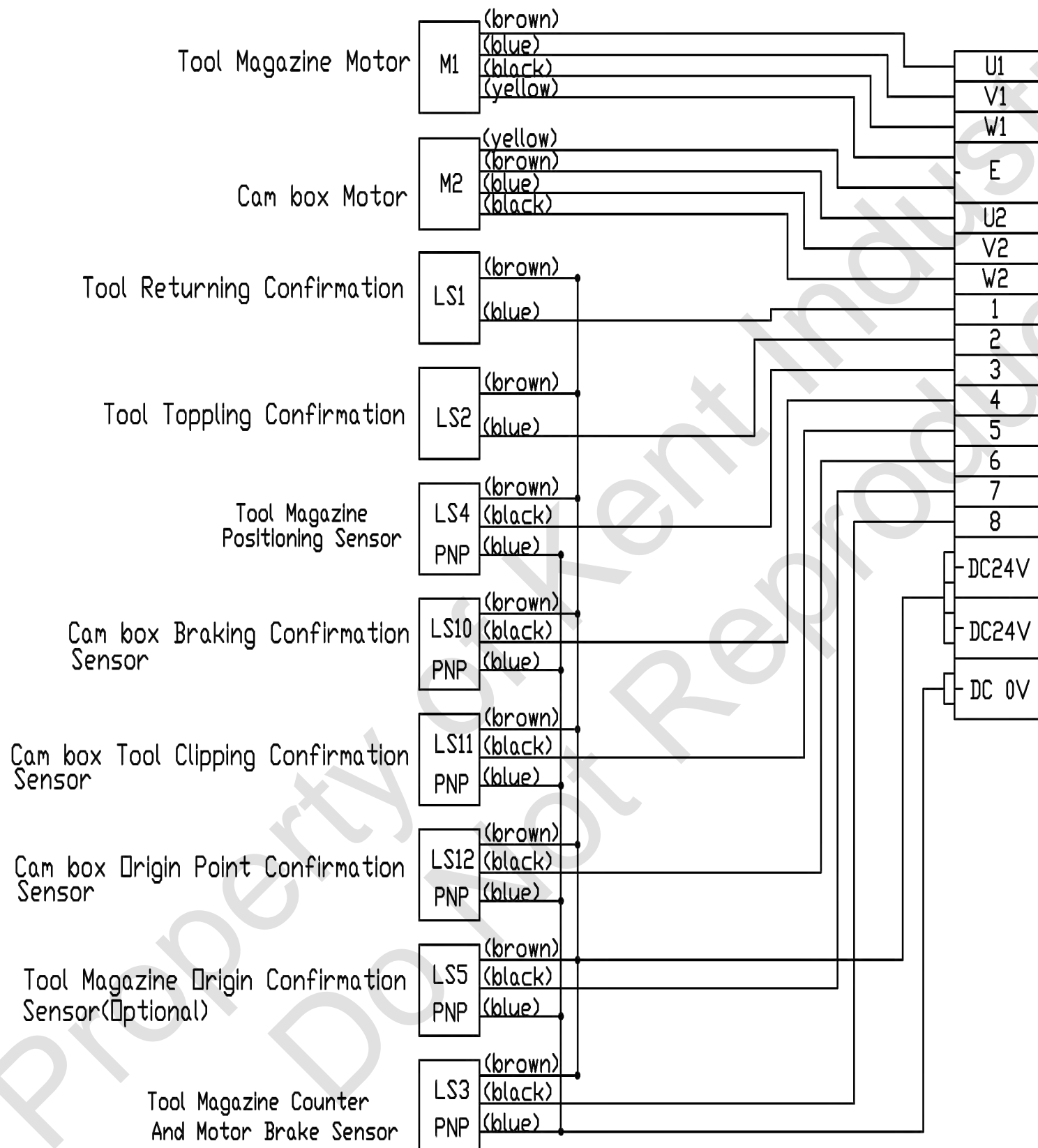
Code Description:

