

## Thunder 1.10.6.0 Release Notes

Release Date: 02/27/2024

The goal of this document is to inform that a new version of official software/firmware is released for HIWIN E series servo drives. Updates made in this version are listed in below table:

Type	Name	Version	Updates
Software	Thunder Human Machine Interface	1.10.6.0	16 new features, 9 bug fixes, 1 known issue
MDP firmware	E1	2.10.6	7 new features, 5 bug fixes, 2 known issues
	E1COE	2.10.6	17 new features, 10 bug fixes, 3 known issues
	E2	3.10.6	8 new features, 7 bug fixes, 2 known issues
	E2COE	3.10.6	14 new features, 11 bug fixes, 3 known issues

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# 1. Software

## 1.1 Thunder Human Machine Interface

### 1.1.1 New Features

#### 1.1.1.1 Version 1.10.6.0

No.	Summary	Description
7989	Add the "Load prm file" window, which allows users to view the comparison before and after conversion before loading	In this version, the "Parameters comparison" window is added, which will pop up to facilitate users to view the differences in Pt parameters before the prm file is loading.
8205	In Thunder "PROFINET setup" interface, ineffective setting fields are hidden based on the telegrams or mechanism settings	In this version, the corresponding parameters setup field will be enabled only if users select the correct telegram.
8206	In Thunder "PROFINET setup" interface, telegram 3 parameter adds the corresponding unit switching fields for Siemens controllers	In this version, the unit of the controller that converted from the velocity reference will be displayed based on the mechanism.
8753	"PROFINET setup" interface supports the function of telegram 102	This version supports the setting interface for telegram 102.
8339	EtherCAT servo drive supports Thunder connection via EoE	In this version, EtherCAT servo drive supports Thunder connection via EoE. Refer to "E Series Servo Drive Thunder over EtherCAT User Manual" for operating information.
8919	Add the control function in "Access"	In this version, the warning window will pop up if users click "Access" to switch the mastership during enabling.
9079	Optimize connection window	In this version, the display of the connection window is simplified based on the existing standard and Fieldbus models.
8537	Thunder supports users to load Renishaw laser interferometer for error map table measurement	This version supports users to load files (.emp, .rtl, .rta) from "Error map setup" interface.
8961	Change the upper limit of multiplier factor value for the analog encoder in Configuration Wizard	In this version, E2 servo drive can be used with analog encoder directly, and the maximum multiplier factor is 65536.
8743	In gantry control system, master servo drive supports slave's Pt parameters	In this version, gantry control system interface has been optimized. With firmware version 2.10.6 (E1) / 3.10.6 (E2) or above, after the communication of master and slave axis has completed, users can read/write the Pt parameters of

No.	Summary	Description
	reading / writing, alarms and version reading	slave axis from the master axis interface.
8319	Add "Loop constructor"	This version supports Bode plot spectrum analyzer tool, which allows users to check the stability of the control system after adjusting filter Pt parameters and gain Pt parameters.
8747	Change the acceleration/deceleration time in velocity mode of test run	In this version, if the drive is used with firmware version 2.10.6 (E1) / 3.10.6 (E2) or above in test run velocity mode, its acceleration/deceleration time will be Pt318/Pt319 parameters, and not be linked to Pt305/Pt306.
8672	03/06/09A models of E2 110V / 220V servo drive support DC input power	This version supports the power setup in Configuration Wizard, 03/06/09A models of E2 110V / 220V servo drive support DC input power.
8903	Support homing methods 17~18, 23~30	In this version, homing methods 17~18, 23~30 are added in "Homing Operation" window.
8744	Add the user's guide for tuning process	In this version, the prompt window will guide users to perform the setting steps, which helps them quickly conduct a test run.
8745	Add "EtherCAT Object List"	In this version, the read-only "EtherCAT Object List" is added in the "Help" list, which allows users to check if the controller command is received.

