Operating instructions

Function blocks Easy Mode
RFID-Station IUT-F190-B40-2V1D
Siemens TIA Portal and S7-300/400 PLC

UHF RFID-Station IUT-F190-B40-2V1D

Project Name:	**UHF RFID-Station IUT-F190-B40-2V1D;** **Easy Mode Function blocks; S7-300/400**
Date:	**17.01.2022**
Creator:	**Karsten Reinhardt**

Version overview

Version	Release data	Comment
1	**10.08.2021**	Initial Version
2	**17.01.2022**	Add RSSI and TransmissionPower (dBm); Adjustment of flowcharts; change of pictures internal structures UserData DBs

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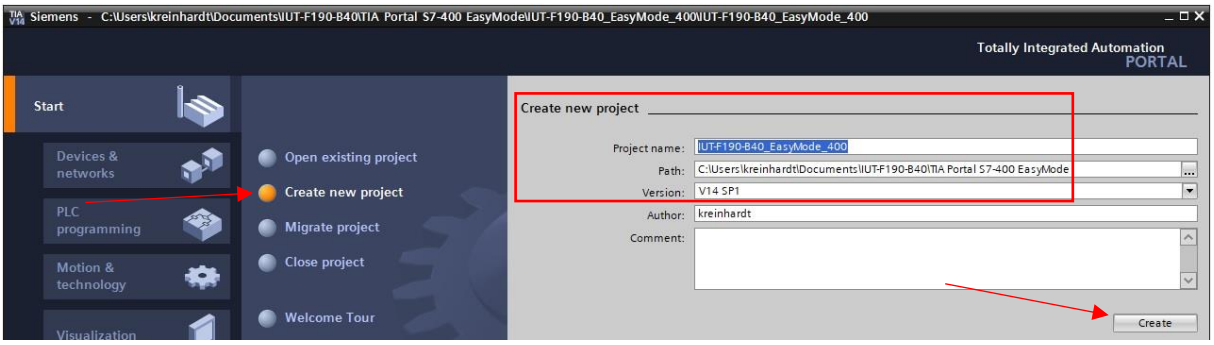
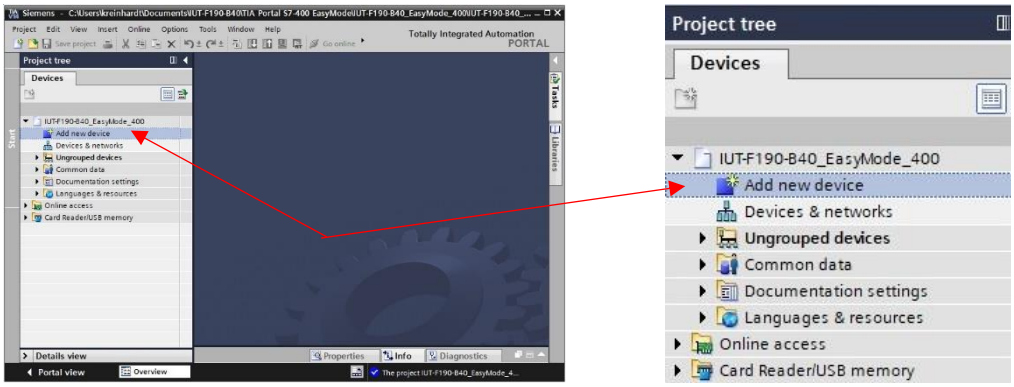
1. Basic PLC configurations

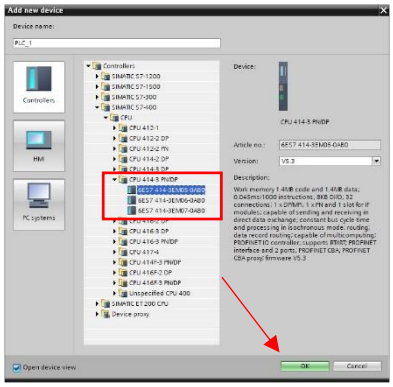
The first step is to create a new PLC project. For this purpose, a project name (e.g. "IUT-F190-B40_EasyMode_400") and a storage path of the project must be entered or selected.



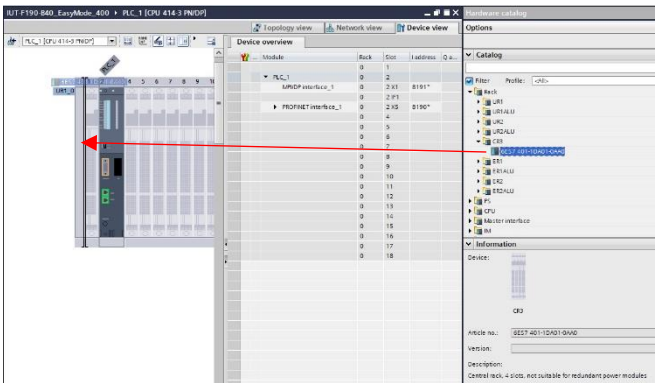
After creating the empty control project, switch to the project view. A selection window is opened by clicking on "Add new device" in the project navigation on the left.

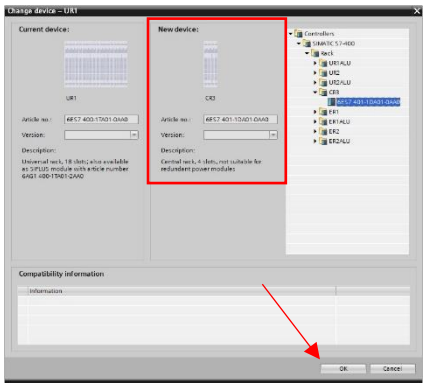


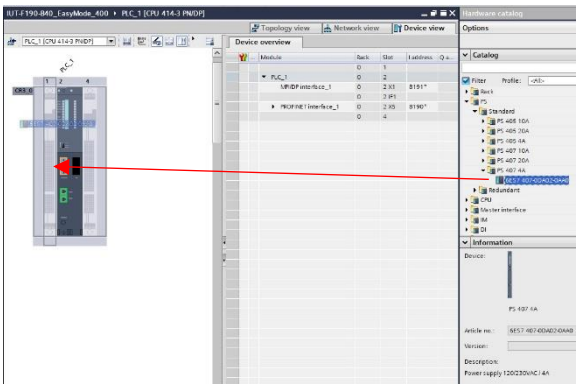
In this selection window, the appropriate controller must be selected.

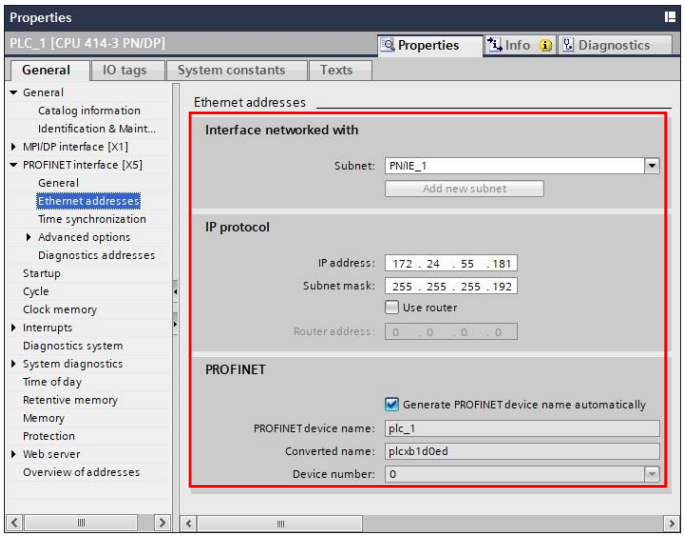


After the assignment of the CPU, the suitable rack (CR3) is to be selected in the next step. The rack is to be moved from the hardware catalog to the beginning of the devices (position 0).
Afterwards the selection of the according power supply (PS 407 4A) is done. The module is to be inserted from the hardware catalog to position 1 of the devices.





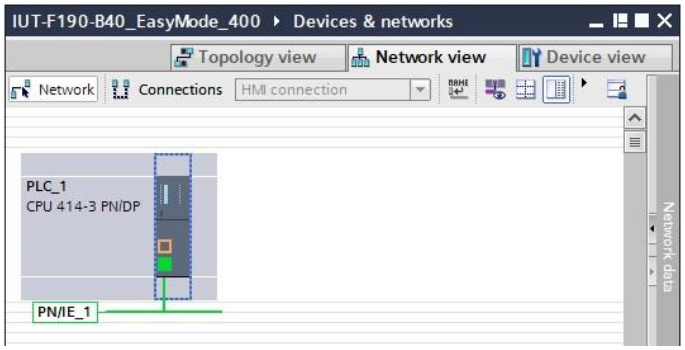




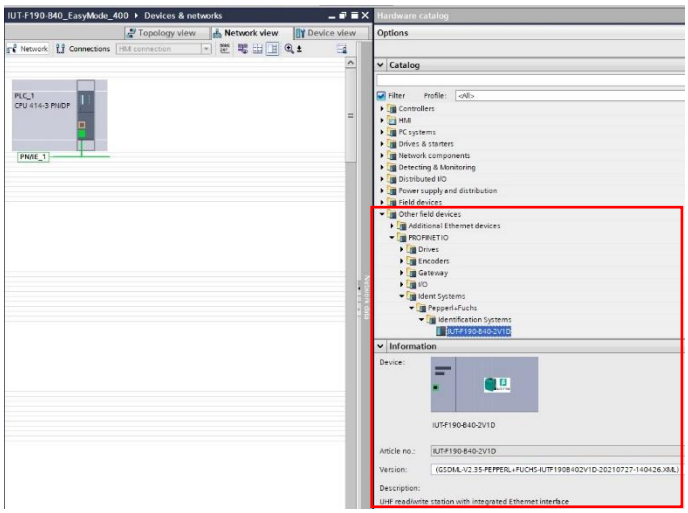
For the Profinet interface X1 a Profinet subnet is to be added under the selection "Ethernet addresses" via the selection "Add new subnet". A subnet with the designation "PN/IE_1" is created.

Then set the network parameters (IP address, subnet mask) of the controller.

IP-Address: 172.24.55.183
Subnet mask: 255.255.255.192



The network view symbolically shows the configured controller. Starting from the CPU, the subnet "PN/IE_1" is located.



On the right-hand side, call up the hardware catalog and select the GSDML file of the IUT-F190-B40:
"Other field devices" → "Profinet IO" → "Ident Systems" → "Pepperl+Fuchs" → "Identification Systems" → "IUT-F190-B40-2V1D".

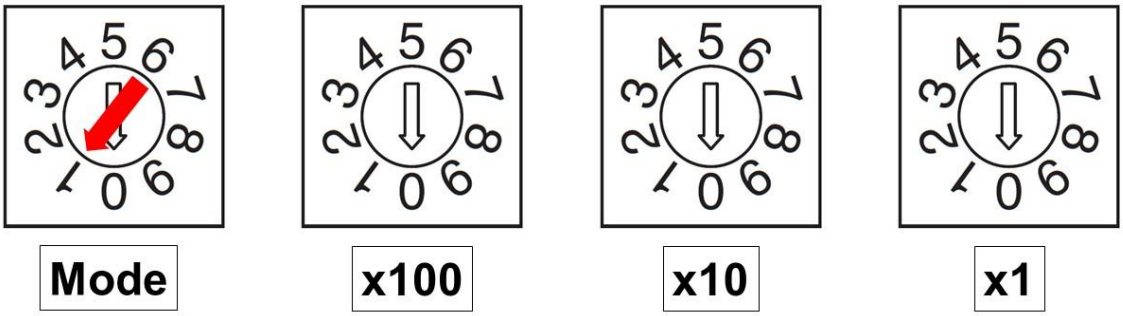
If the GSDML file is not in the catalog, it must be imported beforehand.

2. Setting Rotary Switches on rear of device

On the back of the RFID station there are rotary switches for setting the communication protocol ("Mode" switch) and for presetting an IP address ("x100", "x10", "x1" switches).

In the delivery state, all switches are in position 0.

Before initial commissioning via the Profinet protocol, the "Mode" rotary switch must be set to position 1. After a reset of the supply voltage, communication via Profinet is possible.

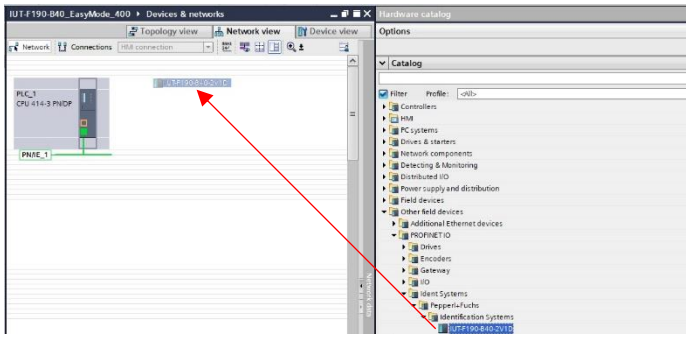


The following table contains an overview of the device setting depending on the rotary switch positions.

Mode	X100	X10	X1	Meaning
0	0	0	0	Ethernet/IP Static IP-Address: IP-Address: 192.168.1.250 Subnet mask: 255.255.255.0
0	0	0	1	Ethernet/IP BOOTP
0	0	0	2	Ethernet/IP DHCP
0	0…2	0…5	0…9	Ethernet/IP Default settings IP-Address: 192.168.1.xxx XXX = Rotary switch position x100, x10, x1 Value range: 003…254 Subnet mask: 255.255.255.0
1	-	-	-	Profinet DCP
9	9	9	9	Reset to factory setting

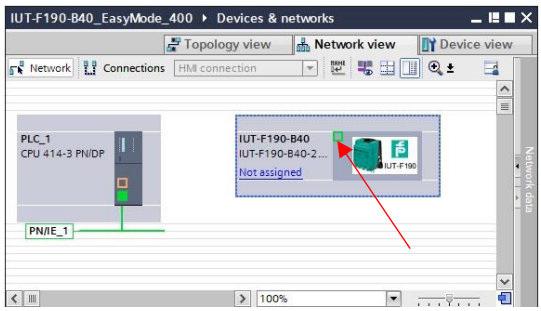
The device can be reset to the factory setting via the rotary switches. For this purpose, all switches must be set to position 9 and a reset of the supply voltage must be performed.

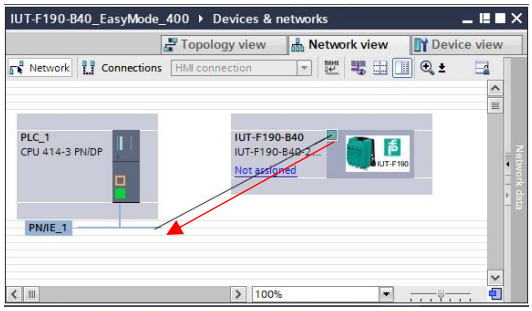
3. PLC hardware setup IUT-F190-B40-2V1D

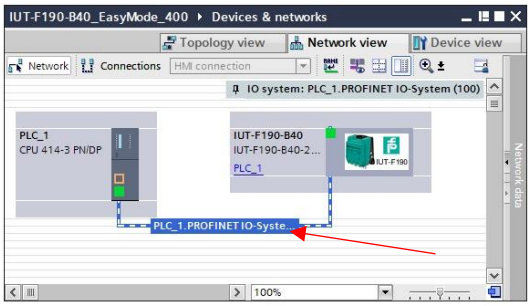


The GSDML for the RFID station IUT-F190-B40 is to be dragged over from the hardware catalog into the center window of the device view.

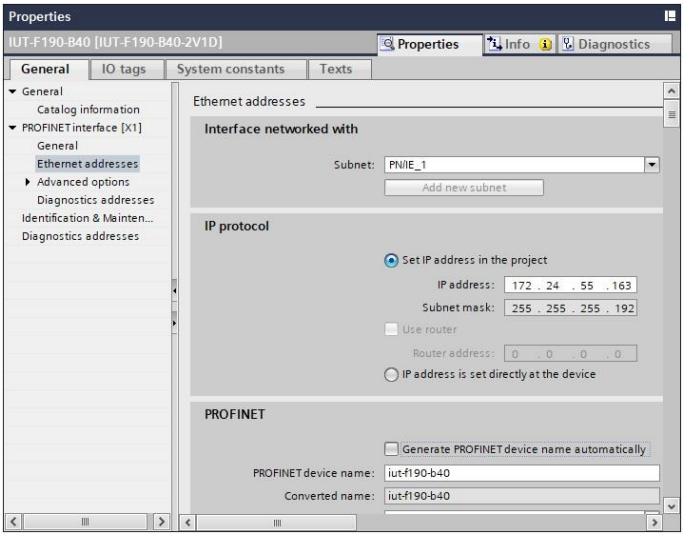
Other field devices → Profinet IO → Ident Systems → Pepperl+Fuchs → Identification Systems → IUT-F190-B40-2V1D





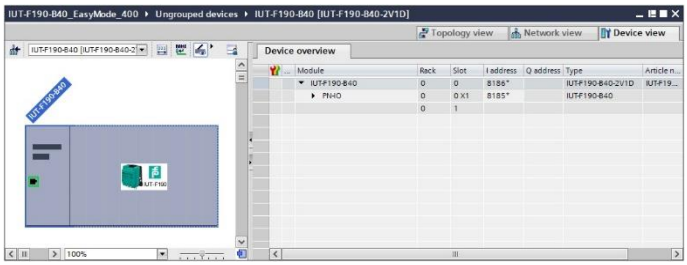


Connection of the RFID station to the Profinet network PN/IE_1.
The Profinet connection between IUT-F190-B40 and controller is connected manually in the network view via the mouse. The RFID station is thus connected to the "PN/IE_1" subnet. The correct Profinet connection is displayed in green. The assignment to the CPU is visible at the IUT-F190-B40 (PLC_1).



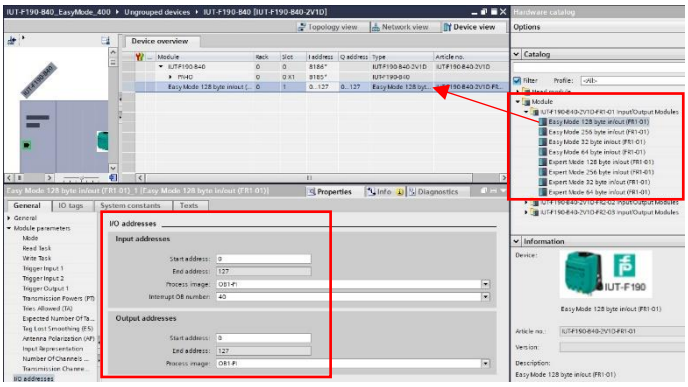
Then set the network parameters (IP address, subnet mask) and the Profinet name of the IUT-F190-B40.

IP-Address:	172.24.55.163
Subnet mask:	255.255.255.192
Profinet Name:	IUT-F190-B40



Double-click on the IUT-F190-B40 icon to open the device view. The communication modules used for the read/write station are shown here in the delivery state.

No module is assigned at the factory.



Selection of communication module "Easy Mode":

Select the desired communication module from the hardware catalog on the right side and drag it to slot 1. In this example the module "Easy Mode 128 Byte in/out (FR1-01) was selected.

The input and output data field each have a start address. This must be parameterized as an input parameter to the function block used.

The communication modules from the hardware catalog are divided according to the country specific devices. The following assignment applies:

IUT-F190-B40-2V1D-FR1-01 Input/Output Modules
→ IUT-F190-B40-2V1D-FR1-01 → Europe

IUT-F190-B40-2V1D-FR2-02 Input/Output Modules
→ IUT-F190-B40-2V1D-FR2-02 → USA

IUT-F190-B40-2V1D-FR2-03 Input/Output Modules
→ IUT-F190-B40-2V1D-FR2-03 → China

The selected communication module must match the existing country-specific device. Otherwise, commissioning of the station is not possible.

The following communication modules are available for the use of the Easy Mode:

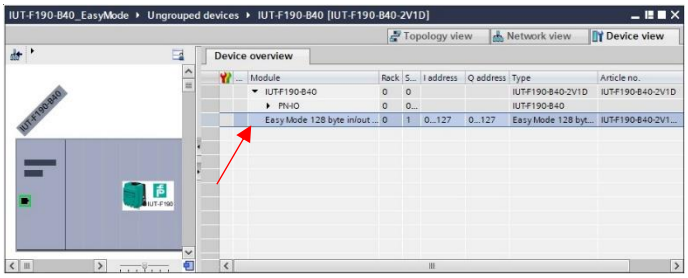
- Easy Mode 32 Byte in/out → max. 28 Byte User Data
- Easy Mode 64 Byte in/out → max. 60 Byte User Data
- Easy Mode 128 Byte in/out → max. 124 Byte User Data
- Easy Mode 256 Byte in/out → max. 252 Byte User Data

The Profinet master used in this example does not support a telegram length of 256 bytes. This means that the corresponding communication module cannot be used in this case.

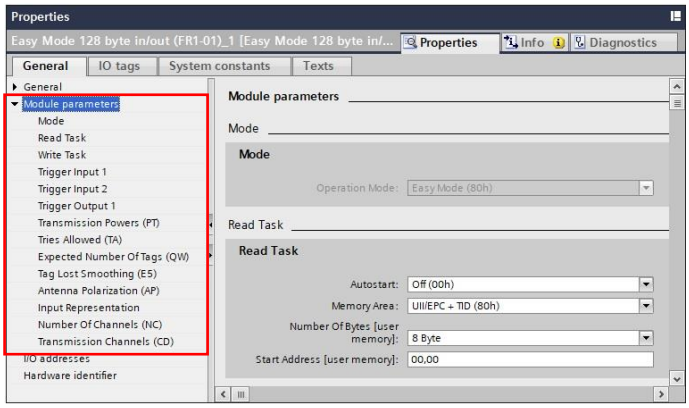
The Expert Mode is activated in the RFID station by configuring the "Expert Mode" modules. This mode is not supported by the function blocks described below.

4. Setup Parameter IUT-F190-B40-2V1D

The RFID station IUT-F190-B40-2V1D has different module parameters when using the Easy Mode. All parameters are stored in the GSDML file and are set within the hardware configuration in the PLC.

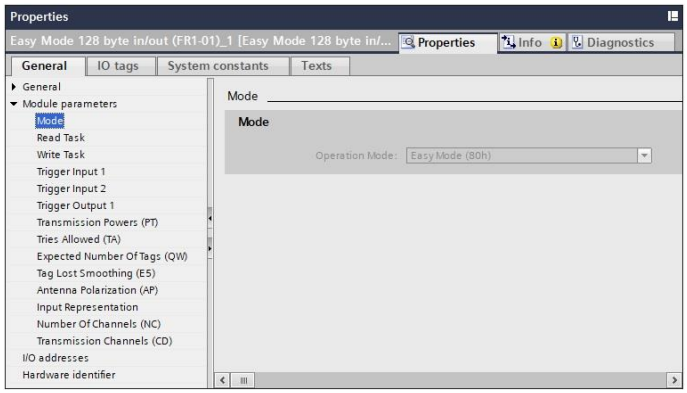


The module parameters are called by clicking on the module "EasyMode 128 byte in/out".



Mode
Read Task
Write Task
Trigger Input 1
Trigger Input 2
Trigger Output 1
Transmission Power (PT)
Tries Allowed (TA)
Expected Number of Tags (QW)
Tag Lost Smoothing (E5)
Antenna Polarization (AP)
Input Representation
Number of Channels (NC)
Transmission Channels (CD)

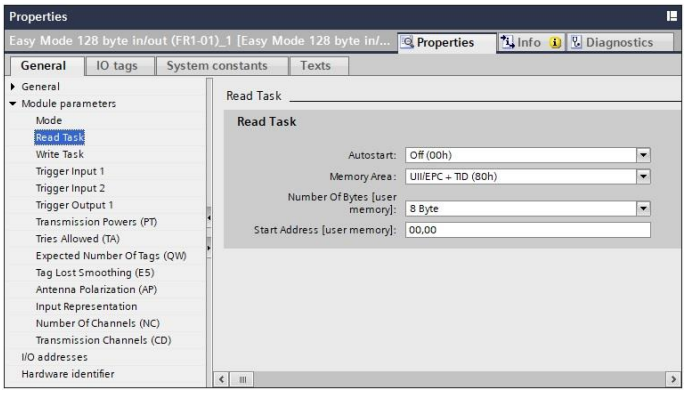
4.1 Parameter “Mode“



The "Mode" parameter has no relevance for the IUT-F190-B40 RFID station. Therefore, it is not possible to change the parameter value.

4.2 Parameter “Read Task“

The "Read Task" parameter is used to make the settings for executing a read access to one or more data carriers. The memory bank or data area to be read is set.



Default setting parameter „Read Task“:

Autostart:	Off (00h)
Memory Area:	UII/EPC + TID
Number of Bytes:	8
Start Address:	00,00

This setting provides read access to the UII/EPC information and the TID of the data carrier. The Autostart function is switched off and the read task is started by the controller (PLC) via process data.

Autostart:
A read task can be started automatically by the RFID station via the "Autostart" parameter. This means that it is not necessary to start the read task via the process output data of the PLC. The RFID station starts the read task automatically directly after the device startup and transmits the read data to the controller via Profinet. The station thus permanently executes a read task. The read task is defined by the parameters "Memory Area", "Number of Bytes" and "Start Address".
The permanently active read task cannot be aborted by the PLC. The execution of a write task is not possible when using the Autostart function. If data need to be written to a data carrier during operation of the station, the Autostart function cannot be used.
The Autostart function is only available in conjunction with a read task. An automatic start of a write task is not possible.

Autostart = Off (00h); Factory setting
Autostart function is switched off. The execution of a read task must be controlled via the PLC.

Autostart = On (80h)
Autostart function is activated. A read task is started automatically by the RFID station according to the settings of "Memory area", "Number of bytes" and "Start address".

Memory Area:
The "Memory area" parameter defines the memory bank to which the read access is made. The IUT-F190-B40 RFID station is a "multi-tag" system and can identify several data carriers simultaneously. The UII or EPC code (memory bank 01) is used to distinguish between several data carriers. For this reason, the UII/EPC code is always transmitted as leading code information when a read task is executed. This is optionally followed by the read-in user data area (memory bank 11) or the TID (memory bank 10).

UII/EPC + TID (80h):
Factory setting; access to the UII/EPC code (memory bank 01) and to the TID (memory bank 10).

UII/EPC + User data (00h):
Access to the UII/EPC code (memory bank 01) and to a partial area of the user data (memory bank 11). The number of bytes transferred from the user data is defined by the "Number of Bytes" parameter. The start address within memory bank 11 (user data) is set via the "Start Address" parameter.

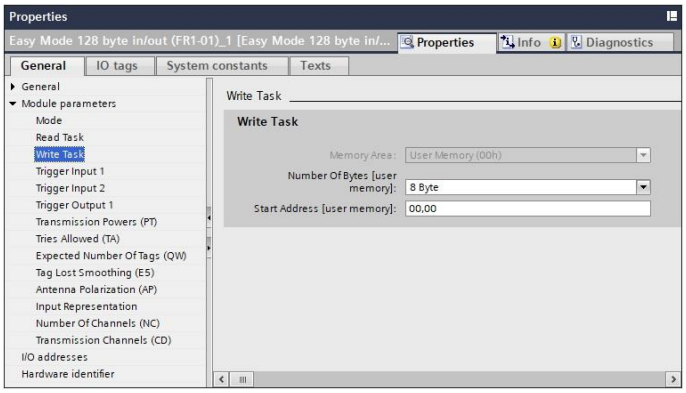
UII/EPC (40h):
Access to the UII/EPC code (memory bank 01). The user data (memory bank 11) and the TID (memory bank 10) are not accessed.

Number of Bytes [User memory]:
The "Number of Bytes" parameter defines the number of bytes read from the memory area for the user data. The number of bytes is always a multiple of 4 bytes. The smallest amount of data to be read is 4 bytes. The maximum number of user data to be read out depends on the size of memory bank 11 (user data area; user memory) and can be found in the data sheet of the data carrier used.
Another limitation of the number of bytes to be read in is the telegram length of the RFID station IUT-F190-B40. This must be selected so that there is sufficient space for the UII/EPC code and the user data section to be read in.

Start Address [User memory]:
The "Start Address" parameter is used to specify the start address from which read access to the user data from memory bank 11 takes place. The value of the start address is a multiple of 4 and is specified over 2 bytes by a hexadecimal number format. The start of the user data is specified by the value 16#0000 (00,00). The value range of the "Start Address" parameter depends on the size of memory bank 11 (user data area; user memory) and can be taken from the data sheet of the data carrier used.

4.3 Parameter “Write Task“

The "Write Task" parameter is used to make the settings for executing a write access to one or more data carriers. A write access always takes place on the user data (user memory). It is defined how many bytes and from which start address should be written.



Default setting parameter „Write Task“:

Memory area: User Memory
Number of Bytes: 8
Start Address: 00,00

This setting causes write access to the user data (user memory) of the data carrier. 8 bytes of data are written starting from memory address 0.

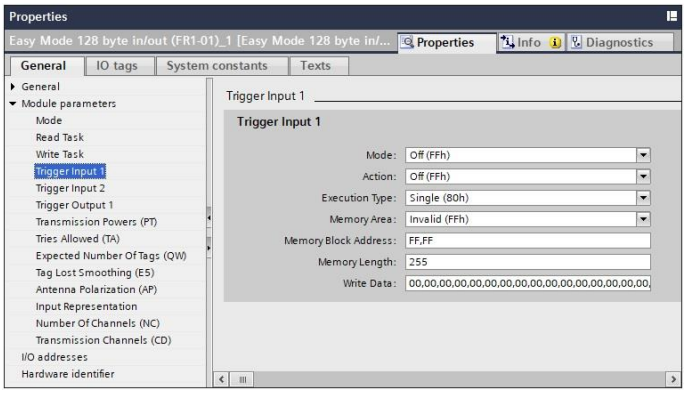
Memory Area:
Write access to a data carrier can only be made to the user data (memory bank 11) when using the "Easy Mode". Therefore, it is not necessary to select a memory area for write access.

Number of Bytes [User memory]:
The parameter "Number of Bytes" defines the amount of bytes to be written to the data carrier. The number of bytes is always a multiple of 4 bytes. The smallest amount of data that can be written is 4 bytes. The maximum number of writeable user data depends on the size of memory bank 11 (user data area; user memory) and can be taken from the data sheet of the data carrier used.
The number of bytes that can be written is also limited by the telegram length of the IUT-F190-B40 RFID station. This must be selected so that there is sufficient space for the write data within the telegram.

