## ☆☆☆ Updating of FBs OS V4.32 11/18/2005

● Remove the OS V4.31's bug – The FUN140 instruction can't correctly execute the successive speed change (DRVC) command for motion control.

## ☆☆☆ Updating of FBs OS V4.31 10/26/2005

● FUN140 instruction supports the new command DRVZ for machine zero return; it can have 3 operation modes for application's choice.

● FUN141 instruction supports the new motion parameter's settings to work with the machine zero return operation
. Parameter 6 : Creep speed for machine zero return
. Parameter 9-1 : Zero return direction
. Parameter 13 : Linear interpolation time constant
. Parameter 15-0 : DOG input
. Parameter 15-1 : Stroke limit input
. Parameter 15-2 : PG0 (Zero point signal) input
. Parameter 15-3 : Clear output
. Parameter 16 : Machine zero point address
. Parameter 17 : Number of zero point signals

● Enhance the password protection
. The PLC main unit verifies the password while being on line connected with the WinProladder software if the ladder program existing the password protection; only passing the correct password, it can allow to have the connection for programming tool.

● It needs WinProladder software V2.34 or later version to support above functions

● Remove the bug - while M1913=1 (Turn off outputs), it had incorrect input status reading from expansion I/O module(s).

● Only passing correct password to allow the ROM PACK operation if the ladder program existing the password protection

● Remove the OS V4.30's bug – The FUN140 instruction can't correctly execute the endless pulse output function for motion control

## .Description of machine zero return command (DRVZ)

Please refer to Chapter 13 (The NC positioning control of FBs-PLC) of Manual II for detailed information about FUN140 instruction; here we only focus the subject on the new command DRVZ for machine zero return application.

The DRVZ command supports three modes of operation for different application requirement; conjoining the FUN141 motion parameter's setting of machine zero return related, it can be listed as below:

| | DRVZ MD0 | DRVZ MD1 | DRVZ MD2 |
|---|---|---|---|
| Parameter 6 (Creep speed) | Must be | Must be | Must be |
| Parameter 9-1 (Return direction) | Must be | Must be | Must be |
| Parameter 15-0 (DOG input) | Must be | Must be | Must be |
| Parameter 15-1 (Limit input) | Optional | Optional | Optional |
| Parameter 15-2 (PG0 input) | No need | No need | Must be |
| Parameter 15-3 (CLR output) | Optional | Optional | Optional |
| Parameter 16 (Zero point address) | Must be | Must be | Must be |
| Parameter 17 (No. of PG0 signal) | No need | No need | Must be |

The FUN140 instruction can't be executed for machine zero return while encountering the following situations with the error indications:

| Error indication | Error code |
|---|---|
| R4060 (Ps 0) | 42 : DRVZ can't follow DRVC |
| R4061 (Ps 1) | 50 : Illegal operation mod of DRVZ |
| R4062 (Ps 2) | 51 : Illegal DOG input |
| R4063 (Ps 3) | 52 : Illegal PG0 input |
| | 53 : Illegal CLR output |

