Installation Guide

VLT® PROFIBUS DP MCA 101

VLT® Frequency Converter FC 102 • FC 103 • FC 202
FC 301/302 • FCP 106 • FCM 106
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1 Introduction

1.1 Purpose of the Manual
This installation guide provides information for quick instal-
lation of a VLT® PROFIBUS DP MCA 101 in the VLT®
frequency converter.
The installation guide is intended for use by qualified
personnel. Users are assumed to know the VLT® frequency
converter, with PROFIBUS technology, and with the PC or
PLC used as a master in the system.
Read the instructions before installation and ensure that
instructions for safe installation are observed.

VLT® is a registered trademark.

1.2 Additional Resources
 Resources available for the frequency converters and
optional equipment:
• The VLT® Operating Instructions provide the
necessary information for getting the frequency
converter up and running.
• The VLT® Design Guide provides detailed
information about capabilities and functionality
to design motor control systems.
• The VLT® Programming Guide provides greater
detail on working with parameters and many
application examples.
• The VLT® PROFIBUS DP MCA 101 Installation Guide
provides information about installing the
PROFIBUS and troubleshooting.
• The VLT® PROFIBUS DP MCA 101 Programming
Guide provides information about configuring the
system, controlling the frequency converter,
parameter access, programming, troubleshooting,
and some typical application examples.

Requirements to the master:
A PLC or PC that:
• Has a serial communication card with PROFIBUS
master class 1 capability.
• Supports all PROFIBUS communication services
required by the application.
• Fulfils requirements of the PROFIBUS standard.
• Fulfils requirements of the PROFIBUS frequency
converter profile and its company-specific
implementation, PROFIdrive.
• Fulfils requirements of the relevant VLT®
frequency converter.

1.3 Items Supplied
When the fieldbus option is not factory-mounted, the
following items are supplied:
• Fieldbus option and connector.
• LCP cradle.
• Front covers (in various sizes).
• Stickers.
• Accessories bag (including EMC bracket).
• Installation Guide.

1.4 Approvals and Certifications

VLT® PROFIBUS DP MCA 101 is intended for use with:
• VLT® HVAC Drive FC 102.
• VLT® Refrigeration Drive FC 103.
• VLT® AQUA Drive FC 202.
• VLT® AutomationDrive FC 301/FC 302.
• VLT® DriveMotor FCP 106.
• VLT® DriveMotor FCM 106.

More approvals and certifications are available. For more
information, contact a local Danfoss partner.
1.5 Disposal

Do not dispose of equipment containing electrical components together with domestic waste. Collect it separately in accordance with local and currently valid legislation.

1.6 Symbols, Abbreviations, and Conventions

<table>
<thead>
<tr>
<th>CAN</th>
<th>Controller area network</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP</td>
<td>Distributed periphery</td>
</tr>
<tr>
<td>EMC</td>
<td>Electromagnetic compatibility</td>
</tr>
<tr>
<td>FDT</td>
<td>Field device tool</td>
</tr>
<tr>
<td>HF</td>
<td>High frequency</td>
</tr>
<tr>
<td>LCP</td>
<td>Local control panel</td>
</tr>
<tr>
<td>LED</td>
<td>Light emitting diode</td>
</tr>
<tr>
<td>LOP</td>
<td>Local operating panel</td>
</tr>
<tr>
<td>PC</td>
<td>Personal computer</td>
</tr>
<tr>
<td>PLC</td>
<td>Programmable logic control</td>
</tr>
<tr>
<td>PPO</td>
<td>Parameter process data</td>
</tr>
<tr>
<td>STW</td>
<td>Status word</td>
</tr>
</tbody>
</table>

Table 1.1 Symbols and Abbreviations

Conventions
Numbered lists indicate procedures. Bullet lists indicate other information and description of illustrations. Italicised text indicates:

- Cross-reference.
- Link.
- Footnote.
- Parameter name.
- Parameter group name.
- Parameter option.
2 Safety

2.1 Safety Symbols

The following symbols are used in this manual:

**WARNING**
Indicates a potentially hazardous situation that could result in death or serious injury.

**CAUTION**
Indicates a potentially hazardous situation that could result in minor or moderate injury. It can also be used to alert against unsafe practices.