## 1.1.2 Bug Fixes

### 1.1.2.1 Version 1.10.6.0

No.	Summary	Description
9089	Fix the problem that the connection window still displays the text of the previous connection interface in offline mode	In this version, the current connection information is only displayed in connecting status.
9152	Fix the problem that under certain operating procedures, abnormal crash occurs during firmware updating	This version fixes the problem that under certain operating procedures, abnormal crash may occur during firmware updating.
9164	Fix the problem that when EM1 series motor is used with 17-bit serial encoder, the alarm ALC52 will pop up after users load the parameters and enable the motor	This version fixes the problem that when EM1 series motor is used with 17-bit serial encoder, the alarm ALC52 (Electrical angle detection incomplete) will pop up after users load the prm file and enable the motor.
8513	Fix the abnormal display of the Pt parameters when switching between different drive models	In this version, the display of "Pt008.tX□□□ - Thermal sensor detection" will be the same after Thunder is connected to E1 and then reconnected to E2.
8171	Fix the abnormal activation of Hall sensor after enabling full-closed loop control	In this version, when users open the "Encoder setup" page after the servo drive configuration is done, the activation option of Hall sensor will not be changed by the activation of full-closed loop control.

No.	Summary	Description
8626	Add the setup reminder for multiplier factor and grating period	In this version, if an analog Hall sensor is selected for encoder setup and the number of multiplier factor/grating period is not divisible, a prompt window will pop up before users leave the setup window.
8625	Fix the multiplier factor of the analog encoder series "Analog Hall sensor 30mm"	In this version, in the "Encoder setup" page in Configuration Wizard, the default value of multiplier factor of the analog encoder series "Analog Hall sensor 30mm" has been adjusted from 4096 to 3000 to avoid the number of multiplier factor/grating period not being divisible.
8963	Add the upper limit prompt for feedback position overflow	when the motor uses with a multi-turn encoder, the prompt will display based on the setting conditions, "When the encoder is used as a multi-turn absolute encoder, the travel distance of the mechanism movement cannot exceed XXX (mm or rev). Otherwise, there will be a risk of counting overflow in feedback position."
8508	Fix the abnormal display when loading E2 parameter file in offline mode	In the previous version, when downloading the E2 parameter file in offline mode, the product model displayed by Thunder would be E1. In this version, the problem is fixed.

### 1.1.3 Known Issues

#### 1.1.3.1 Version 1.10.6.0

No.	Summary	Description and workaround
9392	When the resolution of encoder is not 1 um, the compensation values converted by loading Renishaw error map (.rtl) are incorrect	<p><b>Description:</b> In this version, when the resolution of encoder is not 1 um, the compensation values converted by loading Renishaw error map (.rtl) will be abnormal, so the compensation cannot be correctly performed.</p> <p><b>Workaround:</b> Manually set the values in "Error map setup" window.</p>