### . Example program 1 for DRVZ

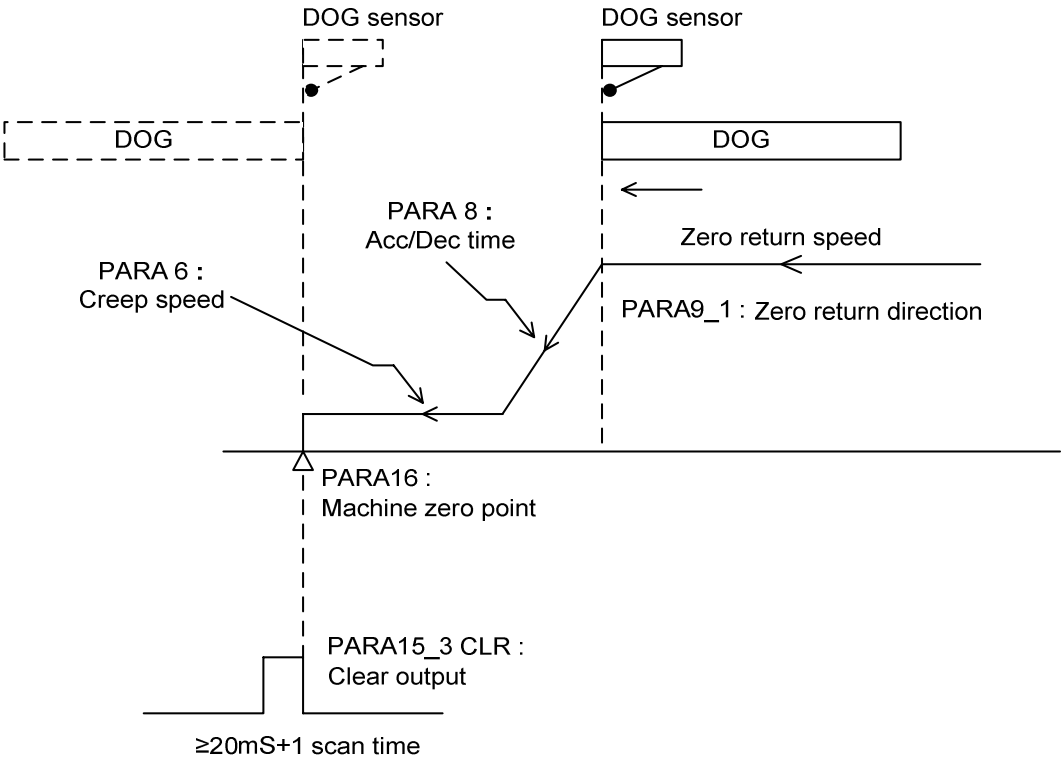
```
SPD     R1000
DRVZ    MD0
MEND
```

### . Example program 2 for DRVZ

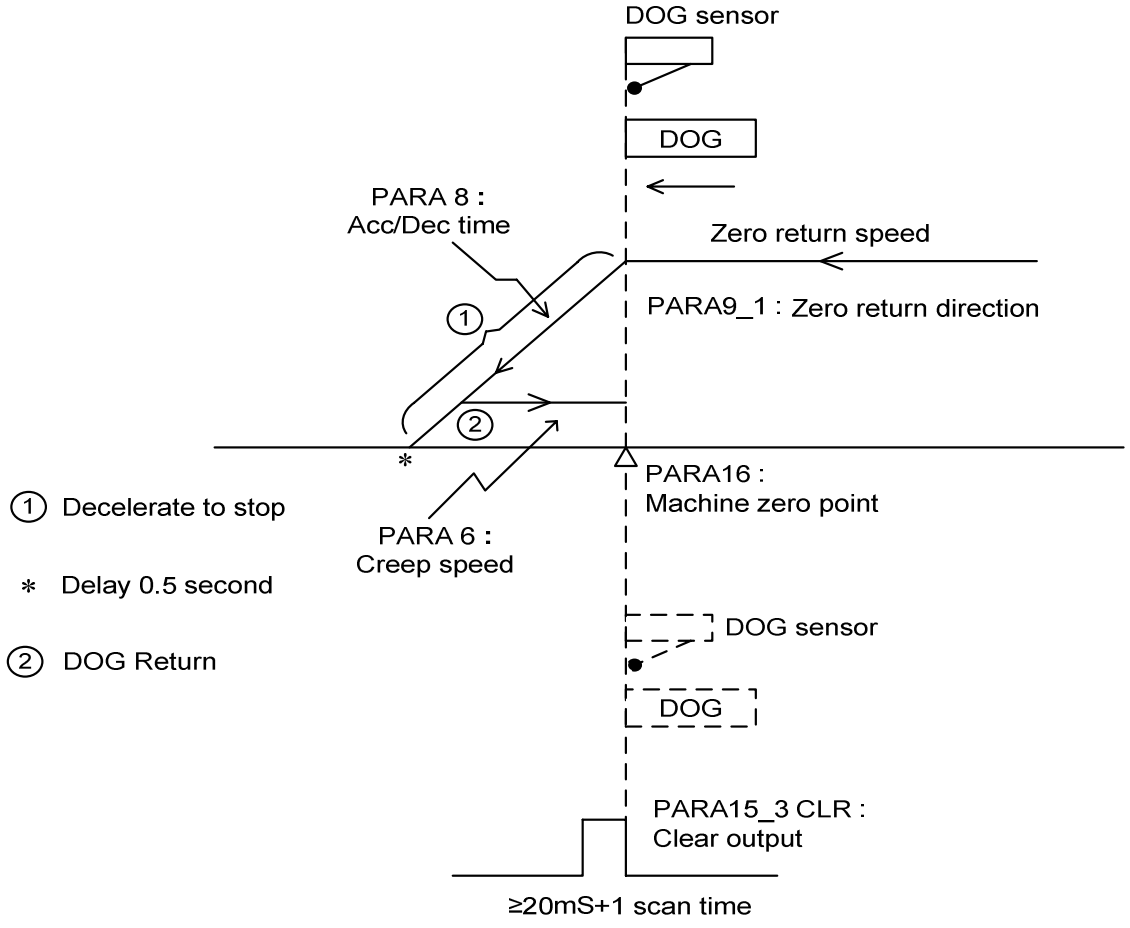
```
SPD     R1000
DRVZ    MD1
WAIT    M0  GOTO   NEXT
```