Start Address [User memory]:
The "Start Address" parameter is used to specify the start address from which write access to the user data from memory bank 11 takes place. The value of the start address is a multiple of 4 and is specified over 2 bytes by a hexadecimal number format. The start of the user data is specified by the value 16#0000 (00,00). The value range of the "Start Address" parameter depends on the size of memory bank 11 (user data area; user memory) and can be taken from the data sheet of the data carrier used.

4.4 Parameter “Trigger Input 1“ and “Trigger Input 2“

These parameters are used to make the settings for trigger input 1 and 2. The function blocks described in this documentation are controlled via the process image of the PLC. The inputs are not used for this

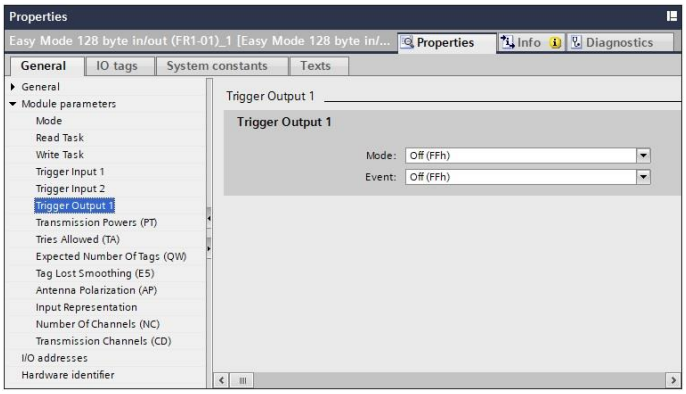


Default setting parameter “Trigger Input 1“ and “Trigger Input 2“

Mode:	Off
Action:	Off
Execution Type:	Single
Memory Area:	Invalid
Memory Block Address:	FF,FF
Memory Length:	255
Write Data:	00,00,00,….

4.5 Parameter “Trigger Output 1“

The "Trigger Output 1" parameter can be used to set the behavior of the digital output at the RFID station. The function blocks described in this documentation are controlled via the process image of the PLC. The output is not used for the time being.

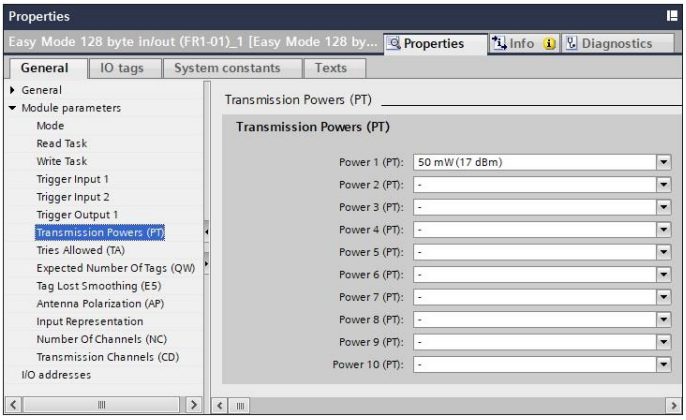


Default setting parameter “Output 1“

Mode:	Off
Event:	Off

4.6 Parameter “Transmission Powers - PT“

The "Transmission Powers - PT" parameter can be used to set one or more transmission power levels for the IUT-F190-B40 RFID station.



Default setting parameter „Transmission Powers - PT“:

Power 1 (PT):	50mW (17 dBm)	PT1
Power 2 (PT):	-	PT2
Power 3 (PT):	-	PT3
…		
Power 10 (PT):	-	PT10

Several predefined values of output power are available for the parameterization of a transmit power stage. This can be set via a drop-down menu for each transmit power level.

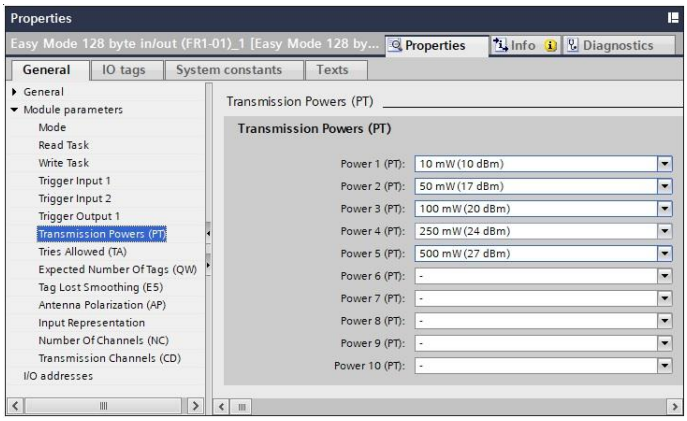
Value range transmission powers (FR1-01):
3mW (5dBm); 4mW (6dBm); 5mW (7dBm); 6mW (8dBm); 8mW (9dBm); 10mW (10dBm); 13mW (11dBm); 15mW (12dBm); 20mW (13dBm); 25mW (14dBm); 30mW (15dBm); 40mW (16dBm); 50mW (17dBm); 60mW (18dBm); 80mW (19dBm); 100mW (20dBm); 125mW (21dBm); 150mW (22dBm); 200mW (23dBm); 250mW (24dBm), 300mW (24dBm); 400mW (26dBm); 500mW (27dBm); 600mW (28dBm); 800mW (29dBm); 1000mW (30dBm)

Default setting: 50mW (17 dBm) → FR1-01

The transmission power required for an access to the data carrier depends on whether a read access or a write access is to take place. Writing data to a data carrier requires greater power. Thus, the transmission power required for writing data is greater compared to read access to the same data carrier at an identical distance.
Thus, the range of the IUT-F190-B40 RFID station for a write task with the same transmission power is smaller compared to the range when executing a read task. This must be taken into account when setting the transmission power, as this applies to both the read task and the write task.

4.6.1 Parameterization of a ramp function for the transmission power

The RFID station IUT-F190-B40 offers the possibility to set several transmit power levels (transmit power 1, transmit power 2 etc.). These power levels are run through one after the other when a read or write task is executed. This makes it possible to parameterize a ramp with a continuously increasing transmission power.



Parameterization of a ramp with 5 levels for the transmission powers

Power 1 (PT1):	10mW (10 dBm)
Power 2 (PT2):	50mW (17 dBm)
Power 3 (PT3):	100mW (20 dBm)
Power 4 (PT4):	250mW (24 dBm)
Power 5 (PT5):	500mW (27 dBm)
Power 6 (PT6):	-
…	
Power 10 (PT10):	-

After starting the read/write task, power 1 (PT1) is used first. After all scan processes (inventory rounds) have been completed at this power level, the next power level (PT 2) is set. This process is repeated until all scan processes have been completed at the last parameterized power level (e.g. PT 5). Subsequently, the power changes back to transmit power 1 (PT 1).
If a data carrier was detected during the execution of a write or read task (ReadValid or WriteValid = 1), the active task can be terminated by resetting the corresponding input signal (StartRead or Start-Write). This makes it possible that the data carrier is always read or written with the lowest required power. This avoids overreach or the unintentional identification of adjacent data carriers.

A test in the application is required to find suitable performance levels. For this purpose, the target data carrier (i.e. the data carrier that is to be identified) is positioned at the location it has during the execution of the read/write task. The transmission power required to reliably identify this data carrier in the position is then determined (PT min; e.g. 100mW).
The target data carrier is then removed and the neighboring data carriers are placed at the positions they had during the identification of the target data carrier. The transmitting power is then increased until one of the neighboring tags is identified (PT max; e.g. 800mW). These data carriers must not be detected by the RFID station under any circumstances later in the application.
How many power levels are used for parameterizing the ramp depends on the application. The more power stages are used, the smaller the change in the jumps of the transmit power can be. However,

the longer the number of power stages, the longer the ramp cycle time. A number of 5 power stages should be sufficient for initial commissioning.

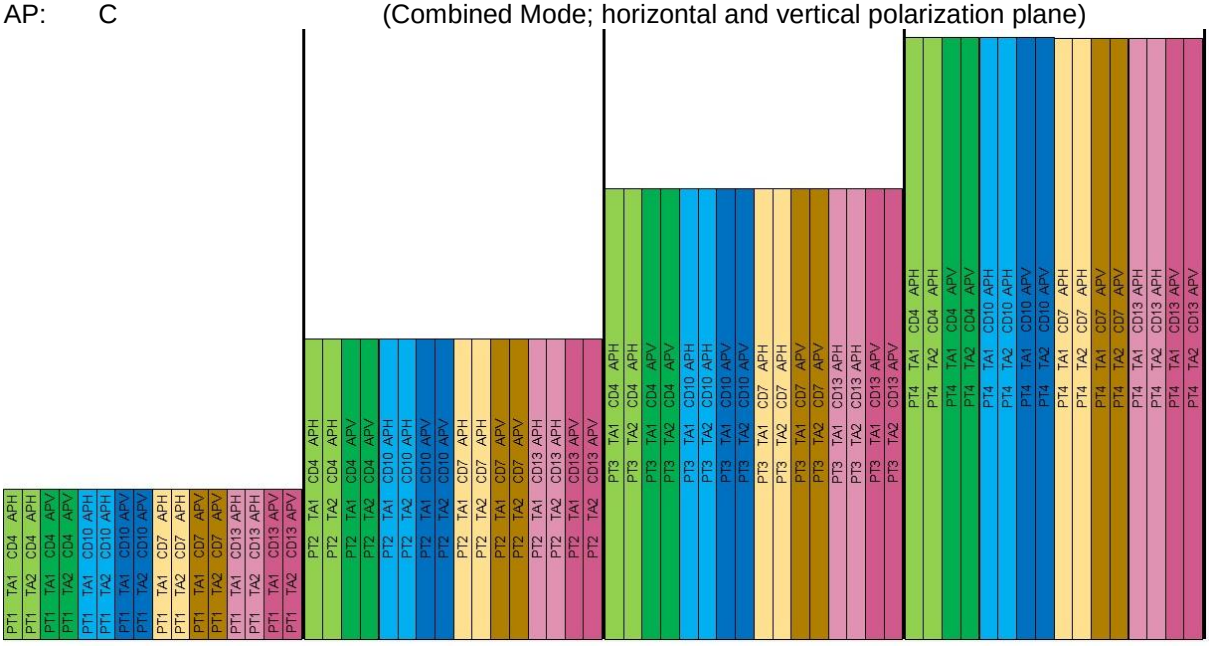
Data carriers are subject to variations in range. I.e. identical data carriers can be identified at identical positions with different transmission power levels. It is therefore recommended to start the ramp with a lower power level than PT min (PT 1 < PT min).
The last power level of the ramp (e.g. PT 5) must have a lower power value than the transmit power with which a neighboring data carrier is unintentionally identified (PT 5 < PT max).

In the preceding example, the PT 1 and PT 2 stages were parameterized with a power value below the output power required for reliable identification of the data carrier (PT 1 < PT 2 < PT min). Stage PT 3 corresponds exactly to the required transmit power (PT 3 = PT min). The power values of PT 4 and PT 5 are above the required transmit power, but below the power at which neighboring tags are unintentionally identified (PT max > PT 5 > PT 4 > PT min).

The number of scan operations (inventory rounds) for each power level can be influenced by the "Tries Allowed" (TA), "Antenna Polarization" (AP) and "Transmit Channels" (CD) or "Number of Channels" (NC) parameters. If the value of the "Tries Allowed" (TA) parameter is increased, more scans are performed per power level. This means that the detection range is scanned longer at this level. If the value of the "Tries Allowed" (TA) parameter is reduced and the "Transmit channels" (CD) or "Number of channels" (NC) is also reduced, fewer scans are performed per power level. An additional reduction in the number of scans is also achieved by setting the "Antenna Polarization" (AP) parameter to horizontal or vertical polarization plane. This causes the transmit power ramp to be run through more quickly.

In the factory setting of the parameters, 2 read attempts (TA = 2) are first performed with horizontal polarization on transmit channel 4 for one power level (PT 1). After this, the polarization switches to the vertical polarization plane and 2 read attempts are carried out again on transmit channel 4. Then 2 read attempts are made on transmit channel 10 with horizontal polarization, followed by 2 read attempts on the same transmit channel with vertical polarization. This sequence is then repeated for transmitting channels 7 and 13. 16 read attempts are thus performed per power stage.

Example 1: Scanning with factory settings and 4 power levels
PT: PT1, PT2, PT3, PT4 (4 power levels)
TA: 2 (2 attempts per transmit channel)
CD: 4, 10, 7, 13 (4 transmit channels)
AP: C (Combined Mode; horizontal and vertical polarization plane)

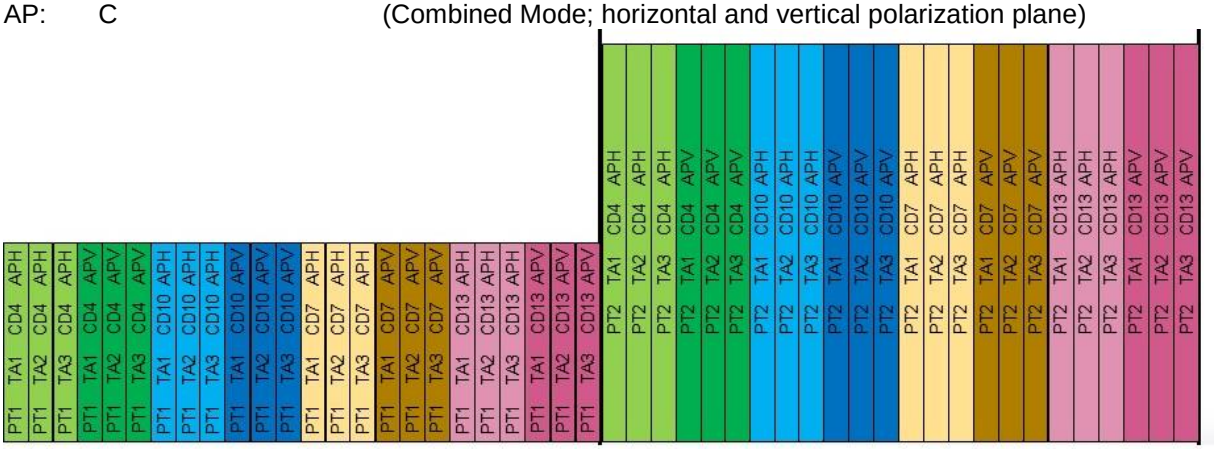


For this configuration, 16 scans are performed per power level. The number of scans can be calculated as follows:

Number of scan operations
= (number of polarization planes) * (number of transmit channels) * (number of attempts)
= 2 * 4 * 2
= 16
Taking into account 4 power levels, this results in 64 scans.

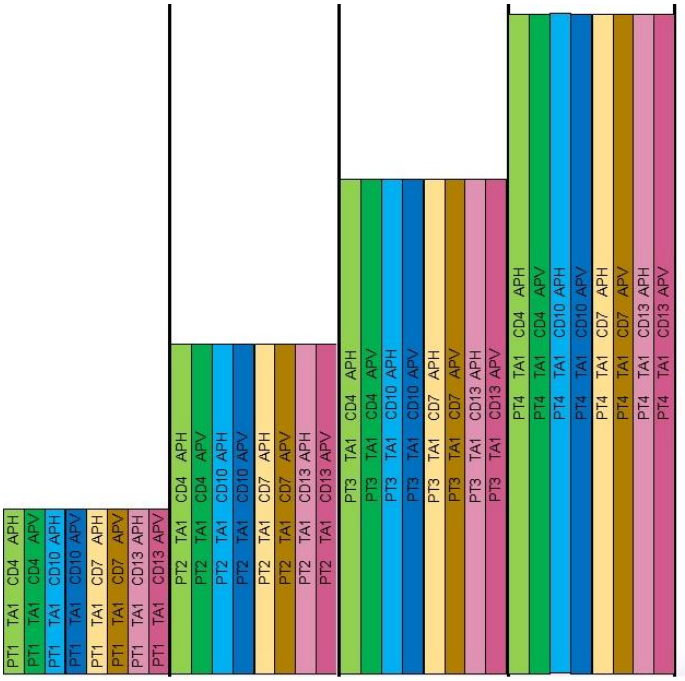
After all scans of the last power level have been completed, the transmit power is reduced again to the value of level 1 (PT 1) and the ramp starts again. This process is repeated until the write or read task is aborted by the function block.

Example 2: Scanning operations with a number of attempts (TA) = 3 and 2 power levels
PT: PT1, PT2 (2 power levels)
TA: 3 (3 attempts per transmit channel)
CD: 4, 10, 7, 13 (4 transmit channels)
AP: C (Combined Mode; horizontal and vertical polarization plane)



The value of the "Tries Allowed" (TA) parameter has been increased to 3. This increases the number of scan attempts to 24 for each power level. The detection zone is scanned longer for each power level. The increase of the ramp or the transmit power is slower.

Example 3: Scanning operations with Tries allowed (TA) = 1 and 4 power levels



PT: PT1, PT2, PT3, PT4 (4 power levels)

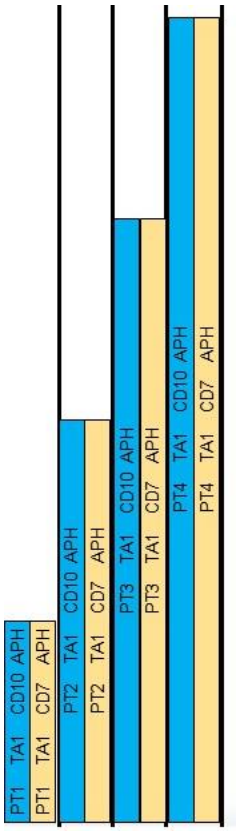
TA: 1 (1 Attempt per transmit channel)

CD: 4, 10, 7, 13 (4 transmit channels)

AP: C (Combined Mode; horizontal and vertical polarization plane)

The value of the "Tries Allowed" (TA) parameter has been reduced to 1. This reduces the number of scan attempts to 8 for each power level. The time with which the detection zone is scanned with a power level is reduced. The power levels of the ramp are scanned faster.

Example 4: Scan trials with horizontal polarization (AP), 2 transmit channels (CD), 1 attempt (TA) and 4 power levels

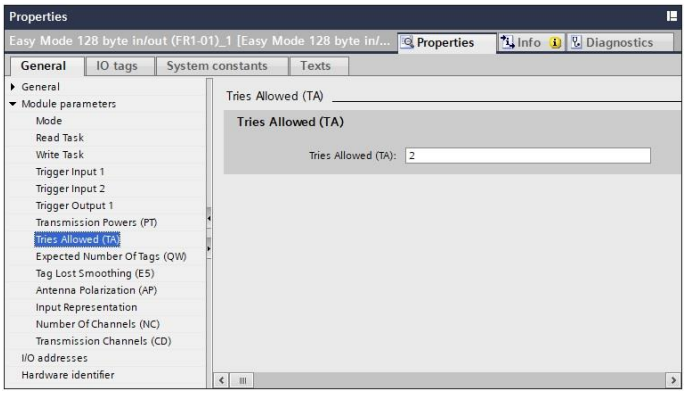


PT: PT1, PT2, PT3, PT4 (4 power levels)
TA: 1 (1 Attempt per transmit channel)
CD: 10, 13 (2 transmit channels)
AP: H (horizontal polarization plane)

The value of the "Tries Allowed" (TA) parameter has been reduced to 1. In addition, only 2 transmit channels (10 and 7) are used. The scan attempts are only performed in the horizontal polarization. This reduces the number of scan attempts to 2 for each power level. The time with which the detection zone is scanned with one power level is reduced. The power levels of the ramp are scanned more quickly.

4.7 Parameter “Tries Allowed - TA“

The "Tries Allowed - TA" parameter allows you to set the number of scan attempts (inventory rounds) that are performed for each transmit channel (parameter CD or NC) per power level (parameter PT).



Default setting parameter „Tries Allowed“

Tries allowed (TA): 2

This results in 2 scan attempts per polarization plane and power level per transmit channel

Value range Tries Allowed: 1…255
Default setting: 2

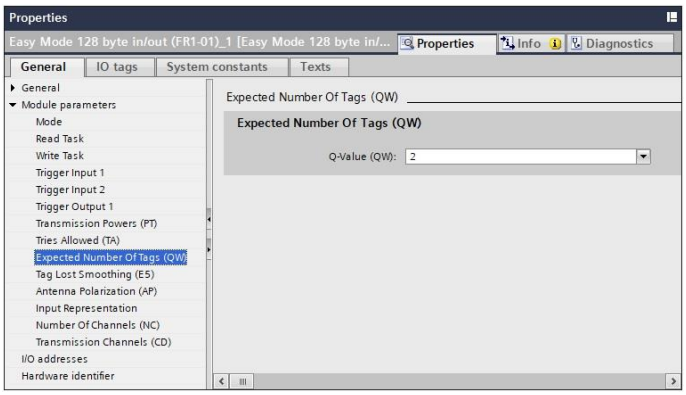
When using only one transmit power level (PT 1), it is not necessary to set the "Tries Allowed" (TA) parameter. The execution of the write or read task is controlled by the process image (function block). The scan attempts on the data carrier are repeated automatically until the task is terminated via the process image (function block).
If several transmit power levels are parameterized (ramp), the "Tries Allowed" parameter can be used to influence the number of scan attempts that are performed for each set power level. More detailed information about this can be found in the section "Parameterization of a ramp function for the transmit power" in the previous chapter.
By increasing the number of access attempts, more scans are performed at one power level. As a result, the detection zone is scanned longer with one transmission power before switching to the next higher power level. This means that data carriers can be better identified even at lower power levels before the transmission power is increased.

With an increasing number of scan attempts, the execution time for the identification of more distant data carriers that must be identified via a higher performance level increases.

4.8 Parameter “Expected Number of Tags - QW“

When identifying one or more data carriers via the air interface, each data carrier is assigned a defined time slot for data transmission by the IUT-F190-B40 RFID station. The greater the number of data carriers expected for identification, the greater the number of time slots available on the air interface must be. The number of time slots should correspond to the number of data carriers to be identified.

With the help of the parameter "Expected Number of Tags" the number of time slots is determined by 2^QW.



Default setting parameter „Expected Number of Tags“

Expected Number of Tags (QW): 2

This uses $2^2 = 4$ time slots on the air interface.

Value range „Expected Number of Tags“: 0…7
0 → 1 time slot resp. 1 data carrier
1 → 2 time slots resp. 2 data carriers
2 → 4 time slots resp. 4 data carriers
3 → 8 time slots resp. 8 data carriers
….
7 → 128 time slots resp. 128 data carriers

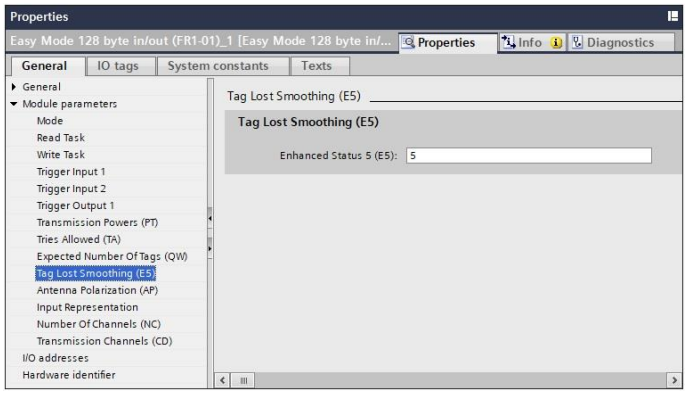
Default setting: 2

In the case of an intended identification of only one data carrier, the "Expected Number of Tags" (QW) parameter can be reduced to a value of 0 or 1. This shortens the processing time of a scan attempt, since fewer time slots are used in the communication on the air interface. It is thus possible to identify a data carrier more quickly.

If the number of time slots is too small when identifying a larger tag population (multitag application), this leads to collisions of the responses from the data carriers on the air interface because they respond in the same time slot. Therefore, as the number of data carriers increases, the value of the parameter QW or the time slots should be adjusted accordingly. An increase in the number of time slots leads to slower identification of the data carriers.

4.9 Parameter “Tag Lost Smoothing – E5“

If a tag leaves the detection zone, the IUT-F190-B40 RFID station continues to make access attempts to this tag. The "Tag lost smoothing" parameter can be used to set how many unsuccessful access attempts should be made before the exit of the tag from the detection zone is reported to the controller.



Default setting parameter „Tag Lost Smoothing“:

Tag Lost Smoothing (E5): 5

5 unsuccessful read accesses to a data carrier must be executed before a corresponding message is sent to the PLC.

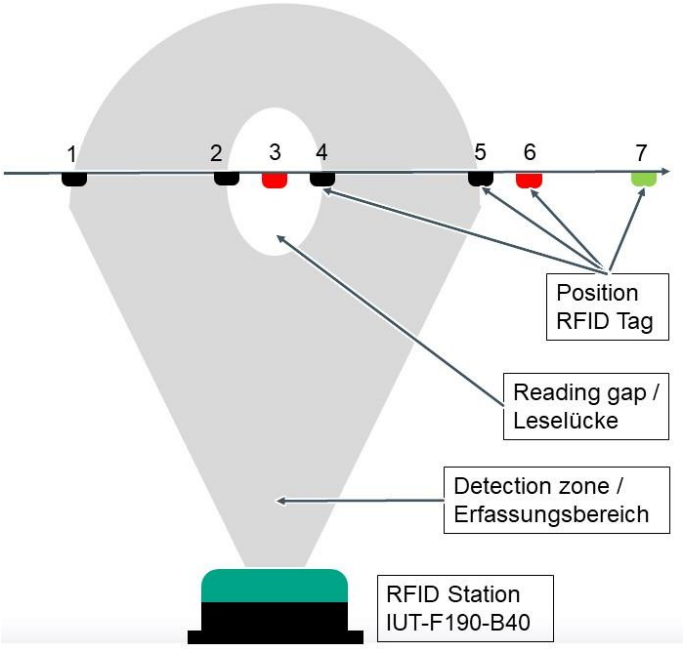
Value range „Tag Lost Smoothing“: 0…252
Default setting: 5

The "Tag Lost Smoothing" parameter (E5) influences how quickly the loss of a data carrier is reported to the PLC. The IUT-F190-B40 RFID station uses electromagnetic waves to identify data carriers. Electromagnetic waves cause reflections on metal surfaces. This can create areas in the detection zone where no stable communication with the data carrier is possible (read gap). If a tag enters such an area, a message is sent to the controller that the tag can no longer be read. The "Tag Lost Smoothing" parameter can be used to delay this message until the tag leaves this area again and enters an area in which it can be stably recognized again.

By increasing the value of the "Tag Lost Smoothing", read gaps can be bridged for moving data carriers. This means that the tags can be identified without interruption in the entire detection zone. If a data carrier finally leaves the detection zone, the notification that the data carrier has left the detection zone is delayed. The system becomes slower with respect to these messages.
The message about the exit of a tag from the detection zone is omitted completely if the read/write task was previously ended by the function block.

With a smaller value for the "Tag Lost Smoothing", the unsuccessful access to a known data carrier is reported more quickly. The system reacts more quickly when a tag leaves the detection zone. However, this increases the sensitivity to read gaps in the detection zone.

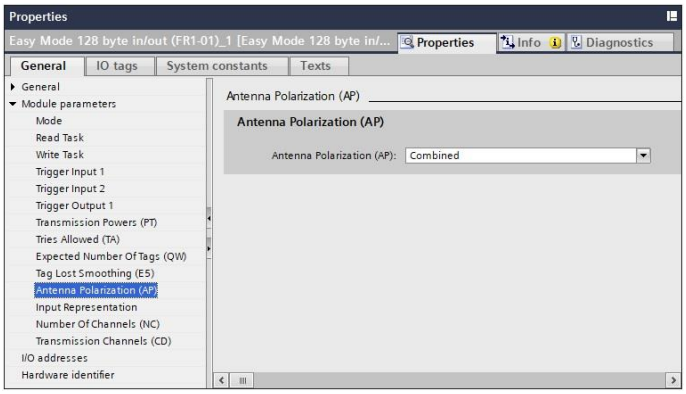
If a tag causes multiple changes between "read" and "not read" when passing through the detection zone, there are read gaps in the detection zone. In this case, the value of the "Tag Lost Smoothing" parameter should be increased.



1: Data carrier enters the detection zone; successful read access (read valid = True) is immediately reported to the PLC.
2: data carrier leaves detection zone and reaches the area of a read gap; no message to the PLC
3: small value of "Tag lost smoothing" → Exit of the tag from the detection zone is reported to the PLC (read valid = False)
4: data carrier re-enters the detection zone from the read gap; successful read access (read valid = True) is reported to the PLC
5: data carrier leaves detection zone permanently; no message to the PLC
6: small value of "Tag lost smoothing" → Exit of the tag from the detection zone is reported to the PLC (read valid = False)
7: large value of "Tag loss smoothing" → Exit of the tag from the detection zone is reported to the PLC (read valid = False)

4.10 Parameter "Antenna Polarization – AP"

The identification of data carriers by the RFID station IUT-F190-B40 takes place via an electromagnetic field. The waves emitted for this purpose are polarized. The "Antenna Polarization" (AP) parameter is used to set the polarization type of the electromagnetic waves.



Default setting parameter „Antenna Polarization":

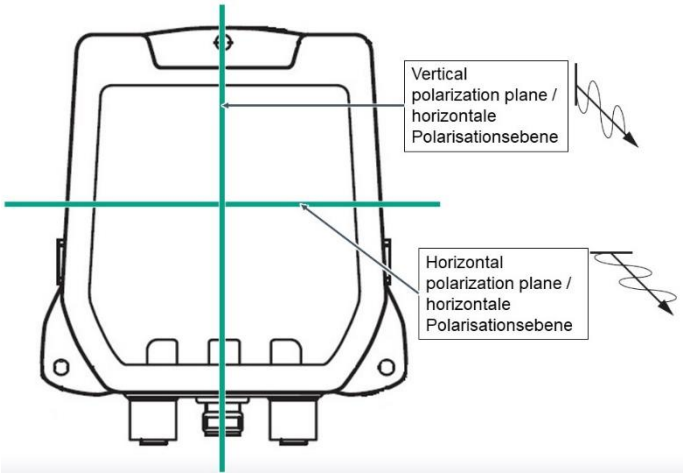
Antenna Polarization (AP): Combined

With the "Combined" setting, a scan with horizontal polarization is performed first. This is followed by a scan with vertical polarization.

Value range „Antenna Polarization": Combined (horizontal + vertical Polarization)
Horizontal (Horizontal polarization only)
Vertical (Vertical polarization only)

Default setting: Combined

The antenna of the IUT-F190-B40 RFID station and the antenna inside a data carrier have a polarization orientation. The orientation of the data carrier must be selected so that the polarization is identical to the set polarization type of the RFID station.



