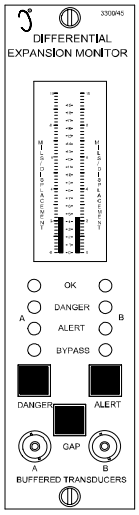
Specifications and Ordering Information

# 3300/45 Dual Differential Expansion Monitor




## Description

Differential Expansion is the measurement of the axial position of the rotor with respect to the machine casing at some distance from the thrust bearing. Changes in axial position relative to the casing affect axial clearances and are usually the result of thermal expansion during startup and shutdown. The measurement is typically made with a proximity probe transducer mounted to the machine casing and observing an axial surface (e.g., collar) of the rotor. The measurement is usually incorporated as part of a Turbine Supervisory Instrumentation system.

The 3300/45 Dual Differential Expansion Monitor provides two channels of continuous differential expansion monitoring. Both the magnitude and direction of differential expansion are monitored. Four alarm setpoints (two over and two under alarms) can be set for each channel. Channel B of the monitor can be turned OFF for machines requiring the measurement at only one location.

## Specifications

### Inputs

| | |
|---|---|
| *Signal:* | Accepts two proximity probe transducer signals. |
| *Input Impedance:* | 10 k Ω. |
| *Signal Scale Factor:* | 20 mV/mil (0.787 V/mm) or<br>10 mV/mil (0.392 V/mm), jumper-selectable. |
| *Power:* | Nominal consumption of 1.5 watts. |

### Signal Conditioning

| | |
|---|---|
| *Accuracy:* | With ±0.33% of full-scale typical, ±1% maximum.<br><br>Specified at ambient temperature of +25°C (+77°F). |

NRTL/C

## Outputs

*Recorder:* User-programmable for +4 to +20 mA, 0 to -10 Vdc, or +1 to +5 Vdc. Voltage or current outputs are proportional to programmed monitor full-scale. Individual recorder outputs are provided for each channel. Monitor operation is unaffected by short circuits on recorder outputs.

*Recorder accuracy (in addition to signal conditioning accuracy):* All specified at +25°C (+77°F).

- **+4 to +20 mA:** ±0.7% of signal, ±0.09 mA offset.
- **+1 to +5 Vdc:** ±1.1% of signal, ±10 mV offset.
- **0 to -10 Vdc:** ±1.1% of signal, ±15 mV offset.

*Output Impedance (voltage outputs):* 100 Ω. Minimum load resistance is 10 k Ω.

*Voltage Compliance (current outputs):* 0 to +12 Vdc range across load. Resistance is 0 to 600 Ω when using +4 to +20 mA option.

*Buffered Transducer Outputs:* One coaxial connector per transducer on the front panel and one terminal connection per channel on the rear panel. All are short circuit protected.

*Output Impedance:* 100 Ω.

*Transducer Supply Voltage:* - 24 Vdc voltages are current limited per channel on individual monitor circuit board.

## Alarms

*Alarm setpoints:* Both alarms (Alert and Danger) are digitally adjustable from 0 to 100% of full-scale and can be set within LCD resolution (±1.6% of full-scale) to a desired level. Once set, alarms are repeatable within ±0.4% of full-scale.

## Relay Modules

*Location:* One relay module can be installed behind each monitor. At least one alarm relay module must be ordered with each 3300 System.

## Display

*Meter:* Nonmultiplexing vertical bargraph type Liquid Crystal Display (LCD). 63 individual LCD segments per channel. Probe Gap indicated on a third, center scale. LCD also displays error codes and monitor ADJUST mode.

*Resolution:* Within ±1.6% of monitor full-scale.

*Size:* 83 mm (3.25 in), vertical dimension.

*LED Indicators*

*OK:* One constant ON green LED per channel to indicate OK condition of monitor, transducers, and field wiring. Constant OFF indicates NOT OK condition or channel Bypassed (red Bypass LED will be ON). OK LED flashing at 1 Hz indicates transducer has been NOT OK but is now OK. OK LED flashing at 5Hz indicates error code(s) stored in memory.

