September 2024 / **Bulletin 100-50-13.1**

Sporlan PSD5 Interface Board GC/FGB Valve Driver

Installation and Operation Instructions

SPORLAN

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CONTENTS

1. SAFETY INFORMATION

Notice

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazard. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
CAUTION indicates a dangerous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Parker for any consequences arising out of the use of this material.
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Intended Use

The products described in this document are analog positioners for Sporlan bipolar stepper electronic Gas Cooler and Flash Gas Bypass valves. The products may only be used in compliance and in accordance with all applicable safety regulations and directives, the specified requirements, and the technical data. They must be adequately protected from water and dust with regard to the application. The product is suitable for use in household refrigeration appliances and/or similar equipment and has been tested in accordance with the referenced UL standards. Any use other than the use explicitly permitted is prohibited and can result in unanticipated hazards.

Prohibited Use

Any use other than that expressed above under Intended use is strictly prohibited.

Liability and Residual Risks

The liability of Parker is limited to the correct and professional use of the product according to the directives referred to herein and in the other supporting documents, and does not cover any damage (including but not limited to) the following causes:

- unspecified installation/use and, in particular, in contravention of the safety requirements of the legislation in force in the country of installation and/or specified in this document;
- use on equipment which does not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- use on devices which allow access to dangerous parts without the aid of tools and/or which do not have a keyed locking mechanism;
- product tampering and/or alteration;
- installation/use on equipment that does not comply with the regulations in force in the country of installation.

Disposal

The equipment (or product) must be subjected to separate waste collection in compliance with local legislation regarding waste disposal. Standards in force on waste disposal.

Document scope

This document describes the PSD5V1SD devices in application as a valve driver for Sporlan GC/FGB valves including information on installation and wiring.

Use the document to:

- Install and use your PSD5V1SD device
- Become familiar with the functions of the PSD5V1SD device

NOTE: Read this document and all related documents before installing, operating, or maintaining the PSD5V1SD-010 or PSD5V1SD-420.

Related Documents

TITLE	REFERENCE
PSD5V1SD-010 / PSD5V1SD-420 Instruction Sheet	LIT-SD-481
Gas Cooler/Flash Gas Bypass Valves	Bulletin 100-80

You can download these technical publications and other technical information from our website at https://discover.parker.com/Sporlanliterature

⚠ WARNING

LOSS OF CONTROL

- When applying this equipment, consider the potential failure modes of control paths and for any critical control functions. Provide a means to achieve a safe state during and after a path failure Examples of critical control functions are emergency stop, power outage and restart.
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use valves and accessories approved by Sporlan for use with this equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

2. INTRODUCTION

2.1 GENERAL INFORMATION

The PSD5 is a small valve positioner that extends the functionality of an external system controller to drive Sporlan Gas Cooler and Flash Gas Bypass valves. The external controller must provide an analog 0-10vdc or 4-20mA signal to the PSD5. The signal is then converted to a step motor signal to position the valve. the PSD5 is approved for use with the GC and FGB series valves only; not the GCM.

2.2 FEATURES

- Driver for Sporlan Gas Cooler and Flash Gas Bypass valves
- Digital input for forcing attached valve to closed position
- Valve state displayed via LED indicator

In this manual, the photographs and drawings help to demonstrate the PSD5V1SD-010 and PSD5V1SD-420 are purely illustrative. The relative dimensions and proportions may not correspond to the actual dimensions, nor are actual size or in scale. Moreover, all wiring and electrical diagrams are to be considered as simplified representations which may not correspond to the actual application.

