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About This Publication

The ST 3000 DE Meter User’s Manual provides a description of the DE Meter and installation and operation procedures for both integrally and remotely mounted meters. This publication is intended to supplement the given transmitter documentation.
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<td>34-ST-32-02</td>
</tr>
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<td>34-ST-25-06</td>
</tr>
</tbody>
</table>
Section 1 – ST 3000 DE Meter

1.1 Overview

Purpose of this manual
This manual describes how to install and operate an ST 3000 DE Meter with given Honeywell Smartline Transmitters operating in the Digital (DE) Communications Mode.

Reader assumptions
We assume that you are somewhat familiar with your Honeywell Smartline Transmitter. If you are not, we recommend that you have the instruction manual for your transmitter on hand when you install the ST 3000 DE Meter.

How to use this manual
If you have installed and used the ST 3000 DE Meter before, just skim the data to find the pertinent installation procedure.

If this is your first ST 3000 DE Meter installation, we recommend that you read this manual before you install the DE Meter.

In this manual
These main topics are covered in this manual.

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Designed for use with Honeywell smart transmitters operating in the Digital (DE) Communications Mode, the ST 3000 DE Meter provides convenient, easy-to-read transmitter output and loop status indications on its liquid-crystal display. The DE Meter can be integrally mounted in

- an ST 3000 Series 100 transmitter,
- an ST 3000 Series 600 transmitter,
- an STT 3000 transmitter, or

it can be remotely mounted in a separate housing.

Figure 1  DE Meter has 25-Segment Bargraph, Digital Readout, and Set of Status Messages

---

Continued on next page
2.1 Function and Design, Continued

As shown in Figure 1, the DE Meter display features a 25-segment bargraph, a digital readout, and a set of status messages.

- The 25-segment bargraph gives a gross indication of transmitter output from 0 to 100% that can be viewed from up to 30 feet away.
- The digital readout, a complement to the bargraph indication, gives a precise indication of transmitter output from \(-199.9\) to \(+199.9\)% that can be read from up to 10 feet away.
- Status messages serve as online diagnostics for various detectable loop conditions. Refer to Table 1 for a list of the messages and the detectable loop conditions they represent. Note that the bargraph and digital readout flash while a status message is displayed.
- When a transmitter is in the square root mode, the DE Meter still displays the transmitter output from 0 to 100%. The DE Meter has no square root mode or flow indicator display.

Table 1 lists the detectable status messages and what they mean.

<table>
<thead>
<tr>
<th>If Status Message is . . .</th>
<th>THEN it means</th>
</tr>
</thead>
<tbody>
<tr>
<td>XMTR IN OUTPUT MODE</td>
<td>Transmitter is in Output Mode and it is not sending a PV signal.</td>
</tr>
<tr>
<td>BAD XMTR STATUS</td>
<td>Transmitter is in Failsafe Mode because it has detected an open input (STT 3000) or an internal problem. PV signal value matches transmitter “Burnout High” or “Burnout Low” configuration selection.</td>
</tr>
<tr>
<td>METER FAULT</td>
<td>An internal DE Meter self-check has failed.</td>
</tr>
<tr>
<td>LOOP OR METER FAULT</td>
<td>A loop problem or a problem within the DE Meter has stopped or corrupted communication data.</td>
</tr>
<tr>
<td>LAST KNOWN VALUE</td>
<td>Bargraph and digital readout indication do not represent the present transmitter output value. Instead, the indications equal the last output value sent prior to receipt of a diagnostic. This message appears when there is any problem with communication.</td>
</tr>
<tr>
<td>NO DATA</td>
<td>No data is available. Either the received data was unusable or more than 1.4 seconds elapsed without any data being received.</td>
</tr>
<tr>
<td>NO DATA – LAST KNOWN VALUE</td>
<td>Typical combination of the two previous conditions.</td>
</tr>
</tbody>
</table>
Section 3 – Installation

3.1 Integral Mounting in Series 100/600 ST 3000

Background

You can mount the DE Meter with fan style bargraph as an integral meter in the electronics housing of the Series 100/600 ST 3000 Transmitter.

