### **SFRA Measurement**



# SFRA Measurement Cables Quick Start Guide

## Introduction

The SFRA measurement cables comply with FRA measurement requirements according to IEC 60076-18. Two cable kits are available: **SFRA Classic Plus** and **IEC 1**.



NOTE! Beginning mid-December 2018, both cable options have been redesigned. As part of this redesign, both cable options will now be single-cable assemblies, rather than the two-cable sets. This redesign improves performance and reliability.

## SFRA Classic Plus

This is the default cable shipped with the M5400 in the 18 m (60 ft) length, with classic 3.6 m (12 ft) fixed-length ground connection. A 30 m (100 ft) variant is also available as an option for use with larger bushings. The Classic Plus also provides ring-style reference ground connections for:

- Shorted lead testing
- IEC 60076-18 FRA Method 1 (shortest braid) grounding technique (with optional braid kit)



Figure 1 SFRA Classic Plus



## IEC 1 with Braid Kit

Use this kit if you test only by the IEC 60076-18 Method 1 technique (shortest braid). The optional SFRA IEC 1 cable kit includes a measurement cable assembly (also available in 18 m and 30 m variants) and a Braid Kit for grounding using the shortest braid method. SFRA IEC 1 cables do not have the fixed length ground connections of the Classic Plus design.



Figure 2 IEC 1



Figure 3 Braid Kit



### Sample IEC Method 1 Connections

The photo to the right illustrates typical IEC Method 1 connections to transformer bushings:

- 1—Lead connection
- **2**—Cable shield ring connection
- **3**—Ground extension braid
- 4—Shortest braid connection
- 5— Bushing-flangeground clamp

To set up IEC Method 1 connections:

 Confirm that you have a good measurement cable and cable connection. To do

this, run the shorted lead test that is appropriate for your cable type. The shorted lead tests are given in "New Ring-Style Cable Shield Connection" on page 4.

- 2. Referring to the photo at the right, attach the Red (input and reference) lead (1) to the center conductor of the bushing.
- Connect the ground extension braid (3) is to the cable shield ring (2).
- 4. Run the ground extension braid down the full length of the bushing.
- 5. Connect the ground extension braid to the bushing flange by using the bushing-flange-ground clamp (5).
- 6. Pull the ground extension braid (3) taut and attach (4) the shortest braid clamp.





Follow this procedure a second time to connect the **Black** (measurement) lead.

This procedure fulfills the Method 1 test setup requirement per IEC Standard 60076-18 for Power Transformers – Measurement of Frequency Response.

## Shorted Lead Test Procedure with Expected Test Results

- New Ring-Style Cable Shield Connection
- 1. Short the Red and Black leads by connecting the clamps to one another.
- 2. Connect the ground reference rings on Red and Black leads using Doble jumper as shown in photo.
- 3. Observe expected flat line test response on the 0 dB (Y axis) from 20 Hz to 2 MHz (X axis).





Classic Fixed-Length Shield Connection

- 1. Short the Red and Black leads by connecting the clamps to one another.
- 2. Connect the **Green** ground reference clamps as shown in photo.
- 3. Observe expected line test response on the 0 dB (Y axis) from 20 Hz to 2 MHz (X axis), noting a roll-off.





SFRA Classic Plus Part Numbers	18 m (60 ft)	Kit with Test Cable and Quick Start Guide	030-2297-01
	30 m (98.4 ft)	Kit with Test Cable and Quick Start Guide	030-2297-02
		Optional Braid Kit	030-1945-01
IEC 1 Part Numbers	18 m (60 ft)	Kit with test cable, braid kit and Quick Start Guide	030-2266-01
	30 m (98.4 ft)	Kit with test cable, braid kit and Quick Start Guide	030-2266-02
		Extra Braid Kit	030-1945-01

# Questions? Customer Service: +1 617-926-4900

**FAX:** +1 617-926-0528

Email: customerservice@doble.com

Limitation in Liability

The limitations on liability and copyright notices contained in the Doble *Sweep Frequency Response Analyzer (SFRA) User Guide* shall apply to the use of this Quick Start Card and are hereby incorporated by reference. © 2019 by Doble Engineering Company All Rights Reserved

