

ASTRA

Telemecanique Unitelway Port TSX07/TSX37 Device Driver
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⌘ Preface ⌘

This document introduces user to the Unitelway Programming Port Protocol of Telemecanique [TSX07 / TSX37 PLC Device Driver](#). It contains technical information about [TSX07 / TSX37 Device Driver](#). This document gives you a broad idea of how to use [TSX07 Device Driver](#) with Astra.

This document broadly, tells you about the capabilities and technical details of [TSX07 / TSX37 Device Driver](#) and how to use the driver.

⌘ Introduction ⌘

The intent of this document is to assist users of the Unitelway Programming Port Protocol of Telemecanique [TSX07 / TSX37 PLC Driver](#) in conjunction with the Astra MMI software package. A general knowledge of Unitelway Programming Port Protocol of Telemecanique [TSX07 / TSX37 PLC](#) family is assumed. The addressing scheme is that of the Telemecanique programming software with some slight modification is explained in the subsequent chapters. Description of the different data types and the addressing scheme should be understood before attempting to use the driver in a Astra project.

The optimization features described in this document can improve performance, but they are not essential for use.

⌘ Technical & Communication Details ⌘

PLC Make :	_____
PLC Modles :	The driver supports the following PLC models TSX07-10, TSX07-16, 07-24, TSX37-10, TSX37-22
PLC Memory :	_____
Communication Protocol :	Unitelway Telemecanique TSX07
Communication Parameters :	
Baud Rate -	9600
Parity -	ODD
Data Bits -	8
Stop Bits -	1
Cable Connections :	The TSX07/TSX37 driver runs on the RS232 standard for serial communication.
Node ID :	Use a node ID 00 to 08 to define the slave address for your PC in ASTRA.

⌘ Data Types and Addressing ⌘

Data Types :

The following is a description of how the Telemecanique TSX07/TSX37 interprets the information from the PLC as different data types. The PLC programmer is responsible for ensuring that the referenced locations can logically be interpreted as correct type. This is particularly important for floating point numbers, as there are such bit configurations, that are incompatible with the IEEE floating point format.

All 16 bit word and 32 bit double words must start on a 16 bit boundary for the Internal bits, System bits. It should start on a 16 bit boundary for the System Words, Internal Words, Constant Words, Timers and Counters. Specific to TSX07/TSX37, it is possible to overlap double words using this format. Say, that the Internal Words - %MW00 and %MW01, both are defined as data type long, so they would share the 16 bit word at location %MW01, as either their high word or low word respectively. Since, this is probably not desirable behaviour, care should be taken to avoid overlap situations.

Address Range

Model TSX07

Memory Range	Low Address	High Address	Read /Write
Internal Coils	%M000	%M127	RW
System Coils	%S000	%S127	R
System Words	%SW000	%SW127	R
Internal Words	%MW000	%MW255	RW
Constant Words	%KW000	%KW063	R
Timer Value	%TM000.V	%TM031.V	R
Timer Preset	%TM000.P	%TM031.P	RW
Counter Value	%C000.V	%C015.V	R
Counter Preset	%C000.P	%C015.P	RW

⌘ Data Types and Addressing ⌘

Model TSX37

Memory Range	Low Address	High Address	Read /Write
Internal Coils	%M000	%M255	RW
System Coils	%S000	%S127	R
System Words	%SW000	%SW127	R
Internal Words	%MW000	%MW1023	RW
Constant Words	%KW000	%KW127	R
Timer Value	%TM000.V	%TM031.V	R
Timer Preset	%TM000.P	%TM031.P	RW
Counter Value	%C000.V	%C031.V	R
Counter Preset	%C000.P	%C031.P	RW
Internal Words	%MF000	%MF511	RW



Note: Input bits / Output bits (%I / %O) are not supported. For Internal Words (%MF) tags only alternate tags (%MF1, %MF3, %MF5... etc.) are to be used to avoid memory overlaps of consecutive tags for example for %MF1 and %MF2.

