-METASYS®

Output Analog Isolated Function Module

Order No. 636-043

Introduction

Description

The Output Analog Isolated (OAI) Function Module is an isolated interface between the DCM and field devices. It is used whenever a connected field device has an internal ground reference that would interfere with the operation of an OAE Function Module. The OAI may be configured to source isolated analog output voltage (0-10 VDC), source isolated analog output current (0-20 mA), or modulate isolated current (0-20 mA) for externally powered devices. The OAI Function Module features:

- digital to analog converter for converting DCM digital input into isolated analog output
- Auto/Manual (A-M) switch to enable/disable DCM control
- manual set potentiometer for manual output control. (CW increases output.)
- optical isolation from DCM electronics
- feedback indication of the Auto/Manual switch setting to the DCM

For non-isolated analog outputs, use the OAE Function Module.

The OAI Function Module plugs into any one of the bottom ten slots associated with the DCM. Figure 1 shows typical function module locations in the NCU. A five slot panel is pictured.

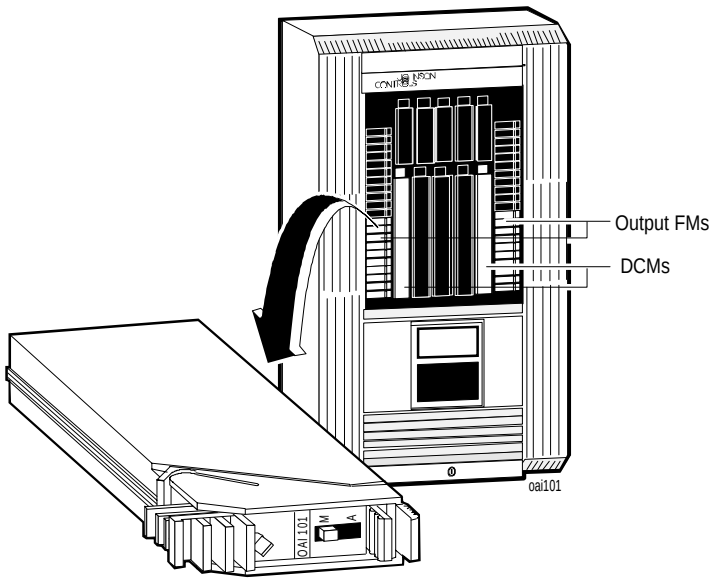

Figure 1: OAI Function Module Locations

Application

The OAI Function Module is typically used to:

- control a variable speed motor controller
- provide a current control (0 to 20 mA) for use with an external current source

Capabilities

Table 1: Function Module Capabilities

Capability	Description	Purpose
Input from DCM	DCM inputs a digital command.	Allows DCM to provide automatic control of outputs.
Auto/Manual Switch, and Manual Adjustment	Switch selects one of: - Auto—DCM control of outputs - Manual—DCM control disabled and output is controlled by manual adjustment.	Allows for manual override of DCM control for special situations. Allows for local/manual control, even if the DCM is not present.
Power on Reset	At low power or after power up, output goes to zero (in Auto mode).	Provides controlled restart.
Output to Field	Module outputs an isolated voltage or current signal proportional to input signal.	Provides proportional control signals for motor driven actuators or variable speed controllers.

Theory of Operation

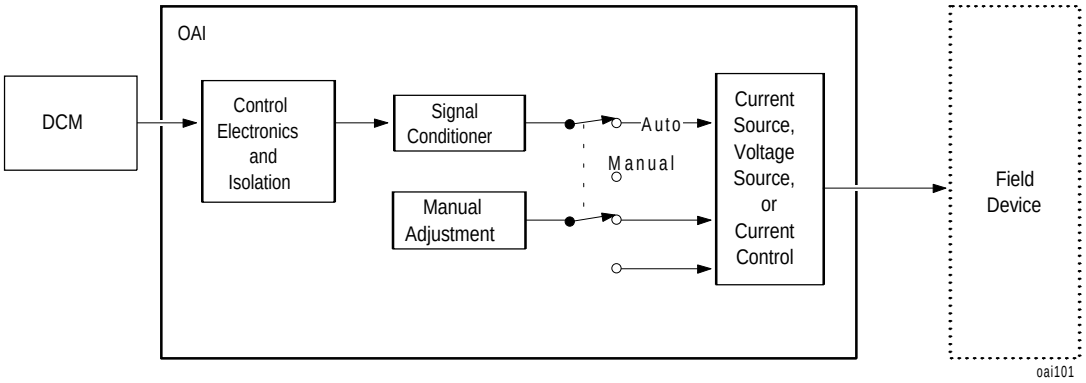

Figure 2: OAI Function Diagram

The process is:

- The DCM provides a digital control signal.
- The control electronics in the OAI latch the digital control signal, then convert it to an isolated, proportional analog signal.
- Depending on how the OAI is wired, this isolated analog signal is a current source, voltage source, or will modulate externally sourced current.
- A manually controlled Auto/Manual switch can disable the DCM control of the OAI outputs. The status of this switch is reported back to the DCM.
- With the Auto/Manual switch in the Manual position, the module output is controlled by a manual adjustment on the OAI. (CW increases the output.)

