

Manual for Insulation Monitoring System
Sample Ladder Program of MELSEC-Q Series
(Insulation Monitoring Module QE82LG)

mitsubishi electric corporation

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1. Revision History

1.1 Sample Ladder Program Instruction

Revision Date	* Control Number	Content
May 27, 2011	SAM-0017	First edition
May 18, 2012	SAM-0017-A	Second edition: modified logics

* Control number is on the right bottom corner.

1.2 Ladder Program

Revision Date	* Control Number	Content
May 27, 2011	SAF-0015	First edition
May 18, 2012	SAF-0015-A	Second edition: modified logics

* Control number is the same as the file name.

1.3 Device List

Revision Date	* Control Number	Content
May 27, 2011	SAM-0016	First edition

* Control number is on the right bottom corner of the supplemental document.

2. Overview

This document describes the sample ladder program for insulation monitoring system using the MELSEC-Q Series QE82LG Insulation Monitoring Module.

Refer to the supplemental material (SAM-0016) for details of devices used in the sample.

For the list of devices, software, and system configuration to which the sample screens and sample program apply, refer to Section 2 Overview in the screen instruction manual (SAM-0015-□).

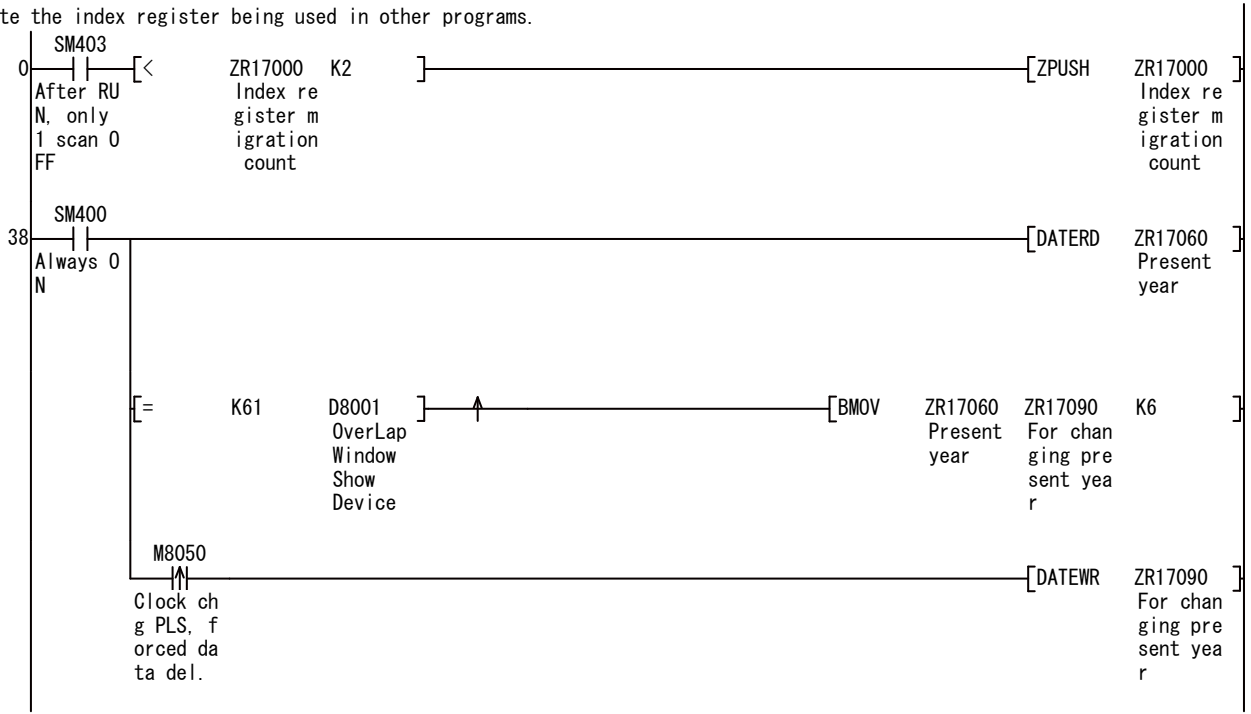
3. Sample Ladder Program

This section describes instructions for the sample ladder program of the insulation monitoring system. For more details, refer to the sample ladder program on next pages.

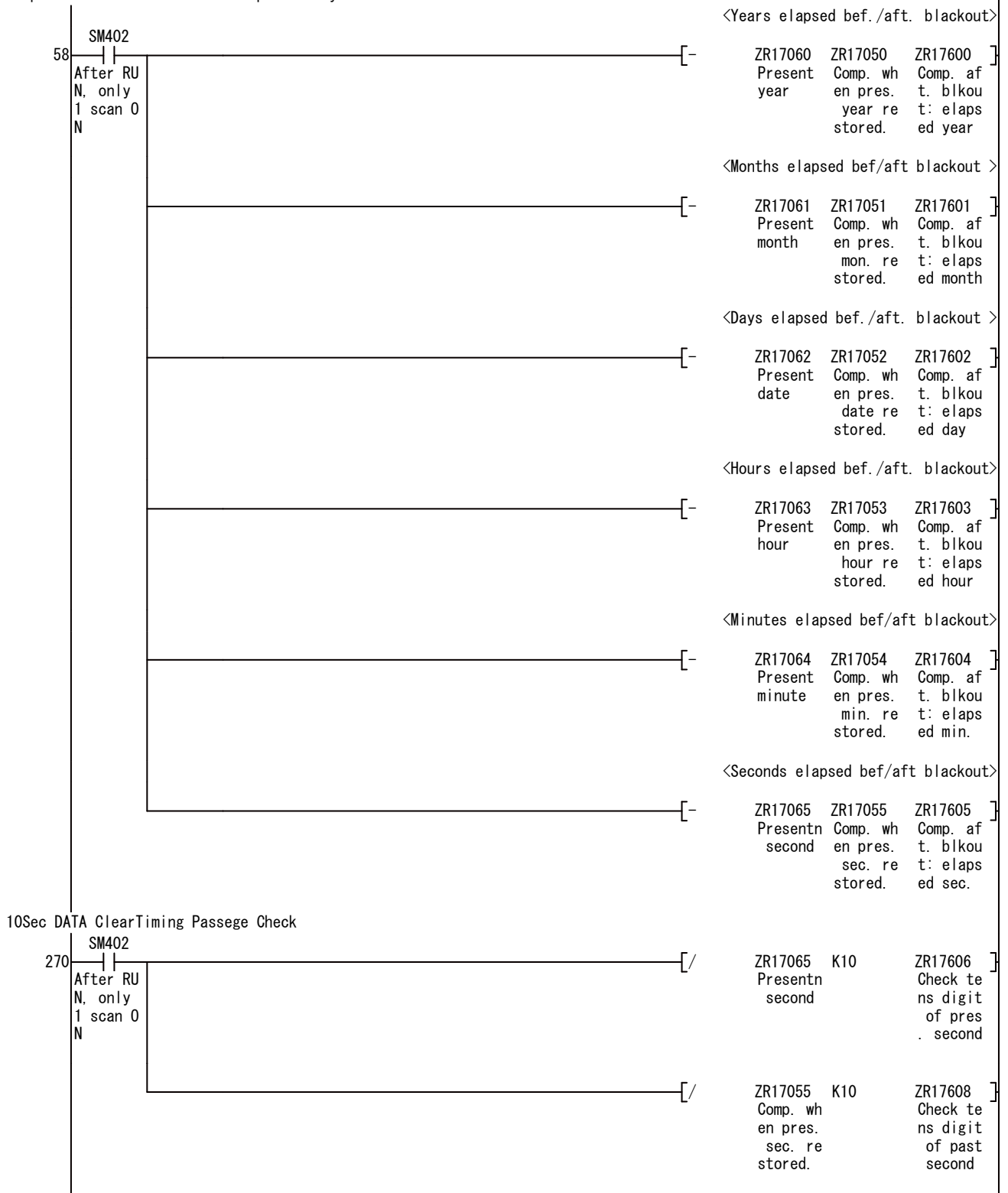
The program consists of the following contents.

No.	Start Step	End Step	Program Contents
1	0	37	Migrate the index register being used in other programs.
2	38	723	Read clock data, check subsequent data necessity in 1 scan after RUN.
3	724	1023	Issue PLS for data switching.
4	1024	1088	Set the I/O slot of QE82LG.
5	1089	1136	Instruct QE82LG on data reset signals.
6	1137	1187	Read the present value data.
7	1188	1301	Determine the maximum value of 10-second data and temporarily store the data.
8	1302	1642	Transition processing when switching 10-second data period.
9	1643	1781	Store 10-second data in HourlyDATATable.
10	1782	1946	Detect the maximum value of the period for HourlyGraph.
11	1947	2025	Store scale for HourlyGraph.
12	2026	2362	Transition processing when switching 5-minute data period.
13	2363	2634	Store 5-minute data in DailyDATATable.
14	2635	2799	Detect the maximum value of the period for DailyGraph.
15	2800	2877	Store scale for DailyGraph.
16	2878	3054	Transition processing when switching 2-hour data period.
17	3055	3328	Store 2-hour data in DailyDATATable.
18	3329	3493	Detect the maximum value of the period for MonthlyGraph.
19	3494	3572	Store scale for MonthlyGraph.
20	3573	3748	Transition processing when switching daily data period.
21	3749	4033	Store daily data in DailyDATATable.
22	4034	4174	Detect the maximum value of the period for YearlyGraph.
23	4175	4253	Store scale for YearlyGraph.
24	4254	4304	Read the maximum value from QE82LG.
25	4305	4412	Check the alarm occurrence status on QE82LG.
26	4413	4598	Read date/time when the maximum value occurred in elements of each CH from QE82LG.L
27	4599	4725	Transition processing by switching period of alarm occurrence count data.
28	4726	4842	Read the alarm occurrence count, store the data in DATATable.
29	4843	4923	Store GraphScale for alarm occurrence count.
30	4924	4974	Write setting parameters to QE82LG.
31	4975	5022	Read the present parameter data from QE82LG.
32	5023	5056	Restore the index register being used in other programs.
33	5057	5052	Read the clock data for use after recovering from a blackout.

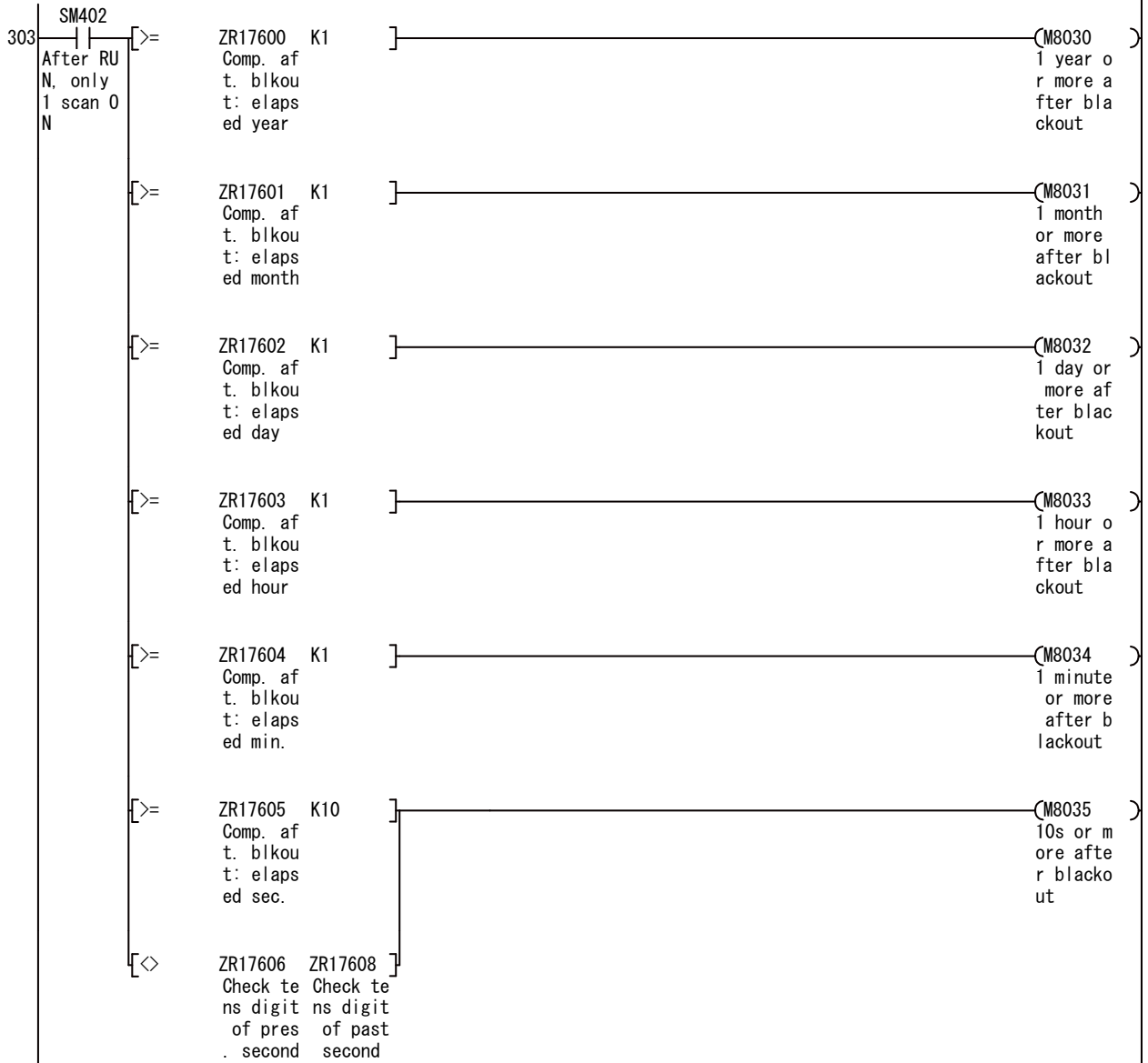
Migrate the index register being used in other programs.



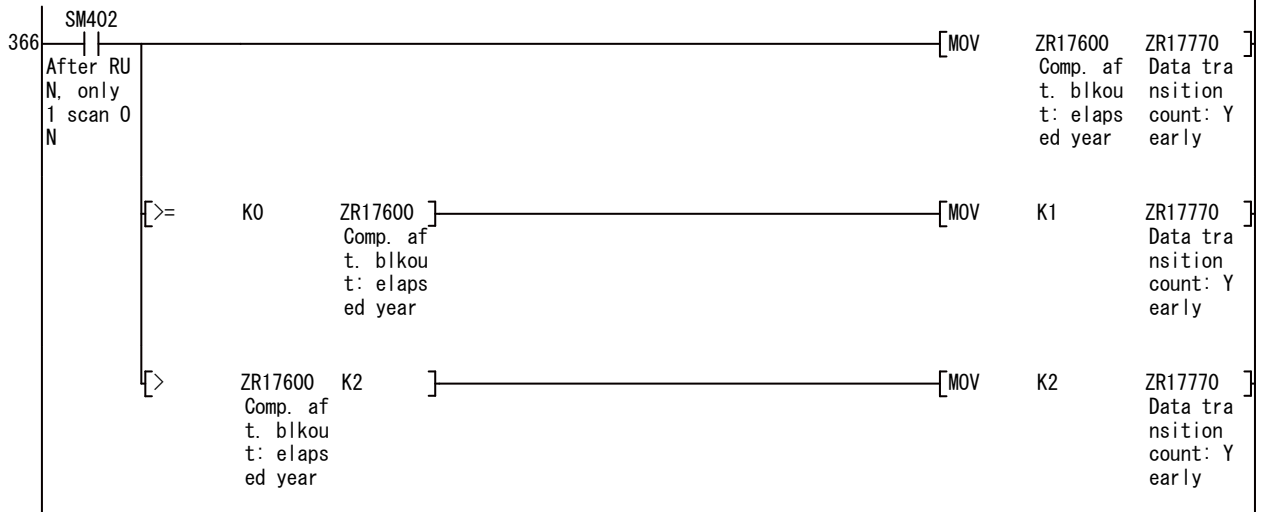
Judge elapsed time after blackout in 1 scan after RUN.
 Compare current clock data and previously saved clock data.

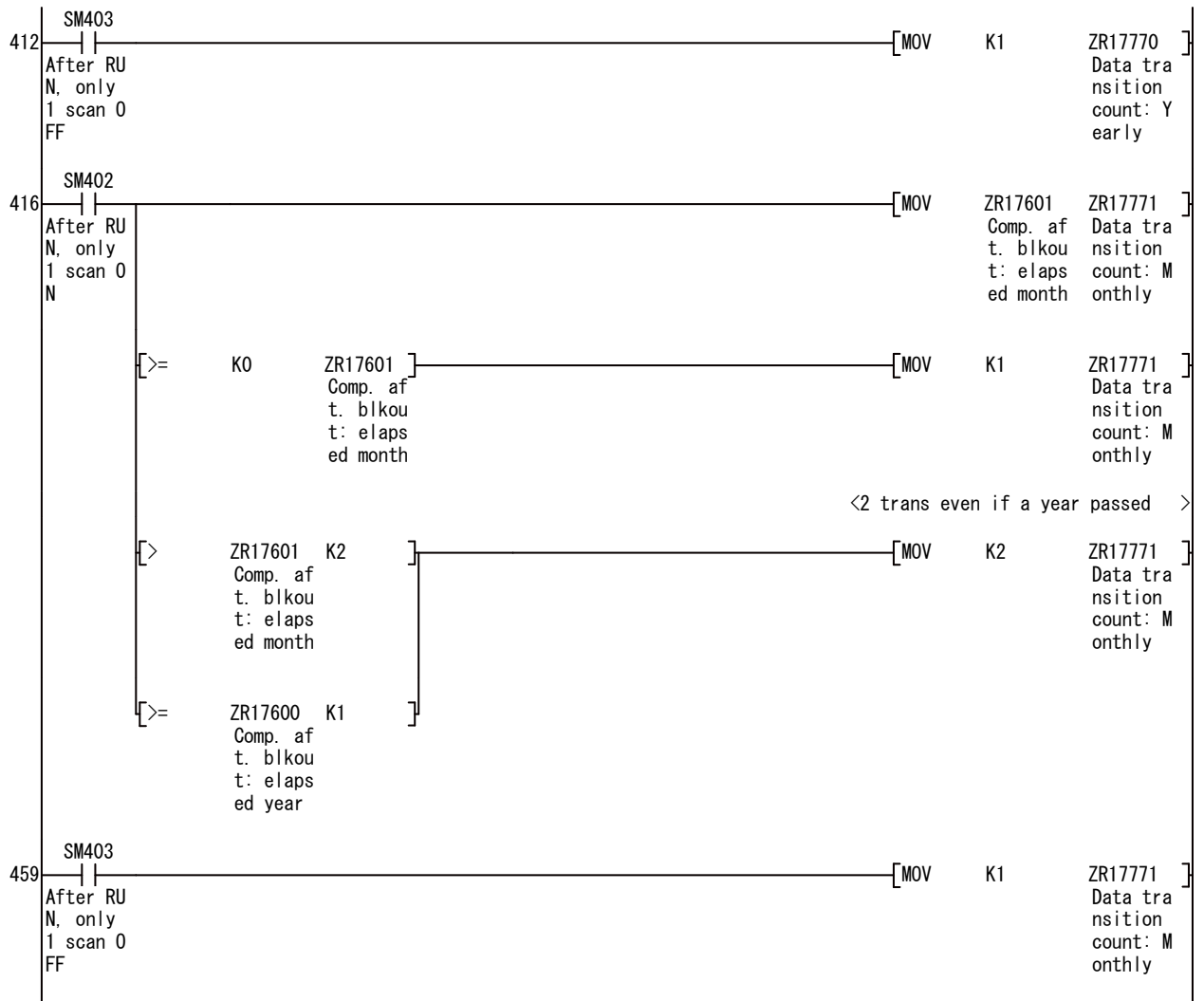


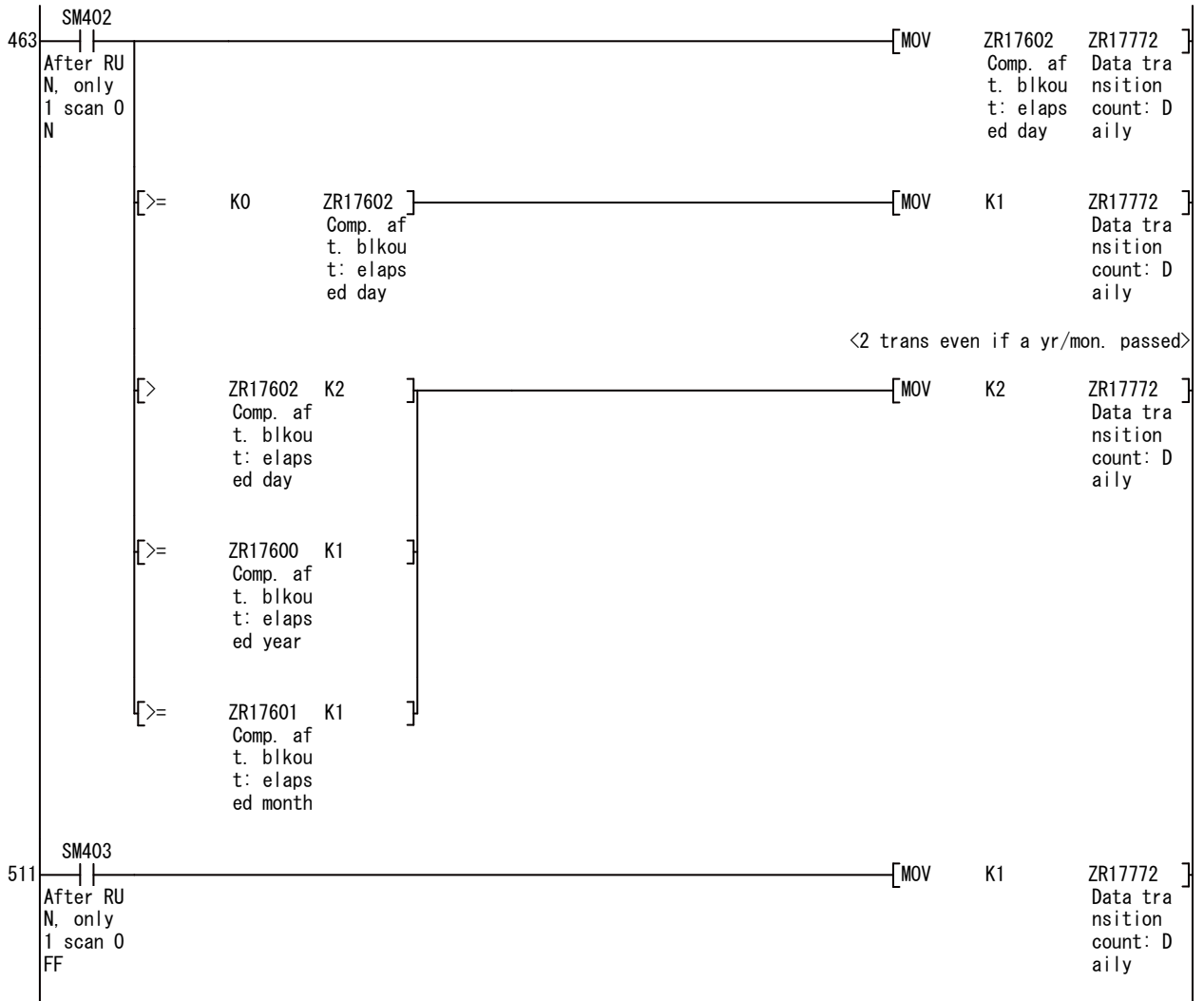
Judge time elapsed during blackout.

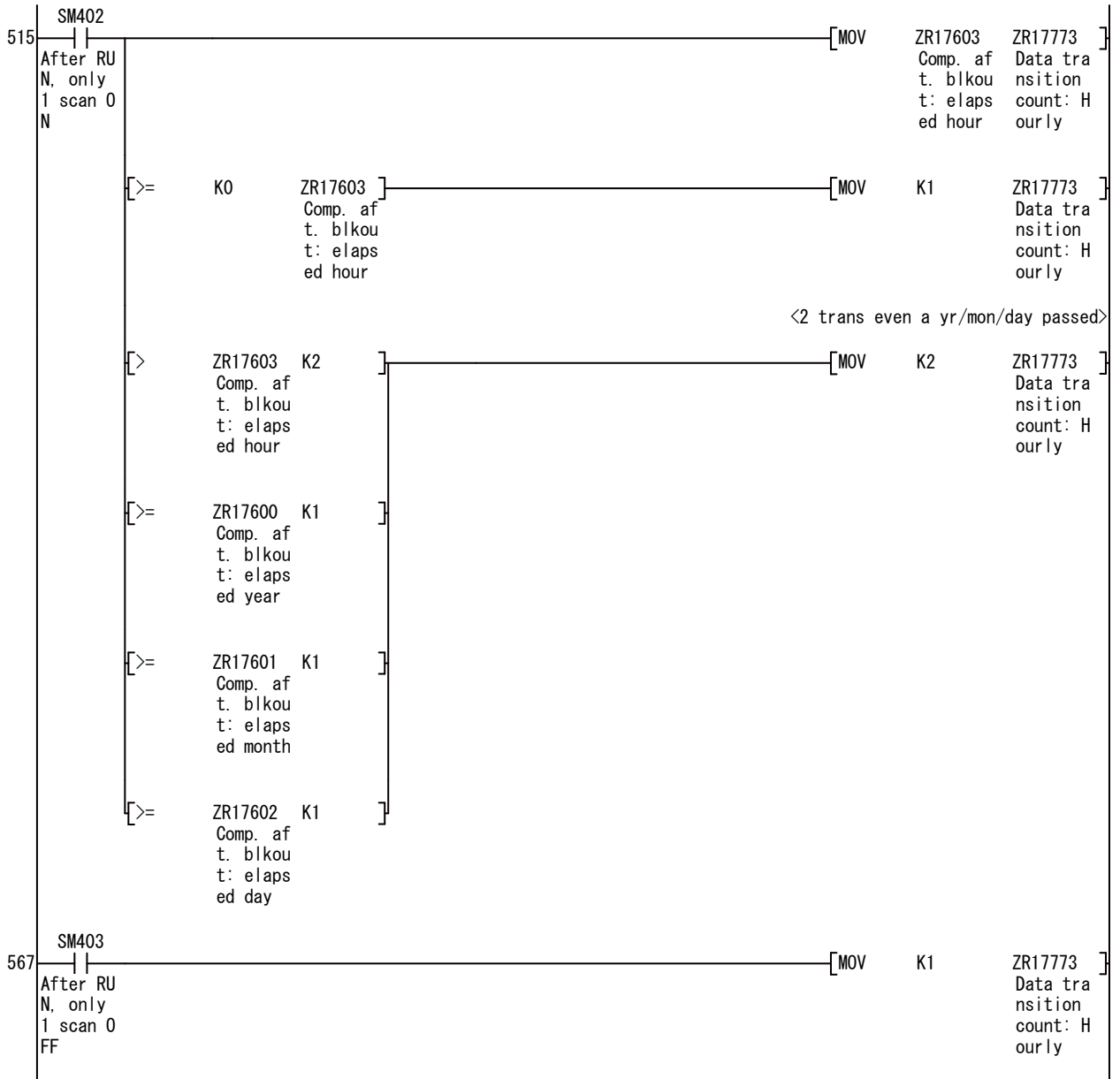


Calculate the number of DATA table transitions.