2.3 MODELS

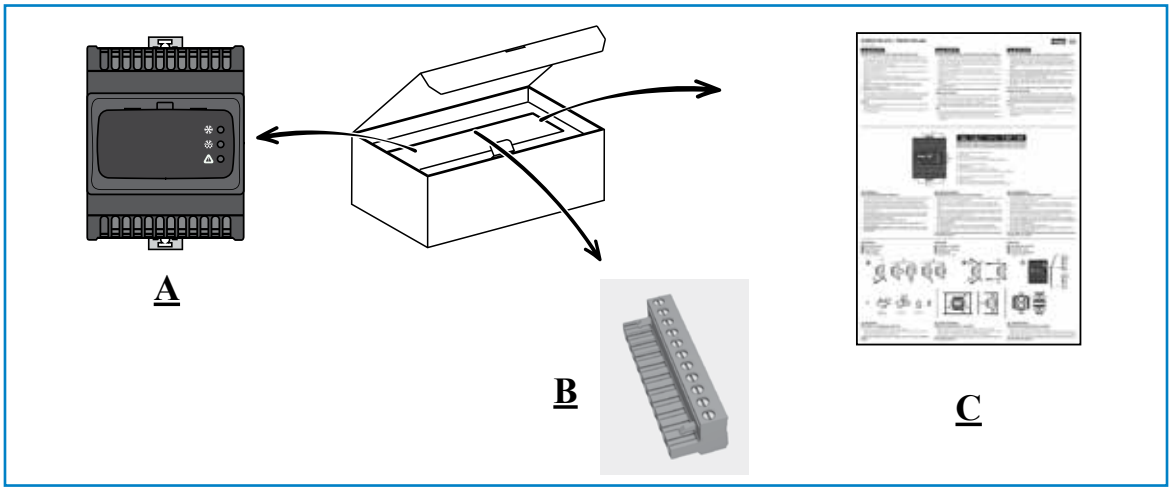
PART NUMBER	ITEM NUMBER	CONTROL INPUT
PSD5V1SD-010	952581	0 - 10V
PSD5V1SD-420	952583	4 - 20mA

The following valves are compatible with the PSD5V1SD-010 and PSD5V1SD-420

VALVE MODELS					
SPORLAN GC	-10	-20	-30	-40	-50
SPORLAN FGB	-60		-70		

Reference Bulletin 100-80 for valve information

2.4 PACKAGE CONTENTS



LABEL	CONTROLLER TERMINAL
A	PSD5V1SD-010 or PSD5V1SD-420
B	11 position removable screw terminals qty 2
C	Instruction Sheet SD-481

2.5 OPERATING ENVIRONMENT

This equipment has been designed to operate outside of any hazardous location and exclusive of application that generate, or have the potential to generate, hazardous atmospheres. Only install this equipment in zones and applications known to be free, at all times, of hazardous atmospheres.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Install and use this equipment in non-hazardous locations only.
- Do not install and use this equipment in applications capable of generating hazardous atmospheres, such as those applications employing flammable refrigerants.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate this equipment according to the conditions described in the Environmental Characteristics.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

2.6 INSTALLATION CONSIDERATIONS

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, ARC FLASH OR FIRE

- Disconnect power from all equipment including connected devices, prior to removing any covers or doors, or installing or removing the PSD5V1SD-010 or PSD5V1SD-420 valve drivers.
- Always use the correctly rated voltage sensing device to confirm the power is off.
- Replace and secure all covers, accessories, hardware, cables and wires after installation or service
- Verify the earthing connections on all earthed devices.
- Use only the specified voltage when operating this equipment.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Install and operate this equipment in an enclosure appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.
- Power line circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the PSD5V1SD-010 and PSD5V1SD-420 devices.
- Do not use this equipment in safety -critical machine functions unless the equipment is otherwise designated as functional safety equipment and conforming to applicable regulations and standards.
- Do not disassemble, repair, or modify this equipment.
- Do not connect any wiring to unused connections, or to connections designated as No Connection (NC).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For mechanical dimensions, see **'MECHANICAL CHARACTERISTICS'** on page 15.

- The PSD5V1SD-010 and PSD5V1SD-420 are intended for Top Hat Section Rail (DIN rail) mounting or panel mounting.
- Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors are vulnerable to electrostatic discharge.

⚠ WARNING

INCORRECT OPERATION OF EQUIPMENT DUE TO ELECTROSTATIC DISCHARGE

- Store the equipment in the packaging until ready for installation.
- The device must only be installed in type-approved cabinets and/or in points that prevent unauthorized access and provide protection from electrostatic discharge.
- Before handling the device, always discharge the static electricity from the body by touching an earthed surface or type-approved anti-static mat.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

3. INSTALLATION

3.1 DIN RAIL MOUNTING

DIN Rail mounting of the PSD5V1SD-010 and PSD5V1SD-420:

1. Move the lower locking clip at the bottom outwards as shown in the diagram below (lever with a screwdriver or similar tool). Be sure to keep the upper locking clip located on top fully inserted.
2. Mount the device on the DIN rail.
3. Press the clips inwards to lock.

NOTE: Once assembled on the DIN rail, verify that the spring locking devices are fully engaged.

