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System Manual

ClearCommand MS550-13481
System Serial Number
3532



ClearCommand

6.0 SET-UP PROCEDURES

Before beginning any of the Set-up Procedures, ensure the following is completed:

- All electric cabling is completely installed.
- The Jumpers are removed from all Processor Station Terminals that are being used in this application.
- All Wire Harnesses are plugged into the Processor and all connections are made to the appropriate equipment.
- Flag Notes 19 and 20 of the Appendix C System Drawing Notes page are complete.

6.1 DIP SWITCH SETTINGS

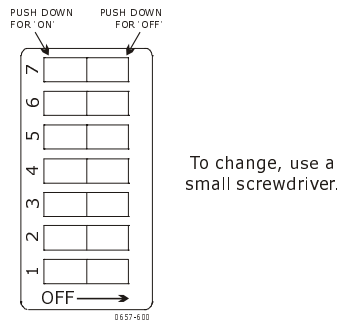


Figure 9: Main Circuit Board SW1 Dip Switch

Settings and adjustments are made by selecting the appropriate Dip Switches SW1-1 through SW1-7 on the Main Circuit Board and then saving the configuration by pressing PB1 on the Auxiliary Circuit Board. Refer to Figure 9: and Figure 10:.

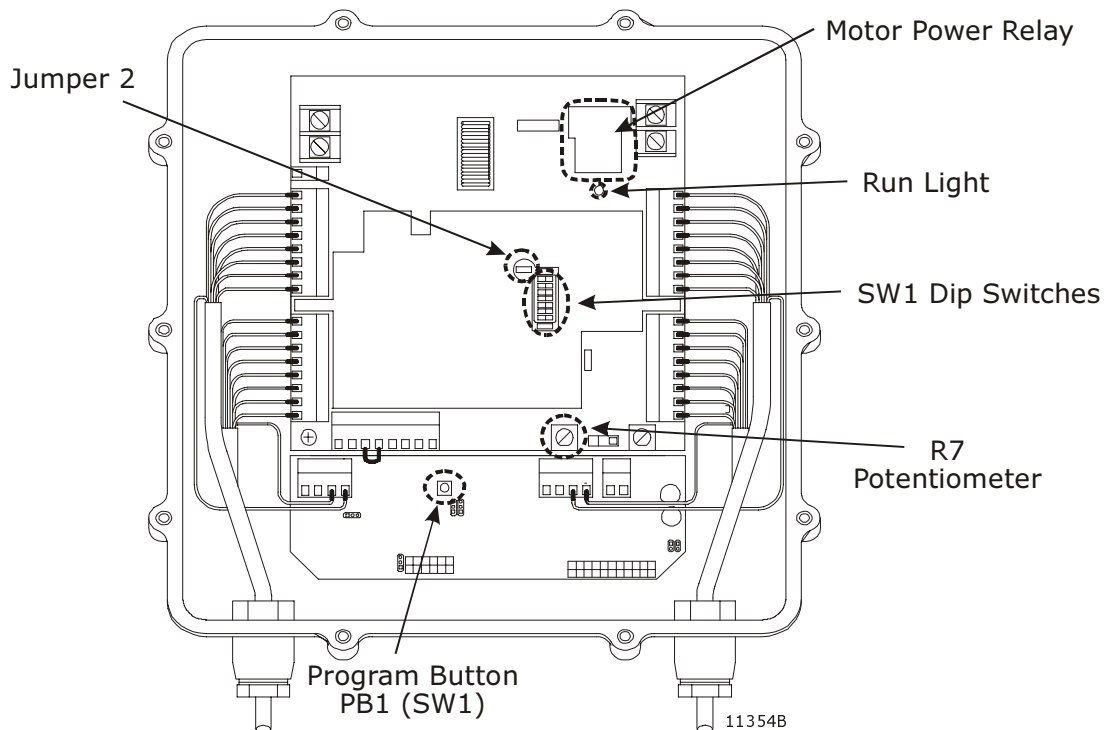


Figure 10: Processor Circuit Board Set-up Locations

NOTE: Depending on the Auxiliary Board revision level, the button for storing the value selected in the ClearCommand memory may be labeled SW1 (RevC and before) or PB1 (RevD and after). The following Set-up Procedures all reflect PB1. THE USAGE OF THE BUTTON IS THE SAME, ONLY THE DESIGNATION IS DIFFERENT.

- Settings can be changed at any time during the lifetime of this ClearCommand Control System.
- Some settings require the operator to move the Control Head lever and/or to adjust potentiometer R7. Read the Section for the parameter carefully before making the adjustment.
- When all adjustments are completed System must be returned to the Run State Refer to Section 6.2.