The unit will operate in the Manual mode without the DCM present. The corresponding power supply must be present.

Specifications

Table 2: OAI Function Module Specifications

Category	Specifications for Configurations		
	Voltage Source	**Current Source**	**Current Control**
Product Code Number	FM-OAI101		
Output Range	0 to 10 V (25 mA maximum)	0 to 20 mA	0 to 20 mA (4 VDC to 30 VDC) (External power supply)
Output Limits	40 mA (Maximum)	910 ohm maximum load, including line resistance	
Output Protection	Fused at 500 mA with a non-field replaceable fuse		
Output Isolation	350V minimum isolation between output and analog supplies; and output and DCM electronics		
Input-Output Characteristics	Linear analog output proportional to digital input value		
Input Range	0 to 1024, based on a 10 bit data value from the DCM		
Response Time	1 sec. for a full range change		
Resolution	0.1% of full range		
Accuracy	±0.4% of full scale output at 70 ±2°F. (21 ± 1.1°C)		
Thermal Effects	Gain Drift: ± 0.0055% per °F (±0.01% per °C) of full scale deviation Offset Drift: ± 0.0055% per °F (±0.01% per °C) of full scale deviation		
Calibration	The module is factory calibrated.		
Default Condition	Output = 0 VDC on loss of input power	Output = 0 mA on loss of input power	Output = 0 mA on loss of input power
Source Power	Power is from the PWR in the NCU/NEU.		(External power)
Operating Environmental Requirements	32 to 122°F (0 to 50°C) 10 to 90% noncondensing relative humidity 86°F (30°C) maximum dew point		
Storage/Shipping Environmental Requirements	-40 to 158°F (-40 to 70°C) 5 to 95% noncondensing relative humidity 86°F (30°C) maximum dew point		
Size	0.85 in. H x 3.06 in. W x 7.0 in. L (2.2 cm H x 7.8 cm W x 17.8 cm L)		
Weight	0.5 lb. (0.22 kg)		
Agency Compliance	FCC Part 15 Subpart J - Class A, UL 916, CSA C22.2 No. 205		
Agency Listings	UL Listed and CSA Certified as part of Metasys®		

Installation Procedures

General Information

When installing and connecting function modules:

- follow NEC and local codes
- observe maximums as specified in the specification table and in these installation guidelines

Physical Installation

Assumptions

The following procedure for the physical installation of the OAI Function Module assumes:

- NCU/NEU panel is installed.
- Connections to field devices are complete.
- You have engineering drawings defining details for the installation.
- You are familiar with Metasys Network terminology, and the location and operation of power switches.

Procedure

For each OAI Function Module in the network, perform the following steps.

1. Set the Auto/Manual switch to Manual.
2. Adjust output to minimum.
3. Refer to the engineering drawings, and identify the proper panel and slot number location for this module.
4. Open the latch.
5. Insert the module in the appropriate slot.
6. Close the latch, locking function module in place.

Current Source (0 to 20 mA)

Figure 3 diagrams the wiring for current source (0 to 20 mA) applications using the OAI Function Module.

