Technical Documentation: Text Protocol for UART Data Transmission $FLOW

Introduction

This document describes the text protocol for UART data transmission used by a device that regulates the flow of liquid (plant protection substances) in a sprayer. The protocol provides a reliable method for exchanging data between the device and a computer, allowing for the control and monitoring of liquid flow regulation.

UART Parameters

- Baud Rate: 115200 bits/s
- Data Bits: 8 bits
- Parity: None
- Stop Bits: 1 (1 stop bit)

Message Format

Each message starts with a preamble consisting of a one-byte '$' symbol. Following the preamble is the message identifier, which is a four-byte character string "FLOW". The DataField containing information about liquid flow regulation comes next. The message is concluded with a checksum and the CR (carriage return) and LF (line feed) symbols.

Example Message

Here is an example message string:

$FLOW,0.00,99.86,34436.00,95.00,100.00,160.00*10

DataField Structure

The DataField includes the following fields:

1. **Data 1 (0.00):** The first field after the preamble provides information about errors in liquid flow regulation. A value of '0.00' indicates normal flow, '1' indicates flow below the norm by 20%, and '2' indicates flow above the norm by 30%.
2. **Data 2 (99.86):** The second field contains the number of impulses received from the liquid flow meter in one second (average over 7 seconds/7).
3. **Data 3 (34436.00):** The third field indicates the total number of impulses received from the flow meter since the device was powered on.
4. **Data 4 (95.00):** The fourth field shows the number of impulses received in 0.2 seconds. The data values are multiplied by 7 for instantaneous calculation.
5. **Data 5 (100.00):** The required number of pulses received by the device from the computer, which must be adjusted to stabilize the flow of liquid (average value over 7 seconds/7).

6. **Data 6 (160.00):** The sixth field represents the PWM duty cycle ranging from 0 to 255, set by the device to control the electric pump's flow strength.

Checksum

After the DataField, a '*' symbol, represented by a two-byte string CHK1 and CHK2.

End of Message

The message concludes with the CR (carriage return) and LF (line feed) symbols, indicating the end of the packet.