FBM230 Field Device System Integrator Module, Four Serial Ports, Single

The FBM230 Field Device System Integrator (FDSI) module provides a serial interface between single-ported field I/O devices and the I/A Series® system.

FEATURES

The key features of the FBM230 are:

- Four ports - each can be individually configured in software for RS-232, RS-422 or RS-485
- Supports RS-232, RS-422 or RS-485 communication interface standards
- I/O software drivers downloadable from a library of available protocols
- Up to 2000 DCI block connections
- Communicates with up to 64 RS-485 or up to 4 direct connect RS-232 or RS-422 devices
- Integrates field device data into an I/A Series control database
- Field mounted
- Class G3 (harsh) environments.

OVERVIEW

The FBM230 has four ports - each can be individually configured in software for RS-232, RS-422 or RS-485. This provides a single FBM230 the flexibility to connect to multiple similar but not identical devices.

Physical wiring is in accordance with Electronic Industrial Association (EIA) standard RS-232, RS-422 or RS-485.

The FBM230 and its associated termination assembly (TA) accommodate several types of connections to single ported devices; direct connection to devices; connection to modems when used with the RS-232 communication interface, and multidrop connections to RS-485 devices. Intrinsic safety devices can be connected between the TA and the field device. The general network configurations are shown in Figure 1.

