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DDIdentifier(10)	DDEName
205	SC Setpoint Turn On Time
206	SC Setpoint Turn Off Time
656	SC Actual Turn On Time
657	SC Actual Turn Off Time

Version: 1.0

A sequence diagram of a section turn on and turn off cycle is provided in Figure F1.1 "SC Setpoint Turn On/Off Time", "SC Actual Turn On/Off Time" may be defined at Boom level or Section level as per the TC Client capabilities. The first section turn on sequence in this diagram is triggered by position update 1. The following position update 2 did not result in the need for a section state change from on to off and thus did not lead to the transfer of a Setpoint CWS command. The third position update triggers the section turn off sequence.

In this diagram, the duration T2 to T5 defines "SC Setpoint Turn On Time", which is the overall time lapse between the moment the TC sends a turn on section command to the working set and the moment this section is physically turned on and the product is applied. The duration T7 to T10 defined the "SC Setpoint Turn Off Time" which is the overall time lapse between the moment the TC sends a turn off section command to the working set and the moment this section is physically turned off and the product is stopped.

Note that the Turn On and Turn Off times for a section can be different; in this example, the time it takes to turn on a section (T5-T2) is longer than the time it takes to turn off a section (T10-T7). Also visible in this diagram is the acknowledgement of the setpoint condensed work state (Setpoint CWS) command by a return message. This response message and the update to the actual state shall be sent by the TC-SC client not later than T5, when a section state change is accepted by TC Client.

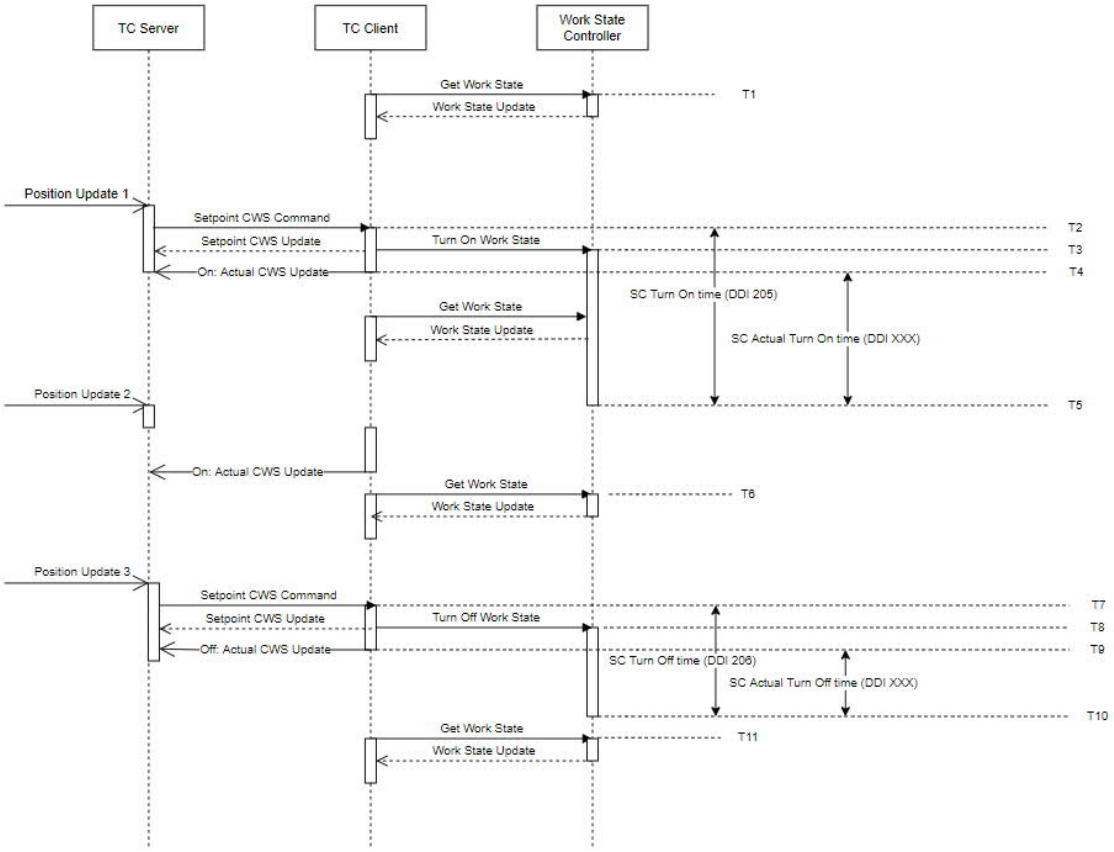
The "SC Actual Turn On/Off time is defined with TC Version 4, to improve the Actual Coverage Map for special use cases.

The duration T4 to T5 defines "SC Actual Turn On time" which is the overall time lapse between the moment the TC client sends the actual Section state and the moment this section is physically turned on and the product is applied. The duration T9 to T10 defines "SC Actual Turn Off Time" which is the overall time lapse between the moment the TC client sends the actual Section state and the moment this section is physically turned off and the product is stopped from being applied.

