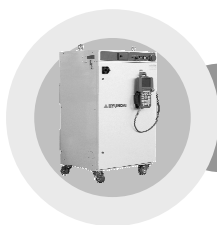




WARNING



**THE INSTALLATION SHALL BE
MADE BY QUALIFIED INSTALLATION
PERSONNEL AND SHOULD
CONFORM TO ALL NATIONAL AND
LOCAL CODES**



Hi4a Controller Function Manual

Prevention Maintenance



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1

**System
Characteristic Data
Monitoring Function**



1. System Characteristic Data Monitoring Function

Prevention Maintenance

- (1) Data monitoring of characteristic data at teaching pendant
- (2) Select 『[PF1]: Service』 → 『1: Monitoring』 → 『11: System characteristic data』

```
00:00:15 *** M A N U A L *** A:D S:2
TC
PN:xxx[ ] S/F:0/0 Sp:25.00

>
Service System Rel.WAIT Cond Set
```

```
00:00:26 ** Service contents ** A:D S:2
1: Monitoring [R245]
2: Register setting
3: Variables
4: Program modify
5: File manager
6: Program conversion
7: System checking
8: Date setting (Day, Time)
9: Data gathering

Use [Number]/[Up][Down] and press [SET].
>
Previous Next
```

```
00:00:57*System characteristic* A:D S:2
1: Axis current offset
2: Axis _ Max torque rate
3: Axis position error level _ max.
4: Axis disturbance torque _ max.
5: Axis disturbance torque rate_max.
6: Axis encoder temperature

Use [Number]/[Up][Down] and press [SET].
>
Line Choose Previous Next
```

```
00:00:46 *** Monitoring *** A:D S:2
0: Monitor OFF
1: Axis data
2: DIO signal [R246]
3: Spot/Stud welding data [R247]
4: Conveyor data
5: Palletize data
6: PLC Relay data [R248]
7: Analog data
9: Servo hand data
10: Cooperation control data
11: System characteristic data

Use [Number]/[Up][Down] and press [SET].
>
Line Previous Next
```

- (3) The Maximum Manual Reset : R300
Reset every kinds of maximum in system characteristic data, re-execute the maximum monitor.
- (4) Axis current offset

- It shows that U and V phase current offset as the Amp.
- Offset renewal of phase current only executes when motor is off.

```
00:33:03 *** A U T O *** A:D S:2
TC SR:100% 1Cycl
PN:xxx[ ] S/F:0/0

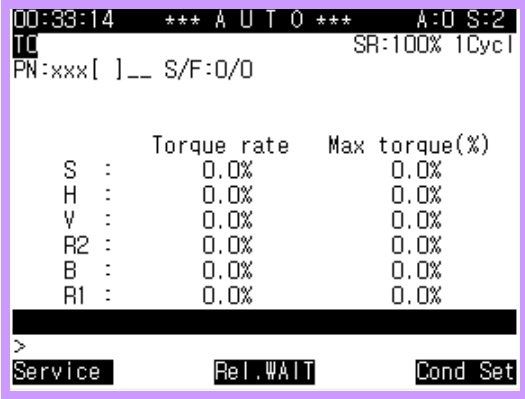
<Cur offset> U V
S : 0.00A 0.00A
H : 0.00A 0.00A
V : 0.00A 0.00A
R2 : 0.00A 0.00A
B : 0.00A 0.00A
R1 : 0.00A 0.00A

>
Service Rel.WAIT Cond Set
```


1. System Characteristic Data Monitoring Function

(5) Axis & Max torque rate

- Monitoring as instantaneous load factor [%] prepared to the rating torque to the current torque
- Maximum of occurred torque at each axis after putting power on the controller



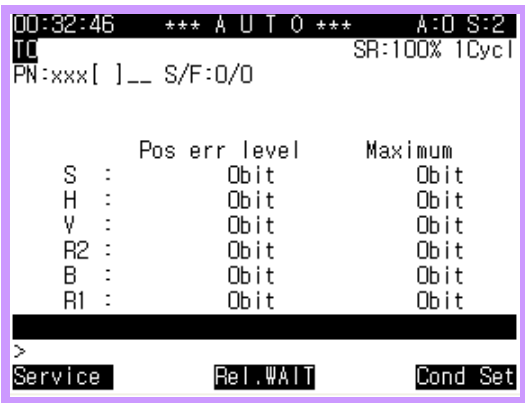
00:33:14 *** A U T 0 *** A:0 S:2
TC SR:100% 1Cycl
PN:xxx[]__ S/F:0/0