*Alarm:* Two red LEDs per channel indicate alarm status (independent Alert and Danger LEDs for each channel). Flashing alarm LED indicates First Out (independent for Alert and Danger alarms).

*Bypass:* Two red LEDs indicate status of Danger Bypass and Rack/Channel Bypass functions.

## Environmental Limits

*Operating Temperature:* 0°C to +65°C (+32°F to +150°F).

*Storage Temperature:* -40°C to +85°C (-40°F to +185°F).

*Relative Humidity:* To 95%, noncondensing.

**CE Mark Directives**

| | |
|---|---|
| EMC Directive | Certificate of Conformity: 158710 |
| Low Voltage Directive | Certificate of Conformity: 135300 |

**Hazardous Area Approvals**

| | |
|---|---|
| CSA/NRTL/C | Class 1 Division 2 Groups A,B,C,D T4 @ Ta = 65°C |

**Physical**

| | |
|---|---|
| *Rack space requirements:* | First and second slot in rack are reserved for Power Supply and System Monitor, respectively. The monitor can be placed in any other available rack position. Rack size will depend on the number of monitors used. |
| *Weight:* | 1 kg (2.2 lbs.). |

## Ordering Information

For spares, order the complete catalog number as described below. This includes a front panel assembly, monitor PWAs with sheet metal, and appropriate relay module. This unit is optioned, tested and ready to install in your system. Spare relay modules can be ordered separately.

**Dual Differential Expansion Monitor**
**3300/45-AXX-BXX-CXX-DXX**
**Option Descriptions**

| | | |
|---|---|---|
| *A: Full-scale Range Option* | **0 1** | 5 - 0 - 5 mm |
| | **0 2** | 0 - 10 mm |
| | **0 3** | 0.25 - 0 - 0.25 in |
| | **0 4** | 0 - 0.5 in |
| | **0 5** | 10 - 0 - 10 mm |
| | **0 6** | 0 - 20 mm |
| | **0 7** | 0.5 - 0 - 0.5 in |
| | **0 8** | 0 - 1.0 in |
| *B: Transducer Input Option* | **0 1** | 25 mm |
| | **0 2** | 35 mm |
| | **0 3** | 50 mm |

*NOTE: the 25 mm and 35 mm transducers can not be used with the 05 through 08 Full-scale range options.*

| | | |
|---|---|---|
| *C: Alarm Relay Option* | **0 0** | No Relays |
| | **0 1** | Epoxy-sealed |
| | **0 2** | Hermetically-sealed |
| | **0 3** | Quad Relay (Epoxy-sealed only) |
| | **0 4** | Spare Monitor-No SIM/SIRM |

**Notes:**
1. At least one relay module must be ordered with each 3300 System. If one common relay module per system has been ordered, all other monitors of this type will be jumper-programmed at the factory to activate relay bus one.
2. AND voting logic is not available with Quad Relays.

| | | |
|---|---|---|
| *D: Agency Approval Option* | **0 0** | Not required |
| | **0 1** | CSA/NRTL/C |

**Note:** CSA/NRTL/C option is only available with relays when the monitor is ordered in a system.

| *Spare Relay Module Assemblies* | |
|---|---|
| *81544-01* | No Relays |
| *81545-01* | Dual Epoxy Relays |
| *81546-01* | Dual Hermetic Relays |
| *84152-01* | Quad Relays |