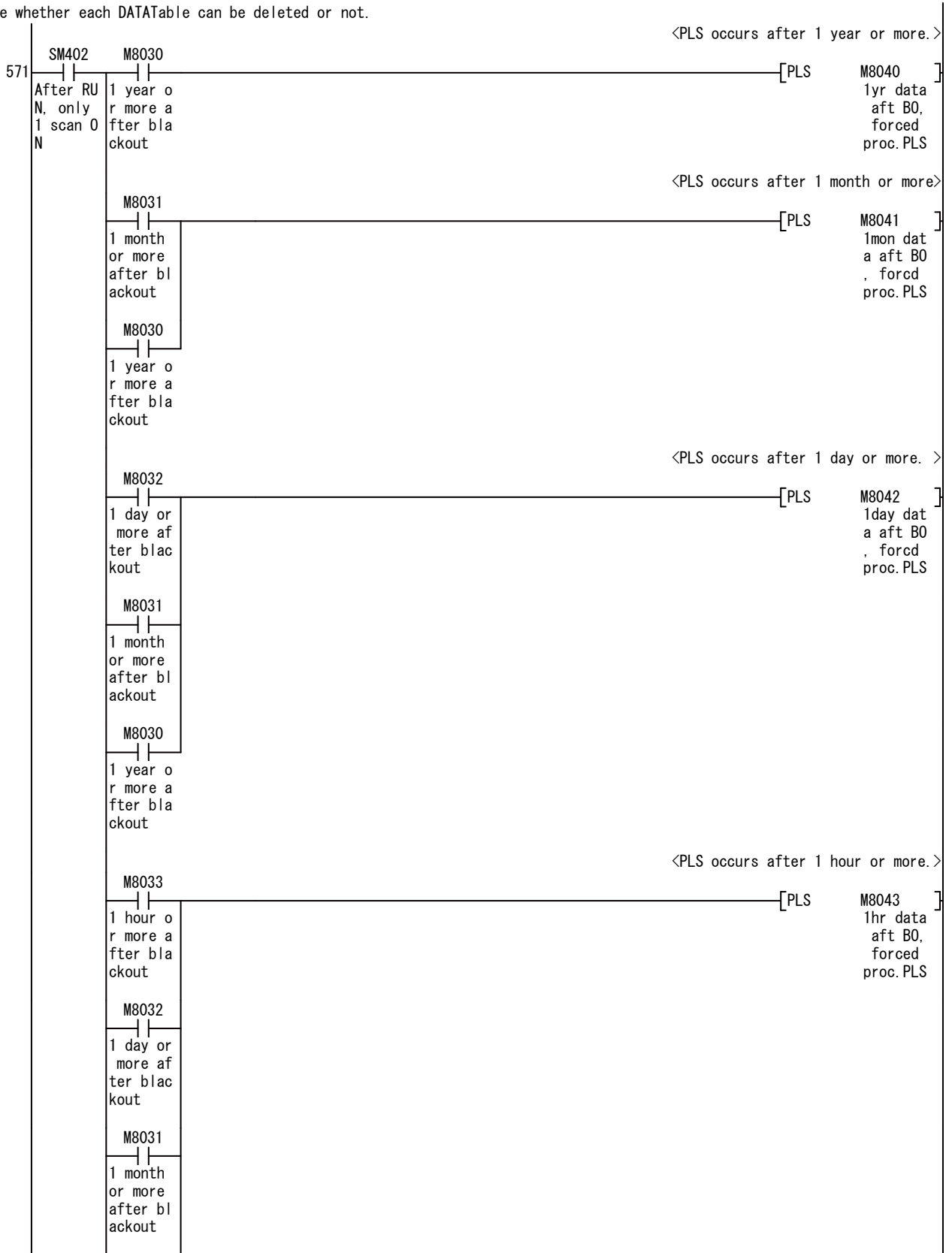








Judge whether each DATATable can be deleted or not.



M8030

1 year or more after blackout

<PLS occurs after 10s or more. >

M8035

10s or more after blackout

[PLS M8044]

10s data aft B0. forced proc. PLS

M8034

1 minute or more after blackout

M8033

1 hour or more after blackout

M8032

1 day or more after blackout

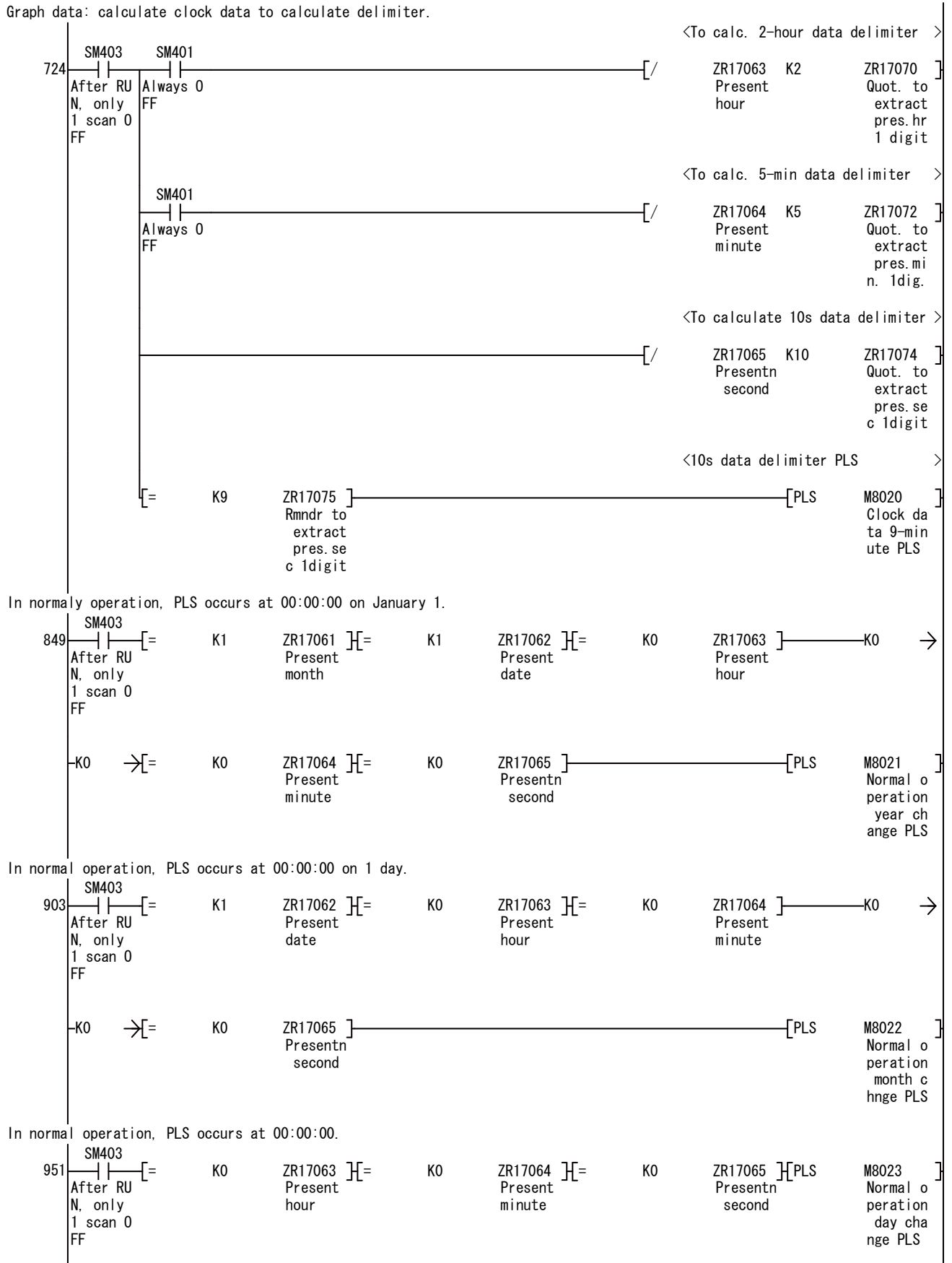
M8031

1 month or more after blackout

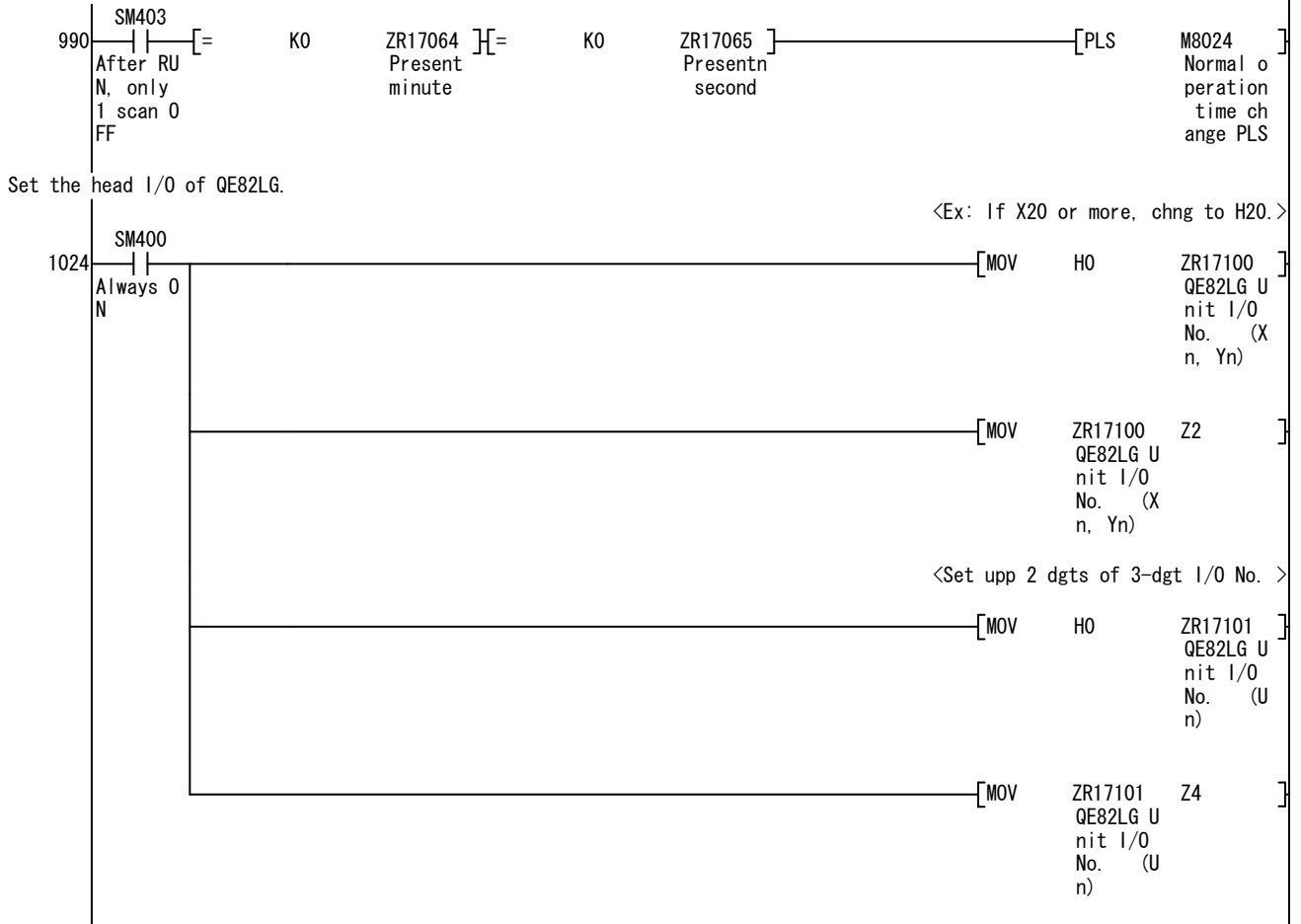
M8030

1 year or more after blackout

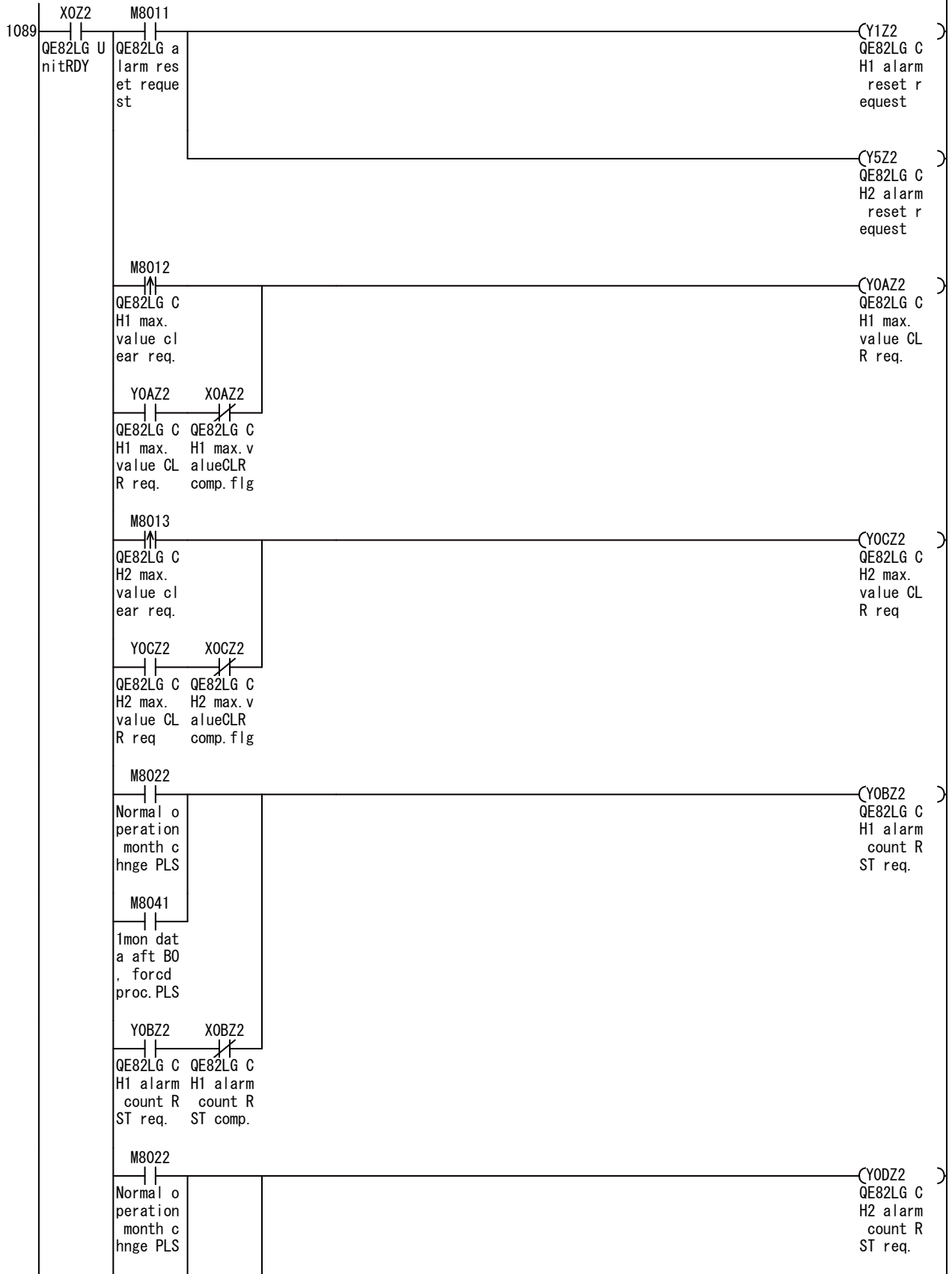
Graph data: calculate clock data to calculate delimiter.

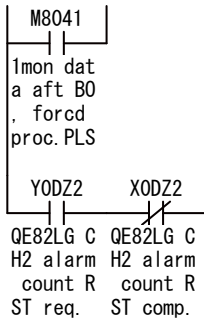


In normal operation, PLS occurs at 00:00.



QE82LG reset commands

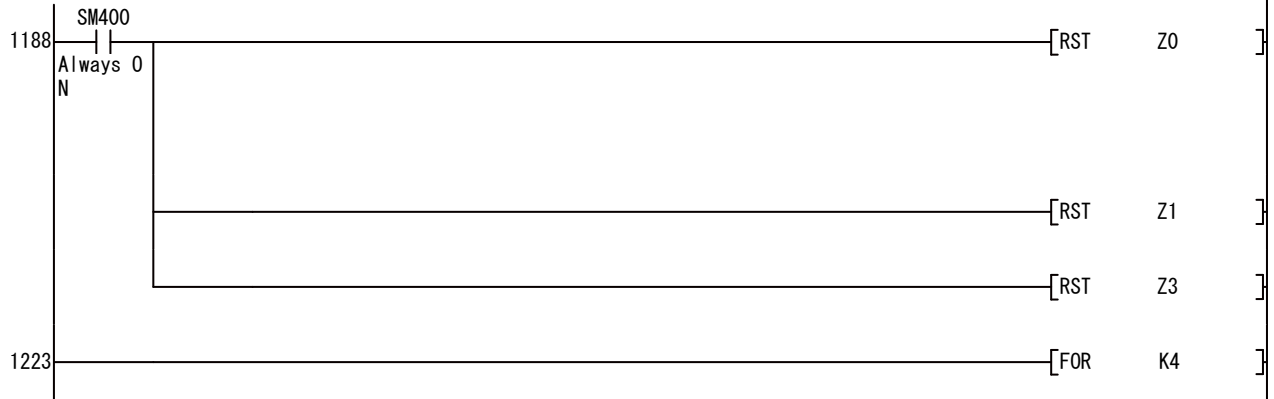


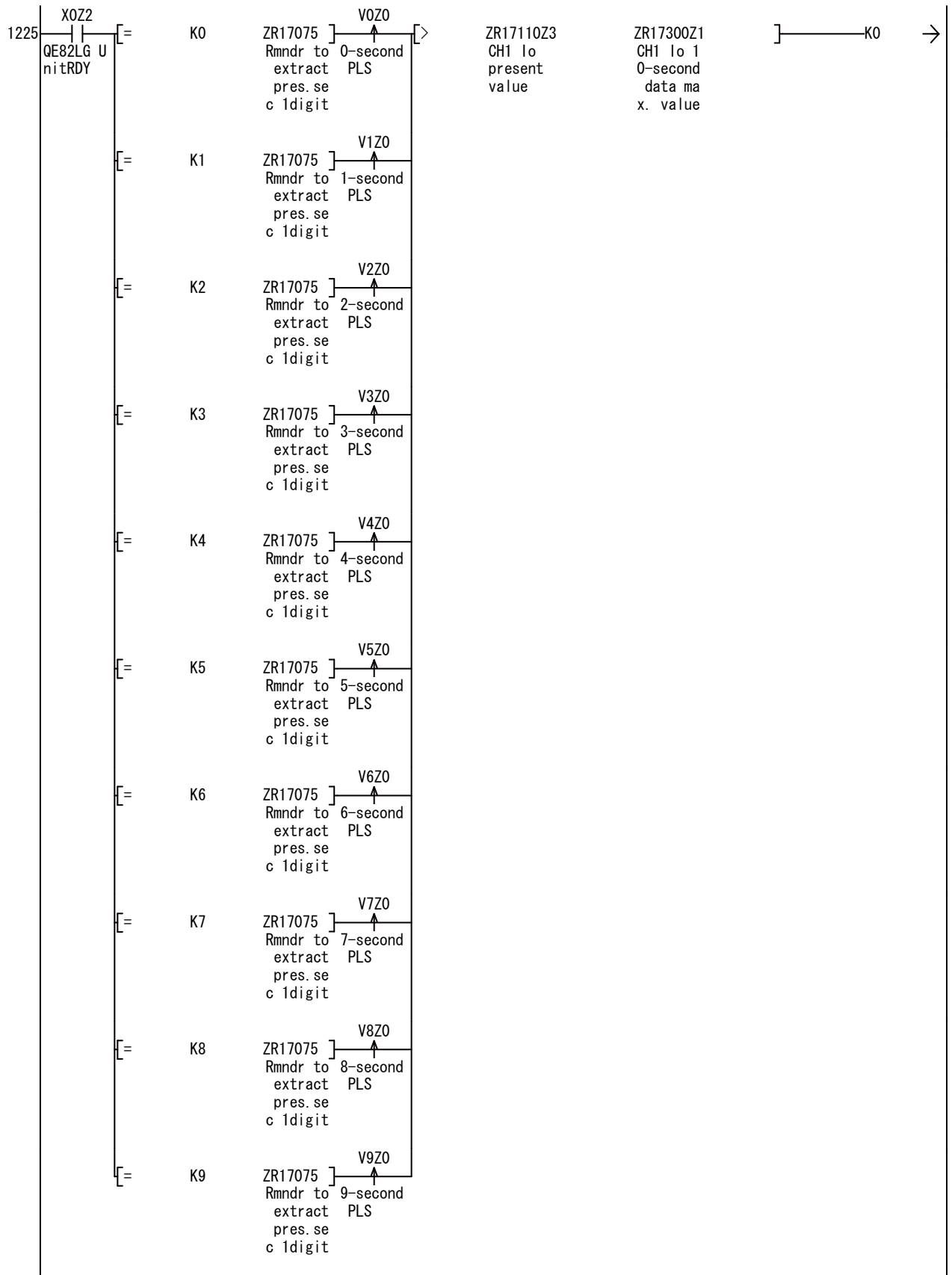


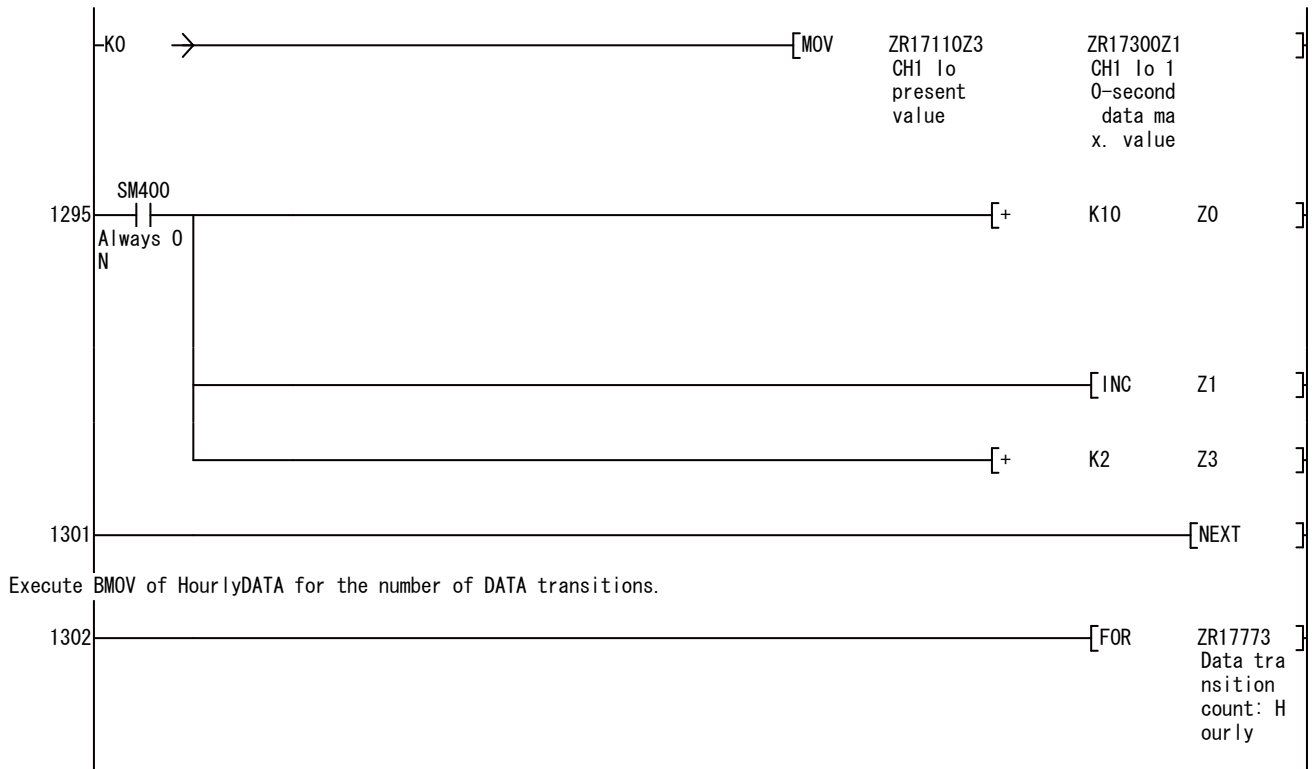
Read the present value of leak current in each channel.



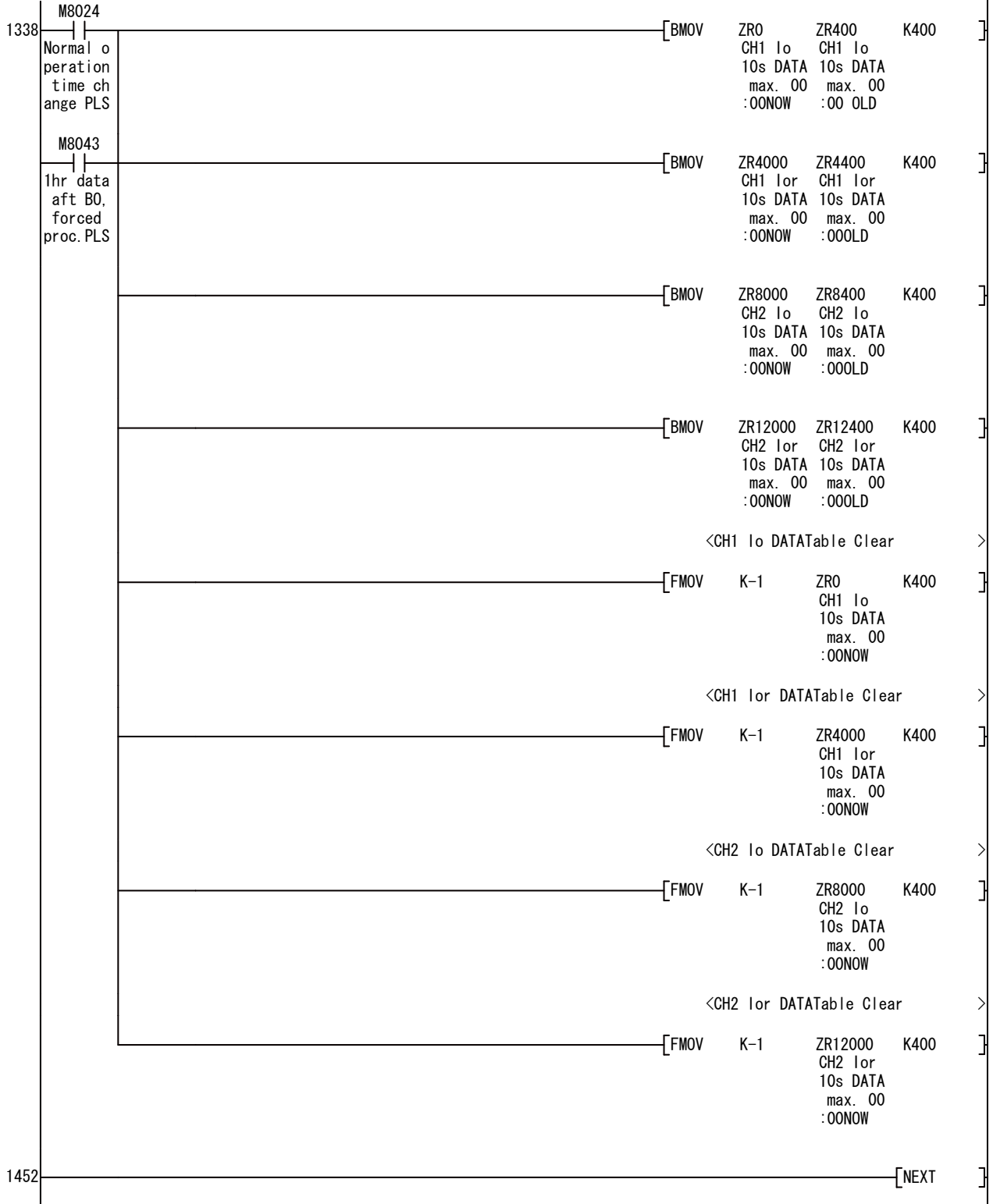
Store the max. 10s data for 4 elements in TEMP area.

