Danfoss S2X Microcontroller Instructions

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Danfoss S2X Microcontroller

Specifications
Description
The Danfoss S2X Microcontroller is a multi-loop controller designed for mobile off-highway control system applications. It is environmentally hardened with the capacity to control multiple electrohydraulic systems either independently or as part of a network.

Features

- Response speed and capacity for controlling dual-path hydrostatic propel systems
- Support for closed-loop speed, horsepower, and position control systems
- Interface with a variety of analog and digital sensors
- Re-programmable firmware for flexibility in device functions
- Aluminum die-cast housing with three connectors for electrical connections

Technical Data

- 4 Analog Inputs (0 to 5 Vdc)
- 4 Speed Sensors (dc-coupled)
- 1 Speed Sensor (ac-coupled)
- 9 Digital Inputs (DIN)

Product Usage Instructions

Installation

1. Ensure power is off before installation.
2. Connect P1 and P2 connectors to the appropriate ports on the controller.
3. Use P3 connector for RS232 communications.

Firmware Installation

1. Download desired firmware code from a computer via the RS232 port.
2. Follow instructions to install the firmware onto the S2X Microcontroller.

Sensor Connection

1. Connect analog sensors to the designated analog inputs.
2. Connect speed sensors to the corresponding speed sensor ports.
3. Use digital inputs for monitoring external switch positions.

FAQ

- Q: Can the S2X Microcontroller be reprogrammed in the field?
  A: Yes, both factory and in-field programming are possible, allowing for flexibility in device functions.
- Q: What type of sensors can be interfaced with the S2X Microcontroller?
  A: The controller can interface with analog sensors such as potentiometers, Hall-effect sensors, pressure sensors, as well as speed sensors and encoders.
- Q: What is the maximum number of servo loops that can be used with the S2X Microcontroller?
  A: Up to four bi-directional servo loops can be utilized with the S2X Microcontroller.

DESCRIPTION

- Danfoss S2X Microcontroller is a multi-loop controller that is environmentally hardened for mobile off-highway control system applications. The S2X Microcontroller has the response speed and capacity to control multiple electrohydraulic control systems either as a stand-alone controller or networked with other similar controllers via a high-speed Controller Area Network system.
- The S2X is ideally suited for dual-path hydrostatic propel systems incorporating closed-loop speed and horsepower control. Additionally, closed-loop position control systems using servovalves and proportional flow control valves are easily accomplished. Up to four bi-directional servo loops can be used.
- The controller can interface with a wide variety of analog and digital sensors such as potentiometers, Hall-effect sensors, pressure sensors, pulse pickups and encoders.

- The use of the I/O features and the control actions performed are defined by firmware installed in the S2X's program memory. The firmware is typically installed by downloading the desired code from another computer via the RS232 port. Re programmability provides a high level of device function flexibility. Either factory or in-field programming is possible.
- The S2X controller consists of a circuit board assembly inside of an aluminum die-cast housing. Three connectors, designated as P1, P2 and P3 are provided for electrical connections. P1 (30 pin) and P2 (18 pin) are the main I/O and power connectors; together they mate to the 48 pin board-mounted header, which protrudes through the bottom of the enclosure. P3 is a circular connector for RS232 communications such as reprogramming, displays, printers and terminals.

FEATURES

- Multi-loop control capability for control of 4 bidirectional servo loops or 2 bidirectional and 4 unidirectional loops.
- Powerful 16-bit Intel 8XC196KC microcontroller:
  - fast
  - versatile
  - controls multiple machine functions with fewer parts.
- Controller Area Network (CAN) provides high speed serial communications with up to 16 other CAN compatible devices and meets the speed requirements of SAE network Class C specifications.
- Rugged aluminum die-cast housing withstands the environmental rigors typically found in mobile applications.
- Four-character LED display provides information for setup, calibration, and troubleshooting procedures.
- Flash memory accessible through a dedicated RS232 port. Allows programming without changing EPROMs.
- Hardened power supply operates over the full range of 9 to 36 Volts with reverse battery, negative transient, and load dump protection.
- Convenient RS232 port connector for data communication with other devices such as displays, printers, terminals, or personal computers.
- Expandable via an internal 50-pin connector for cus-tom I/O boards.