## Field-programmable Options

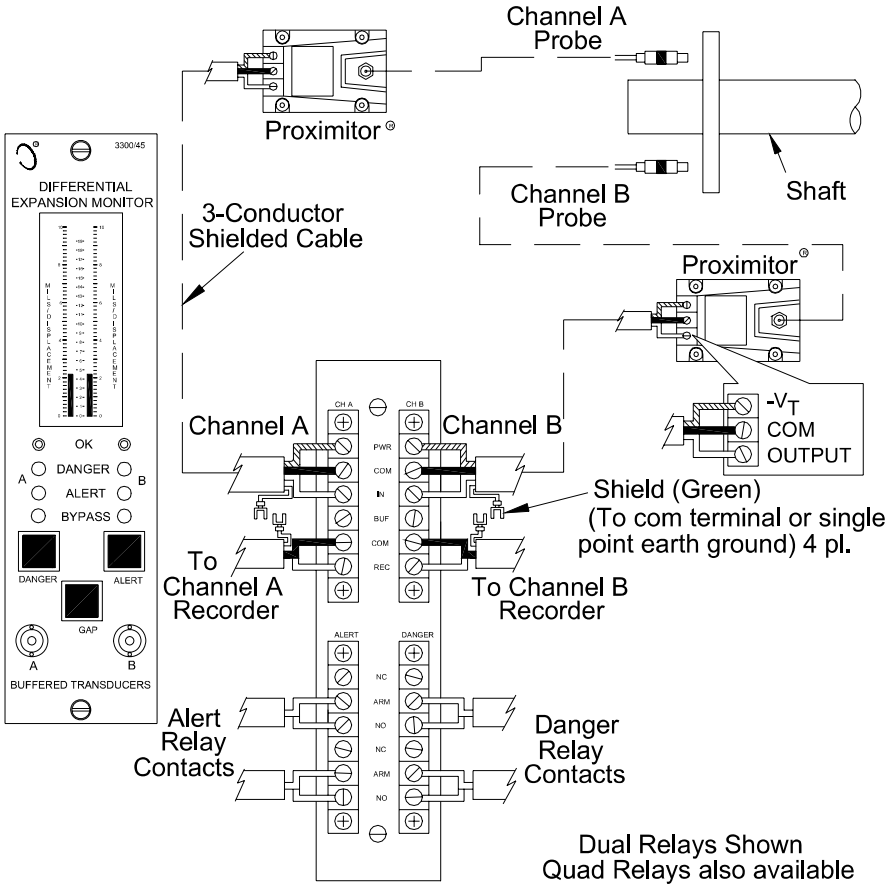
These options are field-programmable via plug-in jumpers. **Bold text** indicates options as shipped from the factory.

| | |
|---|---|
| *First Out Option* | **Enabled**<br>Disabled |
| *Meter Response Time* | **Fast**<br>Slow |
| *Alarm Time Delay Option* | 0.1 second<br>1 second<br>**3 seconds**<br>6 seconds |
| *OK Mode Option* | **Nonlatching**<br>Latching |
| *Not OK Channel Defeat* | **Disabled**<br>Enabled |
| *Alert Reset Option* | **Latching**<br>Nonlatching |
| *Danger Reset Option* | **Latching**<br>Nonlatching |

| | |
|---|---|
| *Recorder Outputs Option* | **+4 to +20 mA**<br>+1 to +5 Vdc<br>0 to -10 Vdc |
| *Danger Relay Voting Logic* | **OR voting for relay drive**<br>AND voting for relay drive<br><br>**Note:** For Quad Relays, AND voting logic must be done externally by wiring the contacts in series. |
| *Alert Relay Mode Option* | **Normally de-energized**<br>Normally energized |
| *Danger Relay Mode Option* | **Normally de-energized**<br>Normally energized |
| *Danger Bypass Switch Option* | **Disabled**<br>Enabled |
| *Zero Scale Position Option (firmware programmable)* | **Standard (0-center/bottom)**<br>Non-standard |
| *Channel B Option* | **On**<br>Off |
| *Upscale Direction Option* | **Toward Probe**<br>Away from Probe |

## Field wiring diagram

3300/45 Dual Differential Expansion Monitor




**Field wiring diagram for 3300/45 Dual Differential Expansion Monitor**