Getting started

Before you install the meter, make sure

- the transmitter has a “meter” end cap,
- the transmitter can operate in digital (DE) communications mode (software version 2.3/6.2 or greater)
- you remove power from the transmitter,
- the meter end cap is removed, and
- you have a screwdriver (medium blade).

Procedure

Use the procedure in Table 2 with the wiring connections shown in Figure 2 to install the DE Meter as an integral meter in a Series 100/600 ST 3000.

Table 2 Installing DE Meter in Series 100/600 ST 3000

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connect yellow lead from DE Meter to -SIGNAL terminal and red lead to +SIGNAL terminal on transmitter's terminal block.</td>
</tr>
<tr>
<td></td>
<td><strong>CAUTION</strong> Never connect the DE Meter leads to the terminals marked METER on the transmitter's terminal block. Also, be sure to leave the metal jumper strap in place between the METER terminals.</td>
</tr>
<tr>
<td>2</td>
<td>Orient DE meter for proper viewing through end cap window, align feet on meter with holes in terminal block, and press meter in place.</td>
</tr>
<tr>
<td>3</td>
<td>Lubricate end cap O-ring with silicon grease (recommend Dow Corning #33 or equivalent).</td>
</tr>
<tr>
<td>4</td>
<td>Replace end cap and tighten end cap lock.</td>
</tr>
<tr>
<td>5</td>
<td>Go to Section 4 – Operation before applying power to the transmitter.</td>
</tr>
</tbody>
</table>

Continued on next page
Figure 2  Wiring Connections for DE Meter in Series 100/600 ST 3000

Series 100 and Series 600

Field wiring

Red

Yellow
3.2 Integral Mounting in STT 3000

Background
You can mount the DE Meter with fan style bargraph as an integral meter for an STT 3000 transmitter mounted in an explosionproof housing.

Getting started
Before you install the meter, make sure

- the transmitter is mounted in explosionproof housing with “meter” end cap,
- you remove power from the transmitter,
- the meter end cap is removed, and
- you have a screwdriver (medium blade)

Procedure
Use the procedure in Table 3 with the wiring connections shown in Figure 3 to integrally install the DE Meter in an STT 3000 mounted in an explosionproof housing.

Table 3 Installing DE Meter in STT 3000

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connect yellow lead from the DE Meter to l – (7) terminal and the red lead to l + (8) terminal on transmitter’s terminal block.</td>
</tr>
<tr>
<td>2</td>
<td>Orient the DE Meter for proper viewing through the end cap window.</td>
</tr>
<tr>
<td>3</td>
<td>Align feet on meter with holes in terminal block and press meter in place.</td>
</tr>
<tr>
<td>4</td>
<td>Lubricate end cap O-ring with silicon grease (we recommend Dow Corning #33 or equivalent).</td>
</tr>
<tr>
<td>5</td>
<td>Replace end cap and tighten end cap lock.</td>
</tr>
<tr>
<td>6</td>
<td>Go to Section 4 – Operation before applying power to the transmitter.</td>
</tr>
</tbody>
</table>

Continued on next page
Figure 3  Wiring Connections for DE Meter in STT 3000
3.3 Remote Mounting in Separate Housing

You can mount the DE Meter with fan style bargraph in a separate remote housing for use with a given Smartline Transmitter.

Before you install the meter, make sure you

- have hardware to attach housing to surface or mounting bracket (Option "MB") for 2-inch pipe mounting,
- have drill, wrenches, screwdriver, etc. as required for mounting hardware,
- review recommended conduit connection practices (Section 3.4 – Conduit Connections),
- have two 16 AWG (maximum) leads (one yellow and one red, if possible) to connect remote DE Meter to transmitter,
- review external wiring diagram 30756054-000,
- remove power from the transmitter, and
- have a screwdriver (medium blade).