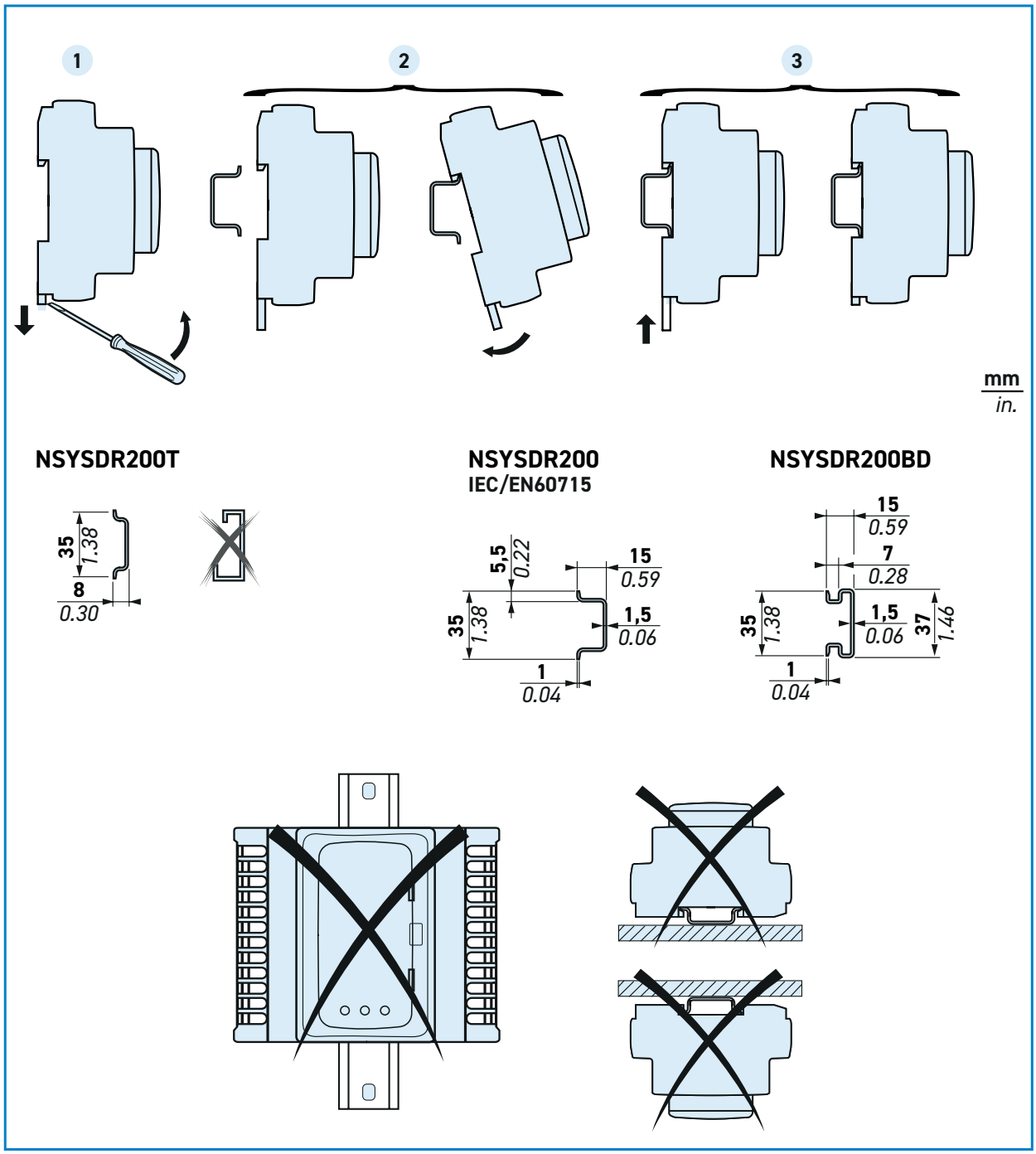


Fig. 1. DIN Rail Installation

3.2 PANEL MOUNTING

Panel mounting the PSD5V1SD-010 and PSD5V1SD-420:

1. Move the two locking clips outwards as shown in the diagram below (lever with a screwdriver or similar tool)
2. Mount the device on the Panel
3. Secure the device with two screws (not provided)