	Torque rate	Max torque(%)
S :	0.0%	0.0%
H :	0.0%	0.0%
V :	0.0%	0.0%
R2 :	0.0%	0.0%
B :	0.0%	0.0%
R1 :	0.0%	0.0%

>
Service Rel.WAIT Cond Set

(6) Axis position error level & max.

- Indicate as amount of encoder bit
- Position deviation maximum that has been occurred at each axis after putting the power of controller On



00:32:46 *** A U T 0 *** A:0 S:2
TC SR:100% 1Cycl
PN:xxx[]__ S/F:0/0

	Pos err level	Maximum
S :	0bit	0bit
H :	0bit	0bit
V :	0bit	0bit
R2 :	0bit	0bit
B :	0bit	0bit
R1 :	0bit	0bit

>
Service Rel.WAIT Cond Set

(7) Axis disturbance torque & max.: Only support dynamic model registration types of robot

- Disturbance torque maximum that has been occurred at each axis after controller power is On.
- Disturbance torque maximum is updated only during manual jogging and playing. It is not updated at GUN pressurization operation and etc.

```

00:33:26 *** A U T O *** A:0 S:2
TC SR:100% 1Cycl
PN:xxx[ ]__ S/F:0/0

```

	Pos err level	Maximum
S :	Obit	Obit
H :	Obit	Obit
V :	Obit	Obit
R2 :	Obit	Obit
B :	Obit	Obit
R1 :	Obit	Obit

```

>
Service Rel.WAIT Cond Set

```

(8) Axis disturbance torque rate&max. : Only support dynamic model registration types of robot

- Maximum of Occurred Disturbance torque change rate after controller power On
- Disturbance torque change rate is updated only during manual jogging and playing. It is not updated at GUN pressurization operation and etc.

```

00:33:38 *** A U T O *** A:0 S:2
TC SR:100% 1Cycl
PN:xxx[ ]__ S/F:0/0

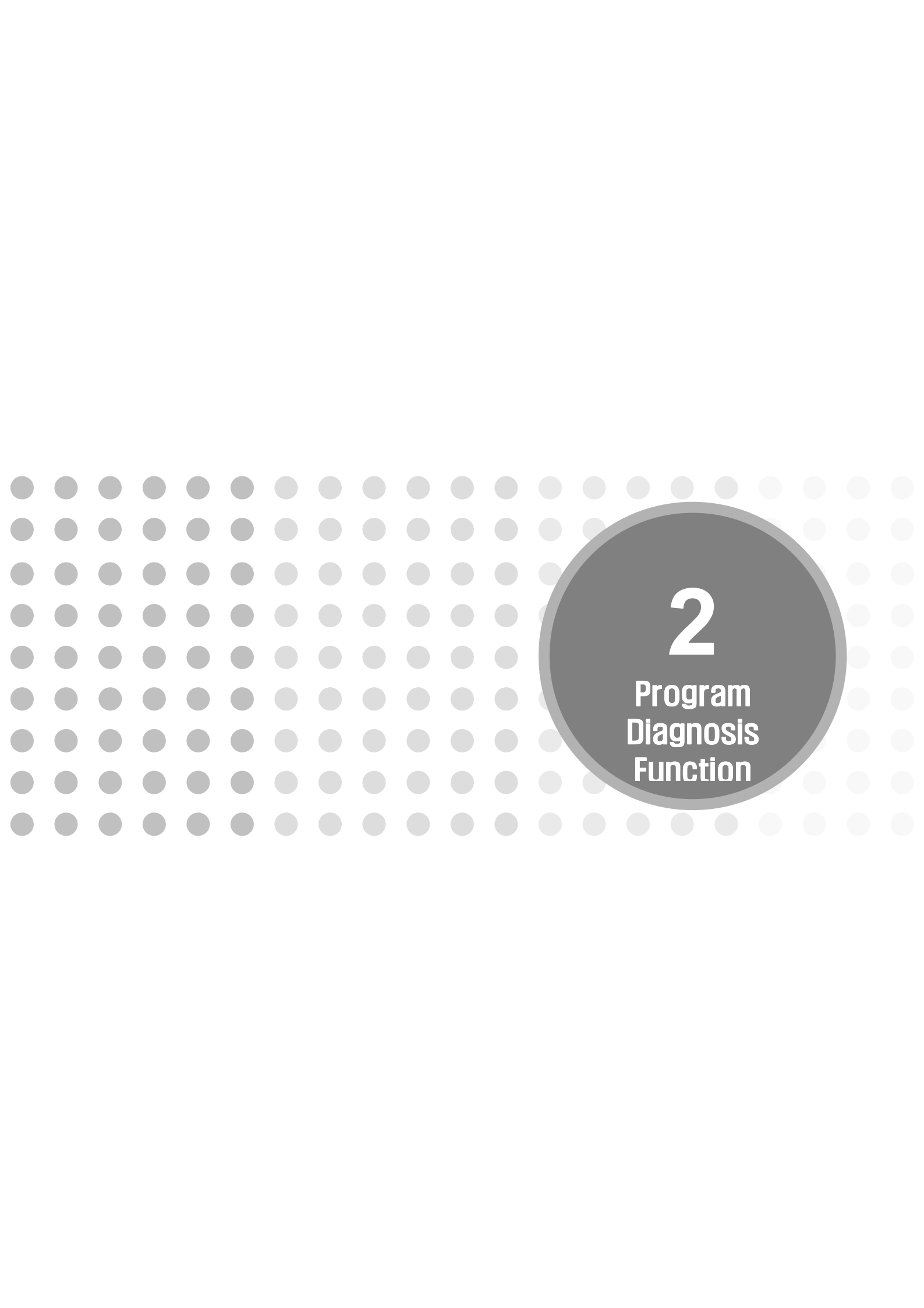
```