The TC-SC server has the responsibility to use the SC Setpoint Turn On or SC Setpoint Turn Off time to adjust the reported work state changes. For example, updating coverage map on a display, see also figure F1.2. These Setpoint and Actual values shall be provided by the implement manufacturer if applicable. The usage of " SC Actual Turn On/Off Time" does not eliminate usage of "SC Setpoint Turn On/Off time", it is supporting information for better

DDE Supplement / Attachment

coverage Map based on Actual CWS. SC Actual Turn On/Off Time is mandatory from TC Version 5 onwards.



DDI	DDI Description	Delay time Marker	Ref
205	SC Setpoint Turn On time	T2 to T5	TC V3
206	SC Setpoint Turn Off time	T7 to T10	TC V3
656	SC Actual Turn On time	T4 to T5	TC V4
657	SC Actual Turn Off time	T9 to T10	TC V4

DDE Supplement / Attachment

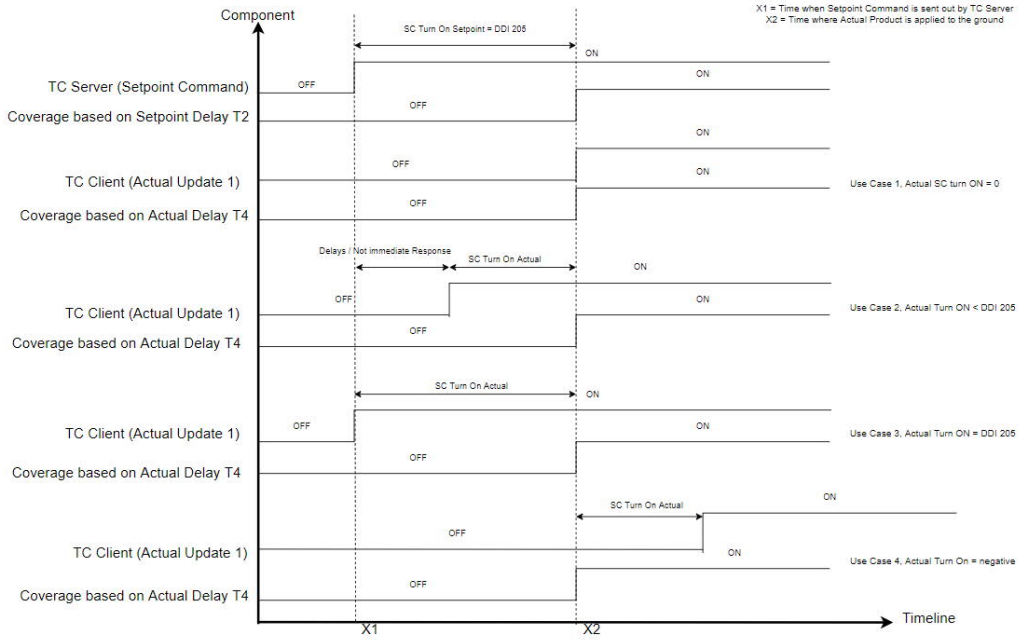


Figure: F1.2

For more information about the usage see the Air Seeder Example on the following pages.

DDE Supplement / Attachment

Example: SC Turn On/Off Time DDIs – Air Seeder

An AirSeeder is a type of agricultural implement, that uses an air stream to carry some type of granular product (e.g. seed or fertilizer) through tubes, that go from the device where the product is metered, to the point where it is placed at the ground.
The product metering devices are centrally located under the bin(s) at the center of the implement.

SC Setpoint Turn On/Off Times

There are many different implementations, but in one implementation, the product can be turned on/off at the product meter (126,128, 130).
In this case, the SC **Setpoint** Turn On/Off Time, is the time that it takes for the product to travel within the hose, all the way from the product meter (126,128, 130) to the ground (113).

Why have both SC Setpoint On and SC Setpoint Off?

The SC Setpoint On Time may be different than the SC Setpoint Off Time, because the speed of the air stream is different when it is full of product than when it is void of product.

SC Actual Turn On/Off (Product On/Off Detection)

Scenario 1:

- A seed sensor can be placed at the ground (113) to detect the product as it hits the ground.
- In this case, the SC Actual Turn On/Off Time would be 0 ms.

Scenario 2:

- Some Air Seeders have a Section distributor (110) with seed sensor(s) there. Normally, the length of the row hoses (112) is kept the same for all rows at that section (111), to ensure the same time delay for all rows at that section.
- In this case, the SC Actual Turn On/Off Time would be the length of time that it takes for the product to travel from the distributor (110) to the ground (113).

Scenario 3:

- There is no seed sensor to detect the product, but the Actual Rate of Product Application is measured at the meters (126, 128, 130).
- In this case, the SC Actual Turn On/Off Time would be the same as the SC Setpoint Turn On/Off Time.