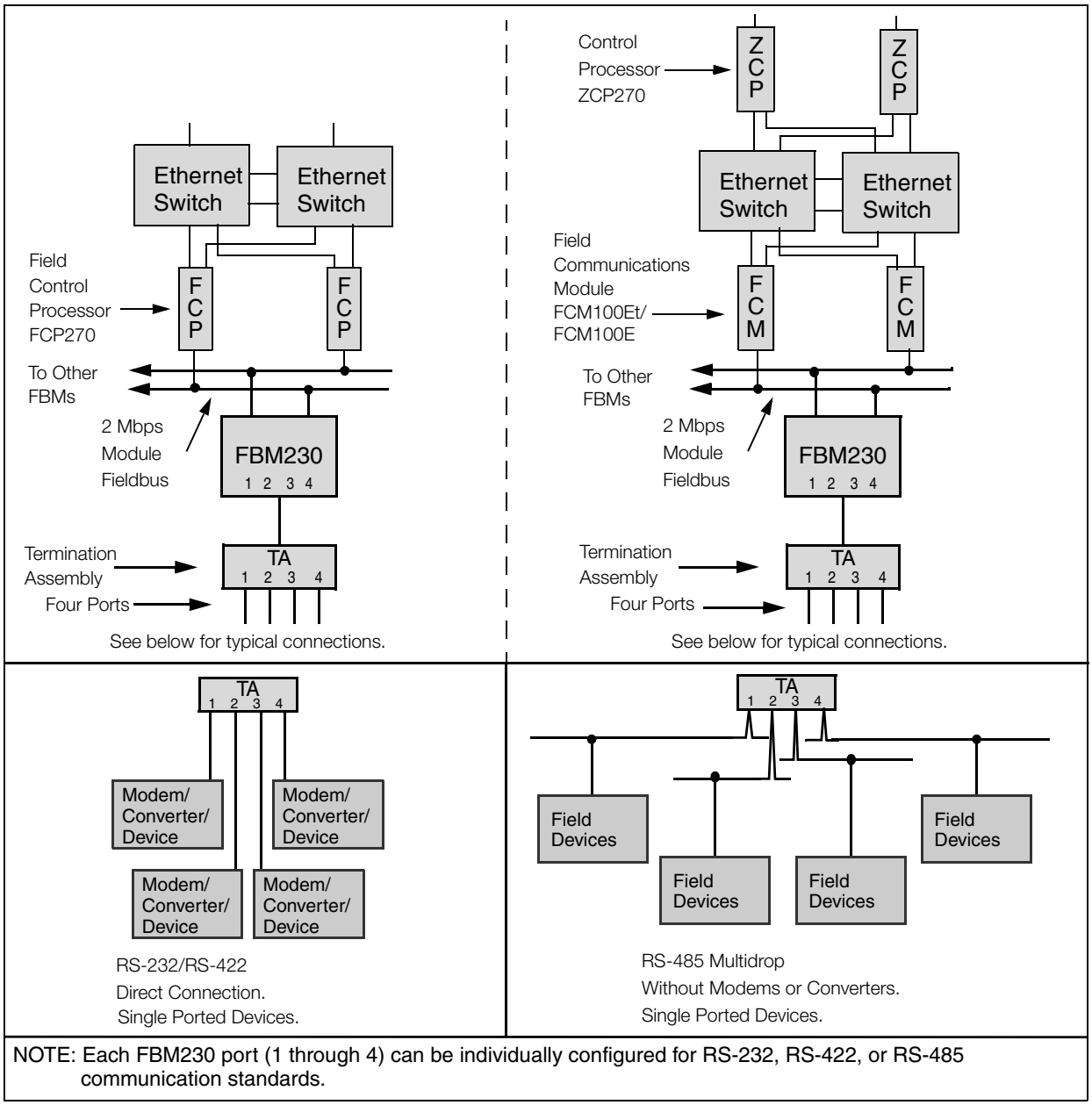


Figure 1. FBM230 in Typical Network Configurations

SERIAL LINK SETUP

Data communication between the FBM230 and field devices are through the 4-ported termination assembly (TA). Two different TAs, one with compression screw connections and the other with ring lug connections, have terminals for each port for RS-422 and RS-485 wiring, with DIP-switch-selectable bus termination resistors per port. For RS-232 wiring, the TA has four standard DB-25 male connectors and a break-out bank of 24 DIP switches for each port that can be used for any RS-232 wiring configuration (for example, to connect Clear-to-Send to Request-to-Send).

I/O DRIVERS

This FBM is a generic hardware module in which different software drivers can be loaded. These drivers configure the FBM to recognize a particular protocol used by the field device. Several of the software drivers are standard product offerings. Other custom drivers can be developed to meet specific needs. These drivers are dynamically downloaded to the FBM230 with software code specifically designed to interface with the third party device's protocol.

The configuration procedures and the software requirements for each driver are unique to the device(s) being integrated into the system.

CONFIGURATOR

The FDSI configurator sets up the FBM230 port via XML device configuration files. The port configurator allows for easy setup of the communication parameters for each port (such as, communication interface standard, baud rate, parity). The device configurator is not needed for all devices, but when needed it configures device specific and point specific considerations (such as, scan rate, address of the data to be transferred and the amount of data to be transferred in one transaction).

OPERATIONS

Each FBM230 can access up to 64 RS-485 or up to 4 direct connect RS-232 or RS-422 devices to read or write data.

From the I/A Series control station to which the FBM230 is connected (refer to Figure 1), up to 2000 Distributed Control Interface (DCI) data connections can be made to read or write data. Supported data types are determined by the particular driver loaded on the FBM230, which converts the data to the DCI data types listed below:

- An analog input or output value (integer or IEEE single-precision floating point)
- A single digital input or output value
- Multiple (packed) digital input or output values (packed in groups of up to 32 digital points per connection).

Thus an I/A Series control station can access up to 2000 analog I/O values, or up to 64000 digital I/O values, or a combination of digital and analog values spread over the four ports of the FBM230. The frequency of access to the FBM230 data by a control station can be as fast as 500 ms. The performance is dependant on each device type and the layout of data in the device.

The FBM230 collects the required data from the devices, performs the necessary conversions, and then stores the converted data in its database for incorporation into the I/A Series plant management functions and operator displays. Data may also be written out to the individual devices from the I/A Series system.

COMPACT, RUGGED DESIGN

The FBM230 has a compact design, with a rugged extruded aluminum exterior for physical and electrical protection of the circuits. Enclosures, specially designed for mounting the FBMs, provide various levels of environmental protection, up to harsh environments per ISA Standard S71.04.

