

# DFS130 - M7 - DST Behaviour

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Author M7 Project Team  
Reviewer M7 Project Manager

## **Deutsche Börse AG**

### **Mailing address**

Mergenthaleralle 61  
65760 Eschborn

### **Web**

[www.deutsche-boerse.de](http://www.deutsche-boerse.de)

### **Chairman of the Supervisory Board**

Martin Jetter

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Officer)

German stock corporation registered  
in

Frankfurt/Main

HRB No. 32232

Local court: Frankfurt/Main

# 1 Introduction

This document contains the functional impact of DST (Daylight Saving Time or summer time) changes on the M7 Trading and M7 Reporting Engine Modules.

## 1.1 About

DST (Daylight Saving Time or summer time) is a practice which has been developed to utilise daylight in order to save energy. It has been observed that the sun rises and sets later in the spring and summer periods, than in the autumn and winter periods. As a result, some regions move their local clocks forward by a defined period of time (usually an hour) to “summer time” every March to benefit from the later sunrise and sunset times during the spring/summer period. In October, the clocks are switched back by the same duration to the local, “winter time”.

## 2 Basic System Behaviour during DST Clock Changes

### 2.1 General

Due to DST changes, the day is shortened (in March), or prolonged (in October) by one hour in the CET/CEST and GMT/BST time zones. This has several implications in terms of the M7 Trading and Reporting Engine Modules, as described in the following chapters.

### 2.2 Shorter Hour Clock Change (23-hour day, Winter > Summer)

During the shorter hour clock change in March, the clocks are moved forwards by one hour:

- At 02:00 CET, the clocks are moved forwards to 03:00 CEST, resulting in a missing hour "02".
- At 01:00 GMT, the clocks are moved forwards to 02:00 BST, resulting in a missing hour "01".

### 2.3 Longer Hour Clock Change (25-hour day, Summer > Winter)

During the longer hour clock change in October, the clocks are moved backwards by one hour:

- At 03:00 CEST, the clocks are moved backwards to 02:00 CET, resulting in an additional, second hour "02".
- At 02:00 BST, the clocks are moved backwards to 01:00 GMT, resulting in an additional, second hour "01".

## 3 Product Type: Energy

### 3.1 General

The following Product Attributes determine the behaviour of the contracts during DST-switch-days:

1. Delivery Period
2. Gap between Contracts (1)
3. Reference Start of Delivery

In case the length of the Delivery Period and the Gap sum up to a natural multiple of a day (2), the Delivery Start for each contract is calculated by adding days to the Reference Start of Delivery. Thus, DST long or short clock changes do not have an impact on the generation of these contracts. This behaviour is applicable to Base and Peak products for example.

In case the Delivery Period and Gap do not sum up to a natural multiple of a day, the Delivery Start for each contract is calculated by adding the length of the Delivery Period and Gap, exactly as these have been entered, to the Reference Start of Delivery. Thus, DST long and short changes may have an impact on contract names and the number of contracts generated. This behaviour is applicable to bi-hourly, 4-hourly, quarterly and half-hourly products for example.

### 3.2 Number of Contracts

On a short clock change day in March, there may be one or more contracts less than on a usual (non-DST) day. Likewise, on a long clock change in October, there may be one or more additional contracts for the extra hour, than on a usual (non-DST) day.

Whether there will be any missing/additional contracts and their actual number will depend on:

1. The length of the delivery period of the contract (3):
  - For an hourly product, there will be one missing/additional contract for the missing/extra hour;
  - For a quarterly product, there will be four missing/additional contracts for the missing/extra hour.
  - For a half-hourly product, there will be two missing/additional contracts for the missing/extra hour.
  - For Peak and Base products, there will not be any missing/additional contracts for the missing/extra hour.
2. Gap between Contracts:
  - The length of the gap may impact the number of missing/additional contracts.

### 3.3 Contract Names

The additional or missing contracts caused by the clock changes may be identifiable by the contract name. This will only be the case if an hour indicator was included in the contract name template during the product setup in the WebGUI. During the long clock change, M7 will add the letter "A" to the hour before the switch and the letter "B" to the hour after the switch:

- CEST -> CET switch – resulting in hours "02A" and "02B".
- BST -> GMT switch – resulting in hours "01A" and "01B".

If the contract name template does not contain any hour indicator, such identification from the contract name will not be possible.