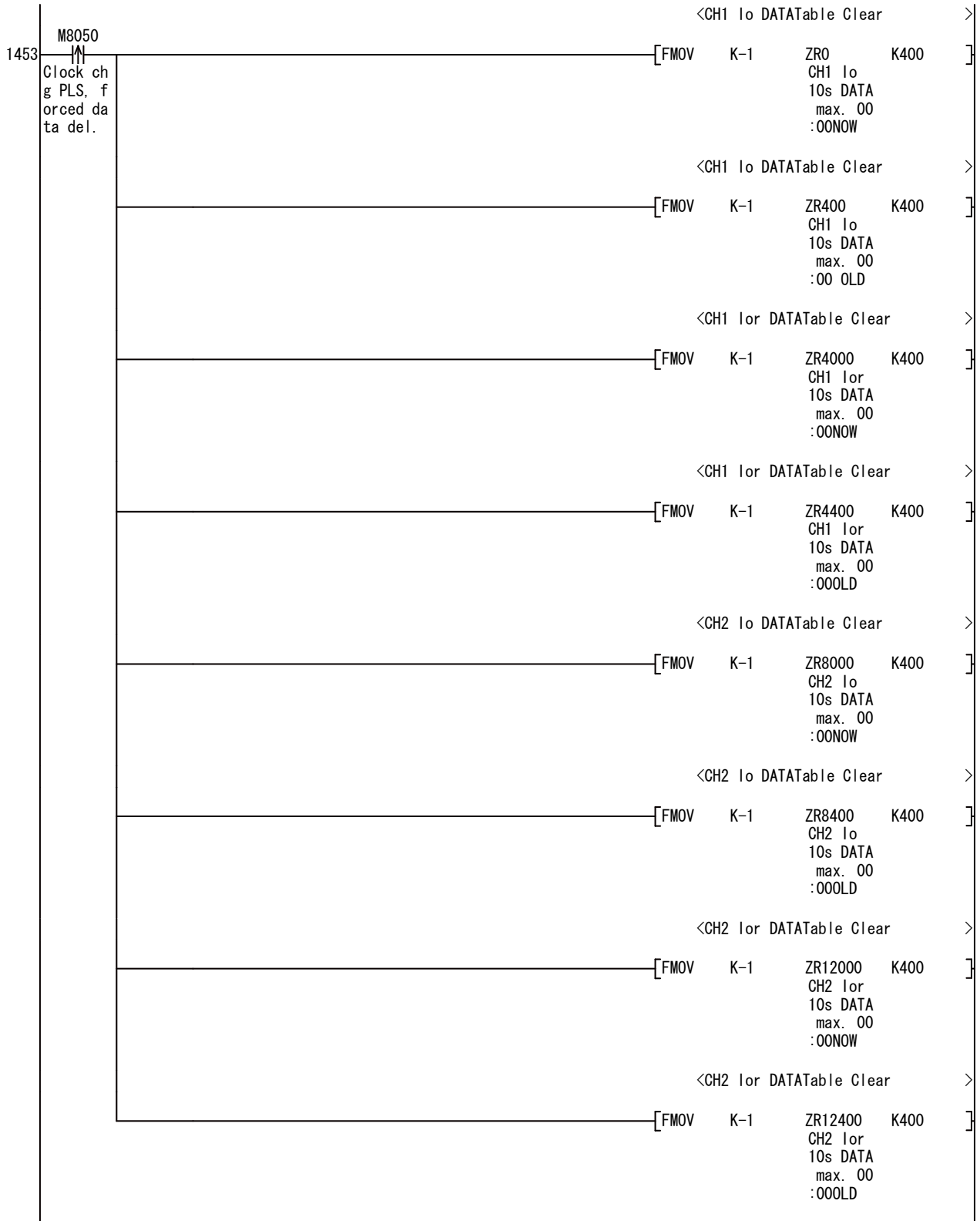


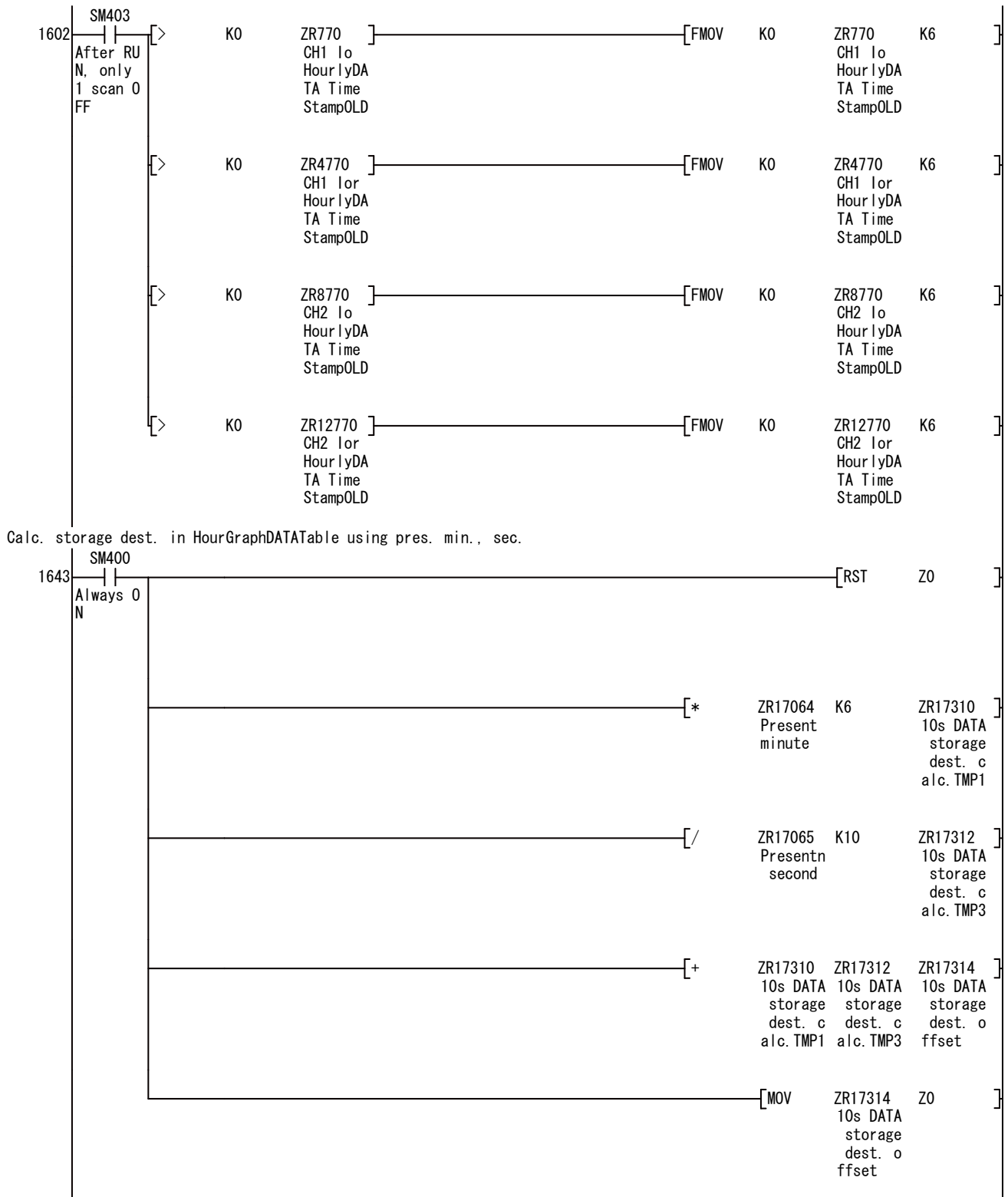




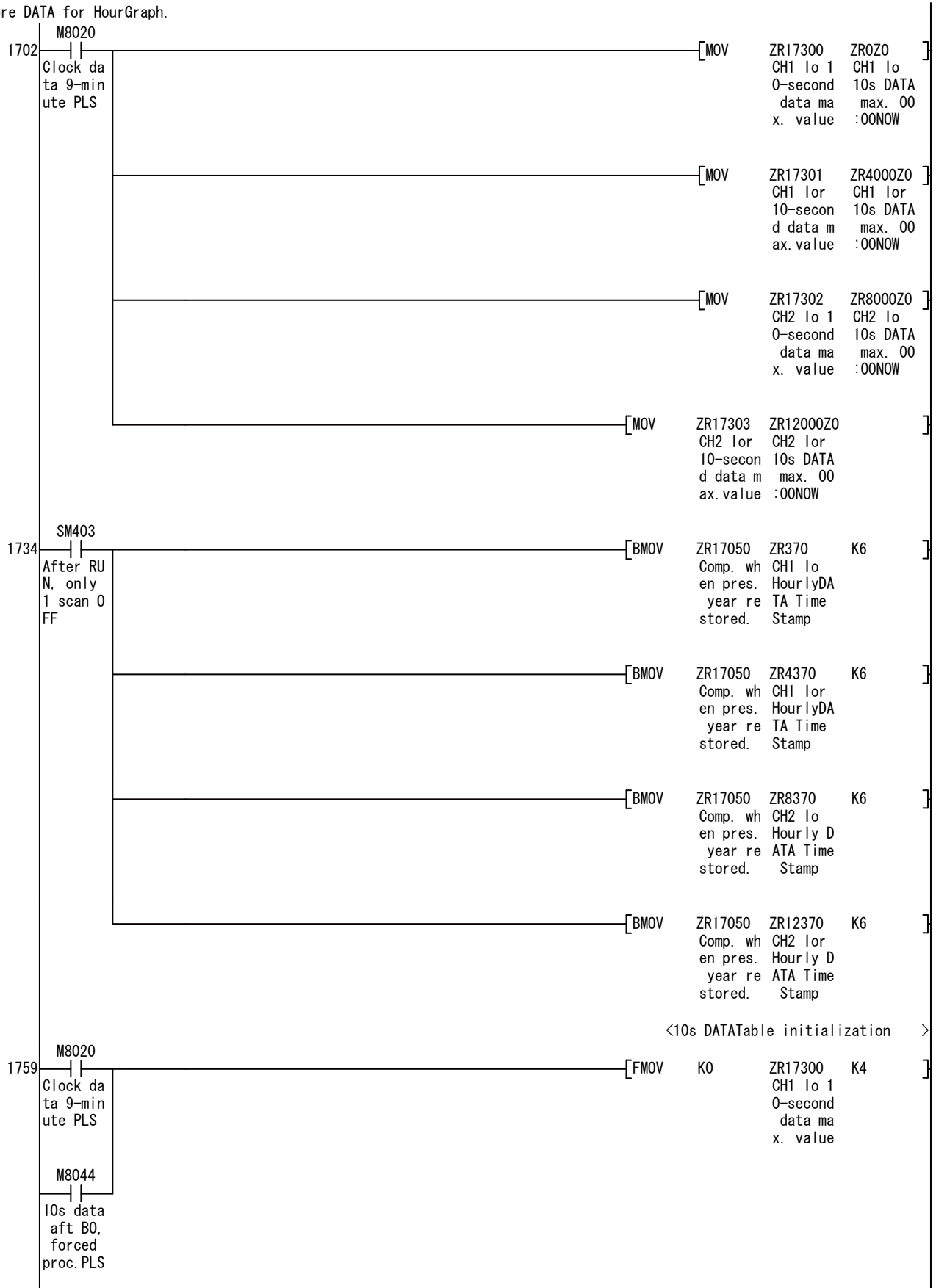
HourGraphDATA transition







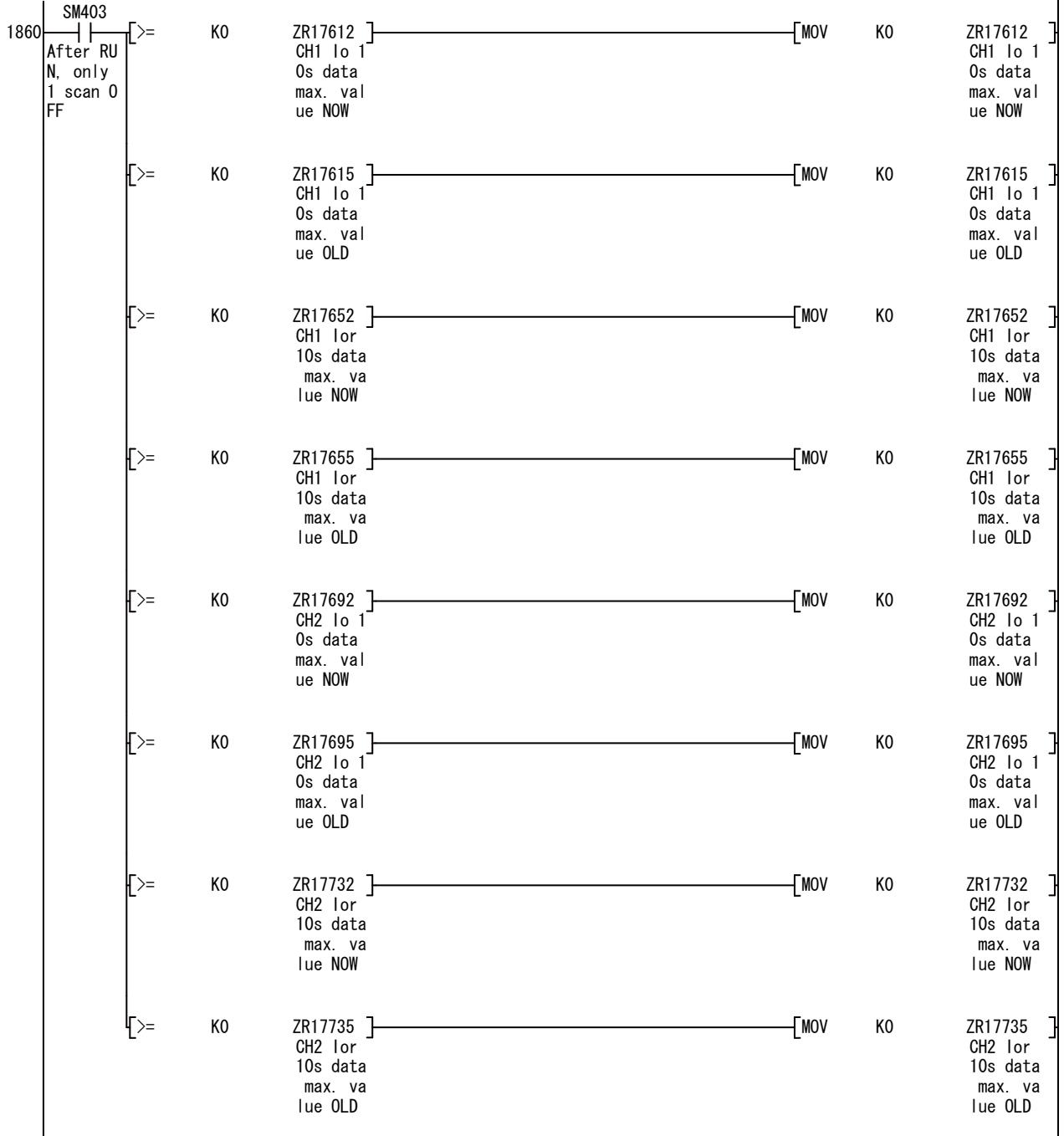
Store DATA for HourGraph.



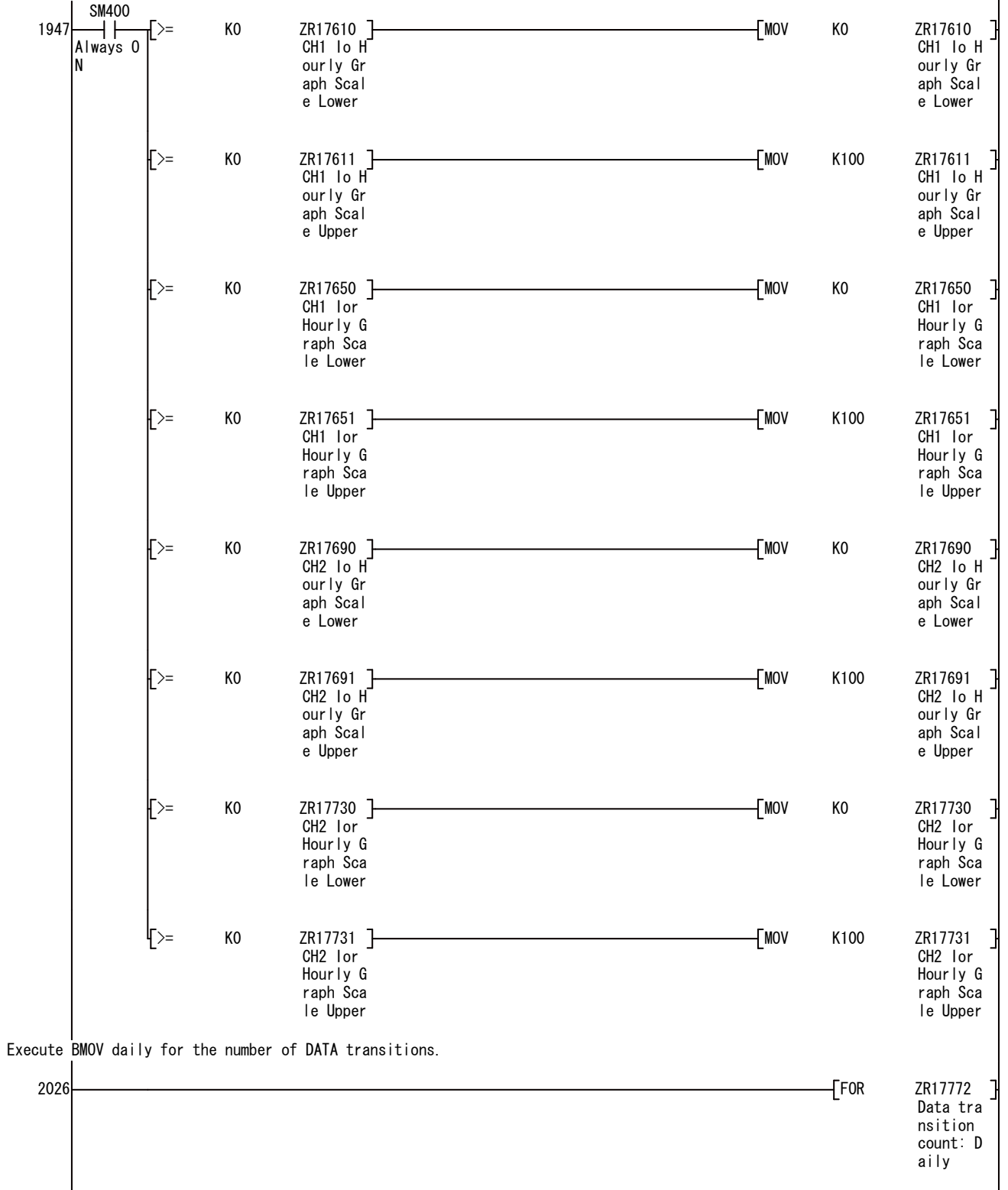
Calculate the maximum period value for graph display.

Address	Device	Channel	Parameter	Value
1782	SM403	ZR0	ZR17612	K360
	After RUN, only 1 scan OFF	CH1 lo	CH1 lo 1	
		10s DATA	0s data	
		max. value	max. value	
		:00NOW	:00NOW	
		[MAX]		
		ZR400	ZR17615	K360
		CH1 lo	CH1 lo 1	
		10s DATA	0s data	
		max. value	max. value	
		:00 OLD	:00 OLD	
		[MAX]		
		ZR4000	ZR17652	K360
		CH1 lor	CH1 lor	
		10s DATA	10s data	
		max. value	max. value	
		:00NOW	:00NOW	
		[MAX]		
		ZR4400	ZR17655	K360
		CH1 lor	CH1 lor	
		10s DATA	10s data	
		max. value	max. value	
		:00OLD	:00OLD	
		[MAX]		
		ZR8000	ZR17692	K360
		CH2 lo	CH2 lo 1	
		10s DATA	0s data	
		max. value	max. value	
		:00NOW	:00NOW	
		[MAX]		
		ZR8400	ZR17695	K360
		CH2 lo	CH2 lo 1	
		10s DATA	0s data	
		max. value	max. value	
		:00OLD	:00OLD	
		[MAX]		
		ZR12000	ZR17732	K360
		CH2 lor	CH2 lor	
		10s DATA	10s data	
		max. value	max. value	
		:00NOW	:00NOW	
		[MAX]		
		ZR12400	ZR17735	K360
		CH2 lor	CH2 lor	
		10s DATA	10s data	
		max. value	max. value	
		:00OLD	:00OLD	
		[MAX]		

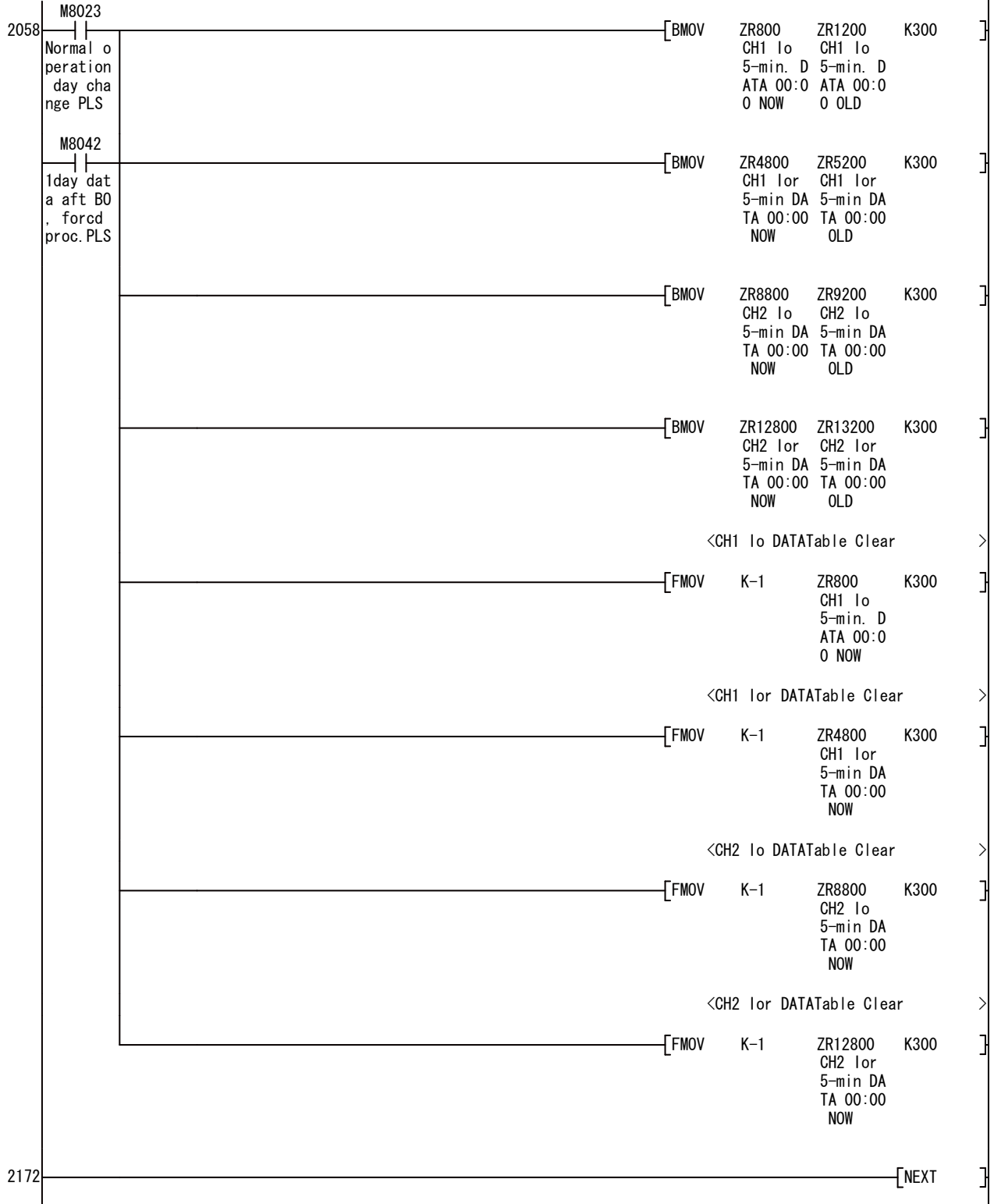
If only -1 exists in DATATable, store 0.