CONTROL BLOCK SUPPORT

The FBM230 offers control block support for the following standard I/A Series system Distributed Control Interface (DCI) block types:

BIN	Binary Input
BINR	Binary Input Redundant
BOUT	Binary Output
IIN	Integer Input
IOUT	Integer Output
PAKIN	Packed Input
PAKOUT	Packed Output
PLSOUT	Pulse Output
RIN	Real Input
RINR	Real Input Redundant
ROUT	Real Output
STRIN	String Input
STROUT	String Output

The DCI blocks are configured just like other I/A Series control blocks. The DCI blocks address and read/write data from/to the addressed field device.

MODULAR BASEPLATE MOUNTING

The module mounts on a Modular Baseplate, which accommodates up to four or eight FBMs. The Modular Baseplate is either DIN rail mounted or rack mounted. The Modular Baseplate includes signal connectors for the FBMs, provides connections for redundant independent dc power supplies, I/O cable connections, and 2 Mbps Module Fieldbus connections.

EASY REMOVAL/REPLACEMENT

The FBM230 module can be removed or replaced without removing field device termination cabling, power, or communications cabling.

FIELDBUS COMMUNICATION

The Fieldbus Communication Module (FCM100Et or FCM100E) or the Field Control Processor (FCP270) interface the redundant 2 Mbps module Fieldbus used by the FBMs. The FBM230 accepts communication from either path of the redundant 2 Mbps Module Fieldbus - should one path fail or be switched at the system level, the module continues communication over the active path.

VISUAL INDICATORS

Light-emitting diodes (LEDs) incorporated into the front of the module provide visual indication of the module's operational status, and the communication activity (transmit or receive) of each of the four communication ports.

TERMINATION ASSEMBLY

The FBM230 termination assembly (TA) is part of the I/A Series system DIN rail mounted subsystem field wiring termination family.

Each FBM230 termination assembly and its associated termination cable provide connection compliance to the electrical interface standards (RS-232, RS-422 or RS-485) between the field devices and the FBM230.

The TA has four DB-25 cable connectors for RS-232 communication interface and switches to match the RS-232 signal pinout of the DB-25 connectors to various field devices.

The TA has a three-tier compression type or ring lug connections for RS-422 and RS-485 communication interfaces. Switch-selectable termination resistors are built into the TA for active termination when used with RS-422 and RS-485 communication interfaces.

Key features of the TA include:

- Combination foot that supports 32 or 35 mm DIN rail mounting
- Three-tier termination for RS-422 and RS-485 and four DB-25 cable connectors for RS-232 communication interfaces
- Switches to select transmit and receive signals and other RS-232 communication signals
- Switch-selectable termination resistors for RS-422 and RS-485 communication
- Polyamide construction.

FUNCTIONAL SPECIFICATIONS

Device Communications

INTERFACE

Four serial I/O communication ports provide interface to up to four direct connect RS-232, RS-422 devices or up to 64 devices via four RS-485 buses (Up to 16 devices per port). Each port is a single logical port to single ported devices.

BUS CHARACTERISTICS

General

Electronic Industrial Association (EIA) RS-232, RS-422 or RS-485 communications selectable on a per port basis. The RS-485 physical communication medium consists of twisted-pair shielded copper cable containing a single conductor pair. The RS-422 is a 4-wire physical communication medium. The RS-232 physical communication medium is a DB-25 cable to a customer supplied device/modem/converter.

EIA RS-232, RS-422 and RS-485 I/O Communication

Type

Asynchronous communication, direct connect link (RS-232)

Transmission Rate

300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 baud.

Protocol

8-bit characters; odd, even or no parity, 1 or 2 stop bits.

NOTE

For driver specific limitations on I/O Capacity and Data Types Transferred, refer to the corresponding driver PSS or User's Guide.

I/O CAPACITY

Up to 64 devices per FBM230 maximum (number of actual devices is performance dependent) with up to 2000 DCI connections.