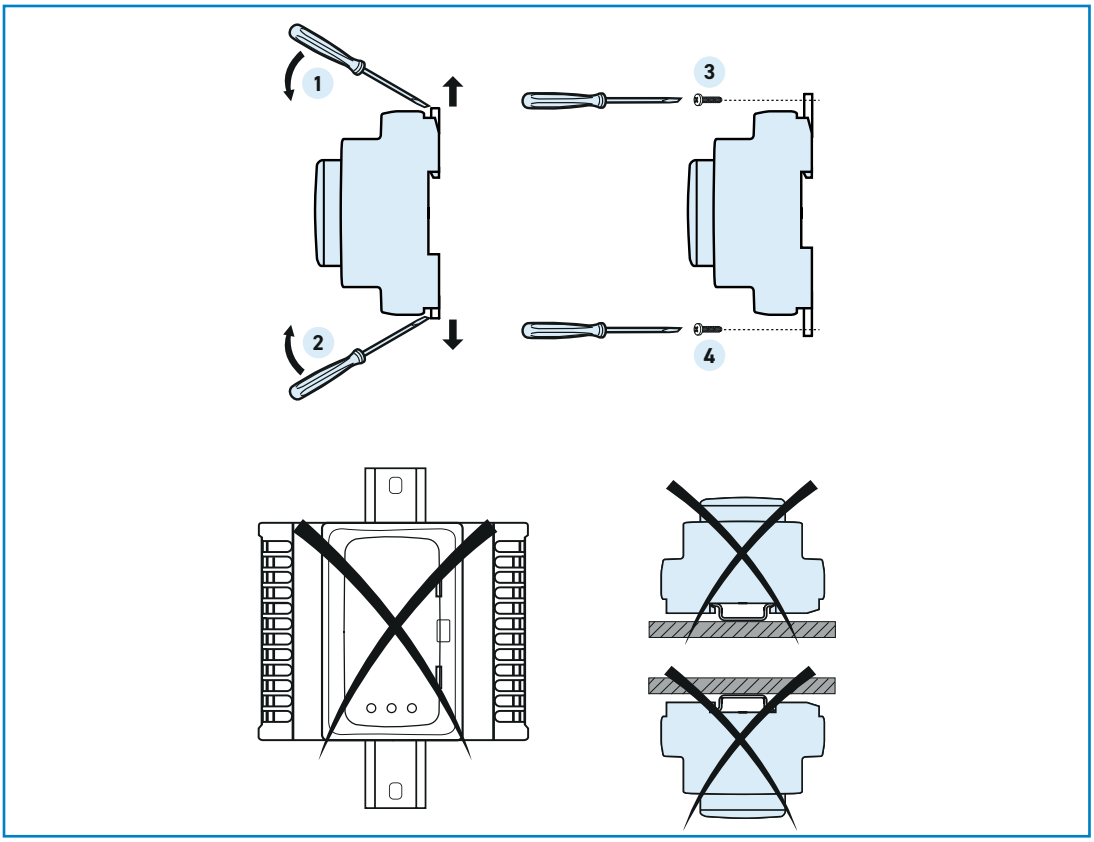


Fig. 2. Panel Installation

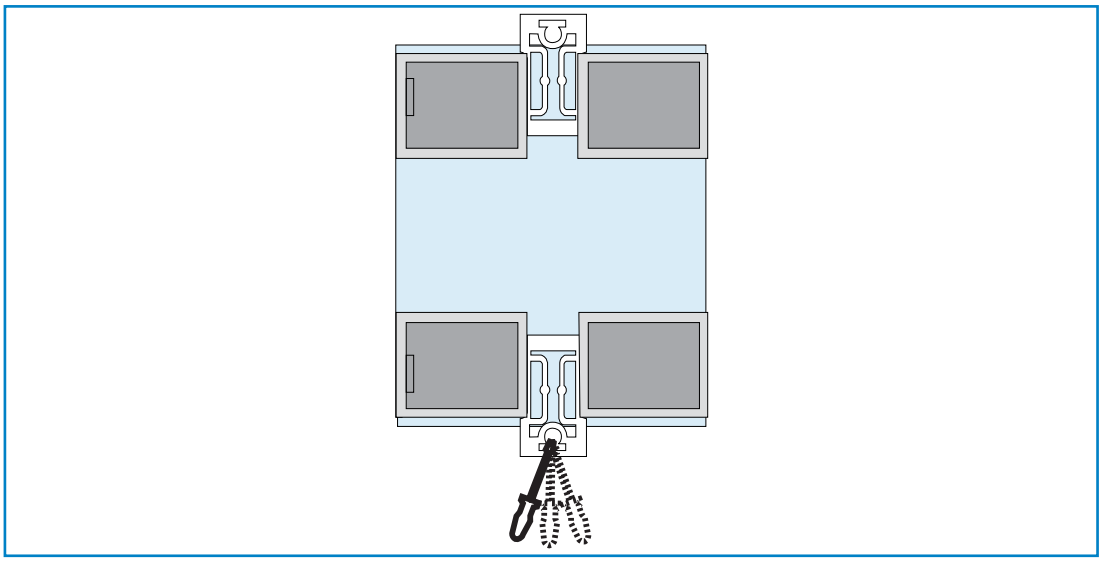


Fig. 3. Detail of Spring Hooking Devices

The PSD5V1SD-010 and PSD5V1SD-420 are designed as an IP20 product and are to be installed only in type-approved cabinets and/or in points that block access to unauthorized persons.