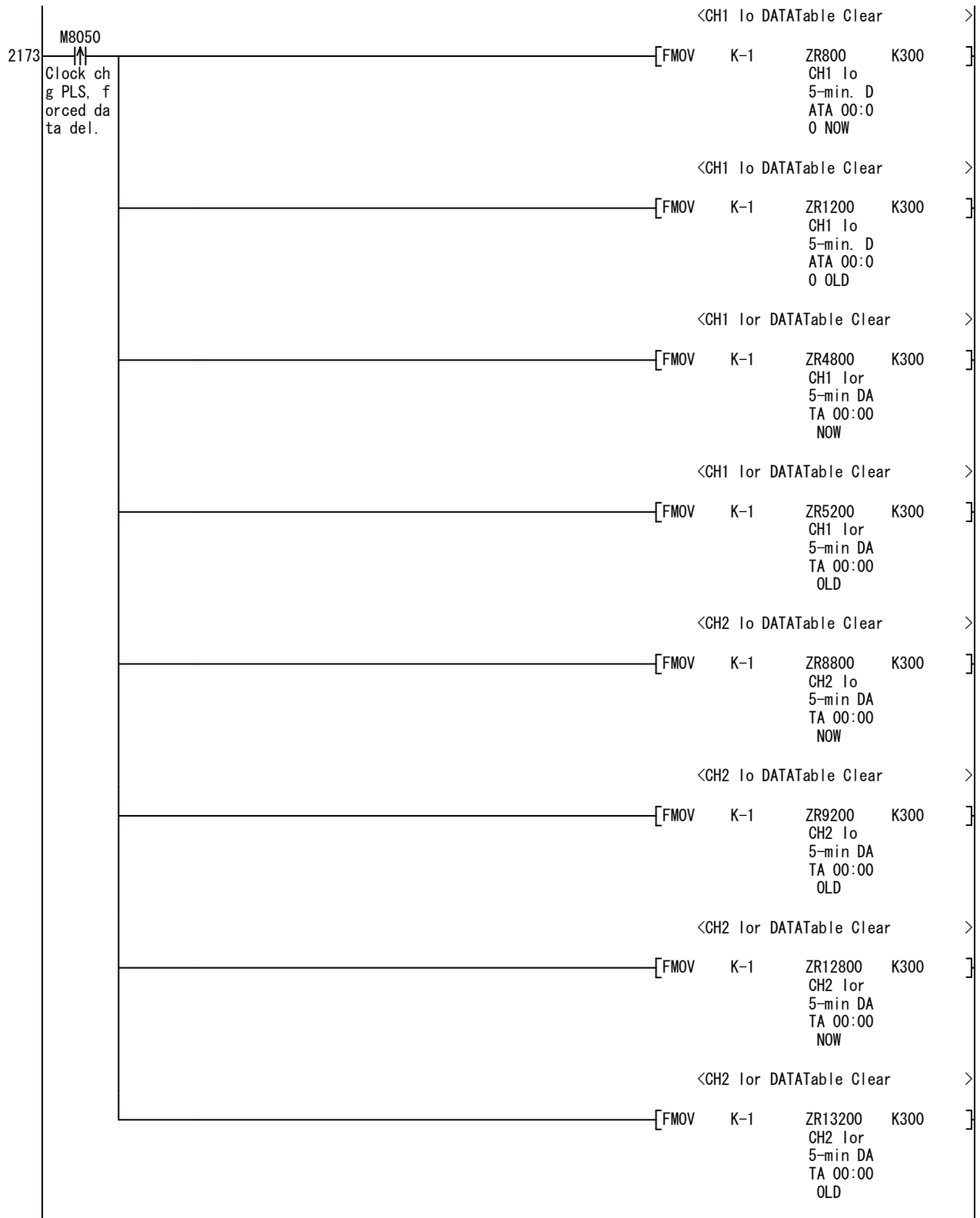


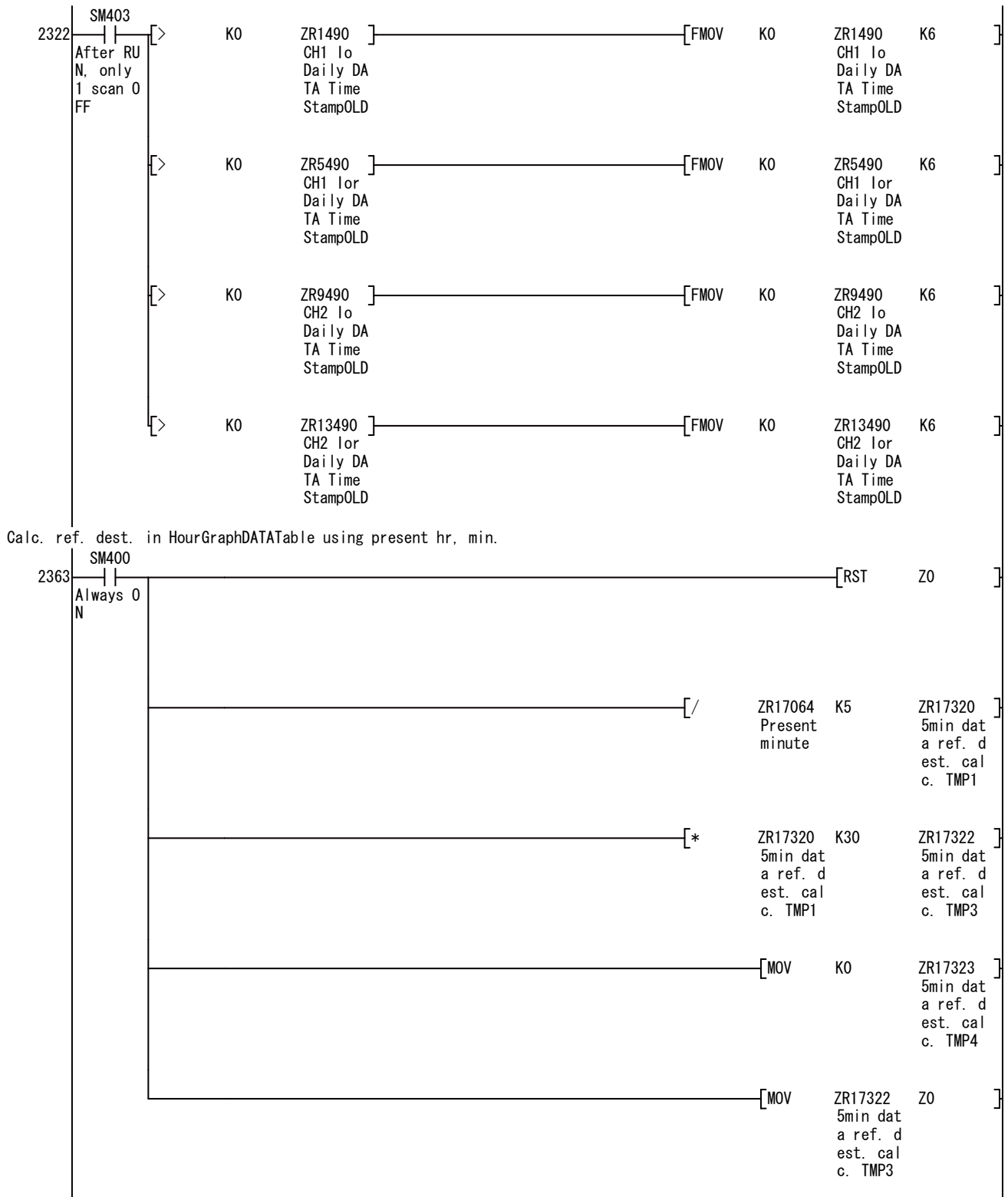
HourlyGraphScaleSetting



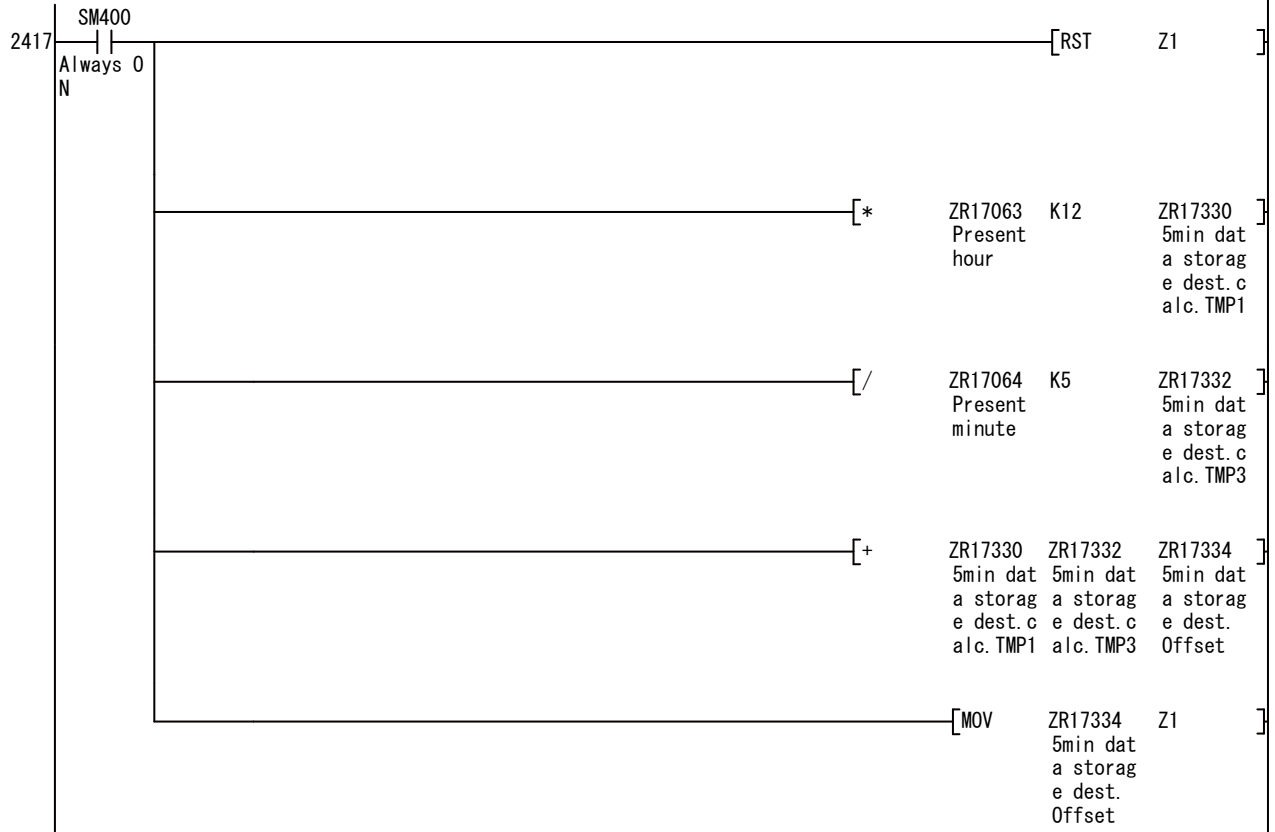
DayGraphDATA transition







Calc. storage dest. in DayGraphDATATable using pres. hr, min.

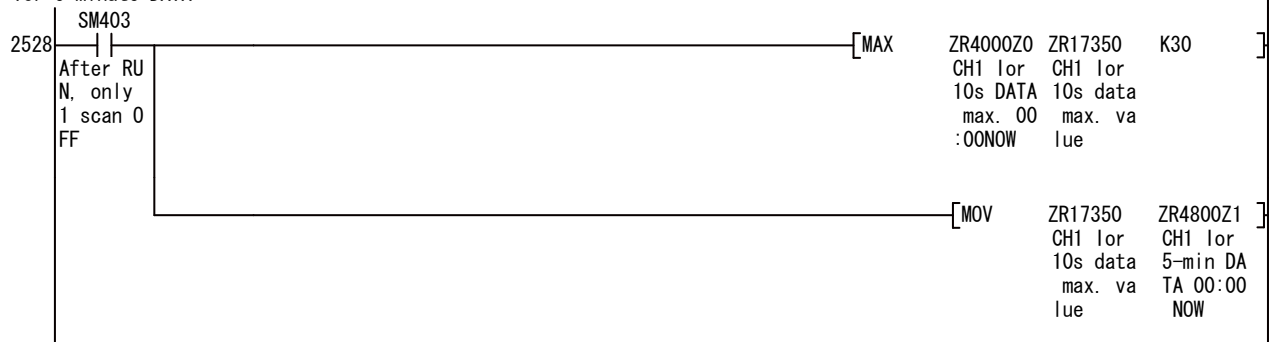


Always judge the maximum value from HourGraphDataTable.

CH1 lo 5-minute DATA



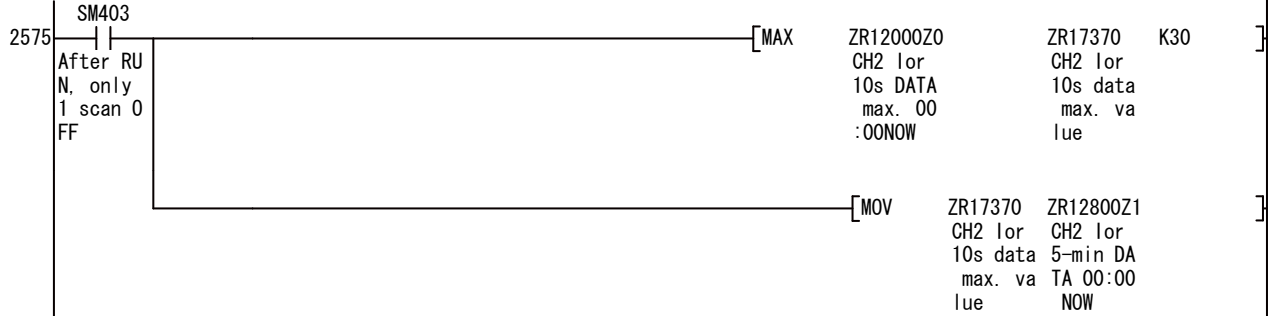
CH1 lor 5-minute DATA



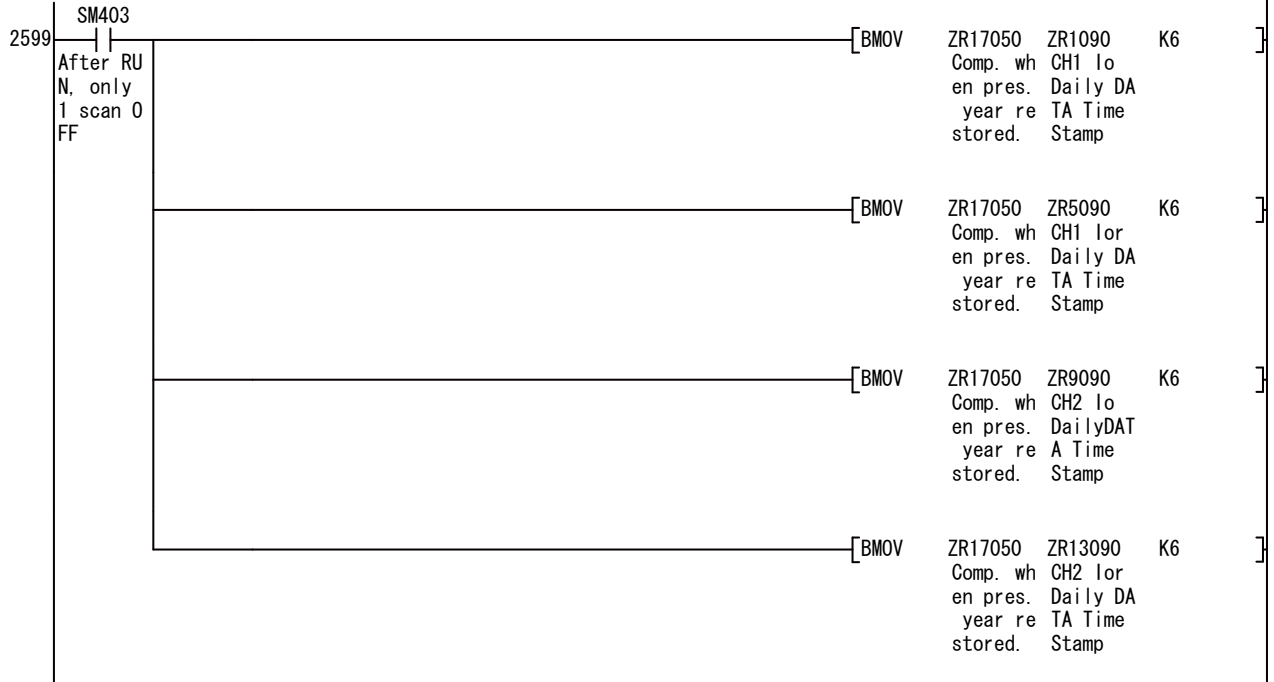
CH2 lo 5-minute DATA



CH2 lor 5-minute DATA



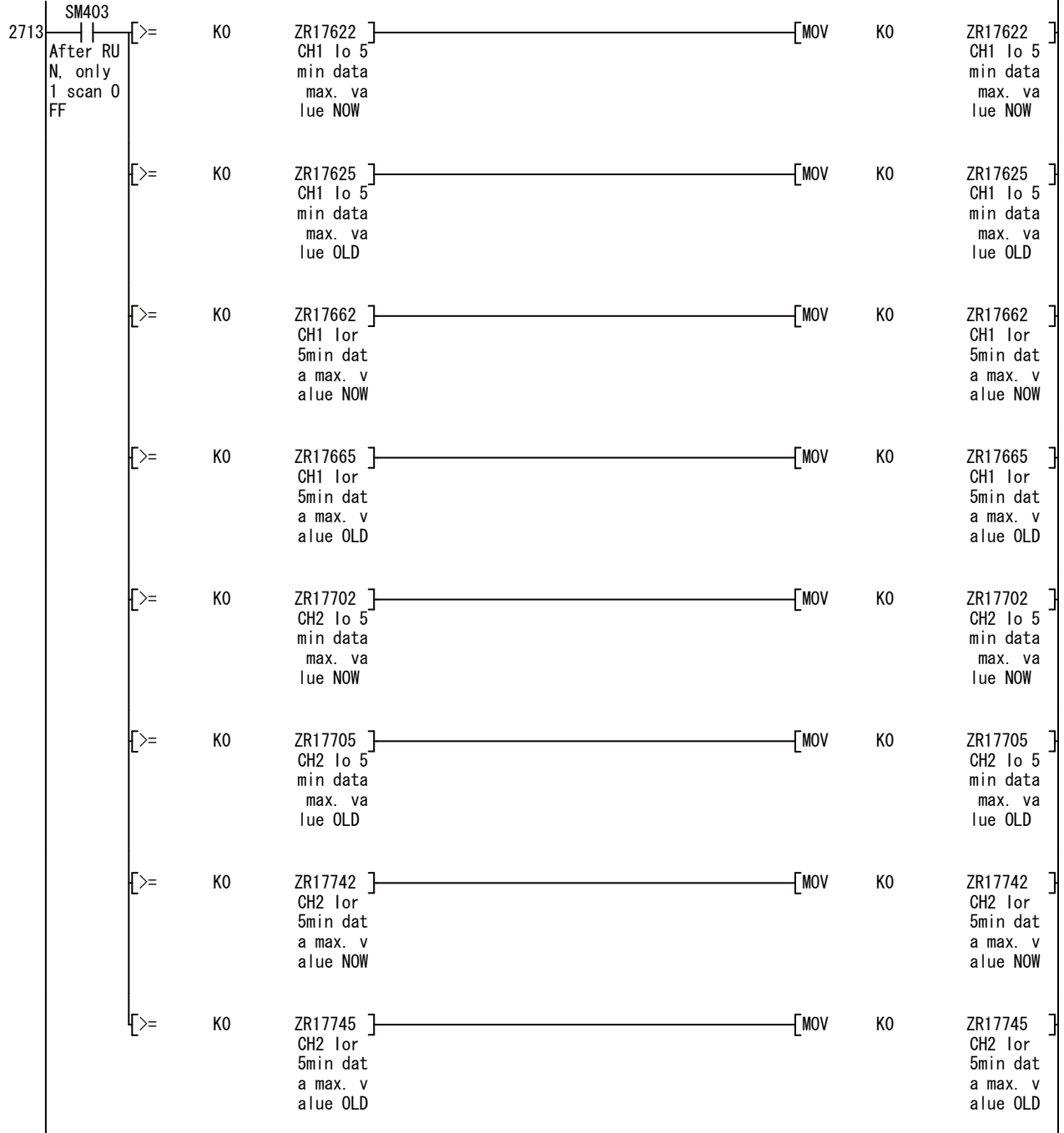
DATA TimeStamp SET



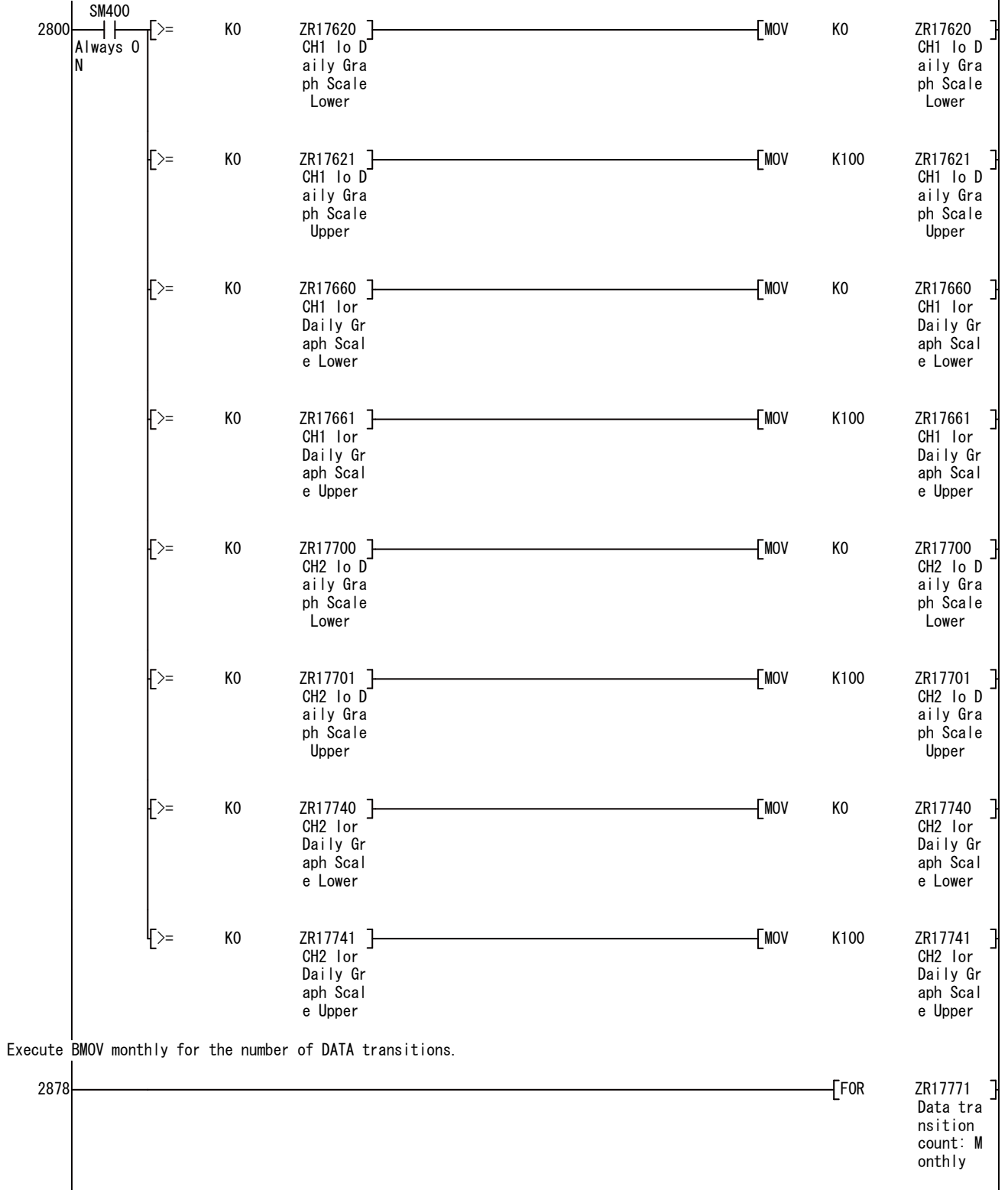
Calculate the maximum period value for graph display.

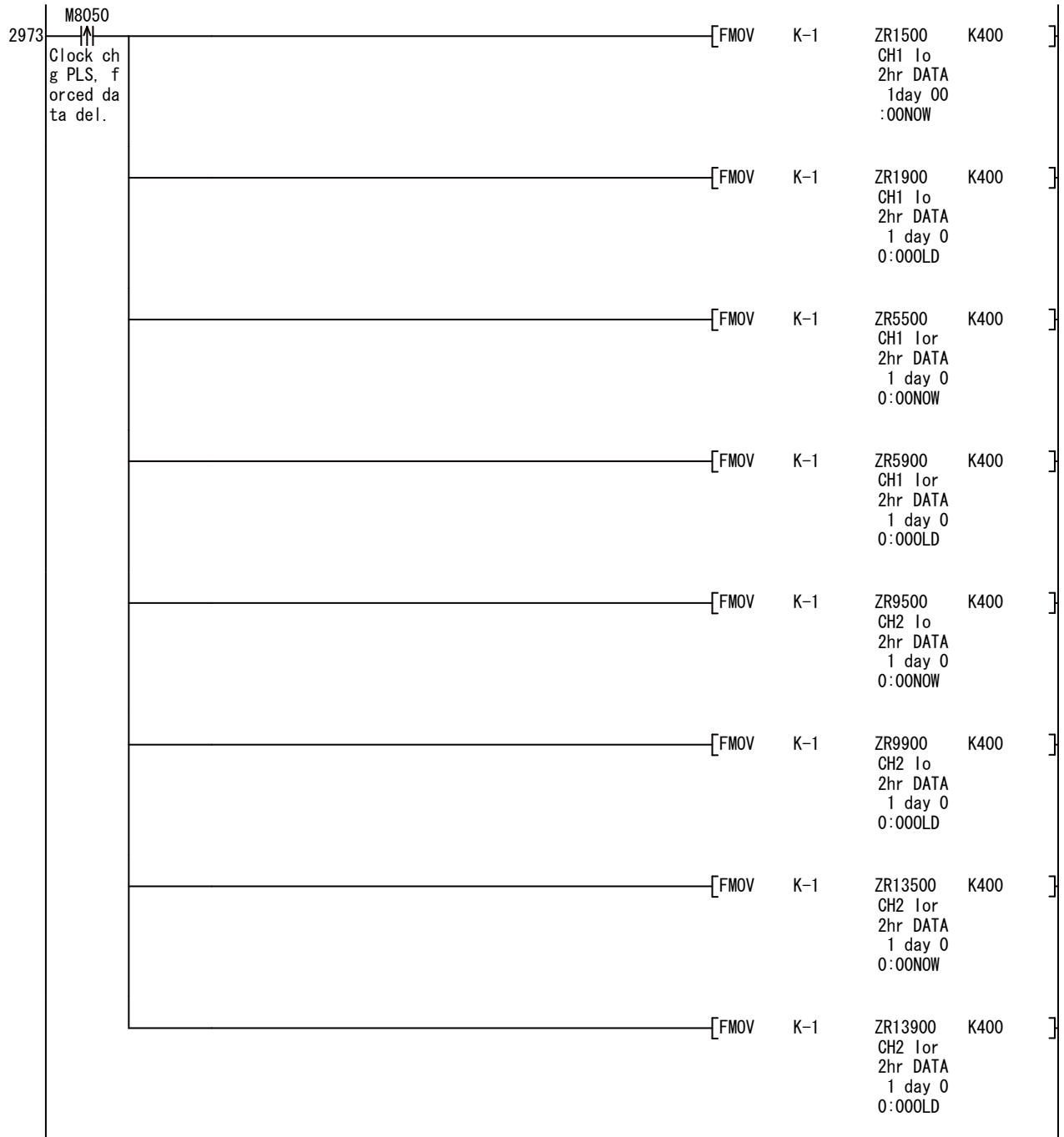
SM403	[MAX]	ZR800	ZR17622	K288
2635 After RU N, only 1 scan 0 FF		CH1 lo 5-min. D ATA 00:0 0 NOW	CH1 lo 5 min data max. va lue NOW	
	[MAX]	ZR1200 CH1 lo 5-min. D ATA 00:0 0 OLD	ZR17625 CH1 lo 5 min data max. va lue OLD	K288
	[MAX]	ZR4800 CH1 lor 5-min DA TA 00:00 NOW	ZR17662 CH1 lor 5min dat a max. v alue NOW	K288
	[MAX]	ZR5200 CH1 lor 5-min DA TA 00:00 OLD	ZR17665 CH1 lor 5min dat a max. v alue OLD	K288
	[MAX]	ZR8800 CH2 lo 5-min DA TA 00:00 NOW	ZR17702 CH2 lo 5 min data max. va lue NOW	K288
	[MAX]	ZR9200 CH2 lo 5-min DA TA 00:00 OLD	ZR17705 CH2 lo 5 min data max. va lue OLD	K288
	[MAX]	ZR12800 CH2 lor 5-min DA TA 00:00 NOW	ZR17742 CH2 lor 5min dat a max. v alue NOW	K288
	[MAX]	ZR13200 CH2 lor 5-min DA TA 00:00 OLD	ZR17745 CH2 lor 5min dat a max. v alue OLD	K288

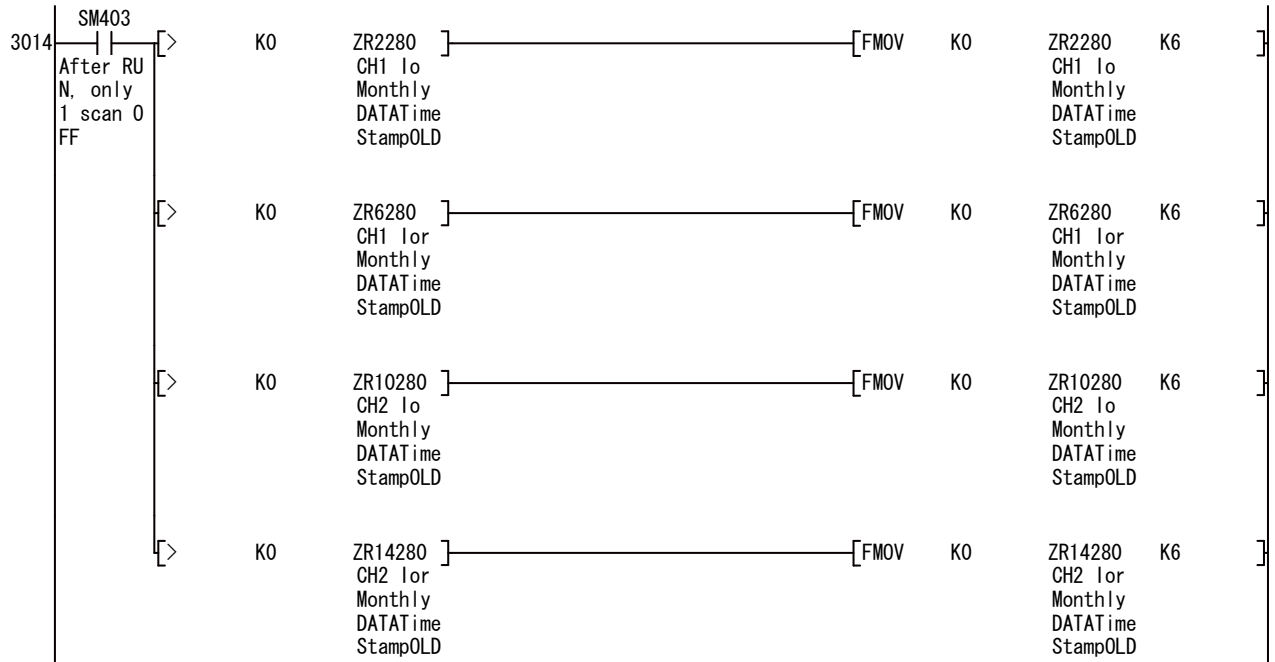
If only -1 exists in DATATable, store 0.



