GE Industrial Control Systems

SCR HIGH VOLTAGE M-FRAME INTERFACE BOARD

DS200SHVMG1A_ _

These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to GE Industrial Control Systems.

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CONTENTS

SAFETY SYMBOL LEGEND

WARNING

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in personal injury or death.

CAUTION

Indicates a procedure, practice, condition, or statement that, if not strictly observed, could result in damage to or destruction of equipment

NOTE Indicates an essential or important procedure, practice, condition, or statement.

FUNCTIONAL DESCRIPTION

WARNING

This equipment contains a potential hazard of electric shock or burn. Only adequately trained persons who are thoroughly familiar with the equipment and the instructions should install or maintain this equipment.

INTRODUCTION

The DS200SHVM SCR High Voltage M-Frame Interface Board (SHVM) provides an interface for signals from an M-frame drive's SCR bridge to the DCFB or SDCI Power Supply Board and PCCA Power Connect Card. The SHVM board performs the following functions:

- Converts shunt signals (–500 mV to +500 mV) into differential-frequency outputs (0 to 500 kHz) that are sent to the DCFB or SDCI board
- Incorporates hardware jumper-selectable 10:1 current transformers to provide additional current attenuation capability
- Provides attenuation of ac line, motor armature, and SCR bridge voltages

The SHVM board has only one group, G1.

DC BRIDGE SHUNT ISOLATOR CIRCUITS

The dc positive (+) and dc negative (−) floating shunt isolator voltage controlled oscillator (VCO) circuits convert shunt signals from the bridge. The circuits range from −500 mV to +500 mV (0 to 500 kHz) and are fed to the DCFB board. The isolator input circuits float to the bridge potential of the dc+ and dc− voltages.

AC CURRENT TRANSFORMERS (ACCTs)

The SHVM board provides 10:1 current transformer (CT) attenuation for the ac line currents (phase A and phase C) if required. This attenuation is jumper selectable. Attenuation is required above 144 mA main line ACCT secondary current (rated dc current/ACCT ratio) because the CT burden resistors on the SDCI and DCFB Power Supply Boards are not rated to handle more than 144 mA. Attenuation should be bypassed when the main line ACCT secondary current is less than 144 mA. See Table 1.

NOTE

The 10:1 CT attenuation (if used) must be compensated for when setting the burden scaling switches on the SDCI or DCFB Power Supply Board.

LINE VOLTAGE ATTENUATORS L1, L2, L3

These attenuators are used to attenuate the ac line voltage, if required, due to the ac line voltage magnitude and generator field rating. If attenuation is not required, then jumpers are to be placed in the bypass position. Attenuators should be selected as follows: (See Table 1.)

- Bypassed if the main ac line is 240 – 600 V
- Included if the main ac line is 601 – 1000 V

DC BRIDGE VOLTAGES P1 and P2

The dc positive and dc negative voltage resistor strings are used to attenuate dc voltage, if required, due to field voltage ratings. Configurable jumpers are used to scale the dc bus voltage feedback. The setting for these jumpers is based on the nominal main ac RMS input voltage. Voltage resistor string attenuators should be bypassed if the main ac line is 240 – 600 V and included if the main ac line is 601 – 1000 V. See Table 1.

APPLICATION DATA

WARNING

The SHVM board is a high voltage interface board with board hardware floating at feedback voltage potential. There is a potential for high voltage to be applied to the board even when the control power is deenergized. Verify that all high voltage input is also deenergized before making any hardware adjustments or changing the board.

BOARD HARDWARE

The SHVM board includes configurable jumpers, wiring plug connectors, and stab connectors (there are no LEDs, fuses, testpoints, or switches) as part of the board. These items are described in the following paragraphs of this section.

CONFIGURABLE JUMPERS (JP)

All SHVM boards include 17 configurable jumpers for attenuation selection. Refer to Figure 1 for the locations of the jumpers (JP) and to Table 1 for the descriptions and settings of all jumpers.

