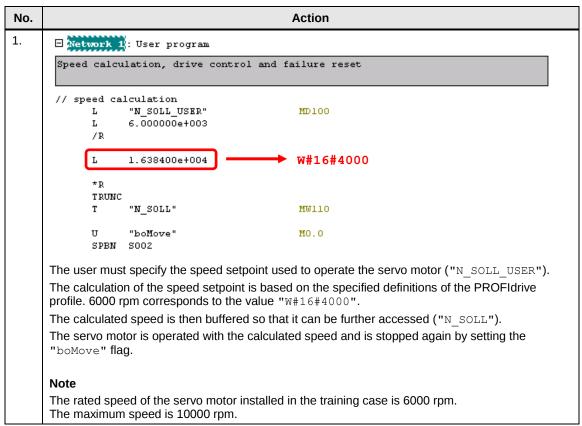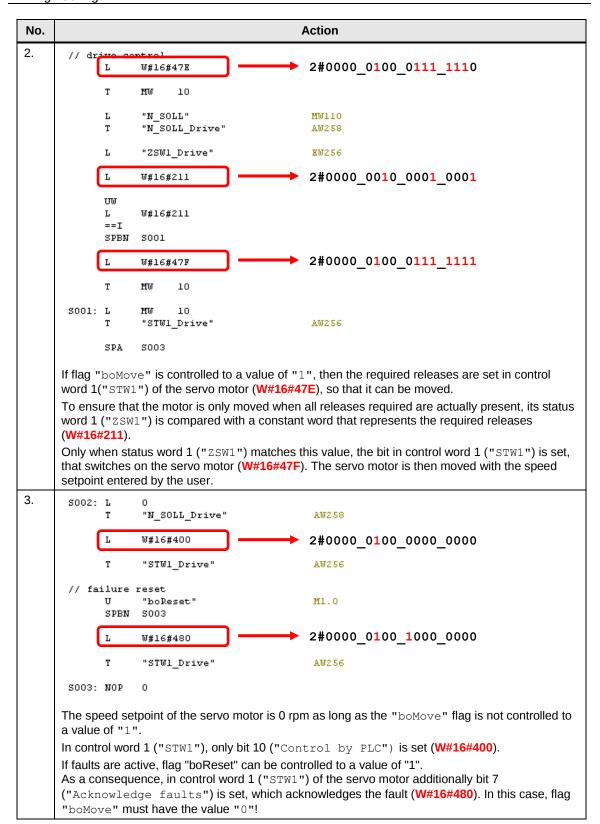## 2.4 Controlling the servo motor

In the sample project, the cyclic communication between SIMATIC CPU and SINAMICS drive is implemented in OB1. The OB1 contains the user program subsequently described.

Table 2-7 Control of the servo motor

No.	Action
1.	

The user must specify the speed setpoint used to operate the servo motor ("N_SOLL_USER").

The calculation of the speed setpoint is based on the specified definitions of the PROFIdrive profile. 6000 rpm corresponds to the value "W#16#4000".

The calculated speed is then buffered so that it can be further accessed ("N_SOLL").

The servo motor is operated with the calculated speed and is stopped again by setting the "boMove" flag.

Note
The rated speed of the servo motor installed in the training case is 6000 rpm.
The maximum speed is 10000 rpm.

No.	Action
| 2. | ```
// drive control
        L       W#16#47E                    2#0000_0100_0111_1110

        T       MW     10

        L       "N_SOLL"            MW110
        T       "N_SOLL_Drive"      AW258

        L       "ZSW1_Drive"        EW256

        L       W#16#211                    2#0000_0010_0001_0001

        UW
        L       W#16#211
        ==I
        SPBN    S001

        L       W#16#47F                    2#0000_0100_0111_1111

        T       MW     10

 S001:  L       MW     10
        T       "STW1_Drive"        AW256

        SPA     S003
``` |

If flag "boMove" is controlled to a value of "1", then the required releases are set in control word 1("STW1") of the servo motor (**W#16#47E**), so that it can be moved.

To ensure that the motor is only moved when all releases required are actually present, its status word 1 ("ZSW1") is compared with a constant word that represents the required releases (**W#16#211**).

Only when status word 1 ("ZSW1") matches this value, the bit in control word 1 ("STW1") is set, that switches on the servo motor (**W#16#47F**). The servo motor is then moved with the speed setpoint entered by the user.

No.	Action
| 3. | ```
 S002:  L       0
        T       "N_SOLL_Drive"      AW258

        L       W#16#400                    2#0000_0100_0000_0000

        T       "STW1_Drive"        AW256

// failure reset
        U       "boReset"           M1.0
        SPBN    S003

        L       W#16#480                    2#0000_0100_1000_0000

        T       "STW1_Drive"        AW256

 S003:  NOP     0
``` |

The speed setpoint of the servo motor is 0 rpm as long as the "boMove" flag is not controlled to a value of "1".

In control word 1 ("STW1"), only bit 10 ("Control by PLC") is set (**W#16#400**).

If faults are active, flag "boReset" can be controlled to a value of "1".
As a consequence, in control word 1 ("STW1") of the servo motor additionally bit 7 ("Acknowledge faults") is set, which acknowledges the fault (**W#16#480**). In this case, flag "boMove" must have the value "0"!

Note	The structure of the relevant (standard) telegram (i.e. STW1, NSOLL_B, etc.) is defined in the PROFIdrive profile. You can find further information about this at the following link:
	SINAMICS S120 / S150 List Manual (Chapter 2.9)

Note	The following addresses are used in the sample project to control the SINAMICS drive:

- AW 256   Control word 1 ("STW1")
- AW 258   Speed setpoint ("NSOLL_B")
- EW 256   Status word 1 ("ZSW1")

Slot	Module	Order number	I Address	Q address	Diagnostic Address
0	SINAMICS-S120-CU310-2PN	6SL3 040-1LA01-0AAx			8175*
X150	PN-IO				8174*
X150.P1 R	Port 1				8173*
X150.P2 R	Port 2				8172*
1	DO SERVO				8171*
1.1	Module Access Point				8171*
1.2					
1.3	Standard Telegramm 1, P~		256...259	256...259	
1.4					
2	DO Control Unit				8170*
2.1	Module Access Point				8170*
2.2	ohne PROFIsafe				8169*
2.3	SIEMENS Telegramm 390, ~		260...263	260...263	