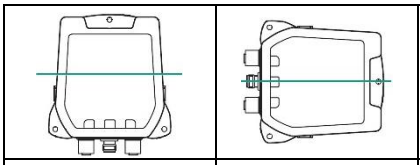
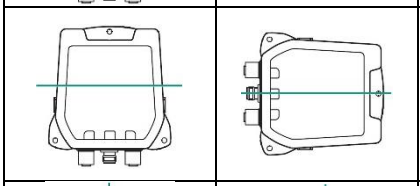
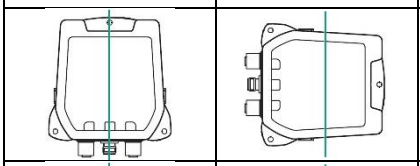
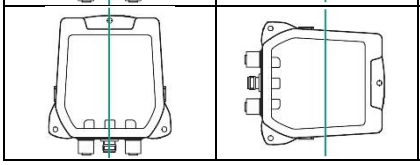
Polarization plane RFID Station IUT-F190-B40:

Horizontal polarization: plane from left to right ground terminal.

Vertical polarization: plane from supply voltage connection to mounting hole

In the factory setting, the "Combined" mode is activated. Under this setting, first a scan with horizontal polarization and then another scan with vertical polarization is performed. This mode has the advantage that the orientation of the data carrier does not have to be taken into account. However, the scan attempt cycle time is extended for each power level, since a scan attempt is performed alternately with both polarization levels.

If the orientation of the data carrier is known and remains unchanged, it is recommended to change the polarization to the setting "horizontal" or "vertical" according to the orientation of the data carrier. In this way, only scan attempts in the polarization type that matches the orientation of the data carrier are executed. The number of scan attempts per power level is thus reduced by half and the throughput time is shortened accordingly.

	Alignment of the polarization plane IUT-F190-B40 identical to the alignment of the polarization plane of the data carrier → correct alignment → Data carrier can be identified
	Alignment of the polarization plane IUT-F190-B40 rotated by 90° to the alignment of the polarization plane of the data carrier → incorrect alignment → Data carrier cannot be identified
	Alignment of the polarization plane IUT-F190-B40 identical to the alignment of the polarization plane of the data carrier → correct alignment → Data carrier can be identified
	Alignment of the polarization plane IUT-F190-B40 rotated by 90° to the alignment of the polarization plane of the data carrier → incorrect alignment → Data carrier cannot be identified

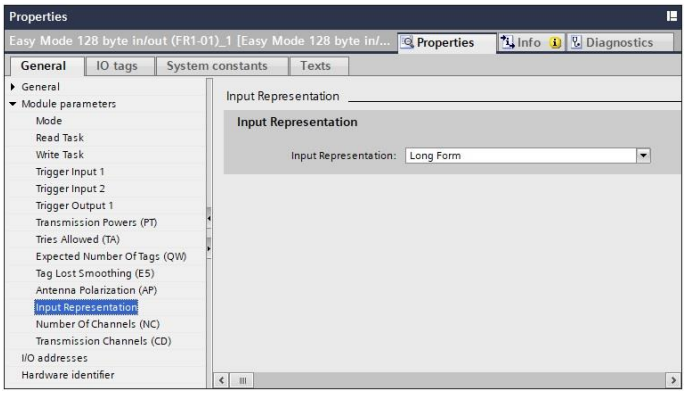
If the RFID station unintentionally identifies neighboring tags, this behavior can be reduced by reducing the transmitting power (parameter PT) and switching to only one polarization plane. Instead of the combined mode (factory setting), horizontal or vertical polarization is then used. However, the orientation of the data carrier must be constant and known.

The energy transmitted to a data carrier depends on the alignment of the data carrier to the RFID station. If the polarization planes of the data carrier and RFID station are the same, the transmitted ener-

gy is at a maximum and the greatest possible range is achieved. If the polarization planes are rotated relative to each other, less energy is transmitted to the data carrier. This reduces the range for detecting the data carrier. When using only one polarization plane (horizontal or vertical), the transmitted energy is minimal if the angle between the polarization plane of the RFID station and the data carrier is 90°.

4.11 Parameter “Input Representation“

The IUT-F190-B40 RFID station supports two data formats for transmission via the process interface. The "Input Representation" parameter can be used to switch between the two formats.



Default setting parameter „Input Representation“:

Input Representation: Long Form

This setting allows multiple data carriers to be identified simultaneously within the detection zone.

Value range “Input Representation“: Long Form
Short Form
Default setting: Long Form

When using the "Long Form" data format, one or more data carriers can be identified that are simultaneously located in the detection zone of the RFID station. For an assignment of the data sent back from the RFID station to the PLC to the associated data carrier, the UII/EPC information is always prefixed in the returned data when using the "Long Form" data format. The UII/EPC code (memory bank 01) is a unique identifier for the data carrier. There must not be more than one data carrier with the same UII/EPC code within the detection zone.

Telegram structure returned data "Long Form":

Byte	Content							
0	Input 2	Input 1	0	Tag Present	Error	Active	Write Valid	Read Valid
1	Length Data (Length between “Length UII/EPC Information High Byte” and “Information Byte Y”)							
2	RSSI							
3	Transmission Power (dBm)							
4	Length UII/EPC Information (High Byte)							
5	Length UII/EPC Information (Low Byte)							
6	PC Word (High Byte)							
7	PC Word (Low Byte)							
8	UII/EPC Byte 1							
9	UII/EPC Byte 2							
…	…							
…	UII/EPC Byte X							
…	Length Information (High Byte)							
…	Length Information (Low Byte)							
…	Information Byte 1							
…	Information Byte 2							
…	…							
…	Information Byte Y							
…	16#00							
255	16#00							

When using the "Short Form" data format, the preceding UII/EPC information in the response is omitted. This format is designed for the identification of exactly one data carrier in the capture zone. If several data carriers are identified when using the "Short Form" data format, an error message is issued.
Telegram structure returned data "Short Form":

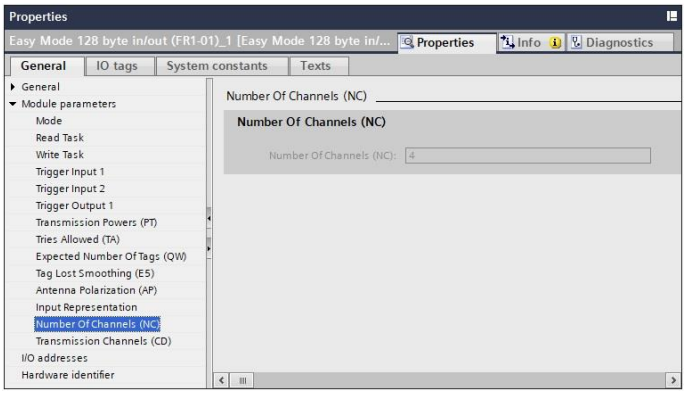
Byte	Content							
0	Input 2	Input 1	0	Tag Present	Error	Active	Write Valid	Read Valid
1	Length Data (Length between “Information Byte 1” and “Information Byte Y”)							
2	RSSI							
3	Transmission Power (dBm)							
4	Information Byte 1							
5	Information Byte 2							
…	…							
…	Information Byte Y							
…	16#00							
255	16#00							

The "Long Form" data format offers the advantage that several data carriers can be identified simultaneously in addition to one data carrier. If more than one data carrier is identified, the information from all data carriers is transferred. There is no error message when identifying more than one data carrier. A disadvantage of the protocol is the required prefix of the UII/EPC information in the response. If the RFID station is to read the TID (memory bank 10) or the user data (memory bank 11) of only one data carrier, the UII/EPC information is not required. However, the UII/EPC information occupies a partial area of the telegram in the reply. I.e. not the complete telegram is available for the transmission of the intended information.

The "Short Form" data format is optimized for the identification of one data carrier. The UII/EPC information is omitted in the reply. By omitting the UII/EPC information, more information can be transmitted within the telegram.

4.12 Parameter “Number of Channels - NC“

This parameter cannot be set for all device variants of the IUT-F190-B40 RFID station. The parameter is only supported by the variants IUT-F190-B40-FR2-02 (USA) and IUT-F190-B40-FR2-03 (China). These devices use the frequency hopping method (FHSS) for data transmission. The "Number of Channels" (NC) parameter can be used to set the number of transmit channels on the air interface that are used within a scan.



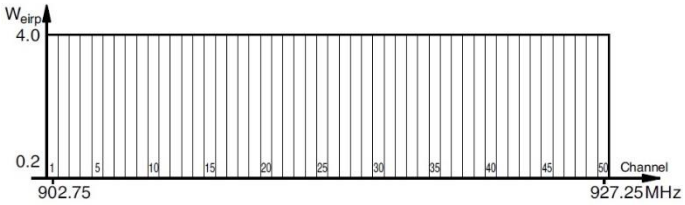
Default setting parameter „Number of Channels“:

Number of Channels (NC): 4

Under this setting, 4 transmit channels are used during the execution of a scan cycle. The preset value depends on the device variant.

IUT-F190-B40-FR1-01 (Europe):
The "Number of Channels" (NC) parameter is not valid for this device variant. This device uses the Dense Reader Mode (DRM) for data transmission. The transmit channels used can be parameterized by the "Transmit Channels" (CD) parameter.

IUT-F190-B40-FR2-02 (USA):
The device version for use in the USA uses 50 transmit channels on the air interface. All 50 channels are always used one after the other.



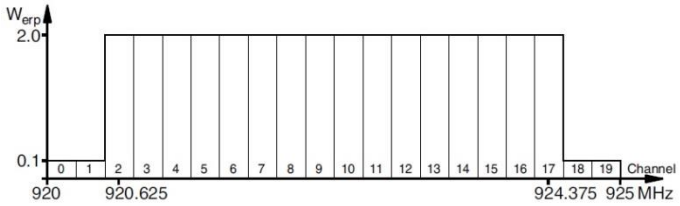
Channel layout IUT-F190-B40-FR2-02:

Use of channels 1 to 50 for data transmission

Value range “Number of Channels“ (FR2-02): 1…50
Default setting (FR2-02): 50

If the value of the "Number of Channels" (NC) parameter is set to the value 10, channels 1 to 10 are used within the first scan cycle. The next scan cycle then uses channels 11 to 20. After channel 50 is used, channel 1 and subsequent channels on the air interface are used again.

IUT-F190-B40-FR2-03 (China):
The device version for use in China has 20 transmission channels available. However, the device only uses channels 2 to 17. All of these 16 channels are always used one after the other.



Channel layout IUT-F190-B40-FR2-03:

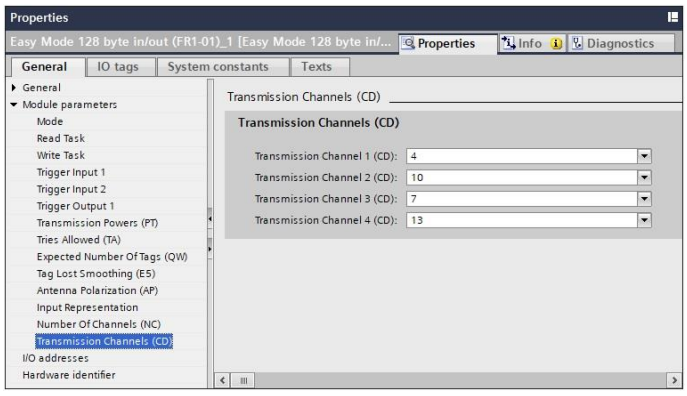
Use of channels 2 to 17 for data transmission

Value range “Number of Channels“ (FR2-03): 1…16
Default setting (FR2-03): 16

If the value of the "Number of Channels" (NC) parameter is set to 4, channels 2 to 5 are used within the first scan cycle. The next scan cycle then uses channels 6 to 9. After channel 17 is used, channel 2 and subsequent channels on the air interface are used again.

4.13 Parameter “Transmission Channels - CD“

By means of the parameter "Transmission Channels" (CD) the transmission channels to be used for the device version IUT-F190-B40-FR1-01 (Europe) can be parameterized. This device uses the Dense Reader Mode (DRM) where only channels 4, 7, 10 and 13 of the channel spectrum can be used. It is possible to change the number and the order of the channels by this parameter.



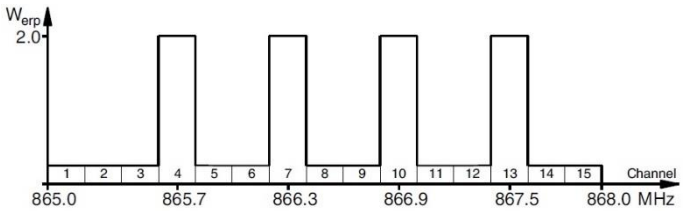
Default setting parameter “Transmission Channels“:

Transmission Channels (CD):

1/4	Channel 4
2/4	Channel 10
3/4	Channel 7
4/4	Channel 13

4 channels are used in the order 4, 10, 7 and 13.

IUT-F190-B40-FR1-01 (Europe):
Channels 4, 7, 10 and 13 of the channel spectrum can be used for this device version. The number of channels can be between 1 (minimum) and 4 (maximum). The order of the channels is adjustable.



Channel layout IUT-F190-B40-FR1-01:

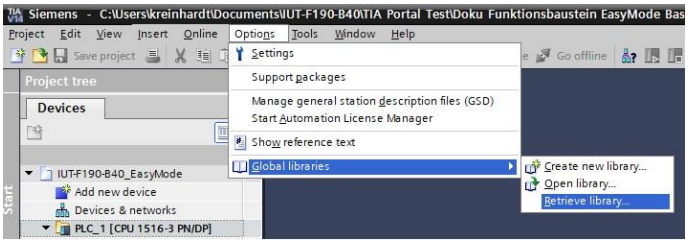
Use of channels 4, 7, 10 and 13 for data transmission.

The number of transmission channels used can be reduced by the "Transmission Channels" (CD) parameter. If fewer transmission channels are used, the execution time for a scan cycle on a power level is reduced. Fewer scans are executed per power level and the ramp function for the output power is faster.

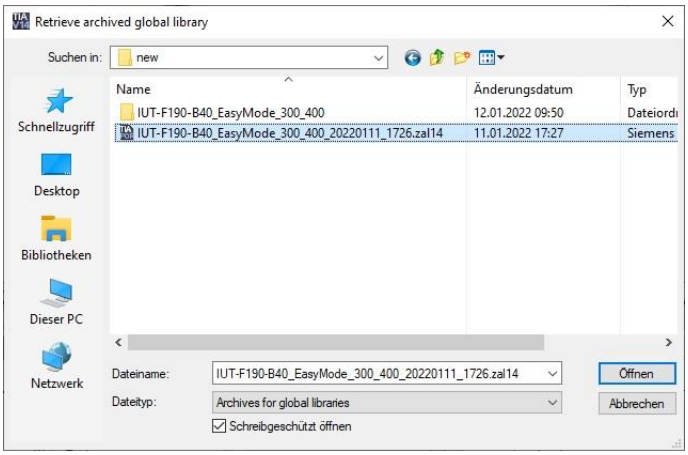
When reducing the number of transmit channels, it is recommended to keep channels 7 and 10, which are located in the middle of the channel spectrum, since data carriers are tuned to the middle frequency of the spectrum.

5. Import library “IUT-F190-B40_EasyMode_300_400“

The "IUT-F190-B40_EasyMode_300_400" library contains various function blocks for using the Easy Mode. This library must first be unpacked.

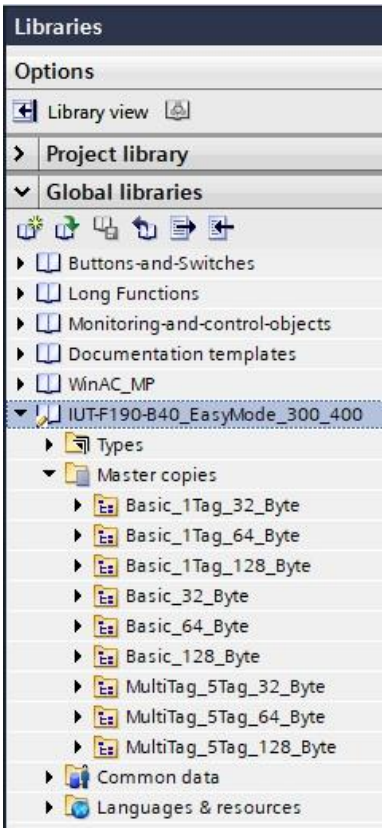


Retrieve library:
Options → Global libraries → Retrieve Library

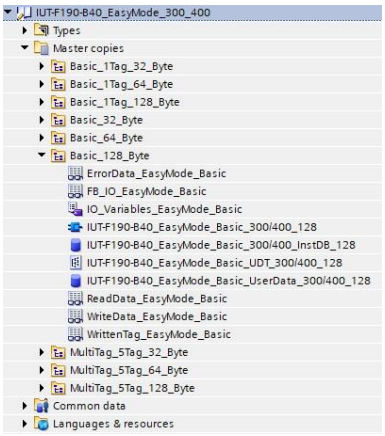


Select library:

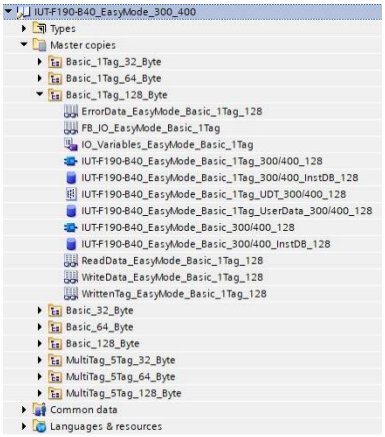
Here: IUT-F190-B40_EasyMode_300_400…..zal14



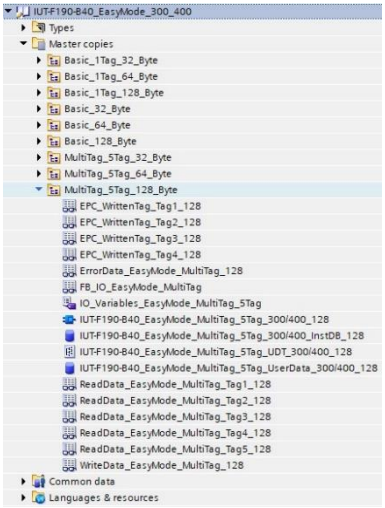
Within the folder "Master copies" there are 3 different function blocks. These function blocks provide different functionality based on the Easy Mode.



Basic:
Basic version of the function block for executing read/write tasks. The number of read and write accesses is counted and output. A task is to be started and ended by the user.



Basic_1Tag:
Function block for executing read/write tasks. The execution of the tasks is automatically terminated as soon as a data carrier is successfully read or written. Furthermore, an active task is aborted if no data carrier has been read or written within a configurable period of time. The execution time for a task is measured and output.

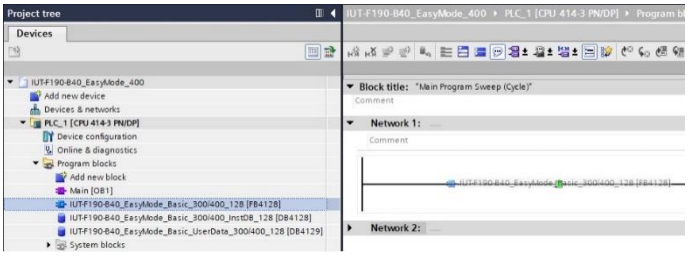


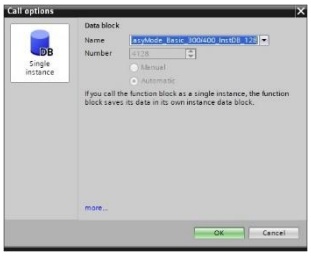
MultiTag_5Tag:
Function module for identifying up to 5 data carriers simultaneously in the detection zone. The data of the identified transponders are stored in separate data structures. A task is to be started and ended by the user.

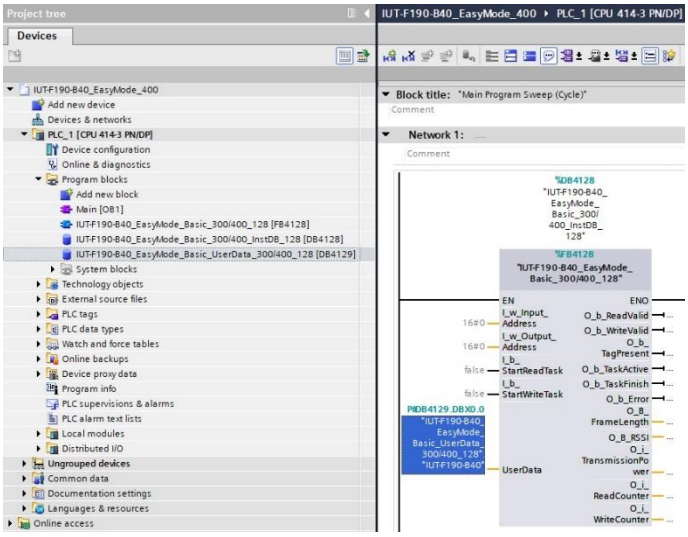
6. Function block “IUT-F190-B40_EasyMode_Basic_300/400“

Functional description "IUT-F190-B40_EasyMode_Basic_300/400:
Basic version of a function block for using the Easy Mode. Write and read tasks can be executed. The number of successful read or write accesses is output. In addition, the time of access to the data carrier is saved. When a new read or write task is started, all internal data and the outputs are reset. The read and write data as well as the access times are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".

Implementation of function block "IUT-F190-B40_EasyMode_Basic_300/400":
Drag function block "IUT-F190-B40_EasyMode_Basic_300/400" (FB4128) from the project tree into OB1. Then select the corresponding instance data block. The library contains the data block "IUT-F190-B40_EasyMode_Basic_300/400_InstDB" (DB4128) which can be used as instance data block. The instance data block can also be regenerated.

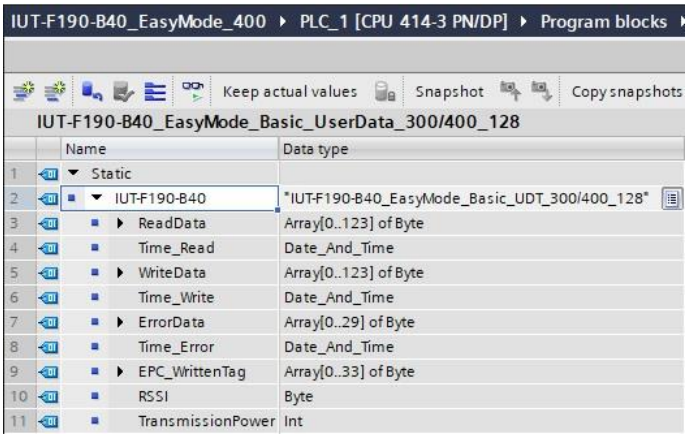






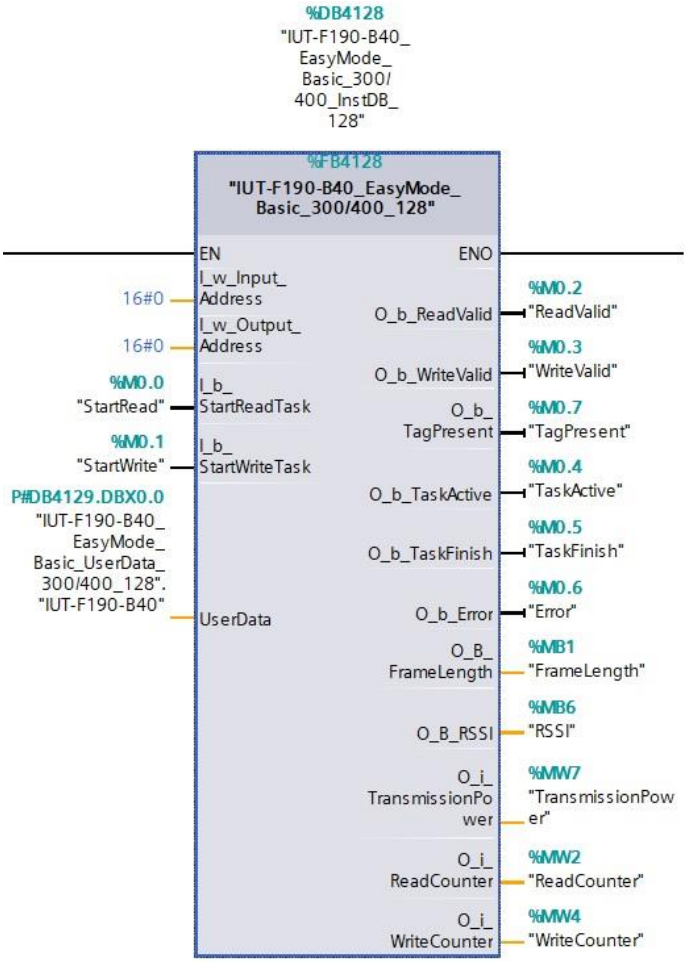
The read/write data, error information and the access times of the function block are located in a separate data block. This is parameterized at the "UserData" input. The library contains the data block "IUT-F190-B40_EasyMode _Basic_UserData_300/400" which can be used for this purpose.

The data block can be generated by the user. The internal data structure is generated from the library via the data type "IUT-F190-B40_ EasyMode_Basic_UDT_300/400".



The data block "IUT-F190-B40_EasyMode _Basic_UserData_300/400" consists of the structure "IUT-F190-B40". This is divided into the following fields:

ReadData → Read data from data carrier
Time_Read → Time of read access
WriteData → Write data for data carrier
Time_Write → Time of write access
ErrorData → Error information
Time_Error → Time of error signal
EPC_WrittenTag → UII/EPC information of a successfully written data carrier
RSSI → RSSI value for data carrier access
TransmissionPower → Transmission power in mW with which the data carrier was accessed



Complete wiring of the "IUT-F190-B40_Easy Mode_Basic_300/400" function block:

The input parameters "I_w_Input_Address" and "I_w_Output_Address" correspond to the start addresses of the input and output data fields of the communication module from the hardware configuration.

Telegram lengths of up to 128 bytes are supported by the function block. The telegram length of 256 bytes is not supported by the function block, since the Profinet master of the used controller does not support this telegram length.

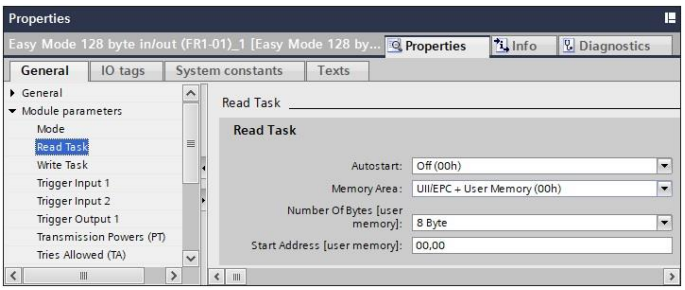
The following table shows the meaning of the input and output variables:

Name	Input / Output	Data type	Meaning
I_w_Input_Address	Input	Word	Start address input data field
I_w_Output_Address	Input	Word	Start address output data field
I_b_StartRead	Input	Bool	Start Read Task; With edge change from 0 → 1; starts execution of read task; end read task with edge change 1 → 0;
I_b_StartWrite	Input	Bool	Start Write Task; with edge change from 0 → 1; starts execution of write task; end write task with edge change 1 → 0;
UserData	InOut	DB	Data block „UserData“ → IUT-F190-B40_EasyMode_Basic_ UserData_300/400.IUT-F190-B40
O_b_ReadValid	Output	Bool	Read valid (successful); 1 := data carrier within detection zone and data read successfully; 0 := data carrier outside detection zone; no data read
O_b_WriteValid	Output	Bool	Write valid (successful); 1 := Data carrier within detection zone and data successfully written; 0 := data carrier outside acquisition zone; no data written
O_b_TagPresent	Output	Bool	Presence data carrier: 1 := one or more data carriers in the detection zone 0 := no data carrier in the detection zone
O_b_TaskActive	Output	Bool	Read or write task active; 1 := read or write task active; 0 := no read or write task active; RFID head off
O_b_TaskFinish	Output	Bool	Read or write task completed; 0 := read or write task active; 1 := no read or write task active; Task finished; RFID head off

O_b_Error	Output	Bool	Error; 1 := error occurred during read or write task 0 := no error condition active
O_B_FrameLength	Output	Byte	Length of the read-in data; Indication of the length of the read-in data in bytes; in case of error condition the length of the error message is indicated.
O_B_RSSI	Output	Byte	RSSI value for data carrier access; Received signal strength in the range between 0dec (weak) and 100dec (strong)
O_i_TransmissionPower	Output	Integer	Transmit power; Value of the transmission power in mW with which the data carrier could be accessed
O_i_ReadCounter	Output	Integer	Counter read operations; Number of successful reads during the execution of a read task.
O_i_WriteCounter	Output	Integer	Counter write operations; Number of successful writes during the execution of a write task.

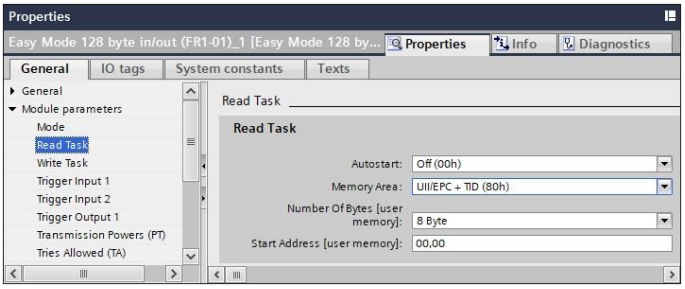
6.1 Read data carrier without Autostart function

Read access to the data carrier must be set via the "Read Task" parameter in the GSDML file. The user data (memory bank 11; User Memory), the UII/EPC code (memory bank 01) and the TID (memory bank 10) can be accessed. If the Autostart function is deactivated, the read task must be triggered via the function block. When using the "Long Form" data format, the UII/EPC information for unique assignment to a data carrier is always placed in front of the read data record in the returned data. When using the "Short Form" data format, the UII/EPC information is omitted.