Scenario 4:

- A seed sensor can be placed at the ground (113) to detect the product as it hits the ground, but there is a delay in measurement, so that the product is already on the ground before it can be reported.
- In this case, the SC Actual Turn On/Off Time would be negative.

DDE Supplement / Attachment

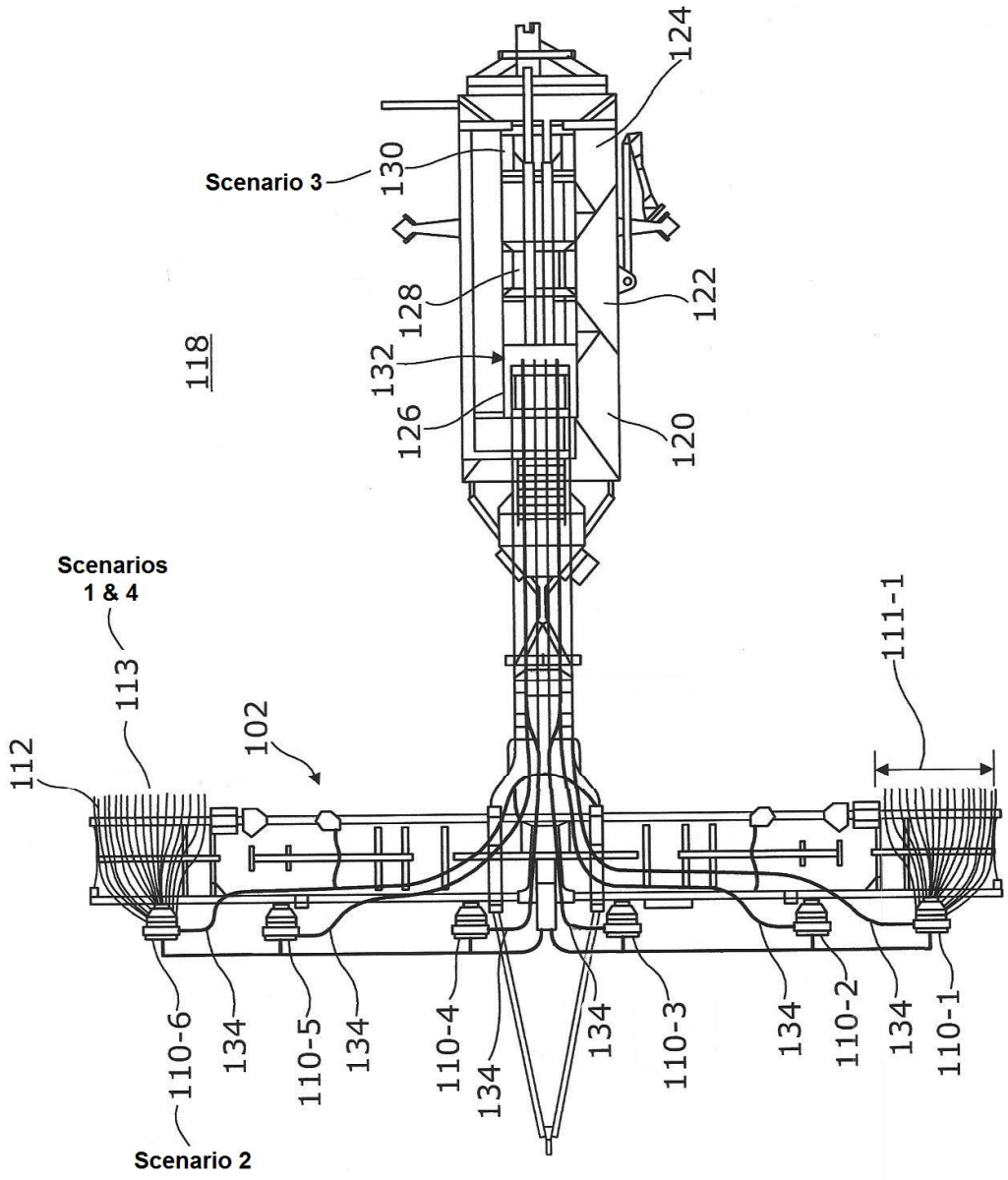


Figure 1 - Air Seeder Example

102 - Toolbar
110 - Distributor (1 for each section)
111 - Section
112 - Row hoses
113 - Product contacts the Ground
118 - Air Seeder
120 - Product Bin 1
122 - Product Bin 2
124 - Product Bin 3
126 - Product Bin 1 Metering Devices (1 for each section)
128 - Product Bin 2 Metering Devices (1 for each section)
130 - Product Bin 3 Metering Devices (1 for each section)
132 - Air Stream (1 for each section)
134 - Section Hoses

NOTE: For visual clarity, row hoses (112) for most sections were omitted from **Figure 1**.