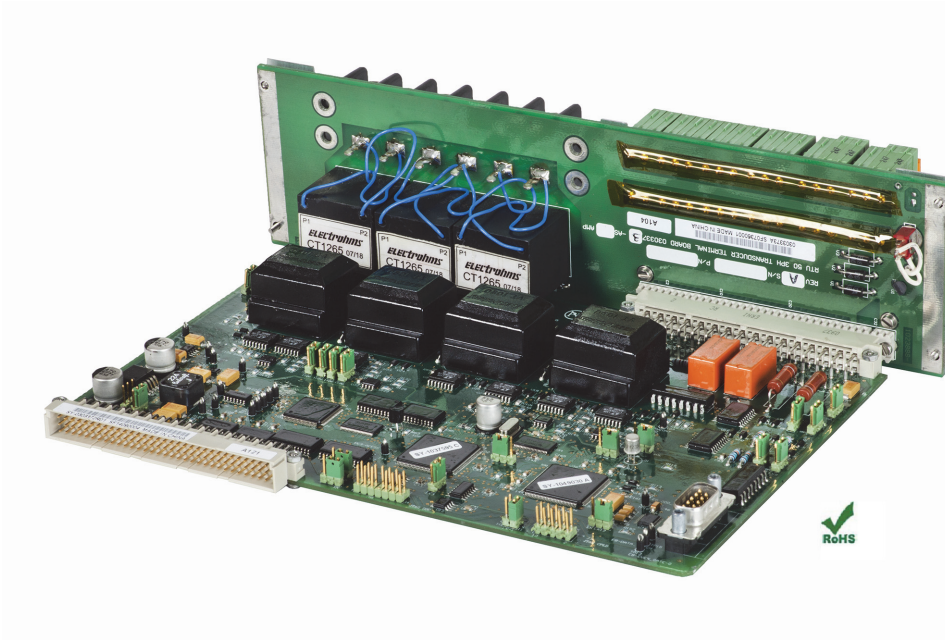


Foxboro Evo™ Remote Terminal Unit (RTU)
3 Phase Digital Transducer Module



OVERVIEW

The 3 Phase Digital Transducer Module provides a direct interface to voltage and current transformers, replacing the need for external transducers.

The onboard digital signal controller uses voltage and current inputs to calculate the electrical quantities of frequency, voltage, current, phase angle, sine of current phase angle, power, power factor, Volt-ampere reactive (VARs), Volt Ampere (VA), and positive, negative and zero phase sequence voltage.

NOTE

This module is plug compatible with the Foxboro Evo SCD6000 and SCD5200 RTUs.

FEATURES

- ▶ Simultaneous sampling eliminates skew error
- ▶ Replaces Mega Watt (MW), Mega Volt Ampere Reactive (MVAR), Megavolt Amperes (MVA), voltage, current, frequency, and power factor transducers for single and three phase circuits
- ▶ Availability of voltage, frequency, and phase angle for a fourth voltage input
- ▶ Provides two digital inputs and outputs for use as additional I/O
- ▶ Provides 0.5% accuracy
- ▶ Operates at 40 MHz
- ▶ Current Transformers (CT) mounted on the terminal board can be disconnected without breaking the CT circuit
- ▶ Current Transformers (CT) and

Voltage Transformers (VT) can be connected in either a Star or a Delta configuration

- ▶ Current Transformers have dual windings to protect against open circuits
- ▶ Dual sync-check functions permit the RTU to automate circuit breaker closure synchronization interlocking and control

FUNCTIONAL DESCRIPTION

The main board contains the Digital Signal Controller (DSC), which has on-chip RAM, Flash, EEPROM, and four 4-channel 12-bit Analog/Digital Converters (ADC). This board also has amplifiers and

antialiasing filters.

VTs are mounted on this board. The interface to Electrobus is by a Dual Port Memory (DPRAM) on the main board. CTs are mounted on the terminal board to prevent the CT current loop from disconnecting.

Two 4-channel ADCs are used to simultaneously sample eight channels. This simultaneous sampling eliminates any skew error. Seven channels are used to provide the isolated transformer signals. The eighth channel is used to monitor temperature and allow dynamic temperature conversion. The temperature sensor is available on the DSC chip. Refer to Figure 1.