- M1 :Tool Magazine Motor
- M2 :Cam box Motor
- C1 :Tool Pot Tool Toppling Pneumatic Cylinder
- LS1 :Tool Pot Tool Returning Limits Switch
- LS2 :Tool Pot Tool Toppling Limits Switch
- LS3 :Tool Magazine Counter & Motor Brake Sensor
- LS4 :Tool Magazine Positioning Sensor
- LS5 :Tool Magazine Point of Origin Sensor (Optional)
- LS10 :Cam box Brake Sensor
- LS11 :Cam box Tool Clipping Point Position Confirmation Sensor
- LS12 :CAM BOX Point of Origin Position
- LS13 :Maximum Tool Dia. Sensor



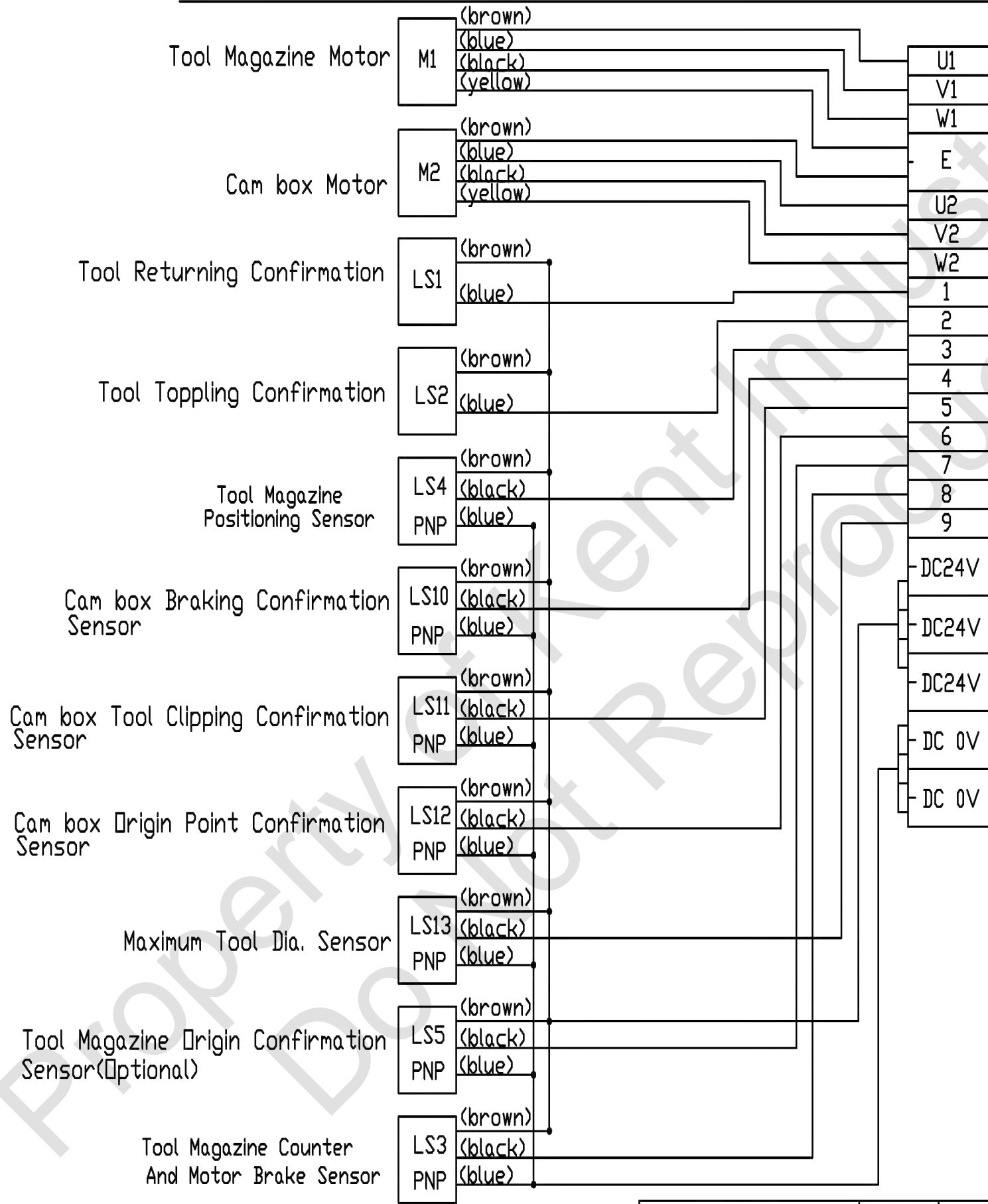
				NO:	
		UNIT NO.	QUANTITY	MATERIAL	TOLERANCE
					D4-02-03 2001/12
DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE	
NAME	A-MAY2004/1/15	DMR4K0009A01			
				>0 ±0.1	
				>6 ±0.2	
				>30 ±0.3	
				>120 ±0.5	
				>315 ±0.8	
				>1000 ±1.2	

