

PART I : LEADING PARTICULARS AND GENERAL DATA

INTRODUCTION

- 1.1 The explosive type picket driving system was developed for route marking purpose in battlefield. This equipment can be mounted on A and B type of vehicles and is capable of emplacing the markers in the ground with the help of explosive force while the vehicle is in motion. The equipment comprises of a platform on which 80 markers are fitted. Each marker has a flag of red color. The marker is driven into the ground by an Electro-explosive device.
- 1.2 The equipment consists of MS picket, which has spike at one end for penetrating into the ground and piston head on the top end. The piston is housed in the housing unit welded to the platform.
- 1.3 A Pyro-cartridge is fitted on the top of each housing, which on firing generates High-pressure gases to impart necessary velocity to picket. The platform is mounted on the left side of vehicle with suitable framework. A firing control unit is used to select and fire the Pyro-cartridge electrically. Supply is obtained from battery of the vehicle on which the equipment is mounted.

PART II : DETAILED TECHNICAL SPECIFICATIONS

1. Technical specifications of the explosive type Picket Driving System is as follows. The system consist of following parts (Refer Fig 1 & 2)
 - a) FIRE CONTROL UNIT
 - b) JUNCTION BOXES.
 - c) PICKET TRAY ASSEMBLY
2. Fire control unit fitted inside the vehicle. Junction Boxes & Picket Tray Assembly is fitted outside of the Vehicle. Fire Control unit is connected with Junction Boxes through Signal Connector Cable. Four Junction Boxes has each 20 Nos. of PYRO - CARTRIDGE connector. Picket Tray Assembly mounted on left hand side of vehicle. Picket tray consist with assembly platform, flag marker housing & flag markers.

PICKET DRIVING SYSTEM

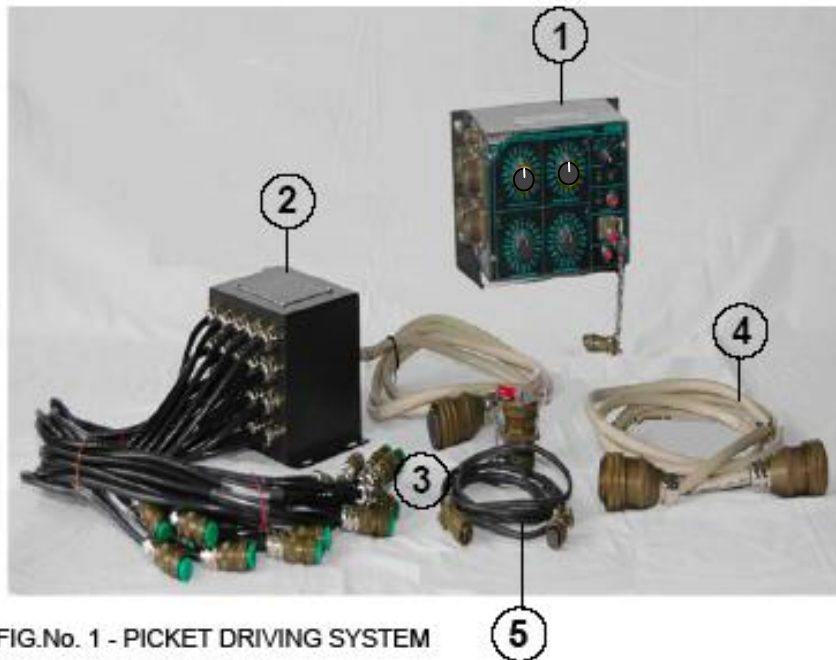
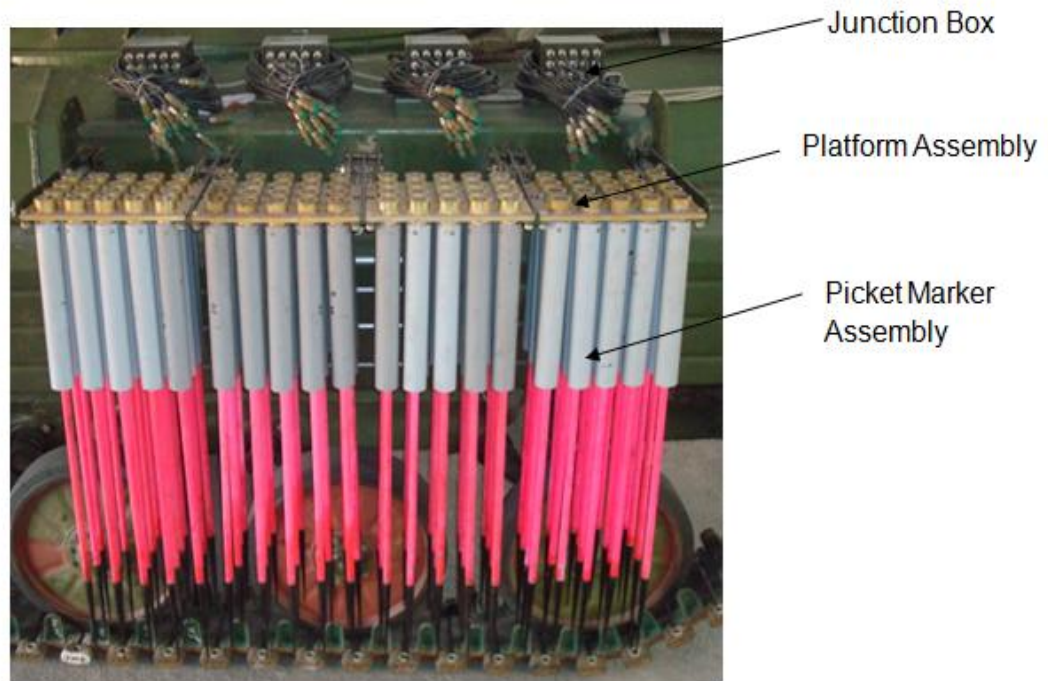