## .Description in diagram for machine zero return operation

Mode 0




Mode 1

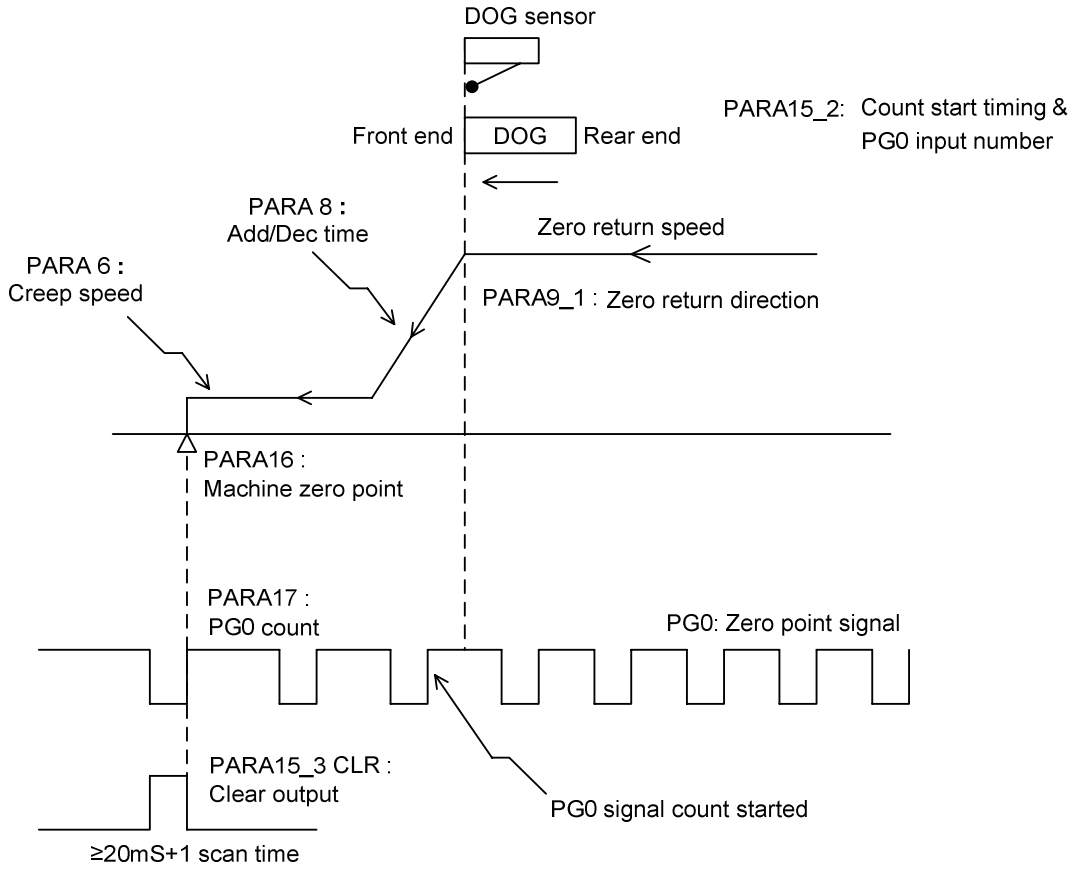



① Decelerate to stop

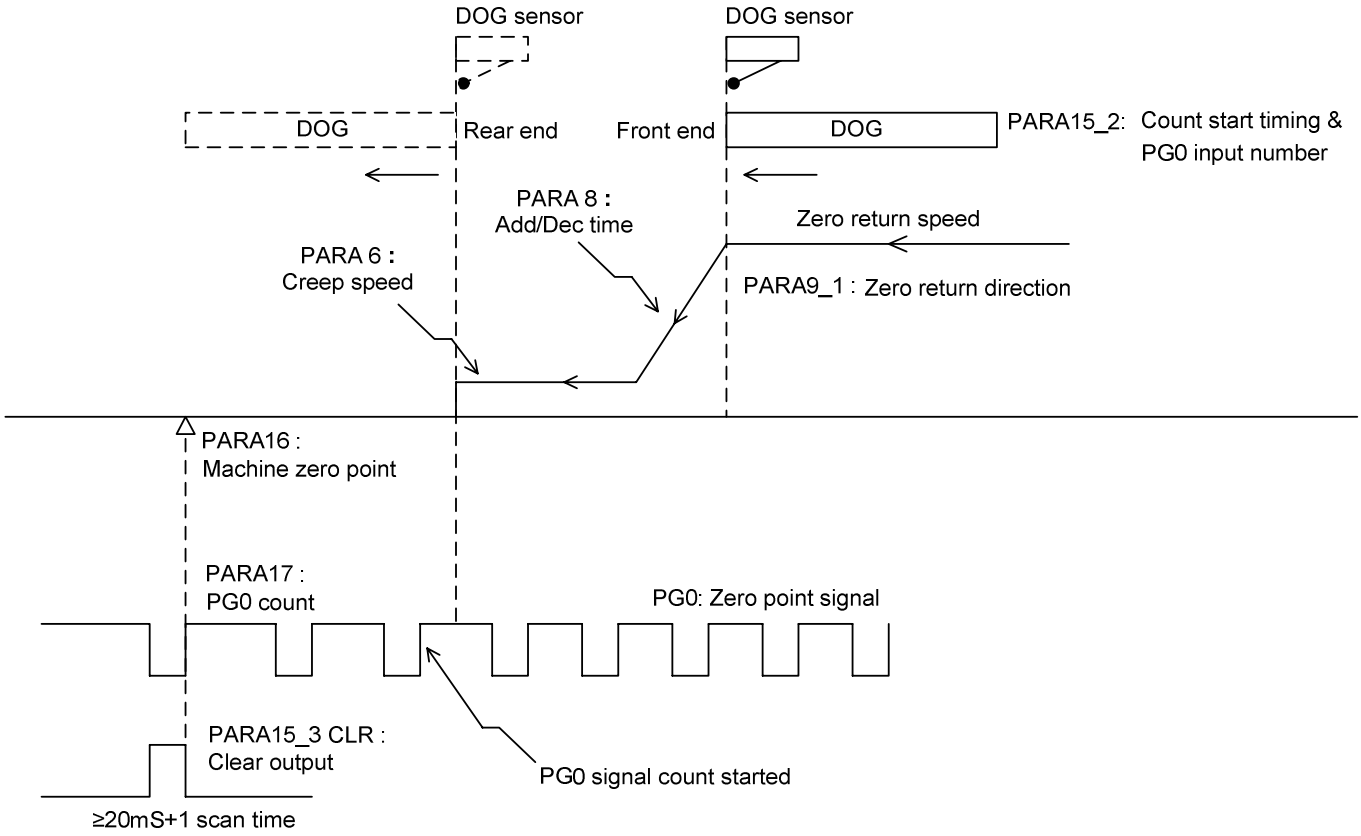
* Delay 0.5 second

② DOG Return

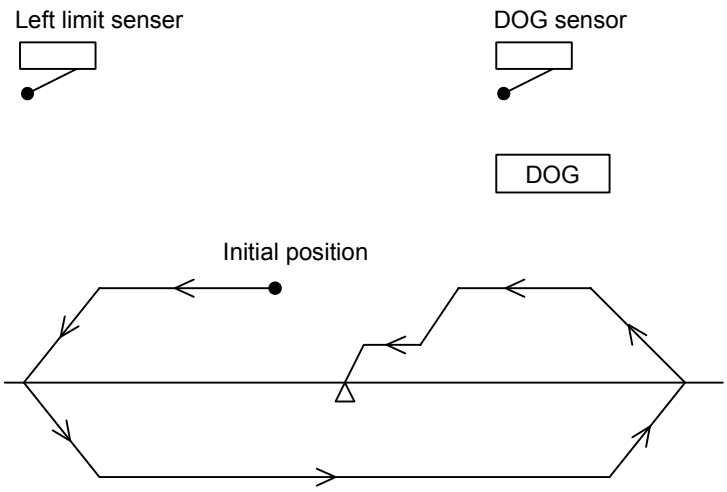
Mode 2(Front end counter)




Mode 2(Rear end counter)



When initial position behind the DOG sensor



## .Description of machine zero return related parameters

Please refer to Chapter 13 (The NC positioning control of FBs-PLC) of Manual II for detailed information about FUN141 instruction; here we only focus the subject on the new parameters working with command DRVZ for machine zero return application.

### FUN141 Motion parameter table

| | | | |
|---|---|---|---|
| SR+0 | 0～2 | Parameter 0 | Default =1 |
| SR+1 | 1～65535 Ps/Rev | Parameter 1 | Default =2000 |
| SR+2 | 1～999999 uM/Rev<br>1～999999 mDeg/Rev<br>1～999999×0.1 mInch/Rev | Parameter 2 | Default =2000 |
| SR+4 | 0～3 | Parameter 3 | Default =2 |
| SR+5 | 1～921600 Ps/Sec<br>1～153000 | Parameter 4 | Default =460000 |
| SR+7 | 1～921600 Ps/Sec<br>1～153000 | Parameter 5 | Default =141 |