DATA TYPES TRANSFERRED

2-byte or 4-byte signed or unsigned integers, 4-byte IEEE single- precision floating values, or binary values. Automatic conversion for other types as implemented by the downloadable driver.

FASTEST ALLOWED ECB BLOCK PERIOD

500 msec

CHANNEL ISOLATION

Each communication channel is galvanically isolated and referenced to earth (ground). The module can withstand, without damage, a potential of 600 V ac applied for one minute between either channel and earth.

CAUTION

This does not imply that the channels are intended for permanent connection to voltages of these levels. Exceeding the limits for input voltages, as stated elsewhere in this specification, violates electrical safety codes and may expose users to electric shock.

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Module Fieldbus Communication

Communicates with its associated FCM100Et, FCM100E or FCP270 via the redundant 2 Mbps module Fieldbus.

FBM230 Power Requirements

INPUT VOLTAGE RANGE (REDUNDANT)
24 V dc +5%, -10%

CONSUMPTION
7 W (maximum)

HEAT DISSIPATION
7 W (maximum)

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 89/336/EEC
Meets: EN 50081-2 Emission standard
EN 50082-2 Immunity standard
EN 61326 Annex A for Industrial Environments

CISPR 11, Industrial Scientific and Medical (ISM) Radio-frequency Equipment - Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement
Meets: Class A Limits

IEC 61000-4-2 ESD Immunity
Contact 4 kV, air 8 kV

IEC 61000-4-3 Radiated Field Immunity
10 V/m at 80 to 1000 MHz

IEC 61000-4-4 Electrical Fast Transient/Burst Immunity
2 kV on I/O, dc power and communication lines

IEC 61000-4-5 Surge Immunity
2kV on ac and dc power lines; 1kV on I/O and communications lines

IEC 61000-4-6 Immunity to Conducted Disturbances Induced by Radio-frequency Fields
10 V (rms) at 150 kHz to 80 MHz on I/O, dc power and communication lines

IEC 61000-4-8 Power Frequency Magnetic Field Immunity
30 A/m at 50 and 60 Hz

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada
UL/UL-C listed as suitable for use in UL/UL-C listed Class I, Groups A-D; Division 2; temperature code T4 enclosure based systems. Communications circuits meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the *I/A Series DIN Rail Mounted Subsystem User's Guide* (B0400FA).

European Low Voltage Directive 73/23/EEC and Explosive Atmospheres (ATEX) directive 94/9/EC
CENELEC (DEMKO) certified as EEx nA IIC T4 for use in CENELEC certified Zone 2 enclosure certified as associated apparatus for supplying non-incendive field circuits for Zone 2, Group IIC, potentially explosive atmospheres when connected to specified I/A Series processor modules as described in the *I/A Series DIN Rail Mounted Subsystem User's Guide* (B0400FA).

Calibration Requirements

Calibration of the module or termination assembly is not required.

ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE
-20 to +70°C (-4 to +158°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

Storage

TEMPERATURE
-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY
5 to 95% (noncondensing)

Contamination

Suitable for use in Class G3 (Harsh) environments as defined in ISA Standard S71.04, based on exposure testing according to EIA Standard 364-65, Class III.

PHYSICAL SPECIFICATIONS

Mounting

The FBM230 mounts on a Modular Baseplate. The Modular Baseplate can be mounted horizontally or vertically on a DIN rail, or mounted horizontally in a 19-inch rack using a mounting kit. Refer to PSS 21H-2X2 B4 for details.
The TA has a combination foot that supports 32 or 35 mm DIN rail mounting.

Part Numbers

Module - P0926GU
TA Ring Lug - P0926PA
TA Compression Screw - P0926GH

Dimensions - Module

HEIGHT
102 mm (4 in)
114 mm (4.5 in) including mounting lugs

WIDTH
45 mm (1.75 in)

DEPTH
104 mm (4.11 in)

Dimensions - TA

See page 9 and page 10.