⌘ Data Types and Addressing ⌘

The address usage is as follows:

Tag Type	Example Address In ASTRA	Data Types
Discrete	%M0 %S0	%M0, %S0 Where Selector represent 0 th word
Unsigned Integer and Integer	%MW0, %SW0, %KW0.	Where all Selector represent 0 th word For Integer type, 15 th bit represent the sign bit
Large Integer	%TM000.P %C000.P	%TM000 – Low Word %TM001 – High Word %C000 – Low Word %C0001 – High Word
Real	%MW000 %TM000.P %MF2	%MW000 – Low Word %MW001 – High Word %TM000 – Low Word %TM001 – High Word %MF002 – Low Word %MF003 – High Word

⌘ Data Types and Addressing ⌘

The Bit Interpretation is as follows:

ASTRA Tag Type	Size in Bits	Interpretation method in ASTRA	Example	
			Read Bits from PLC	Val.
Discrete	1	Discrete	1	1
Unsigned Integer	32	Decimal	00000000 00001011	11
Integer	32	Decimal	00000000 00010001	17
Large Integer	64	Decimal	00000000 00000000 00001011 11111111	307 1
Real	64	IEEE	01000000 00000000 00000000 00000000 11000000 00000000 00000000 00000000 01000000 10000000 00000000 00000000 01000000 11000000 00000000 00000000 01000000 00100000 00000000 00000000	2 -2 4 6 2.5



Optimizations



Use the following guidelines so that you can get an optimum performance from the driver PLC combination.

- Whenever possible, use consecutive addresses, this reduces the overhead on the communication per requested data byte, word or double word.
- When a same address is to be used for two different tags in Astra, make sure that the scan time is the same for both the tags, this ensures that the address is fetched only once for both the tags.
- Use higher scan rates whenever the application allows to do so, this ensures that the critical tags with lower scan rates are fetched with minimum overhead.



Errors



The entire time a Astra project is running, the Event Logger displays the status and any errors that the program generates. The driver utilizes the Event Logger to display error messages regarding the driver. Below are the error messages, the probable cause and most likely solution to all the errors the driver can generate. Error nos. are displayed in the event logger in case of the error situation.

Errors displayed as strings

1. NULL Pointer for Login Data
2. NULL Pointer for Project Path
3. NULL Pointer for Tag Table
4. NULL Handle for Data Manager

Explanation: Internal Fatal Error.

Action: : Contact Astra support.

5. Insufficient Memory for Request Manager
6. Insufficient Memory for Transaction Manager
7. Insufficient Memory for Device Manager

Explanation: Internal Fatal Error.

Action: : Try making more memory available for the project.



Errors



8. Cannot Pagelock Tag Table

Explanation : Internal Fatal Error.

Action : Contact Astra support.

9. Cannot Open File PLCTAG.DAT

10. Cannot Read File PLCTAG.DAT

Explanation : Internal Fatal Error. The input file PLCTAG.DAT does not exist or is corrupt.

Action : Open the project in the configuration mode and close it, this process recompiles the PLCTAG.DAT file.

11. Insufficient Memory for Tag

12. Insufficient Memory for Tag2

13. Insufficient Memory for Tag Container

14. Insufficient Memory for Node

15. Insufficient Memory for Node Container

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

16. No Tags in the Project

Explanation : Internal Fatal Error. The driver detected no valid tags in the project.

Action : Recheck the project in the configuration mode. See if any tags are assigned to this particular device. See if the Node details are correct.

17. No Valid Nodes in the Project

Explanation : Internal Fatal Error. The driver detected no valid nodes in the project.

Action : Recheck the project in the configuration mode. See if the Node details are correct.

18. Multidrop not Supported

Explanation : Internal Fatal Error. An attempt was made to attach two nodes on the same driver when Multidrop is not supported.

Action : Recheck the project in the configuration mode. See if the Node details are correct.

19. Multiple nodes with same ID

Explanation : Internal Fatal Error. An attempt was made to attach two nodes on the same driver with same Node IDs.

Action : Recheck the project in the configuration mode. See if the Node details are correct.



Errors



- 20. Insufficient Memory for Request
- 21. Insufficient Memory for Request2
- 22. Insufficient Memory for Request Container
- 23. Insufficient Memory for Dummy Request
- 24. Insufficient Memory for Action
- 25. Insufficient Memory for Action Container
- 26. Cannot Create Communication Window

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

- 27. Cannot Open Communication Port

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : For the selected Communication port, check for -

- ⊙ If the port physically exists.
- ⊙ If the Communication hardware uses standard base addresses. COM1 uses hex 3F8 and COM2 uses hex 2F8.
- ⊙ If there is any IRQ contention at the hardware level. COM1 uses IRQ4 and COM2 uses IRQ3.
- ⊙ If any other program is already using the Communication port you have requested for
- ⊙ If any DOS level TSRs are running which are using the Communication port you have requested for.
- ⊙ If a mouse driver is installed on the same Communication port you have requested for in Windows environment.
- ⊙ If a mouse driver is installed on the same Communication port you have requested for on DOS environment.
- ⊙ If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.

- 28. Cannot Build Communication DCB

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.



Errors



29. Cannot Set Communication State

Explanation : Internal Fatal Error. Could not initialize the Communication port for the given settings.