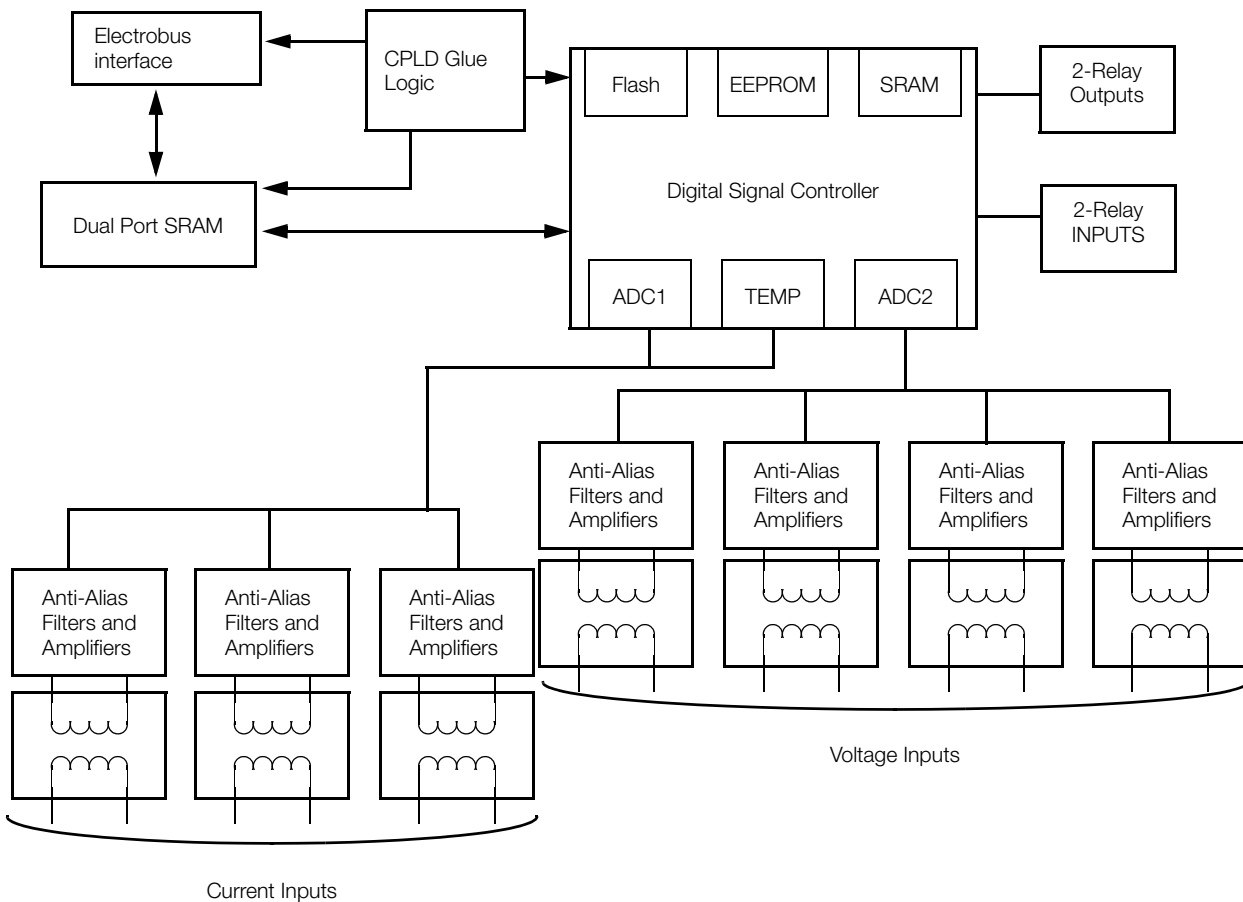


Figure 1. 3 Phase Digital Transducer Module Functional Block Diagram

Front Panel Inputs

Four voltage inputs are provided on the front panel, as shown in Figure 2. These are connected to voltage field transformers. Three of the inputs are normally used to measure the voltage upstream of a circuit breaker. The fourth input is used to measure the voltage downstream of the breaker and to synchronize the check application.

Three 2-terminal current inputs are provided, which are connected to current field transformers. These inputs are available in either 1 A or 5 A nominal signal configurations.

In addition, a utility digital input is provided, which follows the specifications of the SCD6000 Analog/Digital Input Module.

Front Panel Outputs

The front panel also has two digital outputs that meet the specifications of the SCD6000 pilot relay outputs. These outputs, along with the front panel digital inputs, are used to provide additional general purpose I/O.

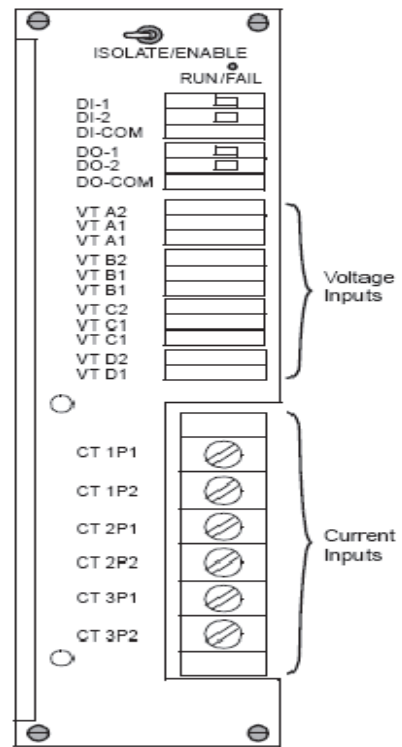


Figure 2. Front Panel

FUNCTIONAL SPECIFICATIONS

Limits of Nominal Range

VOLTS

Nominal 63.5 V or 110 V user configurable

AMPS

Current ranges of 1 A or 5 A based on the part number ordered

FREQUENCY

30%-110% (50 Hz and 60 Hz)