## 2. Firmware

### 2.1 MDP firmware (E1 / E1COE)

#### 2.1.1 New Features

##### 2.1.1.1 Version 2.10.6

No.	Summary	Description
7668	Support homing methods using near home sensor	This version supports homing methods 17~18, 23~30 using near home sensor. Refer to section 8.11.2 in "E1 Series Servo Drive User Manual" for operating methods.
8219	Add Pt140.t□□□X - Model following control selection	This version supports model following control function.
8949	When absolute position measurement APM-C-□□-□H-T-□□ is used with SSA series motor, it can automatically identify the connected motor and set the related parameters	In this version, when absolute position measurement APM-C-□□-□H-T-□□ is used with SSA series motor, it can automatically identify the connected motor and set the related parameters.
4218	In gantry control system, master servo drive supports slave's Pt parameters reading / writing, alarms and version reading	In this version, gantry's master can support slave's Pt parameters reading / writing, alarms reading, parameters sending to drive, and it also provides the window for users to check if its firmware version is the same as slave's firmware version.
8062	Add Pt022.t□□X□ - Detection method for velocity reach output (V-CMP) signal	In this version, users can decide the detection method for velocity reach output (V-CMP) signal. Refer to section 8.3.6 in "E1 Series Servo Drive User Manual" for details.
8019	Velocity mode and internal velocity mode use different acceleration / deceleration time	This version adds internal velocity mode acceleration / deceleration time (Pt318 / Pt319), which is for internal velocity mode and test run; velocity mode uses the original acceleration / deceleration time parameters (Pt305 / Pt306).
8746	When users use Configuration Wizard for the first time, alarm value for overflow position deviation will be automatically adjusted	In this version, when users use Configuration Wizard for the first time, alarm value for overflow position deviation (Pt520 or Pt521) will be automatically adjusted based on the set parameters (motor, encoder, electronic gear ratio).
8914	(Only for Fieldbus) EtherCAT servo drive supports Thunder connection via EoE	In this version, EtherCAT servo drive supports Thunder connection via EoE. Refer to "E Series Servo Drive Thunder over EtherCAT User Manual" for operating information.
8554	(Only for Fieldbus) Optimize the collecting function of object 0x606C (Velocity actual value)	This version optimizes the collecting function of object 0x606C (Velocity actual value) to make the object values more precise.

No.	Summary	Description
8240	(Only for Fieldbus) Change the mastership switching function (Access) of Fieldbus servo drive	In this version, the "Access" can only be switched in disabled status. EtherCAT servo drive can be connected to EtherCAT communication after power on instead of being controlled by the "Access."
8148	(Only for Fieldbus) Add relative objects of analog output	In this version, when Pt006.t□□17 and Pt007.t□□17 are set, Fieldbus servo drive can control analog output via object 3067h and 3068h. Users can monitor analog output via object 4098h and 4099h.
7518	(Only for Fieldbus) Add relative objects of position trigger function	In this version, when random interval of position trigger function (Pt00E.t□□2□ and Pt00E.t□□3□) is selected, users can write position trigger array via object 3069h~306Ch.
7181	(Only for Fieldbus) Position trigger function supports touch probe homing	In this version, users can set Pt00E.t1□□□ to activate the position trigger function via touch probe homing.
8827	(Only for Fieldbus) Add the protecting function to prevent PROFINET drive from performing absolute position movement before completing homing with telegram 9 and 111	In this version, the protecting function is added to prevent PROFINET drive from performing absolute position movement before completing homing with telegram 9 and 111.
8964	(Only for Fieldbus) Support PROFINET drive to use Siemens SINA_POS function block when ModePos is set to 3	In this version's telegram 111, the motion mode of Siemens SINA_POS function block is supported when ModePos is set to 3.
8957	(Only for Fieldbus) PROFINET drive supports telegram 102	In this version, telegram 102 is added, which supports "Torque limit" and "Traversing to fixed stop" of Siemens controller.
8813	(Only for Fieldbus) Change the MDI_VELOCITY variable type of telegram 9 and 111 to Int32, which is also not allowed to be set to a negative value	In this version, the MDI_VELOCITY variable type of telegram 9 and 111 has been changed to Int32 in PROFINET firmware, which is also not allowed to be set to a negative value. If users set the variable to a negative value, it will be forcibly changed to 0.

