Technical Documentation: Text Protocol for UART Data Transmission $VL/VR/VT

Introduction

This document provides technical specifications for utilizing the commands to control a fluid flow controller. The controller can interface with external software and devices via UART, commands are used for regulating various aspects of the fluid flow control system, including section control, liquid application rates, and movement regulation.

UART Parameters

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

Packet Structure

Each communication packet follows a specific structure as outlined below:

- **Preamble**: A single-byte character '$'
- **Talker ID**: A two-byte character string.
- **Data Field**: Variable-length field containing data based on the packet type. Data is separated by commas, and a comma must be inserted before each data entry. The end of the Data Field is marked by an asterisk '*'.
- **CHK1, CHK2**: A two-byte character string representing the checksum of data between the preamble and '*'.
- **CR, LF**: Two-byte binary data indicating the end of the packet.

Example Packet:

$VT,1,0,0,0,0,0,...,60,101,5,1.7,13.03*2D

DataField Structure

Commands consist of 106 information parameters separated by commas. The sequence number is calculated from left to right. The preamble ('$') indicates the start of a command. Parameters are explained below:

- **Data #1**: Two-byte character string

- VL: Vehicle drives to the left of the base line
- VR: Vehicle moves to the right of the base line
- VT: Vehicle follows a given trajectory or is not using course holding mode.
- **Data #2-101**: Control the state of sprayer sections. The sequence number of the section is calculated from left to right (single-byte value).

    - 0: Section is disabled
    - 1: Section is enabled

- **Data #102**: Speed in km/h.

- **Data #103**: Estimated number of pulses emitted by liquid flow sensors in 1 second.

- **Data #104**: Permissible error of liquid introduction in percent (without '%').

- **Data #105**: Distance of deviation from the baseline in meters and cm.

- **Data #106**: Degrees of deviation from the baseline.

Checksum and End of Packet

- **CHK1, CHK2**: A two-byte character string representing the checksum of data between the preamble and '*'.

- **CR, LF**: Two-byte binary data indicating the end of the packet.

Example Commands

$VR,1,0,60,101,5,1.7,13.03*2D

$VL,1,0,60,101,5,3.32,123.28*3C