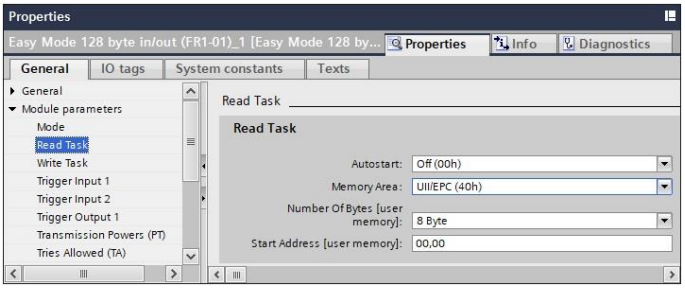
Parameter „Read Task“ → Setting read access to user data (User Memory)

Autostart:	off (00h)
Memory Area:	UII/EPC + User Memory
Number of Bytes:	8 Byte
Start Address:	00,00 (hex)



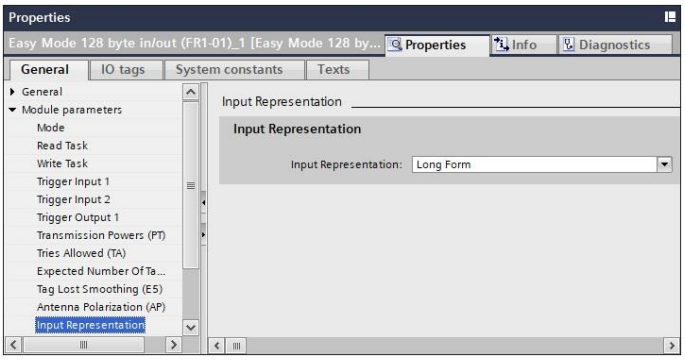
Parameter „Read Task“ → Setting read access to the TID

Autostart:	off (00h)
Memory Area:	UII/EPC + TID
Number of Bytes:	Not relevant
Start Address:	Not relevant



Parameter „Read Task“ → Setting read access to the UII/EPC code

Autostart:	off (00h)
Memory Area:	UII/EPC
Number of Bytes:	Not relevant
Start Address:	Not relevant



Parameter "Input Representation" → Setting Data format RFID station

Long form → Identification of one or more data carriers

Short Form → Identification of only one tag

The read task is not started by the RFID station itself due to the deactivated Autostart function. It is necessary to start the read task via the "I_b_StartReadTask" input on FB4128.

Example 1: Read access to several data carriers one after the other
There is always only one data carrier in the detection zone.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	B...	FALSE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Initial state before the start of the read task:

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 0
RSSI	= 0
TransmissionPower	= 0
ReadCounter	= 0

The read task starts as soon as "StartRead" is set to True.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Read task active; no data carrier in the detection zone:

StartRead	= True
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 0
RSSI	= 0
TransmissionPower	= 0
ReadCounter	= 0

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier A in detection zone and data read in

StartRead	= True
ReadValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the read data)
RSSI	= 20 (depending on the signal quality)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 1

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier has left the detection zone

StartRead	= True
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 20 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 1

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier B in detection zone and data read in

StartRead	= True
ReadValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 20 (depending on the signal quality)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 2

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier has left the detection zone

StartRead	= True
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 20 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 2

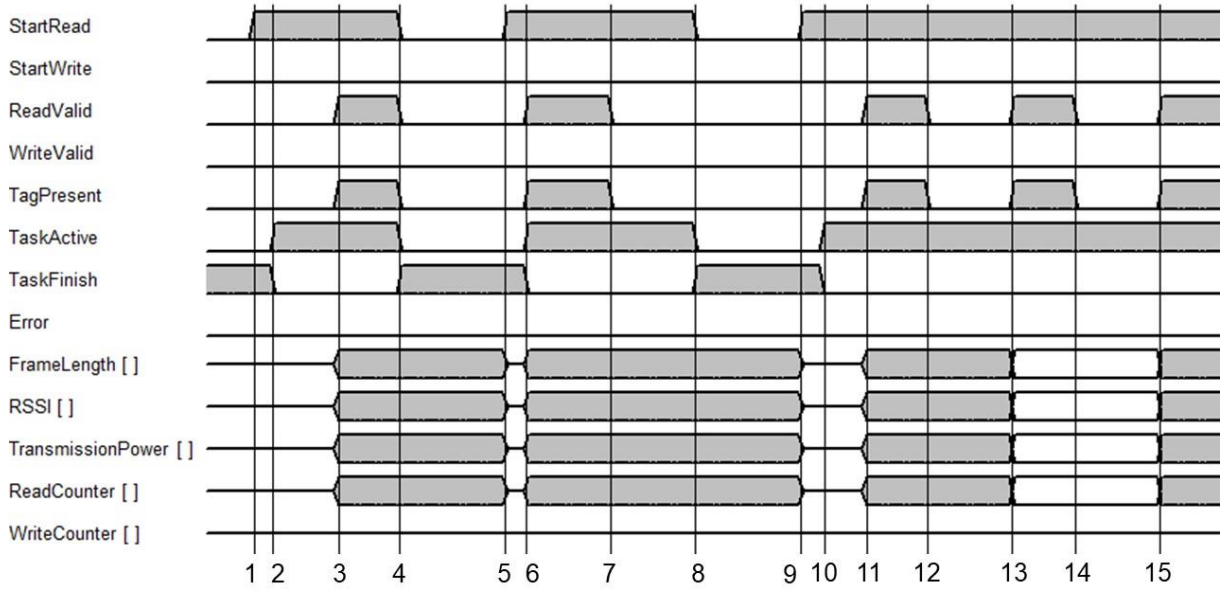
Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	FALSE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task finished

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 20 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 2

If a tag enters the detection zone and is read, a signal change from 0 to 1 occurs at the "ReadValid" and "TagPresent" outputs. The "ReadCounter" output is incremented for each newly read data carrier. The "ReadCounter" counts the edge changes from 0 to 1 at the "ReadValid" output.
If a tag leaves the detection zone and there is no other tag in it, the signal at the "ReadValid" and "TagPresent" outputs changes from 1 to 0. No UII/EPC information of the tag that has left the detection zone is transmitted.

Flowchart Execution of read task without Autostart function with exactly one tag in the detection zone:



Time point	Meaning
1	Start read task StartRead := True;
2	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0;
3	Data carrier A read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 1;
4	Read task finished StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 1;
5	Next read task is started StartRead := True; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter := 0;
6	Data carrier B read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 13; TransmissionPower = 50; ReadCounter = 1;
7	Data carrier B has left detection zone; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 13; TransmissionPower = 50; ReadCounter = 1;
8	Read task finished StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 16; RSSI = 13; TransmissionPower = 50; ReadCounter = 1;
9	Start read task StartRead := True; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0;
10	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0;
11	Data carrier C read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 46; TransmissionPower = 50; ReadCounter = 1;
12	Data carrier C has left detection zone; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 46; TransmissionPower = 50; ReadCounter = 1;
13	Data carrier D read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 13; TransmissionPower = 50; ReadCounter = 2;
14	Data carrier D has left detection zone; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 13; TransmissionPower = 50; ReadCounter = 2;
15	Data carrier E read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 30; RSSI = 23; TransmissionPower = 50; ReadCounter = 3;

Example 2: Read access to multiple data carrier simultaneously
Several data carriers are inserted into the detection zone one after the other. The data carriers are then removed again in the same order.

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	FALSE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Initial state before the start of the read task:
StartRead = False
ReadValid = False
TagPresent = False
TaskActive = False
TaskFinish = True
FrameLength = 0
RSSI = 0
TransmissionPower = 0
ReadCounter = 0
The read task starts as soon as "StartRead" is set to True.

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Read task active; no data carrier in the detection zone
StartRead = True
ReadValid = False
TagPresent = False
TaskActive = True
TaskFinish = False
FrameLength = 0
RSSI = 0
TransmissionPower = 0
ReadCounter = 0

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	26	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier A in detection zone and data read in
StartRead = True
ReadValid = True
TagPresent = True
TaskActive = True
TaskFinish = False
FrameLength = 26 (depending on the length of the read data)
RSSI = 26 (depending on the signal quality)
TransmissionPower = 50 (transmission power level 50mW)
ReadCounter = 1

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier B in detection zone and data read in
StartRead = True
ReadValid = True
TagPresent = True
TaskActive = True
TaskFinish = False
FrameLength = 26 (depending on the length of the read data)
RSSI = 20 (depending on the signal quality)
TransmissionPower = 50 (transmission power level 50mW)
ReadCounter = 2

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	10	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier C in detection zone and data read in

StartRead	= True
ReadValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the read data)
RSSI	= 10 (depending on the signal quality)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 3

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	10	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task active; a data carrier has left the detection zone

StartRead	= True
ReadValid	= False
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 10 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 3

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	10	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task active; another data carrier has left the detection zone; no change from the previous state

StartRead	= True
ReadValid	= False
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 10 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 3

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	10	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task active; the last tag has left the detection zone; no tag left in the detection zone; TagPresent = False;

StartRead	= True
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 10 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 3

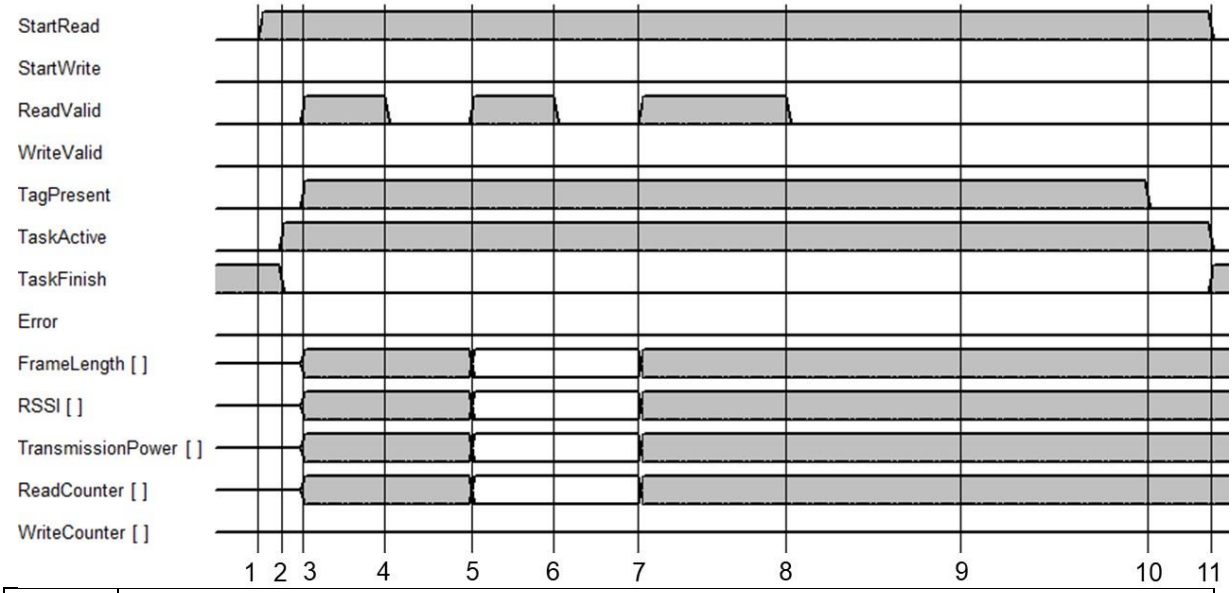
Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	FALSE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	10	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task finished

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 10 (unchanged)
TransmissionPower	= 50 (transmission power level 50mW)
ReadCounter	= 3

Read access to a new tag is signaled by the signal change from 0 to 1 at the "ReadValid" output. If there is already a data carrier in the detection zone ("ReadValid" = 1), the "ReadValid" output is first reset to 0 for 50ms. It is then set to 1 again, thus signaling successful read access to the next data carrier.
If a tag leaves the detection zone, the signal at the "ReadValid" output changes from 1 to 0. If another tag then leaves the detection zone, the signal state at the "ReadValid" output ("ReadValid" = 0) remains unchanged. The exit of this data carrier from the detection zone cannot be detected by the Easy Mode.
Only when the last tag leaves the detection zone does the "TagPresent" output change from 1 to 0. This signals that there are no more tags in the detection zone.

Flowchart Execution of read task without autostart function with 3 data carriers in the detection zone:

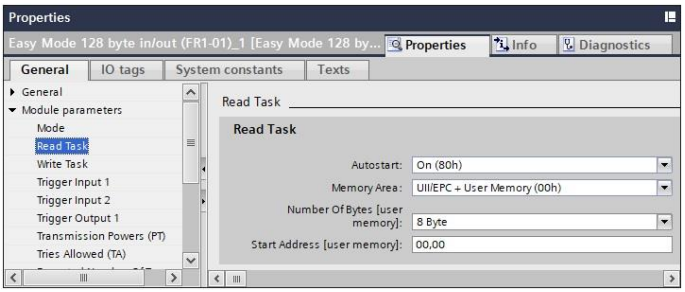


Time point	Meaning
1	Start read task StartRead := True;
2	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0;
3	Data carrier A read; 1 data carrier in the detection zone StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 26; TransmissionPower = 50; ReadCounter = 1;
4	Data carrier B enters the detection range and is read; ReadValid goes to False for 50ms. StartRead := True; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 26; TransmissionPower = 50; ReadCounter = 1;
5	Read-in data from data carrier B are transferred; ReadValid goes to True after 50ms. StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 13; TransmissionPower = 50; ReadCounter := 2;
6	Data carrier C enters the detection range and is read; ReadValid goes to False for 50ms. StartRead := True; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 13; TransmissionPower = 50; ReadCounter = 2;
7	Data read from data carrier C is transferred; ReadValid goes to True after 50ms. StartRead := True; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 3;
8	A data carrier leaves the detection zone StartRead := True; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 3;
9	Another data carrier leaves the detection zone; no changes to the output signals StartRead := True; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 3;
10	The last data carrier leaves the detection zone; no data carrier left in the detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 3;
11	Read task finished StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; Fra-

	meLength = 26; RSSI = 20; TransmissionPower = 50; ReadCounter = 3;

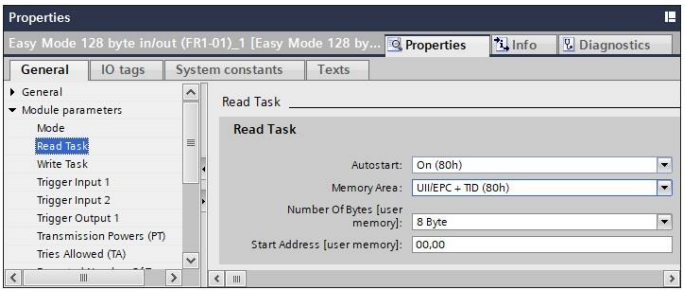
6.2 Read data carrier with Autostart function

Read access to the data carrier must be set via the "Read Task" parameter in the GSDML file. The user data (memory bank 11; User Memory), the UII/EPC code (memory bank 01) and the TID (memory bank 10) can be accessed. If the Autostart function is activated, the read task is started automatically by the RFID station. Control via the function block is therefore not necessary. When using the "Long Form" data format, the UII/EPC information for unique assignment to a data carrier is always placed in front of the read data record in the returned data. When using the "Short Form" data format, the UII/EPC information is omitted.



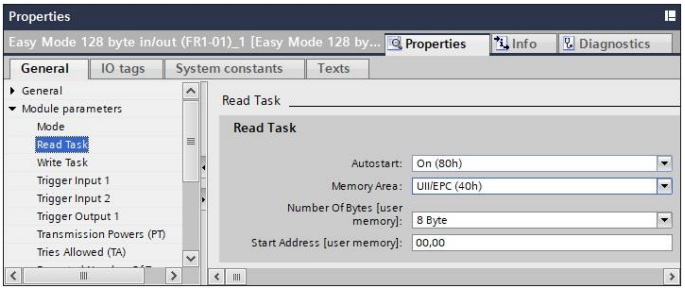
Parameter „Read Task“ → Setting read access to user data (User Memory)

Autostart:	on (80h)
Memory Area:	UII/EPC + User Memory
Number of Bytes:	8 Byte
Start Address:	00,00 (hex)



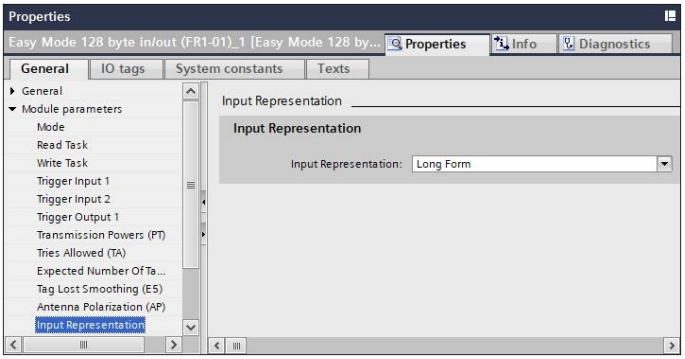
Parameter „Read Task“ → Setting read access to the TID

Autostart:	on (80h)
Memory Area:	UII/EPC + TID
Number of Bytes:	Not relevant
Start Address:	Not relevant



Parameter „Read Task“ → Setting read access to the UII/EPC code

Autostart:	on (80h)
Memory Area:	UII/EPC
Number of Bytes:	Not relevant
Start Address:	Not relevant



Parameter “Input Representation“ → Setting data format RFID station

Long Form → Identification of one or more data carriers

Short Form → Identification of only one data carrier

The read task is started by the RFID station itself via the switched-on Autostart function. It is not necessary to start the read task via the "I_b_StartReadTask" input on FB4128.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Initial state: Read task was started by RFID station

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 0
RSSI	= 0
TransmissionPower	= 0
ReadCounter	= 0

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier A in detection zone and data read in

StartRead	= False
ReadValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the read data)
RSSI	= 20
TransmissionPower	= 50
ReadCounter	= 1

The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	20	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier has left the detection zone

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 20
TransmissionPower	= 50
ReadCounter	= 1

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	23	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier B in detection zone and data read in

StartRead	= False
ReadValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the read data)
RSSI	= 23
TransmissionPower	= 50
ReadCounter	= 2

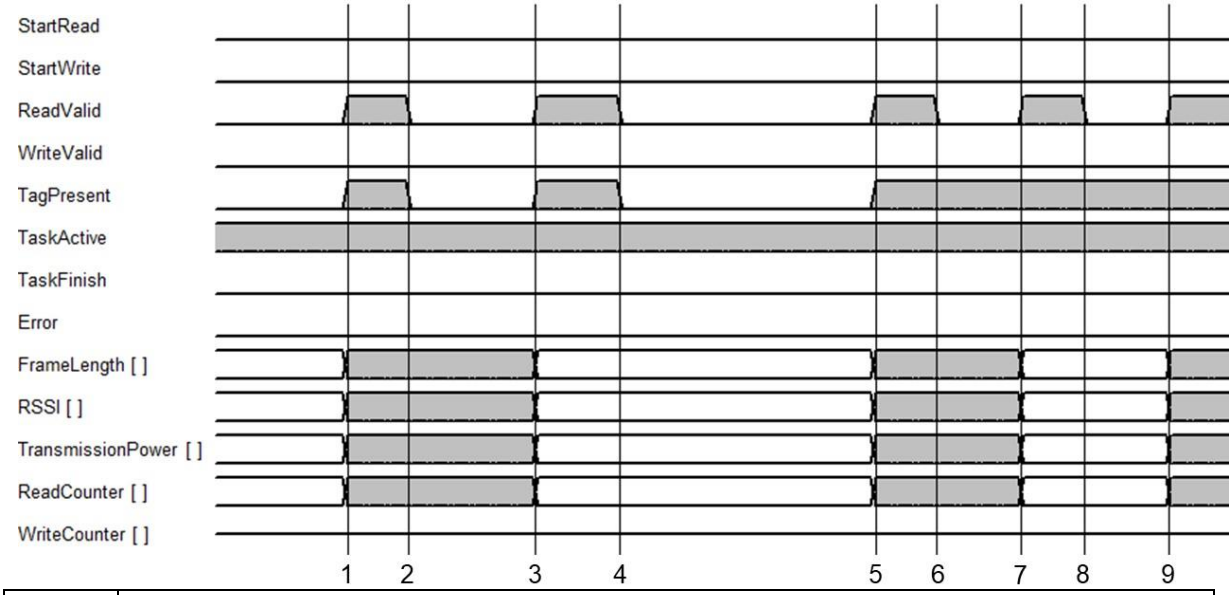
The read-in data as well as the time specification for accessing the data carrier are located within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400".IUT-F190-B40.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB6	DEC	23	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	2	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carrier has left the detection zone

StartRead	= False
ReadValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 26 (depending on the length of the previously read data)
RSSI	= 23
TransmissionPower	= 50
ReadCounter	= 2

Flowchart execution read task with Autostart function:



Time point	Meaning
1	Read task activated; data carrier A read StartRead := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 26; TransmissionPower = 50; ReadCounter = 1;
2	Data carrier A has left the detection zone; no more data carrier in the detection zone; StartRead := False; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 26; TransmissionPower = 50; ReadCounter = 1;
3	Data carrier B read StartRead := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 16; TransmissionPower = 50; ReadCounter = 2;
4	Data carrier B has left detection zone; no more data carrier in detection zone; StartRead := False; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 16; TransmissionPower = 50; ReadCounter = 2;
5	Data carrier C read; there is one data carrier in the detection zone StartRead := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 55; TransmissionPower = 50; ReadCounter = 3;
6	Data carrier D enters the detection zone; ReadValid is set to False for 50ms. StartRead := False; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 55; TransmissionPower = 50; ReadCounter = 3;
7	Read-in data from data carrier D are transferred; ReadValid goes to True after 50ms; there are two data carriers in the detection zone StartRead := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 18; TransmissionPower = 50; ReadCounter = 4;
8	Data carrier E enters the detection zone; ReadValid is set to False for 50ms. StartRead := False; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 18; TransmissionPower = 50; ReadCounter = 4;
9	Read-in data from data carrier E are transferred; ReadValid goes to True after 50ms; there are 3 data carriers in the detection zone StartRead := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 26; RSSI = 12; TransmissionPower = 50; ReadCounter = 5;

6.3 Data structure access to user memory

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

	Name	Data type	Off...	Start...	Monitor ...
	Static				
	IUT-F190-B40	"IUT-...	0.0		
	ReadData	Array[0....	0.0		
	ReadData[0]	Byte	0.0	16#0	16#00
	ReadData[1]	Byte	1.0	16#0	16#0E
	ReadData[2]	Byte	2.0	16#0	16#34
	ReadData[3]	Byte	3.0	16#0	16#00
	ReadData[4]	Byte	4.0	16#0	16#30
	ReadData[5]	Byte	5.0	16#0	16#14
	ReadData[6]	Byte	6.0	16#0	16#F7
	ReadData[7]	Byte	7.0	16#0	16#33
	ReadData[8]	Byte	8.0	16#0	16#7C
	ReadData[9]	Byte	9.0	16#0	16#00
	ReadData[10]	Byte	10.0	16#0	16#1F
	ReadData[11]	Byte	11.0	16#0	16#00
	ReadData[12]	Byte	12.0	16#0	16#00
	ReadData[13]	Byte	13.0	16#0	16#00
	ReadData[14]	Byte	14.0	16#0	16#74
	ReadData[15]	Byte	15.0	16#0	16#83
	ReadData[16]	Byte	16.0	16#0	16#00
	ReadData[17]	Byte	17.0	16#0	16#08
	ReadData[18]	Byte	18.0	16#0	16#01
	ReadData[19]	Byte	19.0	16#0	16#02
	ReadData[20]	Byte	20.0	16#0	16#03
	ReadData[21]	Byte	21.0	16#0	16#04
	ReadData[22]	Byte	22.0	16#0	16#35
	ReadData[23]	Byte	23.0	16#0	16#36
	ReadData[24]	Byte	24.0	16#0	16#37
	ReadData[25]	Byte	25.0	16#0	16#38
	ReadData[26]	Byte	26.0	16#0	16#00

Long Form data format:

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

ReadData[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

ReadData[16…17]: Length of read user memory data
Length 2 bytes; corresponds to "Number of Bytes" from the parameter "Read Task" from the GSDML; 16#0008 = 8 bytes

ReadData[18…25]: read User Memory data
Length depends on the setting "Number of Bytes"; read out partial area of the user memory

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

	Name	Data type	Off...	Start...	Monitor ...
	Static				
	IUT-F190-B40	"IUT-...	0.0		
	ReadData	Array[0....	0.0		
	ReadData[0]	Byte	0.0	16#0	16#01
	ReadData[1]	Byte	1.0	16#0	16#02
	ReadData[2]	Byte	2.0	16#0	16#03
	ReadData[3]	Byte	3.0	16#0	16#04
	ReadData[4]	Byte	4.0	16#0	16#35
	ReadData[5]	Byte	5.0	16#0	16#36
	ReadData[6]	Byte	6.0	16#0	16#37
	ReadData[7]	Byte	7.0	16#0	16#38
	ReadData[8]	Byte	8.0	16#0	16#00

Short Form data format:

ReadData[0…7]: read User Memory data
Length depends on the setting "Number of Bytes"; read out partial area of the user memory

When using the "Short Form" data format, the UII/EPC information of the identified data carrier is not prepended to the read-in data. No length information is transmitted either.

6.4 Data structure access to the TID

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

	Name	Data type	Off...	Start...	Monitor ...
	Static				
	IUT-F190-B40	"IUT-...	0.0		
	ReadData	Array[0....	0.0		
	ReadData[0]	Byte	0.0	16#0	16#00
	ReadData[1]	Byte	1.0	16#0	16#0E
	ReadData[2]	Byte	2.0	16#0	16#34
	ReadData[3]	Byte	3.0	16#0	16#00
	ReadData[4]	Byte	4.0	16#0	16#30
	ReadData[5]	Byte	5.0	16#0	16#14
	ReadData[6]	Byte	6.0	16#0	16#F7
	ReadData[7]	Byte	7.0	16#0	16#33
	ReadData[8]	Byte	8.0	16#0	16#7C
	ReadData[9]	Byte	9.0	16#0	16#00
	ReadData[10]	Byte	10.0	16#0	16#1F
	ReadData[11]	Byte	11.0	16#0	16#00
	ReadData[12]	Byte	12.0	16#0	16#00
	ReadData[13]	Byte	13.0	16#0	16#00
	ReadData[14]	Byte	14.0	16#0	16#74
	ReadData[15]	Byte	15.0	16#0	16#83
	ReadData[16]	Byte	16.0	16#0	16#00
	ReadData[17]	Byte	17.0	16#0	16#0C
	ReadData[18]	Byte	18.0	16#0	16#E2
	ReadData[19]	Byte	19.0	16#0	16#80
	ReadData[20]	Byte	20.0	16#0	16#11
	ReadData[21]	Byte	21.0	16#0	16#05
	ReadData[22]	Byte	22.0	16#0	16#20
	ReadData[23]	Byte	23.0	16#0	16#00
	ReadData[24]	Byte	24.0	16#0	16#5A
	ReadData[25]	Byte	25.0	16#0	16#5E
	ReadData[26]	Byte	26.0	16#0	16#F1
	ReadData[27]	Byte	27.0	16#0	16#A2
	ReadData[28]	Byte	28.0	16#0	16#08
	ReadData[29]	Byte	29.0	16#0	16#A6
	ReadData[30]	Byte	30.0	16#0	16#00

Long Form data format:

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

ReadData[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

ReadData[16…17]: Length of read-in TID;
Length 2 bytes; length of TID depends on data carrier type

ReadData[18…29]: read-in TID
The read-in TID contains information about the used RFID chip; it is a unique number

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

	Name	Data type	Off...	Start...	Monitor ...
	Static				
	IUT-F190-B40	"IUT-...	0.0		
	ReadData	Array[0....	0.0		
	ReadData[0]	Byte	0.0	16#0	16#E2
	ReadData[1]	Byte	1.0	16#0	16#80
	ReadData[2]	Byte	2.0	16#0	16#11
	ReadData[3]	Byte	3.0	16#0	16#05
	ReadData[4]	Byte	4.0	16#0	16#20
	ReadData[5]	Byte	5.0	16#0	16#00
	ReadData[6]	Byte	6.0	16#0	16#5A
	ReadData[7]	Byte	7.0	16#0	16#5E
	ReadData[8]	Byte	8.0	16#0	16#F1
	ReadData[9]	Byte	9.0	16#0	16#A2
	ReadData[10]	Byte	10.0	16#0	16#08
	ReadData[11]	Byte	11.0	16#0	16#A6
	ReadData[12]	Byte	12.0	16#0	16#00

Short Form data format:

ReadData[0…11]: read-in TID

The length of the read-in TID depends on the chip type within the data carrier. The length can vary depending on the chip type. However, the length is constant for one chip type

When using the "Short Form" data format, the UII/EPC information of the identified data carrier is not prefixed to the read-in TID. No length information is transmitted either.

6.5 Data structure access to UII/EPC

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Data type	Off...	Start...	Monitor ...
Static				
IUT-F190-B40	"IUT-...	0.0		
ReadData	Array[0....	0.0		
ReadData[0]	Byte	0.0	16#0	16#00
ReadData[1]	Byte	1.0	16#0	16#0E
ReadData[2]	Byte	2.0	16#0	16#34
ReadData[3]	Byte	3.0	16#0	16#00
ReadData[4]	Byte	4.0	16#0	16#30
ReadData[5]	Byte	5.0	16#0	16#14
ReadData[6]	Byte	6.0	16#0	16#F7
ReadData[7]	Byte	7.0	16#0	16#33
ReadData[8]	Byte	8.0	16#0	16#7C
ReadData[9]	Byte	9.0	16#0	16#00
ReadData[10]	Byte	10.0	16#0	16#1F
ReadData[11]	Byte	11.0	16#0	16#00
ReadData[12]	Byte	12.0	16#0	16#00
ReadData[13]	Byte	13.0	16#0	16#00
ReadData[14]	Byte	14.0	16#0	16#74
ReadData[15]	Byte	15.0	16#0	16#83
ReadData[16]	Byte	16.0	16#0	16#00

Long Form data format:

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

ReadData[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Data type	Off...	Start...	Monitor ...
Static				
IUT-F190-B40	"IUT-...	0.0		
ReadData	Array[0....	0.0		
ReadData[0]	Byte	0.0	16#0	16#34
ReadData[1]	Byte	1.0	16#0	16#00
ReadData[2]	Byte	2.0	16#0	16#30
ReadData[3]	Byte	3.0	16#0	16#14
ReadData[4]	Byte	4.0	16#0	16#F7
ReadData[5]	Byte	5.0	16#0	16#33
ReadData[6]	Byte	6.0	16#0	16#7C
ReadData[7]	Byte	7.0	16#0	16#00
ReadData[8]	Byte	8.0	16#0	16#1F
ReadData[9]	Byte	9.0	16#0	16#00
ReadData[10]	Byte	10.0	16#0	16#00
ReadData[11]	Byte	11.0	16#0	16#00
ReadData[12]	Byte	12.0	16#0	16#74
ReadData[13]	Byte	13.0	16#0	16#83
ReadData[14]	Byte	14.0	16#0	16#00

Short Form data format:

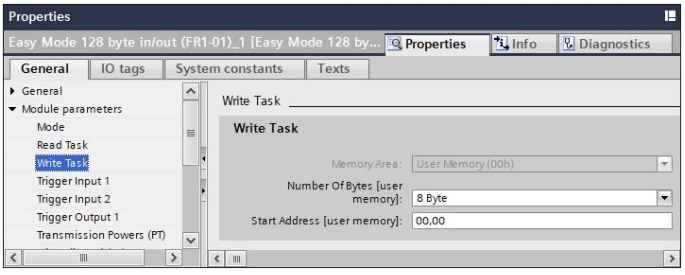
ReadData[0…1]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

ReadData[2…13]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

When using the "Short Form" data format, the transmission of the length specification is omitted.