**NOTICE**
Indicates important information, including situations that can result in damage to equipment or property.

2.2 Qualified Personnel

Correct and reliable transport, storage, installation, operation, and maintenance are required for the trouble-free and safe operation of the frequency converter. Only qualified personnel are allowed to install and operate this equipment.

Qualified personnel are defined as trained staff, who are authorised to install, commission, and maintain equipment, systems, and circuits in accordance with pertinent laws and regulations. Additionally, the qualified personnel must be familiar with the instructions and safety measures described in these operating instructions.

2.3 Safety Precautions

**WARNING**
HIGH VOLTAGE
Frequency converters contain high voltage when connected to AC mains input, DC supply, or load sharing. Failure to perform installation, start-up, and maintenance by qualified personnel can result in death or serious injury.

- Only qualified personnel must perform installation, start-up, and maintenance.

**WARNING**
UNINTENDED START
When the frequency converter is connected to AC mains, DC supply, or load sharing, the motor may start at any time. Unintended start during programming, service, or repair work can result in death, serious injury, or property damage. The motor can start with an external switch, a fieldbus command, an input reference signal from the LCP or LOP, via remote operation using MCT 10 Set-up Software, or after a cleared fault condition.

To prevent unintended motor start:
- Disconnect the frequency converter from the mains.
- Press [Off/Reset] on the LCP before programming parameters.
- Completely wire and assemble the frequency converter, motor, and any driven equipment before connecting the frequency converter to AC mains, DC supply, or load sharing.

**WARNING**
DISCHARGE TIME
The frequency converter contains DC-link capacitors that can remain charged even when the frequency converter is not powered. Failure to wait the specified time after power has been removed before performing service or repair work can result in death or serious injury.

- Stop the motor.
- Disconnect the AC mains and remote DC-link supplies, including battery back-ups, UPS, and DC-link connections to other frequency converters.
- Disconnect or lock the PM motor.
- Wait for the capacitors to discharge fully before performing any service or repair work. The waiting time is specified in the relevant frequency converter operating instructions, Chapter 2 Safety.

**WARNING**
LEAKAGE CURRENT HAZARD
Leakage currents exceed 3.5 mA. Failure to ground frequency converter properly can result in death or serious injury.

- Ensure the correct grounding of the equipment by a certified electrical installer.
**WARNING**

**EQUIPMENT HAZARD**

Contact with rotating shafts and electrical equipment can result in death or serious injury.

- Ensure that only trained and qualified personnel perform installation, start-up, and maintenance.
- Ensure that electrical work conforms to national and local electrical codes.
- Follow the procedures in this manual.

**CAUTION**

**INTERNAL FAILURE HAZARD**

An internal failure in the frequency converter can result in serious injury, when the frequency converter is not properly closed.

- Ensure that all safety covers are in place and securely fastened before applying power.
3 Installation

3.1 Safety Instructions

See chapter 2 Safety for general safety instructions.

3.2 EMC-compliant Installation

To obtain an EMC-compliant installation, follow the instructions provided in the relevant frequency converter operating instructions and design guide. Refer to the fieldbus master manual from the PLC supplier for further installation guidelines.

3.3 Grounding

- Ensure that all stations connected to the fieldbus network are connected to the same ground potential. When distances between the stations in a fieldbus network are long, connect the individual station to the same ground potential. Install equalising cables between the system components.
- Establish a grounding connection with low HF impedance, for example by mounting the frequency converter on a conductive back plate.
- Keep the ground wire connections as short as possible.
- To establish electrical contact between the cable screen and the frequency converter enclosure, use metal cable glands or the clamps provided on the equipment.
- Use high-strand wire to reduce burst transient.