### 3.4 Examples

3.4.1 UK Half-Hour Contracts (GB\_Half\_Hour\_Power)

3.4.1.1 General

If a 30 minute Product is defined with the product attributes in the following table, the system would generate contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	Europe / London
Reference Start of Delivery (CET)	2018-01-01 01:00
Delivery Period	30min
Gaps	0s
Short Name	HH <StartOfDelivery_Year (2digits)> <StartOfDelivery_Month> <StartOfDelivery_Day> - <Index_TwoDigit>

3.4.1.2 23-hour day / March / GMT > BST / Short Clock Change

The 30min contract starting at 00:30 GMT would end at 02:00 BST.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-03-25 00:00	2018-03-25 00:30	2018-03-24 23:00	2018-03-24 23:30	HH180324-47	30m
2018-03-25 00:30	2018-03-25 01:00	2018-03-24 23:30	2018-03-25 00:00	HH180324-48	30m
2018-03-25 01:00	2018-03-25 01:30	2018-03-25 00:00	2018-03-25 00:30	HH180325-01	30m
2018-03-25 01:30	2018-03-25 03:00	2018-03-25 00:30	2018-03-25 02:00	HH180325-02	30m
2018-03-25 03:00	2018-03-25 03:30	2018-03-25 02:00	2018-03-25 02:30	HH180325-03	30m
2018-03-25 03:30	2018-03-25 04:00	2018-03-25 02:30	2018-03-25 03:00	HH180325-04	30m
...	...	...	...	...	
2018-03-26 00:00	2018-03-26 00:30	2018-03-25 23:00	2018-03-25 23:30	HH180325-45	30m
2018-03-26 00:30	2018-03-26 01:00	2018-03-25 23:30	2018-03-26 00:00	HH180325-46	30m

3.4.1.3 25-hour day / October / BST > GMT / Long Clock Change

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-10-28 00:00	2018-10-28 00:30	2018-10-27 23:00	2018-10-27 23:30	HH181027-47	30m
2018-10-28 00:30	2018-10-28 01:00	2018-10-27 23:30	2018-10-28 00:00	HH181027-48	30m
2018-10-28 01:00	2018-10-28 01:30	2018-10-28 00:00	2018-10-28 00:30	HH181028-01	30m
2018-10-28 01:30	2018-10-28 02:00A	2018-10-28 00:30	2018-10-28 01:00A	HH181028-02	30m
2018-10-28 02:00A	2018-10-28 02:30A	2018-10-28 01:00A	2018-10-28 01:30A	HH181028-03	30m
2018-10-28 02:30A	2018-10-28 02:00B	2018-10-28 01:30A	2018-10-28 01:00B	HH181028-04	30m
2018-10-28 02:00B	2018-10-28 02:30B	2018-10-28 01:00B	2018-10-28 01:30B	HH181028-05	30m
2018-10-28 02:30B	2018-10-28 03:00	2018-10-28 01:30B	2018-10-28 02:00	HH181028-06	30m
2018-10-28 03:00	2018-10-28 03:30	2018-10-28 02:00	2018-10-28 02:30	HH181028-07	30m
2018-10-28 03:30	2018-10-28 04:00	2018-10-28 02:30	2018-10-28 03:00	HH181028-08	30m
...	...	...	...	...	
2018-10-29 00:00	2018-10-29 00:30	2018-10-28 23:00	2018-10-28 23:30	HH181028-49	30m
2018-10-29 00:30	2018-10-29 01:00	2018-10-28 23:30	2018-10-29 00:00	HH181028-50	30m

3.4.2 CET Hourly Contracts (60 Min Power)

3.4.2.1 General

If a Product is defined with the product attributes in the following table, the system would generate contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	CET / CEST
Reference Start of Delivery (CET)	2018-01-01 00:00
Delivery Period	60min

Product Attribute	Value
Gaps	0s
Short Name	<StartOfDelivery_TomorrowIndicator> <StartOfDelivery_Hour> - <EndOfDelivery_TomorrowIndicator> <EndOfDelivery_Hour>

3.4.2.2 23-hour day / March / CET > CEST / Short Clock Change

The hour 01 ends at 03.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Short Name	Duration
2018-03-24 23:00	2018-03-25 00:00	23-00	1h
2018-03-25 00:00	2018-03-25 01:00	00-01	1h
2018-03-25 01:00	2018-03-25 03:00	01-03	1h
2018-03-25 03:00	2018-03-25 04:00	03-04	1h
2018-03-25 04:00	2018-03-25 05:00	04-05	1h

3.4.2.3 25-hour day / October / CEST > CET / Long Clock Change

The hour from 02-03 exists twice (A+B).