BOARD CONNECTORS

The SHVM board interfaces with other boards and devices of the drive via eight plug connectors (designated _PL) and eighteen stab connectors. See Figure 1 for an SHVM board layout diagram showing the locations of the connectors and see Tables 2 – 9 for the pin signals of each connector. See Table 10 for stab connector descriptions.

The connector tables are organized as follows:

- **Table 2** – CT1PL Connector
- **Table 3** – CT3PL Connector
- **Table 4** – DC1PL Connector
- **Table 5** – DC2PL Connector
- **Table 6** – 1CPL Connector
- **Table 7** – SQPL Connector
- **Table 8** – IA1PL Connector
- **Table 9** – IA2PL Connector

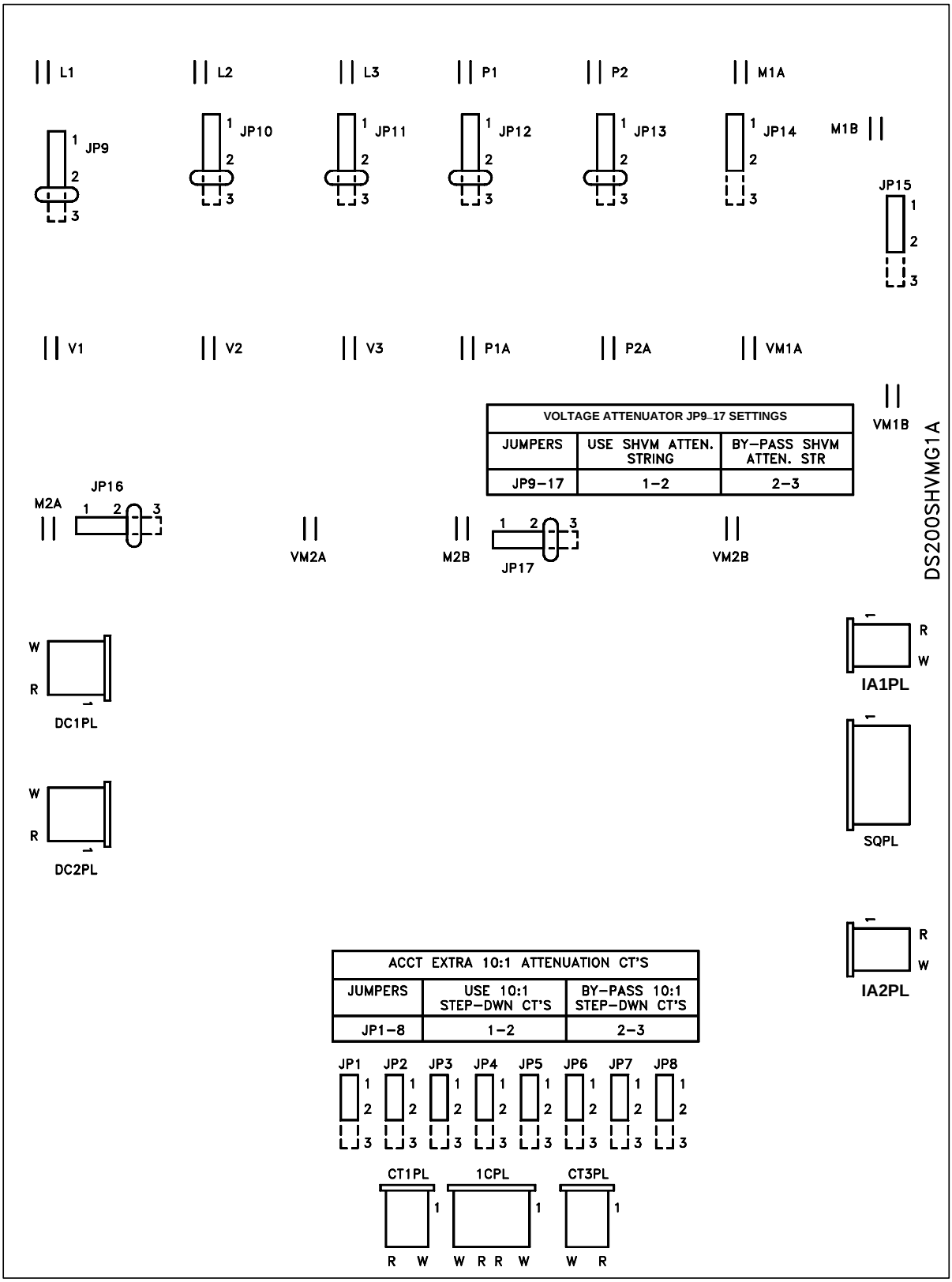

Figure 5-18. SHVM Board Layout

Table 1. SHVM Board Jumper Settings

Revision	Name	Description
All	JP1 – JP8	Selects 10:1 attenuation for phase A (JP1 – JP4) and phase C (JP5 – JP8) current transformers (CTs) Jumpers JP1-JP8 should be set to the same position, either selecting or bypassing the SHVM board's 10:1 CT attenuation for the ac line currents. Attenuation is required above 144 mA main line ACCT secondary current (Rated dc current/ACCT ratio) because the CT burden resistors on the SDCI and DCFB Power Supply Boards are not rated to handle > 144 mA. Be sure to compensate for the 10:1 current attenuation when setting the burden scaling switches on the SDCI or DCFB board. 1.2 Insert 10:1 attenuator, ACCT current > 144 mA 2.3 Bypass 10:1 attenuator, ACCT current ≤ 144 mA
All	JP9	Selects line voltage phase L1 attenuator string for 240 – 600 V ac JP9, JP10, and JP11 are used together to scale the ac line voltage feedbacks. 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP10	Selects line voltage phase L2 attenuator string for 240 – 600 V ac (see JP9) 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP11	Selects line voltage phase L3 attenuator string for 240 – 600 V ac (see JP9) 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP12	Selects positive dc bus voltage attenuator string for 240 – 600 volts (P1) JP12 and JP13 are used together to scale the dc bus voltage feedback. However, the settings for JP12 and JP13 are based on the nominal main ac rms input voltage. 