ORDERING INFORMATION

- For complete hardware and software ordering information, consult the factory. The S2X ordering number assigns both hardware and software.
- For product structure information see page 5.
- Mating I/O Connector: order Part Number K12674 (bag assembly)
- Mating RS232 Connector: order Part Number K13952 (bag assembly)

SOFTWARE FEATURES

S2X software architecture is designed to utilize Danfoss state-of-the-art application software engineering tools including the Kernel operating system, Danfoss Control Objects and Packages, and WebGPI graphical user's interface. Danfoss software engineering methodology allows application software transportability across microcontroller platforms and facilitates rapid engineering of a wide range of mobile machine control solutions including:

- Engine anti-stall and load controls

- Automotive control
- Wheel assist
- Closed loop speed control
- Pressure control
- Closed loop dual path control
- Position control such as machine elevation, gravity reference and coordinated cylinder position
- Steering control for auto steering and coordinated steer-ing requirements
- Application rate control
- Networking

TECHNICAL DATA

INPUTS

- 4 Analog (DIN 0, 1, 2, 3) (0 to 5 Vdc) -intended for sensor inputs (10 bit resolution). Protected against shorts to ground.
- 4 Speed Sensors (PPU 0, 1, 2, 3) (dc-coupled) -for use with solid state zero speed pulse pickups and encoders, any of which can be configured as general purpose analog inputs.
- 1 Speed Sensor (PPU 4) (ac-coupled) -for use with alternators or variable reluctance pulse pickups.
- g Digital Inputs (DIN) -for monitoring external switch position status for pull up (to 32 Vdc) or pull down (to <1.6 Vdc).
- 4 Optional Membrane Switches (DIN 12) -located on housing face.

OUTPUTS

- 2 Low Current – bidirectional current drivers (±275 mA maximum into a 20 ohm load). Protected for shorts to ground.
- 4 High Current – 3 amp drivers, either ON/OFF or under PWM control.These can be used to drive 12 or 24 Vdc on/off solenoids, servo valves or proportional valves. Short circuit limited to 5 amps.
- Optional Display

COMMUNICATION

- Controller Area Network (CAN) for communications with other CAN compatible devices. Supports CAN 2.0A/ 2.0B standards
- RS232 port connected through a 6-pin MS connector.

POWER SUPPLY

- Voltage range 9 to 36 Vdc.
- 5 Vdc regulator for external sensor power (up to 0.5 amp) which is short-circuit protected.

MEMORY

- See Hardware Structure, page 5.

LEDs

- 4-character alphanumeric LED display; each character is a 5×7 dot matrix.
- 2 LED indicators, one LED used as a power indicator, the other LED under software control for use as fault or status indication.

ELECTRICAL CONNECTIONS

- 48-pin board-mounted Metri-Pak I/O connector mates with a 30-pin and 18-pin cable connector.
- 6-pin circular MS connector for RS232 communication.

ENVIRONMENTAL

- **OPERATING TEMPERATURE** -40°C to +70°C (-40° F to 158° F)

MOISTURE

- Protected against 95% relative humidity and high pres-sure washdowns

VIBRATION

- 5 to 2000-Hz with resonance dwell for 1 million cycles for each resonant point run from 1 to 10 gs