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Short Name	Duration
2018-10-27 23:00	2018-10-28 00:00	23-00	1h
2018-10-28 00:00	2018-10-28 01:00	00-01	1h
2018-10-28 01:00	2018-10-28 02:00A	01-02A	1h
2018-10-28 02:00A	2018-10-28 02:00B	02A-02B	1h
2018-10-28 02:00B	2018-10-28 03:00	02B-03	1h
2018-10-28 03:00	2018-10-28 04:00	03-04	1h
2018-10-28 04:00	2018-10-28 05:00	04-05	1h

3.4.3 UK Hourly Contracts (GB\_Hour\_Power)

3.4.3.1 General

If a Product is defined with the product attributes in the following table, the system would generate contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	Europe / London

Product Attribute	Value
Reference Start of Delivery (CET)	2018-01-01 00:00
Delivery Period	60min
Gaps	0s
Short Name	1H <EndOfDelivery_Year (2 digits)> <EndOfDelivery_Month> <EndOfDelivery_Day> - <StartOfDelivery_Hour>

3.4.3.2 23-hour day / March / CET > CEST / Short Clock Change

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-03-24 22:00	2018-03-24 23:00	2018-03-24 21:00	2018-03-24 22:00	1H180324-21	1h
2018-03-24 23:00	2018-03-25 00:00	2018-03-24 22:00	2018-03-24 23:00	1H180324-22	1h
2018-03-25 00:00	2018-03-25 01:00	2018-03-24 23:00	2018-03-25 00:00	1H180325-23	1h
2018-03-25 01:00	2018-03-25 03:00	2018-03-25 00:00	2018-03-25 02:00	1H180325-00	1h
2018-03-25 03:00	2018-03-25 04:00	2018-03-25 02:00	2018-03-25 03:00	1H180325-02	1h
2018-03-25 04:00	2018-03-25 05:00	2018-03-25 03:00	2018-03-25 04:00	1H180325-03	1h

3.4.3.3 25-hour day / October / CEST > CET / Long Clock Change

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-10-27 22:00	2018-10-27 23:00	2018-10-27 21:00	2018-10-27 22:00	1H1027-21	1h
2018-10-27 23:00	2018-10-28 00:00	2018-10-27 22:00	2018-10-27 23:00	1H1027-22	1h
2018-10-28 00:00	2018-10-28 01:00	2018-10-27 23:00	2018-10-28 00:00	1H1028-23	1h
2018-10-28 01:00	2018-10-28 02:00A	2018-10-28 00:00	2018-10-28 01:00A	1H1028-00	1h
2018-10-28 02:00A	2018-10-28 02:00B	2018-10-28 01:00A	2018-10-28 01:00B	1H1028-01A	1h
2018-10-28 02:00B	2018-10-28 03:00	2018-10-28 01:00B	2018-10-28 02:00	1H1028-01B	1h
2018-10-28 03:00	2018-10-28 04:00	2018-10-28 02:00	2018-10-28 03:00	1H1028-02	1h



### 3.4.4 CET Base Contracts (Continuous\_Power\_Base)

#### 3.4.4.1 General

If a Product is defined with the product attributes in the following table, the system would generate contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	CET / CEST
Reference Start of Delivery (CET)	2018-01-01 00:00
Delivery Period	24h
Gaps	0s
Short Name	EPEX_ <StartOfDelivery_TomorrowIndicator> BASE

#### 3.4.4.2 23-hour day / March / CET > CEST / Short Clock Change

The Base contract for the 23-hour day will contain one hour less than usual.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Short Name	Duration
2018-03-24 00:00	2018-03-25 00:00	EPEX_BASE	24h
2018-03-25 00:00	2018-03-26 00:00	EPEX_BASE	23h
2018-03-26 00:00	2018-03-27 00:00	EPEX_BASE	24h

#### 3.4.4.3 25-hour day / October / CEST > CET / Long Clock Change

The Base contract for the 25-hour day will contain one hour more than usual.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Short Name	Duration
2018-10-27 00:00	2018-10-28 00:00	EPEX_BASE	24h
2018-10-28 00:00	2018-10-29 00:00	EPEX_BASE	25h
2018-10-29 00:00	2018-10-30 00:00	EPEX_BASE	24h

### 3.4.5 UK 2-hour Product

#### 3.4.5.1 General

For Base contracts, the behaviour for contracts spanning over the DST switch hours is that on 25-hour days, their Delivery Periods are **extended** by one hour, whilst on 23-hour days, their Delivery Periods are **shortened** by one hour.

