

3701/44 Aeroderivative Monitor

Bently Nevada* Asset Condition Monitoring



Description

The 3701/44 Protection and Condition Monitor is a powerful, distributed monitoring device for all types of machinery. It provides continuous on-line monitoring of GE Aeroderivatives gas turbine machine trains using sophisticated signal processing.

The 3701/44 has a rugged industrialized design, allowing it to be skid mounted. It is capable of accepting a wide array of sensor types, including Proximitors, accelerometers and pressure transducers.

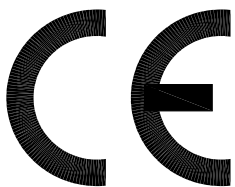
The 3701/44 can also be part of a networked distributed collection of inter-operating systems, or as an integrated part of a machine OEM's control & instrumentation package.

The 3701/44 Protection Monitor components are:

- 3701 Simplex Terminal Base
- 3701 Processor Module
- 3701 PAA Proximitor/Acceleration/Aero Input Module
- 3701 Relay Output Module

3701 Bently Nevada Machinery Configuration software

Sensor types include Displacement, Pressure, Velocity, Acceleration and Speed.



imagination at work

Specifications and Ordering Information

Part Number 100M8649-01

Rev. A (06/13)

3701 Overview

The 3701/44 is a fully-configurable, distributed monitoring system for all types of machinery. At a high level, it combines protection functionality and condition monitoring in a single package. With the ability to define measurements and alarms within the monitor itself, it can act as a stand-alone protection and CM system. There is no need for any interaction with external software to trigger or control the monitor during operation.

3701 Digital Communications

The 3701/44 system includes digital communication capabilities for connection to a variety of devices. It uses a proprietary Ethernet protocol for communicating with System1 software and 3701 configuration software.

The 3701/44 includes two Ethernet ports which provide Ethernet TCP/IP communications capabilities. In addition, the following protocols are supported:

Ethernet Global Data (EGD)
Proprietary GE Protocol for communication with the MarkVIe control system as a peer to the controller.

3701/44 System Description

The 3701/44 system is powered by redundant +24 Vdc nominal supplies. It has several components that can broadly be categorized as input modules, processor modules, and output modules. The input modules are designed to accommodate many different sensors. The input modules condition the signals coming from the sensors so they are ready for A/D conversion by the processor module.

The processor module digitizes the signals from the input modules, performs all signal processing, alarming and driving of relays.

The input modules provide buffered output signals (with correct phase and scaling) and advanced front-end signal diagnostics. A dongle is required to convert the buffered outputs to traditional BNC or SMC connectors.

The output module contains 8 SPDT relays that can be used for protection and an overall relay indicating

protection status. The processor module drives these relays.

3701 Proximitor Acceleration Aeroderivative (PAA) Input Module

The 3701 Proximitor/Aeroderivative (PAA) input module is a 6-channel + Keyphasor input module that accepts inputs from a variety of Proximity, Acceleration, and differential output Aeroderivative Interface Modules and provides sensor power and current limiting, and sensor input impedance.

Each channel of the 3701 Proximitor/Aeroderivative input module may be configured independently.

3701 Relay Output Module

The 3701 Relay Output Module provides 8 SPDT relay outputs or 4 "virtual" DPDT outputs. The 3701 processor module operates on user-configurable relay logic to provide custom monitor or system level relay indications.

The 3701 Relay Output Module also includes a fault tolerant SPDT 'Protection Fault' relay that indicates when the device is not able to meet protection requirements as configured.

3701 Simplex Terminal Base

In the 3701 Simplex Base configuration, the 3701 terminal base is designed for a single main processor module, two input modules, and a relay output module.

In this configuration, all channels are processed in one processor module for both protection and management.

The 3701 Simplex Base configuration provides for Dual Ethernet RJ45 ports, which can be configured for redundancy and or as independent communication ports.

The features that are common to the 3701 terminal base are:

- Two terminal blocks providing wiring options for various types of sensors inputs. These terminal blocks are removable for ease of field wiring.

- Ability to isolate system common from chassis ground when connected to barriers or isolators.
- Primary and Secondary connectors for +24 Vdc nominal power inputs for redundancy and transducers requiring high power.
- Six discrete contact inputs for connecting to dry contact relays to toggle Trip Multiply, Alarm/Relay Inhibit, Latch Reset, Special Alarm Inhibit, Run Mode, and IP/Account reset.