When installing the device, comply with these distances:

- Between PSD5V1SD-010 or PSD5V1SD-420 and all sides of the cabinet (including the panel door).
- The terminal boards on the PSD5V1SD-010 or PSD5V1SD-420 and the wiring cable trays.

NOTE: These distances reduce the electromagnetic interference between the device and the wiring cable trays.

- The PSD5V1SD-010 or PSD5V1SD-420 and the other heat-generating devices installed in the same cabinet.

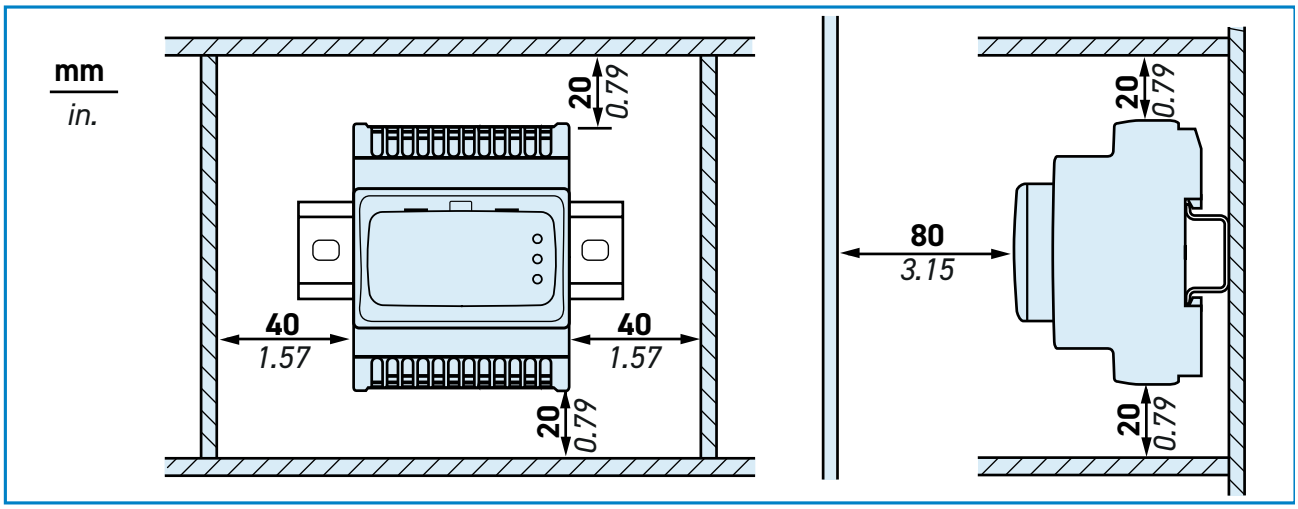


Fig. 4. Distances

⚠ WARNING

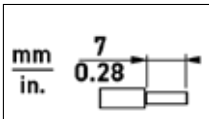
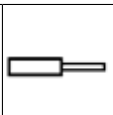
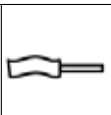
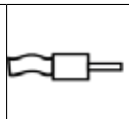
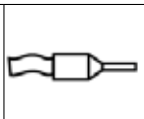
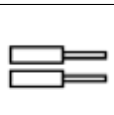
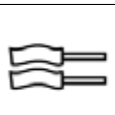
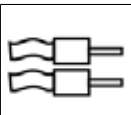
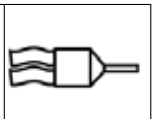
UNINTENDED EQUIPMENT OPERATION

- Install the device in a point that guarantees the minimum distances from all structures and adjacent equipment as indicated in this document.
- Install all equipment in accordance with the technical specifications given in this document

Failure to follow these instructions can result in death, serious injury, or equipment damage.