Therefore, if a Product is defined with the attributes in the following table, the system would generate the contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	Europe / London
Reference Start of Delivery (CET)	2018-01-01 00:00
Delivery Period	2h
Gaps	0s
Short Name	2H <EndOfDelivery_Year (2 digits)> <EndOfDelivery_Month> <EndOfDelivery_Day> - <Index_OneDigit_AB>

3.4.5.2 23-hour day / March / CET > CEST / Short Clock Change

The two-hour contract from 01-03 is replaced by a contract from 02-03 with only one delivery hour.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-03-24 00:00	2018-03-24 02:00	2018-03-23 23:00	2018-03-24 01:00	2H180324_1A	2h
2018-03-24 02:00	2018-03-24 04:00	2018-03-24 01:00	2018-03-24 03:00	2H180324_1B	2h
2018-03-24 04:00	2018-03-24 06:00	2018-03-24 03:00	2018-03-24 05:00	2H180324_2A	2h
2018-03-24 06:00	2018-03-24 08:00	2018-03-24 05:00	2018-03-24 07:00	2H180324_2B	2h
...					
2018-03-25 00:00	2018-03-25 03:00	2018-03-24 23:00	2018-03-25 02:00	2H180325_1A	2h
2018-03-25 03:00	2018-03-25 04:00	2018-03-25 02:00	2018-03-25 03:00	2H180325_1B	1h
2018-03-25 04:00	2018-03-25 06:00	2018-03-25 03:00	2018-03-25 05:00	2H180325_2A	2h

3.4.5.3 25-hour day / October / CEST > CET / Long Clock Change

The two-hour contract from 01-03 contains an additional hour.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-10-27 00:00	2018-10-27 02:00	2018-10-26 23:00	2018-10-27 01:00	2H181027_1A	2h
2018-10-27 02:00	2018-10-27 04:00	2018-10-27 01:00	2018-10-27 03:00	2H181027_1B	2h

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-10-27 04:00	2018-10-27 06:00	2018-10-27 03:00	2018-10-27 05:00	2H181027_2A	2h
...					
2018-10-28 00:00	2018-10-28 02:00A	2018-10-27 23:00	2018-10-28 01:00 A	2H181028_1A	2h
2018-10-28 02:00A	2018-10-28 04:00	2018-10-28 01:00A	2018-10-28 03:00	2H181028_1B	3h
2018-10-28 04:00	2018-10-28 06:00	2018-10-28 03:00	2018-10-28 05:00	2H181028_2A	2h
2018-10-28 06:00	2018-10-28 08:00	2018-10-28 05:00	2018-10-28 07:00	2H181028_1B	2h
2018-10-28 08:00	2018-10-28 10:00	2018-10-28 07:00	2018-10-28 09:00	2H181028_3A	2h

### 3.4.6 UK 4-hour Product

#### 3.4.6.1 General

For Base contracts, the behaviour for contracts spanning over the DST switch hours is that on 25-hour days, their Delivery Periods are **extended** by one hour, whilst on 23-hour days, their Delivery Periods are **shortened** by one hour.

If a Product is defined with the attributes in the following table, the system would generate the contracts as described in the following two sections for 23- and 25-hour days.

Product Attribute	Value
Time Zone	Europe / London
Reference Start of Delivery (CET)	2018-01-01 00:00
Delivery Period	4h
Gaps	0s
Short Name	4H <EndOfDelivery_Year (2 digits)> <EndOfDelivery_Month> <EndOfDelivery_Day> - <Index_OneDigit>

#### 3.4.6.2 23-hour day / March / CET > CEST / Short Clock Change

The 4-hour contract spanning over the DST switch contains one hour less.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-03-24 00:00	2018-03-24 04:00	2018-03-23 23:00	2018-03-24 03:00	4H180324_1	4h
2018-03-24 04:00	2018-03-24 08:00	2018-03-24 03:00	2018-03-24 07:00	4H180324_2	4h
2018-03-24 08:00	2018-03-24 12:00	2018-03-24 07:00	2018-03-24 11:00	4H180324_3	4h
...					
2018-03-25 00:00	2018-03-25 04:00	2018-03-24 23:00	2018-03-25 03:00	4H180325_1	3h

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-03-25 04:00	2018-03-25 08:00	2018-03-25 03:00	2018-03-25 07:00	4H180325_2	4h
2018-03-25 08:00	2018-03-25 12:00	2018-03-25 07:00	2018-03-25 11:00	4H180325_3	4h

3.4.6.3 25-hour day / October / CEST > CET / Long Clock Change

The 4-hour contract spanning over the DST switch contains an additional hour.