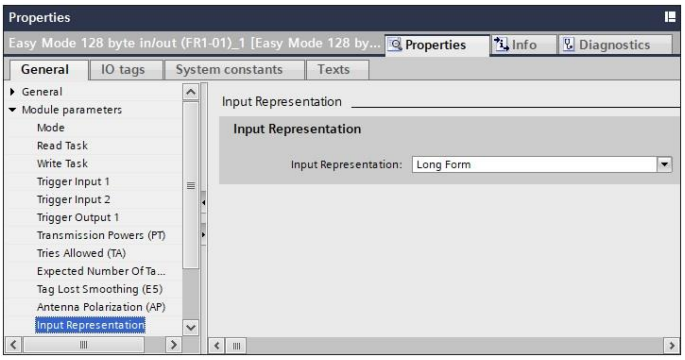
6.6 Write user data to data carrier

Write access to a data carrier takes place when using the Easy Mode on the user data (memory bank 11; User Memory). The write access in the GSDML file is set by the "Write Task" parameter. The Autostart function is not supported for a write task. When using the "Long Form" data format, the UII/EPC information of the written data carrier is always returned in the event of a successful write access to a data carrier. This means that the write access can be assigned to a data carrier. When using the "Short Form" data format, the transmission of the UII/EPC information after a successful write access is omitted.



Parameter „Write Task“ → Setting write access to user data (User Memory)

Memory Area:	User Memory
Number of Bytes:	8 Byte
Start Address:	00,00 (hex)



Parameter “Input Representation“ → Setting data format RFID station

Long Form → Identification of one or more data carriers

Short Form → Identification of only one data carrier

Before the write task is started, the write data must be transferred in the data structure "IUT-F190-B40_EasyMode_Basic_UserData_300/400.IUT-F190-B40.WriteData. The write task is started by the "I_b_StartWriteTask" input at FB4128. When a write access is successfully executed, the UII/EPC information of the written data carrier is transferred to the data structure "IUT-F190-B40_EasyMode_Basic_UserData_300/400.IUT-F190-B40.WrittenTag.

Name	...	Displ...	Monit...	Modify ...
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[0]	...	Hex	16#01	16#01
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[1]	...	Hex	16#02	16#02
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[2]	...	Hex	16#03	16#03
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[3]	...	Hex	16#04	16#04
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[4]	...	Hex	16#05	16#05
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[5]	...	Hex	16#06	16#06
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[6]	...	Hex	16#07	16#07
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[7]	...	Hex	16#08	16#08
"IUT-F190-B40_EasyMode_Basic_UserData_300/400_128"."IUT-F190-B40".WriteData[8]	...	Hex	16#00	16#00

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Initial state before the start of the write task:

StartWrite	= False
WriteValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 0
RSSI	= 0
TransmissionPower	= 0
WriteCounter	= 0

The write task starts as soon as "StartWrite" is set to True.

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Write task active; no data carrier in the detection zone

StartWrite	= True
WriteValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 0
FrameLength	= 0
RSSI	= 0
WriteCounter	= 0

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	TRUE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	33	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	1	

Write task active; data carrier A in detection zone and data written

StartWrite	= True
WriteValid	= True
TagPresent	= True
TaskActive	= True
TaskFinish	= False
FrameLength	= 16 (depending on the length of the UII/EPC information)
RSSI	= 33 (depending on the signal quality)
TransmissionPower	= 50 (power transmission level 50mW)
WriteCounter	= 1

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Dat...	Off...	Sta...	Monitor v...
Static				
IUT-F190-B40	"...	0.0		
ReadData	Arra...	0.0		
Time_Read	Dat...	12...	DT#1	DT#2022-...
WriteData	Arra...	13...		
Time_Write	Dat...	25...	DT#1	DT#2022-...
ErrorData	Arra...	26...		
Time_Error	Dat...	29...	DT#1	DT#1990-...
EPC_WrittenTag	Arra...	30...		
EPC_WrittenTag[0]	Byte	30...	16#0	16#00
EPC_WrittenTag[1]	Byte	30...	16#0	16#0E
EPC_WrittenTag[2]	Byte	30...	16#0	16#34
EPC_WrittenTag[3]	Byte	30...	16#0	16#00
EPC_WrittenTag[4]	Byte	30...	16#0	16#30
EPC_WrittenTag[5]	Byte	30...	16#0	16#14
EPC_WrittenTag[6]	Byte	30...	16#0	16#F7
EPC_WrittenTag[7]	Byte	30...	16#0	16#33
EPC_WrittenTag[8]	Byte	31...	16#0	16#7C
EPC_WrittenTag[9]	Byte	31...	16#0	16#00
EPC_WrittenTag[10]	Byte	31...	16#0	16#1F
EPC_WrittenTag[11]	Byte	31...	16#0	16#00
EPC_WrittenTag[12]	Byte	31...	16#0	16#00
EPC_WrittenTag[13]	Byte	31...	16#0	16#00
EPC_WrittenTag[14]	Byte	31...	16#0	16#74
EPC_WrittenTag[15]	Byte	31...	16#0	16#83
EPC_WrittenTag[16]	Byte	31...	16#0	16#00

UII/EPC information of the successfully written data carrier within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400" in the structure "WrittenTag":

WrittenTag[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

WrittenTag[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

WrittenTag[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	33	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	1	

Write task active; data carrier has left the detection zone
StartWrite = True
WriteValid = False
TagPresent = False
TaskActive = True
TaskFinish = False
FrameLength = 16 (depending on the length of the UII/EPC information)
RSSI = 33 (unchanged)
TransmissionPower = 50 (power transmission level 50mW)
WriteCounter = 1

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	TRUE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	26	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	2	

Write task active; data carrier B in detection zone and data written
StartWrite = True
WriteValid = True
TagPresent = True
TaskActive = True
TaskFinish = False
FrameLength = 16 (depending on the length of the UII/EPC information)
RSSI = 26 (depending on the signal quality)
TransmissionPower = 50 (power transmission level 50mW)
WriteCounter = 2

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Dat...	Off...	Sta...	Monitor v...
Static				
IUT-F190-B40	"...	0.0		
ReadData	Arra...	0.0		
Time_Read	Dat...	12...	DT#1	DT#2022-...
WriteData	Arra...	13...		
Time_Write	Dat...	25...	DT#1	DT#2022-...
ErrorData	Arra...	26...		
Time_Error	Dat...	29...	DT#1	DT#1990-...
EPC_WrittenTag	Arra...	30...		
EPC_WrittenTag[0]	Byte	30...	16#0	16#00
EPC_WrittenTag[1]	Byte	30...	16#0	16#0E
EPC_WrittenTag[2]	Byte	30...	16#0	16#34
EPC_WrittenTag[3]	Byte	30...	16#0	16#00
EPC_WrittenTag[4]	Byte	30...	16#0	16#30
EPC_WrittenTag[5]	Byte	30...	16#0	16#14
EPC_WrittenTag[6]	Byte	30...	16#0	16#F7
EPC_WrittenTag[7]	Byte	30...	16#0	16#33
EPC_WrittenTag[8]	Byte	31...	16#0	16#7C
EPC_WrittenTag[9]	Byte	31...	16#0	16#00
EPC_WrittenTag[10]	Byte	31...	16#0	16#1F
EPC_WrittenTag[11]	Byte	31...	16#0	16#00
EPC_WrittenTag[12]	Byte	31...	16#0	16#00
EPC_WrittenTag[13]	Byte	31...	16#0	16#00
EPC_WrittenTag[14]	Byte	31...	16#0	16#74
EPC_WrittenTag[15]	Byte	31...	16#0	16#84
EPC_WrittenTag[16]	Byte	31...	16#0	16#00

UII/EPC information of the successfully written data carrier within the data block "IUT-F190-B40_EasyMode_Basic_UserData_300/400" in the structure "WrittenTag":

WrittenTag[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

WrittenTag[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

WrittenTag[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	26	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	2	

Write task active; data carrier has left the detection zone

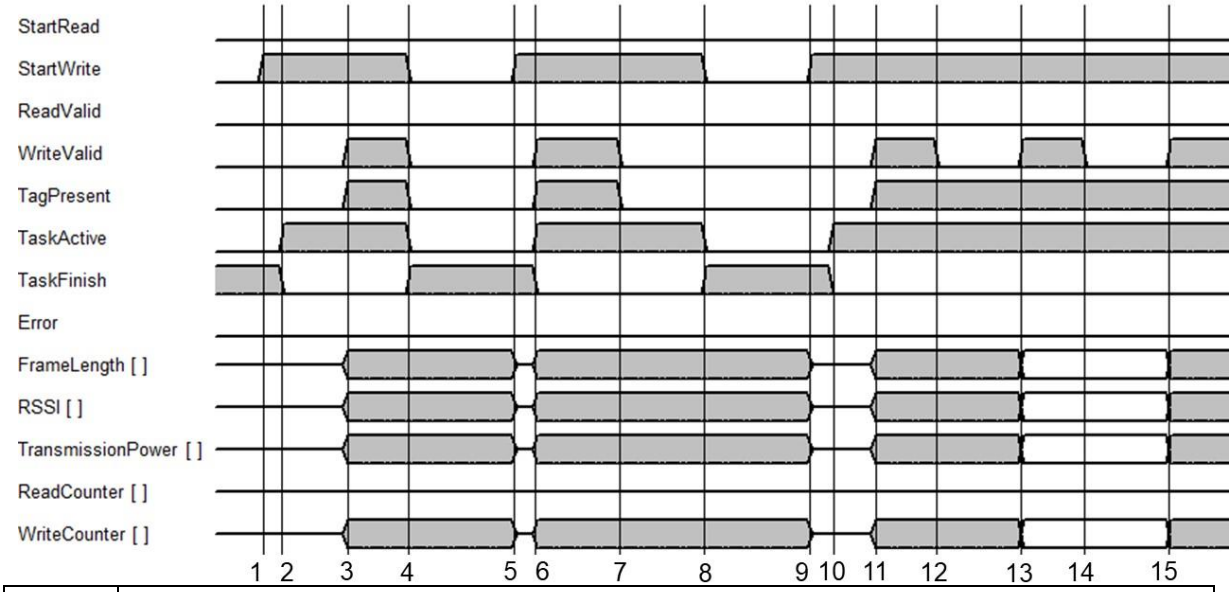
StartWrite	= True
WriteValid	= False
TagPresent	= False
TaskActive	= True
TaskFinish	= False
FrameLength	= 16 (depending on the length of the UII/EPC information)
RSSI	= 26 (unchanged)
TransmissionPower	= 50 (power transmission level 50mW)
WriteCounter	= 2

Name	Address	Displ...	Monitor ..	Modify ..
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	FALSE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	26	
"TransmissionPower"	%MW7	DEC+/-	50	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	2	

Write task finished:

StartWrite	= False
WriteValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 16 (depending on the length of the last UII/EPC information)
RSSI	= 26 (unchanged)
TransmissionPower	= 50 (power transmission level 50mW)
WriteCounter	= 2

Flowchart execution write task:



Time point	Meaning
1	Write task is started StartWrite := True;
2	Write task is activated; no data carrier in detection zone StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0;
3	Data carrier A successfully written StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 46; RSSI = 26; TransmissionPower = 50; WriteCounter = 1;
4	Write task is finished StartWrite := False; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 16; RSSI = 46; TransmissionPower = 50; WriteCounter = 1;
5	Next write task is started StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter := 0;
6	Data carrier B successfully written StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 60; TransmissionPower = 50; WriteCounter = 1;

7	Data carrier B has left detection zone StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 60; TransmissionPower = 50; WriteCounter = 1;
8	Write task is finished StartWrite := False; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 16; RSSI = 60; TransmissionPower = 50; WriteCounter = 1;
9	Write task is started StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0;
10	Write task is activated; no data carrier in detection zone StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0;
11	Data carrier C successfully written StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 26; TransmissionPower = 50; WriteCounter = 1;
12	Data carrier D enters the detection zone; WriteValid is set to False for 50ms. StartWrite := True; WriteValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 26; TransmissionPower = 50; WriteCounter = 1;
13	Data carrier D successfully written; WriteValid bit is set to True after 50ms. StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 46; TransmissionPower = 50; WriteCounter = 2;
14	Data carrier E enters the detection range; WriteValid is set to False for 50ms. StartWrite := True; WriteValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 46; TransmissionPower = 50; WriteCounter = 2;
15	Data carrier E successfully written; Write Valid bit is set to True after 50ms. StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; FrameLength = 16; RSSI = 16; TransmissionPower = 50; WriteCounter = 3;

6.7 Data structure system time of data carrier access

The function block reads the local system time of the controller on certain events and stores the times within the data block "IUT-F190-B40_EasyMode_Basic_UserData" in corresponding structures. The system time is read at the following events:

- Successful read access to a data carrier (ReadValid = True)
- Successful write access to a data carrier (WriteValid = True)
- Error condition (Error = True)

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Data t...	Off...	Sta..	Monitor value
Static				
IUT-F190-B40	"IUT-F...	0.0		
ReadData	Array[...	0.0		
Time_Read	Date_...	12...	DT#1	DT#2022-01-12-17:23:14.142
WriteData	Array[...	13...		
Time_Write	Date_...	25...	DT#1	DT#2022-01-12-15:42:42.515
ErrorData	Array[...	26...		
Time_Error	Date_...	29...	DT#1	DT#1990-01-01-00:00:00
EPC_WrittenTag	Array[...	30...		
RSSI	Byte	33...	16#0	16#42
TransmissionPower	Int	33...	0	50

Time of successful read access to a data carrier:

Data structure IUT-F190-B40.Time_Read

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Data t...	Off...	Sta..	Monitor value
Static				
IUT-F190-B40	"IUT-F...	0.0		
ReadData	Array[...	0.0		
Time_Read	Date_...	12...	DT#1	DT#2022-01-12-17:23:14.142
WriteData	Array[...	13...		
Time_Write	Date_...	25...	DT#1	DT#2022-01-12-17:25:25.445
ErrorData	Array[...	26...		
Time_Error	Date_...	29...	DT#1	DT#1990-01-01-00:00:00
EPC_WrittenTag	Array[...	30...		
RSSI	Byte	33...	16#0	16#49
TransmissionPower	Int	33...	0	50

Time of successful write access to a data carrier:

Data structure IUT-F190-B40.Time_Write

IUT-F190-B40_EasyMode_Basic_UserData_300/400_128

Name	Data t...	Off...	Sta...	Monitor value
Static				
IUT-F190-B40	"IUT-F...	0.0		
ReadData	Array[...	0.0		
Time_Read	Date_...	12...	DT#1	DT#2022-01-12-17:23:14.142
WriteData	Array[...	13...		
Time_Write	Date_...	25...	DT#1	DT#2022-01-12-17:25:25.445
ErrorData	Array[...	26...		
Time_Error	Date_...	29...	DT#1	DT#2022-01-12-17:26:40.768
EPC_WrittenTag	Array[...	30...		
RSSI	Byte	33...	16#0	16#00
TransmissionPower	Int	33...	0	0

Time error state:

Data structure IUT-F190-B40.Time_Error

6.8 Error messages during the execution of write/read tasks

The IUT-F190-B40 RFID station sends an error message to the PLC via the process data field as soon as an error condition occurs during the execution of a read or write task. The error message consists of an error code and a short error description, which is coded in ASCII characters. The error code and the error description are located in the data block "IUT-F190-B40_EasyMode_Basic_User Data_ 300/400" in the data structure "IUT-F190-B40.ErrorData". At the same time the output "O_b_Error" at FB4128 "IUT-F190_EasyMode_Basic_300/400" is set. The "O_B_FrameLength" output indicates the length of the error message.

Example 1: Read and write task controlled simultaneously
It is not permitted that both a read task (I_b_StartReadTask) and a write task (I_b_StartWriteTask) are controlled. This leads to an error state of the RFID station.

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	TRUE	
"FrameLength"	%MB1	DEC	19	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Parallel control of read and write task:

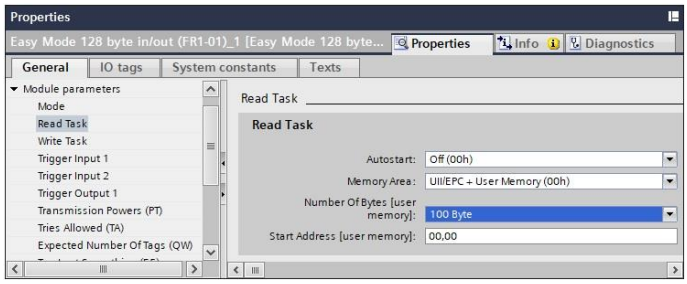
StartRead = True
StartWrite = True
Error = True
FrameLength = 19

IUT-F190-B40_EasyMode_Basic_UserData

Name	Data..	Start ...	Monit...
Static			
IUT-F190-B40	"IUT...		
ReadData	Arra...		
Time_Read	DTL	DTL#19	DTL#1...
WriteData	Arra...		
Time_Write	DTL	DTL#19	DTL#1...
ErrorData	Arra...		
ErrorData[0]	Byte	16#0	16#04
ErrorData[1]	Byte	16#0	16#72
ErrorData[2]	Byte	16#0	16#65
ErrorData[3]	Byte	16#0	16#61
ErrorData[4]	Byte	16#0	16#64
ErrorData[5]	Byte	16#0	16#20
ErrorData[6]	Byte	16#0	16#41
ErrorData[7]	Byte	16#0	16#4E
ErrorData[8]	Byte	16#0	16#44
ErrorData[9]	Byte	16#0	16#20
ErrorData[10]	Byte	16#0	16#77
ErrorData[11]	Byte	16#0	16#72
ErrorData[12]	Byte	16#0	16#69
ErrorData[13]	Byte	16#0	16#74
ErrorData[14]	Byte	16#0	16#65
ErrorData[15]	Byte	16#0	16#20
ErrorData[16]	Byte	16#0	16#73
ErrorData[17]	Byte	16#0	16#65
ErrorData[18]	Byte	16#0	16#74
ErrorData[19]	Byte	16#0	16#00

Name	Ad...	Displa...	Monitor va
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[0]		Hex	16#04
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[1]		Chara...	'r'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[2]		Chara...	'e'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[3]		Chara...	'a'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[4]		Chara...	'd'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[5]		Chara...	' '
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[6]		Chara...	'A'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[7]		Chara...	'N'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[8]		Chara...	'D'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[9]		Chara...	' '
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[10]		Chara...	'w'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[11]		Chara...	'r'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[12]		Chara...	'i'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[13]		Chara...	't'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[14]		Chara...	'e'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[15]		Chara...	' '
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[16]		Chara...	's'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[17]		Chara...	'e'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[18]		Chara...	't'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[19]		Chara...	'$00'

Example 2: Parameterized number of bytes to be read larger than memory of user data
The size of the memory for user data (memory bank 11) depends on the chip type of the data carrier used and can vary depending on the chip type. If the number of bytes to be read in is selected within the "ReadTask" parameter as being larger than the available memory of the user data, this leads to an error state of the RFID station.



Parameter „Read Task“:

Setting of "Number of Bytes" to 100 bytes. This means a read access to a memory size which is not physically available on the data carrier in this length. The memory on the data carrier is smaller.

Name	Address	Displ...	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	TRUE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB6	DEC	0	
"TransmissionPower"	%MW7	DEC+/-	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	

Trigger read task

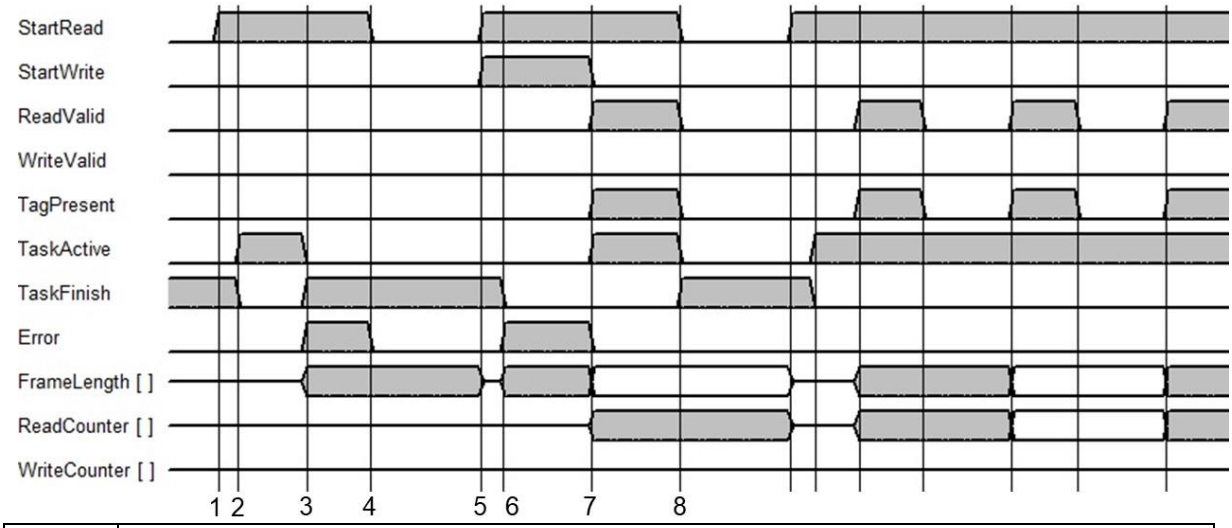
StartRead = True
Error = True
FrameLength = 16

IUT-F190-B40_EasyMode_Basic_UserData

Name	Data..	Start ...	Monit...
Static			
IUT-F190-B40	"IUT...		
ReadData	Arra...		
Time_Read	DTL	DTL#19	DTL#1...
WriteData	Arra...		
Time_Write	DTL	DTL#19	DTL#1...
ErrorData	Arra...		
ErrorData[0]	Byte	16#0	16#04
ErrorData[1]	Byte	16#0	16#69
ErrorData[2]	Byte	16#0	16#6E
ErrorData[3]	Byte	16#0	16#76
ErrorData[4]	Byte	16#0	16#61
ErrorData[5]	Byte	16#0	16#6C
ErrorData[6]	Byte	16#0	16#69
ErrorData[7]	Byte	16#0	16#64
ErrorData[8]	Byte	16#0	16#20
ErrorData[9]	Byte	16#0	16#63
ErrorData[10]	Byte	16#0	16#6F
ErrorData[11]	Byte	16#0	16#6D
ErrorData[12]	Byte	16#0	16#6D
ErrorData[13]	Byte	16#0	16#61
ErrorData[14]	Byte	16#0	16#6E
ErrorData[15]	Byte	16#0	16#64
ErrorData[16]	Byte	16#0	16#00

Name	Ad...	Displa...	Monitor v
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[0]		Hex	16#04
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[1]		Chara...	'i'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[2]		Chara...	'n'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[3]		Chara...	'v'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[4]		Chara...	'a'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[5]		Chara...	'l'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[6]		Chara...	'i'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[7]		Chara...	'd'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[8]		Chara...	' '
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[9]		Chara...	'c'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[10]		Chara...	'o'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[11]		Chara...	'm'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[12]		Chara...	'm'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[13]		Chara...	'a'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[14]		Chara...	'n'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[15]		Chara...	'd'
"IUT-F190-B40_EasyMode_Basic_UserData"."IUT-F190-B40".ErrorData[16]		Chara...	'$00'

Flowchart behavior RFID station in error state:

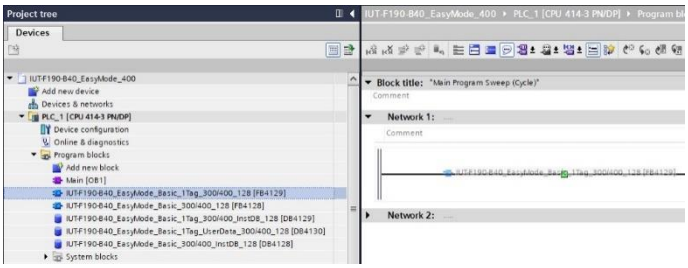


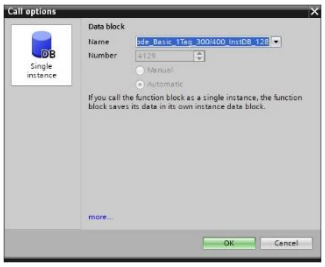
Time point	Meaning
1	Read task is started StartRead := True;
2	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; Error = False; FrameLength = 0; ReadCounter = 0;
3	Data carrier A (no user memory or user memory too small) enters detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; Error = True; FrameLength = 16; ReadCounter = 0;
4	Read task finished StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; Error = False; FrameLength = 16; ReadCounter = 0;
5	Read and write task started simultaneously StartRead := True; StartWrite := True; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; Error = False; FrameLength = 0; ReadCounter := 0;
6	Read and write task must not be active at the same time StartRead := True; StartWrite := True; ReadValid = True; TagPresent = False; TaskActive = False; TaskFinish = False; Error = True; FrameLength = 19; ReadCounter = 0;
7	Trigger on write task is reset; data carrier in the detection zone StartRead := True; StartWrite := False; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; Error = False; FrameLength = 16; ReadCounter = 1;
8	Read task finished StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 16; ReadCounter = 1;

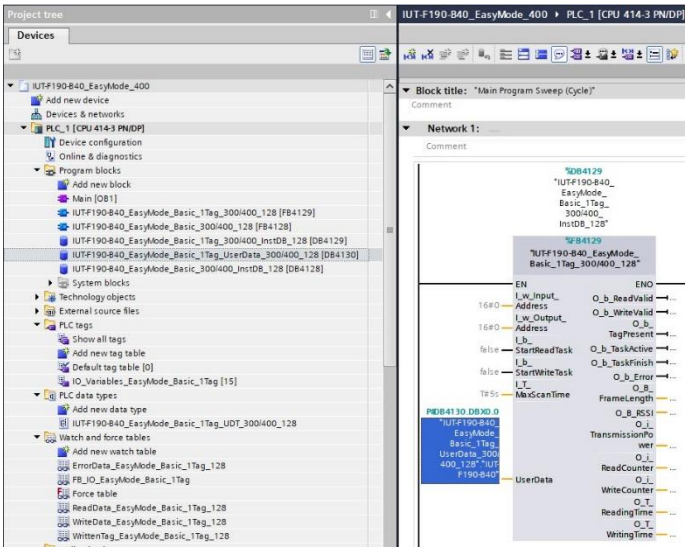
7. Function block “IUT-F190-B40_EasyMode_Basic_1Tag_300/400“

Function description "IUT-F190-B40_EasyMode_Basic_1Tag_300/400:
This function block can be used to start a read or write task. The task is automatically terminated as soon as exactly one data carrier has been read or written. If no data carrier is detected within a configurable time, the active read or write task is automatically terminated by the function block after this time has elapsed. This function block makes it possible to scan an area for a defined period of time until a tag is identified.
In conjunction with the ramp function (parameter PT), the transmit power can be increased continuously until a data carrier is identified. As a result, a data carrier is read or written with the minimum required transmit power. The number of access attempts for each set power level can be increased via the TA parameter.
Within the block "IUT-F190-B40_EasyMode_Basic_1Tag_300/400" the function block "IUT-F190-B40_EasyMode_Basic_300/400" with associated instance data block "IUT-F190-B40_EasyMode_Basic_300/400_InstDB" is called.
With the start of a new write or read task, all internal data and the outputs are reset. The read and write data are located within the data block "IUT-F190-B40-EasyMode_Basic_1Tag_UserData".

Implementation of function block "IUT-F190-B40_EasyMode_Basic_1Tag_300/400":
Drag function block "IUT-F190-B40_EasyMode_Basic_1Tag_300/400" (FB4129) from the project tree into OB1. Then select the corresponding instance data block. The library contains the data block "IUT-F190-B40_EasyMode_Basic_1Tag_300/400_InstDB" (DB4129) which can be used as instance data block. The instance data block can also be regenerated

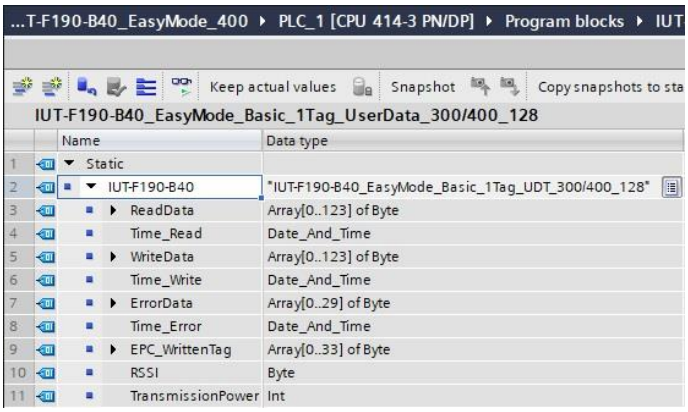




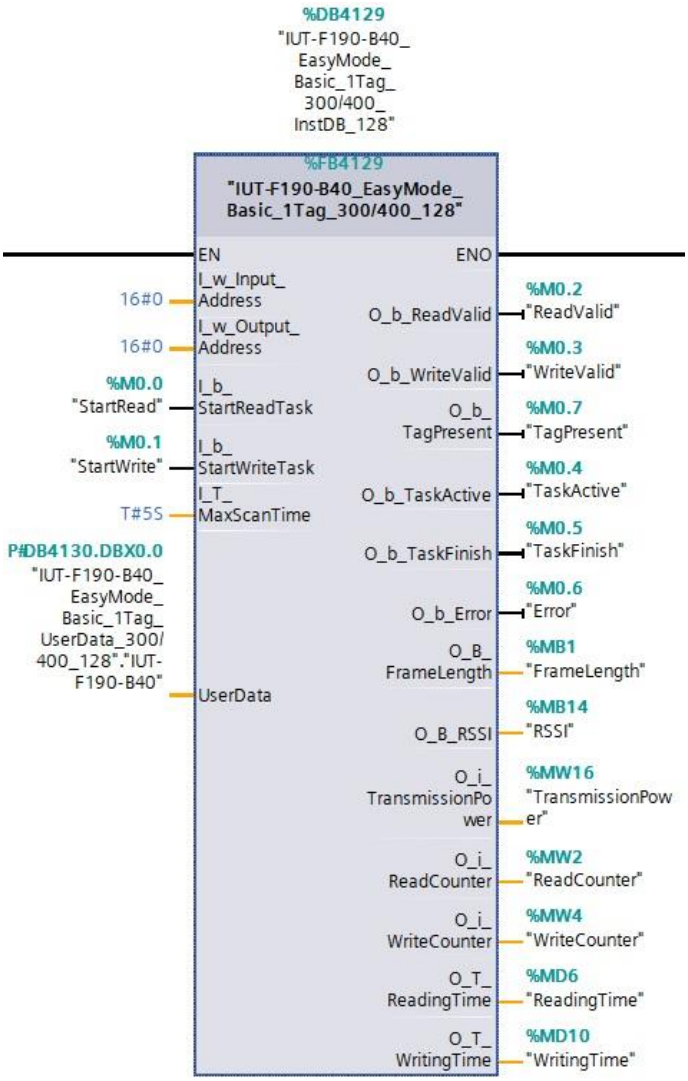


The read/write data of the function block are located in a separate data block. This is parameterized at the "UserData" input. The library contains the data block "IUT-F190-B40_Easy Mode_Basic_1Tag_UserData_300/400" which can be used for this purpose.