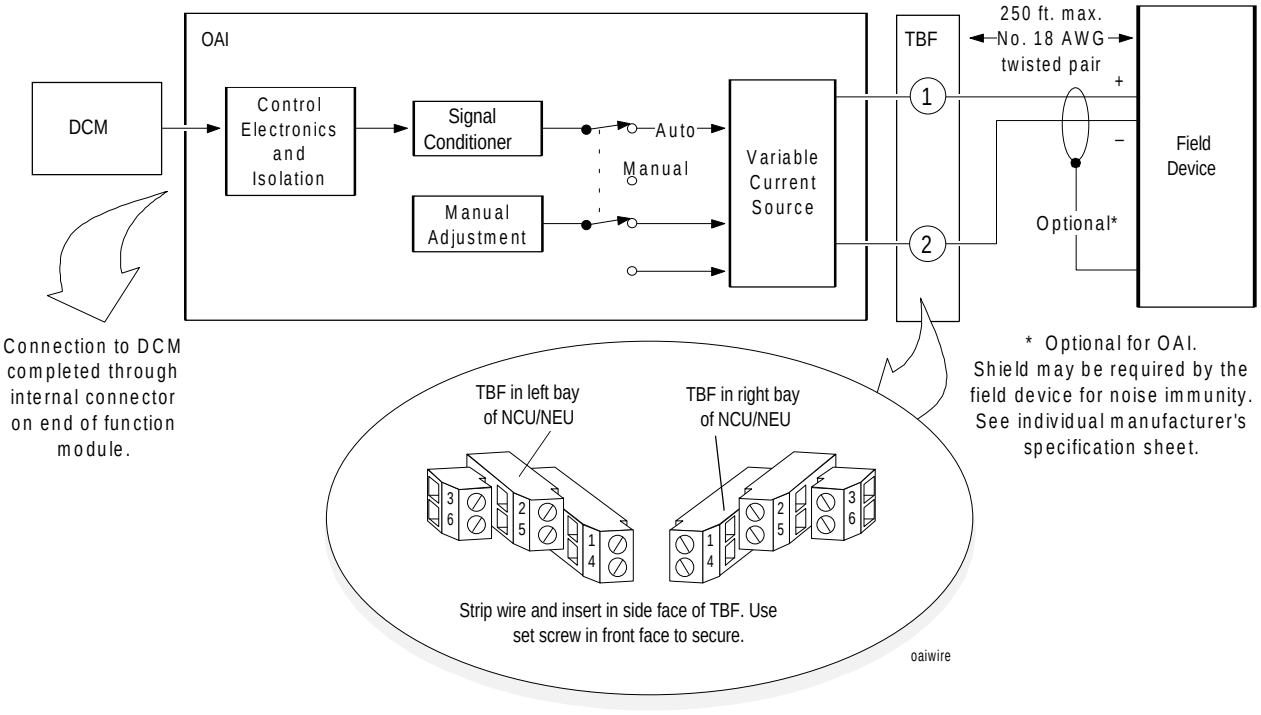

Figure 3: Wiring for Current Source Applications

Voltage Source (0 to 10 volts)

Figure 4 diagrams the wiring for voltage source (0 to 10 volts) applications using the OAI Function Module.

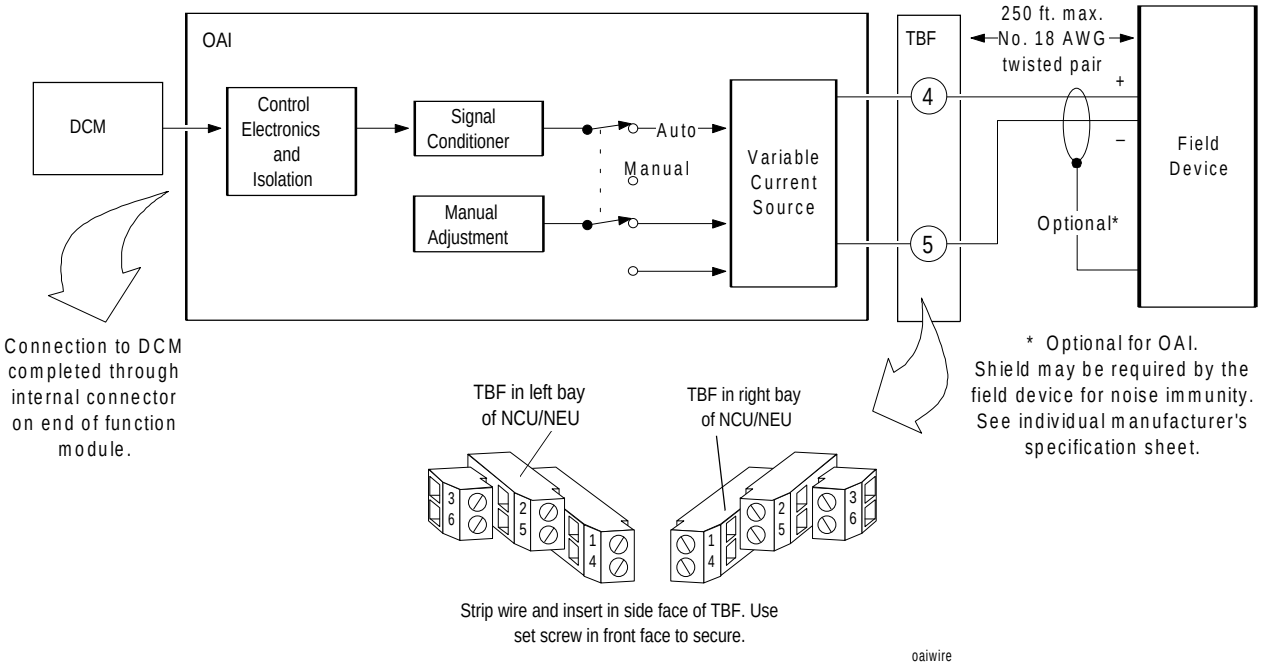

Figure 4: Wiring for Voltage Source Applications

Current Control (0 to 20 mA)