Short Name and Duration per Delivery Periods:

Start CET/CEST	End CET/CEST	Start GMT/BST	End GMT/BST	Short Name	Duration
2018-10-27 00:00	2018-10-27 04:00	2018-10-26 23:00	2018-10-27 03:00	4H181027_1	4h
2018-10-27 04:00	2018-10-27 08:00	2018-10-27 03:00	2018-10-27 07:00	4H181027_2	4h
2018-10-27 08:00	2018-10-27 12:00	2018-10-27 07:00	2018-10-27 11:00	4H181027_3	4h
...					
2018-10-28 00:00	2018-10-28 04:00	2018-10-27 23:00	2018-10-28 03:00	4H181028_1	5h
2018-10-28 04:00	2018-10-28 08:00	2018-10-28 03:00	2018-10-28 07:00	4H181028_2	4h
2018-10-28 08:00	2018-10-28 12:00	2018-10-28 07:00	2018-10-28 11:00	4H181028_3	4h

## 4 Product Type: UDDP

### 4.1 General

As UDDP contracts are based on underlying Energy contracts, the rules for contract generation, the number of contracts, and the contract names of these underlying contracts, are based on the definitions described in section *Product Type: Energy*.

### 4.2 Short Clock Change

User-Defined-Delivery-Product (UDDP) block orders with a Delivery Start and Delivery End containing the clock switch will be shorter, containing less Delivery Units compared to block orders with the same Delivery Start and Delivery End on a usual trading day. Hourly blocks will be exactly one hour and exactly one Delivery Unit shorter, while quarterly blocks will be at most one hour and at most four Delivery Units shorter. The shortening of the delivery interval and the Delivery Units of a quarterly block will depend on the number of contracts missing in the block due to the clock switch.

#### Example:

*An hourly block order for "01-04" is submitted for a product traded in the CET/CEST time zone during the short clock change, will contain the hours "01" and "03" being 2 Delivery Units (2 x 1.0) (It is not possible to create a UDDP starting or ending with "02" (for the CET/CEST time zone) or "01" (for the BST/GMT time zone) on a DST day.). On a non-DST day, the same block would consist of the hours "01", "02" and "03" being 3 Delivery Units (3 x 1.0).*

### 4.3 Long Clock Change

UDDP block orders with a Delivery Start and Delivery End containing the clock switch will be longer compared to block orders with the same Delivery Start and Delivery End on a usual trading day. Hourly blocks will be exactly one hour, and exactly one Delivery Unit longer, whilst quarterly blocks will be at most one hour and at most four Delivery Units longer. The extension of the delivery interval and the Delivery Units of a quarterly block will depend on the number of additional contracts contained in the block due to the clock switch.

#### Example:

*An hourly block order for "01-04" submitted for product traded in CEST/CET time zone during the long clock change will contain the hours "01", "02A", "02B" and "03" being 4 Delivery Units (4 x 1.0).<sup>(4)</sup> On a non-DST day, the same block would consist of the hours "01", "02" and "03" being 3 Delivery Units (3 x 1.0).*

# 5 Product Type Commodities (XBID)

For User-Defined Blocks, please refer to the XBID documentation.

# 6 API

All date/time values in all API messages are in the UTC time zone, and as such are not affected by DST clock changes.

During order submission, maintenance or deletion via the API, the contracts are identified either via the Contract ID or via the Product Name in combination with the Delivery Start and the Delivery End (both in UTC, so that there is no impact from the DST clock changes).

# 7 Reporting Engine

All date/time attributes in all report types are reported in the market time zone and contain a UTC offset.

## 7.0.1 Notes

- 1** *The configured window in between two consecutive contracts.*
- 2** *This includes Peak (Delivery Period + Gap = 8 + 16 hours) and Base (Delivery Period + Gap = 24 + 0 hours) products.*
- 3** *The listed statements are valid under the assumption that the Gap between Contracts is zero.*
- 4** *It is not possible to create a UDDP starting or ending with "02" (for the CET/CEST time zone) or "01" (for the BST/GMT time zone) on a DST day.*