



PROPULSION TELEGRAPH

TYPE 8201

APPLICATIONS

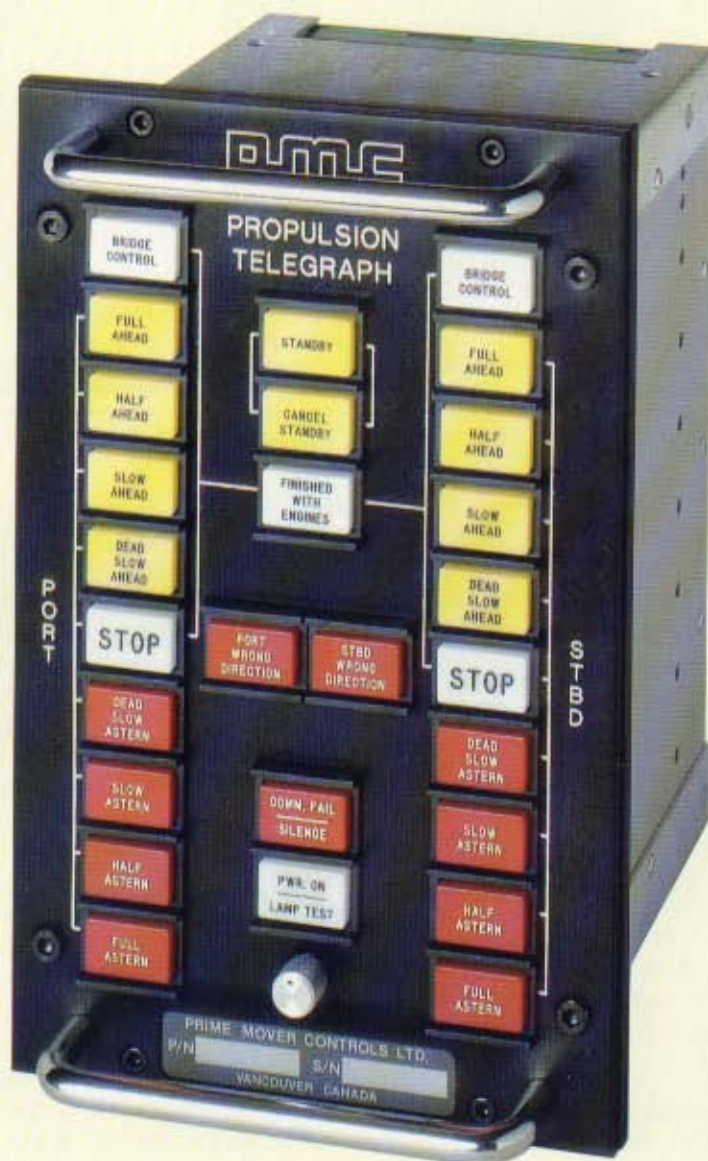
- Tugboats
- Ferries
- Icebreakers
- Dredges
- Fishboats
- Tankers
- Cargo Vessels
- Supply Vessels

FEATURES

- Single or twin screw
- Independent standby orders
- ER and BR groups may each contain up to five units
- Up to 1000 metres between groups using two shielded twisted pair cables
- Reliable communication by isolated current loops and software based checking procedures
- Computer based CMOS logic includes extensive noise protection circuitry
- Dual 24 VDC inputs use ship's unregulated power supplies
- All inputs are protected from damage due to connection errors
- Each unit alarms on communication loss, power failure and wrong direction
- Includes serial port for optional datalogger

SERVICE

- Dual lamps in each display are easily replaced from front
- Power switch and fuses are easily accessible



PRIME MOVER CONTROLS INC.

