iQSmartFeed description

Overview

The iQSmartFeed implements a very fast two speed feeding algorithm for analog and digitally controlled feeding devices.

Commands

Start

Upon the receival of a start command, it is checked whether a learning cycle has to be started. If so, the first learning cycle is started with state STATE_LEARN_SWITCH_TIME_START and the second with state STATE_LEARN_FAST_GAIN_START. Otherwise, the speed is set to fast and the state is switched to STATE_BLOCK_FAST.

Stop

Upon the receival of a stop command, the state is immediately changed to STATE_FILL_ABORT.

States

	State name	Description
0	STATE_IDLE	It is only waited for commands.
1	STATE_BLOCK_FAST	When the weight exceeds the provided feeding threshold for the provided time, the state is switched to STATE_FILL_FAST. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
2	STATE_SUSPEND_FAST	The signal isn't monitored until the suspend time will have passed. The state is switched to STATE_FILL_FAST then. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
3	STATE_FILL_FAST	The fast slow switch point is calculated for each sampled weight. When the current weight exceeds this switch point, the switch timer is started and the state is switched to STATE_SWITCH_RISING. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
4	STATE_SWITCH_RISING	When the current weight reaches its local maximum, the state is switched to STATE_SWITCH_FALLING. If the switch times reaches its timeout, the state is switched to STATE_FILL_SLOW.
5	STATE_SWITCH_FALLING	When the current weight reaches its local minimum, the state is switched to STATE_SWITCH_FALLING. If the switch times reaches its timeout, the state is switched to STATE_FILL_SLOW.
6	STATE_FILL_SLOW	The slow fill set point is calculated for each sampled weight. When the weight exceeds this set point, the feeding is stopped. If checking the fed weight is requested, the state is switched to STATE_FILL_SLOW_MAXIMUM. Otherwise, the target weight is reported as the final weight with status "finished" and the state is switched to STATE_IDLE. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
7	STATE_FILL_SLOW_MAXIMUM	When the weight reaches its local maximum, the state is switched to STATE_FILL_SLOW_SETTLED.
8	STATE_FILL_SLOW_SETTLED	When the scale is settled, the current weight is reported as the final weight with status "finished,settled" and the state is switched to STATE_IDLE.
9	STATE_FILL_ABORT	When the scale is settled, the current weight is reported as the final weight with status "aborted,settled" and the state is switched to STATE_IDLE.
10	STATE_FILL_EMERGENCY_STOP	When the scale is settled, the current weight is reported as the final weight with status "aborted,emergency,settled" and the state is switched to STATE_IDLE.
11	STATE_LEARN_SWITCH_TIME_START	When the scale is settled, speed is set to fast and the state is

		switched to STATE_LEARN_SWITCH_TIME_BLOCK_FAST.
12	STATE_LEARN_SWITCH_TIME_BLOCK_FAST	When the weight exceeds the provided threshold for the provided time, the switch time measurement is started and the state is switched to STATE_LEARN_SWITCH_TIME_MAXIMUM. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
13	STATE_LEARN_SWITCH_TIME_SUSPEND	Neither weight or flow is observed in this state. After a certain timeout is exceeded, the state is switched to STATE_LEARN_SWITCH_TIME_MAXIMUM.
14	STATE_LEARN_SWITCH_TIME_MAXIMUM	When the weight reaches its local maximum, the state is switched to STATE_LEARN_SWITCH_TIME_MINIMUM. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
15	STATE_LEARN_SWITCH_TIME_MINIMUM	When the weight reaches its local minimum, the switch time measurement is stopped, the switch time is stored, the speed is set to slow, the switch timer is started and the state is switched to STATE_LEARN_SWITCH_TIME_BLOCK_SLOW. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
16	STATE_LEARN_SWITCH_TIME_BLOCK_SLOW	When the switch time has passed, the state is switched to STATE_LEARN_SWITCH_TIME_FILL_SLOW. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
17	STATE_LEARN_SWITCH_TIME_FILL_SLOW	The speed is switched to off, the slow gain measurement is started and the state is switched to STATE_LEARN_SWITCH_TIME_FILL_SLOW_MAXIMUM.
18	STATE_LEARN_SWITCH_TIME_FILL_SLOW_MAXIMUM	When the weight reaches its local maximum, the state is switched to STATE_LEARN_SWITCH_TIME_FILL_SLOW_SETTLED.
19	STATE_LEARN_SWITCH_TIME_FILL_SLOW_SETTLED	When the scale is settled, the slow gain measurement is stopped, the slow gain is stored and the state is switched to STATE_FILL_SLOW to feed up to the requested target weight.
20	STATE_LEARN_FAST_GAIN_START	When the scale is settled, the speed is set to fast and the state is switched to STATE_LEARN_FAST_GAIN_BLOCK_FAST or to STATE_LEARN_FAST_GAIN_FLOW_SUSPEND in case a suspend percentage is set.
21	STATE_LEARN_FAST_GAIN_FLOW_SUSPEND	After the calculated suspend time has passed, the state is switched to STATE_LEARN_FAST_GAIN_BLOCK_FAST.
22	STATE_LEARN_FAST_GAIN_BLOCK_FAST	When the weight exceeds the provided threshold for the provided time, state is switched to STATE_LEARN_FAST_GAIN_FLOW_RISING. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
23	STATE_LEARN_FAST_GAIN_FLOW_RISING	When the flow reaches its local maximum, the measurement of the timing of the derivative of the flow is started and the state is switched to STATE_LEARN_FAST_GAIN_FLOW_FALLING. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
24	STATE_LEARN_FAST_GAIN_FLOW_FALLING	When the derivative of the flow reaches its local minimum, the derivative time is taken and the state is switched to STATE_LEARN_FAST_GAIN_FLOW_BLOCKING. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
25	STATE_LEARN_FAST_GAIN_FLOW_BLOCKING	When the derivative time has passed, the fast gain calculation and the switch timer are started and the state is switched to STATE_LEARN_FAST_GAIN_BLOCK_SLOW_FALLING. If the weight exceeds the emergency stop threshold, the feeding is aborted and the state is switched to STATE_FILL_EMERGENCY_STOP.
26	STATE_LEARN_FAST_GAIN_BLOCK_SLOW_FALLING	When the switch time has passed, the fast gain calculation is stopped, the fast gain is stored and the state is switched to STATE_FILL_SLOW to feed up to the requested target weight. When the weight reaches its local maximum, the state is switched to STATE_LEARN_FAST_GAIN_BLOCK_SLOW_RISING.
27	STATE_LEARN_FAST_GAIN_BLOCK_SLOW_RISING	When the switch time has passed or when the weight reaches its local minimum, the fast gain calculation is stopped, the fast gain is stored

		and the state is switched to STATE_FILL_SLOW to feed up to the requested target weight.
28	STATE_DEBUG_OUTPUTS	It is waited for a stop command.