#40 DISK TYPE TOOL MAGAZINE STANDARD WIRING DIAGRAM



			UNIT NO.	QUANTITY	MATERIAL	NO:	TOLERANCE
						D4-02-03	>0 ±0.1
						2001/12	>6 ±0.2
							>30 ±0.3
							>120 ±0.5
							>315 ±0.8
							>1000 ±1.2
NAME	DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE		
AMAY2005/4/26			DMR4K0011A01				

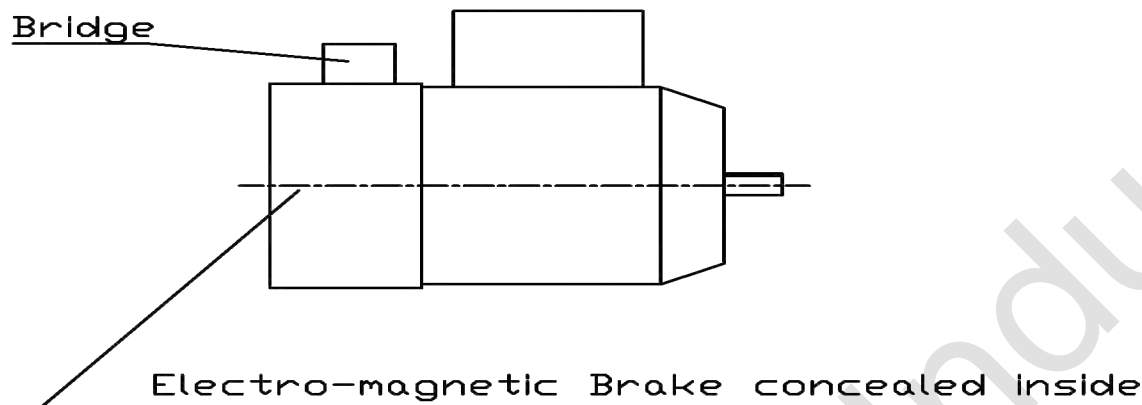
#40 DISK TYPE TOOL MAGAZINE STANDARD WIRING DIAGRAM



			UNIT NO.	QUANTITY	MATERIAL	NO:	TOLERANCE
						D4-02-03	>0 ±0.1
						2001/12	>6 ±0.2
							>30 ±0.3
							>120 ±0.5
							>315 ±0.8
							>1000 ±1.2
DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE			
NAME A-MAY2004/1/15		DMR4K0011A01					