| SR+9 | 1～65535 Ps/Sec | Parameter 6 | Default =1000 |
| SR+10 | 0～32767 | Parameter 7 | Default =0 |
| SR+11 | 0～30000 | Parameter 8 | Default =5000 |
| SR+12 | 0～1 / 0～1 | Parameter 9 | Default =0100H |
| SR+13 | -32768～32767 | Parameter 10 | Default =0 |
| SR+14 | -32768～32767 | Parameter 11 | Default =0 |
| SR+15 | 0～30000 | Parameter 12 | Default =0 |
| SR+16 | 0～30000 | Parameter 13 | Default =500 |
| SR+17 | 0～4294967295 | Parameter 14 | Default =0 |
| SR+19 | 00H～FFH / 00H～FFH | Parameter 15 | Default =FFFFFFFFH |
| SR+20 | 00H～FFH / 00H～FFH | Parameter 16 | Default =0 |
| SR+21 | -999999～999999 | Parameter 17 | Default =1 |
| SR+23 | 0～255 | | |

●Parameter 6：Creep speed for machine zero return; the default is 1000
Motor and compound unit : 1～65535 Ps/Sec
Machine unit : 1～15300 (Cm/Min, ×10 Deg/Min, Inch/Min)

●Parameter 9：Rotation and zero return direction; the default is 0100H

| | b15 b8 | b7 b0 |
|---|---|---|
| SR+12 | Para 9-1 | Para 9-0 |

●Parameter 9-0：Rotation direction setting; the default is 0
Setting value=0, the present value increases while in forward pulse output; the present value decreases while in backward pulse output
Setting value=1, the present value decreases while in forward pulse output; the present value increases while in backward pulse output

●Parameter 9-1：Zero return direction setting; the default is 1
Setting value=0, direction in which the present value increases
Setting value=1, direction in which the present value decreases

●Parameter 13：Interpolation time constant; the default is 500
.Setting range : 0～30000 mS
.Set the time required to achieve the speed specified by the program. (The initiate speed is always regarded as “0”.)
This parameter is valid while interpolation control

●Parameter 15：I/O control interface for DRVZ; the default is FFFFFFFFH

| | b15 b8 | b7 b0 |
|---|---|---|
| SR+19 | Para 15-1 | Para 15-0 |
| SR+20 | Para 15-3 | Para 15-2 |

●Parameter 15-0：Setting of DOG input; it must be the input of the main unit (SR+19)
b6～b0 **:** Reference number of DOG input
（0～15, it means X0～X15）
b7 = 0 **:** Contact A or Normal Open
= 1 **:** Contact B or Normal Close
b7～b0=FFH, Without DOG input

