

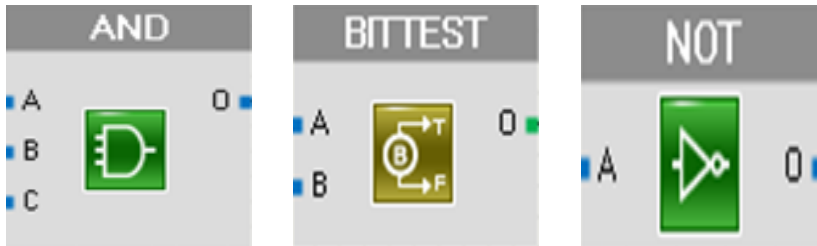
LSIS STANDARD AC DRIVE

S100 Series

User Sequence



1. Definition of User Sequence



- AC Drive can be set automatically by setting each step's function and void parameters.
- User sequence creates a simple sequence from a combination of different function blocks.
- Each function Block is consist of 1~3 input and 1 output like pictures above.
- The sequence can comprise of a maximum of 18 steps using 29 functions and 30 void parameters.
- 1 Loop refers to a single execution of a user configured sequence that contains a maximum of 18 steps.
- User can select 1 Loop Times of between 10~1000ms.

Type	Description
User Func @*	Choose the function to perform in the function block.
User Input @-A	Communication address of the function's first input parameter
User Input @-B	Communication address of the function's second input parameter
User Input @-C	Communication address of the function's third input parameter
User Output	Output value (Read Only) after performing the function block.

* @is the step number(1~`18)

2. User-Seq. Setting Details

Code	Description
AP-02. User Seq. En	Display the parameter groups related to a user sequence
US-01. User Seq. Con	Set Seq. Run and Seq. Stop with the keypad.
US-02. User Loop Time	Set the user Seq. Loop Time. It can be set to 0.01s/0.02s/0.05s/0.1s/0.5s/1s
US-11~28. Link User Out 1~18	Set parameters to connect 18 function blocks.
US-31~60 Void Para 1~30	Set 30 void parameters when constant parameter input is needed.
UF-01~90	Set user defined functions for the 18 function blocks.

3. Check before the test

- ✓ Parameters can't be adjusted during an operation. (but, 'Void Para N' can be changed)
- ✓ To adjust parameters, the operation must be stopped. (US-01 → Stop)
- ✓ If User Input-C is 0x0000, it will be recognized as 0. (but, User Input-A,B can't be 0x0000)
- ✓ Input address that User wants to link at 'Link User Out'

4. Function Block Type-1

No	Type	Description
0	NOP	No operation.
1	ADD	Addition operation, $(A+B)+C$
2	SUB	Subtraction operation, $(A-B)-C$
3	ADDSUB	Addition and subtraction compound operation, $(A+B)-C$
4	MIN	Output the smallest value of the input values, $\text{MIN}(A,B,C)$
5	MAX	Output the largest value of the input values, $\text{MAX}(A,B,C)$
6	ABS	Output the absolute value of the A parameter, $ A $
7	NEGATE	Output the negative value of the A parameter, $-(A)$
8	REMAINDER	Remainder operation of A and B, $A \% B$
9	MPYDIV	Multiplication, division compound operation, $(A \times B)/C$
10	COMPARE-GT	Comparison operation : if $(A>B)$ the output is C; if $(A\leq B)$ the output is 0
11	COMPARE-GTEQ	Comparison operation : if $(A\geq B)$ output is C; if $(A<B)$ the output is 0.
12	COMPARE-EQUAL	Comparison operation : if $(A=B)$ then the output is C, For all other values the output is 0.
13	COMPARE-NEQUAL	Comparison operation : if $(A\neq B)$ then the output is C, For all other values the output is 0.
14	TIMER	Adds 1 each time a user sequence completes a loop. A: Max Loop, B: Timer Run/Stop, C:Choose output mode.