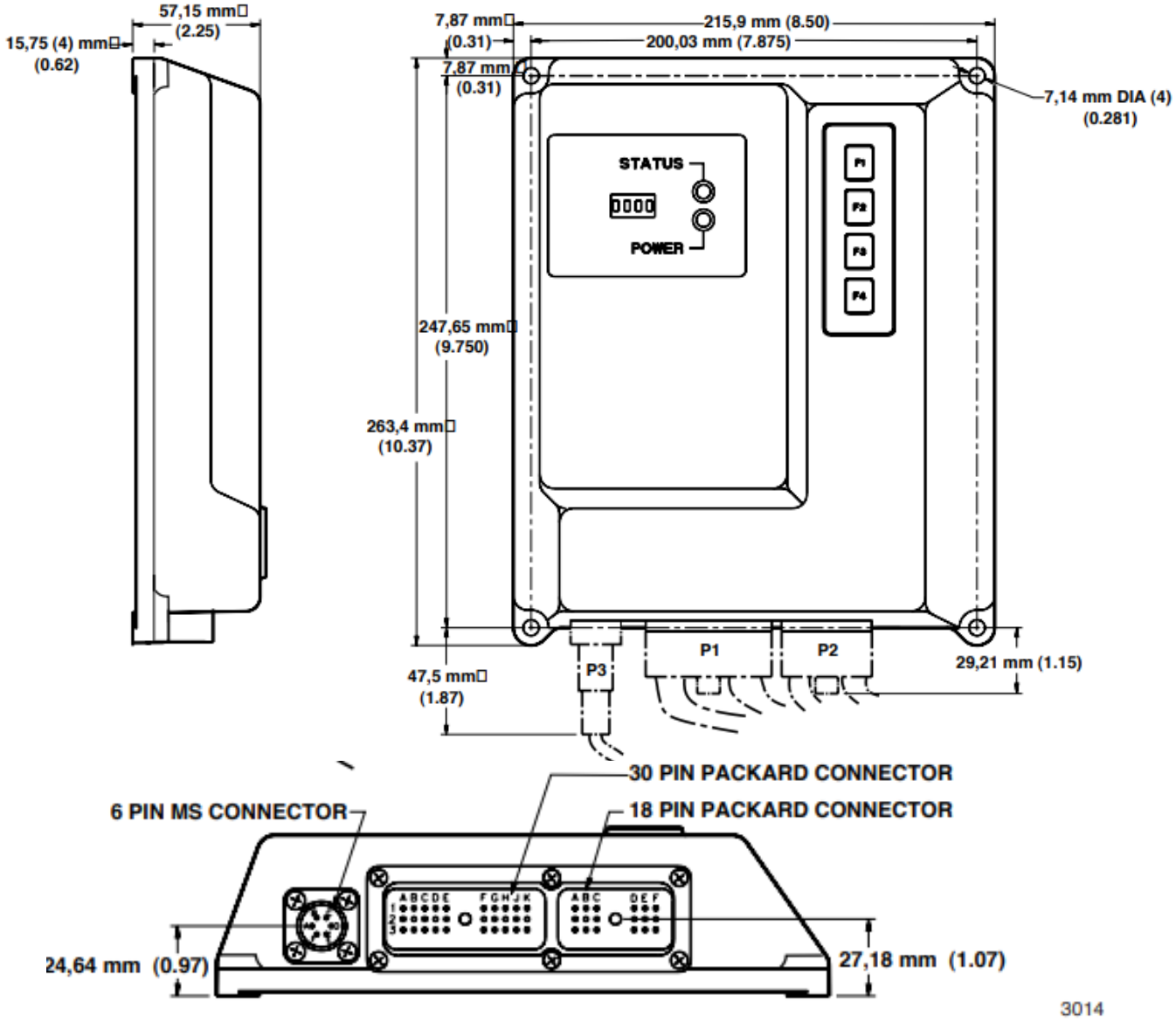
SHOCK

- 50 gs for 11 ms in all 3 axes for a total of 18 shocks

ELECTRICAL

- Withstands short circuits, reverse polarity, over voltage, voltage transients, static discharges, EMI/RFI and load dump.