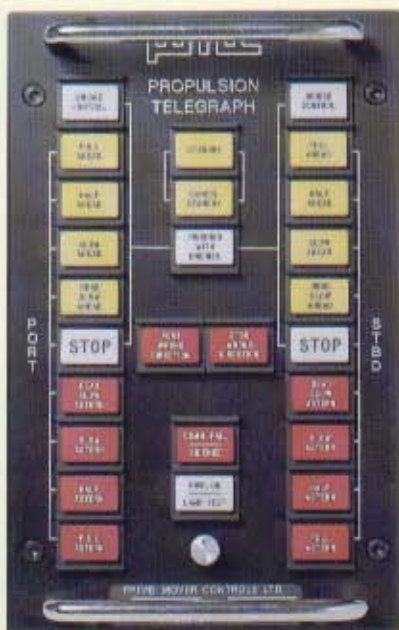
VANCOUVER, BC, CANADA

DESIGN, MANUFACTURE AND SERVICE OF MARINE AND INDUSTRIAL CONTROL COMPONENTS AND SYSTEMS

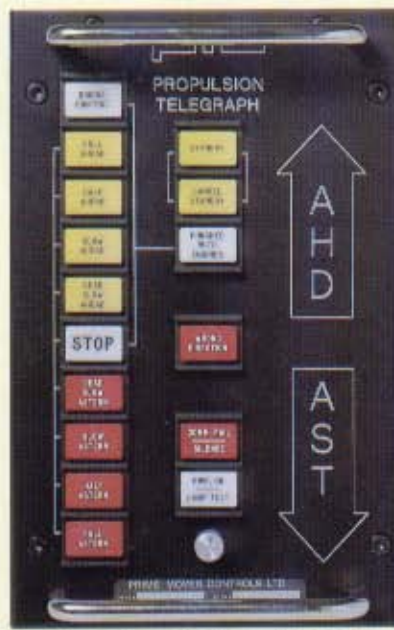
Electronic - Pneumatic - Hydraulic - Mechanical

TYPICAL FACEPLATES

TWIN SCREW



SINGLE SCREW



ALL UNITS ARE AVAILABLE WITH AHD AND AST OPERATING DIRECTIONS REVERSED
ENGINEROOM UNITS DO NOT INCLUDE DIMMERS

GENERAL DESCRIPTION

The PMC type 8201 Propulsion Order Telegraph is a compact, modular, microprocessor controlled marine electronic telegraph. It operates as a stand alone or backup system. It functions entirely independently of the ship's main propulsion controls and allows emergency operation when primary remote control fails.

The type 8201 provides pushbutton communication of all standard propulsion orders between bridge and engine room. In addition, a unique "standby" order group is included which may be operated at any time, independently of the propulsion orders. Communication is fully bidirectional; orders may be placed from either source. Direction is monitored in Ahead, Astern and Stop positions. Wrong direction status is visually and audibly alarmed at all stations. All units also alarm for communication and power failure.

To enhance the inherent noise immunity provided by CMOS, additional circuits and components are used which virtually eliminate the effects of electromagnetic and radio frequency interference. Printed circuit board assemblies are pre-tested, then thoroughly cleaned and conformal coated. The internal board assemblies are securely interconnected and housed in a rugged aluminum enclosure to provide a vibration-free rigid structural unit. Before shipment, assembled units are fully hardware and software tested, as individual units and together as a functional operating system.

Connections to the Type 8201 have been designed to simplify installation procedures. Only two shielded twisted pair cables are required for communication. Total wiring distance between units must not exceed 1000 metres. Any failure of these cables is alarmed at all units as a communication failure. Each unit is powered directly from the ship's 24 volt DC batteries and can also transfer automatically to a backup 24 VDC power source. If any unit loses power, all units alarm. Only the engine room units are connected to remote Wrong Direction contacts. The minimum configuration consists of one bridge unit connected to one engine room unit. Up to five units may be connected together on the bridge as well as five in the engine room — a total of ten units. Groups can be interconnected with a single wire so that any unit in the group can silence all units in the same group. All terminal inputs are protected; field connection errors or applications of incorrect voltages up to 120 volts AC or DC result in no more than blown fuses.

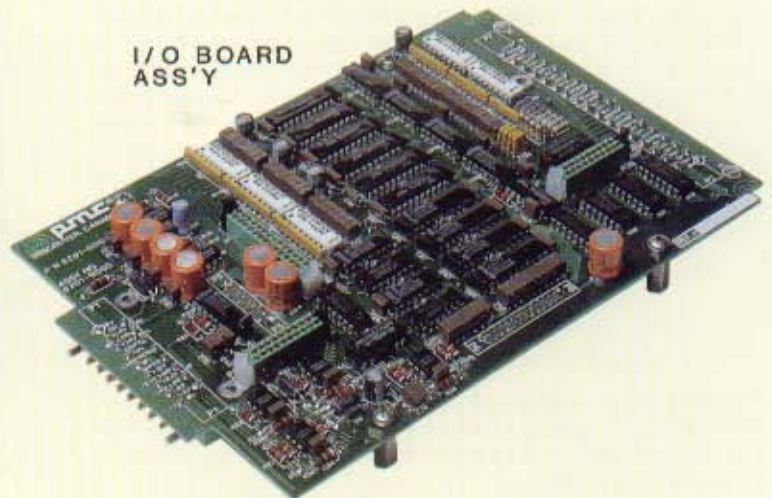
Each indicator light contains two industry standard bulbs which are easily replaced from the front. Each unit includes standard input power fuses, communication line fuses and a power ON-OFF switch. All features, including audible alarm time delays, an RS-232 serial data port for output to an optional remote datalogger and master station selection capability are provided as standard.