Figure 5 diagrams the wiring for current control (0 to 20 mA) applications using the OAI Function Module.

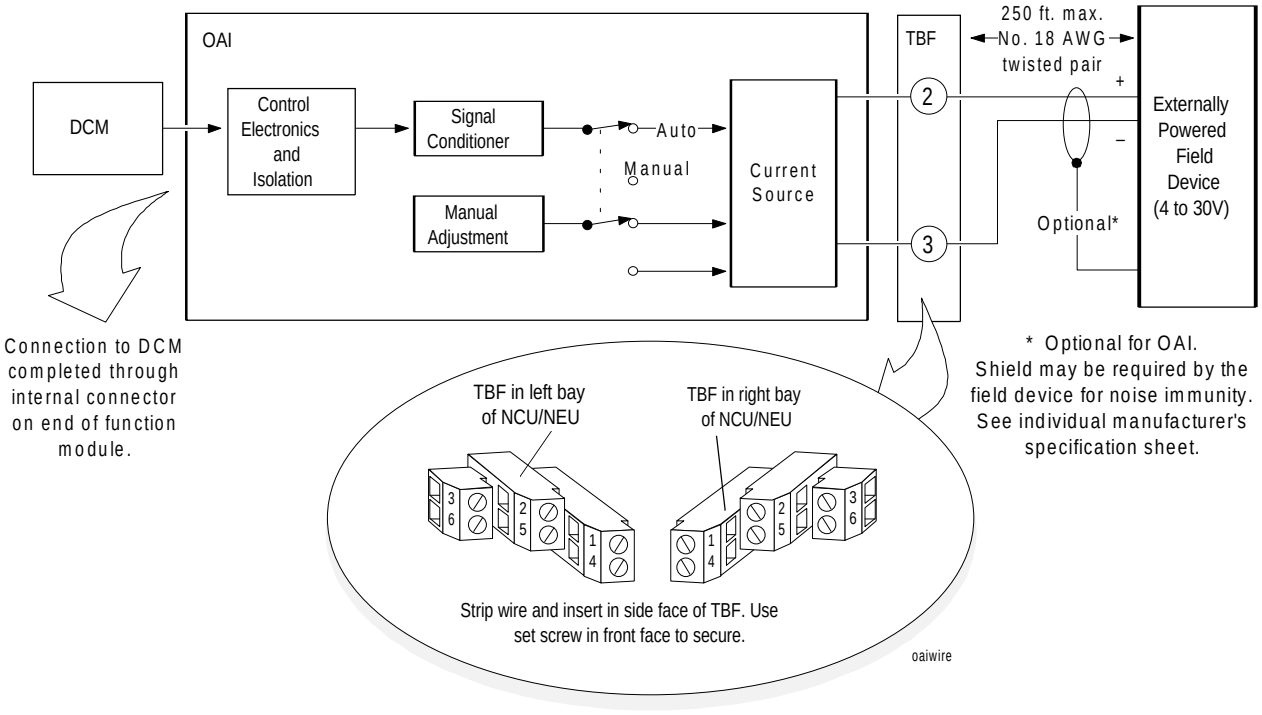

Figure 5: Wiring for Current Control Applications

Commissioning Procedures

Physical Verification

Assumptions

The following procedure for the physical verification of the OAI Function Module assumes:

- Physical installation at the NCU/NEU and PWR panel is complete.
- Power is available at the panel power supply and at the field device.

Procedure

For each OAI Function Module in the network, perform the following steps.

1. Power up the appropriate DCM power supply.
2. Adjust the manual control on the function module and verify that the intended device responds, and that the response is appropriate.

Software Verification

Assumptions

The following procedure for the software verification of the OAI Function Module assumes:

- Physical installation at the NCU/NEU panel is complete, including NCM, DCM, FM, etc.
- The operating software for the network has been downloaded to the NCM controlling the panel.
- An Operator Workstation is available.