#40 DISK TYPE TOOL MAGAZINE MOTOR WIRING DIAGRAM

Tool Magazine Motor external view



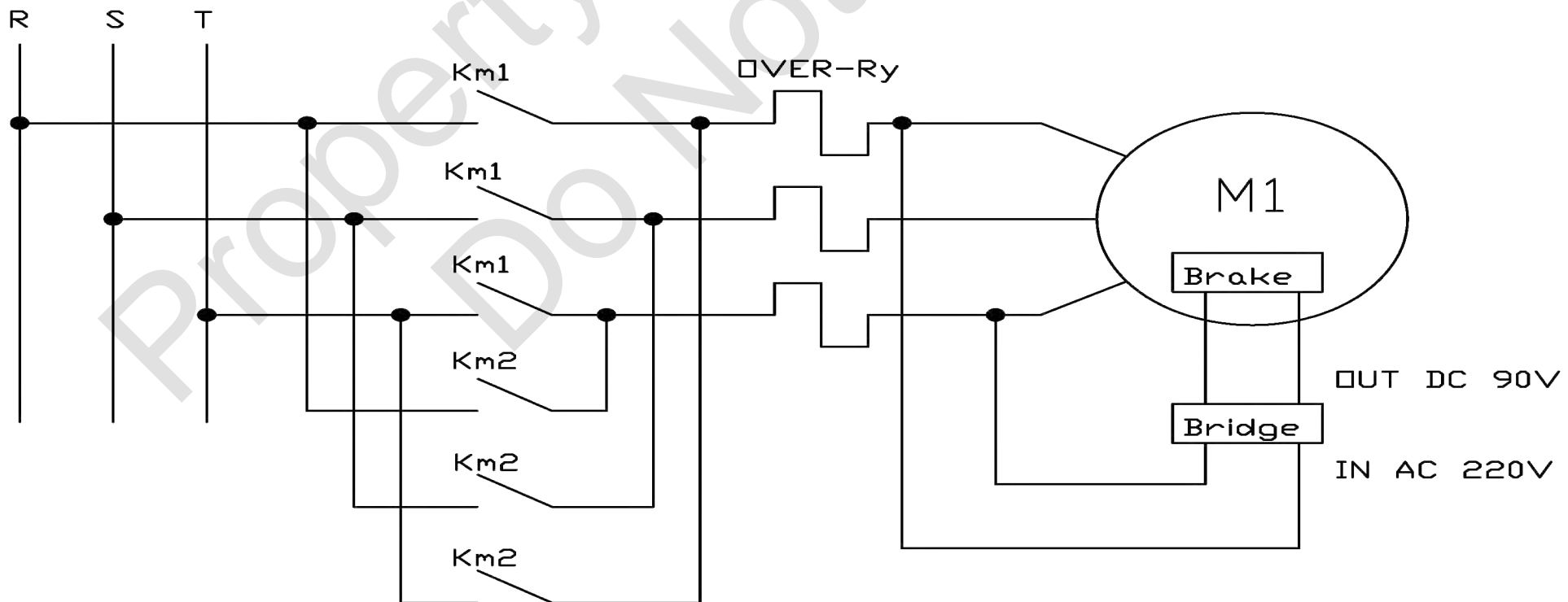
Tool Magazine Motor Electrical Specification:

1.Horse Power:	1/2HP	6.Insulation Resistance:	100M Ω
2.No. of Poles:	4P	7.No Load Current:	1.0A
3.voltage:	60HZ,220V	8:Full Load Current:	1.9A
4.Rotational Speed:	1720R.P.M.	9:Brake Gap:	0.2~0.35mm
5.Hi Pot:	1800V.A.C		

A.The tool magazine motor is a 1/2HP three phase induction motor with electro-magnetic brake (Power Off Braking).

wiring diagram as follow

AC 220V 3 phaes



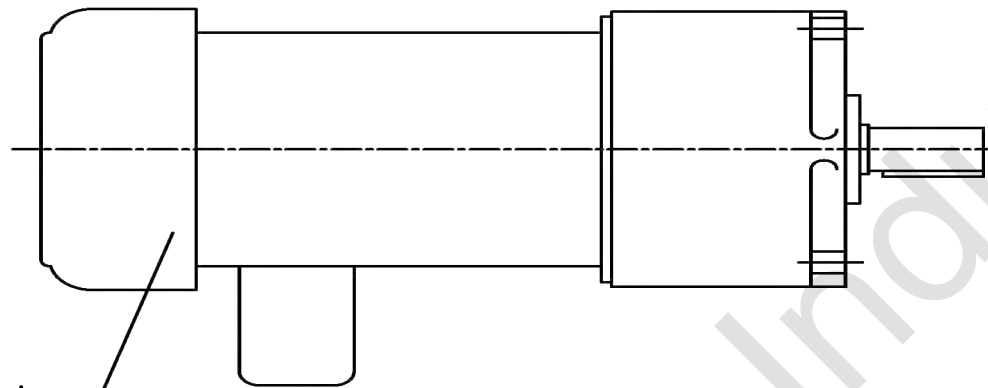
NO.	TOLERANCE
>0	±0.1
>6	±0.2
>30	±0.3
>120	±0.5
>315	±0.8
>1000	±1.2