4. WIRING

The following table presents acceptable cable types and wire sizes for wiring to the PSD5V1SD-010 and PSD5V1SD-420 screw terminals.

								
mm²	0.2 - 2.5	0.2 - 2.5	0.2 - 2.5	0.2 - 2.5	2 x 0.2 - 1	2 x 0.2 - 1.5	2 x 0.25 - 1	2 x 0.5 - 1.5
AWG	24 - 14	24 - 14	22 - 14	22 - 14	2 x 24 - 18	2 x 24 - 16	2 x 22 - 18	2 x 20 - 16

 0 3,5 mm (0.14 in.)		N•m	0.5 - 0.6
		lb-in	4.42 - 5.31

The use of copper conductors is required.

⚠ ⚠ DANGER

LOOSE WIRING CAN RESULT IN ELECTRIC SHOCK

- Tighten connections in conformance with the torque specifications.
- Do not insert more than one wire per connector of the terminal block unless using the cable ends (ferrules) specified above.

Failure to follow these instructions can result in death or serious injury.

4.1 WIRING DIAGRAMS

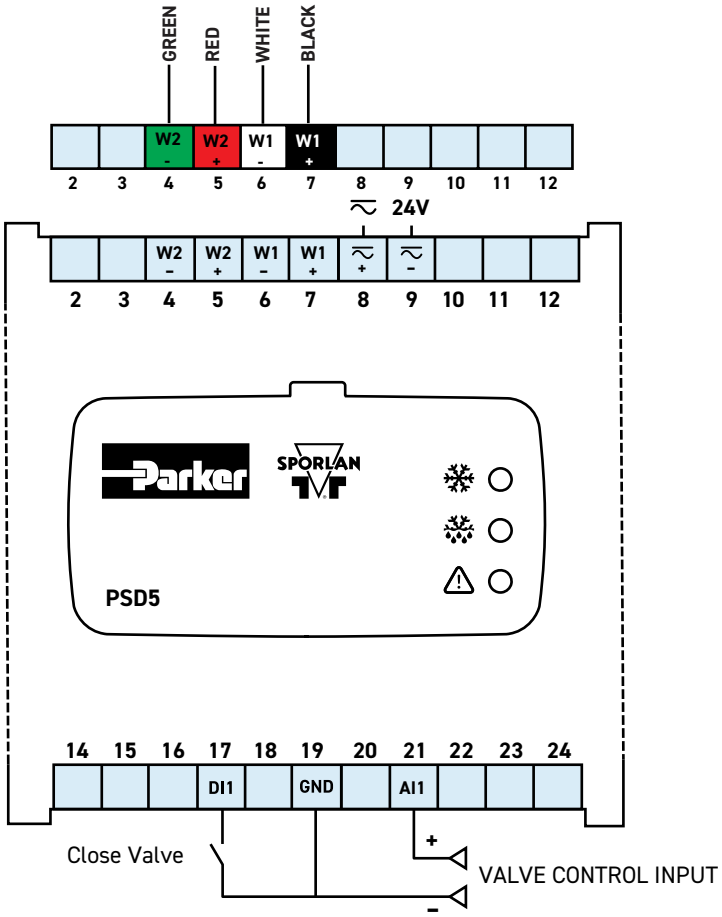
NOTICE
INOPERABLE DEVICE Verify all wiring connections before applying power. **DO NOT** Apply voltage or make connection to NC terminals **Failure to follow these instructions can result in equipment damage.**

4.2 PSD5V1SD-010 / PSD5V1SD-420

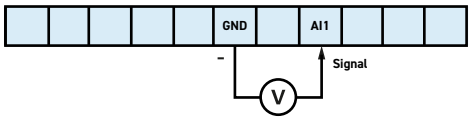
	LABEL	TERMINAL	DESCRIPTION
NC	---	2	Terminal not used.
NC	---	3	Terminal not used.
STEPPER VALVE OUTPUT	W2-	4	Green valve wire
	W2+	5	Red valve wire
	W1-	6	White valve wire
	W1+	7	Black valve wire
POWER SUPPLY	~ / +	8	Power supply V+ / ~ Observe polarity if using DC power supply
	~ / -	9	Power supply V- / ~ Observe polarity if using DC power supply
NC	---	10	Terminal not used.
NC	---	11	Terminal not used.
NC	---	12	Terminal not used.
NC	---	25	Terminal not used.
NC	---	26	Terminal not used.
NC	---	27	Terminal not used.
NC	---	14	Terminal not used.
NC	---	15	Terminal not used.
NC	---	16	Terminal not used.
DIGITAL INPUT	DI1	17	Digital Input 1, pumpdown signal
NC	---	18	Terminal not used.
GROUND	GND	19	0V (GND) common connection for: Digital Input DI1 and Analog Input AI1
NC	---	20	Terminal not used.
ANALOG INPUT	AI1	21	Analog input 1(Positive (+) connection for 0-10V or 4-20mA)1
NC	---	22	Terminal not used.
NC	---	23	Terminal not used.
NC	---	24	Terminal not used.

