

# **IMPULSE·G+ & VG+** *Series 4*

Adjustable Frequency/Vector Crane Controls

24/48/120 VAC Interface Card Instruction Manual



**MAGNETEK**  
MATERIAL HANDLING

April 2012  
Part Number: 144-23916-R2  
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**Part Number:** 144-23905 (24 VAC), 144-23906 (48 VAC), 144-23904 (120 VAC)

**Applicability:** G+/VG+ Series 4 Drives

**Introduction:** IMPULSE® G+/VG+ Series 4 S4IF interface card is designed to interface with 24/48/120 VAC user input and output devices. This eliminates the need for an additional interface relay or isolation circuitry.

The S4IF interface is designed to interface the use of 24, 48, or 120 VAC control logic circuits to eight digital inputs (S1 - S8), analog input/output signals, digital output signals, pulse input/output signals, and RS-485/422 communication signals with the G+/VG Series 4 drives. The interface card mounts directly to the control board CN4-1 connector (see Figure 4) on the drive.

**Receiving:** All equipment is tested against defect at the factory. Report any damage or shortage of the equipment received to the commercial carrier who transported the equipment.

Contains:

- 1 – 24 VAC, 48 VAC, or 120 VAC S4IF interface card
- 1 – Instruction manual

### Interface Specifications

The S4IF card has eight optically isolated input terminals which can be used to connect with the user input devices such as a pendant. Terminals S1 and S2 are typically used for the directional run commands (Forward and Reverse, Up and Down). All eight terminals are multi-function programmable terminals that can be used for speed control and other crane and hoist features. This allows you to assign various functions and performance features without having to rewire the drive.

The drive has four 250 VAC, 1.0 Amp relays for output devices. It includes three programmable multi-function output terminals.

**Table 1: S4IF Ratings**

Terminals S1 – S8		
S4IF Model	Voltage	Frequency
S4IF-120A60	120 VAC	60 Hz
S4IF-48A60	48 VAC	60 Hz
S4IF-24A60	24 VAC	60 Hz
S4IF-120A50	120 VAC	50 Hz

**Table 2: S4IF Terminal and Wire Specifications**

Terminal Symbol	Terminal Screw	Clamping Torque Lb-in (N-m)	Wire Range AWG (mm <sup>2</sup> )
TB1-TB6	M3	4.4 to 5.3 (0.5 to 0.6)	26 to 16 (Stranded: 0.14 to 1.5) (Solid: 0.14 to 1.5)

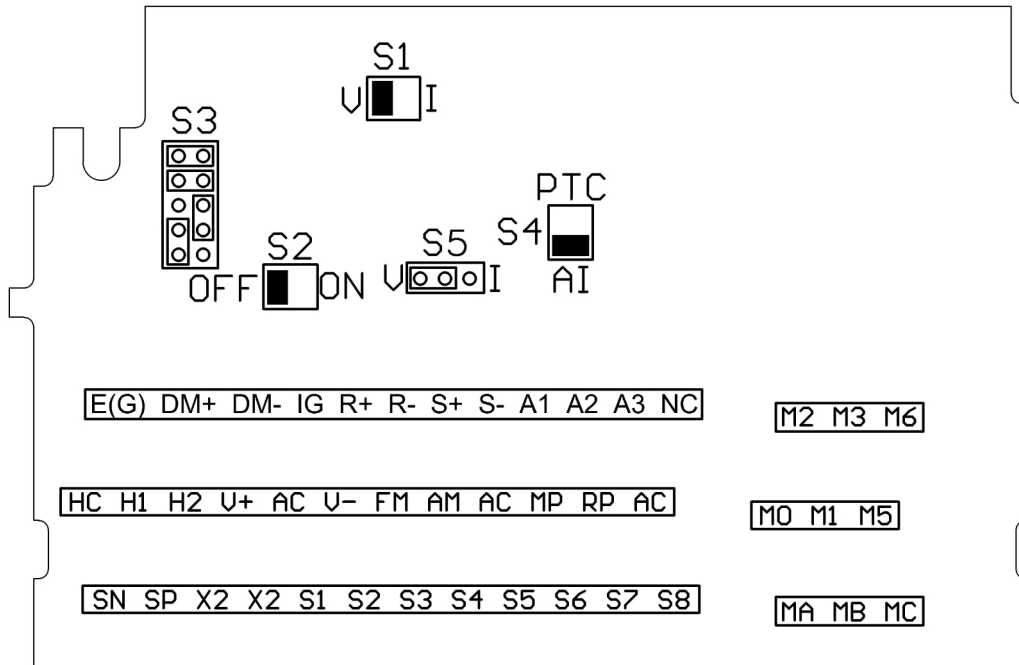


Figure 1: S4IF DIP Switches and Jumper locations

### DIP Switches

The functions of the DIP switches are shown in Table 3 below.

