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Altivar Using Unity Pro Altivar 58 and 58F Variable Speed: A Comprehensive Guide

In the rapidly evolving landscape of industrial automation, variable speed drives (VSDs) have become indispensable for optimizing energy consumption, improving process control, and extending equipment life. Among the leaders in this field, **Altivar** drives are renowned for their reliability, flexibility, and advanced features. This article delves into the intricacies of using the **Unity Pro** software with the **Altivar 58** and **58F** models, providing a detailed, step by step guide for engineers and technicians who want to harness the full potential of these powerful drives.

1. Understanding Altivar Drives

Altivar drives, developed by Schneider Electric, are a family of variable frequency drives (VFDs) designed to control AC motors with high precision. They are built to withstand harsh industrial environments while delivering superior performance. The Altivar 58 and 58F series are among the most popular, offering a balanced mix of power, control, and connectivity options.

1.1 Key Features of Altivar 58/58F

- Power Range: 1 /kW to 400 /kW, suitable for a wide range of applications.
- Modular Design: Allows easy upgrades and customizations.
- Advanced Protection: Includes over current, over temperature, and fault tolerant features.
- Connectivity: Supports Ethernet/IP, Modbus TCP, Profibus, and many other industrial protocols.
- Energy Efficiency: Designed to meet the latest energy saving standards.

1.2 The 58 vs. 58F: What Sets Them Apart?

While both models share many core capabilities, the **58F** introduces enhanced performance for high speed and high torque applications. Key distinctions include:

- Higher Frequency: 58F can handle up to 500 /Hz, compared to 400 /Hz on the 58.
- Improved Power Quality: Reduced harmonic distortion.
- Expanded I/O Options: Additional analog and digital inputs.

2. Unity Pro: The Software Backbone

Unity Pro is Schneider Electric's integrated development environment (IDE) for configuring, programming, and maintaining Altivar drives. It offers a unified platform that simplifies the entire lifecycle of a VFD, from initial setup to advanced troubleshooting.

2.1 Core Advantages of Unity Pro

- Unified Interface: One software for all Altivar models.
- Rapid Parameterization: Predefined templates speed up configuration.
- Remote Monitoring: Real time data access via web browsers.
- Version Control: Keeps firmware and parameter files organized.
- Extensive Documentation: Built in help files and examples.

2.2 System Requirements

Before installing Unity Pro, ensure your PC meets the following specifications:

- Windows 10/11 (64 bit)
- Intel Core i5 or higher
- 4 /GB RAM (8 /GB recommended)
- 512 /MB free disk space for the application, plus additional space for project files
- USB 2.0/3.0 port for drive communication

3. Preparing for Installation

Successful deployment of Altivar 58/58F with Unity Pro requires meticulous preparation. This section covers everything from hardware setup to software installation.

3.1 Hardware Setup

1. Mount the Drive: Secure the Altivar in a clean, dust free enclosure with proper ventilation.
2. Connect Power: Attach the three phase supply, ensuring correct voltage and frequency.
3. Wire the Motor: Connect the motor terminals following the wiring diagram.
4. Establish Communication: Connect the drive to the network via Ethernet or RS 485, depending on your configuration.
5. Install I/O Modules: If using the 58F, attach any additional analog or digital modules.

3.2 Software Installation

Download the latest Unity Pro package from Schneider Electric’s website and follow the installation wizard. During installation, select the “Altivar” family to ensure all necessary libraries are included.

3.3 Driver and Firmware Updates

After installing Unity Pro, update the drive’s firmware to the latest version. This step ensures compatibility and unlocks new features. Use the **Firmware Update** tool within Unity Pro, which automatically detects the drive and streams the appropriate firmware file.

4. Configuring the Altivar 58/58F in Unity Pro

Once the hardware and software are ready, the next step is to configure the drive. Unity Pro offers a wizard guided process that simplifies parameter selection.