3.4 Cable Routing

NOTICE

EMC INTERFERENCE

Use screened cables for motor and control wiring, and separate cables for fieldbus communication, motor wiring, and brake resistor. Failure to isolate fieldbus communication, motor, and brake resistor cables can result in unintended behaviour or reduced performance. Minimum 200 mm (7.9 in) clearance between power, motor, and control cables is required. For power sizes above 315 kW (450 hp), increase the minimum distance of 500 mm (20 in).

NOTICE

When the fieldbus cable intersects a motor cable or a brake resistor cable, ensure that the cables intersect at an angle of 90°.

3.5 Mounting

3.5.1 Mounting in an FC Series Frequency Converter

1. Check whether the fieldbus option is already mounted in the frequency converter. If already mounted, go to step 6. If not mounted, go to step 2.
2. Remove the LCP or blind cover from the frequency converter.
3. Use a screwdriver to remove the front cover and the LCP cradle.
4. Mount the fieldbus option. Mount the option with the connector facing up for top cable entry (see Illustration 3.3), or with the connector facing down for bottom cable entry (see Illustration 3.4). If an MCB option is installed, only top cable entry is possible.
5. Remove the knock-out plate from the new LCP cradle.
6. Mount the new LCP cradle.
7. Set the termination switch (shown in Illustration 3.7) on the fieldbus option to ON, when the frequency converter is the last station on the segment.
3.5.2 Mounting in a VLT® DriveMotor FCP 106 Frequency Converter

1. Remove the lid from the frequency converter.
2. Check whether the fieldbus option is already mounted in the frequency converter. If already mounted, go to step 4. If not mounted, go to step 3.
3. Mount the fieldbus option.
4. Set the termination switch (shown in Illustration 3.7) on the fieldbus option to ON, when the frequency converter is the last station on the segment.

Illustration 3.5 Exploded View

3.6 Setting Address Switches

Set the address switches to give the option a unique ID. Select an address range from 0–125 (factory setting 127) according to Table 3.1.

<table>
<thead>
<tr>
<th>Switch</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address value</td>
<td>Not used</td>
<td>+64</td>
<td>+32</td>
<td>+16</td>
<td>+8</td>
<td>+4</td>
<td>+2</td>
<td>+1</td>
</tr>
<tr>
<td>5</td>
<td>Not used</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>35</td>
<td>Not used</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>82</td>
<td>Not used</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

Table 3.1 Settings for the Address Switches

Alternatively, assign a unique ID from parameter 9-18 Node Address. For setting the address from parameter 9-18 Node Address, ensure that all address switches are set to ON. When the address is already set using address hardware switches, the address value shown in parameter 9-18 Node Address is read-only.
3.7 Electrical Installation

3.7.1 Cabling Requirements

- Terminate the nodes at the physical ends of each segment. If the bus segment is branched, the device furthest from the segment connector represents the end of the segment.
- Terminals 66 and 67 provide a 5 V DC supply, available for external termination.

**NOTICE**
The PROFIBUS D-sub 9 adapter also features a termination switch. When the D-sub 9 adapter is used, set the termination switch on the fieldbus option to OFF, to avoid double termination.

**NOTICE**
When the fieldbus is extended with a repeater, terminate the extension at both ends.

**NOTICE**
To avoid impedance mismatch, use the same cable type throughout the entire network. Refer to chapter 3.7.2 Cable Specifications for cable specifications.

### Table 3.2 Cable Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance at a measuring frequency from 3–20 MHz</td>
<td>135–165 Ω</td>
</tr>
<tr>
<td>Resistance</td>
<td>&lt;110 Ω/km</td>
</tr>
<tr>
<td>Capacitance</td>
<td>&lt;30 pF/m</td>
</tr>
<tr>
<td>Damping (total wire length)</td>
<td>Maximum 9 dB over the whole wire length</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Maximum 0.34 mm², AWG 22</td>
</tr>
<tr>
<td>Cable type</td>
<td>Twisted in pairs, 1 x 2, 2 x 2, or 1 x 4 wires</td>
</tr>
<tr>
<td>Screening</td>
<td>Copper-braided screen, or braided screen and foil screen</td>
</tr>
</tbody>
</table>

Illustration 3.7 Location and Sequence of the Address Switches
3.7.3 Bus Segment Requirements

A maximum of 32 field devices (nodes) can be connected per fieldbus segment. Field devices include:

- Frequency converter, active node.
- Master, active node.
- Repeater, passive node.