PRINTED CIRCUIT BOARDS

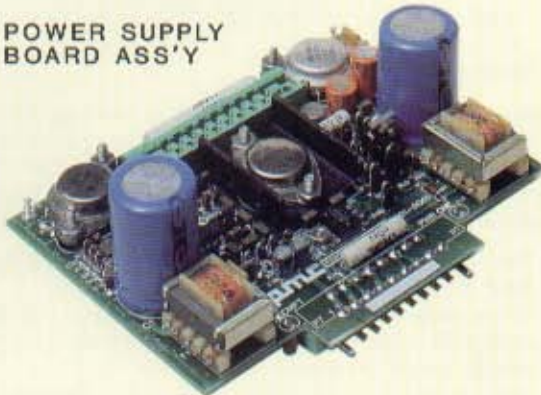
CPU BOARD
ASS'Y



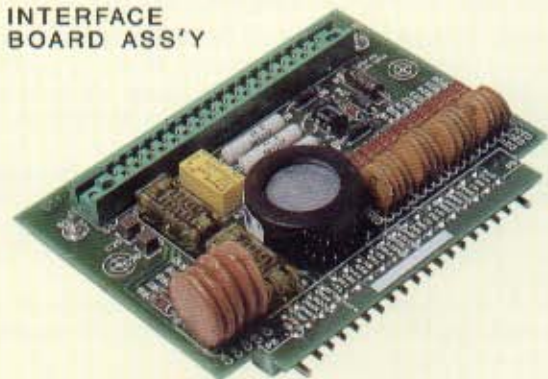
I/O BOARD
ASS'Y



POWER SUPPLY
BOARD ASS'Y



INTERFACE
BOARD ASS'Y



SPECIFICATIONS

SUPPLY: Nominal: 24 VDC. Operating range: from 22-39 VDC. Two inputs are provided for uninterrupted operation.

LOAD: For each twin screw unit at 24 VDC:
0.84 A norm., 0.29 A min., 2.2 Amps max. (LAMP TEST)
For each single screw unit at 24 VDC:
0.76 A norm., 0.29 A min., 1.6 Amps max. (LAMP TEST)

WIRE: Up to two No. 16 AWG wires per terminal. Power cables are No. 16 AWG; communication cables are two shielded twisted pairs, No. 18 AWG minimum.

BOARDS: Glass epoxy PC boards are silicon-resin conformal coated for protection from the marine environment. All boards are rigidly positioned and electrically interconnected using gas tight, gold plated, corrosion resistant contacts.

ENCL: 1.6 to 6.4 mm (1/16" to 1/4") thick aluminum; surface pieces have hard anodized black finish.

WEIGHT: Each unit net: 3.8 kg (8.4 lb); shipping: 8.4 kg (18.4 lb)

ORDERING DATA

1. Ship description: Single Screw ____
Twin Screw __ Double Ended __
2. For Bridge & ER groups: specify the number of units, location of stations and operating directions.
3. Specify if remote wrong direction contacts will be connected.
4. Specify preferred "station-in-command" system:
 - a. one station only active; others in the same group are monitors only and cannot place orders.
 - b. all stations are always active on first-in/last-out basis (one station given group priority).
5. Wrong direction horn delay at each unit: select 0-3-6-9...21 seconds.
6. External signal bell delay at each unit: select 0-3-6-9 seconds.

Note: Items 4-6 can be field modified.

DESCRIPTION OF OPERATION

The PMC type 8201 propulsion telegraph system is designed for single or twin screw vessels and can be combined for multi-screw applications. A typical system involves one or more (max. 5) bridge units communicating with one or more (max. 5) engineroom units. Bridge and engineroom units are identical in function and operation. A dimmer control is provided on each bridge unit only. Communication is fully bi-directional. Each telegraph front display is divided into groups for ease of identification and operation, as follows:

- Power/Communication Group
- Port Telegraph Group
- Starboard Telegraph Group
- Wrong Direction Group
- Standby/Finished with Engines Group

A single screw telegraph unit includes all groups except the starboard group. The starboard surface area will then have an engraved direction symbol. Operation of each group is as follows:

1. Power Group

The Power Group consists of two illuminated pushbuttons: PWR ON/LAMP TEST and COMM. FAIL/SILENCE.