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP13	Selects negative dc bus voltage attenuator string for 240 – 600 volts (P2) (see JP12) 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP14	Selects motor voltage #1 M1A attenuator string for 240 – 600 volts JP14 and JP15 are used together to scale the motor voltage #1 voltage feedback. However, the settings for JP14 and JP15 are based on the nominal main ac rms input voltage. 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP15	Selects motor voltage #1 M1B attenuator string for 240 – 600 volts (M1B) (see JP14) 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP16	Selects motor voltage #2 M2A attenuator string for 240 – 600 volts JP16 and JP17 are used together to scale the motor voltage #2 voltage feedback. However, the settings for JP16 and JP17 are based on the nominal main ac rms input voltage. 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts
All	JP17	Selects motor voltage #2 M2B attenuator string for 240 – 600 volts (see JP16) 1.2 Insert attenuator, Main ac = 601 – 1000 volts 2.3 Bypass attenuator, Main ac = 240 – 600 volts (bypass attenuator)

Table 2. Connector CT1PL, Current Transformer Input To SHVM Board

Pin No.	Nomenclature	Description
CT1PL-1	--------	L1 ACCT current negative input (–), white.
CT1PL-2	--------	L1 ACCT current positive input (+), red.

Table 3. Connectors CT3PL, Current Transformer Input To SHVM Board

Pin No.	Nomenclature	Description
CT3PL-1	--------	L3 ACCT current negative input (–), white.
CT3PL-2	--------	L3 ACCT current positive input (+), red.

Table 4. Connector DC1PL, Shunt Input To SHVM Board

Pin No.	Nomenclature	Description
DC1PL-1	--------	Shunt 1 positive connection (+), red.
DC1PL-2	--------	Shunt 1 negative connection (–), white.