**NOTICE**

A repeater represents a node in each of the 2 segments it connects.

Maximum fieldbus cable length

<table>
<thead>
<tr>
<th>Segment</th>
<th>Repeater</th>
<th>Active nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>92</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>122</td>
</tr>
</tbody>
</table>

Table 3.3 Number of Active Nodes per Segment

<table>
<thead>
<tr>
<th>Transmission speed</th>
<th>1 segment [m]</th>
<th>2 segments [m]</th>
<th>3 segments [m]</th>
<th>4 segments [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6–187.5 kBaud</td>
<td>1000</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
</tr>
<tr>
<td>500 kBaud</td>
<td>400</td>
<td>800</td>
<td>1200</td>
<td>1600</td>
</tr>
<tr>
<td>1.5 MBaud</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
</tr>
<tr>
<td>3–12 MBaud</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
</tbody>
</table>

Table 3.4 Maximum Total Bus Cable Length, including Drop Cables

<table>
<thead>
<tr>
<th>Transmission speed</th>
<th>Maximum drop cable length per segment [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.6–93.75 kBaud</td>
<td>96</td>
</tr>
<tr>
<td>187.5 kBaud</td>
<td>75</td>
</tr>
<tr>
<td>500 kBaud</td>
<td>30</td>
</tr>
<tr>
<td>1.5 MBaud</td>
<td>10</td>
</tr>
<tr>
<td>3–12 MBaud</td>
<td>None</td>
</tr>
</tbody>
</table>

Table 3.5 Maximum Drop Cable Length per Segment

The length statements in Table 3.4 and Table 3.5 are valid for bus cables with the properties in chapter 3.7.2 Cable Specifications.
3.7.4 Wiring Procedures

Wiring procedure for enclosure sizes A1–A3

1. Mount the fieldbus connector on the fieldbus option (terminals 62, 63, 66, and 67). For top cable entry, mount the supplied EMC bracket on top of the frequency converter with 2 screws.

2. Prepare the fieldbus cable by stripping a section of the cable insulation, so that the cable screen is in contact with the EMC bracket. Keep the unshielded wire as short as possible. For cable specifications, refer to chapter 3.7.2 Cable Specifications. For fieldbus cable requirements, see chapter 3.7.3 Bus Segment Requirements.

3. Connect the fieldbus cable wires to the terminals according to the colour code of the wires, see Illustration 3.10.

4. To establish mechanical fixation and electrical contact between cable screen and ground, position the stripped cable between the spring loaded metal clamps.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cable screen</td>
</tr>
<tr>
<td>2</td>
<td>EMC bracket (used for top cable entry only)</td>
</tr>
</tbody>
</table>

Illustration 3.9 Wiring for Enclosure Sizes A1–A3

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>Rx/Tx-P red cable</td>
</tr>
<tr>
<td>63</td>
<td>Rx/Tx-N green cable</td>
</tr>
<tr>
<td>66 and 67</td>
<td>5 V DC supply, available for external termination</td>
</tr>
<tr>
<td>CS</td>
<td>Control select, 5 V DC indicates transmission from the fieldbus option</td>
</tr>
</tbody>
</table>

Illustration 3.10 Fieldbus Cable Terminal Connections
Wiring procedure for enclosure sizes A4–A5, B1–B4, and C1–C4

1. Push the cable through cable glands.
2. Mount the fieldbus connector on the fieldbus option (terminals 62, 63, 66, and 67).
3. Prepare the fieldbus cable by stripping a section of the cable insulation. Keep the unshielded wire as short as possible. For cable specifications, refer to chapter 3.7.2 Cable Specifications. For fieldbus cable requirements, see chapter 3.7.3 Bus Segment Requirements.
4. Connect the fieldbus cable wires to the terminals according to the colour code of the wires, see Illustration 3.10.
5. Fix the cable screen to the metal base plate using cable clamp or cable tie, see Illustration 3.11.
6. Tighten cable glands securely.