FIG.No. 1 - PICKET DRIVING SYSTEM

- 1 - FIRE CONTROL UNIT
- 2 - JUNCTION BOX WITH PYRO CATRIDGE CONNECTORS
- 3 - SIGNAL CONNECTION CABLE
- 4 - SIGNAL CONNECTION CABLE WITH TBF CONNECTOR
- 5 - POWER SUPPLY CABLE

PICKET TRAY WITH FLAGS



3 TECHNICAL SPECIFICATIONS

MECHANICAL

- (A) MARKER
- (B) PLATFORM AND PISTON HOUSING BLOCKS

ELECTRONICS & ELECTRICAL

- (A) FIRE CONTROL UNIT BOX
- (B) SUPPLY CABLE
- (C) SIGNAL CABLES
- (D) TBF CONNECTORS
- (E) JUNCTION BOX

MECHANICAL

(A) MARKER

1. FLAG POST
MATERIAL : MS Seamless Tube
OD : 18.5 mm
ID : 14.3 mm
LENGTH : 1100 mm

RESTRICTED

2. SPIKE
MATERIAL : EN - 24
SPIKE LENGTH : 229 mm
TAPER ANGLE : 2 °
3. PISTON
MATERIAL : EN - 24
OD : 30 mm
HEIGHT : 50 mm
4. FLAG
MATERIAL : Cotton Fabric + Kevlar
LENGTH : 600 mm
WIDTH : 300 mm
COLOR OF FLAG : RED : Qty 80 and } 80 on system & 80 in
stowage boxes on board
5. FLAG RETAINING TUBE
MATERIAL : PVC
OD : 50 mm
ID : 46.5 mm
LENGTH : 350 mm
6. FLAG POST RETAINING RING
MATERIAL : MS
OD : 46 mm
LENGTH : 20 mm

(B) PLATFORM AND PISTON HOUSING BLOCKS

1. PLATFORM
MATERIAL : MS
LENGTH : 370 mm
BREADTH : 250 mm
THICKNESS : 9 mm
HOLE DIA. : 42 mm
NO. OF HOLES : 80
Qty : 04
2. PISTON HOUSING BLOCK
MATERIAL : EN - 24
LENGTH : 68 mm
OD : 45 mm

ELECTRONICS & ELECTRICAL

(A) FIRE CONTROL UNIT

SUPPLY	: 24 V DC
SAFETY	: Safety Connector
MARKER SELECTOR	: 04 Nos Of 20 way rotary switches (marked 1-20)
PLATFORM SELECTOR	: 01 No of 02 pole 05 Way rotary switch
LED INDICATION	: 80Nos LED around 04 selector switches (Only selected group (row) should glow at a time for indicating the availability of picket in selected group (row). The LED should go OFF when explosive is Fired.
FIRING SEQUENCE	:Firing sequence in four row (A,B,C,D) A= Flag 01-20 B= Flag 1-20 C= Flag 01-20 D= Flag 1-20
CONTINUITY TEST	: 35 mA DC(\pm 3mA)
FIRING CURRENT	: 4.5 to 10 Amp DC
CONSTRUCTION	: MS Box
WIDTH	: 225 mm
HEIGHT	: 165 mm
DEPTH	: 140 mm
THICKNESS	: 2 mm
COLOR	: Olive Green

(B) POWER CABLE

TYPE	: 02 core shielded cable
MAX CURRENT	: 10 Amp.
LENGTH	: 03 Meters
CONNECTION	: Power Distribution Box to Fire Control Unit
QUANTITY	: 01 No.