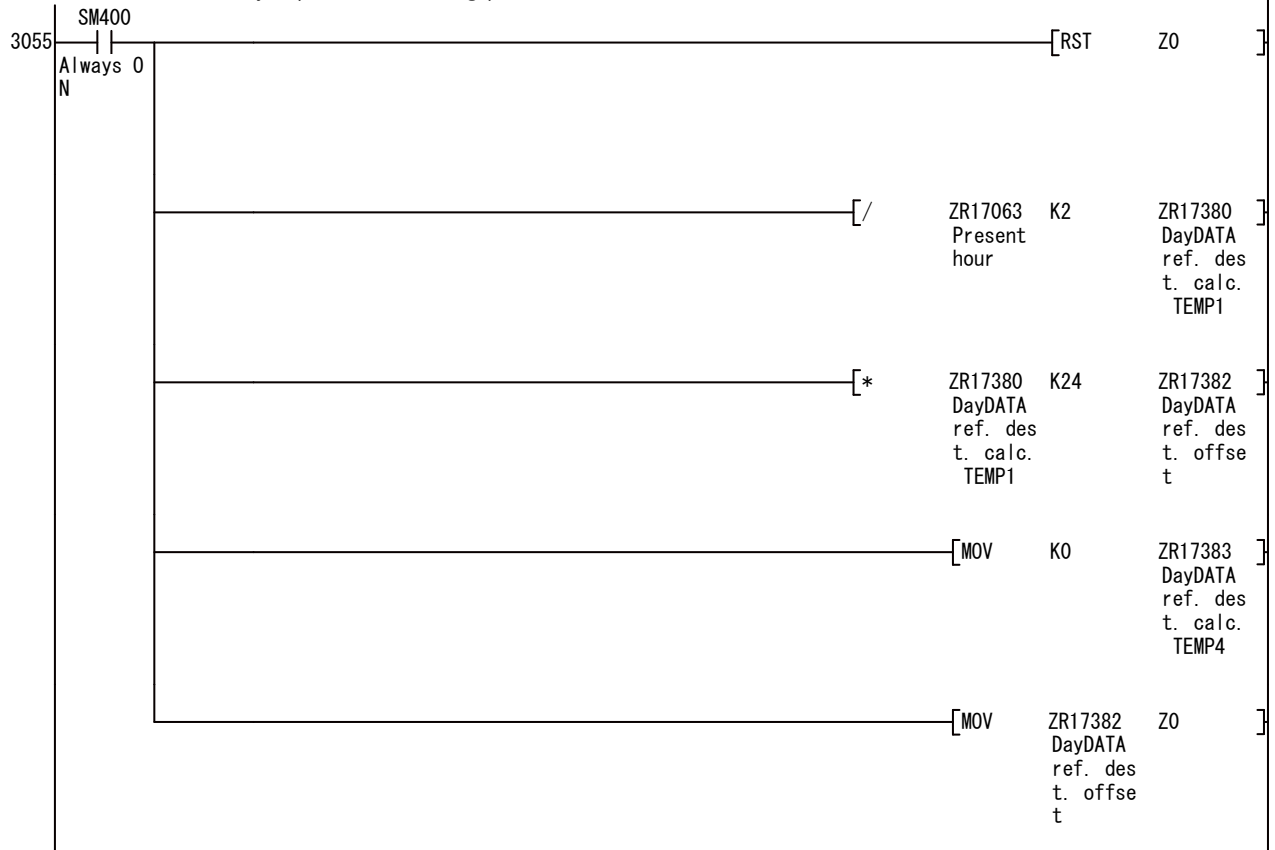
DailyGraphScaleSetting



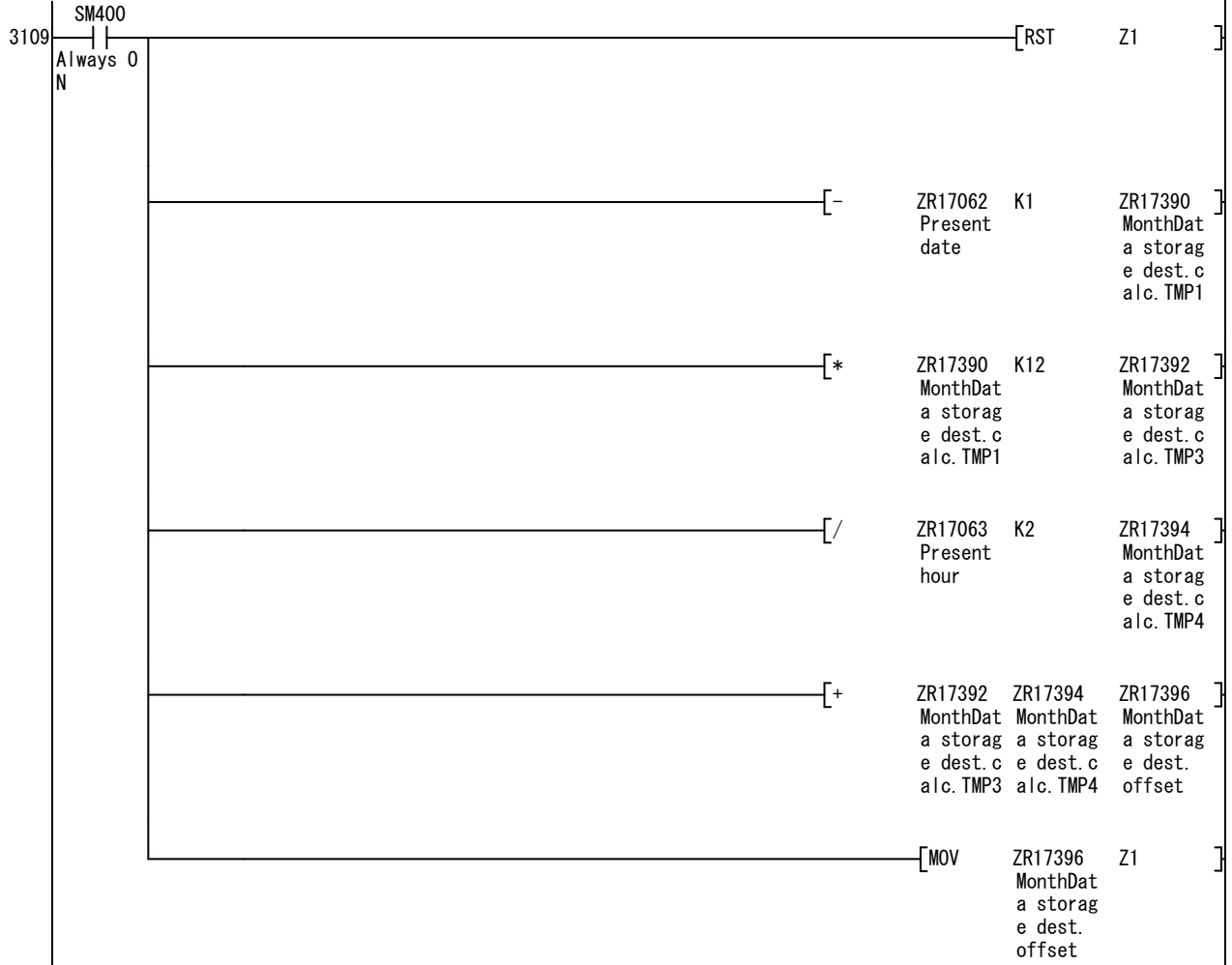




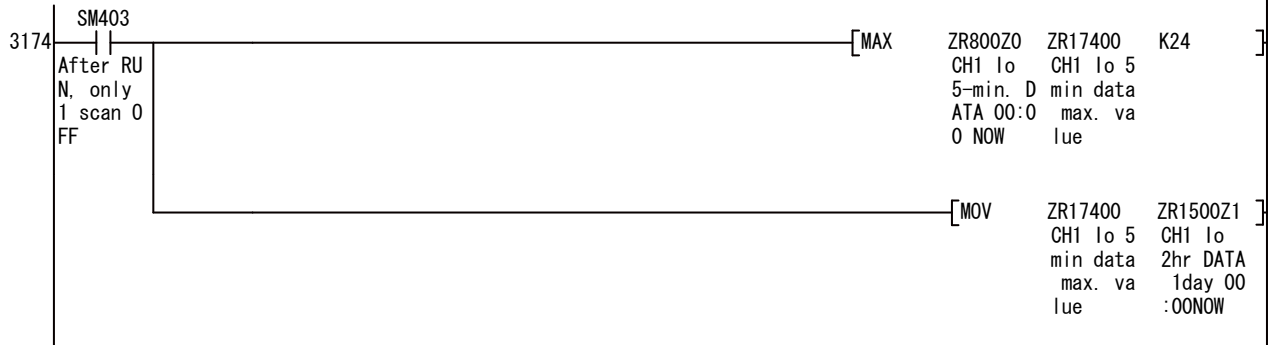
Calc. reference dest. in DayGraphDATATable using present hour.

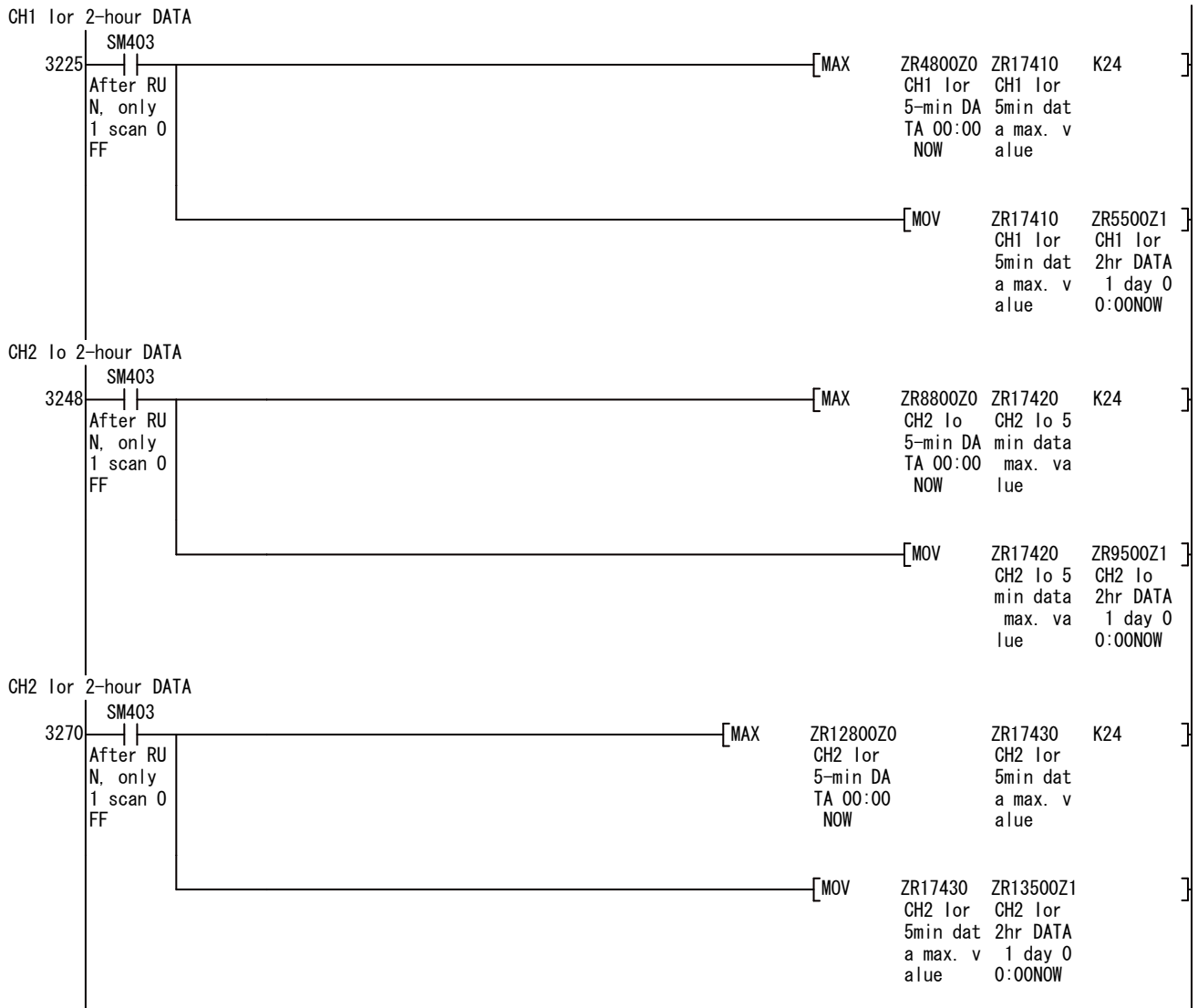


Calc. storage dest. in MonthGraphDATATable using pres. day, hour

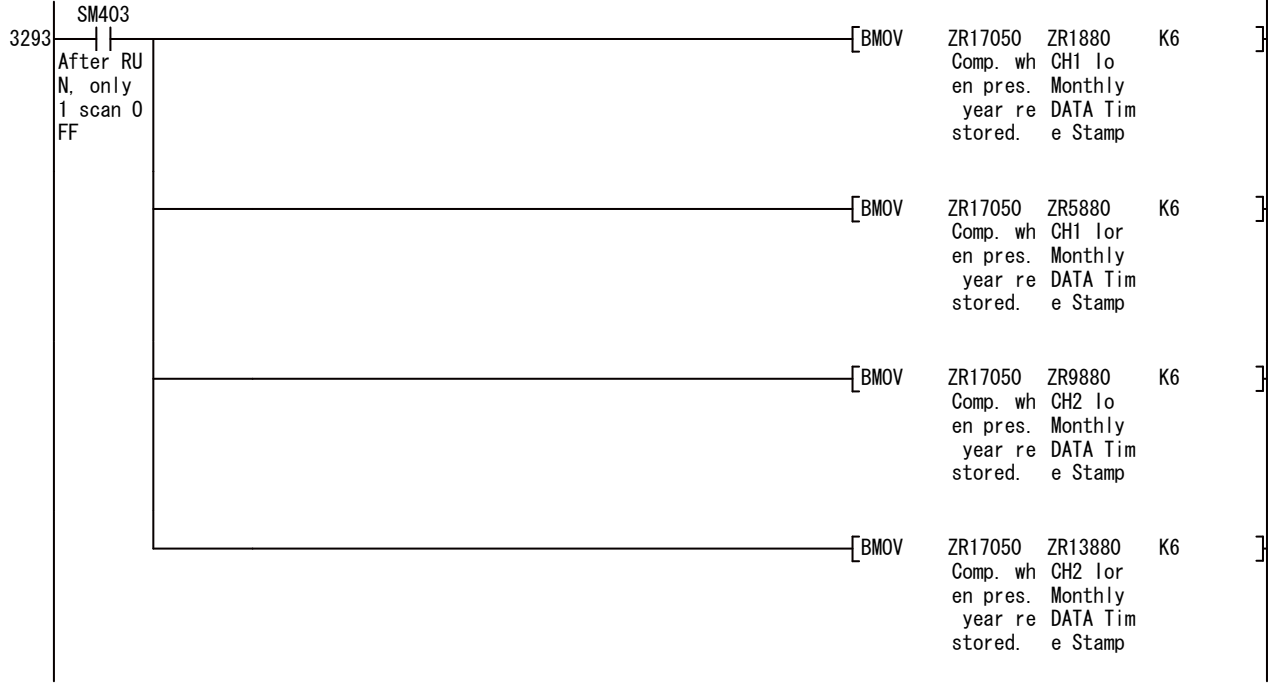


Always judge the maximum value from DayGraphDataTable.
CH1 lo 2-hour DATA





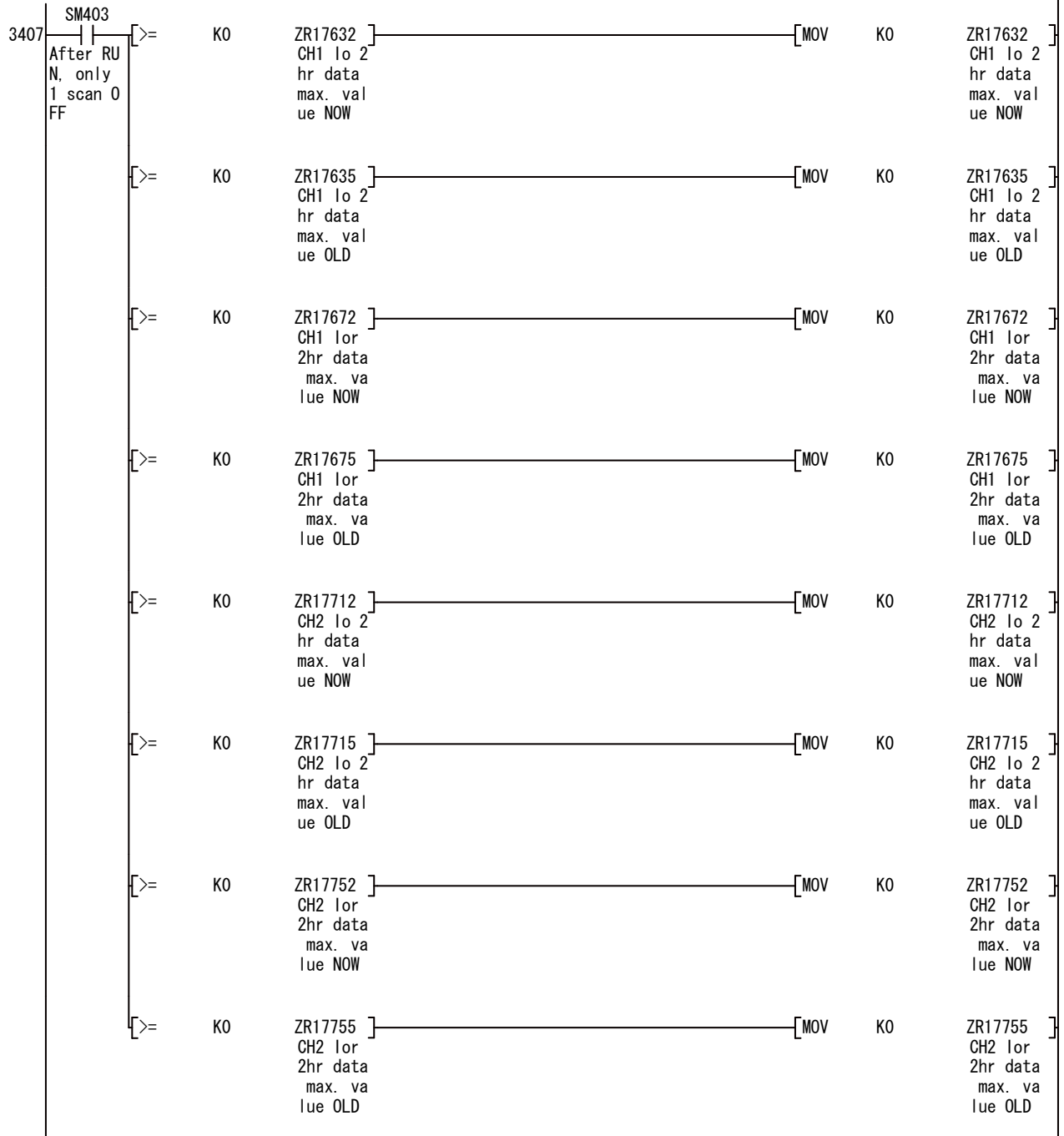
DATA TimeStamp SET



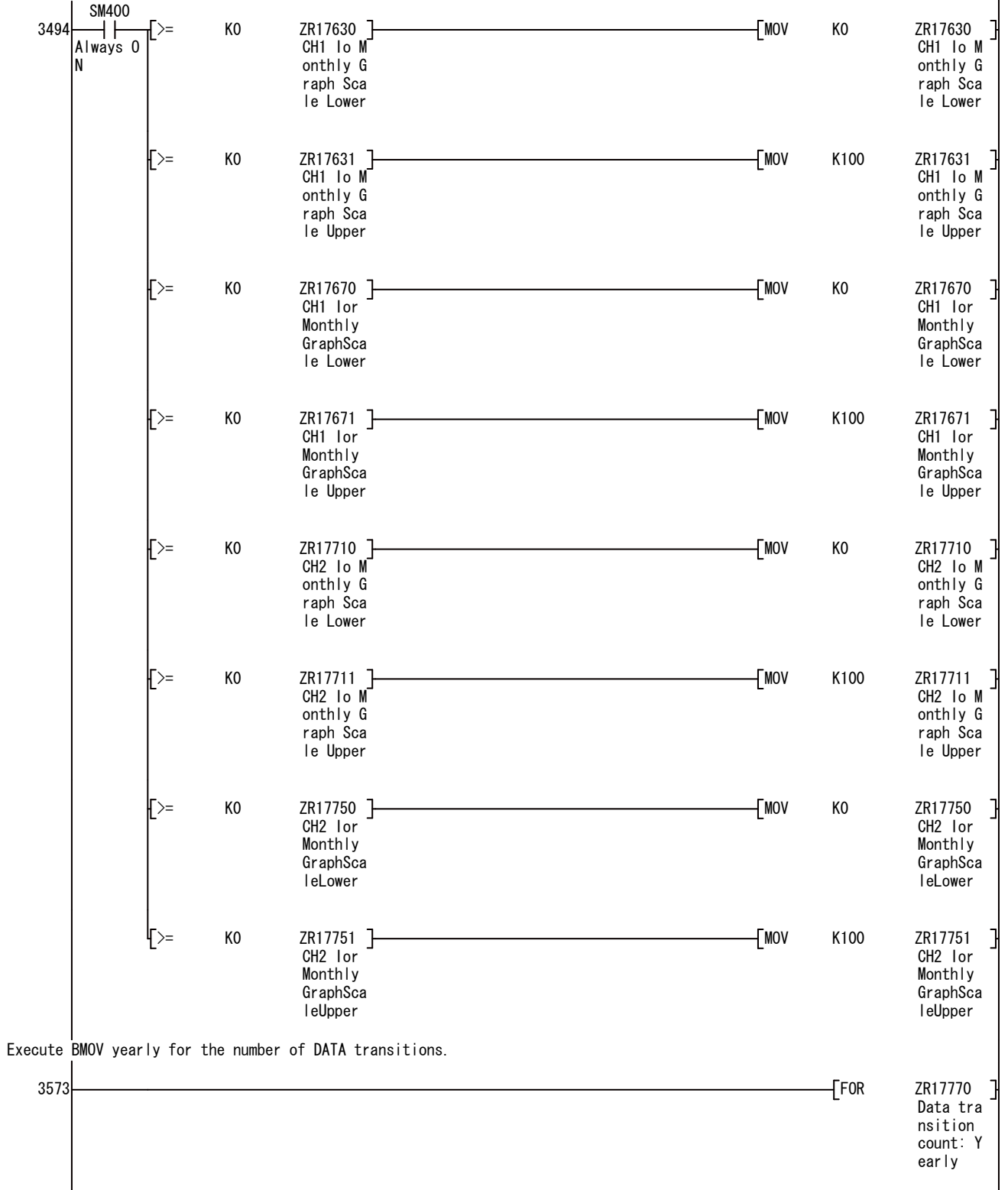
Calculate the maximum period value for graph display.

3329	SM403	[MAX	ZR1500	ZR17632	K372]
After RU N, only 1 scan 0 FF			CH1 lo 2hr DATA 1 day 0 :00NOW	CH1 lo 2 hr data max. val ue NOW		
		[MAX	ZR1900	ZR17635	K372]
			CH1 lo 2hr DATA 1 day 0 0:00OLD	CH1 lo 2 hr data max. val ue OLD		
		[MAX	ZR5500	ZR17672	K372]
			CH1 lor 2hr DATA 1 day 0 0:00NOW	CH1 lor 2hr data max. va lue NOW		
		[MAX	ZR5900	ZR17675	K372]
			CH1 lor 2hr DATA 1 day 0 0:00OLD	CH1 lor 2hr data max. va lue OLD		
		[MAX	ZR9500	ZR17712	K372]
			CH2 lo 2hr DATA 1 day 0 0:00NOW	CH2 lo 2 hr data max. val ue NOW		
		[MAX	ZR9900	ZR17715	K372]
			CH2 lo 2hr DATA 1 day 0 0:00OLD	CH2 lo 2 hr data max. val ue OLD		
		[MAX	ZR13500	ZR17752	K372]
			CH2 lor 2hr DATA 1 day 0 0:00NOW	CH2 lor 2hr data max. va lue NOW		
		[MAX	ZR13900	ZR17755	K372]
			CH2 lor 2hr DATA 1 day 0 0:00OLD	CH2 lor 2hr data max. va lue OLD		

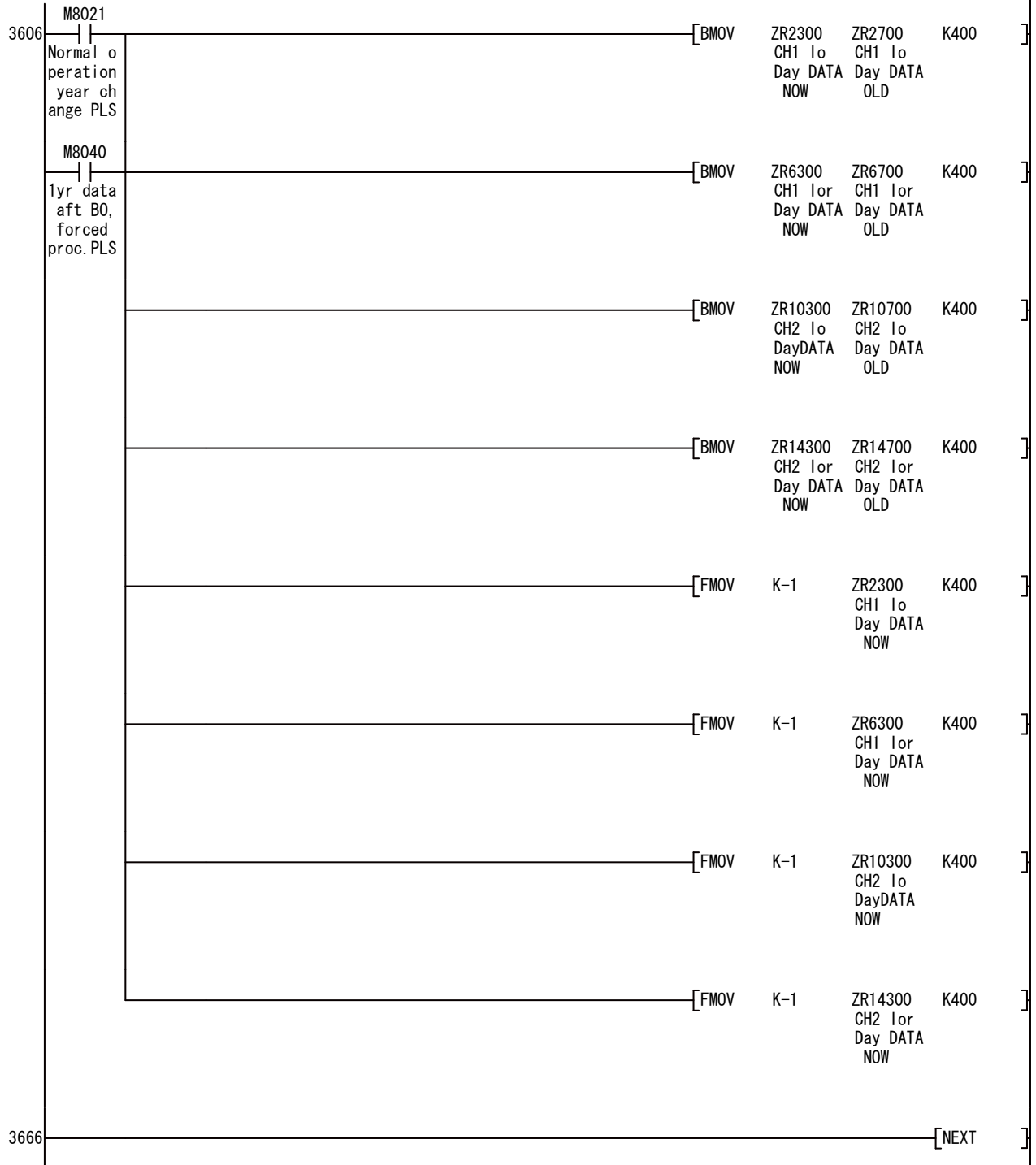
If only -1 exists in DATATable, store 0.