- a. The PWR ON/LAMP TEST light is normally "on" to indicate that the telegraph is operating. Pushing the PWR ON/LAMP TEST pushbutton will cause all indicator lights on that telegraph unit to turn on as long as the pushbutton is pressed.
- b. A power failure of one of the two independent power supplies causes the PWR ON/LAMP TEST lamp to flash and the audible signals to operate. The audible signals may be silenced by pushing the PWR ON/LAMP TEST pushbutton.
- c. If one of the input power sources for this telegraph unit has failed, the PWR ON/LAMP TEST lamp will continue to flash after being silenced.
- d. If both of the input power sources are available, the PWR ON/LAMP TEST lamp reverts to steady operation after being silenced.
- e. If both independent power sources fail, or the telegraph logic fails, the alarm relay will operate and turn on external horns, beacons, alarm annunciators, etc. The unit's disappearance is detected as a COMM. FAIL.
- f. When a telegraph unit is first turned on, or power is restored, the PWR ON/LAMP TEST lamp will flash and the audible alarms will operate. Pushing the PWR ON/LAMP TEST pushbutton will silence the audible alarms and cause the lamp to go "on" steady. This unit will update itself to the status of other existing telegraphs and report on all detected fault conditions. It will then be available to place or receive orders.
- g. Communication failure between telegraph units is alarmed by the flashing COMM. FAIL/SILENCE illuminated pushbutton and the alarm relay. Pushing the COMM. FAIL/SILENCE pushbutton clears the audible alarms. After silence, the front panel display light status indicates various types of communication failures. These failures are detailed in the instruction manual.
- h. Silencing of an alarm within a telegraph group silences all alarms in that group.

2. Port Telegraph Group

This group consists of 10 Port commands: four Ahd and four Ast orders, one BRIDGE CONTROL order and one STOP order.

- a. Completed orders are displayed as steady "on" illuminated pushbuttons and all audible signals are silent.
- b. A new order can be placed by pressing another pushbutton which then flashes at all stations. At the same time the internal horn operates and will continue to operate until the new order is acknowledged. The optional external bell can be programmed for a time delay.
- c. The new order is acknowledged at the receiver by pushing the flashing pushbutton, which then turns to the steady "on" mode. The previous order is canceled, and all audible signals are silenced.
- d. New orders can be changed or canceled at the transmitting telegraph group prior to acknowledgment.
- e. When the BRIDGE CONTROL order is acknowledged, the Ahd, STOP and Ast pushbutton displays are turned off. When bridge control is relinquished by placing and acknowledging another order, the BRIDGE CONTROL lamp is turned off, thereby indicating Engineroom Control.

3. Starboard Telegraph Group

This group exists only for twin screw units. Operation is identical to that described for the port telegraph group.

4. Wrong Direction Group

This group consists of one or two indicating lights (single or twin screw) which alarm when a Wrong Direction condition exists. On vessels which do not have a Wrong Direction input, these lights are provided with a blank nameplate and the alarm function is inactive.

- a. The wrong direction display and alarm is active after an Ahd, STOP or Ast order is acknowledged.
- b. If the order has been acknowledged and the machinery direction does not match the order (Ahd-STOP-Ast), the wrong direction alarm is activated.
- c. Wrong direction alarms consist of a flashing WRONG DIRECTION light, and operation of the internal horn and optional external bell.
- d. The flashing WRONG DIRECTION alarm lights operate immediately. However, operation of the internal horn and the optional external bell may be programmed for a time delay.
- e. Wrong direction audible alarms may be silenced.
- f. If the correct direction status is achieved, then the wrong direction visual and audible alarms are canceled.
- g. If the direction of propulsion thrust changes from the acknowledged telegraph direction, then the wrong direction alarm is re-activated.