Use the procedure in Table 4 with the wiring connections shown in Figure 4 to install the DE Meter in a remote housing.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>For pipe mounting, attach housing to bracket and mount bracket to 2-inch pipe as shown on drawing 30756029-000. Skip to Step 6.</td>
</tr>
<tr>
<td>2</td>
<td>For surface mounting, position housing in desired location on mounting surface.</td>
</tr>
<tr>
<td>3</td>
<td>Use center punch, scribe, etc. to mark location of holes in housing on surface.</td>
</tr>
<tr>
<td>4</td>
<td>Prepare surface for user supplied mounting hardware as required.</td>
</tr>
<tr>
<td>5</td>
<td>Secure housing to surface using mounting holes and user supplied hardware.</td>
</tr>
<tr>
<td>6</td>
<td>Connect conduit. Refer to Section 3.4 – Conduit Connections.</td>
</tr>
</tbody>
</table>
| 7    | Remove cover from housing.  
  | If meter is… | Then…  
  | already installed | remove it by pulling meter toward you to access captive mounting screws and terminal block connections; proceed to Step 8.  
  | not installed | proceed to Step 8. |

Continued on next page
### 3.3 Remote Mounting in Separate Housing, Continued

**Procedure, continued**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Loosen captive mounting screws and remove spacer/terminal block assembly.</td>
</tr>
</tbody>
</table>
| 9    | To connect the remote DE meter to the given transmitter:  
  | • Feed one end of the user-supplied yellow and red leads through a conduit connection in housing.  
  | • Connect yellow lead to remaining – YEL terminal and red lead to remaining + RED terminal on terminal block.  
  | • Run other end of leads to transmitter. Observing RED to + polarity, connect leads across transmitter’s signal (+) terminals so that DE Meter is wired in parallel with transmitter in loop. |
| 10   | Replace spacer/terminal block assembly and tighten mounting screws. |
|      | If meter has… | Then… |
|      | been installed | skip to Step 12. |
|      | not been installed | proceed to Step 11. |
| 11   | If DE Meter has not been installed, connect yellow lead from meter to a – YEL terminal and red lead to adjacent + RED terminal on terminal block. |
| 12   | Orient meter for proper viewing through cover window, align mounting feet over holes and press meter in place. |
| 13   | Lubricate cover O-ring with silicon grease (we recommend Dow Corning #33 or equivalent). |
| 14   | Replace cover. |
| 15   | Go to Section 4 – Operation before applying power to transmitter. |

*Continued on next page*
3.3 Remote Mounting in Separate Housing, Continued

Figure 4  Wiring Connections for DE Meter in Remote Housing

[Diagram showing wiring connections for DE Meter in Remote Housing]

To Transmitter

- YEL + RED

Remote Housing

Captive mounting screws (2)

Spacer/terminal block assembly

94 mm 3.70 in

Yellow

Red

0 % 100

ST 3000 DE Meter User's Manual
3.4 Conduit Connections

When making typical conduit connections as shown in Figure 5, be sure

- to include drain for conduit,
- all pipe threads are adequately sealed against weather by using pipe joint tape or compound suitable to environment.
- to seal unused outlet with pipe plug.

**CAUTION** For explosionproof installation, you must seal the access holes in the housing. Use a conduit seal (Crouse-Hinds type EYS or equivalent) on the wiring outlet(s) of the housing. Note that this is a good standard practice to keep moisture from entering the housing through the conduit in any installation.

![Figure 5: Typical Conduit Connections](image)
Section 4 – Operation

4.1 Startup

Summary

Once the DE Meter is installed, you only have to apply power to the transmitter to start meter operation. After the meter runs its self-test, you can begin monitoring meter indications for transmitter PV output and loop status messages. The self-test indications and some typical operation indications are outlined in this section for reference.

WARNING

If the transmitter is being calibrated or used in the analog mode, you must disconnect the DE Meter or it will cause a 5% transmitter error.

Self-test indications

Every time power is applied to the transmitter, the DE Meter runs a self-test to check certain internal operations and lights all display segments, as shown in Figure 6, for up to 10 seconds, so they can be visually checked for uniform appearance. If the self-test fails, the display will go blank except for the METER FAULT message.

Figure 6 Self-Test Lights All Display Segments for Visual Check

Continued on next page
4.1 **Startup**, Continued

Table 5 summarizes typical DE Meter operation indications. Note that other combinations of status messages are possible.

