6. ENGINE VIBRATION INDICATION

6.1 Introduction

The engine vibration monitoring (EVM) system shows the out of balance force for the N1 and N2 shaft.
High engine vibration shows engine damage or other deviations in the engine. Vibration also reduces the comfort level in the aft passenger compartment.

6.2 Engine Vibration Monitoring System

The EVM system shows vibration in inches/second (IPS) on the right MFDU. An amber limit shows the maximum vibration level.
The EVM system has:
- a dual engine vibration transducer on each engine
- an engine vibration signal conditioner
- controls on the MTP
- a pushswitch on the overhead panel.

The vibration transducer has two internal vibration pick-ups, a pick-up A and B. Each pick-up gives a voltage proportional to the acceleration or deceleration of the vibration.
The vibration transducer is on the IP compressor casing. This casing is the housing for bearings of the HP and LP shaft.

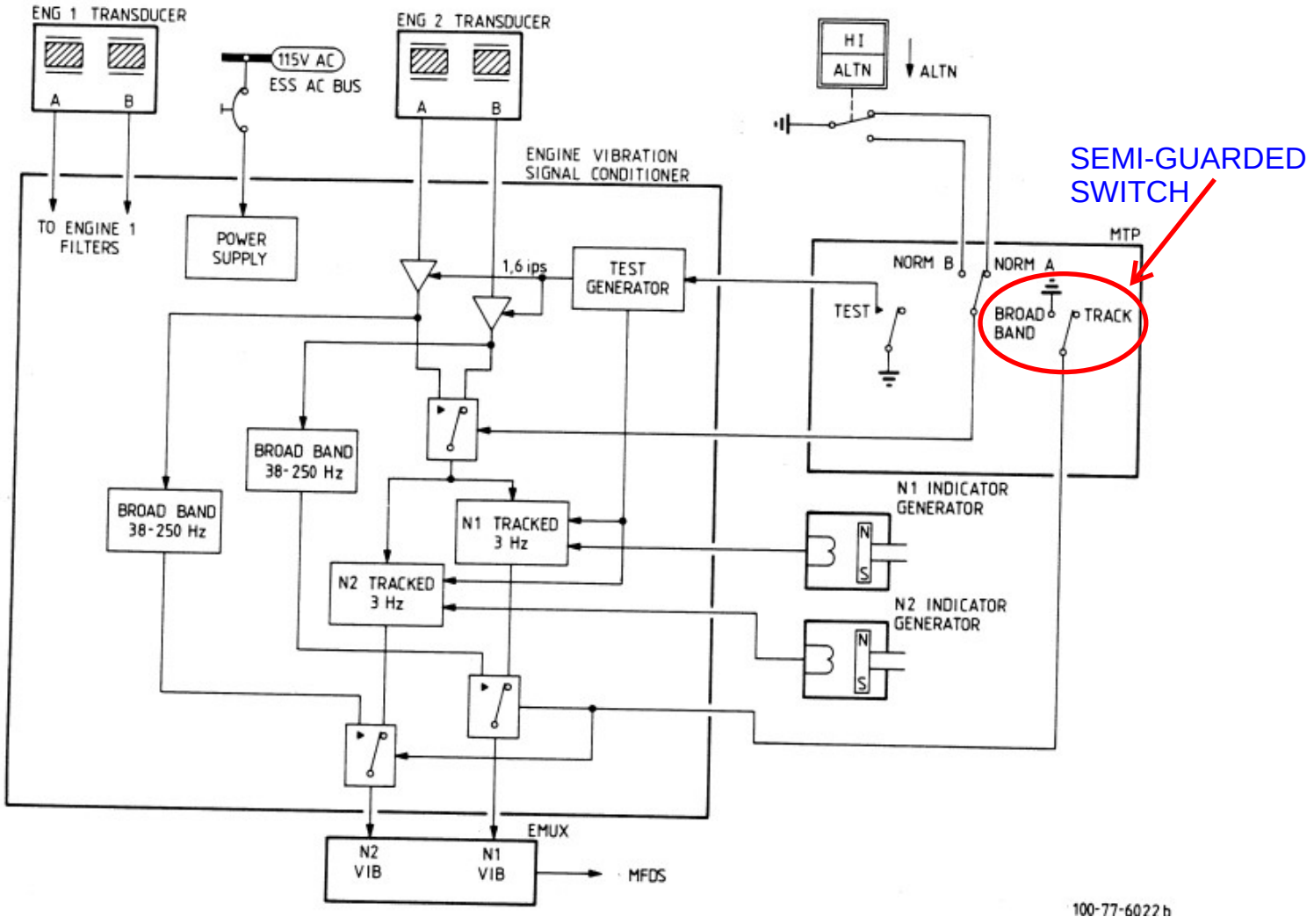
The engine vibration signal conditioner is a single unit for both engines. It processes the output of the engine vibration transducers for indication. The engine vibration signal conditioner is in the equipment bay of the aft cargo compartment.
The engine vibration signal conditioner gives two modes of vibration indication, tracked and broadband.