The 3701 Simplex Terminal Base is available in Rail Mount or Bulkhead Mount. Hanging slotted holes are provided for supporting the Terminal Base while mounting

Specifications

3701/44 System Electrical Specifications

Input Voltage

Min: 18VDC
Max: 36VDC

Current

2.3 amps max current

Inrush Current

3.0 amps max inrush less than 5 mS

3701/44 Processor Module Specifications

Inputs

Max: 12 dynamic signals and 2 Keyphasor signals

Dynamic Range

110 dB @ fs = 102.4 ksps

Signal/Noise Ratio

@ fs = 102.4 ksps

A/D Conversion

Sigma- Delta 24 bits nom.

Bandwidth

0 to 42Khz

Outputs

Two Independent Ethernet ports

Net A: 10/100 BaseT
Net B: 10/100 BaseT

Buffered Signal Outputs

15 pin DSUB connector, available dangle for BNC and SMC options.
550 ohm output impedance

LEDs

MODULE OK LED

Indicates when the module is functioning properly.

Protection Fault LED

Indicates that the monitor has experienced a fault that is affecting protection

User Inhibit LED

Indicates that there has been a user initiated inhibit of alarming functionality

Attention LED

Indicates a condition on the monitor has occurred that may require action

Danger LED

Indicates a Danger condition

Alert LED

Indicates and Alert condition

KPH 1 OK LED

Indicates that Keyphasor signal 1 is triggering.

KPH 2 OK LED

Indicates that Keyphasor signal 2 is triggering.

NetA

Indicates that Network A has a valid link

TX/RX A

Indicates that network traffic is flowing on Network A

Net B

Indicates that Network B has a valid link

TX./RX B

Indicates that network traffic is flowing on Network B

PWR 1 OK

Indicates that the first power input is functioning correctly

PWR 2 OK

Indicates that the second power input is functioning correctly

Accuracy

Direct pk or rms

Within $\pm 0.5\%$ of full-scale typical,
1.1% Worst Case

Bias

+0.4 V / -0.8 V typical, +0.8V / -1.34
V worst case.

Alarming

Setpoints

Over/under user configurable

Time Delay

100ms – 60 minutes

Latching

User configurable alarming or relay
latching

Keyphasor Signal Inputs

Speed Range Dedicated Keyphasor Input

1 to 120,000 rpm

Speed Range Auxiliary Keyphasor Input

1 to 10,000 rpm

Speed Resolution

1 to 100 rpm ± 0.1 rpm
100 to 2000 rpm ± 1 rpm

Gap

± 8.2 mV typical
 ± 22.3 mV worst case

Phase Accuracy

± 1 degree

3701/44 System Environmental Specifications

Indoor Use Only

Operating Temperature Range

-30 C to +65 C
(-22 F to 149 F)

*If the 3701 is operated 100% at +65C, its life will be reduced to approximately 11 years. Any portion of the time it is operated below +65C or any convective airflow will increase its lifespan.

Storage Temperature Range

-40C to +85C
(-40 F to 185 F)

Relative Humidity

0% to 95% rH non-condensing
Operating and Storage

Vibration

5g @ 57-500 Hz.IEC68-2-6

Shock

15g, 11ms

Altitude

< 2000 m (6,562 ft)

Pollution Degree

Pollution Degree 2

Installation Category

Category II

EMC Compliance

CE

2004/108/EC EMC Directive

Standards

EN 61000-6-4

EN55011 Conducted and Radiated
Emissions

EN 61000-6-2

EN 61000-4-2

EN 61000-4-3

EN 61000-4-4

EN 61000-4-5

EN 61000-4-6

EN 61000-4-8

EN 61000-4-11

EN 61000-3-2 2006

EN 61326

Specifications and Ordering Information

Part Number 100M8649-01

Rev. A (06/13)

2006/95/EC Low Voltage

Standards

EN 61010-1

Global EMC

Standards

IEC 61000-6-4
CISPR 11

IEC 61000-6-2
IEC 61000-4-2
IEC 61000-4-3
IEC 61000-4-4
IEC 61000-4-5
IEC 61000-4-6
IEC 61000-4-8

General Safety

CSA General Safety for USA/Canada

CAN/CSA No. 61010-1-12

UL Std No. 61010-1

For further certification and approvals information please visit the following website:

www.ge-mcs.com/bently

Physical

Simplex Base Dimensions

26.7 x 20 x 18.2 cm (10.5 x 7.87 x 7.15 in)

Weight

4.5 kg (9.9 lbs)