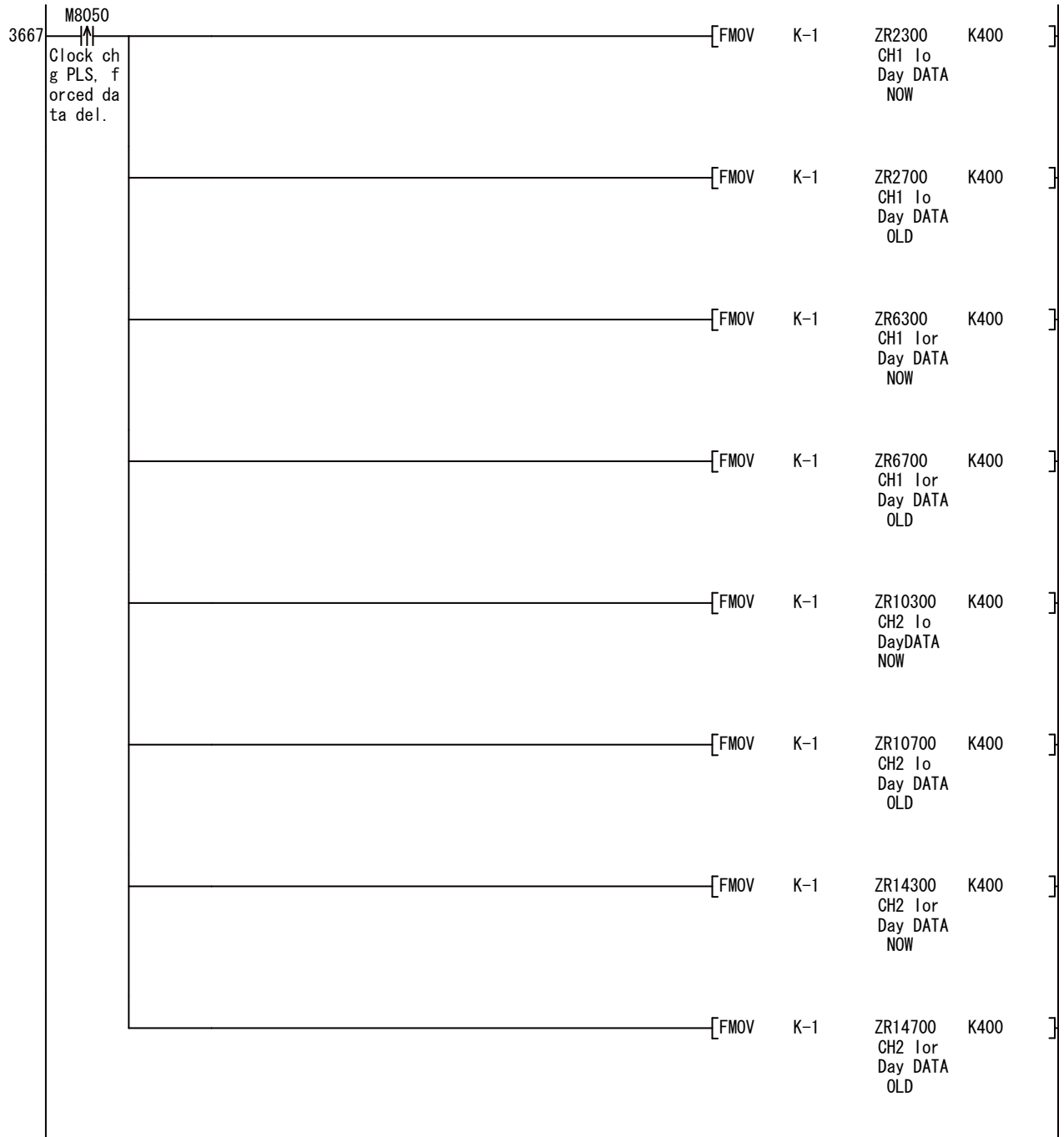


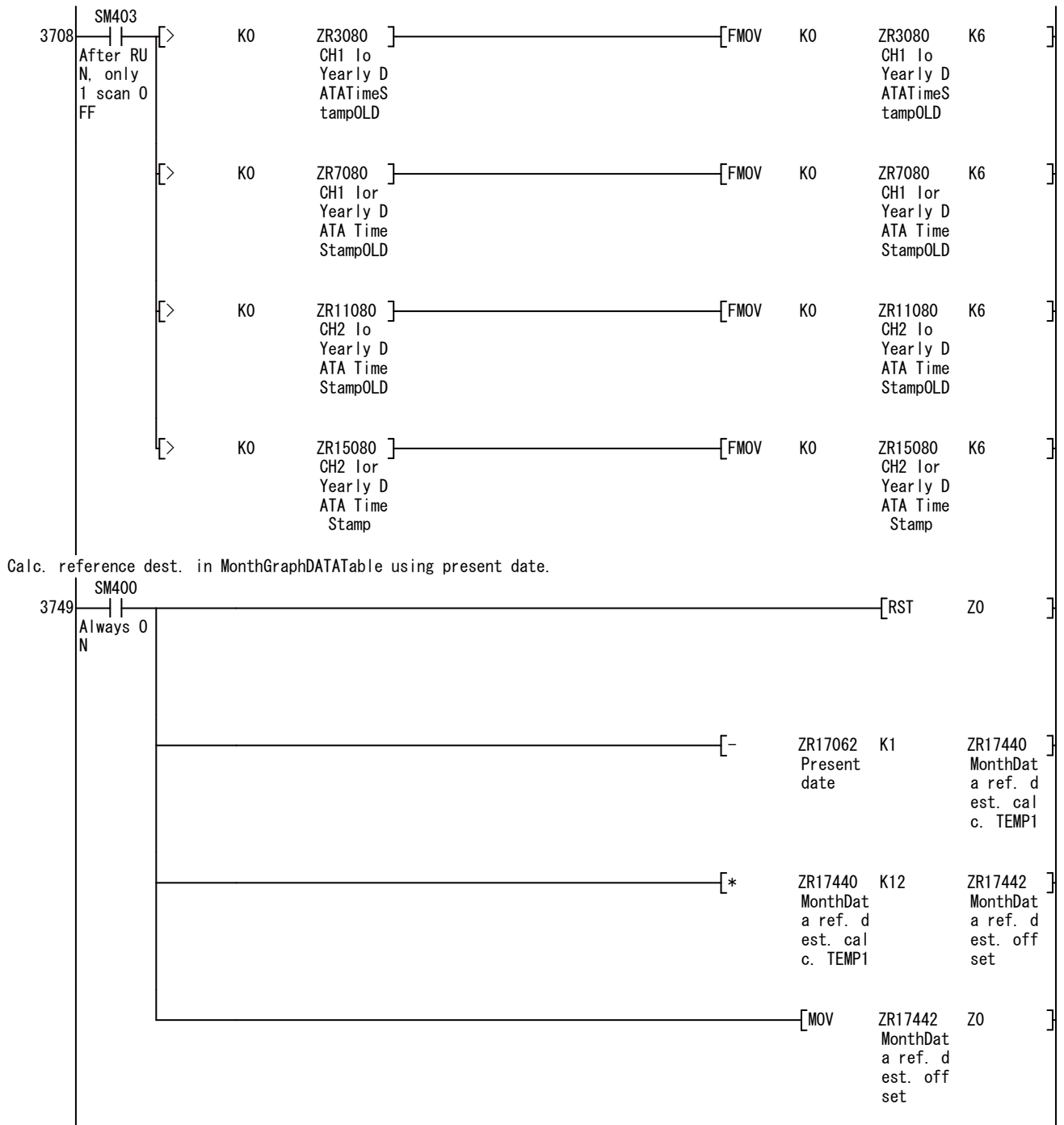
MonthlyGraphScaleSetting



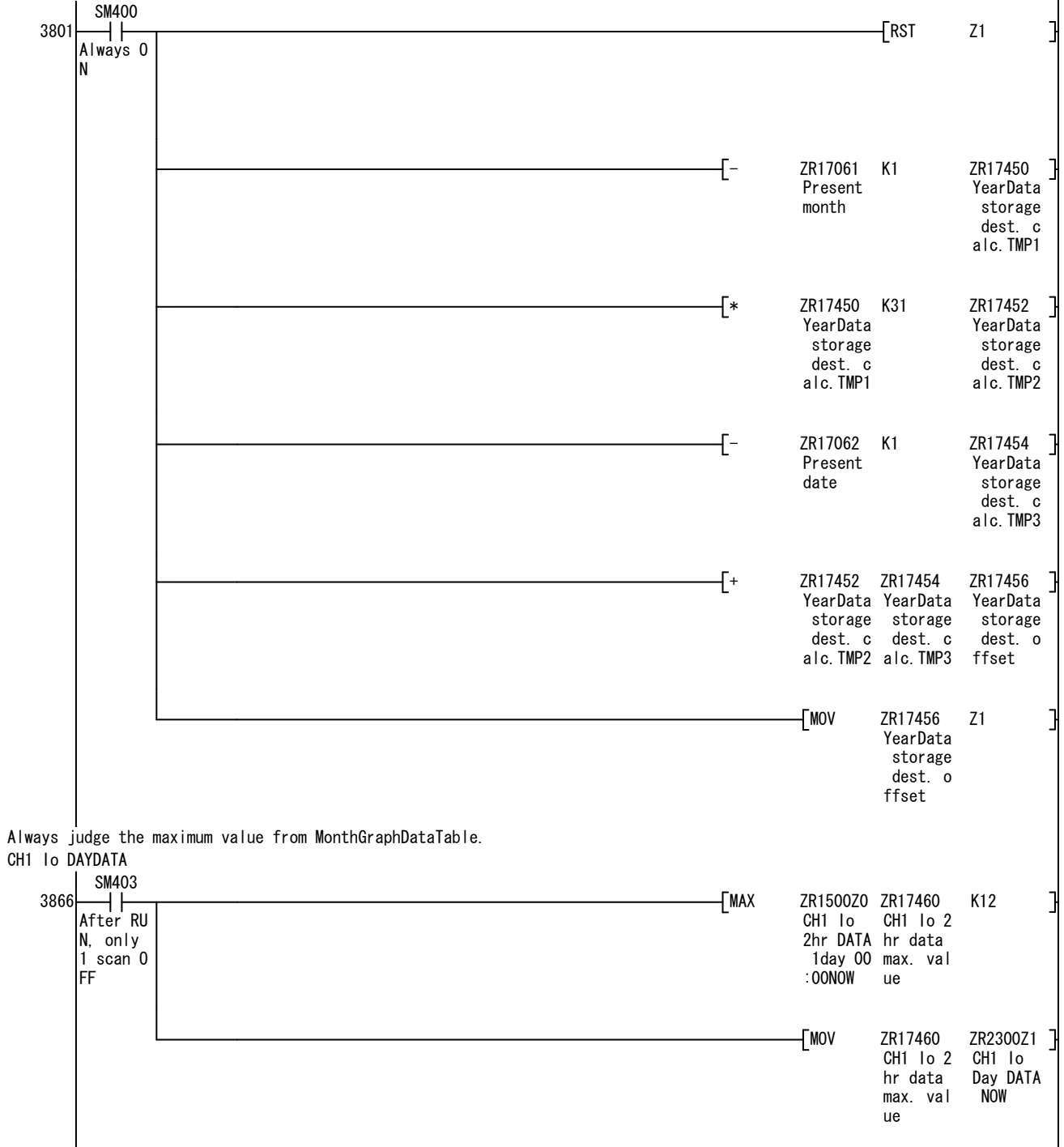
YearGraphDATA transition

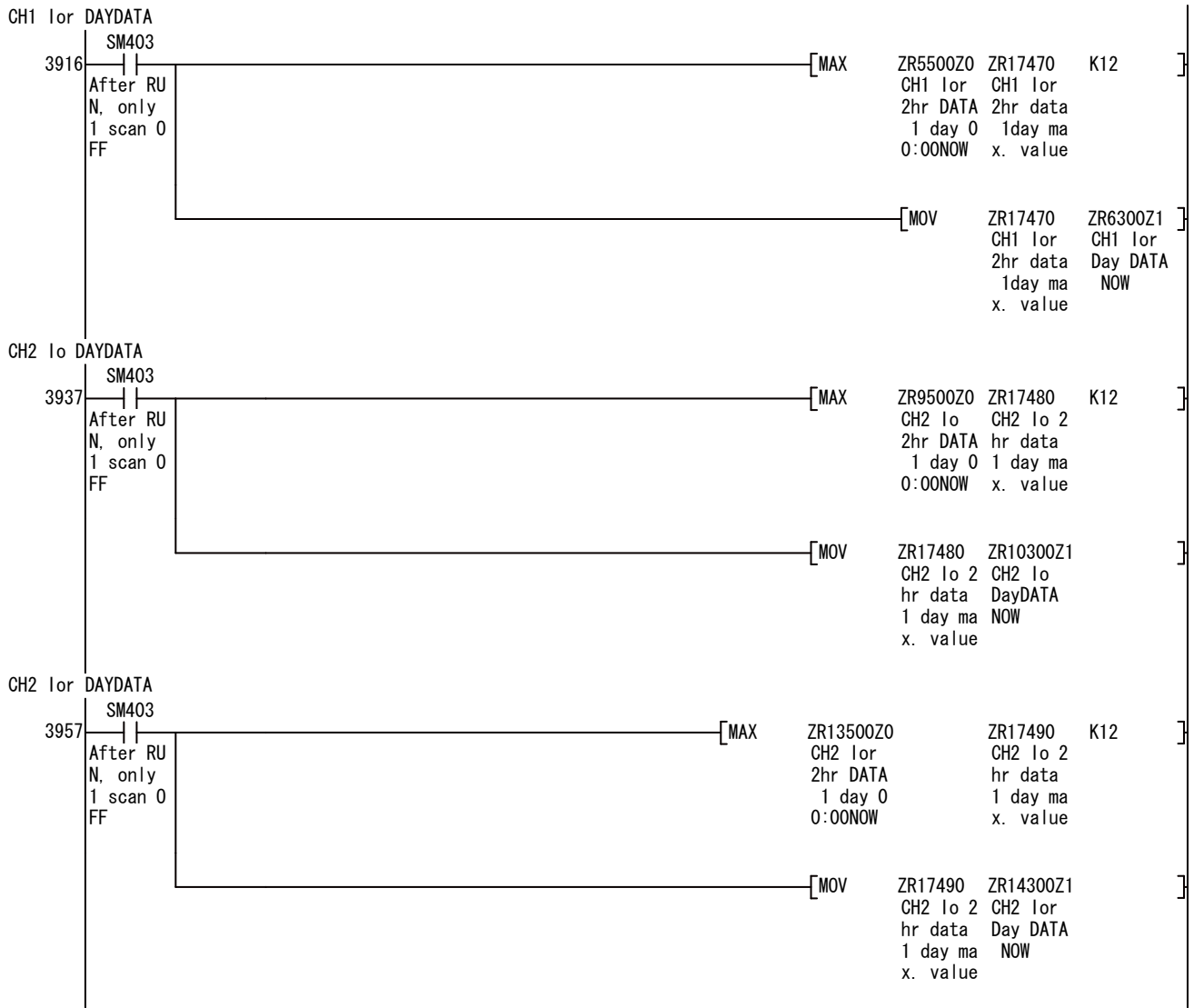




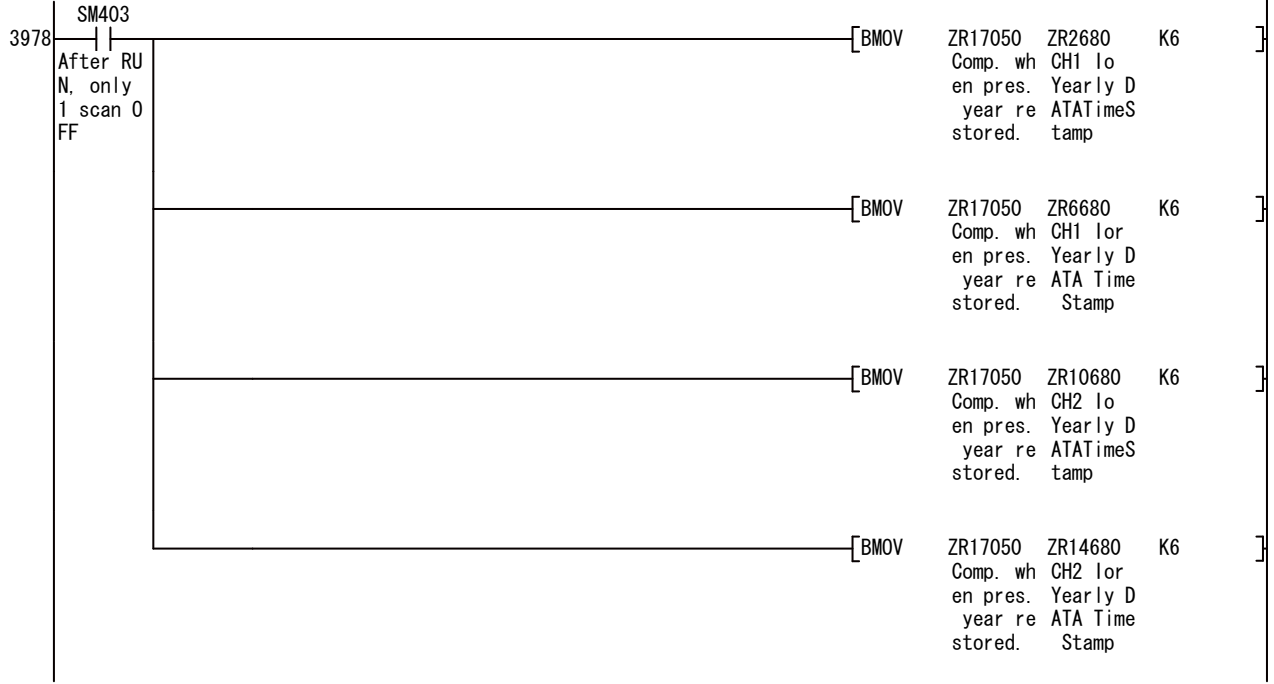


Calc. storage dest. in YearGraphDATATable using pres. mon., date

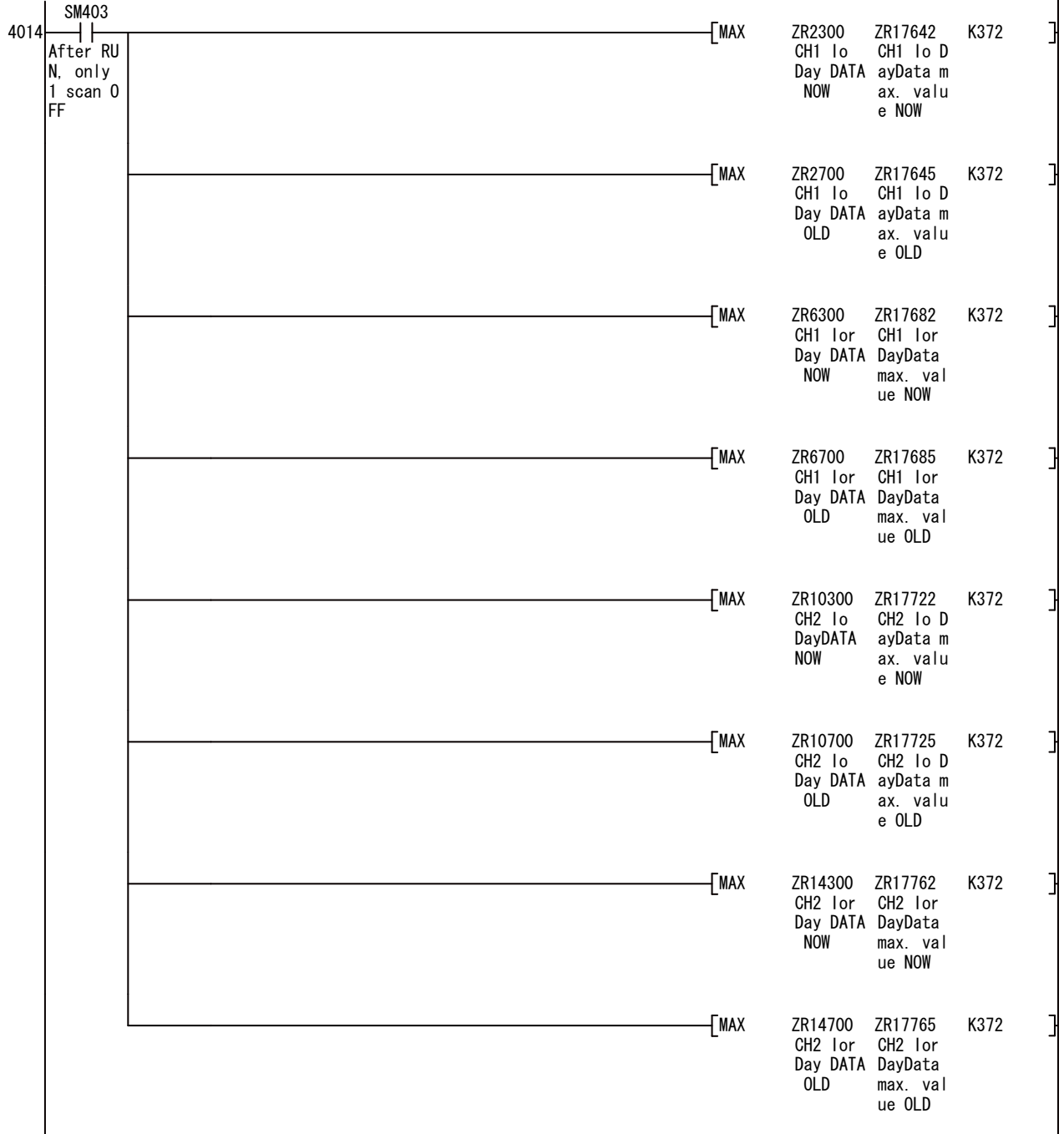




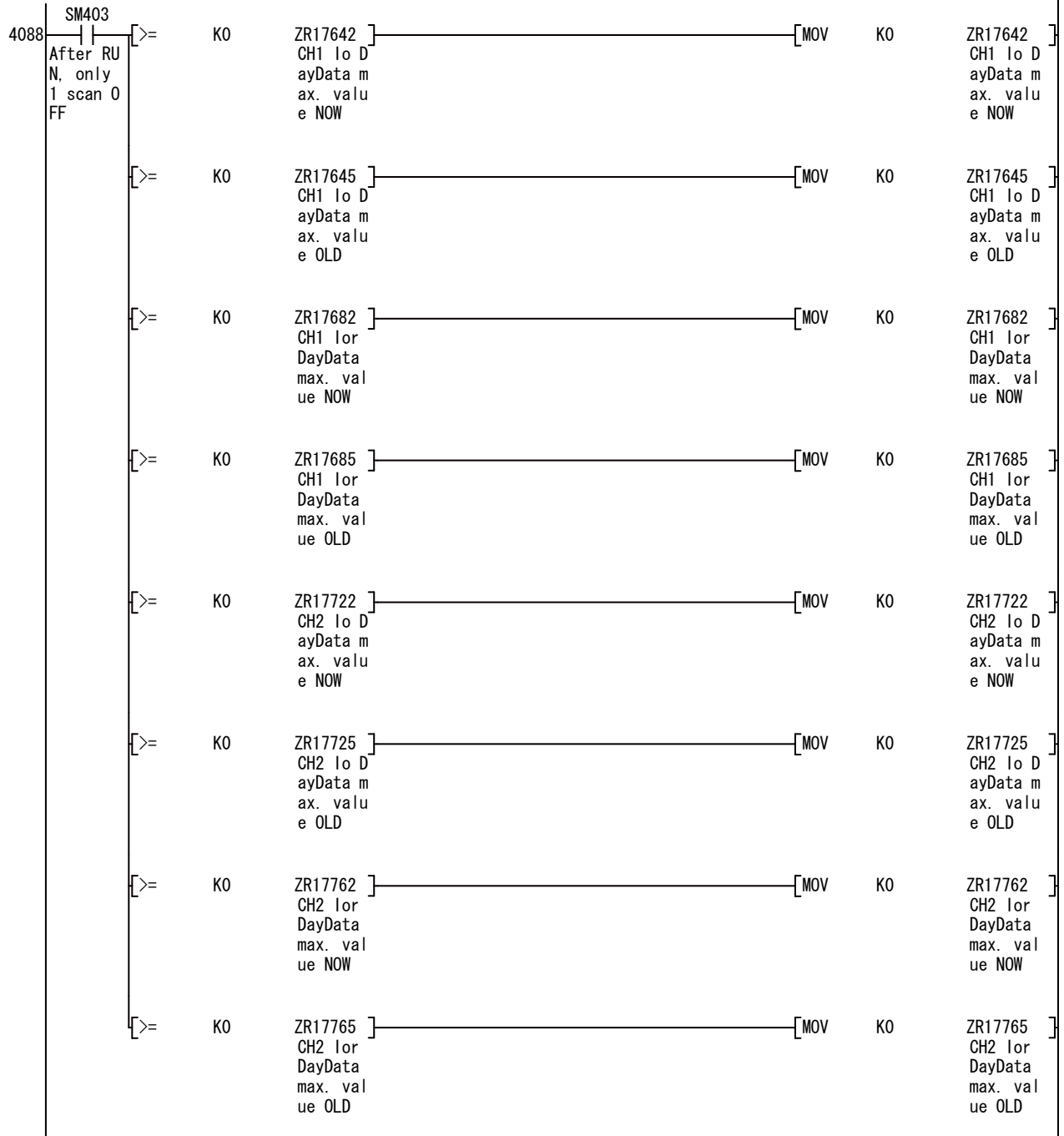
DATA TimeStamp SET



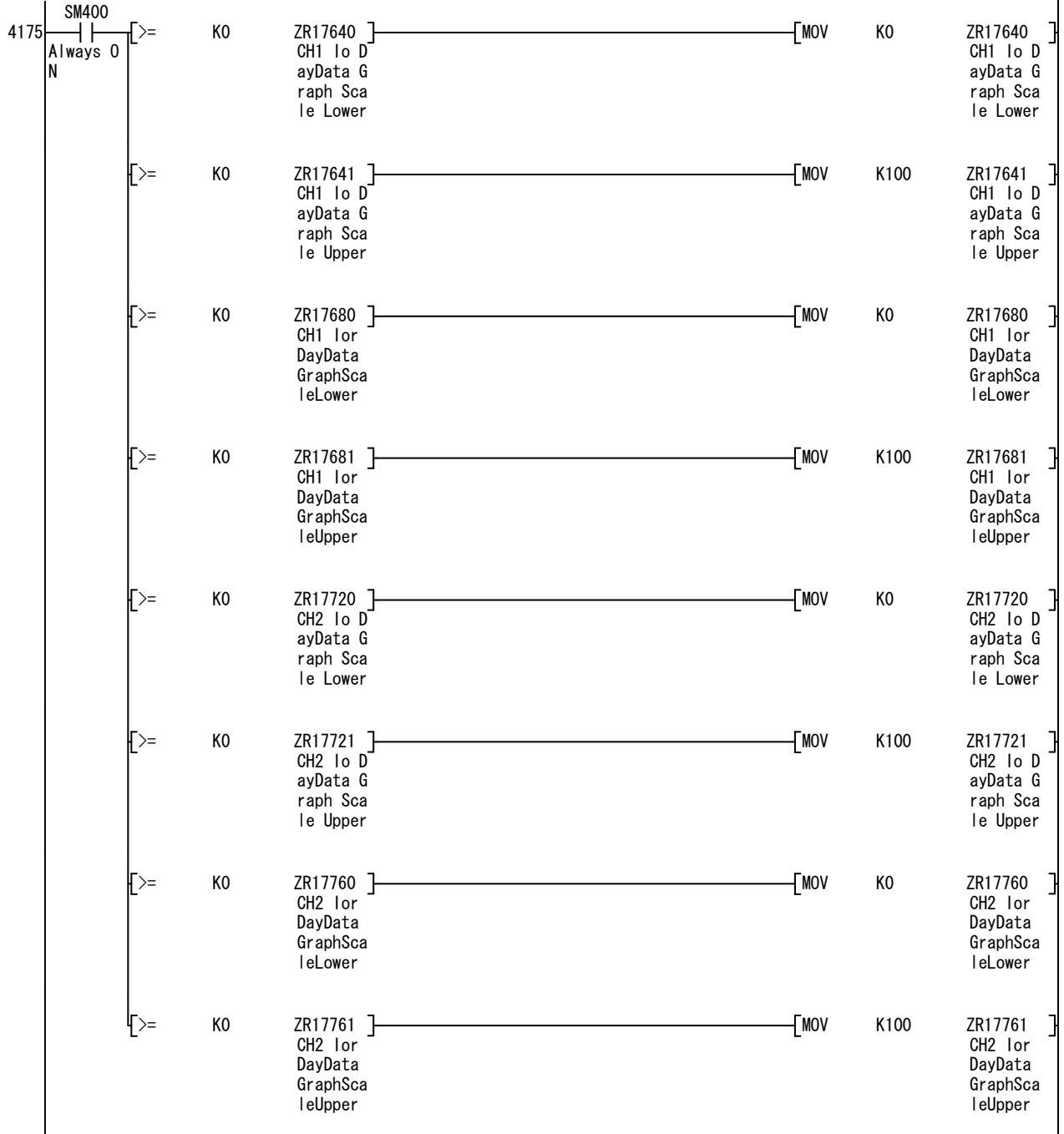
Calculate the maximum period value for garph.