4.1 Opening the Project

1. Launch Unity Pro and create a new project.
2. Select “Altivar 58/58F” from the list of drive families.
3. Enter a descriptive project name, such as “PumpControl_58F.”

4.2 Selecting the Drive Model

In the **Drive Selection** dialog, choose the exact model (e.g., 58F-400-01). Unity Pro will load a template with recommended default parameters.

4.3 Configuring Communication Parameters

- Ethernet/IP: Set the IP address, subnet mask, and gateway. Ensure the drive’s IP does not conflict with other devices.
- Modbus TCP: Define the Modbus address and baud rate if using RS 485.

- Profibus: Configure the station address and data rates.

4.4 Motor and Power Settings

Enter motor specifications such as rated power, voltage, speed, and torque. Unity Pro calculates derived parameters like **Maximum Current** and **Minimum Frequency** automatically.

4.5 Advanced Protection Settings

- Over Current: Set trip thresholds and delays.
- Over Temperature: Define temperature limits and cooling fan speeds.
- Short Circuit: Configure protective relays and breaker settings.

5. Programming Variable Speed Operation

Variable speed drives are most valuable when they can adjust motor speed in response to process demands. Unity Pro offers both simple and advanced programming options.

5.1 Basic Variable Speed Control

Use the **Speed Profile** feature to define a linear ramp or step changes. For example:

- Start at 0 /% load.
- Ramp up to 80 /% load over 5 /seconds.
- Maintain 80 /% for 30 /seconds.
- Ramp down to 0 /% over 3 /seconds.

5.2 Advanced Speed Profiles

For processes requiring precise control, use the **Speed Curve Editor** to create custom curves:

1. Plot desired speed (in RPM) against time.
2. Insert key points for acceleration, deceleration, and holding periods.
3. Apply smoothing filters to avoid abrupt changes.

5.3 Implementing PID Control

Unity Pro supports PID (Proportional Integral Derivative) loops for closed loop speed control. Configure the PID parameters as follows:

- Proportional Gain (Kp): 1.2
- Integral Gain (Ki): 0.01
- Derivative Gain (Kd): 0.5
- Setpoint: Desired speed in RPM.

5.4 Example: Pump Speed Adjustment

Suppose you need to maintain a constant flow rate in a pipeline. You can program the drive to adjust speed based on pressure sensor feedback:

- Read pressure via an analog input.
- Apply a scaling factor to convert pressure to desired speed.
- Use a PID loop to fine tune the speed.
- Log data for later analysis.

6. Troubleshooting Common Issues

Even with careful setup, problems can arise. Below are solutions to the most frequent issues encountered when

using Altivar 58/58F with Unity Pro.

6.1 Communication Failures

- Check Cabling: Ensure Ethernet cables are Cat5e or higher and connectors are secure.
- Verify IP Settings: Duplicate IP addresses cause conflicts.
- Firmware Mismatch: Ensure the drive firmware matches Unity Pro's driver version.

6.2 Parameter Errors

- Out of Range Values: Unity Pro will highlight parameters that exceed permissible limits.
- Missing Parameters: Some advanced features require additional modules; confirm all necessary hardware is installed.

6.3 Performance Degradation

- Check for Harmonic Distortion by using a power analyzer.
- Ensure Cooling Fans are operating correctly.
- Verify that the Motor is Not Over Loaded beyond its rated capacity.

7. Best Practices for Maintenance and Optimization

Regular maintenance not only prolongs the lifespan of Altivar drives but also ensures optimal performance.

7.1 Routine Checks

- Inspect Ventilation and Cooling Fans every 3 /months.
- Verify Firmware Versions are up to date.
- Monitor Thermal Logs for abnormal temperature spikes.

7.2 Firmware and Parameter Updates

Schneider Electric releases firmware updates that enhance functionality and fix bugs. Use Unity Pro's **Firmware Update** tool to apply these patches safely.

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