4. Function Block Type-2

No	Type	Description
15	LIMIT	Sets a limit for the A parameter. If Input-A is between B and C, output the input to A.
16	AND	Output the AND operation, (A and B) and C
17	OR	Output the OR operation, (A B C)
18	XOR	Output the XOR operation, (A^B)^C
19	AND/OR	Output the AND/OR operation, (A and B) C
20	SWITCH	Output a value after selecting one two inputs, if (A) then B otherwise C
21	BITTEST	Test the B bit of the A parameter, BITTEST(A,B). If the B bit of the A input is 1, the output is 1.
22	BITSET	Set the B bit of the A parameter, BITSET(A,B). Output the charged value after setting the B bit to input at A. The input value of B must be between 0~16.
23	BITCLEAR	Output the input at A as the B filter gain time constant, B x US-02 (US Loop Time)
24	LOWPASSFILTER	Output the input at A as the B filter gains time constant, B x US-02 (US Loop Time)
25	PI_CONTROL	P, I gain = A,B parameter input, then output as C. Conditions for PI_PROCESS output : C=0: Const PI, C=1: PI_PROCESS_B>=PI_PROCESS-OUT>=0, C=2: PI_PROCESS-B>=PI_PROCESS-OUT>=-(PI-PROCESS-B) P gain = A/100, I gain= 1/(Bx Loop Time)
26	PI_PROCESS	A is an input error, B is an output limit, C is the value of Const PI output. Range of C is 0~32767.
27	UPCOUNT	Upcounts the pulses and then output the value- UPCOUNT(A,B,C)
28	DOWNCOUNT	Downcounts the pulses and then output the value- DOWNCOUNT(A,B,C)

1. User Function Block - MPYDIV

● 1-1. Check List

- $Out = (AxB)/C$
- If the address of User Input-C is 0x0000, operate only with Input-A,B
- If User-Seq. setting is wrong, User output will be -1.

● 1-2. Setting

- US-31~33 Void Para1~3 → Should input decimal number.
- UF-2~4 User Input1~3 → Addresses of Void Para1~3

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-11	Link User Out 1	0x110D
US-31	Void Para 1	100
US-32	Void Para 2	100
US-33	Void Para 3	200

Code	Name	Setting
UF-01	User Func 1	8: MpyDiv
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
UF-04	User Input 1-C	0x1D21
US-01	User Seq. Con	0 : Stop

● 1-3. Test

- Set the US-01 (User Seq, Con) as 1(Run)
- Check UF-05 : 50
- Check 'Jog Dec' : 5sec.

2. User Function Block - COMPARE-GT

● 2-1. Check List

- Out = if(A>B) then C else 0.
- If the address of User Input-C is 0x0000 and condition is satisfied, out will be 1(True).
- If User-Seq. setting is wrong, User output will be -1.

● 2-2. Setting

- US-31~33 Void Para1~3 → Should input decimal number.
- UF-2~4 User Input1~3 → Addresses of Void Para1~3

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-11	Link User Out 1	0x1404
US-31	Void Para 1	1000
US-32	Void Para 2	500
US-33	Void Para 3	50

Code	Name	Setting
UF-01	User Func 1	10: Compare-GT
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
UF-04	User Input 1-C	0x1D21
US-01	User Seq. Con	0 : Stop

● 2-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-05 :50
- Check 'Carrier Frequency' : 5kHz.

3. User Function Block - TIMER

● 3-1. Check List

- Out = Loop Time(US-02) x A(Max Loop)
- User Input-A is the Timer Max Loop value. Input-A below 0 is counted as 0.
- User Input-B is the Timer initial value. If Input-B is 1, Out is 0 and Timer stops. unless timer operates.
- User Input-C is the selection of output method. If Input-C is 1, current timer value outs. Unless '1' outs above max value.

● 3-2. Setting

- US-31~33 Void Para1~3 → Should input decimal number.
- UF-2~4 User Input1~3 → Addresses of Void Para1~3

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-11	Link User Out 1	0x1101
US-31	Void Para 1	1000
US-32	Void Para 2	0
US-33	Void Para 3	1

Code	Name	Setting
UF-01	User Func 1	14: Timer
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
UF-04	User Input 1-C	0x1D21
US-01	User Seq. Con	0 : Stop

● 3-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-05 : 0~1000
- Check 'Cmd Freq' : 0~10Hz

4. User Function Block - ANDOR

● 4-1. Check List

- Out = ((A&B)IC)
- If the address of User Input-C is 0x0000, operate only with Input-A,B
- A,B,C, Out are all 16Bit binary type.