UNIT NO.	QUANTITY	MATERIAL	SCALE	PART NO.	TITLE
				DMR4K0012A01	

DRAWING DESIGN	CHECK APPROVE
NAME A-MAY2004/1/15	

#40 DISK TYPE CAM BOX MOTOR WIRING DIAGRAM

MOTOR EXTERNAL VIEW



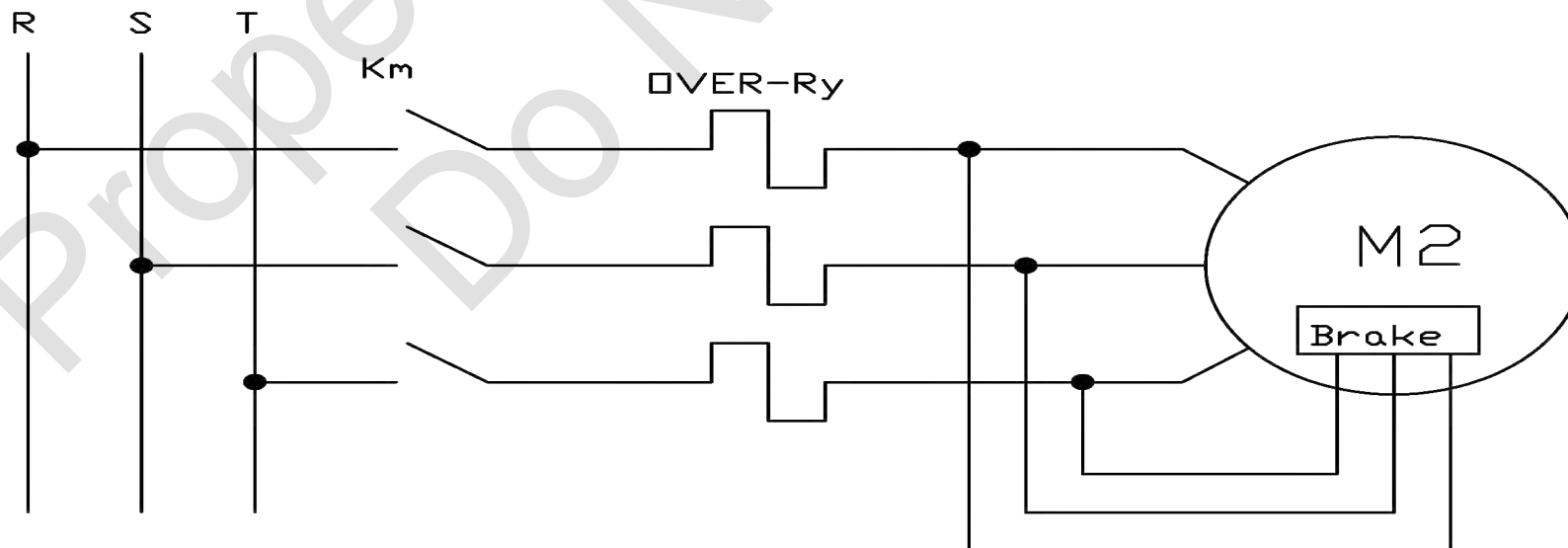
Electro-magnetic Brake concealed inside

Cam box Motor Electrical Specification:

1.Horse Power:	1/2HP	6.Insulation Resistance:	100M Ω
2.No.Of Poles:	4P	7.No Load Current:	1.15A
3.voltage:	60HZ,220V	8:Full Load Current:	2.0A
4.Rotational Speed:	1720R.P.M.	9:Brake Gap:	0.3~0.35mm
5.Hi Pot:	1800V.A.C		

Note: Electro-magnetic Brake Voltage and Motor Voltage are the equal.

WIRING DIAGRAM AS FOLLOW
AC 220V 3 PHAES



NO.	TOLERANCE
D4-02-03	± 0.1
2001/12	± 0.2
	± 0.3
	± 0.5
	± 0.8
	± 1.2

UNIT NO.	QUANTITY	MATERIAL	SCALE	TITLE

UNIT NO.	PART NO.	CHECK APPROVE
	DMR4K0013A01	

DRAWING DESIGN	NAME
A-MAY2004/1/15	

6 、 Electrical Control Protection Programming:

- (1) As Cam box and the tool magazine move extremely fast, the control program for all motor relays, sensors, and the I/O port of electromagnetic valves should be written on PLC Level 1 of the controller (where SCAN TIME reacts faster). This is to prevent the electronic control from having over slow reactions and causing the machine to make wrong movements.
- (2) In the proceeding of tool changing, each movement has to be confirmed for its completion before continuing with the next movement. (Refer to the tool-changing flowchart diagram)
- (3) Do not topple the tool if the sensor for the positioning of the tool magazine is not confirmed (i.e. LS4 is ON).
- (4) Do not start the motor of the tool magazine or rotate the tool palette if LS2 is OFF in the proceeding of tool tilt and LS1 is ON before confirming the completion of tool tilt.
- (5) Do not change the tool if tool tilt is not confirmed (i.e. LS1 is ON).
- (6) Do not change the tool if the spindle of the machine has not returned to the tool changing position.
- (7) Do not change the tool if the spindle orientation has not been completed.
- (8) Do not move the spindle head if the arm has not return to its home position.
- (9) Overload protection relay should be activated when overloading, so that the motor will not be burn off.
- (10) The amperage of the motor's current has to be below the motor's full load current.
1/4 Hp: 1.2 A; 1/2 Hp: 2 A; 3/4Hp:2.8 A;1 Hp: 3 A (at 60Hz)

7 、 Installation Procedure:

Before installing our disk type tool-changing system, you should read this section carefully and understand it completely before proceeding with the installation procedure.

Adjustment of the arm and the tool magazine was done before the product left our factory, users do not have to spend time to work on it. Hence, users could treat the tool magazine, the tool-changing mechanism and the tool arm as a complete unit without having to do any adjustment when installing our Disk Type Tool Changing System. But the tool-changing point of the spindle and the tool-changing point of the arm have to be accurately adjusted.

The tool-changing point of the spindle and the tool-changing point of the arm have to be accurately overlapped, so that tool-changing movements will be smoothly carried out under normal usage without any collision noise. If the adjustment is inaccurate, not only tool-changing movements will not be smooth but it will also produce collision noises, which will have harmful effect on the life span of the tool. Hence, the only important point for installing our Disk Type Tool Changing System is “to overlap the tool-changing point of the spindle and the tool-changing point of the arm accurately”. We recommend users to follow the installation procedures below:

- (1) Make an interfacing bracket as we have suggested, and lock it onto the vertical column after confirming the bilateral perpendicularity geometrical tolerance between the vertical column interface and the tool magazine interface.
- (2) Make a three-stages tool-calibration fixture as we have suggested. (As per attached drawing)
- (3) Lock the disk type tool-changing system onto the interfacing bracket. Put the two rest blocks closely on the top of the interfacing bracket and ensure the horizontal accuracy is kept.
- (4) Move the Z-direction of the spindle to the highest point.
- (5) Put adjustment fixture A into the spindle for the spindle to grip and let the tool-changing arm grip adjustment fixture B. Press and release the brake, which is on top of the tool-changing mechanism motor. Then use a hexagonal spanner to turn the screw, which is

located at the top center of the motor, until the tool-changing mechanism reaches the tool-clipping position. (Keep turning the screw on top of the tool-changing mechanism motor, and the tool-changing arm will remain fixed for a period of time. This will ensure that the tool-clipping position has been reached).

- (6) Use a level to adjust the interfacing bracket so that the tool-changing arm is perpendicular to the spindle.
- (7) Move the Z-direction of the spindle to about 2mm from the top of the predicted tool-changing point.
- (8) Adjust the X- and Y-direction of the tool-changing system so that the X- and Y-coordinate of the tool-changing points for the tool-changing arm and the spindle overlap. If adjusting the Fixture C allow it to pass through the Fixture B and entering the internal hole of the Fixture A that means the X and Y direction adjustment is completed.
- (9) Measure the Z-direction coordinate for the tool-changing point of the down to approximately 0.3~0.5mm above the Z-direction coordinate of the tool-changing point for the tool-changing arm (the ideal distance would be 1/2 of the spindle clamp distance). And set this point as the coordinate for the tool-changing point. Again, use the hexagonal spanner to turn the screw on the top center of the motor in the opposite direction, until the tool-changing mechanism returns to its home position.
- (10) Change the tool manually first, to check that the movements of tool pot toppling, the tool-changing mechanism performing the tool-change, the spindle catching and releasing tools, ... etc coordinate well together without any error, then proceed with CNC automatic sequence program control. After trial tool-changing several times and making sure that no bad phenomena appear, the positioning pins can be fix into positions between the tool-changing system and the interfacing bracket, and between the interfacing bracket and the vertical column, respectively.
- (11) Connect the circuit for electronic control, pneumatic valves, and pneumatic source according to the wiring diagram.
- (12) Pour the hi-grade of circulation oil into the tool-changing mechanism until the surface of the oil can be seen from the oil-viewing window