Illustration 3.11 Wiring for Enclosure Sizes A4–A5, B1–B4, and C1–C4

Wiring procedure for enclosure sizes D, E, and F

1. Mount the fieldbus connector on the fieldbus option (terminals 62, 63, 66, and 67).
2. Prepare the fieldbus cable by stripping a section of the cable insulation. Keep unshielded wire as short as possible. For cable specifications, refer to chapter 3.7.2 Cable Specifications. For fieldbus cable requirements, see chapter 3.7.3 Bus Segment Requirements.
3. Connect the fieldbus cable wires to the terminals according to the colour code of the wires, see Illustration 3.10.
4. Fix the cable screen to the metal base plate using cable clamp or cable tie, see Illustration 3.12.
5. Tie down the cable and route it with other control wires inside the unit, see Illustration 3.12.

Illustration 3.12 Wiring for Enclosure Sizes D, E, and F
Wiring procedure for VLT® DriveMotor FCP 106

1. Mount the fieldbus connector on the fieldbus option (terminals 62, 63, 66, and 67).

2. Prepare the fieldbus cable by stripping a section of the cable insulation, so that the cable screen is in contact with the EMC bracket. Keep the unshielded wire as short as possible. For cable specifications, refer to chapter 3.7.2 Cable Specifications. For fieldbus cable requirements, see chapter 3.7.3 Bus Segment Requirements.

3. Connect the fieldbus cable wires to the terminals according to the colour code of the wires, see Illustration 3.10.

4. To establish mechanical fixation and electrical contact between cable screen and ground, position the stripped cable between the spring loaded metal clamps.

3.8 Reassembling Cover

1. Mount the new front cover and the LCP.

2. Attach the sticker with the correct product name to the front cover.

3.9 Applying Power

Follow the instructions in the frequency converter operating instructions to commission the frequency converter. The frequency converter automatically detects the PROFIBUS interface. A new parameter group (9.** PROFIBUS) appears.

3.10 Checking Network Cabling

1. If the address has not been set via the address switches, go to parameter 9-18 Node Address to set the address.

2. Connect to a running PROFIBUS master.

3. Check that network cabling is correct:
   
   3a. Check that the net status LED flashes green in any pattern, except search baud rate, see Table 4.2.

   3b. Check if parameter 9-63 Actual Baud Rate shows the same baud rate as the PROFIBUS master.

   3c. Check that the bit baud rate search in parameter 9-53 Profibus Warning Word is not active.
4 Troubleshooting

4.1 Warnings and Alarms

**NOTICE**

Refer to the relevant *operating instructions* for an overview of warning and alarm types and for the full list of warnings and alarms.

Alarm word, warning word, and PROFIBUS warning word are shown on the frequency converter display in hex format. When there is more than 1 warning or alarm, the sum of all warnings or alarms is shown. Alarm word, warning word, and PROFIBUS warning word can also be shown via fieldbus in:

- Parameter 16-90 Alarm Word.
- Parameter 16-92 Warning Word.
- Parameter 9-53 Profibus Warning Word.

For warning 165, Baud rate search, refer to Table 4.1.