Table 5. Connector DC2PL, Shunt Input To SHVM Board

Pin No.	Nomenclature	Description
DC2PL-1	--------	Shunt 2 positive connection (+), red.
DC2PL-2	--------	Shunt 2 negative connection (–), white.

Table 6. Connector 1CPL, I/O Between SHVM Board and Power Supply Board

Pin	Nomenclature	Description
1CPL-1	--------	L1 ACCT current output, white.
1CPL-2	--------	L1 ACCT current output, red.
1CPL-3	--------	L3 ACCT current output, red.
1CPL-4	--------	L3 ACCT current output, white.

Table 7. Connector SQPL, I/O Between SHVM Board and Power Supply Board

Pin	Nomenclature	Description
SQPL-1	ACNP	25 kHz positive power (+) from power supply board.
SQPL-2	ACNN	25 kHz negative power (–) from power supply board.
SQPL-3	ACNACOM	25 kHz power common.
SQPL-4	ACNACOM	25 kHz power common.

Table 8. Connector IA1PL, I/O Between SHVM Board and Power Supply Board

Pin	Nomenclature	Description
IA1PL-1	--------	Motor armature current (DC1) shunt differential VCO positive output (+), 0 to 500 kHz, red.
IA1PL-2	--------	Motor armature current (DC1) shunt differential VCO negative output (–), 0 to 500 kHz, white.

Table 9. Connector IA2PL, I/O Between SHVM Board and Power Supply Board

Pin	Nomenclature	Description
IA2PL-1	--------	Motor armature current (DC2) shunt differential VCO positive output (+), 0 to 500 kHz, red.
IA2PL-2	--------	Motor armature current (DC2) shunt differential VCO negative output (–), 0 to 500 kHz, white.

Table 10. SHVM Board Stab Terminal Connections

Stab	Description
L1	Ac voltage attenuator input.
L2	Ac voltage attenuator input.
L3	Ac voltage attenuator input.
M1A	Motor #1 attenuator positive input (+).
M1B	Motor #1 attenuator negative input (–).
M2A	Motor #2 attenuator positive input (+).
M2B	Motor #2 attenuator negative input (–).
P1	Dc bridge attenuator positive input (+).
P1A	Dc bridge attenuator positive output (+).
P2	Dc bridge attenuator negative input (–).
P2A	Dc bridge attenuator negative output (–).
V1	Ac voltage attenuator output.
V2	Ac voltage attenuator output.
V3	Ac voltage attenuator output.
VM1A	Motor #1 attenuator positive output (+).
VM1B	Motor #1 attenuator negative output (–).
VM2A	Motor #2 attenuator positive output (+).
VM2B	Motor #2 attenuator negative output (–).