Mass

MODULE
284 g (10 oz) approximate
Termination Assembly
Ring Lug (P0926PA)
363 g (0.8 lb) approximate
Compression Screw (P0926GH)
272 g (0.6 lb) approximate

Cables

FBM230 TO TA LENGTHS
1 m (3 ft) to 5 m (15 ft)

TERMINATION CABLE TYPE
Type 5 - Refer to Table 1 on page 8

TA RS-232 CONNECTION (DB-25 CABLE) TO MODEM/CONVERTER/DEVICE
Up to 15 m (50 ft) for custom cables per EIA Standard RS-232.

RS-422 AND RS-485
Up to 1200 m (3937 ft)

Table 1. Termination Cable Types and Part Numbers

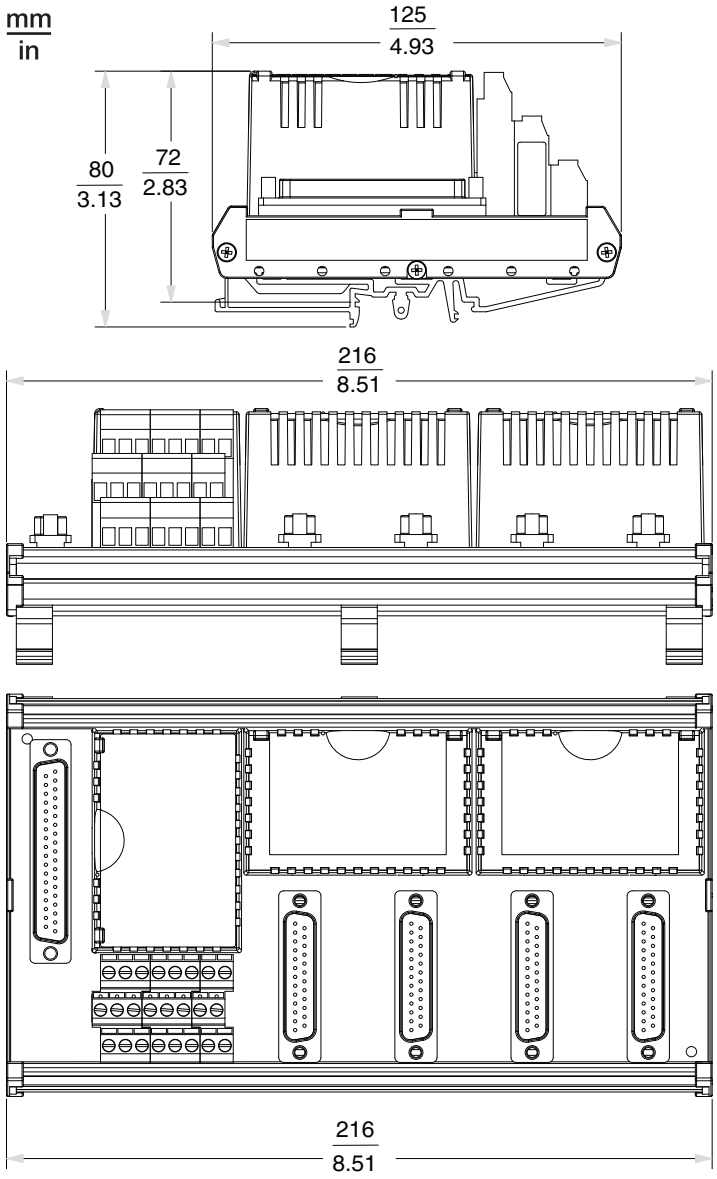
Length m (ft)	Type 5 LSZH[a]	Type 5 Hypalon/XLPE[b]
1.0 (3.2)	P0928AW	P0926GJ
2.0 (6.6)	P0928AX	P0931RV
3.0 (9.8)	P0928AY	P0926GQ
5.0 (16.4)	P0928AZ	P0926GR

(a) Low smoke zero halogen or low smoke free of halogen (LSZH) is a material classification used for cable jacketing. LSZH is composed of thermoplastic or thermoset compounds that emit limited smoke and no halogen when exposed to high sources of heat. Temperature range: -40 to +105°C (-40 to +221°F)

(b) H/XLPE is Hypalon outer jacket and XLPE (cross-linked polyethylene) primary conductor insulation. Temperature range: -40 to +90°C (-40 to +194°F). Hypalon cables are no longer available for purchase.