## 2.1.2 Bug Fixes

### 2.1.2.1 Version 2.10.6

No.	Summary	Description
8823	Fix the phenomenon that when a Windows 10 operating system computer is connected to multiple servo drives at the same time, the firmware updating screen of HMI will wait for more than 5 seconds (or even longer) to detect the servo drive	In the previous version, the servo drive does not respond to Windows operating system with enough USB device information, which leads to this phenomenon occurring in Windows 10 operating system. In this version, the problem is fixed.
8798	Fix the problem that the motor cannot be successfully enabled after the phase initialization SW method 1 is completed	In the previous version, after users execute phase initialization via Thunder and complete SW method 1 in Step 2, the motor cannot be successfully enabled in "Test Run" window. In this version, the problem is fixed.
8727	Fix the problem that the alarm ALC50 will be triggered due to the failed detection when the phase initialization SW method 1 does electrical angle searching at the specific position	In the previous version, when the phase initialization SW method 1 does electrical angle searching at the specific position, the detection will fail and the alarm ALC50 (Electrical angle detection failure) will be triggered. In this version, the problem is fixed, and the detection mechanism is optimized.
8918	Change the default value of Pt008.t□□X to 1	In this version, the default value of Pt008.t□□X is changed to 1. When the battery of the encoder is invalid, the warning AL930 (Encoder battery malfunction) will be immediately detected.
8553	Optimize the error detecting mechanism of homing	This version adds the judgment mechanism for the unexpected triggering of limit signal. When the reverse limit signal of the motor movement's direction is mistakenly triggered, the homing procedure will be stopped.
8908	(Only for Fieldbus) Optimize the status function of EtherCAT PDS	In the previous version, EtherCAT servo drive may stay in enabled status if users operate enabling and disabling in a short period of time. In this version, the problem is fixed.
8829	(Only for Fieldbus) Fix the problem that negative values cannot be input for part of the EtherCAT objects	In the previous version, users cannot input negative values for EtherCAT type int8 objects through the host controller. In this version, the problem is fixed.
8136	(Only for Fieldbus) Fix the problem that errors would not be reported when users input incorrect subindex for EtherCAT objects	In the previous version, errors would not be reported when users input incorrect subindex for EtherCAT objects. In this version, the problem is fixed.
9087	(Only for Fieldbus) Fix the problem that when using Siemens controller with MC_Home for homing, failure may occur under certain circumstances	In the previous version, when using Siemens controller with MC_Home for homing, home position may not be found if the motor position is too close to the Z-phase signal. In this version, the problem is fixed.



No.	Summary	Description
8921	(Only for Fieldbus) Fix the problem that when "Detection of safety function alarm" is effective (set Pt010.t1□□□), the alarm can still be successfully cleared even if the STO trigger alarm (ALEb0) has been removed	In the previous version, when "Detection of safety function alarm" is effective (set Pt010.t1□□□), the alarm can still be successfully cleared even if the STO trigger alarm (ALEb0) has been removed. In this version, the problem is fixed.

## 2.1.3 Known Issues

### 2.1.3.1 Version 2.10.6

No.	Summary	Description and workaround
9367	When ESC is used with analog encoder and digital Hall signal, the alarm ALC21 may be triggered if the index signal is touched during the movement of motor	<b>Description:</b> In this version, when ESC is used with analog encoder and digital Hall signal, the alarm ALC21 (Hall sensor error) may be triggered if the index signal is touched during the movement of motor.  <b>Workaround:</b> Downgrade to the older firmware version.
9493	(Only for Fieldbus) EtherCAT servo drive cannot perform PP mode in "PreOp" state	<b>Description:</b> When EtherCAT servo drive performs PP mode in "PreOp" state of EtherCAT State Machine, the commands are invalid.  <b>Workaround:</b> <ol style="list-style-type: none"> <li>1. Change the application scenario: Enter "Op" state before using PP mode.</li> <li>2. Downgrade to the older firmware version 2.7.17.</li> </ol>
4457	PDL variable memory limit change	<b>Description:</b> As to PDL variable memory limit change, related information is listed as below:  2.10.6 - Variable memory left 310 Bytes 2.8.16 - Variable memory left 220 Bytes 2.8.8 - Variable memory left 240 Bytes 2.7.17 - Variable memory left 272 Bytes 2.7.5 - Variable memory left 288 Bytes 2.6.19 - Variable memory left 304 Bytes 2.6.11 - Variable memory left 328 Bytes 2.5.6 - Variable memory left 306 Bytes 2.4.6 - Variable memory left 306 Bytes 2.3.12 - Variable memory left 322 Bytes 2.2.8 - Variable memory left 496 Bytes 2.1.8 - Variable memory left 516 Bytes  <b>Workaround:</b> Reserved variable arrays in the firmware can be used: par16_save[100] (data type int16), par32_save[100] (data type int32).