Action : If you have directly manipulated the PROJECT.INI file section [COM1] or [COM2], check if the settings for Baud Rate, Data Bits, Stop Bits and the Parity are standard. Try using the Communication port setting utility provided with Astra in case you are in doubts about the standard settings.

30. NULL Pointer for Model Names

31. Read Queue Full

Explanation : Internal Fatal Error.

Action : Contact Astra support.

32. Device Time Out

Explanation : The Device did not respond and the Device driver timed out. The Driver will retry the request to Device for a specified number of times and if the Device still does not respond the driver will HALT its transactions with the Device.

Action : If this happens during **initialization**, check –

- ⊙ Whether the Device power is on.
- ⊙ Whether the cable connections to the device are proper.
- ⊙ Whether the Node ID settings are proper in case the Device supports it (Applicable to S5) .
- ⊙ Whether the Device model is the same as configured in the Node Configuration.
- ⊙ Whether the Communication hardware is proper and works.
- ⊙ Whether strong EMI or RFI fields are existent which cause noise on the Communication line.
- ⊙ Whether some turnaround delay is required, try changing the entries in the DRIVERS.INI file. This may be typically required for faster PCs on which Astra runs.

If this happens during the **Run**, check –

- ⊙ Whether other applications block the Windows, in such a case the retry mechanism will normally re-establish the Communication.
- ⊙ Whether the cable connections have been disturbed.



Errors



- ⦿ Whether the Device has malfunctioned.
- ⦿ Whether the Communication hardware is proper and works.

33. Invalid IEEE Format

Explanation : The 32 bits read from the Device contained bit values such that it could not be interpreted as a valid IEEE format.

Action : Use OEM software and initialize floating type tags in the plc.

34. Write Queue Full

Explanation : The write request sent by the Astra is queued for faster execution, the current limit for the queue size is 300. If the queue is full this message will be prompted and the latest request will be ignored.

Action : Go to the project configuration file and put an entry with section name "QueueSize". Under this section name, put a key name "WriteQueue", so that it looks like:

```
[QueueSize]
WriteQueue=WXY
Where,
WXY can be upto 5000.
```

35. This error number is no more in use.!!!

36. No Valid Tags in the Project

Explanation : Internal Fatal Error. The driver detected no valid tags in the project.

Action : Recheck the project in the configuration mode. See if any tags are assigned to this particular device. See if the Node details are correct.

37. Insufficient Memory for Register

38. Insufficient Memory for Tag Container2

39. Insufficient Memory for Register Container

Explanation : Internal Fatal Error.

Action : Try making more memory available for the project.

40. Tag Address Invalid

41. Tag Address Invalid2.

Explanation : The address entered for a Tag is invalid.

Action : Reconfigure the project and check.

42. Driver Scan Halted

43. Driver Scan Halted2

Explanation : The driver has stopped communicating with the device. This may happen in two situations –



Errors



- ⊙ When the initial scan is complete - in this case this is just a status information.
- ⊙ When time-out has occurred and retry for establishing communication has failed.

Action

- : In the second case check –
 - ⊙ If the cable connections have been disturbed.
 - ⊙ If the Device has malfunctioned.
 - ⊙ If the Communication hardware is proper and works.

44. Cannot Find INI File Entry, Setting Default Port

Explanation : The [PROTOCOL] section in PROJECT.INI does not have the driver name against the COM1 or the COM2 entry. In such a case default COM1 is selected as the Communication port.

Action : Run the Communication port setting utility provided with Astra and set all the parameters properly.

45. This error number is no more in use !!!

46. Cannot Run Without Initialisation

47. Cannot Run Without Initialization2

48. Cannot Write Without Initialisation

49. Cannot Build Frames Without Initialisation

Explanation : Due to some abnormal termination in a previous run, the Device Driver has not unloaded itself and hence could not deinitialize itself.

Action : Unload Windows and restart again.

50. NULL Pointer for Queue

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.

51. Invalid IEEE Format2

Explanation : This might be caused due to –

- ⊙ Presence of junk values at a particular memory area of your PLC.
- ⊙ Accessing a particular type of tag with improper data type, say accessing a floating point data type as a word.

Action : Doing the following actions in case of above mentioned causes, should help

- ⊙ Using your OEM software, you can fill in proper values at places which have junk values.
- ⊙ Use proper data types for your tags.



Errors



52. Cannot Pagelock Buffer

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.

53. Device Response Delay

Explanation : The Device did not respond and the Device driver timed out. The Driver will retry the request to Device for a specified number of times and if the Device still does not respond the driver will HALT its transactions with the Device.