8 、 Original Setting:

- (1) The gap between the tool magazine orientation and the counter sensor (M12) and the sensor block should be adjusted to between 0.8~1.0 mm.
- (2) The gap of tool magazine motor's brake pad should be adjusted to between 0.2~0.35 mm.
- (3) The gap between the sensor ($\Phi 4$) on Cam box tool-changing mechanism and the sensing block should be adjusted to between 0.4~0.5 mm.
- (4) The gap of Cam box motor's brake pad should be adjusted to between 0.3~0.35 mm.

9 、 Troubleshooting:

9-1. Unstable Tool Tilting:

We have made the best adjustment to the disk type tool-changing system before our product left our factory, and we would suggest users not to do any random adjustment. If tool tilt is unstable due to the transportation or human error, please follow the procedures below to check and make adjustment:

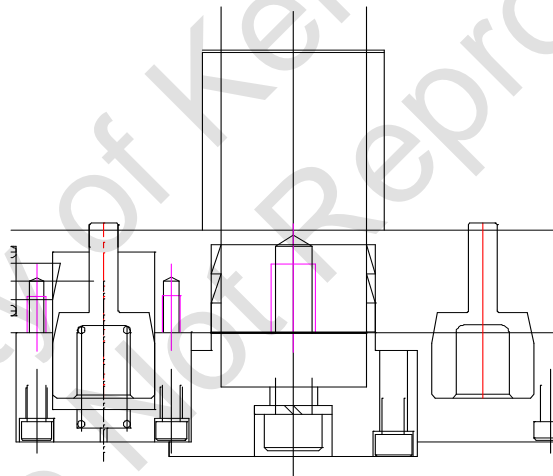
- (1) Check whether the pneumatic source conform to the power supplying specification (refer to the section on the electrical control's power supply specification).
- (2) Check whether the tool tilting mechanism has any damage to it. If so, please contact us and we will send someone over to repair it.

※ Note: Be sure not to set the speed too fast, otherwise there is a possible danger of dropping the tool.

9-2. Tool Calibration Procedure

Please adjust the arm as following procedure when need:

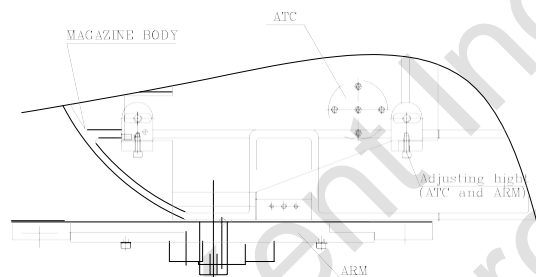
- (1) Use an overhead crane to lift the Cam box and inspect it externally for any flaw.
- (2) Use M12×50L + spring washer + flat washer to fasten the Cam box onto the datum surface of the tool magazine's main structure, and pull the Cam box to the elongated holes on the outside.
- (3) Open the power distribution box of the Cam box and connect it to the power supply of the electronic control box. Check to see if there is any abnormal phenomenon in the operation of the Cam box.
- (4) Tighten the nut and sun washer on the Cam box shaft ° (as illustrated in Diagram 1).



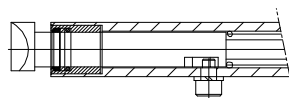
- (5) Use M5×35L bolt + spring washer to fasten the packing rings on the tool-changing arm, but do not tighten it temporarily.
- (6) Sequentially insert the separation ring for the tool-changing arm and put the tool-changing arm into the Cam box axis, and fasten M12×35L bolt + spring washer onto the tool-changing arm with a bit tightness around the axis and without any gaps.
- (7) Supply electrical power to Cam box to allow the Cam box axis to rotate to the tool-clipping angle.
- (8) Use the three-point tool calibration fixtures to adjust the position of the tool-changing arm. The adjustment method is to insert Fixture

A into the tool pot, and Fixture B is placed at the tool clipper and coupled with the protuberance, but the tool pusher clip has to be placed into the arm first. Then, re-adjust the Cam box position, so that Fixture C can go through Fixture A and Fixture B and reach the arm at the position of the tool-clipping point, and line up with the center of the tool pot.