<table>
<thead>
<tr>
<th>Bit (hex)</th>
<th>Unit diagnose bit</th>
<th>PROFIBUS warning word (parameter 9-53 Profibus Warning Word)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000001</td>
<td>160</td>
<td>Connection with DP-master is not OK.</td>
</tr>
<tr>
<td>00000002</td>
<td>161</td>
<td>Unused</td>
</tr>
<tr>
<td>00000004</td>
<td>162</td>
<td>FDL (fieldbus data link layer) is not OK.</td>
</tr>
<tr>
<td>00000008</td>
<td>163</td>
<td>Clear data command received.</td>
</tr>
<tr>
<td>00000010</td>
<td>164</td>
<td>Actual value is not updated.</td>
</tr>
<tr>
<td>00000020</td>
<td>165</td>
<td>Baud rate search.</td>
</tr>
<tr>
<td>00000040</td>
<td>166</td>
<td>PROFIBUS ASIC is not transmitting.</td>
</tr>
<tr>
<td>00000080</td>
<td>167</td>
<td>Initialising of PROFIBUS is not OK.</td>
</tr>
<tr>
<td>00000100</td>
<td>152</td>
<td>Drive is tripped.</td>
</tr>
<tr>
<td>00000200</td>
<td>153</td>
<td>Internal CAN error.</td>
</tr>
<tr>
<td>00000400</td>
<td>154</td>
<td>Wrong configuration data from PLC.</td>
</tr>
<tr>
<td>00000800</td>
<td>155</td>
<td>Wrong ID sent by PLC.</td>
</tr>
<tr>
<td>00001000</td>
<td>156</td>
<td>Internal error occurred.</td>
</tr>
<tr>
<td>00002000</td>
<td>157</td>
<td>Not configured.</td>
</tr>
<tr>
<td>00004000</td>
<td>158</td>
<td>Timeout occurred.</td>
</tr>
<tr>
<td>00008000</td>
<td>159</td>
<td>Warning active.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit (hex)</th>
<th>Unit diagnose bit</th>
<th>PROFIBUS warning word (parameter 9-53 Profibus Warning Word)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000001</td>
<td>10</td>
<td>Connection with DP-master is not OK.</td>
</tr>
<tr>
<td>00000002</td>
<td>11</td>
<td>Unused</td>
</tr>
<tr>
<td>00000004</td>
<td>12</td>
<td>FDL (fieldbus data link layer) is not OK.</td>
</tr>
<tr>
<td>00000008</td>
<td>13</td>
<td>Clear data command received.</td>
</tr>
<tr>
<td>00000010</td>
<td>14</td>
<td>Actual value is not updated.</td>
</tr>
<tr>
<td>00000020</td>
<td>15</td>
<td>Baud rate search.</td>
</tr>
<tr>
<td>00000040</td>
<td>16</td>
<td>PROFIBUS ASIC is not transmitting.</td>
</tr>
<tr>
<td>00000080</td>
<td>17</td>
<td>Initialising of PROFIBUS is not OK.</td>
</tr>
<tr>
<td>00000100</td>
<td>18</td>
<td>Drive is tripped.</td>
</tr>
<tr>
<td>00000200</td>
<td>19</td>
<td>Internal CAN error.</td>
</tr>
<tr>
<td>00000400</td>
<td>20</td>
<td>Wrong configuration data from PLC.</td>
</tr>
<tr>
<td>00000800</td>
<td>21</td>
<td>Wrong ID sent by PLC.</td>
</tr>
<tr>
<td>00001000</td>
<td>22</td>
<td>Internal error occurred.</td>
</tr>
<tr>
<td>00002000</td>
<td>23</td>
<td>Not configured.</td>
</tr>
<tr>
<td>00004000</td>
<td>24</td>
<td>Timeout occurred.</td>
</tr>
<tr>
<td>00008000</td>
<td>25</td>
<td>Warning active.</td>
</tr>
</tbody>
</table>

For warning 165, Baud rate search, refer to Table 4.1.

<table>
<thead>
<tr>
<th>Bit (hex)</th>
<th>Unit diagnose bit</th>
<th>PROFIBUS warning word (parameter 9-53 Profibus Warning Word)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000001</td>
<td>10</td>
<td>Connection with DP-master is not OK.</td>
</tr>
<tr>
<td>00000002</td>
<td>11</td>
<td>Unused</td>
</tr>
<tr>
<td>00000004</td>
<td>12</td>
<td>FDL (fieldbus data link layer) is not OK.</td>
</tr>
<tr>
<td>00000008</td>
<td>13</td>
<td>Clear data command received.</td>
</tr>
<tr>
<td>00000010</td>
<td>14</td>
<td>Actual value is not updated.</td>
</tr>
<tr>
<td>00000020</td>
<td>15</td>
<td>Baud rate search.</td>
</tr>
<tr>
<td>00000040</td>
<td>16</td>
<td>PROFIBUS ASIC is not transmitting.</td>
</tr>
<tr>
<td>00000080</td>
<td>17</td>
<td>Initialising of PROFIBUS is not OK.</td>
</tr>
<tr>
<td>00000100</td>
<td>18</td>
<td>Drive is tripped.</td>
</tr>
<tr>
<td>00000200</td>
<td>19</td>
<td>Internal CAN error.</td>
</tr>
<tr>
<td>00000400</td>
<td>20</td>
<td>Wrong configuration data from PLC.</td>
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<tr>
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</tr>
<tr>
<td>00008000</td>
<td>25</td>
<td>Warning active.</td>
</tr>
</tbody>
</table>