●Parameter 15-1：Setting of stroke limit input (SR+19)
b14～b8 **:** Reference number of limit input
(0～125, it means X0～X125）
b15 = 0 **:** Contact A or Normal Open
= 1 **:** Contact B or Normal Close
b15～b8=FFH, Without limit input

●Parameter 15-2：Setting of PG0 signal input; it must be the input of the main unit (SR+20)

b6～b0：Reference number of PG0 input

（0～15, it means X0～X15）

b7 = 0：Start counting at front end of sensing DOG input

b7 = 1：Start counting at rear end of sensing DOG input

b7～b0 = FFH, Without PG0 input

●Parameter 15-3：Setting of CLR signal output; it must be the output of the main unit (SR+20)

b15～b8：Reference number of CLR output

（0～23, it means Y0～Y23）

b15～b8=FFH, Without CLR output

●Parameter 16：Machine zero point address; the default is 0

Setting range : -999999～999999 Ps

●Parameter 17：Number of zero point signals (Sensing of PG0 input);

the default is 1.

Setting range : 0～255 Count

# ☆☆☆ Updating of FBs OS V4.24

8/31/2005

● Port 1～4 support Modbus RTU/ASCII (Slave) communication protocol

. Method 1 (All OS versions of FBs PLC can support this method)

R4047 : Upper Byte = 55H，configure the communication port of Modbus RTU protocol

= Other values，Port 1～4 don't support Modbus RTU protocol
(FATEK as the default)

Lower Byte : Port assignment for Modbus RTU protocol

Format as below :

| Upper Byte | Lower Byte | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 55 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |

b0, Reserved ;

b1=0, Port 1 acts as FATEK protocol
=1, Port 1 acts as Modbus RTU protocol

b2=0, Port 2 acts as FATEK protocol
=1, Port 2 acts as Modbus RTU protocol

b3=0, Port 3 acts as FATEK protocol
=1, Port 3 acts as Modbus RTU protocol

b4=0, Port 4 acts as FATEK protocol
=1, Port 4 acts as Modbus RTU protocol

.
.
.

b7～b5, Reserved

※ It allows to assign multiple ports for Modbus RTU protocol，where the corresponding bit must be 1。

For example:
R4047=5502H, Assign Port 1 as Modbus RTU protocol ;
R4047=5504H, Assign Port 2 as Modbus RTU protocol ;
R4047=5506H, Assign both Port 1 & Port 2 as Modbus RTU protocol。

. Method 2 (FBs PLC OS V4.24 or later can support this method)

R4047 : Upper Byte = 56H，configure the communication port of FATEK or Modbus RTU/ASCII communication protocol

= Other values，it doesn't work above function

Lower Byte : Port assignment for communication protocols

Format as below :

| Upper Byte | Lower Byte | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 56 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |

| Bits | Value | Description |
|---|---|---|
| b1b0 | 0 or1 | Port 1 works FATEK protocol |
| | 2 | Port 1 works Modbus RTU protocol |
| | 3 | Port 1 works Modbus ASCII protocol |
| b3b2 | 0 or 1 | Port 2 works FATEK protocol |
| | 2 | Port 2 works Modbus RTU protocol |
| | 3 | Port 2 works Modbus ASCII protocol |
| b5b4 | 0 or 1 | Port 3 works FATEK protocol |
| | 2 | Port 3 works Modbus RTU protocol |
| | 3 | Port 3 works Modbus ASCII protocol |
| b7b6 | 0 or 1 | Port 4 works FATEK protocol |
| | 2 | Port 4 works Modbus RTU protocol |
| | 3 | Port 4 works Modbus ASCII protocol |

- Port 1～4 work the master of Modbus RTU/ASCII communication protocol
  . Enable the FUN150(M-BUS) instruction, let A/R input of instruction be 0, the assigned communication port performs the master of Modbus RTU communication protocol
  . Enable the FUN150(M-BUS) instruction, let A/R input of instruction be 1, the assigned communication port performs the master of Modbus ASCII communication protocol