Procedure

For each OAI Function Module in the network, perform the following steps.

1. Select the System summary that includes this OAI object.
2. Set Auto/Manual switch on the OAI to Auto.
3. Use the software override command and verify that the object's value attribute (as seen in the Summary) matches the actual value for the field device.

Troubleshooting Procedures

Troubleshooting Chart

Use the diagram in Figure 6 (next page) as a troubleshooting guide. It applies for failures between point objects and field devices connected through an OAI Function Module.

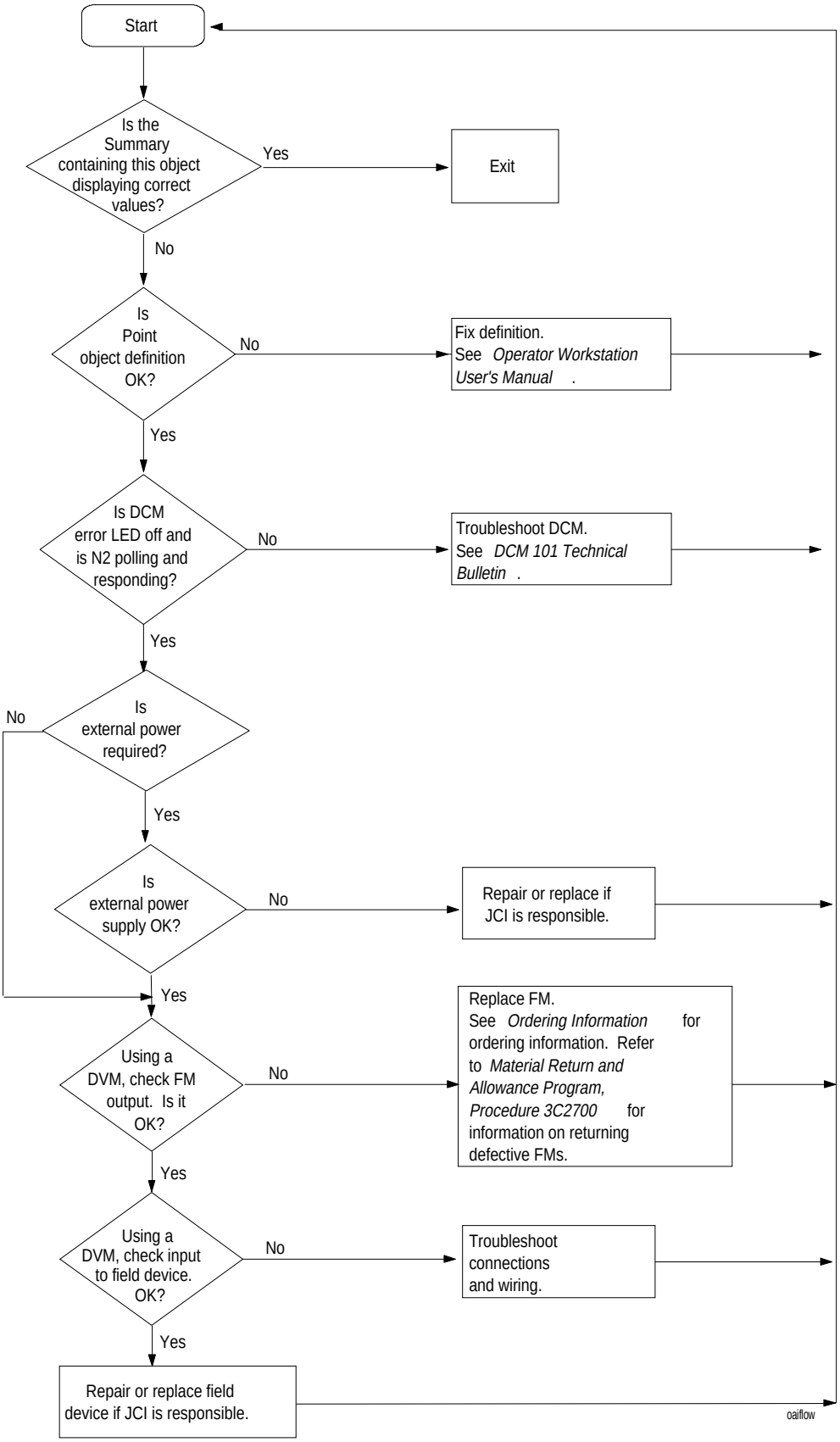

Figure 6: OAI Troubleshooting

Ordering Information

Table 3: Code Number

Description	Product Code Number
OAI Function Module	FM-OAI101-0

Notes

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