5. Standby/Finished with Engines Group

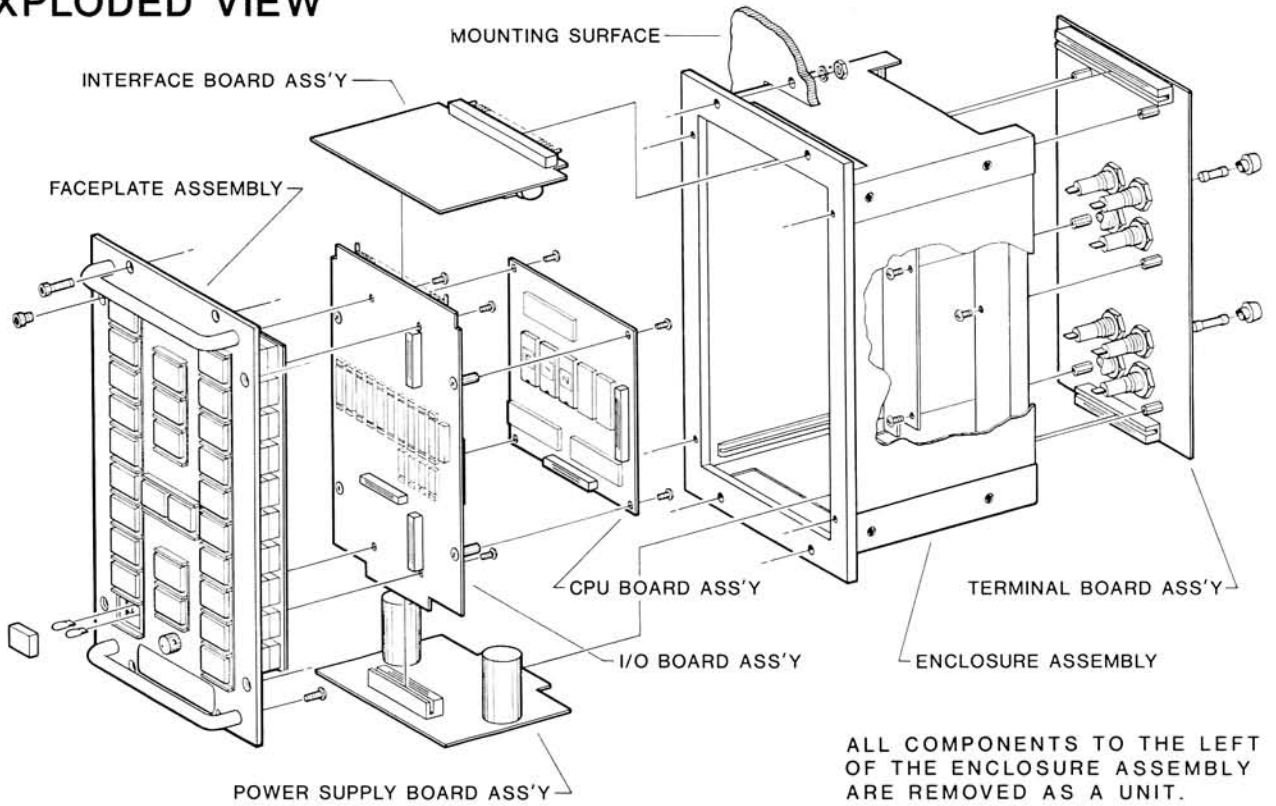
This group consists of three illuminated pushbuttons: STANDBY, CANCEL STANDBY and FINISHED WITH ENGINES. Together, they function as a separate telegraph group similar to the port and starboard telegraph groups.

- a. A STANDBY order may be placed independently of any other telegraph order.
- b. STANDBY, acknowledged or not, may be canceled by a CANCEL STANDBY order at the initiating telegraph.
- c. A receiving telegraph must acknowledge a STANDBY order before it can issue a CANCEL STANDBY order.
- d. If the port and/or starboard telegraphs are active, a FINISHED WITH ENGINES order may only be implemented if both port and starboard telegraphs have acknowledged BRIDGE CONTROL or STOP orders.