Action : If this happens during **Initialisation** check –

- ⊙ If the Device is powered on.
- ⊙ If the cable connections to the device are proper.
- ⊙ If the Device model is the same as configured in the Node Configuration.
- ⊙ If the Communication hardware is proper and working.
- ⊙ If strong EMI or RFI fields are existent which cause noise on the Communication line.

If this happens during the **Run** check –

- ⊙ If in case other applications block the Windows, in such a case the retry mechanism will normally re-establish the Communication.
- ⊙ If the cable connections have been disturbed.
- ⊙ If the Device has malfunctioned.
- ⊙ If the Communication hardware is proper and working.

54. Response Check Sum Error

Explanation : The Device did respond but the bytes received were corrupt. The Driver will retry the request to Device.

Action : If this happens during **Initialisation** check –

- ⊙ If the Communication hardware is proper and working.
- ⊙ If strong EMI or RFI fields are existent which cause noise on the Communication line.
- ⊙ If the Communication port settings are proper.



Errors



If this happens during the **Run** check –

- ⊙ If the cable connections have been disturbed.
- ⊙ If the Device has malfunctioned.
- ⊙ If the Communication hardware is proper and working.

55. Data Over Flow

Explanation : Unexpected data in large volume was received on the Communication port. It is also possible that the data entered by the user is out of range of the data type. This can happen for byte type of tags.

Action : Check –

- ⊙ If the cable connections have been disturbed.
- ⊙ If the Device has malfunctioned.
- ⊙ If the Communication hardware is proper and working.

56. Model Name Invalid

Explanation : Internal Fatal Error. The model name associated with a particular Node was invalid.

Action : Open the project in the configuration mode. Check the model in the Node Configuration .

57. Cannot Open File PLCTAG.DAT 2

58. Cannot Read File PLCTAG.DAT 2

59. Cannot Read File PLCTAG.DAT 3

Explanation : Internal Fatal Error. The input file PLCTAG.DAT does not exist or is corrupt.

Action : Open the project in the configuration mode and close it, this process recompiles the PLCTAG.DAT file.

60. This error number is no more in use !!! 61. This error number is no more in use !!!

62. Invalid number for conversion to BCD for WORD

Explanation : The 16 bits given for write from Astra to the Device contained bit values such that it could not be interpreted as a valid BCD format. Write will not be done in these cases.

Action : Avoid such values.



Errors



63. Invalid number for conversion to BCD for DWORD

Explanation : The 32 bits given for write from Astra to the Device contained bit values such that it could not be interpreted as a valid BCD format. Write will not be done in these cases.

Action : Avoid such values.

64. Invalid number for conversion to BCD for WORD

Explanation : The 16 bits given for write from Astra to the Device contained bit values such that it could not be interpreted as a valid BCD format. Write will not be done in these cases.

Action : Avoid such values.

65. Invalid number for conversion to BCD for DWORD

Explanation : The 32 bits given for write from Astra to the Device contained bit values such that it could not be interpreted as a valid BCD format. Write will not be done in these cases.

Action : Avoid such values.

66. Error Composing Write Request

Explanation : Write request could not be composed. This may happen in two cases –

⊙ Invalid number for write.

⊙ Write Queue full.

Action : Avoid non interpretable values, Avoid writing too fast

67. Error Composing Read Request After Write

Explanation : A read request immediately following a write request could not be composed.

This may happen in two cases –

⊙ Invalid number for write.

⊙ Write Queue full.

Action : Follow the following actions –

⊙ Avoid non interpretable values

⊙ Kindly refer to error number 34 to increase the size of the write queue.



Errors



68. Node Failed.

Explanation : Internal Fatal Error. The Node was not able to communicate. In case of Multidrop PLC system the node id given to the nodes may be same or cable from PC to PLC may be faulty.

Action : Open the project in the configuration mode check the Node Configuration and close it. For Multidrop communication check the node ID. Check the cable.

69. Cannot Open File NODES.DAT

70. Cannot Read File NODES.DAT 2

Explanation : Internal Fatal Error. The input file NODES.DAT does not exist or is corrupt.

Action : Open the project in the configuration mode and close it, this process recompiles the NODES.DAT file.

71. Node set on by user.

Explanation : Not an error . It indicates that node is selected by the user. For ASTRA generated default tags for a PLC, in that if command tag is 0 then this message is displayed.

Action : None , as it indicates that node is selected by the user.

72. Node set off by user.

Explanation : Not an error . It indicates that node is unselected by the user. For ASTRA generated default tags for a PLC in that if command tag is 1 then this message is displayed.

Action : None, as it indicates that node is unselected by the user.

73. Node manager proc address not defined.

Explanation : Internal Fatal Error.

Action : Contact ASTRA support.



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