	Disturbance Tq	Maximum
S :	0.0	0.0
H :	0.0	0.0
V :	0.0	0.0
R2 :	0.0	0.0
B :	0.0	0.0
R1 :	0.0	0.0

```

>
Service Rel.WAIT Cond Set

```



2

Program Diagnosis Function



2. Program Diagnosis Function

Prevention Maintenance

(1) 『[PF2]: System』 → 『1: User parameter』 → 『17: Make pro. Diagnosis file』

```
00:00:15 *** M A N U A L *** A:0 S:2
TC
PN:xxx[ ] S/F:0/0 Sp:25.00

>
Service System Rel.WAIT Cond Set
```

```
00:59:00 *** System setting *** A:0 S:2
1: User parameter
2: Controller parameter
3: Machine parameter
4: Application parameter
5: Initialize
6: Automatic constant setting

Use [Number]/[Up][Down] and press [SET].
>
Previous Next
```

```
00:59:25** User configuration **A:0 S:2
13:Collision sensor
(1)Sensor = <Emergenc, Stop>
(2)Signal logic = <Posi, Negative>
14:FIFO Function
(1)Application No. = <DSBL, 20EA, 1EA>
(2)Program = <Ext-Set., Int-Set.>
15:Ext-update PBack prog = <DSBL, ENBL>
16:When STOP, manual operat'g = <DSBL, ENBL>
17:Make prog. diagnosis file = <DSBL, ENBL>
(1)Program = [ 1 ] (2)file no = [ 1 ]
18: Record for servogun open = <DSBL, ENBL>
Press [SHIFT]+[<-] [ -> ] Key.
>
Previous Next End
```

- Program : Robot operational program number of diagnosis subject
- File no : File number to save the diagnosis result (ROBOT.R01~R99)
- Record report file while 1cycle or continuous operation
- Regular renewal while playing the program continuously
- Diagnosis result file is not renewable when occurring the Internal stop or External stop, Motor Off, Emergency and etc.
- Diagnosis function is valid even if Program CALL occurs.
- Diagnosis file is not renewable when occurring Program JUMP.
- User can periodically manage the condition of robot as writing out diagnosis result file of the standard operation program.