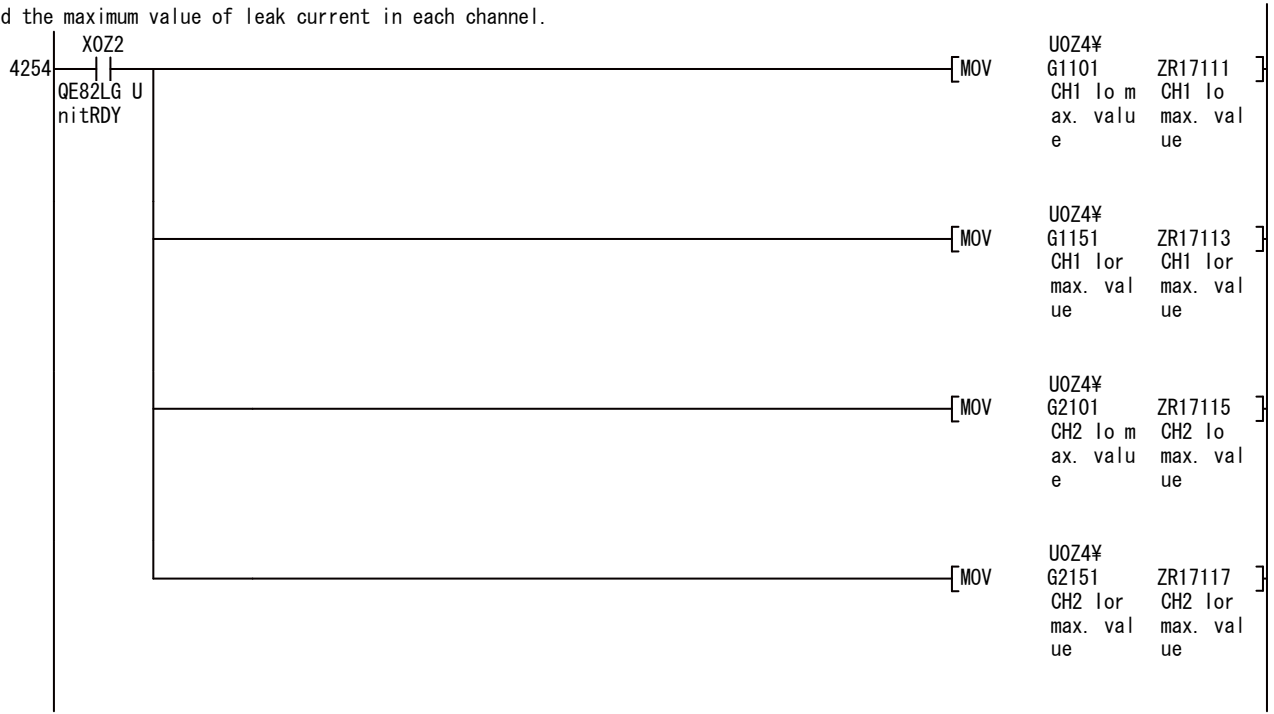
If only -1 exists in DATATable, store 0.



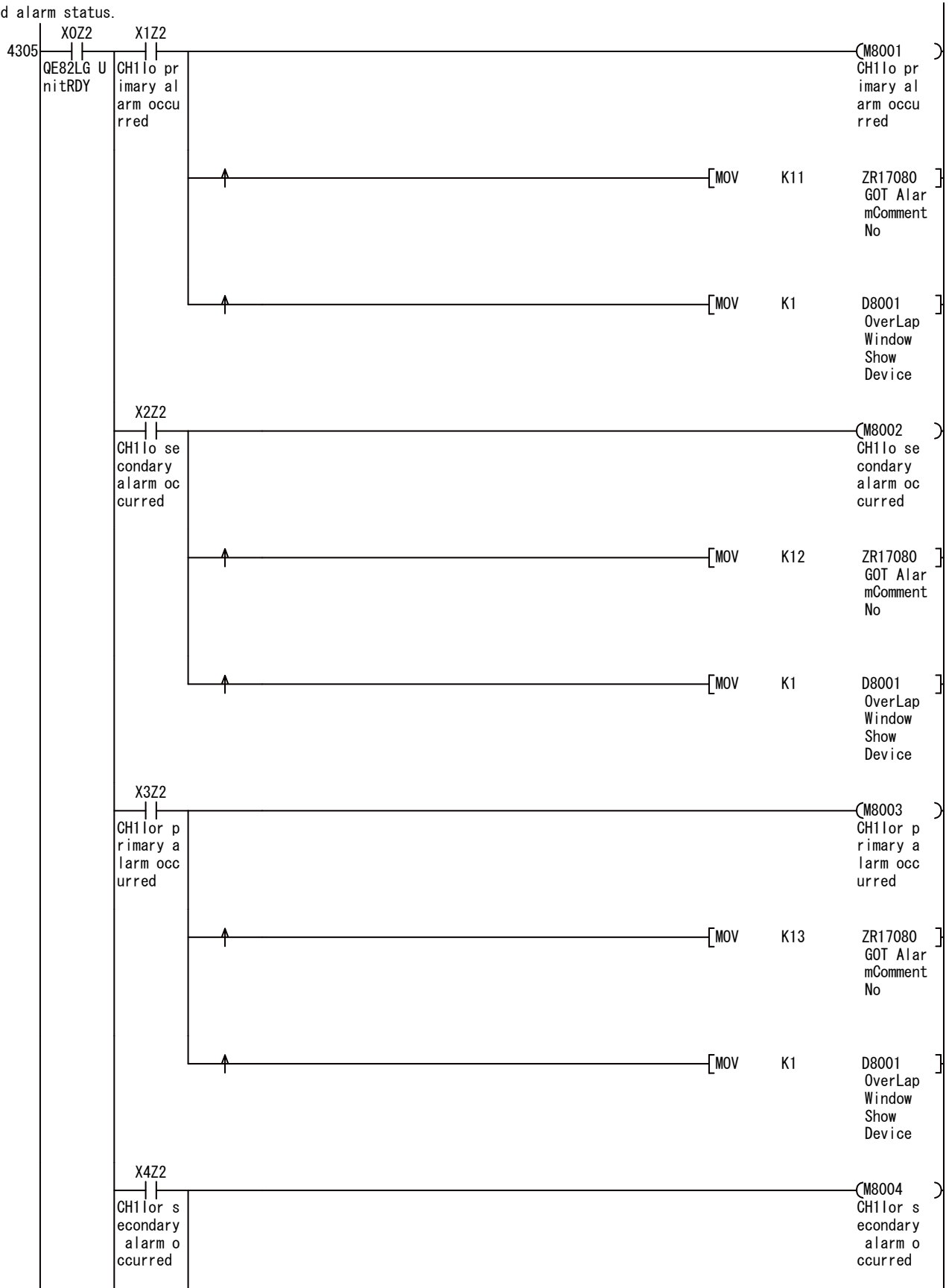
YearlyGraphScaleSetting

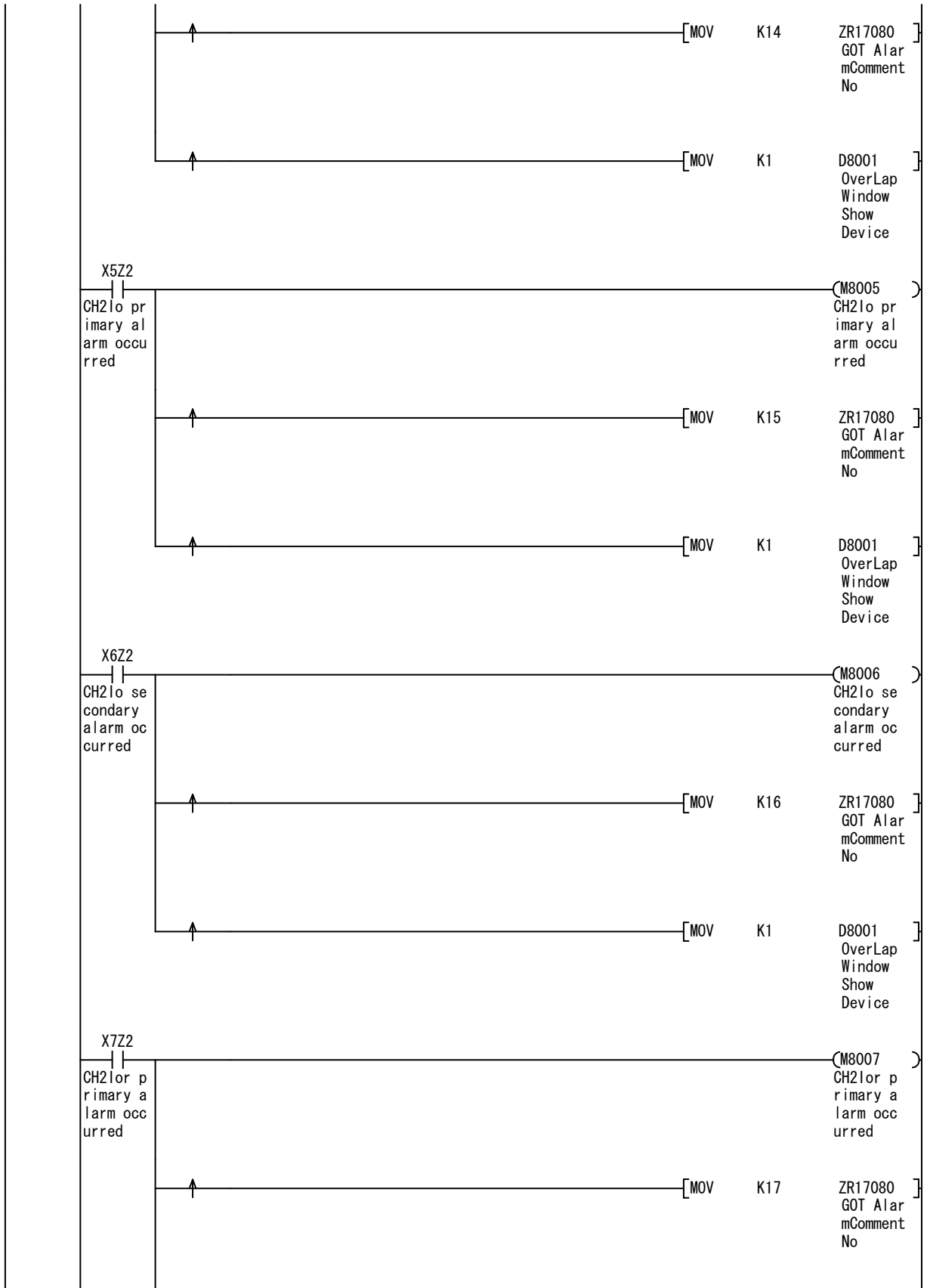


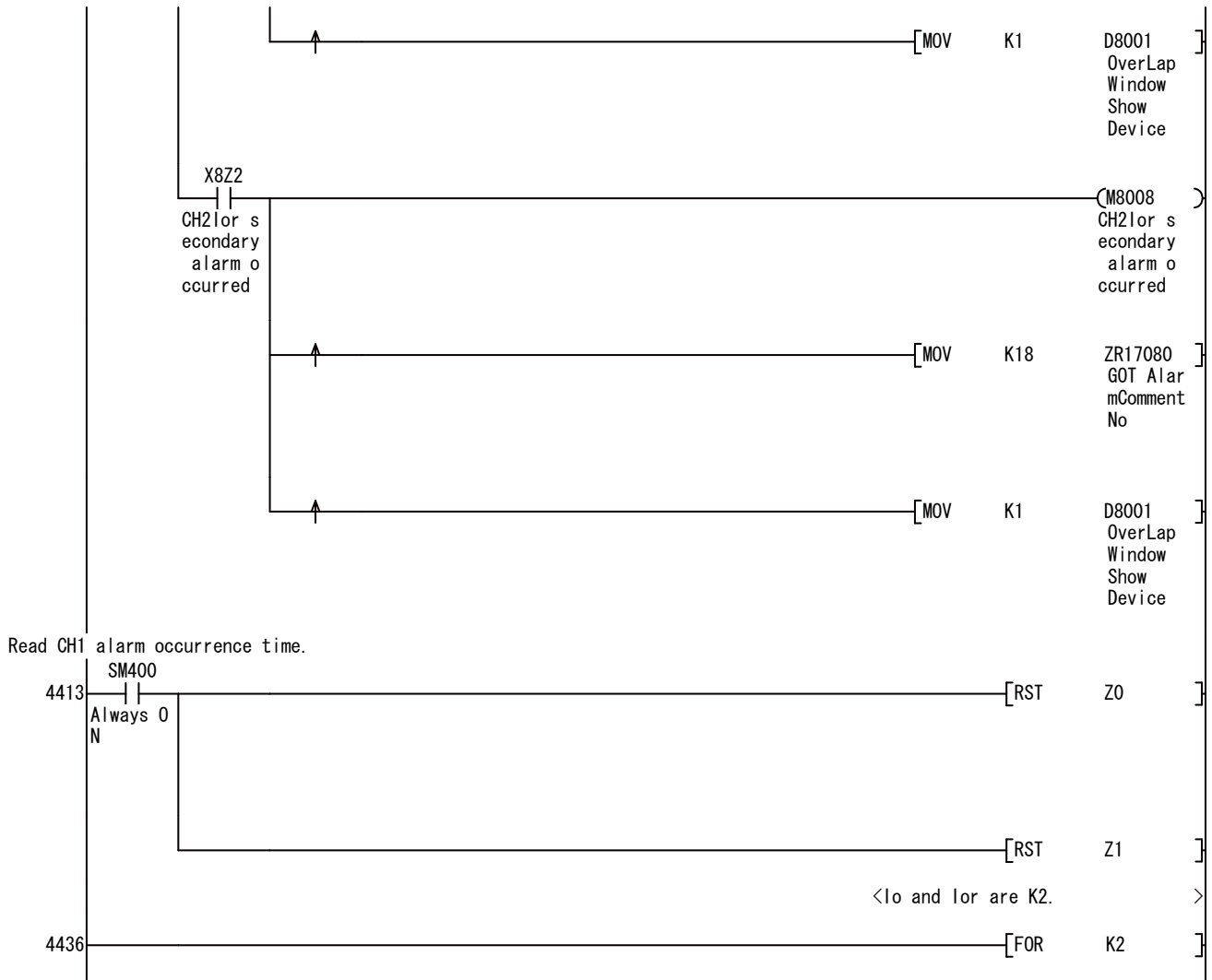
Read the maximum value of leak current in each channel.



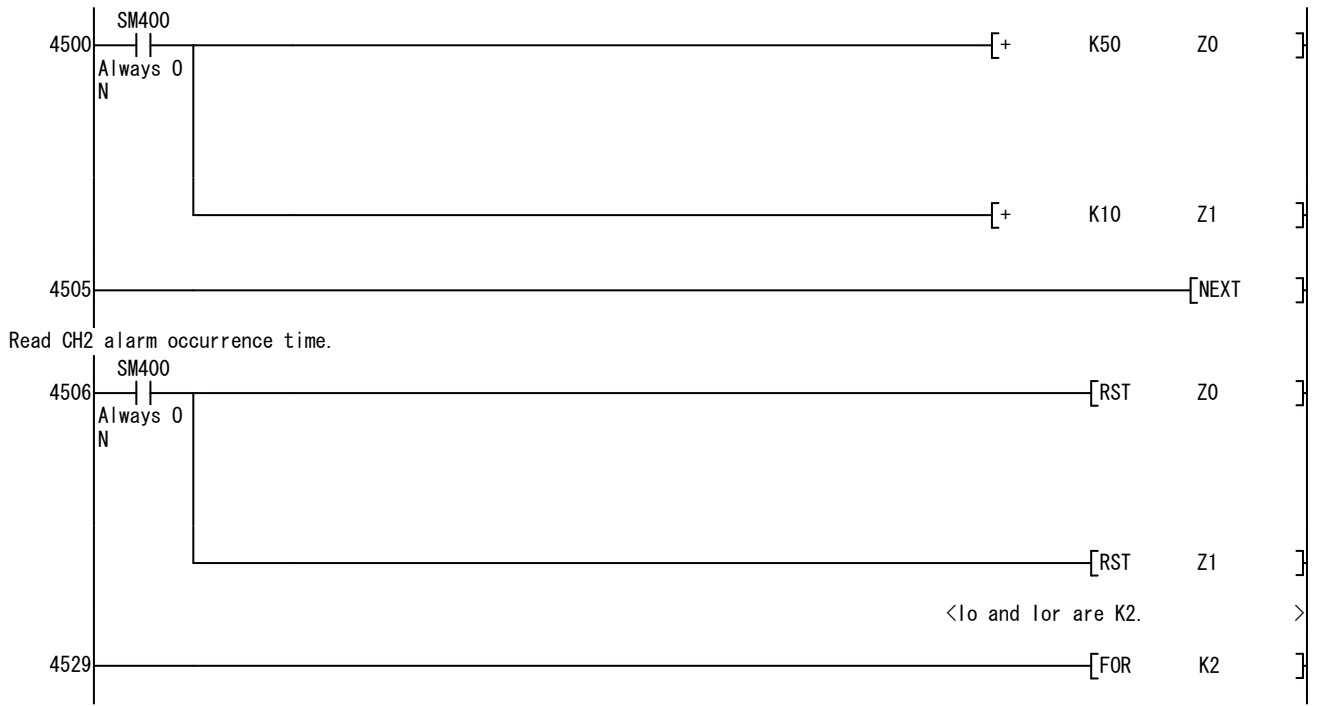
Read alarm status.