[1] 0-10Vdc for PSD5V1SD-010. 4-20mA for PSD5V1SD-420

	Valve	Reference document
PARKER/SPORLAN	Models GC /FGB	Bulletin 100-80



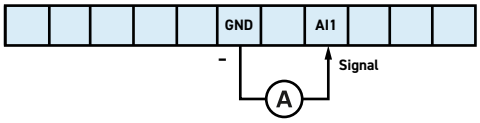
PSD5V1SD-010 – Control Voltage Input Connection



Connect 0-10VDC control input between GND and AI1.

NOTICE
Do not apply voltages over 11 V to the controllers analog input.
Failure to follow these instructions can result in equipment damage.

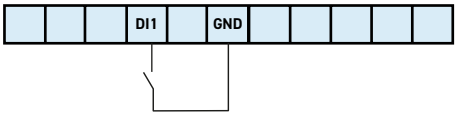
PSD5V1SD-420 – Control Current Input Connection



Connect 4-20mA control input between GND and AI1.
NOTE: 100 Ohm Input Impedence

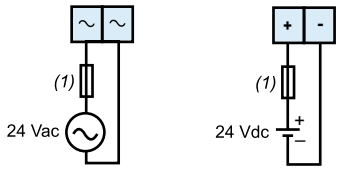
NOTICE
Do not apply currents over 30mA to the controllers analog input.
Failure to follow these instructions can result in equipment damage.

PSD5V1SD-010 and -420 – Digital Input



Connect relay/switch dry contact to DI1 to force valve closed on switch/relay contact closure.
NOTE: Do not apply external power supply to the dry contact digital inputs.
Failure to follow these instructions can result in equipment damage.

PSD5V1SD-010 and -420 – Power Input



[1] Use Type T Fuse 3.15A

Fig. 12. PSD5V1 SD-010 / PSD5V1SD-420 Wiring Diagram

5. ENVIRONMENTAL CHARACTERISTICS

The PSD5V1SD-010 and PSD5V1SD-420 are IP20 rated.

They must be installed in a NEMA 1 cabinet or other location protected from exposure to liquids and involuntary contact with high voltages. Use metal cabinets to improve the immunity of the PSD5V1SD-010 and PSD5V1SD-420 to electromagnetic fields.

This device meets the UL requirements indicated in the table below.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Do not exceed any of the nominal values specified in the "General specifications" tables.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- The application of incorrect current and voltage values to the analog input may damage the electronic circuits.
- Applying a 4-20mA signal to the PSD5V1SD-010 analog input or connecting a voltage signal to the PSD5V1SD-420 analog input will damage the electronic circuits.

NOTICE

INOPERABLE DEVICE

- Do not apply voltages over 11 V to the PSD5V1SD-010 analog input.
- Do not apply currents over 30 mA to the PSD5V1SD-420 analog input.
- Ensure that the signal applied corresponds to the PSD5V1SD device.

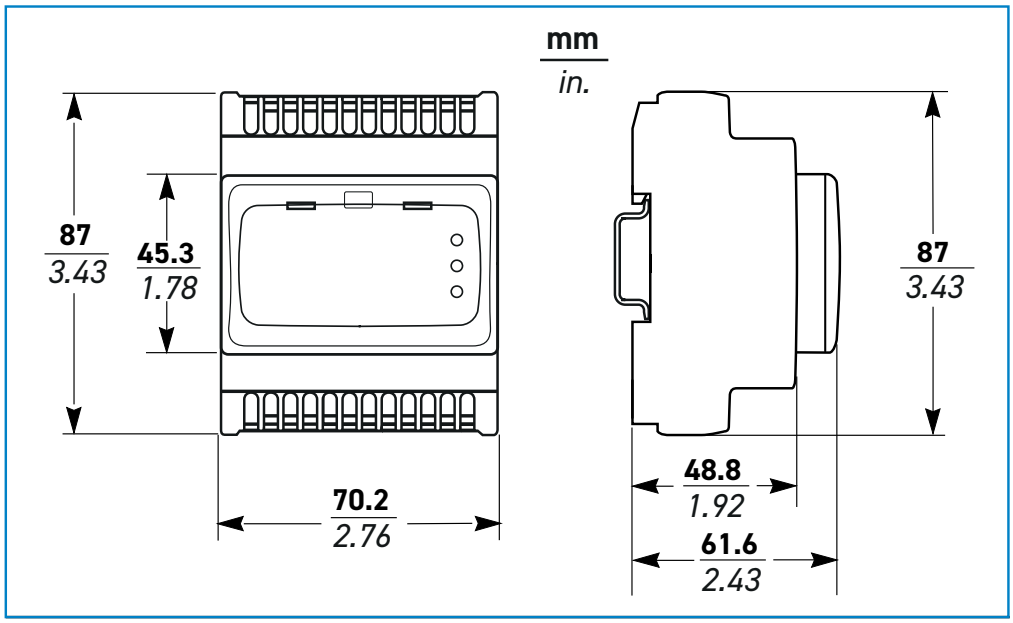
Failure to follow these instructions can result in equipment damage.