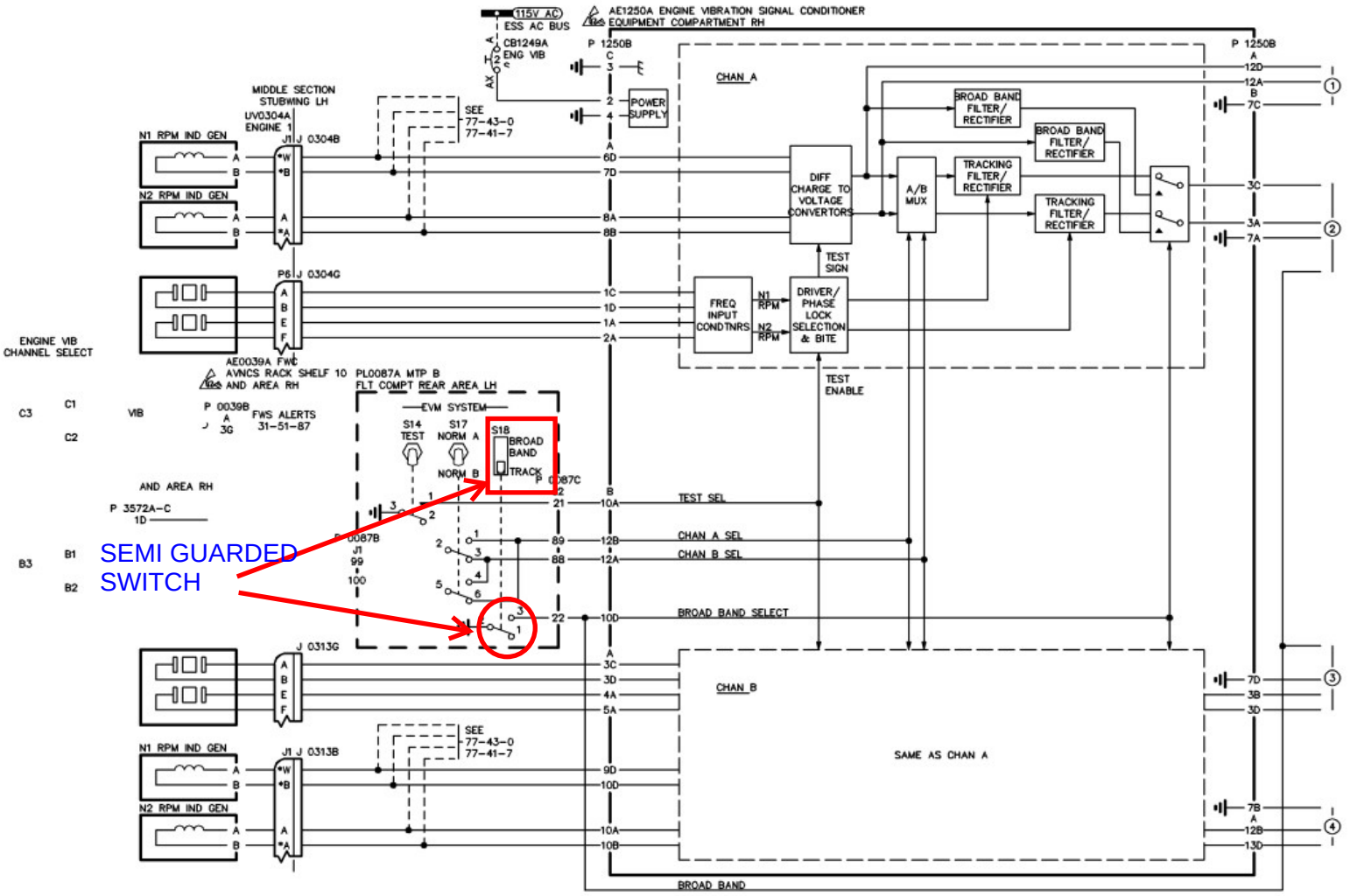
6.3 Tracked Indication

The tracked mode shows vibration of the N1 and N2 shaft. The engine vibration signal conditioner tunes two filters with an input of the N1 and N2 RPM indicator generators. Both filters connect to one pick-up of the vibration transducer, the other is standby. The VIB pushswitch on the ENGINE panel controls the active pick-up of the vibration transducer.

6.4 Broadband Indication

The broadband mode is an alternative mode. Vibration of the total power plant is shown.
In this mode the output of both pick-ups in the vibration transducer goes through broadband filters. The MFDU shows vibration for pick-up A and B.
A semi-guarded switch selects the tracked or broadband mode.


ENG 1 TRANSDUCER
A
B
115V AC
ESS AC BUS
ENG 2 TRANSDUCER
A
B
HI
ALTN
ALTN
ENGINE VIBRATION
SIGNAL CONDITIONER
SEMI-GUARDED
SWITCH
TO ENGINE 1
FILTERS
POWER
SUPPLY
1,6 ips
TEST
GENERATOR
MTP
NORM B
NORM A
TEST
BROAD