The data block can be generated by the user. The internal data structure is generated from the library via the "IUT-F190-B40_EasyMode _Basic_1Tag_UDT_300/400" data type.



The data block "IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400" consists of the structure "IUT-F190-B40". This is divided into the following fields:
ReadData → Read data from data carrier
Time_Read → Time of read access
WriteData → Write data for data carrier
Time_Write → Time of write access
ErrorData → Error information
Time_Error → Time of error condition
EPC_WrittenTag → UII/EPC information of a successfully written data carrier
RSSI → RSSI value for data carrier access
TransmissionPower → Transmitting power in mW for tag access



Complete wiring of the "IUT-F190-B40_EasyMode_Basic_1Tag_300/400" function block:

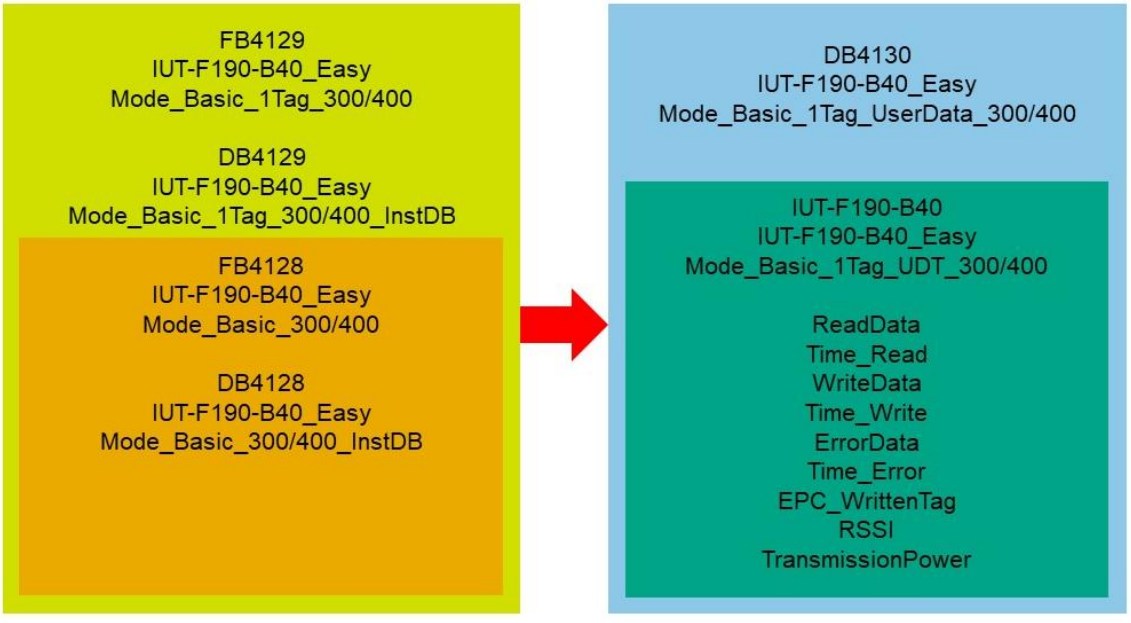
The input parameters "I_w_Input_Address" and "I_w_Output_Address" correspond to the start addresses of the input and output data fields of the communication module from the hardware configuration.

Telegram lengths of up to 128 bytes are supported by the function block. The telegram length of 256 bytes is not supported by the function block, since the Profinet master of the used controller does not support this telegram length.

The following table shows the meaning of the input and output variables:

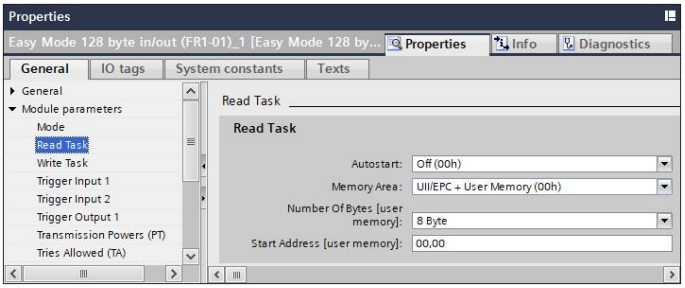
Name	Input / Output	Data type	Meaning
I_w_Input_Address	Input	Word	Start address input data field
I_w_Output_Address	Input	Word	Start address output data field
I_b_StartReadTask	Input	Bool	Start read task; with edge change from 0 → 1; starts execution of read task; end read task with

			edge change 1 → 0;
I_b_StartWriteTask	Input	Bool	Start write task; with edge change from 0 → 1; starts execution of write task; end write task with edge change 1 → 0;
I_T_ScanTime	Input	Time	Maximum execution time read/write task; default = 5 seconds (T#5s)
UserData	InOut	DB	Data area for read and write data as well as error information → „IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400“.“IUT-F190-B40“
O_b_ReadValid	Output	Bool	Read successful; 1 := data carrier within detection zone and data read successfully; 0 := data carrier outside detection zone; no data read
O_b_WriteValid	Output	Bool	Write successful; 1 := data carrier within detection zone and data written successfully; 0 := data carrier outside acquisition zone; no data written
O_b_TagPresent	Output	Bool	Presence of data carriers: 1 := one or more data carriers in the detection zone. 0 := no data carrier in the detection zone
O_b_TaskActive	Output	Bool	Read or write task active; 1 := read or write task active; 0 := no read or write task active; RFID head off
O_b_TaskFinish	Output	Bool	Read or write task completed; 0 := read or write task active; 1 := no read or write task active; RFID head off
O_b_Error	Output	Bool	Error; 1 := error occurred during read or write task 0 := no error condition active
O_B_FrameLength	Output	Byte	Length of the read-in data; Indication of the length of the read-in data in bytes; in case of error condition the length of the error message is indicated.
O_B_RSSI	Output	Byte	RSSI value for data carrier access; Received signal strength in the range between 0dec (weak) and 100dec (strong)
O_i_TransmissionPower	Output	Integer	Transmit power; Value of the transmission power in mW with which the data carrier could be accessed
O_i_ReadCounter	Output	Integer	Counter read operations; Number of successful reads during the execution of a read task.
O_i_WriteCounter	Output	Integer	Counter write operations; Number of successful writes during the execution of a write task.
O_T_ReadingTime	Output	Time	Time between start and end of a read task
O_T_WritingTime	Output	Time	Time between start and end of a write task



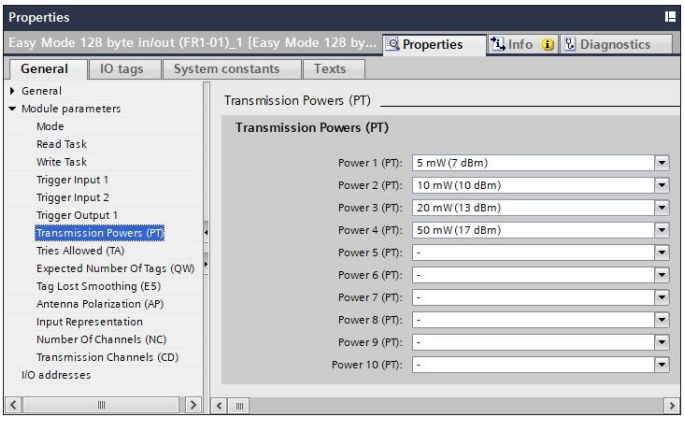
7.1 Execution read task

Read access to the data carrier must be set via the "Read Task" parameter in the GSDML file. The user data (memory bank 11; User Memory), the UII/EPC code (memory bank 01) and the TID (memory bank 10) can be accessed.
The Autostart function must be switched off when using this function block, because the read or write task is aborted when the first data carrier is identified and does not remain permanently active.
When using the "Long Form" data format, the UII/EPC information is always prefixed to the read data set in the returned data for unique assignment to a data carrier. When using the "Short Form" data format, the UII/EPC information is omitted.
Several transmission power levels can be defined via the PT parameter. These are run through during the execution of the task. The number of access attempts to be executed per power level can be set via the TA parameter. The larger the value, the more scans are executed per power level and the slower the ramp for the transmit power is run through.



Parameter „Read Task“ → Setting read access to data areas (e.g. User Memory)

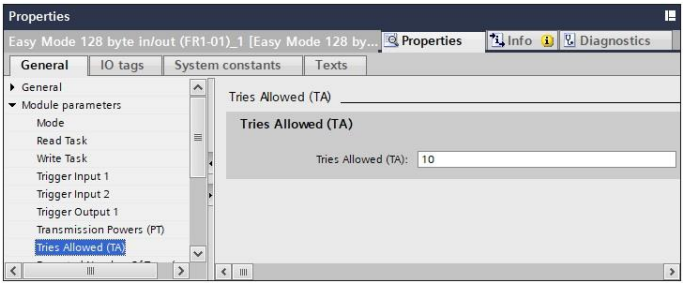
Autostart:	off (00h)
Memory Area:	UII/EPC + User Memory
Number of Bytes:	8 Byte
Start Address:	00,00 (hex)



Parameter “Transmission Powers” → Setting ramp function for transmit power

PT1	→ 5mW (7 dBm)
PT2	→ 10mW (10 dBm)
PT3	→ 20mW (13 dBm)
PT4	→ 50mW (17 dBm)

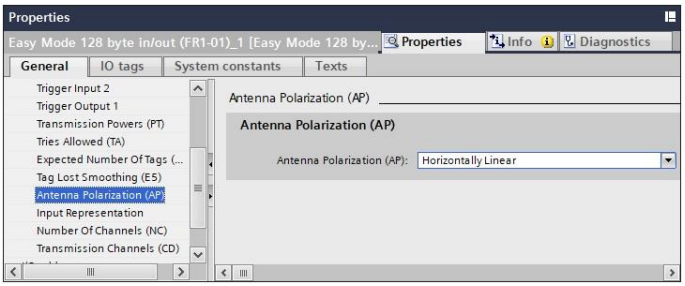
A maximum of 10 values can be set. The values are to be set according to their size. The larger the number of values, the longer the ramp takes to run.



Parameter „Tries Allowed“ → Setting the access attempts per transmission power level

TA → 10

If the orientation of the tags is known and always constant, the polarization of the RFID station (parameter AP) can be set to either horizontal or vertical. In this way, only access attempts with a polarization form suitable for the orientation of the data carrier are executed. This accelerates the passage of the ramp.



Parameter „Antenna Polarization“ → Setting polarization alignment

AP → horizontal

The read task is started by the "I_b_StartReadTask" input at FB4129.

Name	Address	Displ..	Monitor ...	Modify ...
"StartRead"	%M0.0	Bool	FALSE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

Initial state before start of read task
StartRead = False
ReadValid = depending on previous state
TagPresent = depending on previous state
TaskActive = False
TaskFinish = True
FrameLength = depending on previous state
RSSI = depending on previous state
TransmissionPower = depending on previous state
ReadCounter = depending on previous state
ReadingTime = depending on previous state
The read task starts as soon as "StartRead" is set to True.

Name	Address	Displ..	Monitor ...	Modify ...
"StartRead"	%M0.0	B...	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

Read task active; detection range is scanned
StartRead = True
ReadValid = False
TagPresent = False
TaskActive = True
TaskFinish = False
FrameLength = 0
RSSI = 0
TransmissionPower = 0
ReadCounter = 0
ReadingTime = T#0MS
The read task is activated. The detection range is scanned. No data carrier has been detected yet.

Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB14	DEC	33	
"TransmissionPower"	%MW16	DEC	20	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#3S_854MS	
"WritingTime"	%MD10	Time	T#0MS	

Data carrier read in; read task completed
StartRead = True
ReadValid = True
TagPresent = True
TaskActive = False
TaskFinish = True
FrameLength = 26 (depending on the data length)
RSSI = 33 (depending on the signal quality)
TransmissionPower = 20 (transmission power level 20mW)
ReadCounter = 1
ReadingTime = T#3S_854MS (depending on the task duration)

The read-in data are located within the data block "IUT-F190-B40_EasyMode_Basic_1Tag _UserData_300/400". "IUT-F190-B40" in the data structure "ReadData".

Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	FALSE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"RSSI"	%MB14	DEC	33	
"TransmissionPower"	%MW16	DEC	20	
"ReadCounter"	%MW2	DEC	1	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#3S_854MS	
"WritingTime"	%MD10	Time	T#0MS	

Trigger for read task reset

StartRead	= False
ReadValid	= True
TagPresent	= True
TaskActive	= False
TaskFinish	= True
FrameLength	= 26 (depending on the data length)
RSSI	= 33 (unchanged)
TransmissionPower	= 20 (transmission power level 20mW)
ReadCounter	= 1
ReadingTime	= T#3S_854MS (depending on the task duration)

Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

No data carrier read; read task ended after timer expired

StartRead	= True
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 0
FrameLength	= 0
RSSI	= 0
ReadCounter	= 0
ReadingTime	= 0ms

IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128

Name	Data ty..	Offset	Start va..	Monitor val..
Static				
IUT-F190-B40	"IUT...	0.0		
ReadData	Array[...	0.0		
ReadData[0]	Byte	0.0	16#0	16#00
ReadData[1]	Byte	1.0	16#0	16#0E
ReadData[2]	Byte	2.0	16#0	16#34
ReadData[3]	Byte	3.0	16#0	16#00
ReadData[4]	Byte	4.0	16#0	16#30
ReadData[5]	Byte	5.0	16#0	16#14
ReadData[6]	Byte	6.0	16#0	16#F7
ReadData[7]	Byte	7.0	16#0	16#33
ReadData[8]	Byte	8.0	16#0	16#7C
ReadData[9]	Byte	9.0	16#0	16#00
ReadData[10]	Byte	10.0	16#0	16#1F
ReadData[11]	Byte	11.0	16#0	16#00
ReadData[12]	Byte	12.0	16#0	16#00
ReadData[13]	Byte	13.0	16#0	16#00
ReadData[14]	Byte	14.0	16#0	16#74
ReadData[15]	Byte	15.0	16#0	16#5C
ReadData[16]	Byte	16.0	16#0	16#00
ReadData[17]	Byte	17.0	16#0	16#08
ReadData[18]	Byte	18.0	16#0	16#01
ReadData[19]	Byte	19.0	16#0	16#02
ReadData[20]	Byte	20.0	16#0	16#03
ReadData[21]	Byte	21.0	16#0	16#04
ReadData[22]	Byte	22.0	16#0	16#05
ReadData[23]	Byte	23.0	16#0	16#06
ReadData[24]	Byte	24.0	16#0	16#07
ReadData[25]	Byte	25.0	16#0	16#08
ReadData[26]	Byte	26.0	16#0	16#00

Data structure of read-in data when accessing the user memory using the "Long Form" data format:

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code
ReadData[2…3]: PC-Word
Length 2 Byte; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code
ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique
ReadData[16…17]: Length of read user memory data Length 2 bytes; corresponds to "Number of Bytes" from the parameter "Read Task" from the GSDML; 16#0008 = 8 bytes
ReadData[18…25]: read-in User Memory data
Length depends on the setting "Number of Bytes"; read out partial area of the user memory

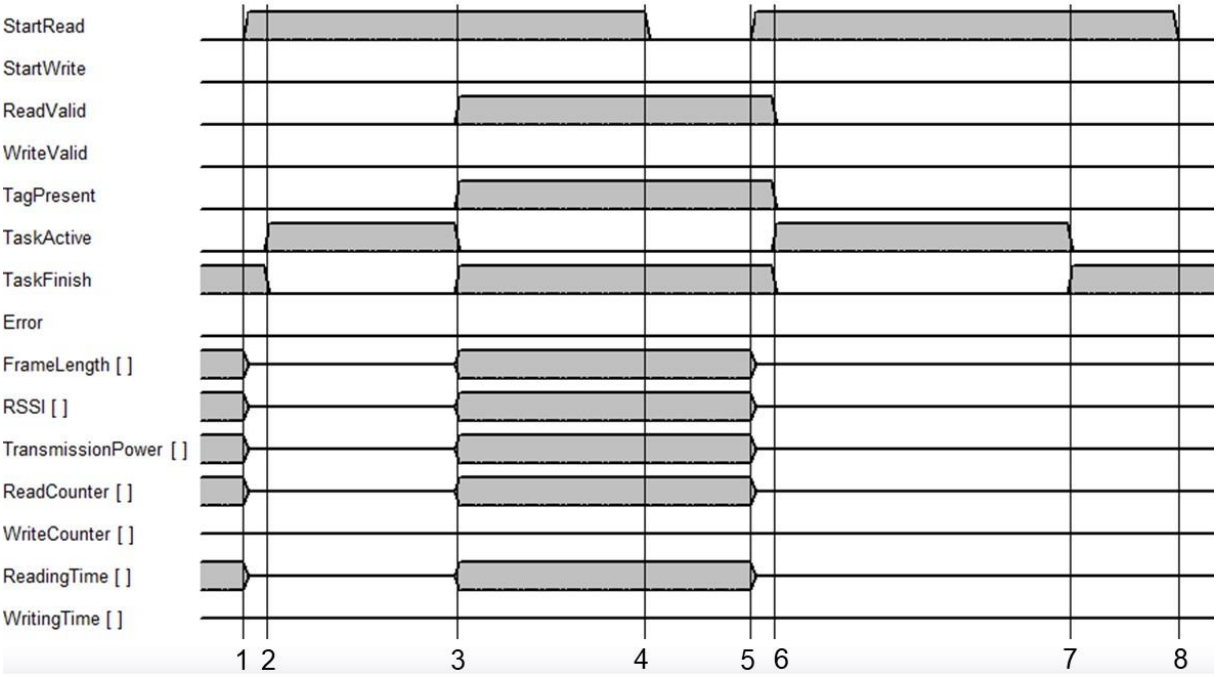
IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128

Name	Dat...	Off...	Start ..	Monitor value
Static				
IUT-F190-B40	"IUT...	0.0		
ReadData	Arr...	0.0		
Time_Read	Dat...	124...	DT#195	DT#2022-01-14-15:13:21.544
WriteData	Arr...	132...		
Time_Write	Dat...	256...	DT#195	DT#1990-01-01-00:00:00
ErrorData	Arr...	264...		
Time_Error	Dat...	294...	DT#195	DT#1990-01-01-00:00:00
EPC_WrittenTag	Arr...	302...		
RSSI	Byte	336...	16#0	16#3C
TransmissionPower	Int	338...	0	5

Time of successful read access to a data carrier:

Data structure IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400.Time_Read

Flowchart execution read task:

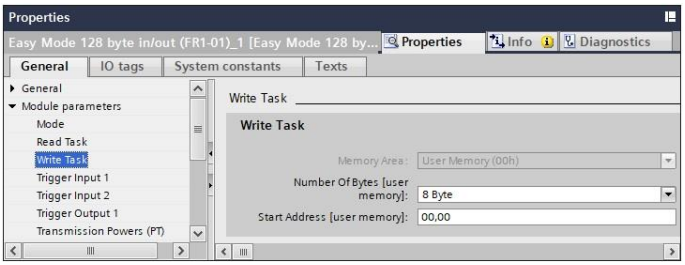


Time point	Meaning
1	Read task is started StartRead := True; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms
2	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms
3	Data carrier read and read task completed StartRead := True; ReadValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 26; RSSI = 33; TransmissionPower = 50; ReadCounter = 1; ReadingTime = T#4s_6ms
4	Trigger for start read task is reset StartRead := False; ReadValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 26; RSSI = 33; TransmissionPower = 50; ReadCounter = 1; ReadingTime = T#4s_6ms
5	Read task is started StartRead := True; ReadValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms
6	Read task is activated; no data carrier in detection zone StartRead := True; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms
7	Read task finished after timer expires StartRead := True; ReadValid = True; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms
8	Trigger for start read task is reset StartRead := False; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; ReadCounter = 0; ReadingTime = 0ms

7.2 Execution write task

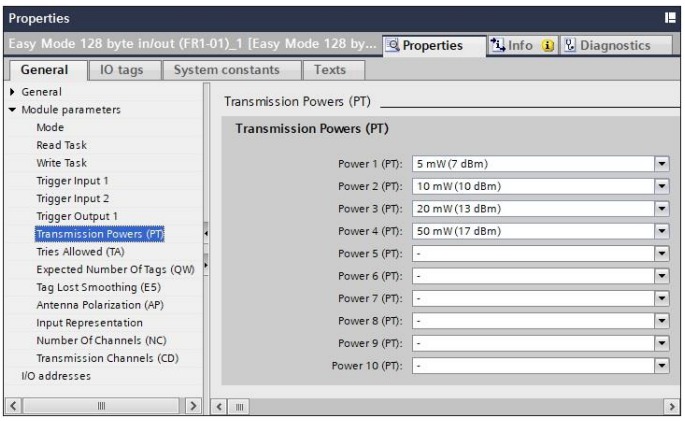
Write access to a data carrier is configured via the "Write Task" parameter in the GSDML file. When using the Easy Mode, only the writing of user data within the user memory is possible. A write operation to the UII/EPC information cannot be executed.
The Autostart function is not supported when executing a write operation. To use the function block, the Autostart function must be deactivated within the "Read Task".
When using the "Long Form" data format, the data returned by the RFID station always contains the UII/EPC information of the tag that was successfully written to. This ensures a clear assignment of the write access to a data carrier. When using the "Short Form" data format, the UII/EPC information is omitted.
Several transmission power levels can be defined via the PT parameter. These are passed through during the execution of the task. A write access to a data carrier requires a higher transmission power

than a read access to the same data carrier in the same position. The number of access attempts to be executed per power level can be set via the TA parameter. The larger the value, the more scans are executed per power level and the slower the ramp for the transmit power is run through.



Parameter „Write Task“ → Setting write access to data area (User Memory)

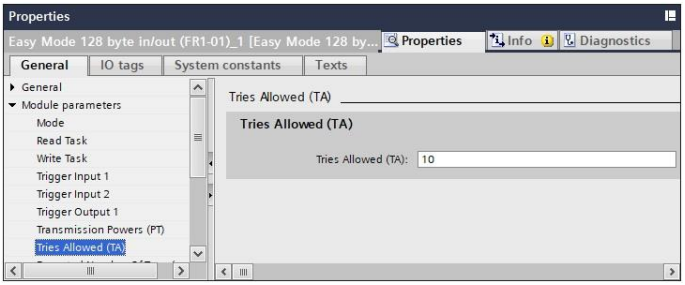
Memory Area:	User Memory
Number of Bytes:	8 Byte
Start Address:	00,00 (hex)



Parameter “Transmission Powers” → Setting ramp function for transmit power

PT1	→ 5mW (7 dBm)
PT2	→ 10mW (10 dBm)
PT3	→ 20mW (13 dBm)
PT4	→ 50mW (17 dBm)

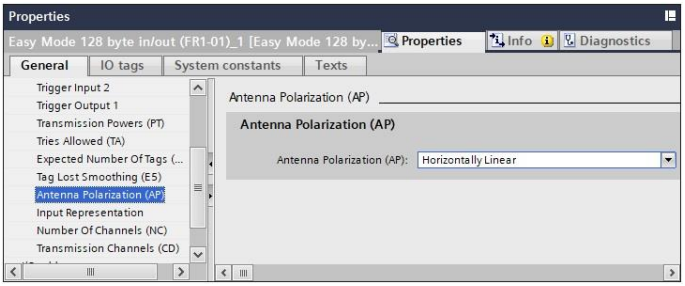
A maximum of 10 values can be set. The values are to be set according to their size. The larger the number of values, the longer the ramp takes to run.



Parameter „Tries Allowed“ → Setting the access attempts per transmission power level

TA → 10

If the orientation of the tags is known and always constant, the polarization of the RFID station (parameter AP) can be set to either horizontal or vertical. In this way, only access attempts with a polarization form suitable for the orientation of the data carrier are executed. This accelerates the passage of the ramp.

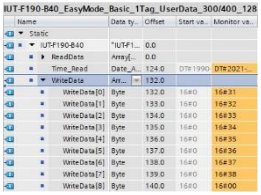


Parameter „Antenna Polarization“ → Setting polarization alignment

AP → horizontal

Before starting a write task, the write data must first be defined. These are located in the „IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400.IUT-F190-B40“ data block in the "WriteData" data structure.

Name	...	Displ...	Monit...	Modify ...
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[0]	...	Hex	16#31	16#31
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[1]	...	Hex	16#32	16#32
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[2]	...	Hex	16#33	16#33
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[3]	...	Hex	16#34	16#34
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[4]	...	Hex	16#35	16#35
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[5]	...	Hex	16#36	16#36
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[6]	...	Hex	16#37	16#37
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[7]	...	Hex	16#38	16#38
"IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[8]	...	Hex	16#00	16#00



The write task is started by the "I_b_StartWriteTask" input at FB4129.

Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

Initial state before start of write task
StartWrite = False
WriteValid = depending on previous state
TagPresent = depending on previous state
TaskActive = False
TaskFinish = True
FrameLength = depending on previous state
RSSI = depending on previous state
TransmissionPower = depending on previous state
WriteCounter = depending on previous state
The write task starts as soon as "StartWrite" is set to True.

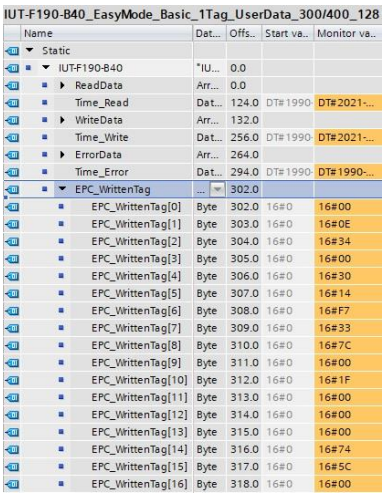
Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	B...	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

Write task active; detection zone is scanned
StartWrite = True
WriteValid = False
TagPresent = False
TaskActive = True
TaskFinish = False
FrameLength = 0
RSSI = 0
TransmissionPower = 0
WriteCounter = 0
The write task is activated. The detection range is scanned. No data carrier has been detected yet.

Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	TRUE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB14	DEC	40	
"TransmissionPower"	%MW16	DEC	10	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	1	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#2S_514MS	

Data carrier written; write task completed
StartWrite = True
WriteValid = True
TagPresent = True
TaskActive = False
TaskFinish = True
FrameLength = 16 (depending on the data length)
RSSI = 40 (depending on the signal quality)
TransmissionPower = 10 (power transmission level 10mW)
WriteCounter = 1
WritingTime = T#2S_514MS (depending on the task duration)

The UII/EPC information of the described data carrier is located within the data block "IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400" in the data structure "EPC_WrittenTag".