6. GENERAL SPECIFICATIONS

FEATURE	DESCRIPTION
The product complies with the following standards:	UL 60730-1 / UL 60730-2-9
Construction of control:	Incorporated Control
Purpose of control:	Operating Control. Driver for electronic valve (Non-safety related)
Method of mounting control:	DIN Rail or Panel mounting
Pollution degree:	2
Overvoltage category:	2
Rated impulse voltage:	2500 V
Software class:	A
Degree of protection provided by enclosure:	IP20 (Open type)
Environmental front panel rating	Open Type
Loads:	Refer to the section "Input/Output characteristics"

DESCRIPTION	VALUE
Power supply:	24 Vac/dc (±10 %), Class 2 Source
Power supply frequency:	50/60 Hz
Power draw (maximum):	35 VA / 25 W maximum
Ambient operating conditions:	Temperature: -10...65 °C (14...149 °F) Humidity: 10...90% RH (non-condensing)
Transportation and storage conditions:	Temperature: -20...85 °C (-4...185 °F) Humidity: 10...90% RH (non-condensing)
Maximum terminal temperature for internal conductors:	105 °C (221 °F)
Classification of control according to protection against electric shock:	Class II control intended for use in Class I equipment
Power supply fuse	Fuse type T 3.15 A

7. MECHANICAL CHARACTERISTICS



7.1 INPUT / OUTPUT CHARACTERISTICS

I/O	DESCRIPTION	NOTES
Analog input	PSD5V1SD-010: 0 -10V	Impedance: 21K Ω, 11Vdc Max.
	PSD5V1SD-420: 4 - 20mA	Impedance: 100 Ω, 30mA Max.
Digital input	Voltage-free (Dry Contact) digital input	Closure current to ground: 0.5 mA Typ.
Electronic Valve output	W1+W1- / W2+W2-	24 Vdc , 0.8 A Max.

NOTICE
INOPERABLE EQUIPMENT
Do not apply external power supply to the dry contact digital input.
Failure to follow these instructions can result in equipment damage.

8. POWER SUPPLY

The PSD5V1SD-010 and PSD5V1SD-420 can be powered at a voltage of 24 Vac (±10%) 50/60 Hz or 24 Vdc.

NOTE:

- Fuse power to the PSD5V1SD-010 and PSD5V1SD-420 using a Type T Fuse 3.15A.
- For AC supply use only Class 2 transformer.
- For DC supply use only SELV DC supply.

⚠ ⚠ DANGER

AN EARTH LOOP CAUSES ELECTRICAL SHOCK AND/OR DAMAGE TO THE EQUIPMENT

- Do not connect the 0 V (GND) power supply/transformer connection supplying this equipment to any external ground (earth) connection.

Failure to follow these instructions will result in death or serious injury.

If the specified voltage is not maintained, the equipment may operate unintentionally or become inoperable.

WARNING

POTENTIAL OF OVERHEATING AND FIRE

- Do not connect the equipment directly to line voltage.
- Use only isolating SELV, Class 2 power supplies/transformers to supply power to the equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The device must be connected to an appropriate power supply/transformer with the following characteristics:

9. USER INTERFACE

	LED	COLOR	ON	FLASHING	OFF
	EEV	Green	Power On	Valve closed / Valve closing on digital switch input closure	Power outage
	Not Used	Yellow	Not Used / Always OFF	Not Used / Always OFF	Always OFF
	Alarm	Red	-	1 Analog Input < 4mA	No Alarm

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