<table>
<thead>
<tr>
<th>DE Meter Indication</th>
<th>What It Means</th>
<th>DE Meter Indication</th>
<th>What It Means</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image" /></td>
<td>No power applied.</td>
<td><img src="image2" alt="Image" /></td>
<td>・After meter ran its self-test, it did not receive communication data from transmitter. ・Transmitter may have been configured for analog mode.</td>
</tr>
<tr>
<td><img src="image3" alt="Image" /></td>
<td>Normal operation display.</td>
<td><img src="image4" alt="Image" /></td>
<td>Meter has received communication data with six or more corrupted parts.</td>
</tr>
<tr>
<td><img src="image5" alt="Image" /></td>
<td>Too much time has elapsed since end of last communication data without receipt of new data.</td>
<td><img src="image6" alt="Image" /></td>
<td>Meter has received communication data with six or more corrupted parts.</td>
</tr>
<tr>
<td><img src="image7" alt="Image" /></td>
<td>Transmitter is in failsafe mode. The PV signal in the communication data sent to the meter represents either a Burnout High (upscale, as shown) or Burnout Low (downscale) configuration selection.</td>
<td><img src="image8" alt="Image" /></td>
<td>Transmitter has been configured for OUTPUT mode.</td>
</tr>
</tbody>
</table>
Section 5 – Reference Data

5.1 Specifications

Table 6 lists pertinent DE Meter specifications for reference.

<table>
<thead>
<tr>
<th>Operating Conditions</th>
<th>Rated</th>
<th>Extreme, Transportation and Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>°F</td>
<td>-40 to 176</td>
<td>-58 to 194</td>
</tr>
<tr>
<td>°C</td>
<td>-40 to 80</td>
<td>-50 to 90</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% RH</td>
<td>0 to 100</td>
<td>0 to 100</td>
</tr>
<tr>
<td>Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display Resolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bargraph</td>
<td>±4% reading</td>
<td></td>
</tr>
<tr>
<td>Digital Readout</td>
<td>±0.1% reading</td>
<td></td>
</tr>
</tbody>
</table>

1. Since the DE Meter is receiving and displaying a digital signal from the transmitter, it contributes no additional source of error or ambient temperature influence (other than resolution).

2. The LCD display will turn black at some temperature between 80 and 90°C (176 and 194°F), rendering the display unreadable. This effect is temporary, and normally occurs at 90°C (194°F).
5.2 Reference Drawings

<table>
<thead>
<tr>
<th>Drawing numbers</th>
<th>These drawings are inserted behind this page.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 30756029-000 - Remote Meter and Temperature Transmitter Installation Drawing</td>
</tr>
<tr>
<td></td>
<td>• 30756054-000 - ST 3000 Transmitter Series 100 and Series 600 with Remote DE Meter External Wiring Diagram</td>
</tr>
</tbody>
</table>
POWER SUPPLY

RECEIVER

FIELD TERMINALS

FIELD WIRING

FIELD TERMINALS

POWER SUPPLY AND RECEIVER LOCATED IN NON-HAZARDOUS AREA

SMART FIELD COMMUNICATOR MAY BE CONNECTED AT ANY POINT IN THE LOOP BETWEEN THE BARRIER(S) AND THE ST-3000 TRANSMITTER AT WHICH CONNECTIONS ARE ACCESSIBLE. THERE MUST BE A MINIMUM SERIES RESISTANCE OF 250 OHMS BETWEEN THE SMART FIELD COMMUNICATOR CONNECTION POINT AND POWER SUPPLY. SEE INSTALLATION MANUAL.

1. LOOP RESISTANCE EQUALS WIRE RESISTANCE PLUS RECEIVER RESISTANCE.

NOTE:

METER ELECTRONICS MODULE MUST BE REMOVED FROM HOUSING TO GAIN ACCESS TO TERMINAL BLOCK.

SIGNAL

MA

MA

- (BLACK)

+ (RED)

ST 3000 TRANSMITTER

SERIES 100/600

REMOTE D.E. METER

YELLOW

RED

Honeywell

EXTERNAL WIRING DIAGRAM

ST 3000 TRANSMITTER SERIES 100/600 WITH REMOTE D.E. METER

30756054

A3

Mike M. 8/4/89

CHECKED

L. M. 9/1/89

1/4/89

Lincoln T. 7/1/89

MATERIAL

FINISH

ANGULAR DIMENSION

SCALE

USED ON

SHT 1 OF 2

DO NOT SCALE Dwg

PLATE
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Title of Publication: **ST 3000 DE Meter User's Manual**
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Writer: **K. Butzloff**

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