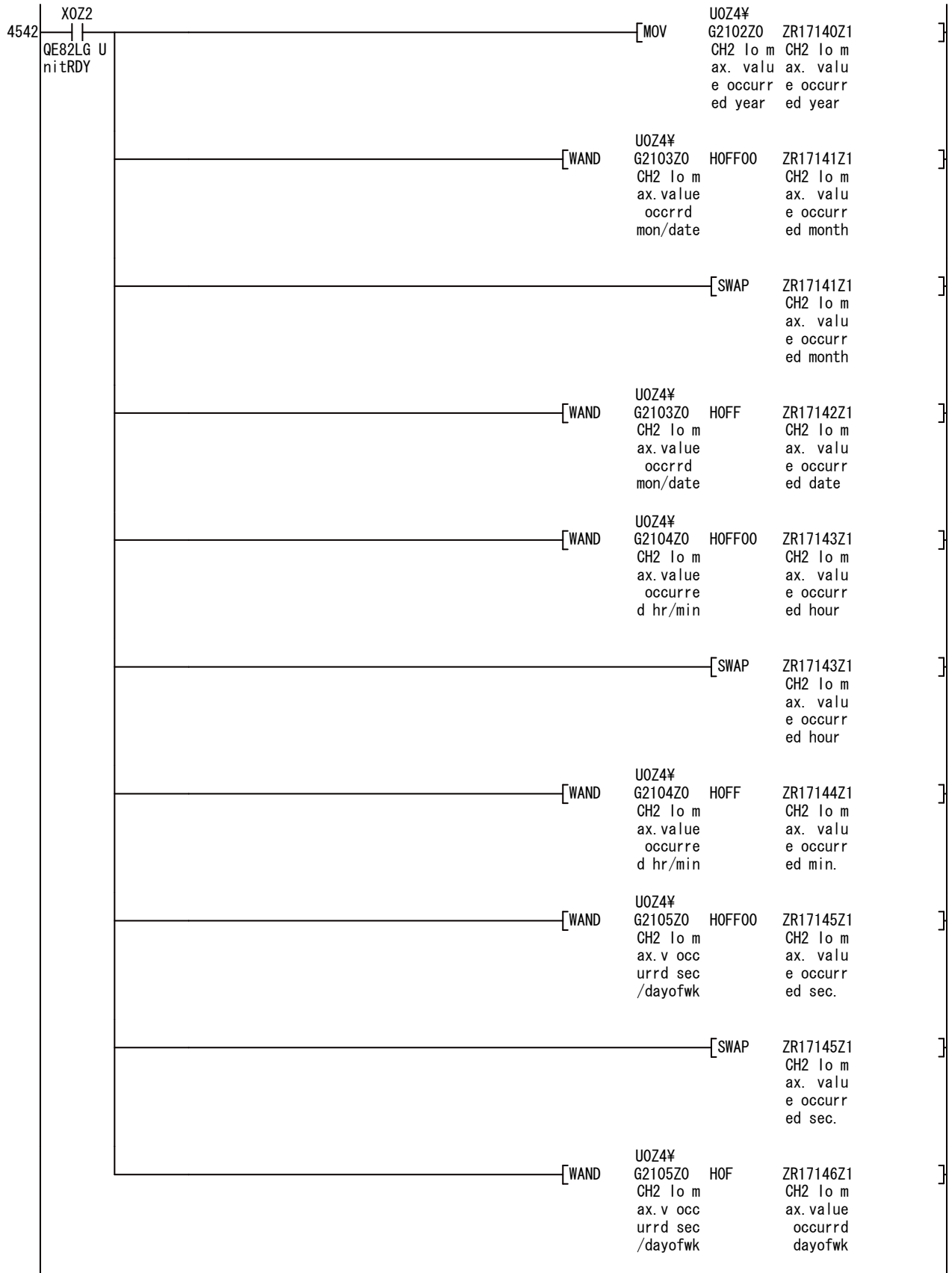


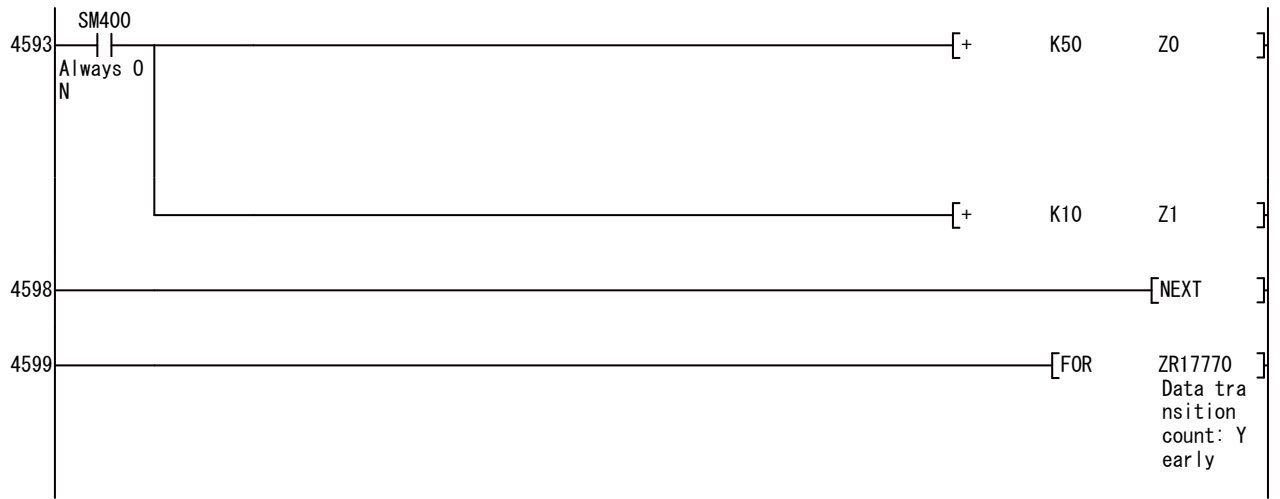




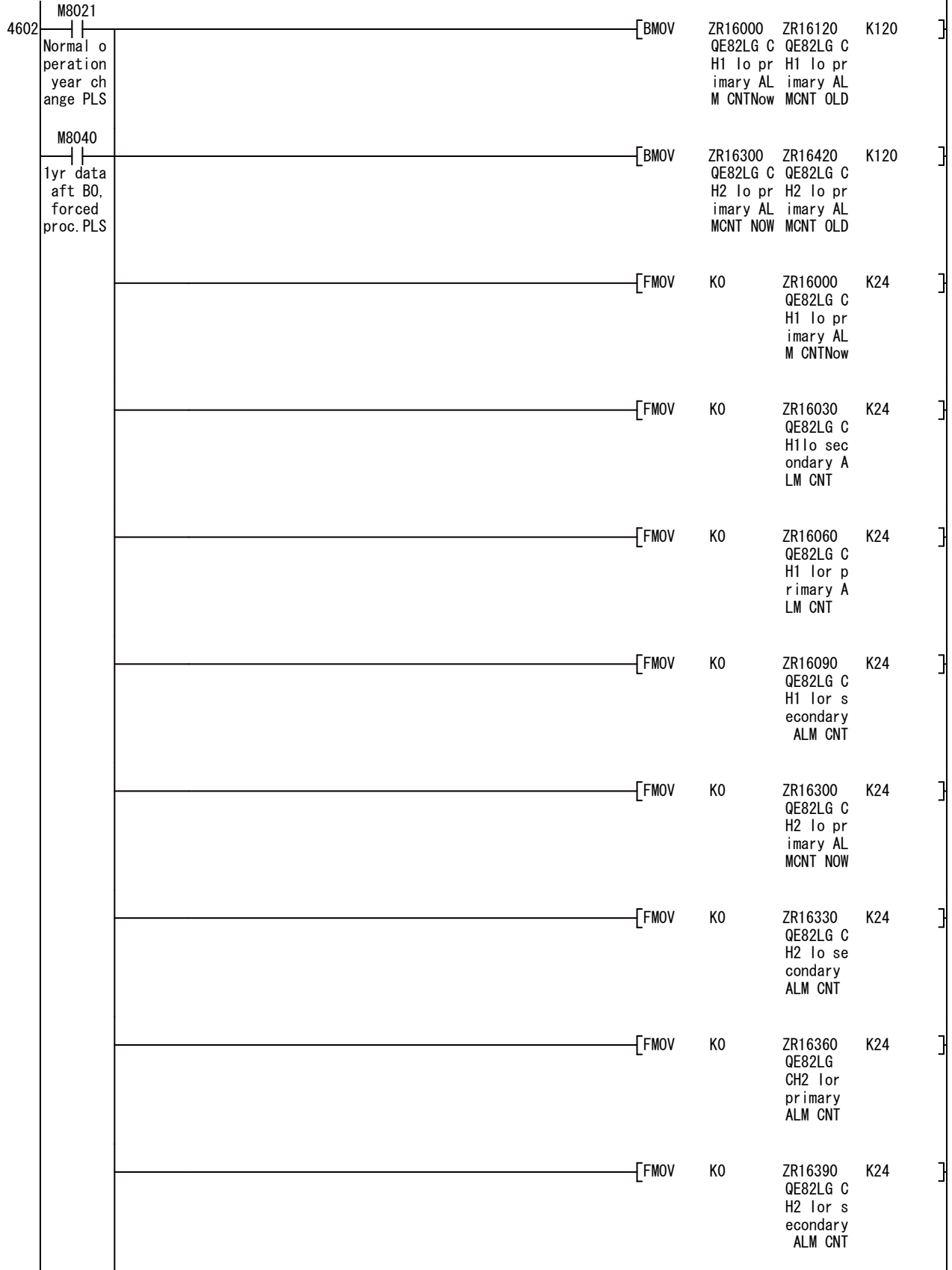
4449	XOZ2		[MOV	UOZ4¥ G1102Z0		ZR17120Z1	
	QE82LG U nitRDY			CH1 lo m ax. valu e occur ed year		CH1 lo m ax. valu e occur ed year	
			[WAND	UOZ4¥ G1103Z0	HOFF00	ZR17121Z1	
				CH1 lo m ax. value occurr d mon/date		CH1 lo m ax. value occurr ed month	
						[SWAP	ZR17121Z1
							CH1 lo m ax. value occurr ed month
			[WAND	UOZ4¥ G1103Z0	HOFF	ZR17122Z1	
				CH1 lo m ax. value occurr d mon/date		CH1 lo m ax. valu e occur ed date	
			[WAND	UOZ4¥ G1104Z0	HOFF00	ZR17123Z1	
				CH1 lo m ax. value occurr ed hr/min		CH1 lo m ax. valu e occur ed hour	
					[SWAP	ZR17123Z1	
						CH1 lo m ax. valu e occur ed hour	
		[WAND	UOZ4¥ G1104Z0	HOFF	ZR17124Z1		
			CH1 lo m ax. value occurr ed hr/min		CH1 lo m ax. valu e occur ed min.		
		[WAND	UOZ4¥ G1105Z0	HOFF00	ZR17125Z1		
			CH1 lo m ax. v occ urr d sec /dayofwk		CH1 lo m ax. valu e occur ed sec.		
					[SWAP	ZR17125Z1	
						CH1 lo m ax. valu e occur ed sec.	
		[WAND	UOZ4¥ G1105Z0	HOF	ZR17126Z1		
			CH1 lo m ax. v occ urr d sec /dayofwk		CH1 lo m ax. value occurr d dayofwk		

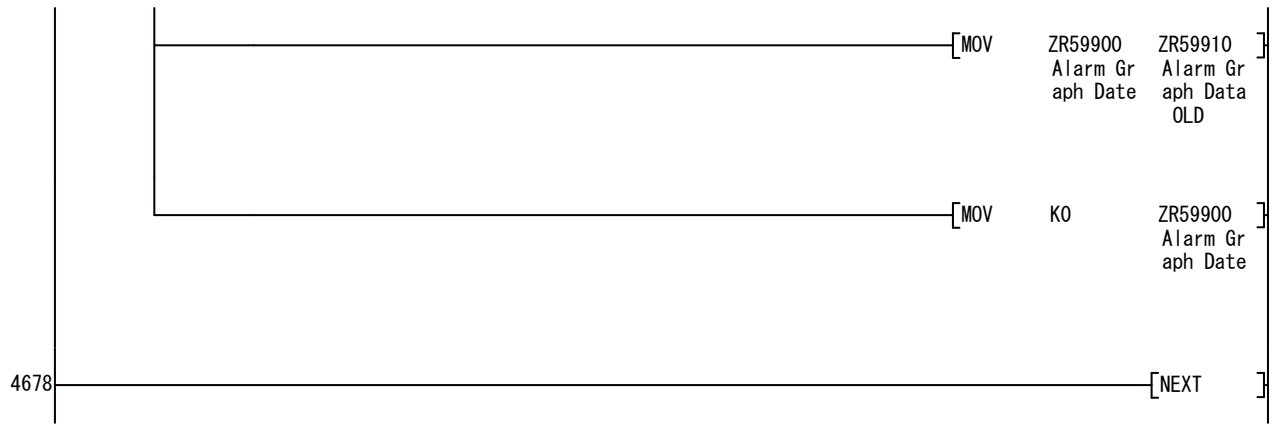


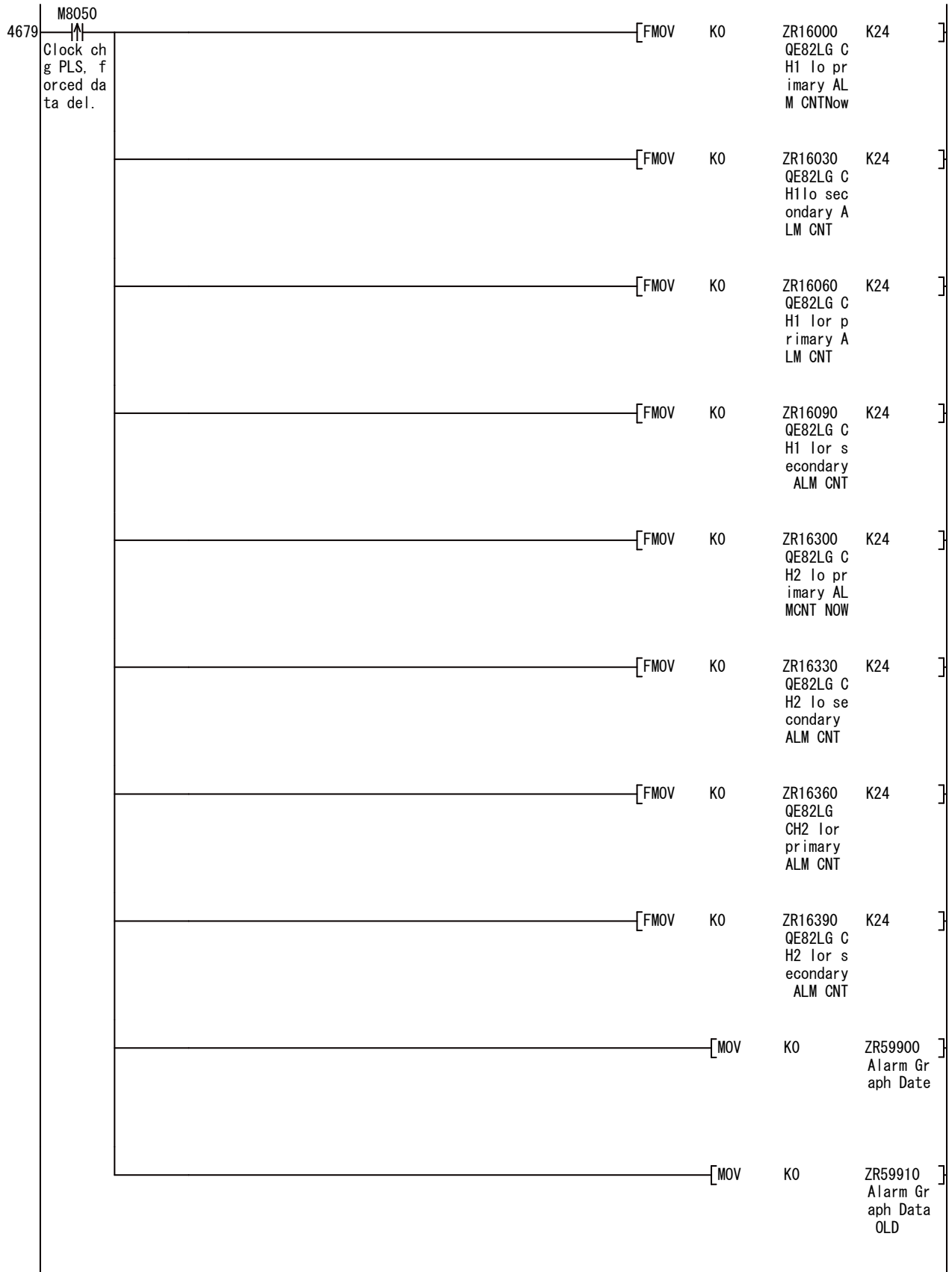




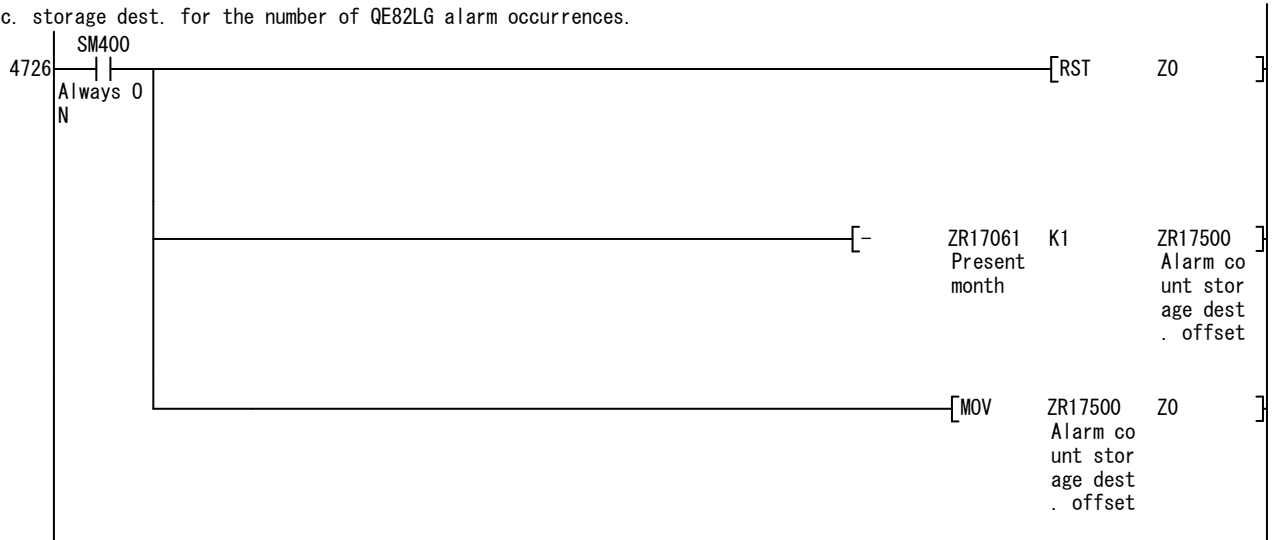
AlarmGraphDATA transition



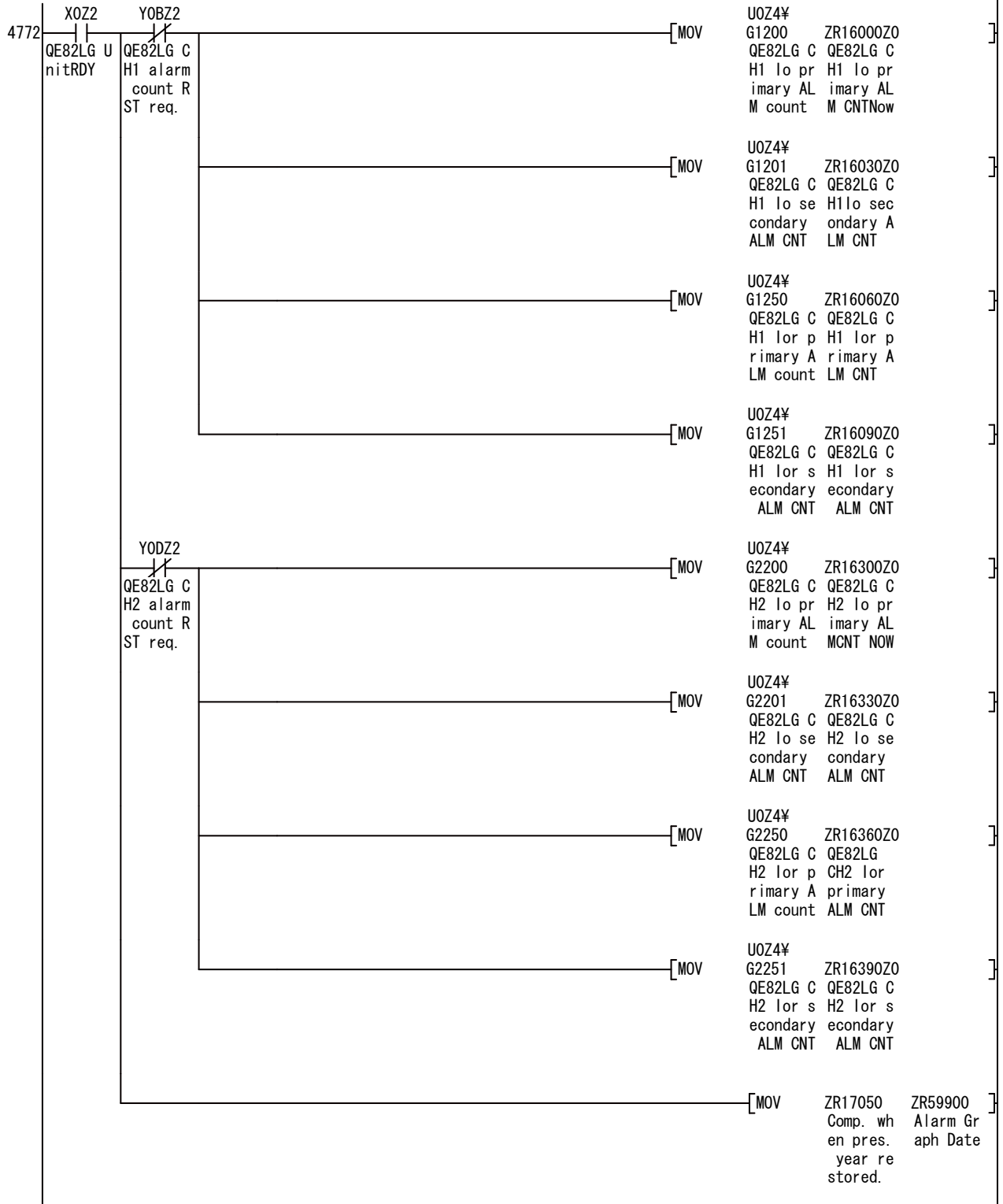




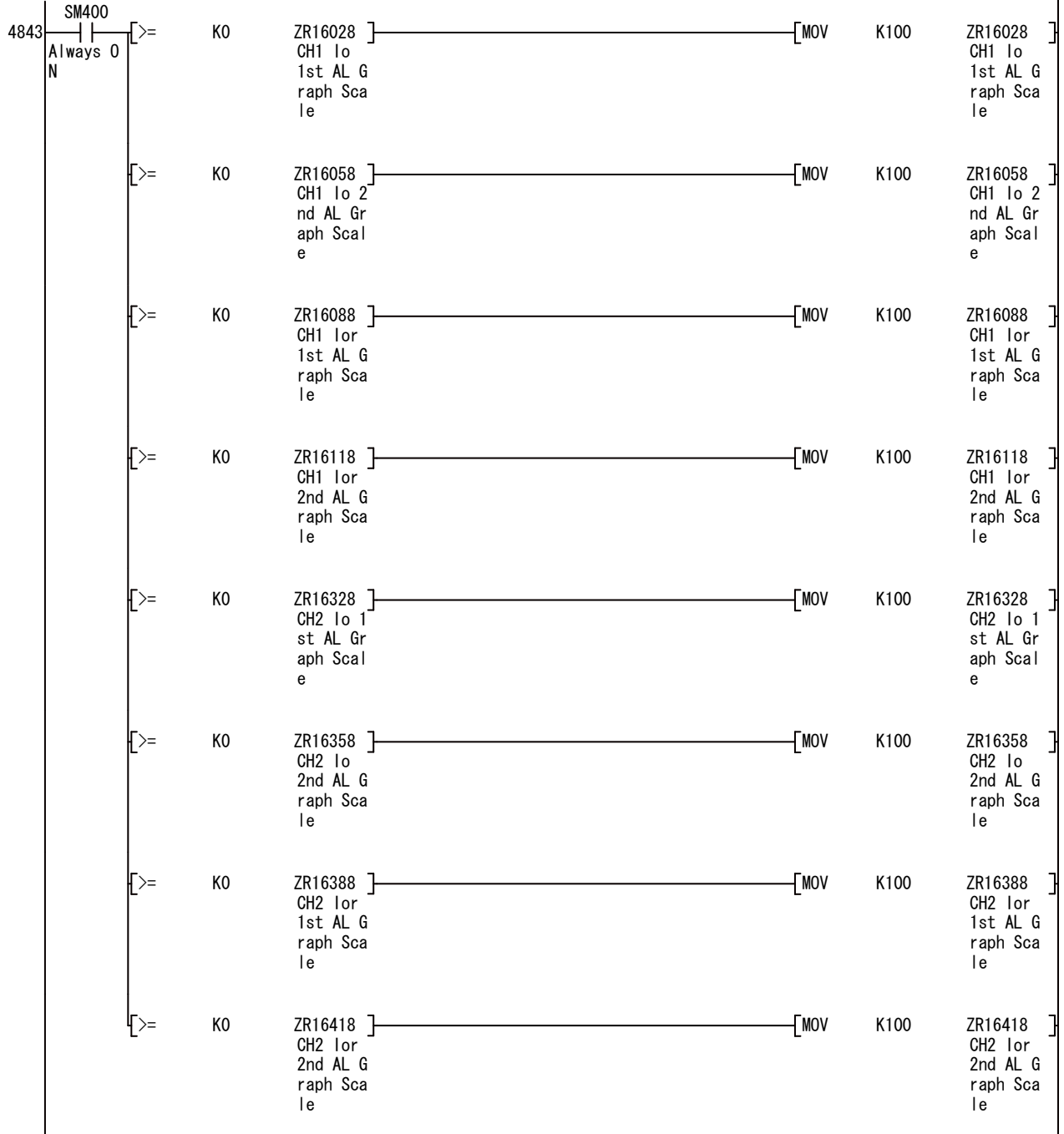
Calc. storage dest. for the number of QE82LG alarm occurrences.



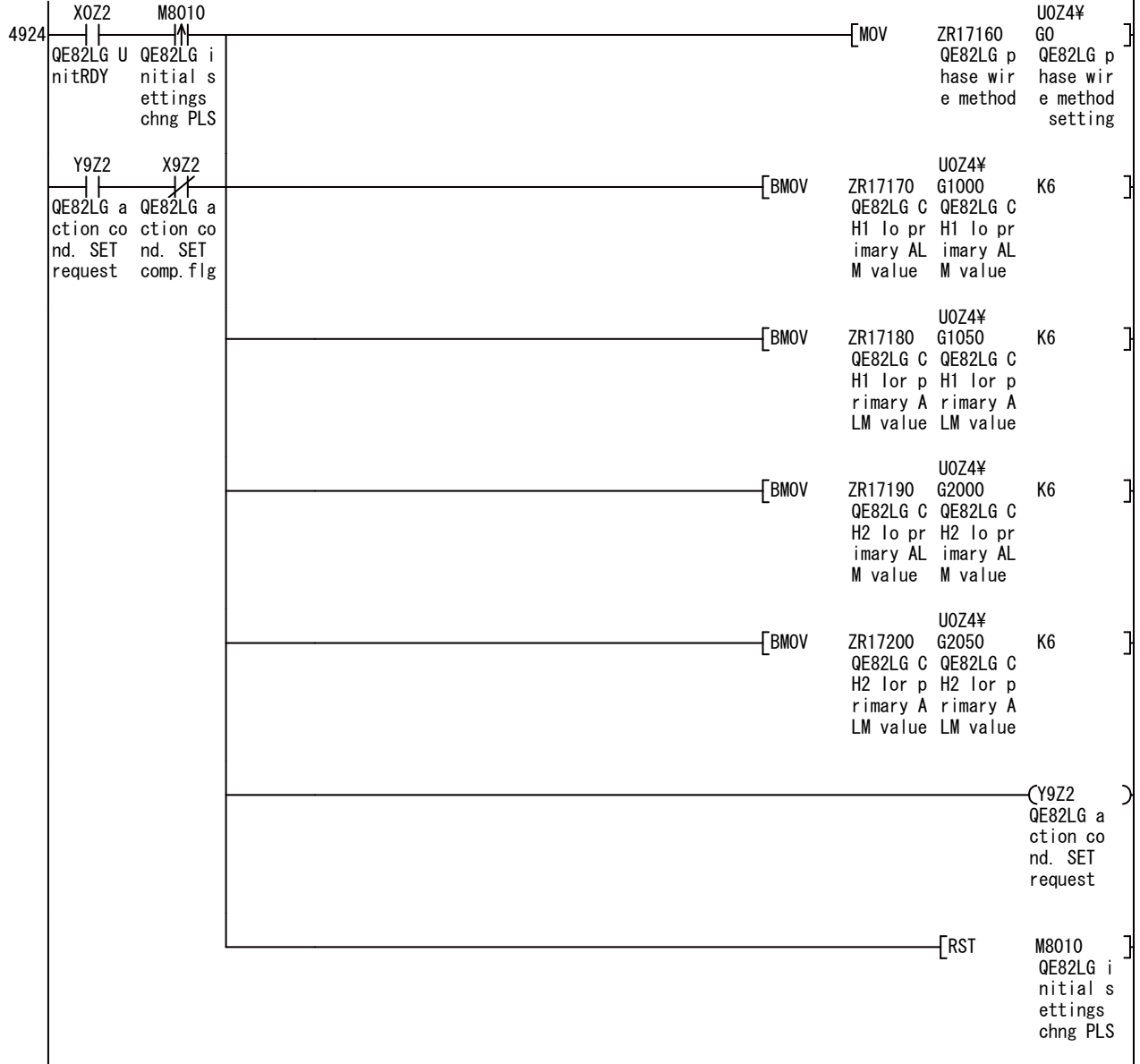
Store the number of alarm occurrences.



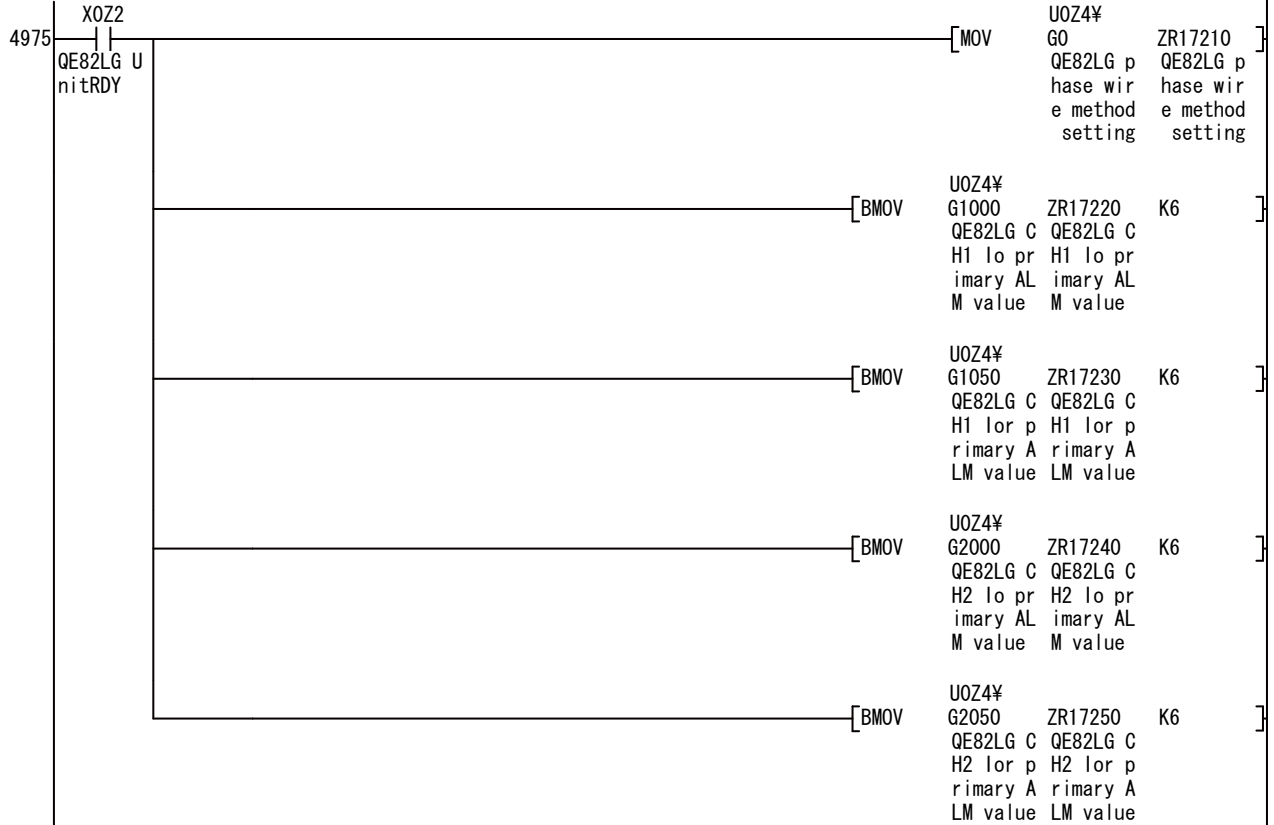
Alarm Occurrence Graph Scale



QE82LG main unit settings



Read QE82LG main unit settings.



Restore the index register being used in other programs.



Store clock data before blackout.