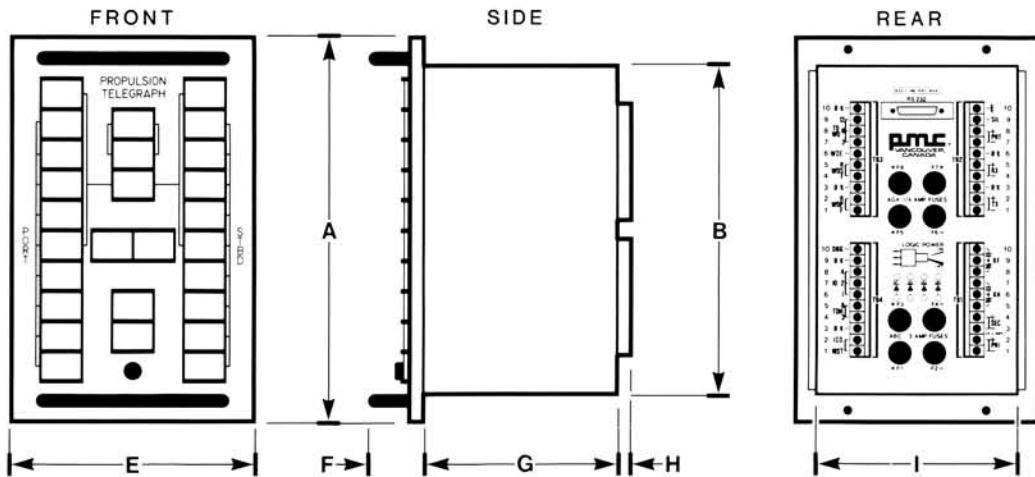
PRIME MOVER CONTROLS INC.

3600 Gilmore Way, Burnaby, BC, Canada V5G 4R8 Tel: (604) 433-4644 FAX: (604) 433-5570

EXPLODED VIEW



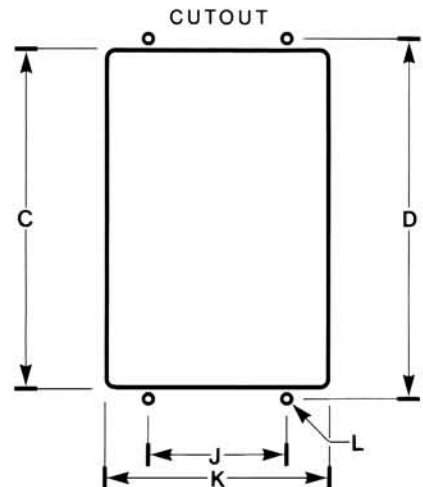
DIMENSIONS



1 mm : 0.394 in.
1 inch : 25.4 mm

A	279.4	11.00
B	243.8	9.60
C	247.7	9.75
D	263.5	10.37
E	177.8	7.00
F	41.9	1.65
G	142.2	5.60
H	10.7	0.42
I	149.9	5.90
J	101.6	4.00
K	165.1	6.50
L	TAP	No. 10-24 or M5x.8
	mm.	inch

Mounting Kit part no. 8800-9045 (inch) or 8800-9046 (metric) is provided for each enclosure and consists of 4 stainless steel screws, nuts and washers.



STANDARD RS-232C SERIAL DATA PORT, FOR DATALOGGER, PRINTER, COMPUTER, ETC. MAY BE CONNECTED AT BRIDGE OR ENGINE ROOM (NOT BOTH).

WRONG DIRECTION TIME DELAY MAY BE SET INDEPENDENTLY AT EACH UNIT - SEE NOTE BELOW

DO NOT CONNECT IF UNIT IS INSTALLED ON BRIDGE

SYSTEM ENTERS DEBUG MODE IF CONNECTED TO 0 VOLTS. DO NOT CONNECT FOR NORMAL OPERATION (ENG RM OR BR)

IF MULTIPLE UNITS (MAX. 5) ARE CONNECTED TOGETHER ON BRIDGE EACH UNIT MUST BE GIVEN IDENTIFICATION CODE 0 TO 7 BY CONNECTING 1, 2 AND/OR 4 TO 0 VOLTS. DO NOT CONNECT IF SINGLE UNIT. ACTUATION OF HORN RELAY KH MAY BE DELAYED FROM 0 - 9 SEC. IN 3 SEC. INCREMENTS - SELECT AMOUNT BY CONNECTING 3 SEC. AND/OR 6 SEC. TERMINAL TO 0 VOLTS.

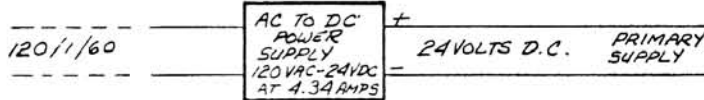
IF MULTIPLE UNITS (MAX. 5) ARE CONNECTED TOGETHER ON BRIDGE, ONE UNIT MAY BE DESIGNATED AS BEING 'IN COMMAND' BY NOT CONNECTING 'ICD' TO 0 VOLTS - THIS UNIT WILL THEN BE ALLOWED TO PLACE AND ACKNOWLEDGE ORDERS - OTHER UNITS WITH 'ICD' CONNECTED TO 0 VOLTS ACT AS REPEATERS ONLY AND CANNOT PLACE OR ACKN. ORDERS; THEY ONLY DISPLAY STATUS.

