

# Access Level

Access Level functionality is different depending on the emDRIVE firmware version.

## Up to V1.14.x

Access Level is emDrive functionality that is used to limit read and write permissions for objects depending on user granted access.

Access Level functionality is available from firmware V1.11.0 and newer.

Each Parameter has attribute ([Object's Attributes](#)) for Read and Write access level. To be able to read or write to object Inverter must be unlocked to required level.

## Access Levels

Level	Name	Description
1	End User	Object is available to End User even when inverter is locked with "Customer Key"
2	Customer	Object is available by default. Can be locked with "Customer Key"
3	Production	Object is available only in production to write production related and calibration objects (only Emsiso)
4	Development	Object is available only during development (only Emsiso)

Devices shipped from manufacturer are unlocked to "Customer" level. Customer has the option to lock the device and prevent additional changing of object values from 3rd parties.

## Access Level CANopen Objects

Objects at index **0x2010** are used for Access Level functionality

Sub - index	Name	Description
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0x01	Access_Level__Current	Shows current access level that inverter is set to, objects with equal or lower access level can be accessed.
0x02	Access_Level_Key_input	Write your key to unlock the device, depending on the key, specific level will be unlocked.
0x03	Access_Level_Customer_Key	Writing value to this object will lock the device to "End User" (after reset). The same key must be used to unlock the device to "Customer" level. Remove locking by writing value "0".

## Locking emDrive

Lock the emDrive inverter is intended to be used by Customer to prevent End User to make any changes of configuration. Objects with End User access level are mostly Read Only objects or only Read Access Level is set to End User.

To lock the emDrive follow the steps

1. Chose the secret key that will be used to lock and unlock the inverter. Value can be from 1 - 4294967295 (32-bit unsigned integer).
2. Write chosen key to object "Access\_Level\_Customer\_Key"
3. Save Device Parameters
4. Reset the device
5. After power up, device will have Current Access Level at 1 - End User. Check by reading object "Access\_Level\_\_Current"

## Unlocking emDrive

If the emDrive is locked with Customer key and we want to change parameters that require Access Level 2, we have to unlock the emDrive after each power on. To verify that emDrive is locked, read object "Access\_Level\_\_Current" which should read "1".

To unlock the emDrive follow the steps

1. Write correct Customer Key to object "Access\_Level\_Key\_input".
2. Read object "Access\_Level\_\_Current" which should change to "2" if the key was correct.

At this point Customer Level object can be read/written. But if the emDrive is reset, it will return to locked End User Access Level. To permanently unlock the emDrive and remove the key follow additional steps are needed.

1. Write correct Customer Key to object "Access\_Level\_Key\_input".
2. Read object "Access\_Level\_\_Current" which should change to "2" if the key was correct.
3. Write value "0" to "Access\_Level\_Customer\_Key" to remove the key.
4. Save Device Parameters
5. Reset the device
6. After power up, device will have Current Access Level at 2 - Customer. Check by reading object "Access\_Level\_\_Current"

## V1.15.0+

Access Level is a feature of emDrive that controls read and write permissions for various objects based on the user's granted access.

Access Level functionality is available from firmware V1.11.0 and newer.

Each parameter in emDrive has attributes ([Object's Attributes](#)) that define the required Read and Write Access Level. To interact with these parameters, the inverter must be unlocked to the corresponding access level. Higher access levels grant access to a greater number of objects.

## Access Levels

Level	Name	Description
0	End User	Available to the End User, even when the inverter is locked with the "Service Key".
1	Service	Available to Service personnel. Can be locked using the "Service Key".
2	Admin	Available by default. Can be locked using the "Admin Key".
3	Production	Accessible only in production for writing production-related and calibration objects (Emsiso).
4	Development	Accessible only during development (Emsiso).

Devices shipped from the manufacturer are unlocked to the "Admin" level. The customer has the option to lock the device, preventing third parties from changing object values.

## Access Level CANopen Objects

The following objects at index **0x2010** are used to control Access Level functionality:

Sub - index	Name	Description
0x01	Access_Level__Current	Displays the current access level of the inverter. Objects with equal or lower levels can be accessed.
0x02	Access_Level__Key_input	Enter a key to unlock the device. The entered key will unlock a specific level.
0x03	Access_Level__Admin_Key	Write a value to lock the device to "Admin" level after reset. Use the same key to unlock. Write "0" to remove locking.
0x04	Access_Level__Service_Key	Write a value to lock the device to "Service" level after reset. Use the same key to unlock. Write "0" to remove locking.

## Locking emDrive

Locking the emDrive inverter is typically performed by the Admin or Service personnel to prevent the End User from making configuration changes. Objects accessible to the End User are usually read-only or have read-only permissions set.

To lock the emDrive follow the steps

1. Choose a secret key (an integer between 1 and 4,294,967,295).
2. Write the selected key to either the "Access\_Level\_\_Service\_Key" or "Access\_Level\_\_Admin\_Key" depending on the desired lock level.
3. Save the device parameters.
4. Reset the device
5. After powering up, the device will be locked one level below the set key. Verify this by reading the "Access\_Level\_\_Current" object.

## Unlocking emDrive

To modify parameters that require higher access levels (such as Admin or Service), the emDrive must be unlocked after every power cycle. To confirm that the emDrive is locked, check the "Access\_Level\_\_Current" object, which should display the correct locked level.

To unlock the emDrive:

1. Write the correct key to the "Access\_Level\_\_Key\_input" object.
2. Read the "Access\_Level\_\_Current" object to verify the change to the corresponding access level.

Once unlocked, objects at the unlocked level can be accessed. However, if the emDrive is reset, it will revert to the locked state. To permanently unlock the emDrive, follow these additional steps:

1. Write the correct key to the "Access\_Level\_\_Key\_input" object.
2. Verify that the access level has changed by reading "Access\_Level\_\_Current".
3. Write the value "0" to "Access\_Level\_\_Admin\_Key" or "Access\_Level\_\_Service\_Key" to remove the respective key.
4. Save the device parameters.
5. Reset the device.

After the reset, the device will no longer require the key to access the previous locked level. You can verify this by checking the "Access\_Level\_\_Current" object.

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