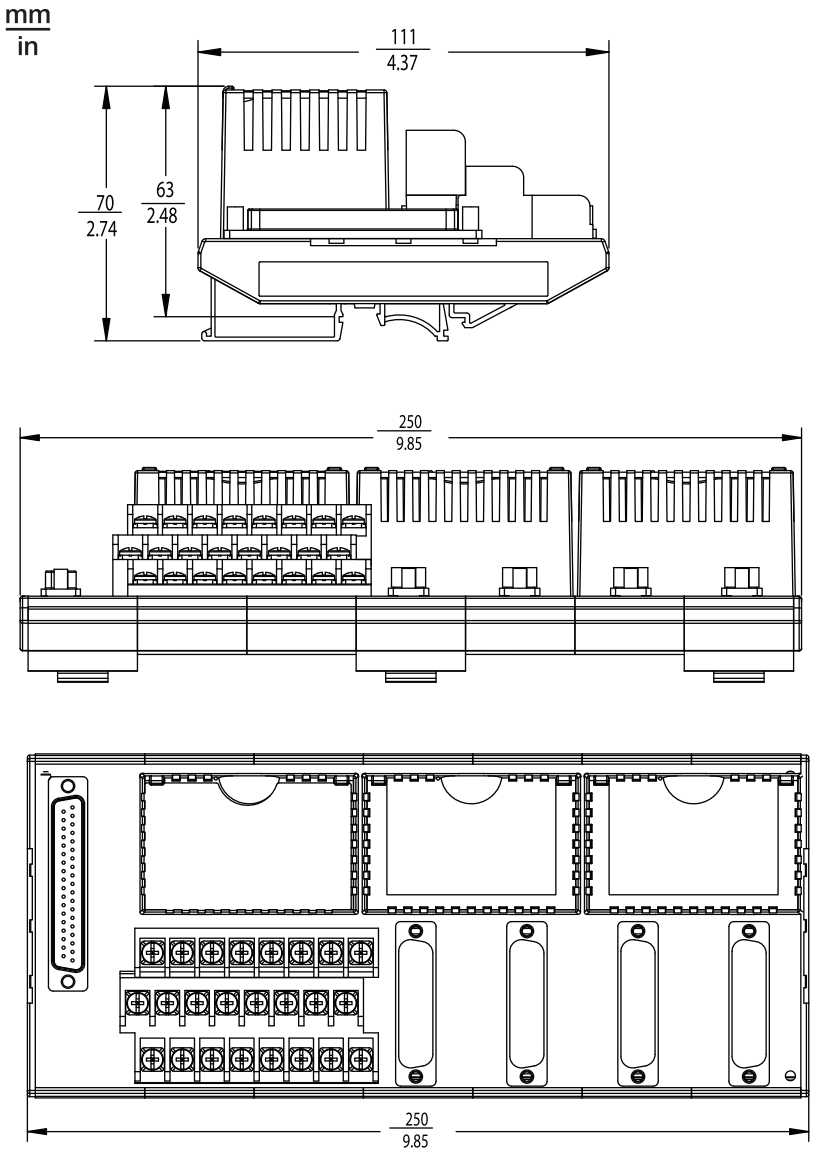
DIMENSIONS - NOMINAL

Compression Screw Termination Assembly (P0926GH)



DIMENSIONS - NOMINAL

Ring Lug Termination Assembly (P0926PA)



RELATED PRODUCT SPECIFICATION SHEETS

PSS Number	Description
PSS 21H-2W1 B3	DIN Rail Mounted Subsystem Overview
PSS 21H-2W2 B3	DIN Rail Mounted Equipment, Agency Certifications

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