● 4-2. Setting

- US-31~33 Void Para1~3 → Should input decimal number.
- UF-2~4 User Input1~3 → Addresses of Void Para1~3

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-31	Void Para 1	15
US-32	Void Para 2	12
US-33	Void Para 3	14

Code	Name	Setting
UF-01	User Func 1	19: ANDOR
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
UF-04	User Input 1-C	0x1D21
US-01	User Seq. Con	0 : Stop

● 4-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-05 : 0x000e (0000 0000 0000 1110)

5. User Function Block - SWITCH

● 5-1. Check List

- Out = if(A) then B else C
- User Input-A : 1(True) or 0(False)
- If Input-A is 1, B's value outs. Unless C's value outs.
- B's value must be greater than or equal to C's

● 5-2. Setting

- US-31~33 Void Para1~3 → Should input decimal number.
- UF-2~4 User Input1~3 → Addresses of Void Para1~3

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-11	Link User Out 1	0x1404
US-31	Void Para 1	1
US-32	Void Para 2	120
US-33	Void Para 3	30

Code	Name	Setting
UF-01	User Func 1	20: Switch
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
UF-04	User Input 1-C	0x1D21
US-01	User Seq. Con	0 : Stop

● 5-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-05 : 120
- Check 'Carrier Frequency' : 12kHz

6. User Function Block - BITTEST

● 6-1. Check List

- Input-A is the value that is subjected to test.
- Input-B means the bit which is tested.
- Input-C is not used.

● 6-2. Setting

- US-31~32 Void Para1~2 → Should input decimal number.
- UF-2~3 User Input1~2 → Addresses of Void Para1~2

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	1 : 0.02s
US-31	Void Para 1	15
US-32	Void Para 2	5

Code	Name	Setting
UF-01	User Func 1	21: BITTEST
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D20
US-01	User Seq. Con	0 : Stop

● 6-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-05 : 0

7. User Function Block – ADD & REMAINDER & COMPARE-EQUAL

● 7-1. Check List

- ADD : If User-Seq. setting is wrong, User output will be -1.
- REMAINDER : Input-C is not used.
- COMPARE-EQUAL : If the address of User Input-C is 0x0000 and condition is satisfied, out will be 1(True).
- If the result of calculation for Cmd Freq is higher than Max Freq, it will be recognized as Max Freq.

● 7-2. Setting-1

Code	Name	Setting
APP-02	User Seq. En	1 : Yes
US-02	User Seq. Loop Time	5 : 1s
US-13	Link User Out 3	0x1101
US-16	Link User Out 6	0x1101
US-31	Void Para 1	1
US-32	Void Para 2	2
US-33	Void Para 3	0
US-34	Void Para 4	6000
US-01	User Seq. Con	0 : Stop

7. User Function Block – ADD & REMAINDER & COMPARE-EQUAL

● 7-2. Setting-2

- User Output 1 : 0x1E05, User Output 2 : 0x1E0A, User Output 5 : 0x1E19
- Void Para 1 : 0x1D1F, Void Para 2 : 0x1D20, Void Para 3 : 0x1D21, Void Para 4 : 0x1D22
- Cmd Freq : 0x1101

Code	Name	Setting
UF-01	User Func 1	1: ADD
UF-02	User Input 1-A	0x1D1F
UF-03	User Input 1-B	0x1D21
UF-04	User Input 1-C	0x0000
UF-05	User Output 1	-

Code	Name	Setting
UF-06	User Func 2	9: REMAINDER
UF-07	User Input 2-A	0x1E05
UF-08	User Input 2-B	0x1D20
UF-09	User Input 2-C	-
UF-10	User Output 2	-

Code	Name	Setting
UF-11	User Func 3	12: COMPARE-EQUAL
UF-12	User Input 3-A	0x1E0A
UF-13	User Input 3-B	0x1D1F
UF-14	User Input 3-C	0x1D22
UF-15	User Output 3	-

Code	Name	Setting
UF-16	User Func 4	1: ADD
UF-17	User Input 4-A	0x1D1F
UF-18	User Input 4-B	0x1E05
UF-19	User Input 4-C	0x0000
UF-20	User Output 4	-

Code	Name	Setting
UF-21	User Func 5	9: REMAINDER
UF-22	User Input 5-A	0x1E14
UF-23	User Input 5-B	0x1D20
UF-24	User Input 5-C	-
UF-25	User Output 5	-

Code	Name	Setting
UF-26	User Func 6	12: COMPARE-EQUAL
UF-27	User Input 6-A	0x1E19
UF-28	User Input 6-B	0x1D21
UF-29	User Input 6-C	0x1D21
UF-30	User Output 6	-

7. User Function Block – ADD & REMAINDER & COMPARE-EQUAL

- 7-3. Test

- Set the US-01 (User Seq, Con) as 1(Run).
- Check UF-15 : 6000
- Check UF-30 : 0
- Check 'Cmd Freq' : 60.00 → 0 → 60.00 → Repeated