- Assign the "FORCE to RUN" input of the PLC main unit

- . If the PLC main unit has been assigned with the on-board input to work the "Force to RUN" function, turning on this input more than 3 seconds while PLC stays at STOP mode, the PLC main unit will reset and restart the execution like the power off then power up; the main unit will enter into the RUN mode if it doesn't find any error; the main unit will still stay at the STOP mode if it finds the error

- Enlarge the ladder program capacity up to 20223 Words (19967 W before)
- Remove the bug - while the system contains the maximum digital inputs (256 points in total), it causes the malfunction of Y0~Y7
- Debug the wrong transfer treatment while executing the simultaneous convergence in step ladder programming

# ☆☆☆ Updating of FBs OS V4.23 6/8/2005

● Supporting the working interface for FBs-2A1D/FBs-2DA on-board analog modules, the related interface registers are as below :

. D4071 : This register shows the installation information

High Byte = 5AH, main unit with intelligent board

= Other values, main unit without intelligent board

Low Byte = 1, on-board is FBs-CBE

= 2, on-board is FBs-B2A1D

= 3, on-board is FBs-B2DA

| Value of D4071 | Port 1 Comm. Interface | Analog Interface |
|---|---|---|
| 5A01H (Main unit with FBs-CBE) | .FATEK protocol only<br>.Comm. parameters<br>.Baud Rate : 115200 bps<br>.Data Bit : 7-bit<br>.Parity : Even<br>.Stop Bit : 1-bit<br>.M1960=0, Port 1 is busy<br>.R4040 High Byte=0, Non delay for reply | None |
| 5A02H (Main unit with FBs-B2A1D) | . FATEK protocol only<br>. Comm. parameters<br>.Baud Rate : 104727 bps<br>.Data Bit : 7-bit<br>.Parity : Even<br>.Stop Bit : 1-bit<br>.M1960=0, Port 1 is busy<br>.R4040 High Byte=0, Non delay for reply | .Analog Input : 2 channels<br>.Analog Output : 1 channel<br>.Resolution : 12-bit<br>.Data Format : 14-bit, but valid12-bit<br>.Type of Signal :<br>Voltage: 0～10V / Current: 0～20mA<br>.Without isolation between channels<br>.D4072 : 1st Analog Input Register (0～16380)<br>.D4073 : 2nd Analog Input Register (0～16380)<br>.D4076 : 1st Analog Output Register (0～16380) |
| 5A03H (Main unit with FBs-B2DA) | . FATEK protocol only<br>. Comm. parameters<br>.Baud Rate : 104727 bps<br>.Data Bit : 7-bit<br>.Parity : Even<br>.Stop Bit : 1-bit<br>.M1960=0, Port 1 is busy<br>.R4040 High Byte=0, Non delay for reply | .Analog Output : 2 channels<br>.Resolution : 12-bit t<br>.Data Format : 14-bit, but valid12-bit<br>. Type of Signal :<br>Voltage: 0～10V / Current: 0～20mA<br>. Without isolation between channels<br>.D4076 : 1st Analog Output Register (0～16380)<br>.D4077 : 2nd Analog Output Register (0～16380) |

.Data format of 14-bit, but valid 12-bit representation (0～16380) :

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0 | 0 |

- Floating point instructions (FUN200~FUN213) may combine with V、Z、P0~P9 to serve indirect addressing application.
- Adding the malfunction detection for main unit power failure detection circuit and force entering STOP operation mode while the execution of illegal system reset. If under such situation, the ERR indicator flickers in 1 Hz frequency, and the corresponding indications are as below:
  . The output indicators Y3=ON, Y2=OFF, Y1=ON, Y0=ON
  . The register R4049 will contain the value 11
- Modify the internal display mode for Input/Output、RUN、ERR indicators while PLC main unit stays at STOP or ERROR mode.
- When upgrading the PLC OS firmware version V4.20 or later, it needs version V1.03 of the update utility Os_update.exe for working.

## ☆☆☆ Updating of FBs OS V4.22 5/23/2005

- Modbus communication convenient instruction (FUN150) supports new function code as below :
  . Function code 02 : Read Input Status (1xxxxx, 100001~165535)
  . Function code 04 : Read Input Registers (3xxxxx, 300001~365535)
- Clear the input registers (R3840~R3903) while the power up or changing operation from STOP to RUN mode.
- Revise the writing procedure for ROM PACK manipulation while only the program backup.
- When upgrading the PLC OS firmware version V4.20 or later, it needs version V1.03 of the update utility Os_update.exe for working.