- (9) Tighten the Cam box on the magazine with 4.M12X12L screws ◦
- (10) Check the clearance between the flange of the clip and tool flange ,if the toper cleanses is equal to lower cleame are the same ◦ (the cleame is 0.8mm for BT and that is 0.2mm for CAT and DIN Tool shank)if the toper cleame is not equal to lower clew , one nut move the above set of Cam box and arm up or down ◦ (as illustrated in Diagram 2).



- (11) In the process of tightening, use magnetic holder to hold the leveler on the Cam box. The pointer of the leveler should touch the tool clipper near the outer rim. Repeat the height measurement for both ends of the tool clipper, where the height at both ends should be within 0.1mm of difference.
- (12) Place the tool pusher clip spring onto the end of the tool pusher clip, and after smearing some lubricating oil, fit it into the tool-changing arm. Fix M8 anti-revolving bolt + spring washer to the arm (as illustrated in Diagram 3).



- (13) Turn the manual bolt behind the Cam box motor, so that the tool-changing arm descends about 50mm. Apply lubricant on the safety pusher pin of the tool-changing arm and then insert it into the lubricated spring of safety pusher pin. Then, insert the safety pusher pin into the tool-changing arm and fasten it with M5×35L bolt + spring washer (as illustrated in Diagram 1).
- (14) After fastening the parts for the tool-changing arm, try several times to make sure that the safety pusher pin can spring upwards freely, and test to see if tool-changing movement is working properly by putting a tool into the tool pot.

9-3. When the Tool Palette Not Turning Smoothly:

- (1) Please check to see if there is any foreign object got stuck to the Geneva wheel or drive shaft (refer to the assembly drawing and part list). Please eliminate it.
- (2) Please dismantle the motor and then electrify the motor, so it operates independently. Check to see if it rotates smoothly without any noise.
- (3) If after going through above inspections without eliminating the breakdown, please contact our company.

9-4. When the Tool Arm Motion Not Smooth:

- (1) Please check to see if there is any damage to the tool-changing arm. If there is, please contact our company to have the parts replaced.
- (2) Please check the tool-changing mechanism and main structure of the tool magazine to see if there is any change to the locking position (Check to see whether there is any damage to the positioning pin or it has already been shear off. If there is, please contact our company to have the parts replaced.
- (3) Please check whether there is any loose movement between the tool-changing arm and axis of the tool-changing mechanism. If there is, please stop the machine and cut off the power supply and loosen the screw on top center of the motor with a hexagonal spanner until the tool-changing mechanism reach the tool clipping position. Push the tool-changing arm upward to the end and clip on the tool that has toppled down, then calibrate both end of the tool-changing arm so they are within (0.1mm) in height, (Refer to tool calibration procedure)
- (4) Be sure not to self-dismantle the tool-changing mechanism, if there is any breakdown, please contact our company.

9-5 When the Tool-Changing Speed is too Slow:

- (1) Please check whether the motor produces any strange noise
- (2) Please check whether the power supply conform to the specification.

(3) Please check whether the speed of spindle clamping and unclamping complies with the requirement.

(4) There is any other breakdown, please contact us.

9-6. Sudden Power Failure during the Course of Tool Change by the Tool-Changing Arm

- (1) For short period of power failure, please re-start the machine, and manually return the tool-changing arm to its original position.
- (2) For long period of power failure, please release the motor brake, rotating the tool-changing arm to its original point location by using a spanner to turn the spindle on top of the Cam box motor, and ensure the safety of the machinery by forcing the tool pot to return the tool.

10 、 Maintenance:

- (1) The circulation oil inside the tool-changing mechanism should be changed after 2400 hours of continuous usage. And the oil level has to be checked non-periodically. A refill is in order if the oil falls below the required level.
- (2) Tool disk and cylinder mounting plate's surface need to check grease every month.
- (3) Check and see if there is still some lubricating oil in the bearings every three-month.

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