2.1. Contents of program diagnosis result file

- (1) Program basic data
Robot type, total axis, program number, total step, playing speed rate, run time, write out date
- (2) Diagnosis data
Current Offset, average/max torque, Rated torque over time, average/max position difference.

2.2. Program diagnosis result checking

The program diagnosis result will be saved as a file. The final result can be saved to the computer and can be checked at the computer through the HRView. Also it can be checked at teaching pendant directly.

- (1) 『[PF1]: Service』 → 『7: System checking』 → 『8: Program diagnosis』

```
00:00:15 *** M A N U A L *** A:0 S:2
TC
PN:xxx[ ]__ S/F:0/0 Sp:25.00

>
Service System Rel.WAIT Cond Set
```

```
01:00:53 ** Service contents ** A:0 S:2
1: Monitoring [R245]
2: Register setting
3: Variables
4: Program modify
5: File manager
6: Program conversion
7: System checking
8: Date setting (Day, Time)
9: Data gathering

Use [Number]/[Up][Down] and press [SET].
>
Previous Next
```

```
01:01:10*** System checking *** A:0 S:2
1: System version [R286]
2: Running time [R 10]
3: Diagnosis of troubles
4: Error logging
5: Stop logging
6: History of operation
7: Hinet check
8: Program diagnosis
9: Encoder noise inspection
10: Ethernet diagnosis

Use [Number]/[Up][Down] and press [SET].
>
Previous Next
```

```
01:01:22 * Program diagnosis * A:0 S:2
Program diagnosis file number =[0]
-----

Select and Enter number. Press [SET]
>[0 - 99]
Help End
```




3

**Data Gathering
Function**



3. Data Gathering Function

Prevention Maintenance

- (1) Data gathering result file : ROBOT.GD0~GD9
It can be managed by backing up through HRView.

- (2) User menu
『[PF1]: Service』 → 『9: Data gathering』 function

```
00:00:15 *** M A N U A L *** A:D S:2
TC
PN:xxx[ ]__ S/F:0/0 Sp:25.00

>
Service System Rel.WAIT Cond Set
```

```
01:02:46 ** Service contents ** A:D S:2
1: Monitoring [R245]
2: Register setting
3: Variables
4: Program modify
5: File manager
6: Program conversion
7: System checking
8: Date setting (Day, Time)
9: Data gathering

Use [Number]/[Up][Down] and press [SET].
>
Previous Next
```

```
01:02:56 ** Data Gathering ** A:D S:2
Gathering file : ROBOT.GD[0]

Sampling time : [ 20]msec
Parameter
1:[ 0] 2:[ 0] 3:[ 0] 4:[ 0]
5:[ 0] 6:[ 0] 7:[ 0] 8:[ 0]
9:[ 0] 10:[ 0] 11:[ 0] 12:[ 0]
Refer to HELP for Parameter setting

Max gathering time: [ 1]sec

Enter number and press [SET]
>[0 - 9]
Help Complete
```

- Gathering file : ROBOT.GD0~9
- Sampling time : minimum 10msec
- Parameter
Gathering possible until 12 parameters at the same time
Parameter type input is possible refer to the help manual by pressing PF1[Help] key.
- Max gathering time
Automatic calculation according to the sampling time and parameter number

- (3) Data gathering instruction

- GATHER var
var = 1 : Data gathering start
var = 0 : Data gathering end, Automatic end when becoming maximum gathering time
- Data gathering is operated in program 1cycle or continuously playback mode.
It is not operated in step go/back or 1step playback mode.

3. Data Gathering Function

- Collecting data with the occurrence of internal stop or External stop, Motor Off, Emergency and etc.
After data gathering is started, it is gathered until the end instruction or designated time.
- Data gathering file is always renewed.