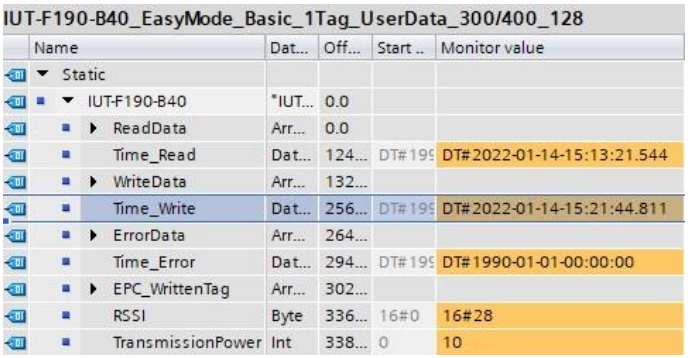
IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128					
	Name	Dat...	Offs..	Start va..	Monitor va..
	Static				
	IUT-F190-B40	"IU...	0.0		
	ReadData	Arr...	0.0		
	Time_Read	Dat...	124.0	DT#1990-	DT#2021-...
	WriteData	Arr...	132.0		
	Time_Write	Dat...	256.0	DT#1990-	DT#2021-...
	ErrorData	Arr...	264.0		
	Time_Error	Dat...	294.0	DT#1990-	DT#1990-...
	EPC_WrittenTag	...	302.0		
	EPC_WrittenTag[0]	Byte	302.0	16#0	16#00
	EPC_WrittenTag[1]	Byte	303.0	16#0	16#0E
	EPC_WrittenTag[2]	Byte	304.0	16#0	16#34
	EPC_WrittenTag[3]	Byte	305.0	16#0	16#00
	EPC_WrittenTag[4]	Byte	306.0	16#0	16#30
	EPC_WrittenTag[5]	Byte	307.0	16#0	16#14
	EPC_WrittenTag[6]	Byte	308.0	16#0	16#F7
	EPC_WrittenTag[7]	Byte	309.0	16#0	16#33
	EPC_WrittenTag[8]	Byte	310.0	16#0	16#7C
	EPC_WrittenTag[9]	Byte	311.0	16#0	16#00
	EPC_WrittenTag[10]	Byte	312.0	16#0	16#1F
	EPC_WrittenTag[11]	Byte	313.0	16#0	16#00
	EPC_WrittenTag[12]	Byte	314.0	16#0	16#00
	EPC_WrittenTag[13]	Byte	315.0	16#0	16#00
	EPC_WrittenTag[14]	Byte	316.0	16#0	16#74
	EPC_WrittenTag[15]	Byte	317.0	16#0	16#5C
	EPC_WrittenTag[16]	Byte	318.0	16#0	16#00

UII/EPC information of the successfully written tag within the data block "IUT-F190-B40_EasyMode_Basic_1Tag" in the structure "EPC_WrittenTag":

WrittenTag[0...1]: Length UII/EPC Information
Länge 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

WrittenTag[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

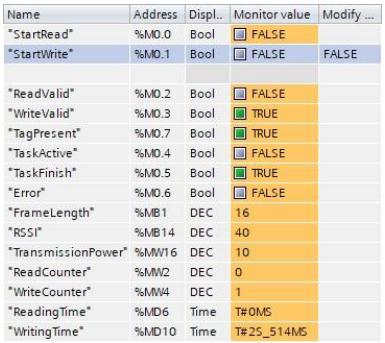
WrittenTag[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique



IUT-F190-B40_EasyMode_Basic_1Tag_UserData_300/400_128					
	Name	Dat...	Off...	Start ..	Monitor value
	Static				
	IUT-F190-B40	"IUT...	0.0		
	ReadData	Arr...	0.0		
	Time_Read	Dat...	124...	DT#195	DT#2022-01-14-15:13:21.544
	WriteData	Arr...	132...		
	Time_Write	Dat...	256...	DT#195	DT#2022-01-14-15:21:44.811
	ErrorData	Arr...	264...		
	Time_Error	Dat...	294...	DT#195	DT#1990-01-01-00:00:00
	EPC_WrittenTag	Arr...	302...		
	RSSI	Byte	336...	16#0	16#28
	TransmissionPower	Int	338...	0	10

Time of successful write access to a data carrier:

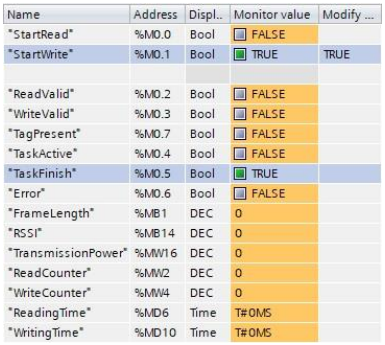
Data structure IUT-F190-B40_EasyMode_ Basic_1Tag_UserData_300/400.Time_Write



Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	FALSE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	TRUE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"RSSI"	%MB14	DEC	40	
"TransmissionPower"	%MW16	DEC	10	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	1	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#2S_514MS	

Trigger for write task reset

StartWrite	= False
WriteValid	= True (depending on previous state)
TagPresent	= True (depending on previous state)
TaskActive	= False
TaskFinish	= True
FrameLength	= 26 (depending on the data length)
RSSI	= 40 (depending on previous state)
TransmissionPower	= 10 (depending on previous state)
WriteCounter	= 1 (depending on previous state)
WritingTime	= Writing time (depending on the task duration)

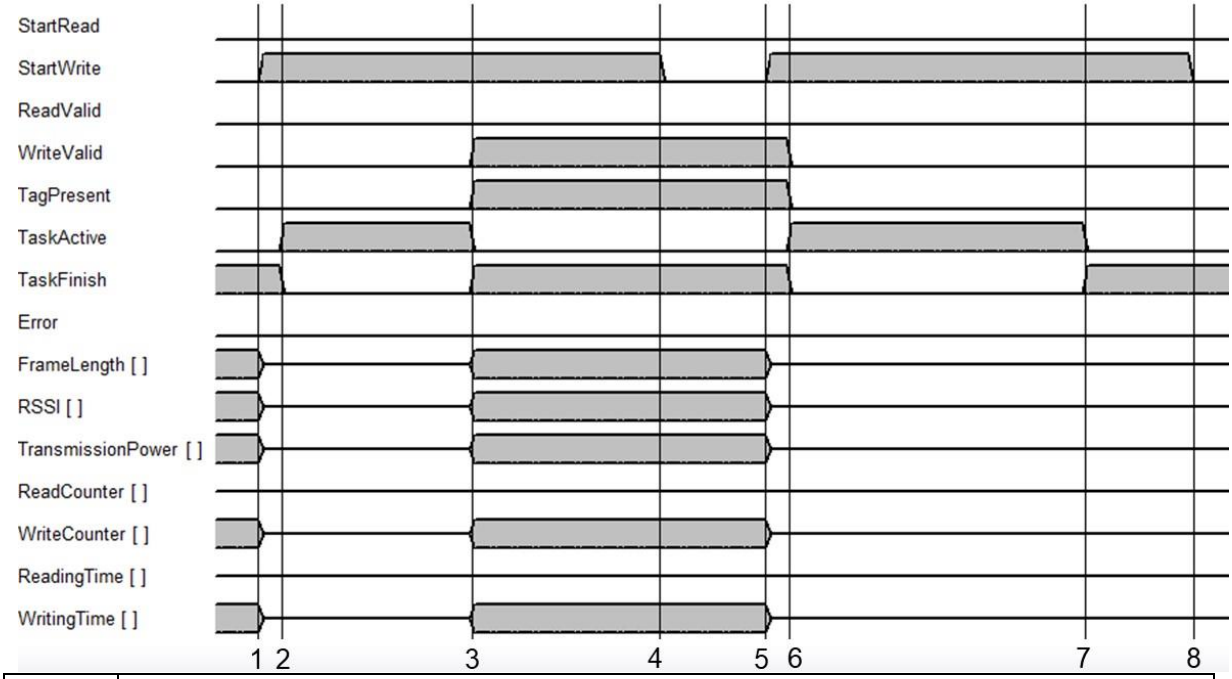


Name	Address	Displ..	Monitor value	Modify ...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"RSSI"	%MB14	DEC	0	
"TransmissionPower"	%MW16	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	0	
"ReadingTime"	%MD6	Time	T#0MS	
"WritingTime"	%MD10	Time	T#0MS	

No data carrier detected and no data written; write task terminated after timer expires

StartWrite	= True
WriteValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
FrameLength	= 0
RSSI	= 0
TransmissionPower	= 0
WriteCounter	= 0
WritingTime	= 0ms

Flowchart execution write task:

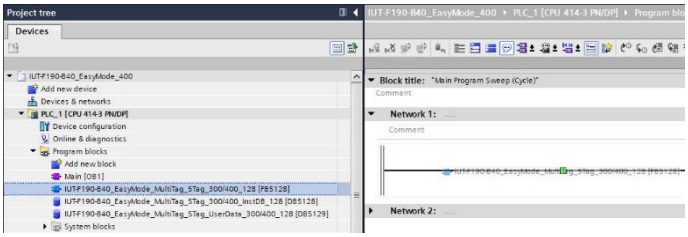


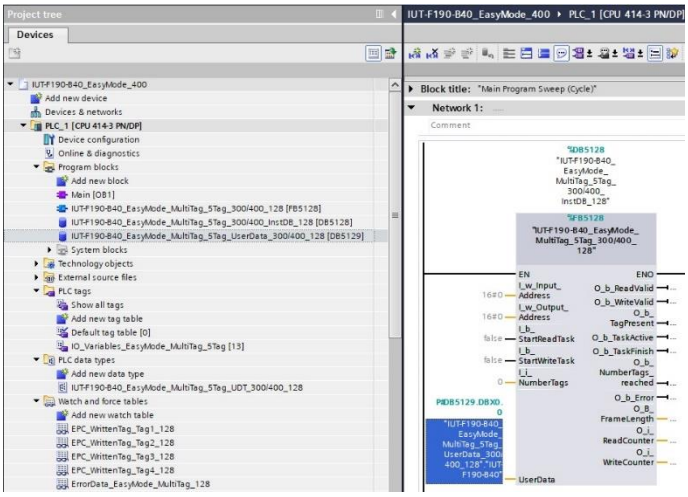
Time point	Meaning
1	Write task is started StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms
2	Write task is activated; no data carrier in detection zone StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms
3	Data carrier written and write task completed StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 26; RSSI = 46; TransmissionPower = 50; WriteCounter = 1; WritingTime = T#4s_6ms
4	Trigger for start write task is reset StartWrite := False; WriteValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 26; RSSI = 46; TransmissionPower = 50; WriteCounter = 1; WritingTime = T#4s_6ms
5	Write task is started StartWrite := True; WriteValid = True; TagPresent = True; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms
6	Write task is activated; no data carrier in detection zone StartWrite := True; WriteValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms
7	Write jtask finished after timer expires StartWrite := True; WriteValid = True; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms
8	Trigger for start write task is reset StartWrite := False; WriteValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; FrameLength = 0; RSSI = 0; TransmissionPower = 0; WriteCounter = 0; WritingTime = 0ms

8. Function block “IUT-F190-B40_EasyMode_MultiTag_5Tag_300/400“

Functional description "IUT-F190-B40_EasyMode_Multitag_5Tag_300/400":
The function block can be used to identify up to 5 data carriers simultaneously via a read task. The information read in from the data carriers is stored in separate structures within the "IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400" data block.
In conjunction with the ramp function (PT parameter), the transmit power can be increased continuously. This means that the data carriers are read or written with the minimum required transmit power. The number of access attempts for each set power level can be increased via the TA parameter.
By increasing parameter E5, it is possible to suppress multiple readings of a data carrier. This is necessary if there are reading gaps within the detection zone.
The function block can also be used to program up to 5 data carriers simultaneously. The same data record is programmed in the user data in all data carriers. For the unique assignment of the programmed data carriers, the UII/EPC information of the data carrier is stored within the data block.
The function block reads the local system time of the PLC at the start of the task execution and at successful write and read accesses to data carriers. From this, the execution time for the accesses to the individual data carriers is formed. The system times and the execution times are also stored within the data block.
With the start of a new write or read task, all internal data and the outputs are reset.

Implementation of function block "IUT-F190_EasyMode_MultiTag_5Tag_300/400":
Drag function block "IUT-F190-B40_EasyMode_MultiTag_5Tag_300/400" (FB5128) from the project tree into OB1. Then select the corresponding instance data block. The library contains the data block "IUT-F190-B40_EasyMode_MultiTag_5Tag_300/400_InstDB" (DB5128) which can be used as instance data block. However, the instance data block can also be regenerated.





The read/write data and the access times to the data carriers are located in a separate data block. This is parameterized at the "UserData" input. The library contains the data block "IUT-F190-B40_EasyMode_MultiTag_5Tag_User Data_300/400" which can be used for this purpose.

The data block can be generated by the user. The internal data structure is generated from the library via the "IUT-F190-B40_EasyMode_ MultiTag_5Tag_UDT_300/400" data type.

...B40_EasyMode_400 ▸ PLC_1 [CPU 414-3 PN/DP] ▸ Program blocks ▸ IUT-F190-B40_EasyM

Keep actual values | Snapshot | Copy snapshots to start values

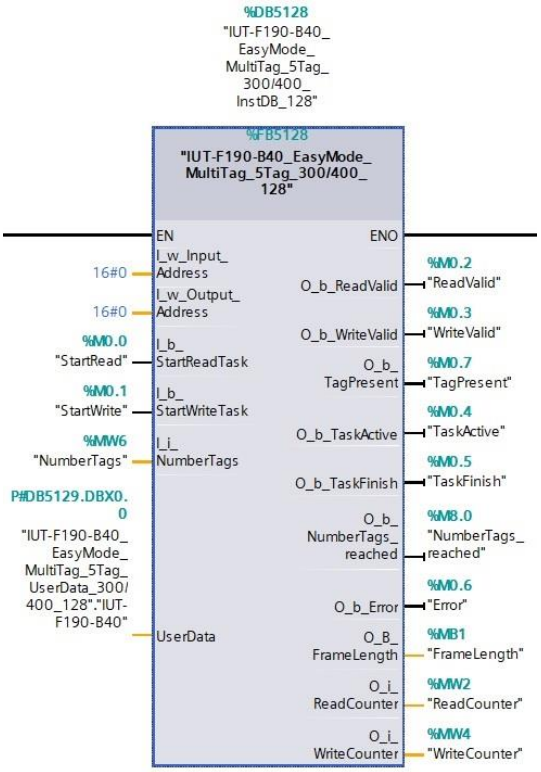
IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128

	Name	Data type
1	Static	
2	IUT-F190-B40	"IUT-F190-B40_EasyMode_MultiTag_5Tag_UDT_300/400_128"
3	Date_Trigger	Date_And_Time
4	Date_Scan_Tag1	Date_And_Time
5	ScanTime_Tag1	Time
6	ReadData_Tag1	Array[0..123] of Byte
7	EPC_Written_Tag1	Array[0..33] of Byte
8	RSSI_Tag1	Byte
9	TransmissionPower_Tag1	Int
10	Date_Scan_Tag2	Date_And_Time
11	ScanTime_Tag2	Time
12	ReadData_Tag2	Array[0..123] of Byte
13	EPC_Written_Tag2	Array[0..33] of Byte
14	RSSI_Tag2	Byte
15	TransmissionPower_Tag2	Int
16	Date_Scan_Tag3	Date_And_Time
17	ScanTime_Tag3	Time
18	ReadData_Tag3	Array[0..123] of Byte
19	EPC_Written_Tag3	Array[0..33] of Byte
20	RSSI_Tag3	Byte
21	TransmissionPower_Tag3	Int
22	Date_Scan_Tag4	Date_And_Time
23	ScanTime_Tag4	Time
24	ReadData_Tag4	Array[0..123] of Byte
25	EPC_Written_Tag4	Array[0..33] of Byte
26	RSSI_Tag4	Byte
27	TransmissionPower_Tag4	Int
28	Date_Scan_Tag5	Date_And_Time
29	ScanTime_Tag5	Time
30	ReadData_Tag5	Array[0..123] of Byte
31	EPC_Written_Tag5	Array[0..33] of Byte
32	RSSI_Tag5	Byte
33	TransmissionPower_Tag5	Int
34	Date_Scan_LastTag	Date_And_Time
35	ScanTime_LastTag	Time
36	ReadData_LastTag	Array[0..123] of Byte
37	EPC_Written_LastTag	Array[0..33] of Byte
38	RSSI_LastTag	Byte
39	TransmissionPower_LastTag	Int
40	WriteData	Array[0..123] of Byte
41	ErrorData	Array[0..29] of Byte
42	Date_Error	Date_And_Time

The "IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400" data block consists of the "IUT-F190-B40" structure. This structure is formed from the UDT "IUT-F190-B40_EasyMode_MultiTag_5Tag_UDT_300/400".

The structure is divided into the following sub-sections:

Date_Trigger → System time to start the read/write task
Date_Scan_Tag1/2/3/4/5 → System time access to data carrier 1/2/3/4/5
ScanTime_Tag1/2/3/4/5 → Execution time for accessing volumes 1/2/3/4/5; difference between "Date_Scan_Tag" and "Date_Trigger
ReadData_Tag1/2/3/4/5 → Data read in from data carrier 1/2/3/4/5
EPC_Written_Tag1/2/3/4/5 → UII/EPC information of the successfully written data carrier 1/2/3/4/5
RSSI_Tag1/2/3/4 → RSSI value for data carrier access
TransmissionPower_Tag1/2/3/4 → Transmission power in mW which was valid by data carrier access
WriteData → User data for write access to a data carrier
ErrorData → Error information
Date_Error → System time Error state



Complete wiring of the "IUT-F190-B40_EasyMode_MultiTag_5Tag" function block:

The input parameters "I_w_Input_Address" and "I_w_Output_Address" correspond to the start addresses of the input and output data fields of the communication module from the hardware configuration.

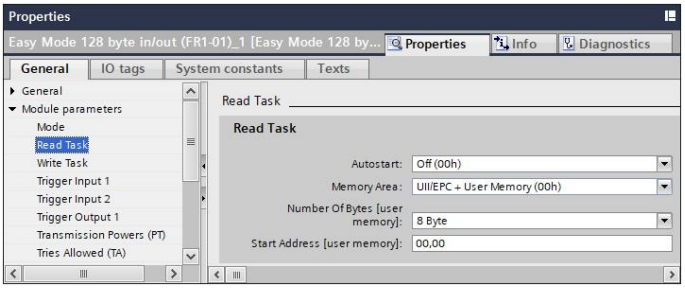
Telegram lengths of up to 128 bytes are supported by the function block. The telegram length of 256 bytes is not supported by the function block, since the Profinet master of the used controller does not support this telegram length.

The following table shows the meaning of the input and output variables:

Name	Input / Output	Data type	Meaning
I_w_Input_Address	Input	Word	Start address input data field
I_w_Output_Address	Input	Word	Start address output data field
I_b_StartRead	Input	Bool	Start read task; with edge change from 0 → 1; starts execution of read task; end read task with edge change 1 → 0;
I_b_StartWrite	Input	Bool	Start write task; with edge change from 0 → 1; starts execution of write task; end write task with edge change 1 → 0;
I_i_NumberTags	Input	Integer	Number of expected volumes; value range 1 to 5
UserData	InOut	DB	Data area for read and write data, access times and error information → " IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400“
O_b_ReadValid	Output	Bool	Read successful; 1 := data carrier within detection zone and data read successfully; 0 := data carrier outside detection zone; no data read
O_b_WriteValid	Output	Bool	Write successful; 1 := data carrier within detection zone and data written successfully; 0 := data carrier outside acquisition zone; no data written
O_b_TagPresent	Output	Bool	Presence of data carriers: 1 := one or more data carriers in the detection zone. 0 := no data carrier in the detection zone
O_b_TaskActive	Output	Bool	Read or write task active; 1 := read or write task active; 0 := no read or write task active; RFID head off
O_b_TaskFinish	Output	Bool	Read or write task completed; 0 := read or write task active; 1 := no read or write task active; RFID head off
O_b_NumberTags_reached	Output	Bool	Expected number of data carriers reached 0 := expected number of data carriers not reached 1 := expected number of data carriers reached
O_b_Error	Output	Bool	Error; 1 := error occurred during read or write task 0 := no error condition active
O_B_FrameLength	Output	Byte	Length of the read-in data; Indication of the length of the read-in data in bytes; in case of error condition the length of the error message is indicated.
O_i_ReadCounter	Output	Integer	Counter read operations; Number of successful reads during the execution of a read task.
O_i_WriteCounter	Output	Integer	Counter write operations; Number of successful writes during the execution of a write task.

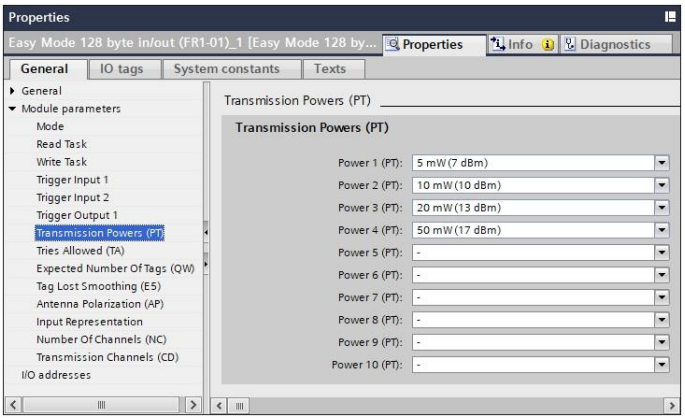
8.1 Execution read task

Read access to the data carrier must be set via the "Read Task" parameter in the GSDML file. The user data (memory bank 11; User Memory), the UII/EPC code (memory bank 01) and the TID (memory bank 10) can be accessed.
The Autostart function must be switched off when using this function block. The read or write task is started and ended by the function block.
For applications where several data carriers are to be identified simultaneously in the detection zone (Multitag,) the "Long Form" data format must be used. It is not possible to use the "Short Form" data format for the identification of multiple data carriers. When using the "Long Form" data format, the UII/EPC information for unique assignment to a data carrier is always placed in front of the read-in data record in the returned data.
Several transmission power levels can be defined via the PT parameter. These are run through during the execution of the task. The number of access attempts to be executed per power level can be set via the TA parameter. The larger the value, the more scans will be executed per power level and the slower the ramp for the transmit power will be run through. By increasing the parameter E5, the RFID station can be set to be more tolerant of reading gaps.



Parameter „Read Task“ → Setting read access to data areas (e.g. User Memory)
Autostart: off (00h)
Memory Area: UII/EPC + User Memory
Number of Bytes: 8 Byte
Start Address: 00,00 (hex)

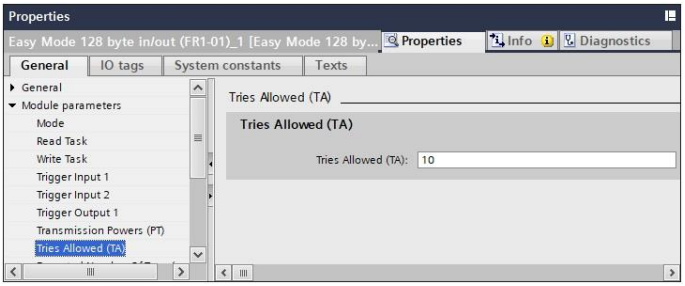
A multiple of 4 bytes is always read in. The start address is to be set in 4 byte steps.



Parameter “Transmission Power” → Setting ramp function for transmit power

PT1: 5mW (7 dBm)
PT2: 10mW (10 dBm)
PT3: 20mW (13 dBm)
PT4: 50mW (17 dBm)

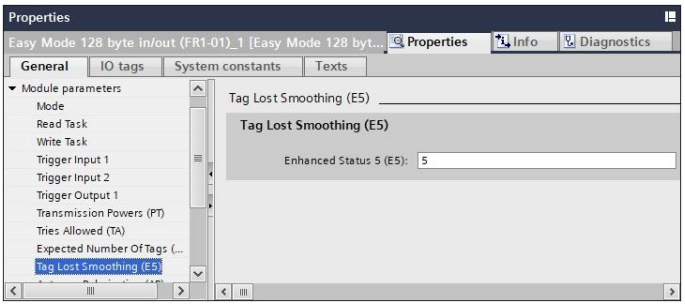
A maximum of 10 values can be set. The values are to be set according to their size. The larger the number of values, the longer the ramp takes to run.



Parameter „Tries Allowed“ → Setting of access attempts per transmission channel

TA: 10

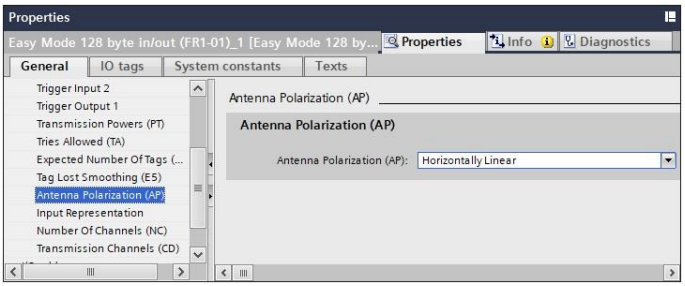
10 access attempts are made at each set power level (PT) per transmit channel (CD) and polarization plane (AP).



Parameter „Tag Lost Smoothing“ → Setting the number of failed access attempts before logging off the data carrier.

E5: 5

If the orientation of the tags is known and always constant, the polarization of the RFID station (parameter AP) can be set to either horizontal or vertical. In this way, only access attempts with a polarization form suitable for the orientation of the data carrier are executed. This accelerates the passage of the ramp.



Parameter „Antenna Polarization“ → Setting polarization shape

AP: horizontal

The function block does not perform a check for multiple reading of a data carrier. If a data carrier is read multiple times by the RFID station, the new read access is treated as a read access to a new data carrier. To reduce the probability of multiple reads, parameter E5 can be increased.

The read task is started by the "I_b_StartRead" input at FB5128.

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	FALSE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"NumberTags"	%MW6	...	3	3
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Initial state before the start of the read task:

StartRead	= False
NumberTags	= 3 (3 data carriers are expected)
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
NumberTags_reached	= True (depending on previous state)
FrameLength	= 0
ReadCounter	= 3 (depending on previous state)

The read task starts as soon as "StartRead" is set to True.

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	TRUE	TRUE
"StartWrite"	%M0.1	Bool	FALSE	
"NumberTags"	%MW6	DE...	3	3
"ReadValid"	%M0.2	Bool	TRUE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	26	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Read task active; data carriers in the detection zone are read one after the other

StartRead	= True
NumberTags	= 3
ReadValid	= True (positive edge with each new data carrier)
TagPresent	= True
TaskActive	= True
TaskFinish	= False
NumberTags_reached	= True
FrameLength	= 26 (depending on the data length)
ReadCounter	= 3 (Number of data carrier read)

If the first data carrier is read after the start of command execution, the "ReadValid" output changes to True. As soon as another data carrier is read, the "ReadValid" output initially changes to False for 50ms and then changes back to True. Each positive edge at the "ReadValid" output signals successful read access to a new data carrier. The "ReadCounter" output counts the positive edges at the "ReadValid" output.

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	FALSE	FALSE
"StartWrite"	%M0.1	Bool	FALSE	
"NumberTags"	%MW6	DE...	3	3
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"ReadCounter"	%MW2	DEC	3	
"WriteCounter"	%MW4	DEC	0	

Reading task finished

StartRead	= False
NumberTags	= 3
ReadValid	= False
TagPresent	= False
TaskActive	= False
TaskFinish	= True
NumberTags_reached	= True (depending on previous state)
FrameLength	= 0
ReadCounter	= 3 (depending on the number of previously read data carriers)

The read-in data is located within the data block "IUT-F190-B40_EasyMode_MultiTag_5Tag_ UserData_300/400.IUT-F190-B40.ReadData_Tag1/2/3.

IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128

Name	Dat...	Offset	S...	Monitor value
Static				
IUT-F190-B40	*...	0.0		
Date_Trigger	Dat...	0.0	DT#	DT#2022-01-17-10...
Date_Scan_Tag1	Dat...	8.0	DT#	DT#2022-01-17-10...
ScanTime_Tag1	Time	16.0	T#0	T#101MS
ReadData_Tag1	Arr...	20.0		
ReadData_Tag1[0]	Byte	20.0	16#	16#00
ReadData_Tag1[1]	Byte	21.0	16#	16#0E
ReadData_Tag1[2]	Byte	22.0	16#	16#34
ReadData_Tag1[3]	Byte	23.0	16#	16#00
ReadData_Tag1[4]	Byte	24.0	16#	16#30
ReadData_Tag1[5]	Byte	25.0	16#	16#14
ReadData_Tag1[6]	Byte	26.0	16#	16#F7
ReadData_Tag1[7]	Byte	27.0	16#	16#33
ReadData_Tag1[8]	Byte	28.0	16#	16#7C
ReadData_Tag1[9]	Byte	29.0	16#	16#00
ReadData_Tag1[10]	Byte	30.0	16#	16#1F
ReadData_Tag1[11]	Byte	31.0	16#	16#00
ReadData_Tag1[12]	Byte	32.0	16#	16#00
ReadData_Tag1[13]	Byte	33.0	16#	16#00
ReadData_Tag1[14]	Byte	34.0	16#	16#74
ReadData_Tag1[15]	Byte	35.0	16#	16#84
ReadData_Tag1[16]	Byte	36.0	16#	16#00
ReadData_Tag1[17]	Byte	37.0	16#	16#08
ReadData_Tag1[18]	Byte	38.0	16#	16#01
ReadData_Tag1[19]	Byte	39.0	16#	16#02
ReadData_Tag1[20]	Byte	40.0	16#	16#03
ReadData_Tag1[21]	Byte	41.0	16#	16#04
ReadData_Tag1[22]	Byte	42.0	16#	16#05
ReadData_Tag1[23]	Byte	43.0	16#	16#06
ReadData_Tag1[24]	Byte	44.0	16#	16#07
ReadData_Tag1[25]	Byte	45.0	16#	16#08
ReadData_Tag1[26]	Byte	46.0	16#	16#00

Data carrier 1: ReadData_Tag1

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code
ReadData[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code
ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique
ReadData[16…17]: Length of read user memory data
Length 2 bytes; corresponds to "Number of Bytes" from the parameter "Read Task" from the GSDML; 16#0008 = 8 bytes
ReadData[18…25]: read-in User Memory data
Length depends on the setting "Number of Bytes"; read out partial area of the user memory

The read-in data for data carrier 2 are located in the data structure ReadData_Tag2 and the read-in data for data carrier 3 are located in the data structure ReadData_Tag3. The structure of the data sets is analogous to data carrier 1.
In addition to the read-in data for each data carrier, system times for data carrier access are also stored within the data block.

IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128

Name	Dat...	Offset	S...	Monitor value
Static				
IUT-F190-B40	*...	0.0		
Date_Trigger	Dat...	0.0	DT#	DT#2022-01-17-10:18:09.938
Date_Scan_Tag1	Dat...	8.0	DT#	DT#2022-01-17-10:18:10.039
ScanTime_Tag1	Time	16.0	T#0	T#101MS
ReadData_Tag1	Arr...	20.0		
EPC_Written_Tag1	Arr...	144.0		
RSSI_Tag1	Byte	178.0	16#	16#3C
TransmissionPower_Tag1	Int	180.0	0	5
Date_Scan_Tag2	Dat...	182.0	DT#	DT#2022-01-17-10:18:10.137
ScanTime_Tag2	Time	190.0	T#0	T#199MS
ReadData_Tag2	Arr...	194.0		
EPC_Written_Tag2	Arr...	318.0		
RSSI_Tag2	Byte	352.0	16#	16#35
TransmissionPower_Tag2	Int	354.0	0	5
Date_Scan_Tag3	Dat...	356.0	DT#	DT#2022-01-17-10:18:11.207
ScanTime_Tag3	Time	364.0	T#0	T#1S_269MS
ReadData_Tag3	Arr...	368.0		
EPC_Written_Tag3	Arr...	492.0		
RSSI_Tag3	Byte	526.0	16#	16#21
TransmissionPower_Tag3	Int	528.0	0	50
Date_Scan_Tag4	Dat...	530.0	DT#	DT#1990-01-01-00:00:00
ScanTime_Tag4	Time	538.0	T#0	T#0MS
ReadData_Tag4	Arr...	542.0		
EPC_Written_Tag4	Arr...	666.0		
RSSI_Tag4	Byte	700.0	16#	16#00
TransmissionPower_Tag4	Int	702.0	0	0
Date_Scan_Tag5	Dat...	704.0	DT#	DT#1990-01-01-00:00:00
ScanTime_Tag5	Time	712.0	T#0	T#0MS
ReadData_Tag5	Arr...	716.0		
EPC_Written_Tag5	Arr...	840.0		
RSSI_Tag5	Byte	874.0	16#	16#00
TransmissionPower_Tag5	Int	876.0	0	0
Date_Scan_LastTag	Dat...	878.0	DT#	DT#2022-01-17-10:18:11.207
ScanTime_LastTag	Time	886.0	T#0	T#1S_269MS
ReadData_LastTag	Arr...	890.0		
EPC_Written_LastTag	Arr...	101...		
RSSI_LastTag	Byte	104...	16#	16#21
TransmissionPower_LastTag	Int	105...	0	50
WriteData	Arr...	105...		
ErrorData	Arr...	117...		
Date_Error	Dat...	120...	DT#	DT#1990-01-01-00:00:00

Date_Trigger → Local system time (date) of the PLC at the time of start read task
DT#2021-08-10-16:08:00.851

Date_Scan_Tag1 → local system time (date) of the PLC at the time of read access to data carrier 1
DT#2021-08-10-16:08:00.905

ScanTime_Tag1 → Read time for data carrier 1; difference of "Date_Trigger" and "Date_Scan_Tag1".
T#54ms

RSSI_Tag1 → RSSI value for access data carrier 1 (16#3C)

TransmissionPower_Tag1 → transmission power level which was valid for data carrier access of tag 1 (5mW)

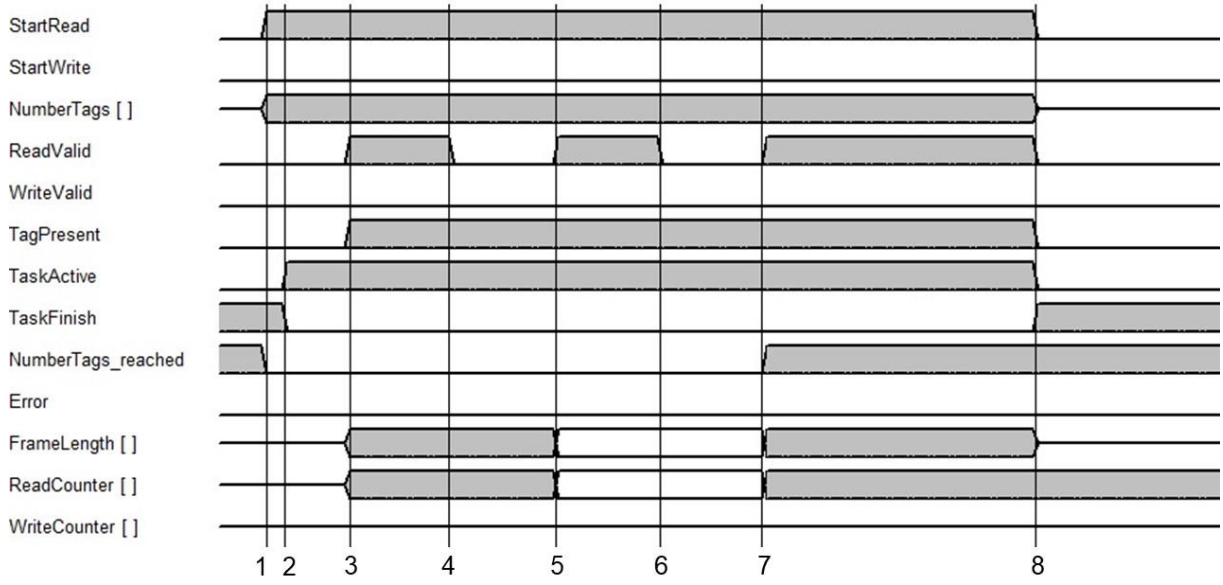
Date_Scan_Tag2 → local system time (date) of the PLC at the time of read access to data carrier 2
DT#2021-08-10-16:08:01:051

ScanTime_Tag2 → Read time for data carrier 2; difference of "Date_Trigger" and "Date_Scan_Tag2".
T#200ms

RSSI_Tag2 → RSSI value for access data carrier 2 (16#35)

TransmissionPower_Tag2 → transmission power level which was valid for data carrier access of tag 2 (5mW)

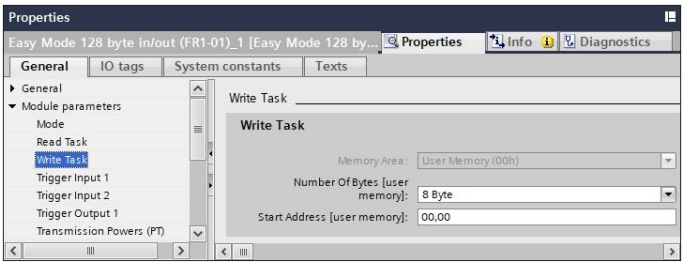
Flowchart execution read task:



Time point	Meaning
1	Read task is started StartRead := True; NumberTags := 3; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; NumberTags_reached = False; FrameLength = 0; ReadCounter = 0
2	Read task is activated; no data carrier in detection zone StartRead := True; NumberTags := 3; ReadValid = False; TagPresent = False; TaskActive = True; TaskFinish = False; NumberTags_reached = False; FrameLength = 0; ReadCounter = 0
3	Data carrier A read in StartRead := True; NumberTags := 3; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; NumberTags_reached = False; FrameLength = 26; ReadCounter = 1
4	Data carrier B detected; ReadValid is reset for 50ms StartRead := True; NumberTags := 3; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; NumberTags_reached = False; FrameLength = 26; ReadCounter = 1
5	Data carrier B read in; ReadValid is set again after 50ms StartRead := True; NumberTags := 3; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; NumberTags_reached = False; FrameLength = 26; ReadCounter = 2
6	Data carrier C detected; ReadValid is reset for 50ms StartRead := True; NumberTags := 3; ReadValid = False; TagPresent = True; TaskActive = True; TaskFinish = False; NumberTags_reached = False; FrameLength = 26; ReadCounter = 2
7	Data carrier C read in; ReadValid is set again after 50ms StartRead := True; NumberTags := 3; ReadValid = True; TagPresent = True; TaskActive = True; TaskFinish = False; NumberTags_reached = True; FrameLength = 26; ReadCounter = 3
8	Trigger for start read task is reset; read job ended StartRead := False; NumberTags := 0; ReadValid = False; TagPresent = False; TaskActive = False; TaskFinish = True; NumberTags_reached = True; FrameLength = 0; ReadCounter = 3

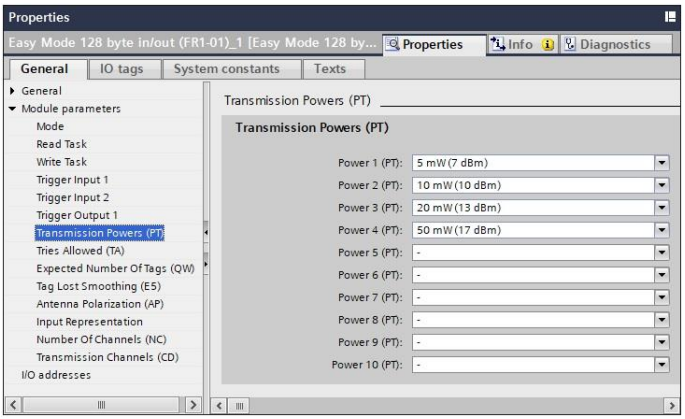
8.2 Execution write task

Write access to a data carrier is configured via the "Write Task" parameter in the GSDML file. When using the Easy Mode, only the writing of user data within the user memory is possible. A write operation to the UII/EPC information cannot be executed.
The Autostart function is not supported when executing a write operation. To use the function block, the Autostart function must be deactivated within the "Read Task".
When using the "Long Form" data format, the data returned by the RFID station always contains the UII/EPC information of the tag that was successfully written to. This ensures a clear assignment of the write access to a data carrier. When using the "Short Form" data format, the UII/EPC information is omitted.
Several transmission power levels can be defined via the PT parameter. These are passed through during the execution of the task. A write access to a data carrier requires a higher transmission power than a read access to the same data carrier in the same position. The number of access attempts to be executed per power level can be set via the TA parameter. The larger the value, the more scans are executed per power level and the slower the ramp for the transmit power is run through.



Parameter „Write Task“ → Setting write access to data area (User Memory)

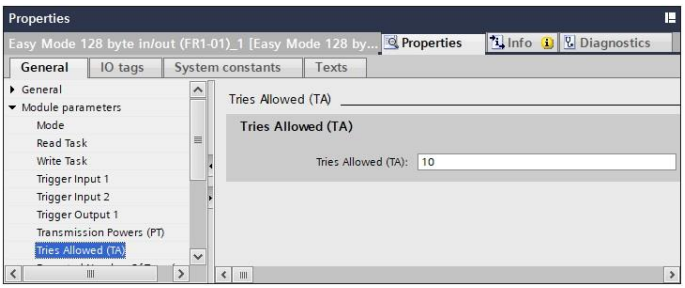
Memory Area: User Memory
Number of Bytes: 8 Byte
Start Address: 00,00 (hex)



Parameter “Transmission Power” → Setting ramp function for transmit power

PT1: 5mW (7 dBm)
PT2: 10mW (10 dBm)
PT3: 20mW (13 dBm)
PT4: 50mW (17 dBm)

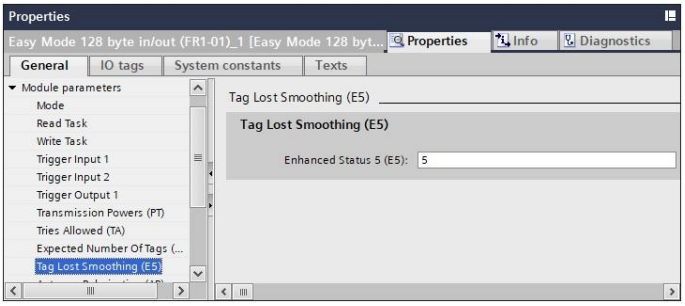
A maximum of 10 values can be set. The values are to be set according to their size. The larger the number of values, the longer the ramp takes to run.



Parameter „Tries Allowed“ → Setting the access attempts per transmission power level

TA: 10

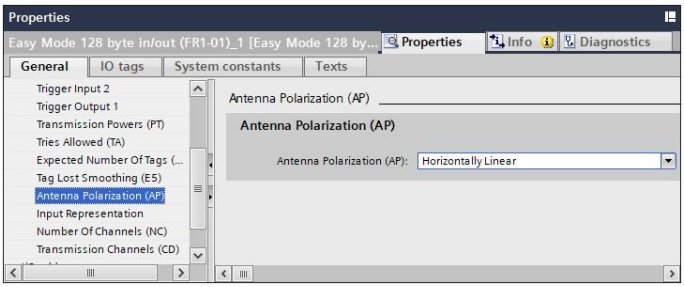
10 access attempts are made at each set power level (PT) per transmit channel (CD) and polarization plane (AP).



Parameter „Tag Lost Smoothing“ → Setting the number of failed access attempts before logging off the data carrier.

E5 → 5

If the orientation of the tags is known and always constant, the polarization of the RFID station (parameter AP) can be set to either horizontal or vertical. In this way, only access attempts with a polarization form suitable for the orientation of the data carrier are executed. This accelerates the passage of the ramp.



Parameter „Antenna Polarization“ → Setting polarization alignment

AP → horizontal

Before starting a write task, the write data must first be defined. These are located in the data block "IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400" in the data structure "IUT-F190-B40". "WriteData".

Name	A...	Dis...	Moni...	Modify ...
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[0]	%...	Hex	16#31	16#31
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[1]	%...	Hex	16#32	16#32
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[2]	%...	Hex	16#33	16#33
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[3]	%...	Hex	16#34	16#34
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[4]	%...	Hex	16#35	16#35
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[5]	%...	Hex	16#36	16#36
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[6]	%...	Hex	16#37	16#37
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[7]	%...	Hex	16#38	16#38
"IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128"."IUT-F190-B40".WriteData[8]	%...	Hex	16#00	16#00

IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128

Name	Data type	Offset	Star...	Monitor value
WriteData	Array[0..1...	1028.0		
WriteData[0]	Byte	1028.0	16#0	16#31
WriteData[1]	Byte	1029.0	16#0	16#32
WriteData[2]	Byte	1030.0	16#0	16#33
WriteData[3]	Byte	1031.0	16#0	16#34
WriteData[4]	Byte	1032.0	16#0	16#35
WriteData[5]	Byte	1033.0	16#0	16#36
WriteData[6]	Byte	1034.0	16#0	16#37
WriteData[7]	Byte	1035.0	16#0	16#38
WriteData[8]	Byte	1036.0	16#0	16#00

The write task is started by the "I_b_StartWrite" input at FB5128.

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	TRUE
"NumberTags"	%MW6	DE...	3	3
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	3	

Initial state before start of write task
StartWrite = False
NumberTags = 0
WriteValid = depending on previous state
TagPresent = False
TaskActive = False
TaskFinish = True
NumberTags_reached = depending on previous state
FrameLength = depending on previous state
WriteCounter = depending on previous state

The write task starts as soon as "StartWrite" is set to True

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	TRUE	TRUE
"NumberTags"	%MW6	DE...	3	3
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	TRUE	
"TagPresent"	%M0.7	Bool	TRUE	
"TaskActive"	%M0.4	Bool	TRUE	
"TaskFinish"	%M0.5	Bool	FALSE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	16	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	3	

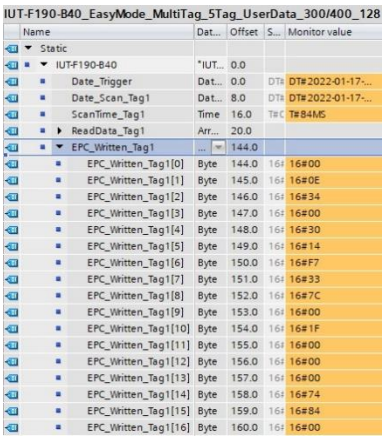
Write task active; 3 data carrier have been written successfully
StartWrite = True
NumberTags = 3
WriteValid = True
TagPresent = True
TaskActive = True
TaskFinish = False
NumberTags_reached = True
FrameLength = 16 (depending on the length of the UII/EPC information)
WriteCounter = 3

If the first data carrier is written after the start of task execution, the "WriteValid" output changes to True. As soon as another data carrier has been written, the "WriteValid" output initially changes to False for 50ms and then back to True. Each positive edge at the "WriteValid" output signals successful write access to a new data carrier. The "WriteCounter" output counts the positive edges at the "WriteValid" output.

Name	Addr...	Dis...	Monitor...	Mod...
"StartRead"	%M0.0	Bool	FALSE	
"StartWrite"	%M0.1	Bool	FALSE	FALSE
"NumberTags"	%MW6	DE...	3	3
"ReadValid"	%M0.2	Bool	FALSE	
"WriteValid"	%M0.3	Bool	FALSE	
"TagPresent"	%M0.7	Bool	FALSE	
"TaskActive"	%M0.4	Bool	FALSE	
"TaskFinish"	%M0.5	Bool	TRUE	
"NumberTags_reached"	%M8.0	Bool	TRUE	
"Error"	%M0.6	Bool	FALSE	
"FrameLength"	%MB1	DEC	0	
"ReadCounter"	%MW2	DEC	0	
"WriteCounter"	%MW4	DEC	3	

Write task finished
StartWrite = False
NumberTags = 3
WriteValid = False
TagPresent = False
TaskActive = False
TaskFinish = True
NumberTags_reached = True
FrameLength = 0
WriteCounter = 3 (depending on the number of previously programmed data carriers)

Within the data block "IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400" the UII/EPC information of the successfully described tags are located in the structures "EPC_Written_Tag1/2/3".



IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128				
Name	Dat...	Offset	S...	Monitor value
Static				
IUT-F190-B40	*IUT...	0.0		
Date_Trigger	Dat...	0.0	DT#	DT#2022-01-17-...
Date_Scan_Tag1	Dat...	8.0	DT#	DT#2022-01-17-...
ScanTime_Tag1	Time	16.0	T#C	T#84MS
ReadData_Tag1	Arr...	20.0		
EPC_Written_Tag1	...	144.0		
EPC_Written_Tag1[0]	Byte	144.0	16#	16#00
EPC_Written_Tag1[1]	Byte	145.0	16#	16#0E
EPC_Written_Tag1[2]	Byte	146.0	16#	16#34
EPC_Written_Tag1[3]	Byte	147.0	16#	16#00
EPC_Written_Tag1[4]	Byte	148.0	16#	16#30
EPC_Written_Tag1[5]	Byte	149.0	16#	16#14
EPC_Written_Tag1[6]	Byte	150.0	16#	16#F7
EPC_Written_Tag1[7]	Byte	151.0	16#	16#33
EPC_Written_Tag1[8]	Byte	152.0	16#	16#7C
EPC_Written_Tag1[9]	Byte	153.0	16#	16#00
EPC_Written_Tag1[10]	Byte	154.0	16#	16#1F
EPC_Written_Tag1[11]	Byte	155.0	16#	16#00
EPC_Written_Tag1[12]	Byte	156.0	16#	16#00
EPC_Written_Tag1[13]	Byte	157.0	16#	16#00
EPC_Written_Tag1[14]	Byte	158.0	16#	16#74
EPC_Written_Tag1[15]	Byte	159.0	16#	16#84
EPC_Written_Tag1[16]	Byte	160.0	16#	16#00

Data carrier 1: EPC_Written_Tag1

ReadData[0...1]: Length UII/EPC Information
Length 2 Byte; UII/EPC-Information = PC-Word + UII/EPC-Code; 16#000E = 14 Byte; 2 Byte PC-Word + 12 Byte UII/EPC-Code

ReadData[2…3]: PC-Word
Length 2 bytes; PC-Word contains additional information (e.g. length) about the UII/EPC code; does not belong to the actual UII/EPC code; 16#3400 or 16#3000 is the PC-Word for a 12 byte long UII/EPC code

ReadData[4…15]: UII/EPC-Code
Length depends on the programming of the data carrier; length can be changed by reprogramming; length always multiple of 2 bytes; the UII/EPC code of all data carriers in the detection zone must be unique

The UII/EPC information for the programmed data carrier is located in the EPC_Written_Tag2 data structure and the UII/EPC information for the programmed data carrier 3 is located in the EPC_Written_Tag3 data structure. The structure of the data sets is analogous to data carrier 1.

In addition to the UII/EPC information for each successfully programmed data carrier, system times for data carrier access are also stored within the data block.

IUT-F190-B40_EasyMode_MultiTag_5Tag_UserData_300/400_128				
Name	Dat...	Offset	S...	Monitor value
Static				
IUT-F190-B40	*...	0.0		
Date_Trigger	Dat...	0.0	DT#	DT#2022-01-17-10:37:58.615
Date_Scan_Tag1	Dat...	8.0	DT#	DT#2022-01-17-10:37:58.699
ScanTime_Tag1	Time	16.0	T#C	T#84MS
ReadData_Tag1	Arr...	20.0		
EPC_Written_Tag1	Arr...	144.0		
RSSI_Tag1	Byte	178.0	16#	16#42
TransmissionPower_Ta...	Int	180.0	0	5
Date_Scan_Tag2	Dat...	182.0	DT#	DT#2022-01-17-10:37:58.795
ScanTime_Tag2	Time	190.0	T#C	T#180MS
ReadData_Tag2	Arr...	194.0		
EPC_Written_Tag2	Arr...	318.0		
RSSI_Tag2	Byte	352.0	16#	16#35
TransmissionPower_Ta...	Int	354.0	0	5
Date_Scan_Tag3	Dat...	356.0	DT#	DT#2022-01-17-10:37:59.848
ScanTime_Tag3	Time	364.0	T#C	T#1S_233MS
ReadData_Tag3	Arr...	368.0		
EPC_Written_Tag3	Arr...	492.0		
RSSI_Tag3	Byte	526.0	16#	16#1A
TransmissionPower_Ta...	Int	528.0	0	50
Date_Scan_Tag4	Dat...	530.0	DT#	DT#1990-01-01-00:00:00
ScanTime_Tag4	Time	538.0	T#C	T#0MS
ReadData_Tag4	Arr...	542.0		
EPC_Written_Tag4	Arr...	666.0		
RSSI_Tag4	Byte	700.0	16#	16#00
TransmissionPower_Ta...	Int	702.0	0	0
Date_Scan_Tag5	Dat...	704.0	DT#	DT#1990-01-01-00:00:00
ScanTime_Tag5	Time	712.0	T#C	T#0MS
ReadData_Tag5	Arr...	716.0		
EPC_Written_Tag5	Arr...	840.0		
RSSI_Tag5	Byte	874.0	16#	16#00
TransmissionPower_Ta...	Int	876.0	0	0
Date_Scan_LastTag	Dat...	878.0	DT#	DT#2022-01-17-10:37:59.848
ScanTime_LastTag	Time	886.0	T#C	T#1S_233MS
ReadData_LastTag	Arr...	890.0		
EPC_Written_LastTag	Arr...	101...		
RSSI_LastTag	Byte	104...	16#	16#1A
TransmissionPower_La...	Int	105...	0	50
WriteData	Arr...	105...		
ErrorData	Arr...	117...		
Date_Error	Dat...	120...	DT#	DT#1990-01-01-00:00:00

Date_Trigger → Local system time (date) of the PLC at the time of start write task
DT#2022-01-17-10:37:58.615

Date_Scan_Tag1 → local system time (date) of the PLC at the time of write access to data carrier 1
DT#2022-01-17-10:37:58.699

ScanTime_Tag1 → Write time for data carrier 1; difference of "Date_Trigger" and "Date_Scan_Tag1".
T#84ms

RSSI_Tag1 → RSSI value for access data carrier 1 → 16#42 (66)

TransmissionPower_Tag1 → transmission power level for access data carrier 1 → 5 (transmission power level 5mW)

Date_Scan_Tag2 → local system time (date) of the PLC at the time of write access to data carrier 2
DT#2022-01-17-10:37:58.795

ScanTime_Tag2 → Write time for data carrier 2; difference of "Date_Trigger" and "Date_Scan_Tag2".
T#180ms

RSSI_Tag2 → RSSI value for access data carrier 2 → 16#35 (53)

TransmissionPower_Tag2 → transmission power level for access data carrier 2 → 5 (transmission power level 5mW)

9. Easy-Mode – structure process data

The process data fields are used to transfer the process data between the IUT-F190-B40-2V1D RFID station and a PLC. There is a process data field for input data, i.e. from the direction of the station to the controller, and a process data field for output data, i.e. from the direction of the controller to the RFID station. Both process data fields have a fixed length of max. 256 bytes. This length is constant and is permanently set in the hardware configuration of the PLC.

The following telegram lengths are available for the integration of the Easy Mode:

Easy Mode 32 Byte in/out
Easy Mode 64 Byte in/out
Easy Mode 128 Byte in/out
Easy Mode 256 Byte in/out

Within the telegram 4 bytes are used for control information. The telegram length minus the 4 bytes of control information can thus be used for the user data.

The following table shows the structure of the process data field for the output data:

Byte	Content							
0	0	0	0	0	0	0	Start Write	Start Read
1	Unused							
2	Unused							
3	Unused							
4	Write Data							
5	Write Data							
6	Write Data							
….	Write Data							
255	Write Data							

The "Start Read" bit controls the execution of a read task. The read task is started as soon as the bit is set. The "Start Write" bit is used to control a write task. This starts as soon as the "Start Write" bit is set.
A read task or a write task is executed as long as the associated start bit is set. The task can only be aborted by resetting the start bit.

The parameters required for data carrier access such as "Memory area", "Number of bytes" and "Start address" must be set beforehand in the GSDML file. A change during system operation is only possible by re-transferring the hardware configuration to the PLC. The parameters should therefore be set appropriately during initial commissioning.

Within the GSDML parameter "Read Task" an "Autostart" function can be activated. If the "Autostart" function is activated, no output data must be sent. The RFID station performs a permanent read access. The memory area to be read by the read access is defined by the parameter setting in the GSDML file. When using the "Autostart" function, the "Start Read" and "Start Write" bits have no relevance.

The following table shows the structure of the process data field for the input data when using the "Long Form" data format:

Byte	Content							
0	Input 2	Input 1	0	TagPresent	Error	Active	Write Valid	Read Valid
1	Length Data							
2	RSSI							
3	Transmission Power (dBm)							
4	Length UII/EPC Information (High Byte)							
5	Length UII/EPC Information (Low Byte)							
6	PC Word (High Byte)							

7	PC Word (Low Byte)
8	UII/EPC Byte 1
9	UII/EPC Byte 2
…	…
…	UII/EPC Byte X
…	Length Information (High Byte)
…	Length Information (Low Byte)
…	Information Byte 1
…	Information Byte 2
…	…
…	Information Byte Y
…	16#00
255	16#00

As soon as a read or write task is started and executed, this is indicated by the "Active" bit. This bit remains set for the complete period of the task execution. The "Active" bit is only reset when the read or write task is canceled.

If a read task is active, the "Read Valid" bit is set when the data carrier is in the detection range and the data has been read. The bit remains set for the duration of the data carrier's stay in the detection range. This bit is only reset when the data carrier leaves the detection range.

The "Write Valid" bit behaves identically. It is set when the data carrier is in the detection zone and the data has been successfully written to the data carrier. The bit is reset as soon as the data carrier leaves the detection zone again.

The presence of at least one tag in the detection zone is signaled via the "TagPresent" bit. If no tag is present in the detection zone, this bit is reset.

When several tags are identified simultaneously, successful read or write access is indicated by a positive edge change (0 → 1) at the "Read Valid" or "Write Valid" bits. If a new tag enters the detection zone, the "Read Valid" or "Write Valid" bit is initially reset for 50ms. The bit is then set again, thus signaling successful read access or write access.

The signal state of the optionally connectable trigger sensors is indicated by the "Input 1" or "Input 2" bit. For this purpose, the function of the trigger must be set accordingly via the GSDML file.

The byte "Length data" contains the length of the read data in bytes. The length depends on the size of the UII/EPC and the number of bytes set in the GSDML file. Starting from byte 4, the number of transmitted user data is specified for "Length data".

The RSSI value for data carrier access is transmitted via the "RSSI" byte. The RSSI has a value between 0 and 100. The greater the value, the better the signal quality of the data transmission between the data carrier and the RFID station.

With the RFID station, the use of several power levels can be set one after the other (transmission power ramp). The "Transmission Power (dBm)" byte specifies the value of the transmission power in dBm with which access to the data carrier could be successfully performed. The transmission power is specified in dBm and not in mW, since this value can be represented by a byte.

For an unambiguous assignment of the transmitted data to a transponder, the UII/EPC information must be specified. The length of the EPC information is first transmitted in bytes 4 and 5, since the UII/EPC of data carriers can have a different length. This is followed by the PC word in bytes 6 and 7. Starting from byte 8, the process input data field contains the UII/EPC of the read data carrier.

In the case of a read access to the TID or the user data, the UII/EPC is followed by an indication of the length of the read TID or user data. This is then followed by the TID or the read-in area of the user data.

An error may occur during the execution of a read or write task. The error status is indicated via the "Error" bit. If an error condition exists, additional error information is transmitted via the input data field. This information contains an error code and an error description in plain text (ASCII characters). A check of the error description provides an indication of the cause of the error condition.

The following table shows the structure of the process data field of the input data in the error state:

Byte	Content							
0	0	0	0	0	Error	Active	Write Valid	Read Valid
1	Length Data							
2	Unused							
3	Unused							
4	Error Code (HEX)							
5	Error String							
6	Error String							
…	Error String							
255	Error String							

Trouble shooting

Index	Description	Solution
1	Profinet communication does not work	1. Check whether the setting of the Profinet name in the device and in the PLC are identical 2. check if the rotary switch "Mode" on the back of the device is in position "1"
2	All data within the DBs for the Easy Mode are 16#00	1. Control of a read task by StartRead → check if input data have a change. 2. Check whether the input parameters "I_w_Input_Address" and "I_w_Output_ Address" have the same address as the communication module from the hardware configuration.
3	Function block does not react to the control of the inputs	1. Check whether the Autostart function has been activated in the hardware configuration when using the Autostart function, a read job is automatically started by the station (blue LED on the station is on) and the station does not react to the process output data of the controller 2. Deactivation of the Autostart function 3. Check whether a communication module for the Easy Mode has been parameterized in the hardware configuration → if "Expert Mode" is selected, a different protocol is used and the function block for the Easy Mode does not work
4	The EPC information has a different length than described in the documentation	1. An EPC code can have a different length and depends on the delivery status of the transponder. 2. In the majority the EPC has a length of 12 bytes 3. The length of the EPC information results from the length of the EPC plus the PC word (2 bytes).
5	Writing the EPC is not possible	1. Write access to the EPC is not possible when using Easy Mode → change to Expert Mode required
6	ReadCounter or WriteCounter are constantly increased when the presence of a data carrier remains unchanged (standstill)	1. Counters for successful reading or writing are incremented for each access to a data carrier 2. Data carrier is constantly re-read → unstable communication between RFID station and data carrier 3. Increase of parameter E5 (tag loss smoothing). As a result, the logoff of the tag from the RFID station is delayed.
7	An error message with the status value 16#0A appears.	1. Check whether "Long Form" or "Short Form" data format is activated (Input Representation parameter in the GSDML). 2. Long form: at least 2 data carriers with the same UII/EPC information are not permitted in the detection zone; only data carriers with different UII/EPC information are permitted 3. Short form: at least 2 data carriers are not allowed in the detection zone; only one data carrier can be in the detection zone.
8	An error message with the status value 16#04 appears when a data carrier enters the detection zone.	1. Access to the parameterized data area is not possible 2. Either the data carrier does not have a memory bank for the user data or the amount of data to be read in is larger than the available memory within the data carrier
9	Read task is active (blue LED on), but the data carrier can only be read at a small distance	1. Check the mounting requirements of the data carrier (on metal or on plastic or non-conductive substrate). 2. If there is an "-M-" in the P+F specific designation (e.g. IUC76-F157-M-FRx), the data carrier is optimized for mounting on metal. The range is optimal with appropriate mounting 3. If there is no "-M-" in the P+F specific designation (e.g. IUC77-25L110), the mounting can be done on non-conductive substrate 4. Increase of the transmitting power by the parameter PT in the GSDML file
10	If a write job is active, the orange LED lights up only briefly on successful write access	1. Correct. When a write access is successful, the orange LED lights up only briefly. Afterwards, the LED is off until the next successful write access is made to the same or another data carrier 2. When a read request is executed, the orange LED lights up for as long as a data carrier remains in the detection zone and can be read.
11	Temporary change UHF parameters	1. The device parameters for setting the UHF antenna are carried out by parameterizing the GSDML in the PLC. After device start-up or voltage reset, the parameters are transferred from the PLC to the device and updated if necessary. 2. 2. Temporary change of the UHF parameters is possible via the integrated web server. These settings are then active until the next power reset. 3. 3. Thus, for example, the transmitting power can be changed during initial commissioning without having to reload the change in the hardware configuration into the PLC. If the suitable setting is found, this value is then set in the GSDML and the hardware configuration is updated.
12	Several data carriers are identified at the same time	1. Reading from several data carriers is possible, as it is a radio system. 2. Parameterization of a ramp function for the transmit power (parameter PT) with ascending power values as well as increase of the number of access attempts (parameter TA) 3. Use of the "IUT-F190-B40_EasyMode_Basic_1Tag" function block. This aborts the read task as soon as a data carrier has been read successfully.