MASTER STATION SELECT - SEE NOTES BELOW.

MAX. DISTANCE BETWEEN UNITS IS 1000 METERS

24 VOLTS D.C. SHIP'S BATTERIES

EMERGENCY SUPPLY



WRONG DIRECTION TIME DELAY CAUSES INTERNAL HORN AND RELAY KH TO BE DELAYED BY 0-21 SEC. - DISPLAY IS NOT DELAYED.

WRONG DIRECTION TIME DELAY SELECT 0-21 SEC IN 3 SEC INCREMENTS - SELECT AMOUNT BY CONNECTING 3 SEC., 6 SEC. AND/OR 12 SEC. TERMINAL TO 0 VOLTS.

WRONG DIRECTION CONTACTS OPEN WHEN ENG MOVES INTO DIR. SHOWN - IF WRONG DIRECTION FEATURE IS USED THEN NORM. CLOSED REMOTE SWITCHES ARE CONNECTED HERE TO ALL ENG. ROOM UNITS IN PARALLEL AND ALL WDE TERMINALS OF THESE UNITS MUST ALSO BE CONNECTED TO 0 VOLTS

DEBUG MODE ENABLE - SEE NOTE ABOVE.

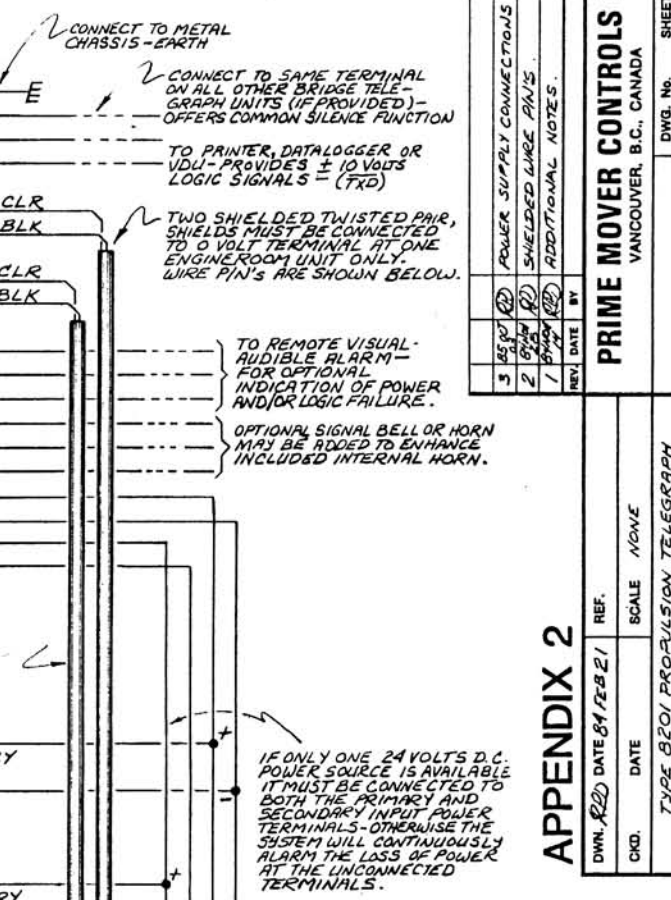
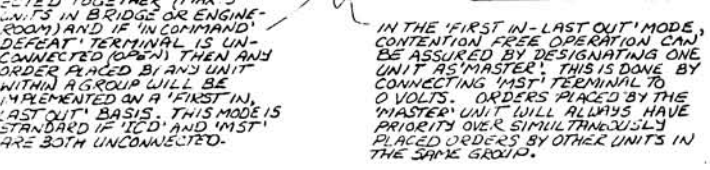
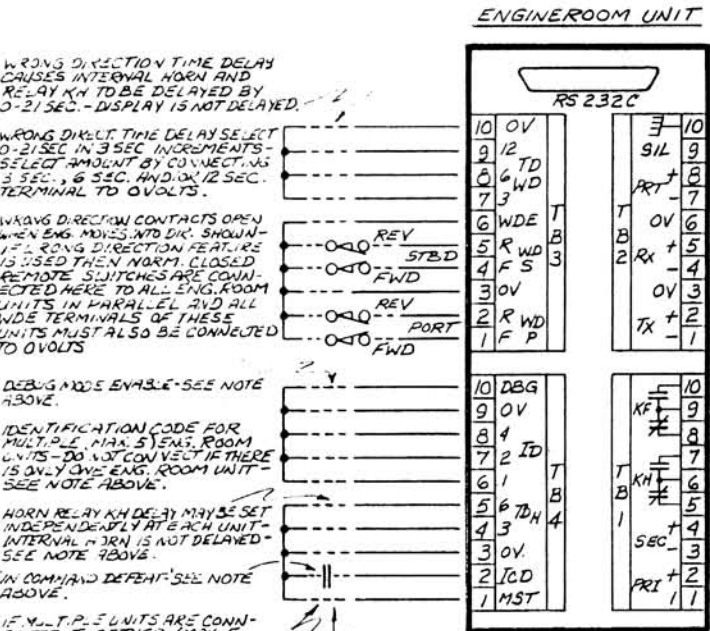
IDENTIFICATION CODE FOR MULTIPLE (MAX. 5) ENG. ROOM UNITS - DO NOT CONNECT IF THERE IS ONLY ONE ENG. ROOM UNIT - SEE NOTE ABOVE.