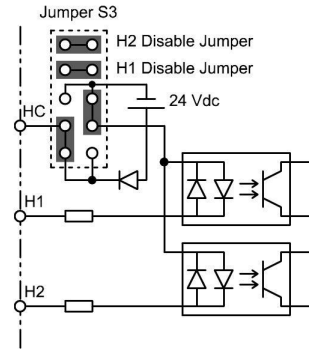
Table 3: DIP Switches

Name	Function	Setting
S1	Input signal level for analog input A2	V: 0 to 10 VDC or -10 to 10 VDC (internal resistance: 20Ω) <b>(default)</b> I: 4-20mA (internal resistance: 250 Ω)
S2	RS-485 and RS-422 terminating resistance	OFF: No terminating resistance <b>(default)</b> ON: Terminating resistance of 110 Ω
S3	Safe Disable / External Power Supply Selection	See Table 4
S4	Analog A3 input select	OFF: A3 is used as Analog Input 3 <b>(default)</b> ON: A3 is used with a Positive Temperature Coefficient (PTC) thermistor
S5	FM output signal level setting	V: 0 to 10 VDC or -10 to 10 VDC <b>(default)</b> I: 4 to 20mA



**Sinking/Sourcing Mode Selection for Safe Disable Inputs**

When using the Safe Disable inputs, S3 can be used to select the type of inputs (Sinking or Sourcing) and whether an internal or external power supply is used for the Safe Disable inputs H1 and H2 (as shown in Table 4). To enable, remove jumpers for H1 and H2 Safe Disable.



**Figure 2: S3 Settings When not Using Safe Disable Inputs (Default)**

**Table 4: Safe Disable Input Sink/Source/External Power Supply Selection**

Mode	Drive Internal Power Supply	External 24Vdc Power Supply
Sinking Mode (default)		
Sourcing Mode		



**Installation and Wiring:**

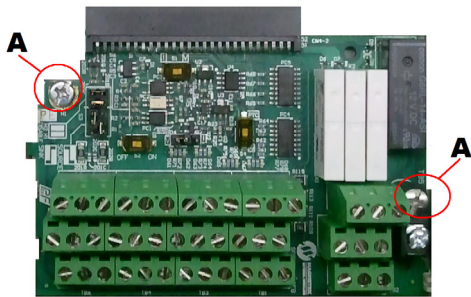


**WARNING**

HAZARDOUS VOLTAGE CAN CAUSE SEVERE INJURY OR DEATH. LOCK ALL POWER SOURCES FEEDING THE DRIVE AND THE S4IF INTERFACE CARD'S WIRING IN THE "OFF" POSITION

**Important:** When handling boards always use electro static discharge protection. Keep the boards in the ESD bag as long as you can. Do not lay the board on any surfaces without ESD protection. When handling, always hold the board from the edges and do not touch the components. Installation should be performed only by qualified personnel who are familiar with this type of equipment and the hazards involved, and have read this entire installation guide.

**Loosen to remove**



**Figure 3**



**Figure 4**

**Installation Steps:**

1. Prior to installation, record all modified parameters.
2. Set A01-05 = 7770 (this prepares all modified and user parameters for IF card removal).
3. Disconnect all electrical power to the drive.
4. Remove the drive's front cover.
5. Verify that the "CHARGE" indicator lamp inside the drive is OFF (may take up to 5 minutes).
6. Use a voltmeter to verify the voltage at the incoming power terminals (L1, L2, and L3) has been disconnected.
7. Follow your local ESD procedures.
8. Loosen the two retaining screws (A) pictured in Figure 3.
9. Remove existing interface card by grasping each corner at TB6 and TB5 and slide down until free.
10. Return I/O board to ESD bag
11. Complete all main circuit terminal connections as the installation of the S4IF interface card may block wiring access.

*NOTE: Wires to the S4IF interface card should be stripped 0.2" ±20% for maximum system safety. Solder dipping or ferrules are also highly recommended.*

12. Insert the S4IF interface card by sliding it onto the side guides until it mates tightly into the CN4-1 connector.
13. Tighten the screws (A) pictured in Figure 3.
14. Connect the command signals to the desired inputs of the S4IF interface card.
15. Refer to the IMPULSE®G+/VG+ Series 4 instruction manual for additional information regarding the S1, S2, S3, and S4 settings (see Table 5).
16. Reinstall and secure the drive's front cover.
17. Reconnect power to the drive.
18. Set A01-05 = 8880 (this moves all modified and user parameters to new IF card).
19. Verify modified parameters with those recorded in Step 1.



The table below outlines the functions of the S4IF interface card terminals.