Table 4.1 Parameter 9-53 Profibus Warning Word

4.2 Troubleshooting

4.2.1 LED Status

The 2 bicolour LEDs on the PROFIBUS card indicate the status of PROFIBUS communication:

- The lower LED (NS) indicates the net status, that is, the cyclic communication to the PROFIBUS master.
- The upper LED (MS) indicates the module status, that is, acyclic DP-V1 communication from either a PROFIBUS master class 1 (PLC) or a master class 2 (MCT 10 Set-up Software, FDT tool).

Illustration 4.1 LED Panel VLT® PROFIBUS DP MCA 101
<table>
<thead>
<tr>
<th>State</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power on</td>
<td>Red: solid red</td>
<td>The interface is defect. Contact Danfoss.</td>
</tr>
<tr>
<td></td>
<td>Green: flashing green</td>
<td>The interface is OK.</td>
</tr>
<tr>
<td>Baud rate search</td>
<td>Green: flashing green</td>
<td>Searching for the baud rate. Check the connection to the master if the interface stays in this state.</td>
</tr>
<tr>
<td>Wait parameterising</td>
<td>Green: long green</td>
<td>Baud rate found - waiting for parameters from the master.</td>
</tr>
<tr>
<td></td>
<td>Red: long red flash</td>
<td>Wrong parameters from the master.</td>
</tr>
<tr>
<td>Wait configuration</td>
<td>Green: short green flash</td>
<td>Parameters from master OK – waiting for configuration data.</td>
</tr>
<tr>
<td></td>
<td>Red: short red flash</td>
<td>Wrong configuration data from the master.</td>
</tr>
<tr>
<td>Data exchange</td>
<td>Green: solid green</td>
<td>Data exchange between the master and the frequency converter is active.</td>
</tr>
<tr>
<td></td>
<td>Red: flashing red</td>
<td>Clear state. Warning 34, Fieldbus fault is active and a bus reaction in parameter 8-04 Control Word Timeout Function is executed.</td>
</tr>
</tbody>
</table>

Table 4.2 Net Status

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No light</td>
<td>Off</td>
</tr>
<tr>
<td>Green: short green</td>
<td>DP-V1 communication from a master class 1 (PLC) is active.</td>
</tr>
<tr>
<td>Green: long green</td>
<td>DP-V1 communication from a master class 2 (MCT 10, FDT) is active.</td>
</tr>
<tr>
<td>Green: solid green</td>
<td>DP-V1 communication from a master class 1 and 2 is active.</td>
</tr>
<tr>
<td>Red: flashing red</td>
<td>Internal fault.</td>
</tr>
</tbody>
</table>

Table 4.3 Module Status

4.2.2 No Communication with the Frequency Converter

When there is no communication with the frequency converter, check that:

- The cabling is correct. The red and green cables are connected to the correct terminals as shown in Illustration 3.10.
- The bus connection is terminated at both ends. If not, terminate the bus connection with termination resistors at the initial and final nodes.

4.2.3 Warning 34 Fieldbus Fault Appears

Warning 34, Fieldbus fault is not only related to wiring. Warning 34, Fieldbus fault appears when:

- There is no master communication for 60 s after power-up.
- The master is in stop mode.
- Master communication is not established, or is incorrectly configured.
- Wiring is incorrect.

Action:

- Check the master mode and master configuration.
- Check the wiring for correct master mode and communication.
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