## 2.2 MDP firmware (E2 / E2COE)

### 2.2.1 New Features

#### 2.2.1.1 Version 3.10.6

No.	Summary	Description
8819	When E2 series servo drive is used with analog encoder, the supported upper limit of multiplier factor is increased to 65536	In this version, when E2 series servo drive is used with analog encoder, the supported upper limit of multiplier factor is 65536 (not including using with ESC).
7668	Support homing methods using near home sensor	This version supports homing methods 17~18, 23~30 using near home sensor. Refer to section 8.11.2 in "E2 Series Servo Drive User Manual" for operating methods.
8219	Add Pt140.t□□□X - Model following control selection	This version supports model following control function.
8949	When absolute position measurement APM-C-□□-□H-T-□□ is used with SSA series motor, it can automatically identify the connected motor and set the related parameters	In this version, when absolute position measurement APM-C-□□-□H-T-□□ is used with SSA series motor, it can automatically identify the connected motor and set the related parameters.
4218	In gantry control system, master servo drive supports slave's Pt parameters reading / writing, alarms and version reading	In this version, gantry's master can support slave's Pt parameters reading / writing, alarms reading, parameters sending to drive, and it also provides the window for users to check if its firmware version is the same as slave's firmware version.
8062	Add Pt022.t□□X□ - Detection method for velocity reach output (V-CMP) signal	In this version, users can decide the detection method for velocity reach output (V-CMP) signal. Refer to section 8.3.6 in "E2 Series Servo Drive User Manual" for details.
8019	Velocity mode and internal velocity mode use different acceleration / deceleration time	This version adds internal velocity mode acceleration / deceleration time (Pt318 / Pt319), which is for internal velocity mode and test run; velocity mode uses the original acceleration / deceleration time parameters (Pt305 / Pt306).
8746	When users use Configuration Wizard for the first time, alarm value for overflow position deviation will be automatically adjusted	In this version, when users use Configuration Wizard for the first time, alarm value for overflow position deviation (Pt520 or Pt521) will be automatically adjusted based on the set parameters (motor, encoder, electronic gear ratio).
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8554	(Only for Fieldbus) Optimize the collecting function of object 0x606C (Velocity actual value)	This version optimizes the collecting function of object 0x606C (Velocity actual value) to make the object values more precise.

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8148	(Only for Fieldbus) Add relative objects of analog output	In this version, when Pt006.t□□17 and Pt007.t□□17 are set, Fieldbus servo drive can control analog output via object 3067h and 3068h. Users can monitor analog output via object 4098h and 4099h.
7518	(Only for Fieldbus) Add relative objects of position trigger function	In this version, when random interval of position trigger function (Pt00E.t□□2□ and Pt00E.t□□3□) is selected, users can write position trigger array via object 3069h~306Ch.
7181	(Only for Fieldbus) Position trigger function supports touch probe homing	In this version, users can set Pt00E.t1□□□ to activate the position trigger function via touch probe homing.