Mounting

Bulkhead or Rail Mounting

Ordering Information

Product Description: Adapt Application Solution Kits

Product Number: ADAPT_SOLUTIONS

OPTIONS:

- **ADAPT_LM2500** Designed for the LM2500
- **ADAPT_LM6000** Designed for the LM6000

Spares

3701/44

3701/44 Gas Turbine Monitor

177896-01

3701/44 Processor Module

177990-01

Prox Accel Aero (PAA) Module

177897-01

3701 Output Relay Module

175794-01

3701 Simplex Terminal Base

177992-01

3701 Terminal Block – Standard

Accessories

323314-01

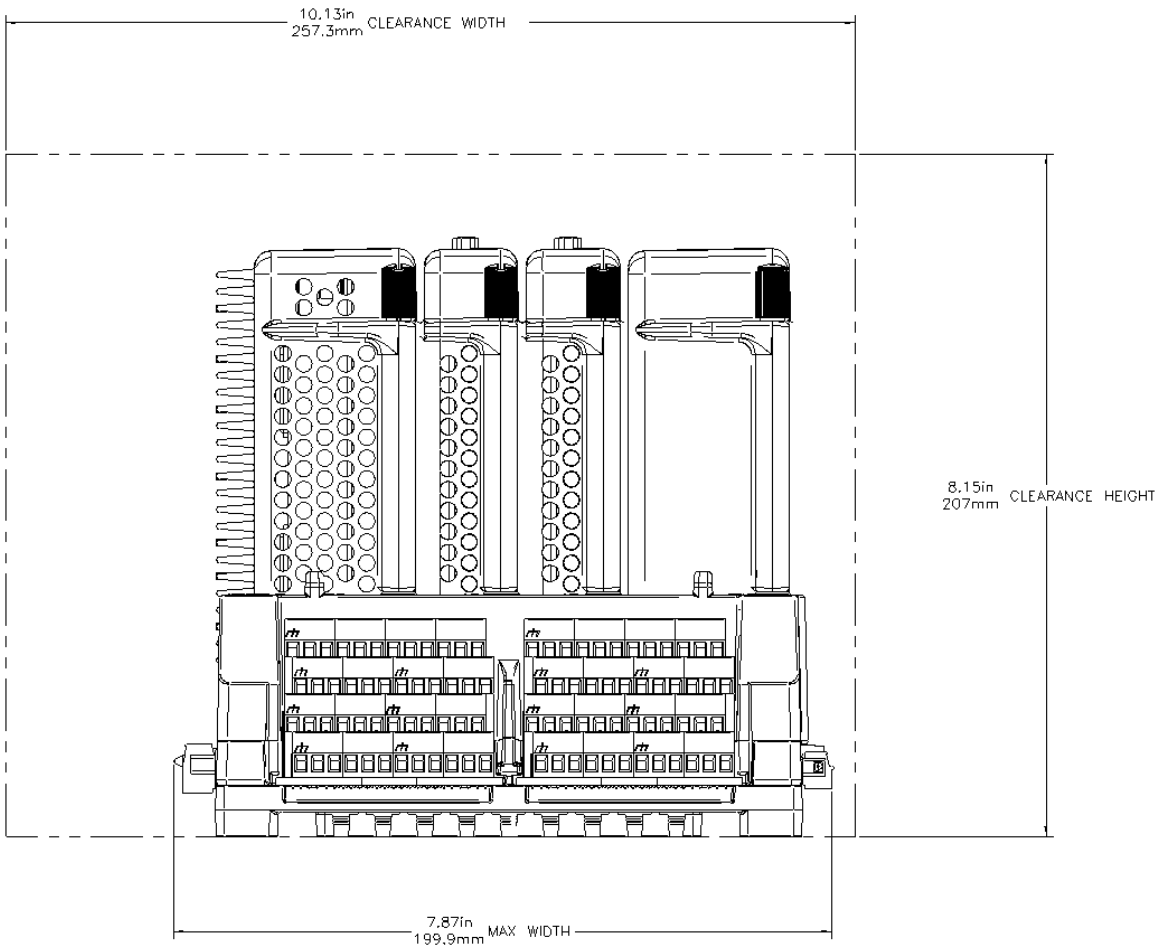
Buffered Output cable 15 pin D-Sub to 7 SMA connectors

323314-02

Buffered Output cable 15 pin D-Sub to 7 BNC connectors

324343

Nema 4 Weatherproof Housing Kit



3701/44 Simplex Terminal Base Side View
Dimensions shown in inches except as noted

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