**Table 5: Control Circuit Terminals**

Classification	Terminal	Signal Function	Description	Signal Level
Sequence Input Signal	S1	MFDI 1 (Run Forward)	Forward run when closed, stop when open (H01-01)	Photo-coupler isolation 120 VAC
	S2	MFDI 2 (Run Reverse)	Reverse run when closed, stop when open (H01-02)	
	S3	MFDI 3 (Speed 2)	Multi-function contact inputs (H01-03 to H1-08)	
	S4	MFDI 4 (Speed 3)		
	S5	MFDI 5 (Speed 4)		
	S6	MFDI 6 (Speed 5)		
	S7	MFDI 7 (External Fault)		
	S8	MFDI 8 (Microspeed Gain)		
	X2	MDFI Common	Multifunction input common	
Analog Input Signal	+V	Power supply for analog inputs	Positive supply for analog inputs	+10.5 VDC, 20 mA
	-V	Power supply for analog inputs	Negative supply for analog inputs	-10.5VDC, 20 mA
	A1	MFAI 1 (Master Frequency Reference)	Multi-function analog input reference (H03-02)	-10 to +10 V (20kΩ) 0 to +10 V (20kΩ)
	A2	MFAI 2 (Not Used)	Multi-function analog reference (H03-09)	-10 to +10 V (20kΩ) 0 to +10 V (20kΩ) 4 to 20 mA (250Ω)
	A3	MFAI 3 (Master Frequency Reference)	Auxiliary analog input (H03-05)	-10 to +10 V (20kΩ) 0 to +10 V (20kΩ)
	AC	Analog Common	0 V	0 V
	E(G)	Ground for shielded lines and option cards	Earth ground	0 V
Relay Output Signal	M0	MFDO (Brake Release)	Multi-function digital output	Form A Relay: 250 VAC, 1 A 30 VDC, 1 A
	M1			
	M2	MFDO (X-Press Programming)	Multi-function digital output	Form A Relay: 250 VAC, 1 A 30 VDC, 1 A
	M3			
	M5	MFDO (X-Press Programming)	Multi-function digital output	Form A Relay: 250 VAC, 1 A 30 VDC, 1 A
	M6			
	MA	Fault annunciate Terminals MA-MC: N/O Terminals MB-MC: N/C	Terminals MA & MC N/O; closed at major faults Terminals MB & MC N/C open at major fault	Form C Relay: 250 VAC, 1 A 30 VDC, 1 A
	MB			
MC				



Classification	Terminal	Signal Function	Description	Signal Level
Analog Output Signal	FM	MFAO 1 (Output frequency)	Multi-function analog monitor (H04-01 to H04-03)	-10 to +10 V, 2 mA 0 to +10 V, 2 mA 4 to 20 mA
	AC	Analog Common	Analog Common	0V
	AM	MFAO 2 (Output current)	Multi-function analog monitor 2 (H04-04 to H04-06)	-10 to +10 V, 2 mA 0 to +10 V, 2 mA
Pulse I/O Signal	RP	Multi-Function Pulse Train Input	Pulse input frequency reference (H06-01)	Input Freq: 0 to 32 kHz Duty Cycle: 30 to 70% High Level: 3.5 to 13.2 VDC Low Level: 0 to 0.8 VDC Input Impedance: 3kΩ
	MP	Pulse train output (Output frequency)	Pulse output frequency (H06-06)	32 kHz (max)
RS-485/422	R+	Receive (+)	For 2-wire RS-485, jumper R+ and S+ and jumper R- and S-	RS-485/422 Line Driver 115.2 kbps (max)
	R-	Receive (-)		
	S+	Transmit (+)		
	S-	Transmit (-)		
	IG	Shield connection	Isolated serial communication ground	0V
Safe Disable	H1	Safe Disable input 1	Safe Disable input 1	24 VDC, 8 mA Internal Impedance: 3.3kΩ
	H2	Safe Disable input 2	Safe Disable input 2	
	HC	Safe Disable common	Safe disable common	0 V
	DM+	Safety monitor output	Safety monitor output	48 VDC, 8 mA
	DM-	Safety monitor output common	Safety monitor output common	0 V

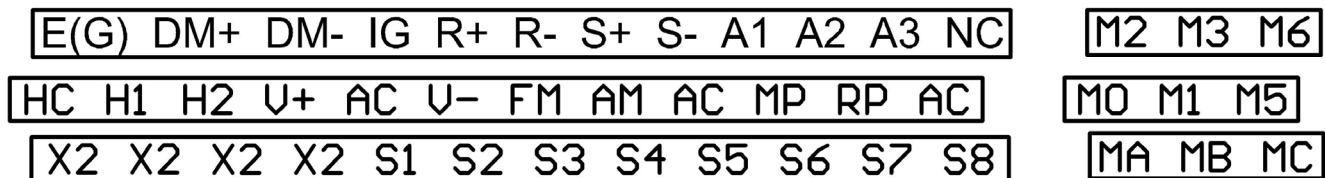


Figure 5: S4IF Circuit Terminal Diagram