## 2.2.2 Bug Fixes

### 2.2.2.1 Version 3.10.6

No.	Summary	Description
8823	Fix the phenomenon that when a Windows 10 operating system computer is connected to multiple servo drives at the same time, the firmware updating screen of HMI will wait for more than 5 seconds (or even longer) to detect the servo drive	In the previous version, the servo drive does not respond to Windows operating system with enough USB device information, which leads to this phenomenon occurring in Windows 10 operating system. In this version, the problem is fixed.
8798	Fix the problem that the motor cannot be successfully enabled after the phase initialization SW method 1 is completed	In the previous version, after users execute phase initialization via Thunder and complete SW method 1 in Step 2, the motor cannot be successfully enabled in "Test Run" window. In this version, the problem is fixed.
8727	Fix the problem that the alarm ALC50 will be triggered due to the failed detection when the phase initialization SW method 1 does electrical angle searching at the specific position	In the previous version, when the phase initialization SW method 1 does electrical angle searching at the specific position, the detection will fail and the alarm ALC50 (Electrical angle detection failure) will be triggered. In this version, the problem is fixed, and the detection mechanism is optimized.
8918	Change the default value of Pt008.t□□□X to 1	In this version, the default value of Pt008.t□□□X is changed to 1. When the battery of the encoder is invalid, the warning AL930 (Encoder battery malfunction) will be immediately detected.
8553	Optimize the error detecting mechanism of homing	This version adds the judgment mechanism for the unexpected triggering of limit signal. When the reverse limit signal of the motor movement's direction is mistakenly triggered, the homing procedure will be stopped.
8772	Fix the problem that the	In the previous version, using BiSS-C encoder with the resolution of 22 bit will

No.	Summary	Description
	alarm AL820 will be triggered when using BiSS-C encoder with the resolution of 22 bit	cause the CRC calculation result to be incorrect, and thus triggering the alarm AL820 (Encoder communication error). In this version, the problem is fixed.
8868	Fix the invalid two-dimensional dynamic error compensation control function	In the previous version, there is no compensation effect when the two-dimensional dynamic error compensation control function is activated. In this version, the problem is fixed.
8908	(Only for Fieldbus) Optimize the status function of EtherCAT PDS	In the previous version, EtherCAT servo drive may stay in enabled status if users operate enabling and disabling in a short period of time. In this version, the problem is fixed.
8829	(Only for Fieldbus) Fix the problem that negative values cannot be input for part of the EtherCAT objects	In the previous version, users cannot input negative values for EtherCAT type int8 objects through the host controller. In this version, the problem is fixed.
8136	(Only for Fieldbus) Fix the problem that errors would not be reported when users input incorrect subindex for EtherCAT objects	In the previous version, errors would not be reported when users input incorrect subindex for EtherCAT objects. In this version, the problem is fixed.
8921	(Only for Fieldbus) Fix the problem that when "Detection of safety function alarm" is effective (set Pt010.t1□□□), the alarm can still be successfully cleared even if the STO trigger alarm (ALEb0) has been removed	In the previous version, when "Detection of safety function alarm" is effective (set Pt010.t1□□□), the alarm can still be successfully cleared even if the STO trigger alarm (ALEb0) has been removed. In this version, the problem is fixed.

## 2.2.3 Known Issues

### 2.2.3.1 Version 3.10.6

No.	Summary	Description and workaround
9367	When ESC is used with analog encoder and digital Hall signal, the alarm ALC21 may be triggered if the index signal is touched during the movement of motor	<b>Description:</b> In this version, when ESC is used with analog encoder and digital Hall signal, the alarm ALC21 (Hall sensor error) may be triggered if the index signal is touched during the movement of motor.  <b>Workaround:</b> Downgrade to the older firmware version.
9493	(Only for Fieldbus) EtherCAT servo drive cannot perform PP mode in "PreOp" state	<b>Description:</b> When EtherCAT servo drive performs PP mode in "PreOp" state of EtherCAT State Machine, the commands are invalid.  <b>Workaround:</b> 1. Change the application scenario: Enter "Op" state before using PP mode. 2. Downgrade to the older firmware version 2.7.17.
4457	PDL variable memory limit change	<b>Description:</b> As to PDL variable memory limit change, related information is listed as below:  3.10.6 - Variable memory left 310 Bytes 3.9.16 - Variable memory left 212 Bytes 3.9.10 - Variable memory left 232 Bytes  <b>Workaround:</b> Reserved variable arrays in the firmware can be used: par16_save[100] (data type int16), par32_save[100] (data type int32).