(C) SIGNAL CONNECTOR

TYPE	: 24 Core Shielded Cable
MAX CURRENT	: 10 Amp.
LENGTH	: 750mm
CONNECTION	: Fire Control Unit Box to TBF Connector
QUANTITY	: 04 Nos.

(D) TBF CONNECTORS

TYPE	: Through Bulk Head Connector
No. OF PINS	: 24 Nos.

RESTRICTED

MAX CURRENT : 10 Amp
QUANTITY : 04 Nos.

(E) JUNCTION BOXES

MATERIAL : MS
WIDTH : 150 mm
HEIGHT : 120 mm
DEPTH : 120 mm
THICKNESS : 02 mm
COLOR : Olive Green
QUANTITY : 04 Nos.

CONNECTIONS : TBF Connector to Pyro Cartridges.

TBF END : 24 pin Female Connector
NO. OF CONNECTIONS : 1 No.
24 CORE CABLE GLAND : PG 16
WIRE LENGTH : 1970mm, 2170mm, 2500mm, 2860 mm

CARTRIDGE END : 04 Pin Female Connector
NO. OF CONNECTIONS : 20 Nos.(each junction box)
2 CORE CABLE GLAND : PG 9

MARKER NO. PLATE : On top of the Box
ENGRAVING : 20 Nos. with specified row and marker Nos.
MATERIAL : Aluminum
LENGTH : 120 mm
WIDTH : 80 mm
THICKNESS : 1 mm

(F) NET WEIGHT OF SYSTEM : 400 KG

(G) TIME TO RELOAD THE SYSTEM : 06 HOURS

(H) PYRO-CARTRIDGE

Type : Electro-explosive Device (EED)
Number of bridge-wire (BW) : Two per cartridge
Bridge-wire material : Nichrome wire, 44 SWG
BW resistance, ohms : 0.3 to 0.5 per BW
Squib composition, Qty mg : ME 300, 85 \pm 5
Transfer charge, Qty, mg : ME 436, 150 \pm 10
Main charge, Qty mg. : ME 422, 800 \pm 10
No-fire Current (NGC), Amps : 0.50 for 60 second per BW

RESTRICTED

All-fire Current (AFC), Amps	: 1.40 per BW
Recommended Fire Current (RFC), Amps	: 2.0 to 10.0 per BW
Delay in operation, m.secs	: 20 ± 10 at 2.0 Amps fire current per BW
Dimensions	: Drg. No. ERDL 898
Life	: 10 yrs. In storage
Pressure developed, KSC	: 400 ± 100 in 10 ± 1.0 cc vol
Operating temp. range	: -30 ± 2 0C to $+55 \pm 2$ 0C
Hermetic sealing	: Provided
Firm Part no.	: PC 100 DQ

PART III: UNPACKING AND REMOVAL OF PRESERVATIVES

General

- 1 No special unpacking and removal instructions are required for Fire control unit for explosive type Picket firing system with Terminal Boxes and its accessories.

The following Equipments are supplied for installation in AERV

a.	Fire Control Unit Box	01 No.
b.	Signal Cables	04 Nos.
c.	MS TBF Connectors	04 Nos.
d.	Junction Boxes	04 Nos.
e.	Mounting Screws & washers	05 Sets
f.	MS Pickets (Markers) with Flags	160 Nos.
	RED Markers	80 Nos. on system & 80 Nos. in stowage boxes on board
g.	Pyro-Electric Cartridges	160 Nos. (80 Nos. on system and 80 Nos. in stowage boxes on board)
h.	User Handbook	01 No.

PART IV : CONDITION OF USE

4.1 Conditions of Use :

A FCU is capable of supplying 4 Amp current for firing a single Pyro-cartridge. The FCU is portable and easy to handle which works on 24 V DC. The safety plug provided in the FCU prevents the firing. Four Nos of DPD switches are provided to select the flag (Flag A, B, C, & D). It is also provided with 4 Nos. rotary switches as marker selectors each numbered from 1 to 20 for selecting the firing of particular marker. Provision of Test Switch has been made to check the continuity of electrical circuit which must be checked before firing. Green LED indicates continuity check is O.K. The FCU provided warning light & audio signal to warn the wrong polarity of the batter supply. The firing switch supplies the energy to the cartridge of the selected marker only after the safety plug has been inserted in the safety socket.