(4) Setup method to collect the data

- 4 digit parameter number : [ABCD]
- [AB] : Axis number
0 is the parameter that is not relevant with axis.
1-12 is relevant axis number.
- [CD] : Parameter number
 - ① In the case of AB=0
00: No parameter designation
01: Tool end position X
02: Tool end position Y
03: Tool end position Z
31~46: Public input signal DIW01(DI16:DI1) ~ DIW16(DI256:DI241)
71~86: Public output signal DOW01(DO16:DO1)~DOW16(DO256:DO241)
 - ② AB=the case of each axis
00: No parameter designation
01: Angle of each axis
02: Speed of each axis
03: Load ratio of each axis
04: Position deviation of each axis
- Help to set up the parameter will be indicated when pressing 『[PF1]: Help』 key.

```
01:03:35 ** Data Gathering ** A:D S:2
Parameter number 4 : [ABCD]

[AB] : Axis number
      0 is a regardless param for axis
      1-12 is axis number
[CD] : Parameter number
  1) case AB=0
    00: not assigned parameter
    01: Tool end X position
    02: Tool end Y position
    03: Tool end Z position
>
Previous Next Escape
```

```
01:03:47 ** Data Gathering ** A:D S:2
21: All ~,
31: DIW01(DI16 - DI1) ~
46: DIW16(DI256 - DI241)
71: DOW01(DO16 - DO1) ~
86: DOW16(DO256 - DO241)
2) case AB=Axis
  00: not assigned parameter
  01: Axis angle
  02: Axis speed
  03: Axis torque rate
  04: Axis position error level
>
Previous Next Escape
```

(5) Contents of gathering result file

■ Parameter number

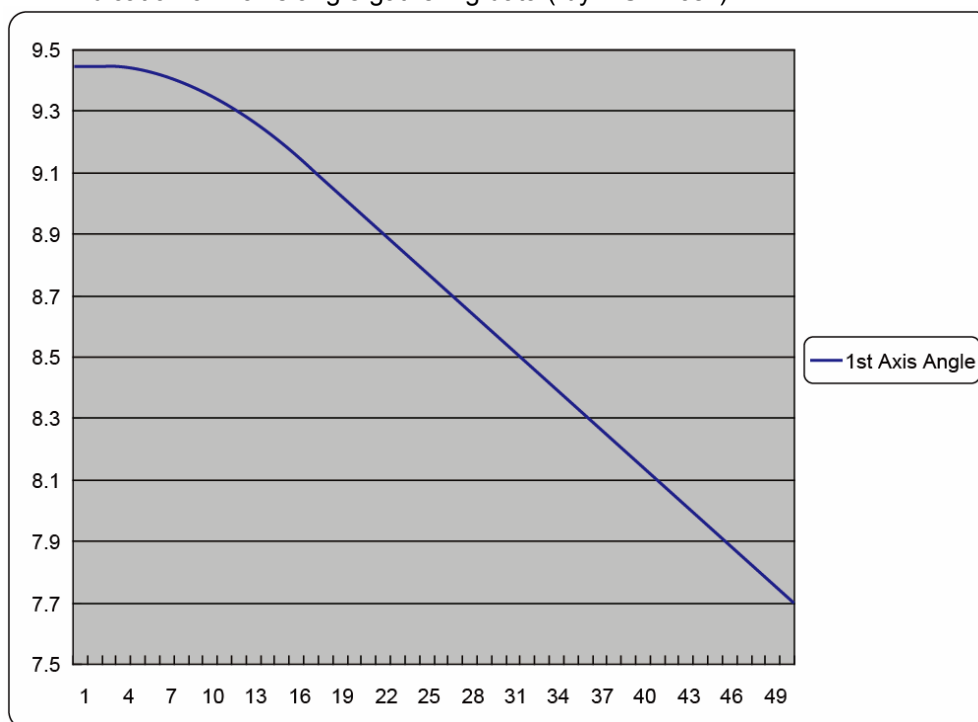
1 2 3 31 46 71 86 101 102 103 104 201

■ data

```
1 -284.063 1800.016 2276.735 01010101010101 0000000000000000
  0000000000000000 0000000000000000 9.446 -5.132 0 0 84.380
2 -284.063 1800.016 2276.735 01010101010101 0000000000000000
  0000000000000000 0000000000000000 9.446 -5.235 0 0 84.380
3 -283.996 1800.019 2276.680 01010101010101 0000000000000000
  0000000000000000 0000000000000000 9.444 -5.338 0 0 84.382
```

⋮
⋮

■ Indication of 1 axis angle gathering data (by MS Excel)



◆ Other ◆

(1) MAIN CPU VERSION

■ After V10.07-15

(2) SERVO DSP VERSION

■ After V4.17



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