## ☆☆☆ Updating of FBs OS V4.21 3/11/2005

- Revise the Linear Conversion instruction (FUN33)
- Revise the Communication convenient instruction (FUN151 MD2)
- Revise the Read instruction to get 0.1mS high speed timer (FUN92 CN=4)
- When upgrading the PLC OS firmware version V4.20 or later, it needs version V1.03 of the update utility Os_update.exe for working.

## ☆☆☆ Updating of FBs OS V4.20 2/4/2005

- Support floating point instructions FUN200 ～ FUN213
- Revise the hex-key input (FUN77) instruction
- Revise the write (FUN161,WR-DP) instruction for ROM PACK manipulation
- Revise the read (FUN162,RD-DP) instruction for ROM PACK manipulation
- While working in RUN mode, the RUN indicator of the PLC main unit flickers in 10 Hz frequency (Fast blink).
- The manufacturing default is 3 mS as the communication reply delay time

  R4040=0303H ; the defaults are 3 mS for Port 0 & Port 1 reply delay time

  R4041=0303H ; the defaults are 3 mS for Port 2 & Port 3 reply delay time

  R4042=0003H ; the default is 3 mS for Port 4 reply delay time
- When upgrading the PLC OS firmware version V4.20 or later, it needs version V1.03 of the update utility Os_update.exe for working.

## ☆☆☆ Updating of FBs OS V4.10 11/23/2004

- Revise the FUN5 (DIFD, Differential Down) instruction.
- Revise the FUN141 (MPARA, Motion Parameter) instruction, the default value of limited spped setting (Parameter 4) is initialized by 460 KHz.

## ☆☆☆ Updating of FBs OS V4.09 10/27/2004

- Remove the data update bug of FUN150 (Let the Comm. port of the main unit work as the master of the Modbus RTU communication protocol) instruction while reading the slave's discrete status (Fun_code=01h).
- Remove the pulse output bug of FUN140 (High speed pulse output) instruction while the endless motion (The moving stroke setting value = 0, and the unit is in Ut) or successive speed changing control by using the external trigger (EXT) as the transfer condition to forward the next motion step.

# ☆☆☆ Updating of FBs OS V4.08

10/20/2004

● Support the installation detection for main unit On-Board intelligent module, for exa. FBs-CBE…

● Support FBs-2ARTD4/FBs-2ATC4 both analog and temperature input modules

● Provide linear conversion instruction FUN33(LCNV) for below applications:

- Convert the raw reading value of the analog input into the engineering range for display or for proceeding control operation

- Making the linear compensation for the temperature measurement, the measurement value from the PLC's temperature module can be corrected by the value from the standard temperature meter through this instruction

● Provide the write (FUN161,WR-DP) and read (FUN162,RD-DP) instructions for ROM PACK manipulation, where through these instructions, the ROM PACK can be worked as the portable Data Pack for machine working parameters's saving and loading

● Register R4135 provides the information of Hour & Minute from RTC

## ☆☆☆ Updating of FBs OS V4.07 7/23/2004

- Support RUN time On-Line program editing
- Support 30 seconds adjustment for Real Time Clock

## ☆☆☆ Updating of FBs OS V4.06 7/2/2004

- Support 12-bit or 14-bit resolution and number of average for analog inputs
- Support FUN84(TDSP) instruction for 7-segment ／ 16-segment display pattern conversion
- Support M2000=1, high speed pulse output(FUN140) can work
- Modify the OS firmware, the immediate stop of the high speed pulse output (FUN140) wouldn't have the delay
- FUN32(ADCNV) supports the 14-bit raw reading value conversion for the 4～20mA analog inputs
- FUN30(PID) instruction works on 14-bit calculation
- Support special PLC's protection

## ☆☆☆ Updating of FBs OS V4.05 4/10/2004

- Support the reading of FBs-6AD analog inputs, the resolution are 12-bit.
- Support the reading of FBs-TC2/6/16 and FBs-RTD6/16 temperature inputs, the resolution are 0.1 degree.
- Support the FUN86 PID temperature control.
- Support the FUN30 general purpose PID loop control.