4.2 Climatic and Durability Requirements And Category

Operating temperature	: 0°C to + 55°C
Storage temperature	: 0° C to + 70°C

The Fire Control Unit is designed to comply with environmental conditions as per JSS 55555.

4.3 Transportation Requirements

The Equipment is transportable by Air, Road over a country under packed Condition.

PART -V DESCRIPTION OF TESTS

5.0 General Test Conditions

1. Unless otherwise specified, all tests to be carried out in an environment wherein ambient temperature is within the range of +10°C to 55°C. The relative humidity and the atmosphere pressure not be controlled
2. Inspection of Picket Driving System (PDS) Equipment be governed by the provisionally sealed drawings (amended from time to time) and specifications issued by the AHSP (Authority Holding Sealed Particulars)
3. The drawing and Specifications governing the inspection are liable to be amended by the AHSP during the course of manufacture and fabrication and as such, the inspector to ensure proper check on such amendments and deviations.

5.1 TECHNICAL EVALUATION

5.1.1 TEST EQUIPMENT REQUIRED

- i. DC Power Source of 24 Volt, 8 Amp or better
- ii. Multimeter
- iii. Shorting Connector

5.1.2 PRECAUTIONS

Sufficient precautions to be built-in to protect the system for inadvertent reverse polarity connection.

5.2 ACCEPTANCE TESTS

5.2.1 ACCEPTANCE TESTING – Test Plan

For the purpose of acceptance testing, the tests are divided into three groups:

5.2.1.1 Group ‘A’ Tests

- a. Group ‘A’ tests shall be carried out on 100 % of the offered units.

RESTRICTED

- b. Any equipment not meeting the requirement shall be returned to the manufacturer for rectification.
- c. Following are the group 'A' test, which shall be carried out as per the method indicated.

<u>Sr.No</u>	<u>Test</u>	<u>Test method *</u>
1	Visual Examination	6.1
2	Mechanical	6.2
3	Reverse Polarity Protection	6.3
4	Operating Voltage Range	6.4
5	Continuity Test	6.5
6	Fire/Performance Check	6.6
7	Weight	6.7
8	Size	6.8

NOTE: *For Test Methods, Refer to the ATP document

5.2.1.2 Group 'B' Tests

- a. Group 'B' tests shall be carried out on 10 % basis i.e. 1 in every 10 offered units.
- b. Records of Group 'A' tests carried out on offered units by the manufacturer would be available.
- c. If an equipment does not conform to a specific Group 'B' requirement, the same shall be returned to manufacturer for rectification. In addition, next 10 units offered shall be subjected to that particular test.
- d. Following are Group 'B' tests which shall be carried out as per the method indicated

<u>Sr.No.</u>	<u>Test</u>	<u>Test Method*</u>
1	Power Consumption	6.9
2	High Temperature Test	6.10
3	Low Temperature Test	6.11
4	Vibration	6.12

RESTRICTED

5	Bump Test	6.13
---	-----------	------

NOTE: *For Test Methods, Refer to the ATP document

5.2.1.3 GROUP 'C' TESTS

- a. Group 'C' tests shall be carried out on 1 % basis i.e. 1 in every 100 offered units as a Type test.
- b. Records of Group 'A' tests carried out on offered units by the manufacturer to be available.
- c. If equipment does not conform to a specific Group 'C' requirement, the same shall be returned to manufacturer for rectification. Any further production shall only continue after conforming to this test.
- d. Following are Group 'C' tests which shall be carried out as per the method indicated (refer JSS55555 2000 for test procedure).

Environmental Test Specifications for Group 'C' Testing

Class L2J – Ground equipment partially protected (Sequential tests in tracked vehicles)

1	Vibration (Test No. 28)	5 to 13 Hz +/- 6mm constant displacement 13 to 500 Hz with 40 m/s ² constant acceleration Sweep Rate: 1 Octave per minute Axis: Three Axes Duration: 1 hour each axis
2	High Temperature (Test No. 17 Condition K)	Operational: +55 deg. C +/- 3 deg. C - 16 hrs Storage: +70 deg C +/- 3 deg C - 16 hrs
3	Damp Heat (Test No. 10)	40 deg C +/- 2 deg C, 95 % RH for 16 hours
4	Low Temperature (Test No. 20 Condition M)	Operational : 0 deg C - 16 hrs
5	Rapid Temperature	40 deg C +/- 3deg C, 95 % RH for 3 hour

RESTRICTED

	Cycle (Test No. 22, Procedure 2)	-40 deg C +/- 3deg C for 3 hour One Cycle
7	Dust Test (Test No. 14)	Subject the unit to dust test in dust chamber maintained at 40°C±3 °C for 1 Hr in switched OFF Condition.