HORN RELAY KH DELAY MAY BE SET INDEPENDENTLY AT EACH UNIT - INTERVAL IN 3 SEC. IS NOT DELAYED - SEE NOTE ABOVE.

'IN COMMAND' DEFER - SEE NOTE ABOVE.

IF MULTIPLE UNITS ARE CONNECTED TOGETHER (MAX. 5 UNITS IN BRIDGE OR ENGINE ROOM) AND IF 'IN COMMAND' DEFER TERMINAL IS UNCONNECTED (OPEN) THEN AN ORDER PLACED BY ANY UNIT WITHIN A GROUP WILL BE IMPLEMENTED ON A 'FIRST IN, LAST OUT' BASIS. THIS MODE IS STANDARD IF 'ICD' AND 'MST' ARE BOTH UNCONNECTED.

IN THE 'FIRST IN - LAST OUT' MODE, CONTENTION FREE OPERATION CAN BE ASSURED BY DESIGNATING ONE UNIT AS 'MASTER'; THIS IS DONE BY CONNECTING 'MST' TERMINAL TO 0 VOLTS. ORDERS PLACED BY THE 'MASTER' UNIT WILL ALWAYS HAVE PRIORITY OVER SIMULTANEOUSLY PLACED ORDERS BY OTHER UNITS IN THE SAME GROUP.



- NOTES:**
1. MAX. CURRENT PER SINGLE SCREW UNIT IS 1.6 AMPS (TEST MODE) NORMAL RUNNING CURRENT IS 0.76 A. MIN. CURRENT IS 0.29 A.
 2. MAX. CURRENT PER TWIN SCREW UNIT IS 2.2 AMPS (TEST MODE) NORMAL RUNNING CURRENT IS 0.84 A. MIN. CURRENT IS 0.23 A.
 3. POWER FUSES F1, F2, F3, F4 ARE 3 AMP TYPE ABC 3 CERAMIC.
 4. COMM FUSES F5, F6, F7, F8 ARE 1/4 AMP TYPE AGX 1/4 GLASS.
 5. POWER WIRING IS NO 16 AWG - REMAINDER IS NO 18 AWG MIN.
 6. RELAYS KH AND KF ARE RATED 4A. 250 VAC, 3A. 30 VDC.

REV.	DATE	BY	REVISION
3	10/10/80	RD	POWER SUPPLY CONNECTIONS
2	09/10/80	RD	SHIELDED WIRE PAIR'S
1	08/10/80	RD	ADDITIONAL NOTES.

APP. NO.	REV. DATE	SCALE	NAME
APPENDIX 2	DATE 81 FEB 21		

PRIME MOVER CONTROLS LTD.
VANCOUVER, B.C., CANADA

DWG. No. **F-82-0410** SHEET OF

TYPE 8201 PROULSION TELEGRAPH SINGLE BRIDGE & SINGLE ENG. RM. STATIONS CONNECTION DIAGRAM

THIS DRAWING SHALL NOT BE REPRODUCED OR USED FOR MANUFACTURE, PRODUCTION, OR PROCUREMENT WITHOUT THE EXPRESS WRITTEN PERMISSION OF PRIME MOVER CONTROLS LTD.