BAND
TRACK
BROAD BAND
38-250 Hz
BROAD BAND
38-250 Hz
N1 TRACKED
3 Hz
N1 INDICATOR
GENERATOR
N
S
N2 TRACKED
3 Hz
N2 INDICATOR
GENERATOR
N
S
EMUX
N2
VIB
N1
VIB
MFDS
100-77-6022 b


SEMI GUARDED SWITCH
115V AC
ESS AC BUS
CB1249A
ENG VIB
AE1250A ENGINE VIBRATION SIGNAL CONDITIONER
EQUIPMENT COMPARTMENT RH
P 1250B
POWER SUPPLY
CHAN A
CHAN B
SAME AS CHAN A
DIFF CHARGE TO VOLTAGE CONVERTORS
A/B MUX
BROAD BAND FILTER/ RECTIFIER
TRACKING FILTER/ RECTIFIER
FREQ INPUT CONDTNRS
DRIVER/ PHASE LOCK SELECTION & BITE
TEST SIGN
TEST ENABLE
TEST SEL
CHAN A SEL
CHAN B SEL
BROAD BAND SELECT
BROAD BAND
MIDDLE SECTION STUBWING LH
UV0304A
ENGINE 1
N1 RPM IND GEN
N2 RPM IND GEN
J1 J 0304B
P6 J 0304G
J 0313G
J1 J 0313B
SEE 77-43-0 77-41-7
ENGINE VIB CHANNEL SELECT
AE0039A FWC
AVNCS RACK SHELF 10 AND AREA RH
PL0087A MTP B
FLT COMPT REAR AREA LH
EVM SYSTEM
S14 TEST
S17 NORM A
S18 BROAD BAND TRACK
NORM B
P 0039B
FWS ALERTS 31-51-87
P 3572A-C 1D
P 0087B
P 0087C
GFHEM492B