Overload Capacity

TWO HOUR CONTINUOUS OVERLOAD

Current Inputs

125% of nominal

Voltage Inputs

125% of nominal

SHORT DURATION

Current Inputs

20 times rated current for 2 seconds

Voltage Inputs

2 times rated voltage for 2 seconds

Isolation

2 kV rms

Anti-Aliasing Filter

7 x switched capacitor type

Temperature Reference

Onboard, Class 2 accuracy

Bandwidth

250 Hz

CPU Update Time

All quantities are updated every cycle; the CPU performs calculations every power station cycle; CPU updates are performed every 100 ms

Accuracy

0.5% of full scale output at reference conditions, as per AS1384-1973, over the following ranges:

VOLTS

80% to 110%

AMPS

20% to 125%

FREQUENCY

95% to 105%

Burden of Measuring Circuit

Not to exceed:

0.1 VA per element for voltage circuit

0.1 VA per element for current circuit

ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE

-20°C to +70°C (-4°F to +158°F)

RELATIVE HUMIDITY

5% to 95% RH (noncondensing)

ALTITUDE

-300 m to +2,000 m (-1,000 ft to +6,500 ft)

Storage

TEMPERATURE

-40°C to +85°C (-40°F to +185°F)

RELATIVE HUMIDITY

5% to 95% RH (noncondensing)

ALTITUDE

-300 m to +2,000 m (-1,000 ft to +6,500 ft)

Vibration

1 g (10 Hz to 150 Hz)

Shock

5 g (18 Pulses for 11 ms each)

Bump

10 g (6000 Pulses for 16 ms each)

REGULATORY COMPLIANCE

ELECTROMAGNETIC COMPATIBILITY (EMC)

EUROPEAN EMC DIRECTIVE 2014/30/EU

Meets EN 61326-1 Immunity requirements for industrial locations

EN 61000-6-5:2001, Part 6-5: Generic Standards – Immunity for power station and substation environments

CISPR 11, INDUSTRIAL SCIENTIFIC AND MEDICAL (ISM) RADIO-FREQUENCY EQUIPMENT - ELECTROMAGNETIC DISTURBANCE CHARACTERISTICS - LIMITS AND METHODS OF MEASUREMENT

Radiated emissions meet Class “A” limits

IEC 61000-4-2 ESD IMMUNITY

Contact ± 6 kV, Air ± 8 kV

IEC 61000-4-3 RADIATED FIELD IMMUNITY

10 V/m at 80 MHz to 1000 MHz, 3 V/m at 1 GHz to 6 GHz

IEC 61000-4-4 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY

± 2 kV at 100 kHz

IEC 61000-4-5 SURGE IMMUNITY

± 2 kV

IEC 61000-4-6 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RADIO FREQUENCY FIELDS

10 V (rms) at 150 KHz to 80 MHz

IEC 61000-4-16 CONDUCTED, COMMON MODE DISTURBANCES IMMUNITY

10 V (rms) to 1 V (rms) 15 Hz to 150 Hz

1 V (rms) 150 Hz to 1.5 kHz

1 V (rms) to 10 V (rms) 1.5 kHz to 15 KHz

10 V (rms) 15 kHz to 150 kHz

IEC 61000-4-18 DAMPED OSCILLATORY WAVE

Common Mode ± 1 kV at 1 MHz

Differential Mode ± 0.5 kV at 1 MHz

PRODUCT SAFETY

This product complies with the following safety standards:

- ▶ UL 61010-1 - Safety requirements for electrical equipment for measurement, control, and laboratory use - PART 1: GENERAL REQUIREMENTS - Edition 3
- ▶ CSA C22.2 NO. 61010-1 - Safety requirements
- ▶ EN 61010-1:2010 - Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 1: General requirements

PHYSICAL SPECIFICATIONS

Power Supply

Electrobus Interface

Physical Size

262 mm x 196 mm x 71 mm

Processor Type

MC56F8346 - 40 MHz (100 nS cycle) DRAM
16 KB x 16 Cypress CY7C026 (25 nS)

INTERNAL FLASH

64 KB x 16 KB

INTERNAL EEPROM

8 KB x 16 KB

ADC

Internal 4 ch x 4 ch (2 ch. simultaneous)

+3 V input range, unipolar

± 2 ppm/ $^{\circ}$ C reference error

± 1 count relative capacity

ORDERING INFORMATION

Part Number	Description
SY-0399140R	3 Phase Digital Transducer Module (1 Amp, 0.5% Accuracy) (RoHS)
SY-0399142R	3 Phase Digital Transducer Module (5 Amp, 0.5% Accuracy) (RoHS)



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1016