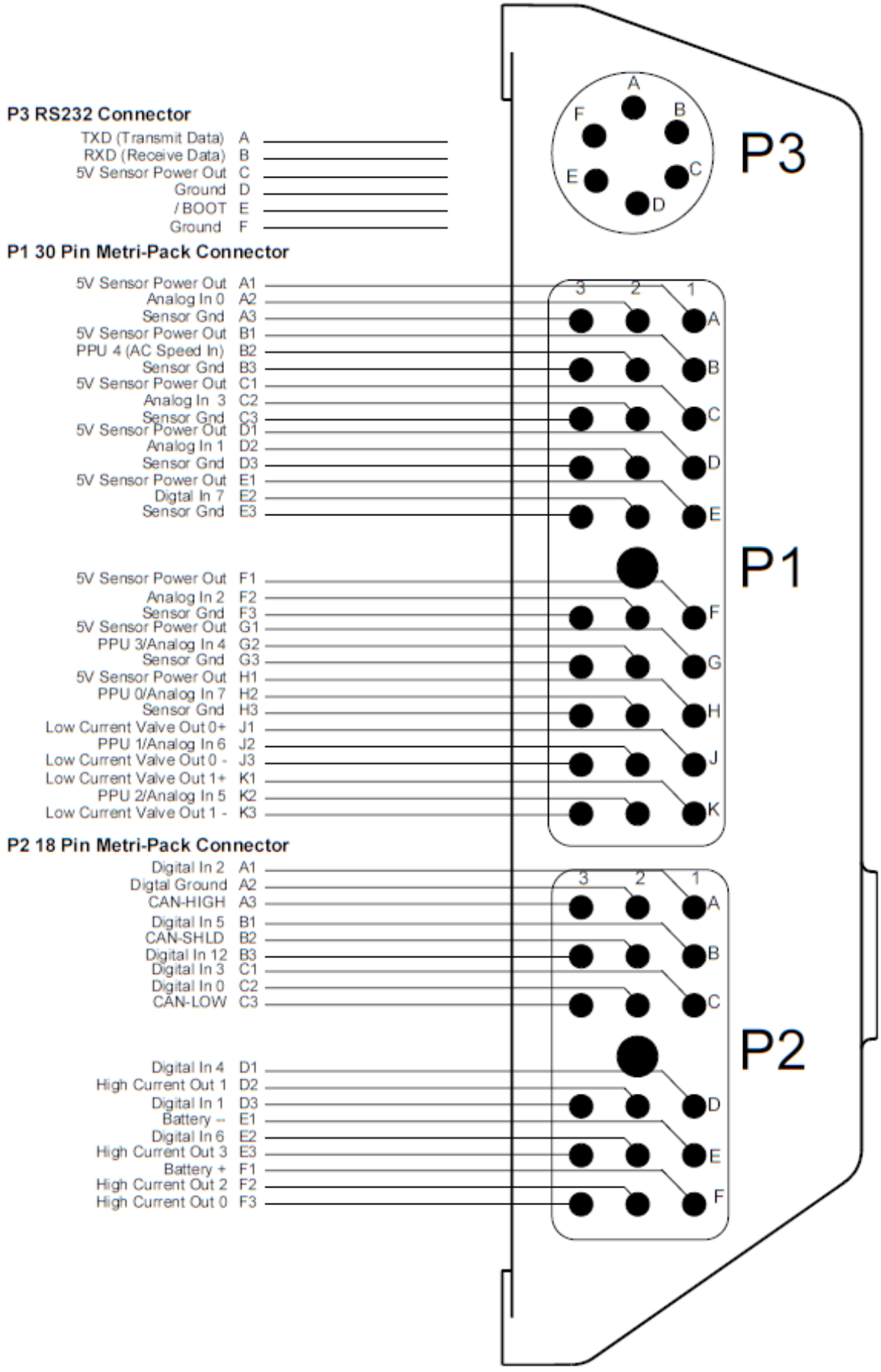
DIMENSIONS



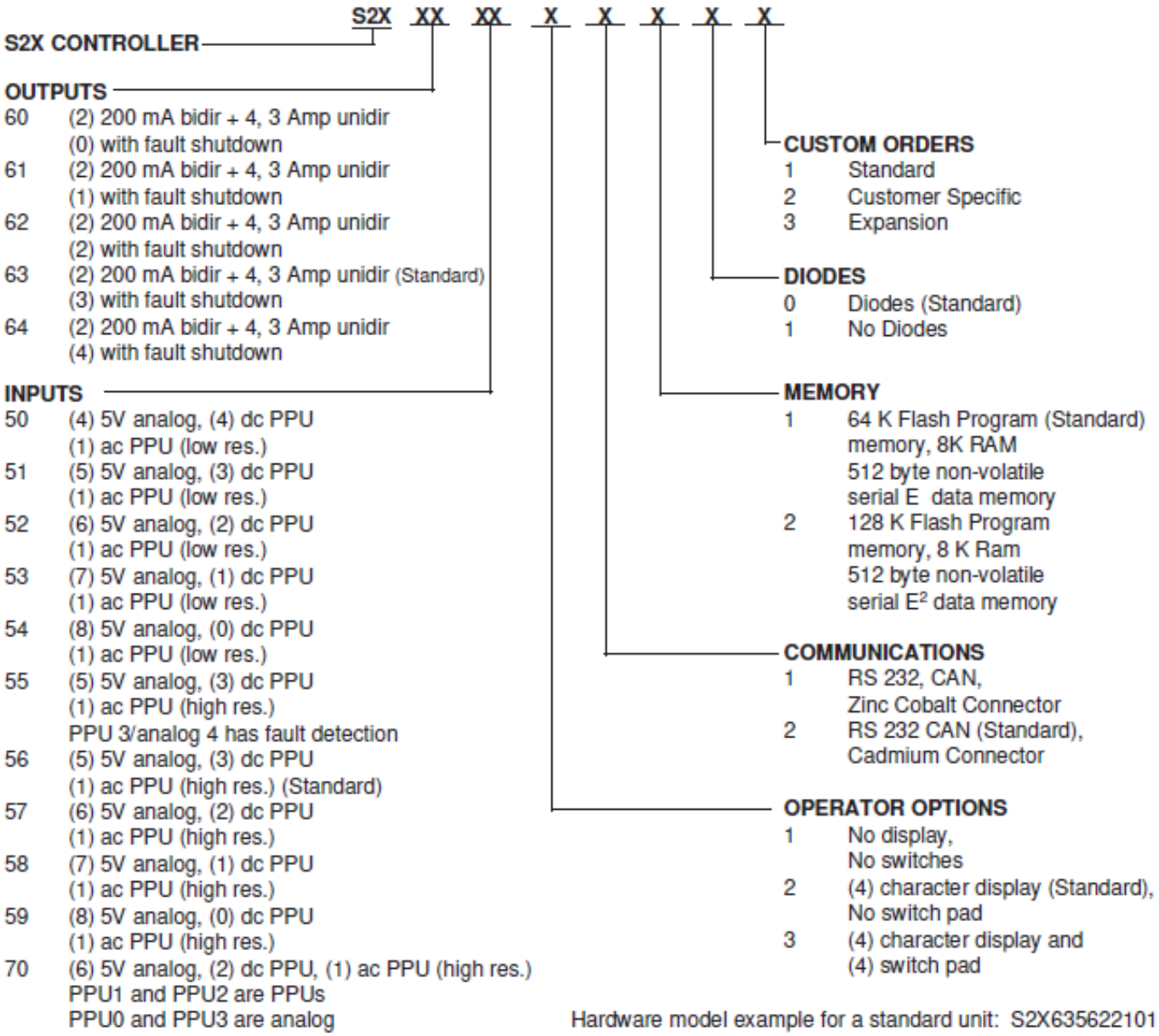
Dimensions in Millimeters (Inches).

Danfoss recommends standard installation of the controller to be in the vertical plane with connectors facing down.

CONNECTOR PINOUTS



HARDWARE STRUCTURE



Hardware model example for a standard unit: S2X635622101

CUSTOMER SERVICE

NORTH AMERICA
ORDER FROM

- Danfoss (US) Company
- Customer Service Department
- 3500 Annapolis Lane North
- Minneapolis, Minnesota 55447
- Phone: (763) 509-2084
- Fax: (763) 559-0108

DEVICE REPAIR

- For devices in need of repair, include a description of the problem, a copy of the purchase order and your name, address and telephone number.

RETURN TO

- Danfoss (US) Company
- Return Goods Department
- 3500 Annapolis Lane North Minneapolis, Minnesota 55447

EUROPE
ORDER FROM

- Danfoss (Neumünster) GmbH & Co. Order Entry Department
- Krokamp 35
- Postfach 2460
- D-24531 Neumünster
- Germany
- Phone: 49-4321-8710
- Fax: 49-4321-871355

Documents / Resources

	Danfoss S2X Microcontroller [pdf] Instructions S2X Microcontroller, S2X, Microcontroller

References

- User Manual