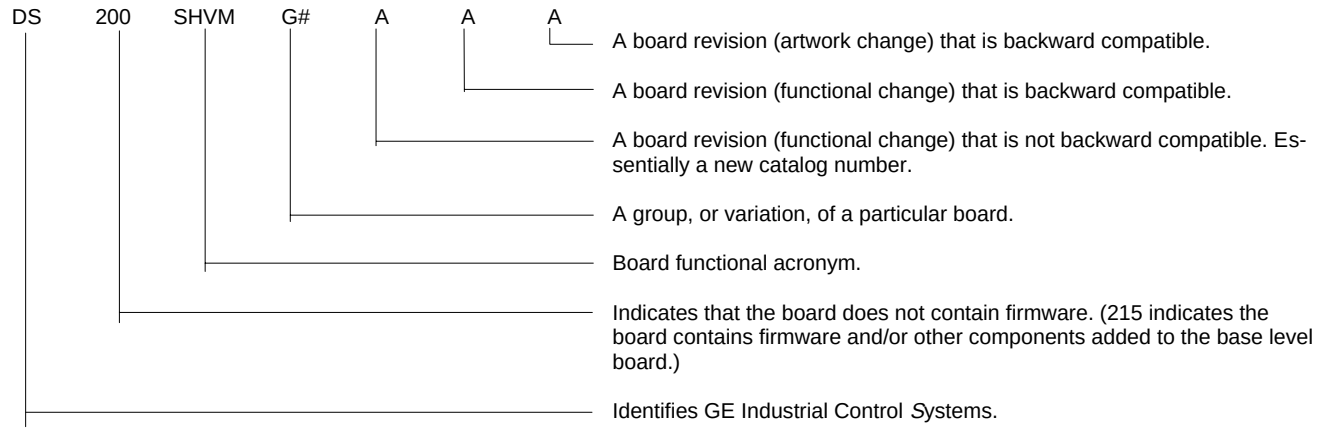

Figure 2. Sample Board Part Number, DS Series

RENEWAL/WARRANTY REPLACEMENT

BOARD IDENTIFICATION

A printed wiring board is identified by an alphanumeric part (catalog) number stamped on its edge. For example, the SCR High Voltage M-Frame Interface Board is identified by part number DS200SHVMG#ruu. (See Figure 2 for part number breakdown.)

NOTE

All digits are important when ordering or replacing any board.

WARRANTY TERMS

The GE Industrial Control Systems Terms and Conditions brochure details product warranty information, including the **warranty period** and **parts and service** coverage.

The brochure is included with customer documentation. It may be obtained separately from the nearest GE Sales Office or authorized GE Sales Representative.

WARRANTY PARTS AND SERVICE

There are no end-user replaceable components on the SHVM board. If any components on the board fail, the board needs to be replaced as a unit.

To obtain a replacement board, or service assistance, contact the nearest GE Service Office.

Please have the following information ready to exactly identify the **part** and **application**:

- GE requisition or shop order number
- Equipment serial number and model number
- Board number and description

PROCEDURE FOR REPLACING BOARDS

WARNING

To prevent electric shock, turn off power to the drive, then test to verify that no power exists in the board before touching it or any connected circuits.

CAUTION

To prevent equipment damage, do not remove boards or connections, or re-insert them, while power is applied to the drive.

Treat all boards as static-sensitive. Use a grounding strap when changing boards or software chips, and always store boards in anti-static bags or boxes they were shipped in.

To replace an SHVM board:

1. **Turn off the power to the drive**, then wait several minutes for all the capacitors to discharge. Test any electrical circuits before touching them to ensure the power is off.

WARNING

The SHVM board is a high voltage interface board with board hardware floating at feedback voltage potential. There is a potential for high voltage to be applied to the board even when the control power is deenergized. Verify that all high voltage input is also deenergized before making any hardware adjustments or changing the board.

2. Access the SHVM boards as follows:
   a. Open the drive's cabinet door to access the printed wiring boards.
   b. Locate the SHVM board mounted on the drive's SCR assembly (secured to six nylon standoffs with six nylon nuts).

3. Carefully disconnect all cables from the SHVM board as follows:
   – Verify cables are labeled with the correct connector name (as marked on the board) to simplify reconnection.
   – For ribbon cables, grasp each side of the cable connector that mates with the board connector and gently pull the cable connector loose.
   – For cables with pull tabs, carefully pull the tab.

4. Remove the six nylon nuts from the nylon standoffs that hold the SHVM board in position, and remove the board.

NOTE

Because of upgrades, boards of different revision levels may not contain identical hardware. However, GE Industrial Control Systems assures compatibility of its replacement boards.

5. Verify that all jumpers on the new (replacement) SHVM board are set in the same position as they were on the old board, unless these instructions indicate otherwise.

6. Orient the new SHVM board in the same position as the one removed, install it onto the nylon standoffs, and secure it by fully tightening the six nylon nuts that were removed in step 4.

7. Reconnect all cables to the SHVM board as labeled that were removed in step 3. Ensure that cables are properly seated at both ends.

8. Close the drive cabinet doors.

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