Adjustment settings can be done one right after another or one at a time.

Once a setting has been saved by depressing PB1, adjustment of another parameter may be started by:

1. Set all the Dip Switches to the Off position.
2. Place the Control Head Lever in the Full Astern/Idle position.
3. Ensure Potentiometer R7 is in the fully counter clockwise ↺ position.
4. Adjustment of another parameter may be started.

When switching the Dip Switches ON, select the switches in the order from Highest to Lowest.

EXAMPLE: Refer to Figure 11.: Throttle Maximum:

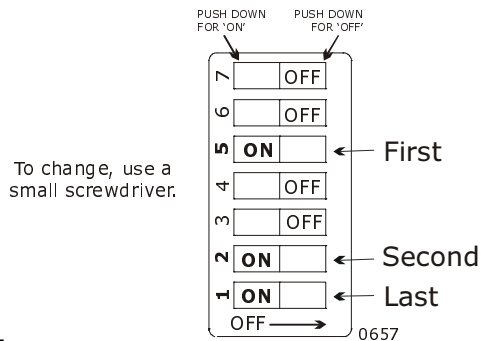


Figure 11: Dip Switch SW1 Setting Example

SW1-5 select ON 1st,

SW1-2 select ON 2nd,

SW1-1 select ON last

NOTE: When selecting the Dip Switch setting, a nearly solid tone may sound and the motor control relay (located next to the Power Supply Terminal Block) will begin clicking. The tone and clicking will continue until a valid switch setting is completed.

CAUTION: IF THE TONE AND CLICKING CONTINUES ONCE THE DIP SWITCH SELECTION IS COMPLETED, the Dip Switch selection is not a valid selection or the system was not in the Run State (Normal Operating Mode) when entering the Set-up Mode. Place the System into the Run State (Refer to Section 6.2) and then follow each step in the Adjustment Section, ensuring the Dip Switch selection is set exactly as required for the adjustment.

6.2 RUN STATE (NORMAL OPERATING MODE)

NOTE: The Normal Operating Mode was called Safe State in earlier versions. ONLY THE NAME OF THE STATE HAS CHANGED, ALL FUNCTIONS ARE THE SAME. Throughout the Set-up Procedures the Normal Operating Mode is referred to as Run State.

To change, use a small screwdriver.

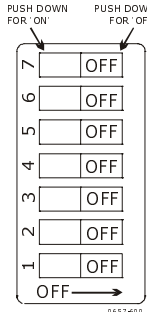


Figure 12: Dip Switch Run State

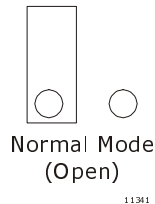
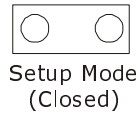


Figure 13: Jumper 2 Closed & Open

Run State is the Normal Operating Mode. The System must be in Run State during the operation of ClearCommand.

Run State:


- All SW1 Dip Switches are in the Off position (Refer to Figure 12:)
- Jumper 2 is in the Open State



Refer to Figure 10:, page 19, or the Drawing in Appendix C for location of SW1 Dip Switch and Jumper 2.

NOTE: When all Adjustments have been completed the System must be placed in the Run State for Normal Operation.

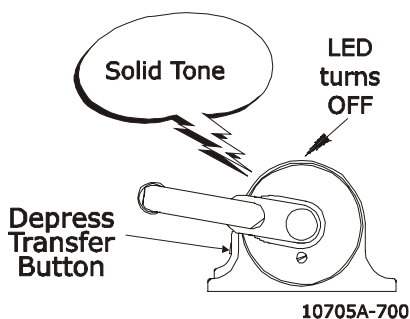
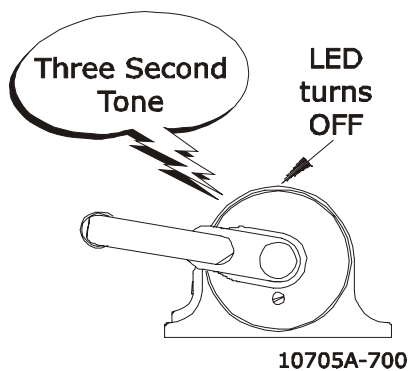
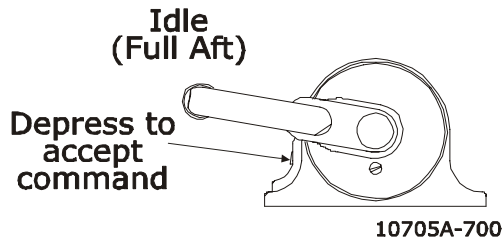
6.3 ENABLING SET-UP MODE



- A) Take command at a Station.
- B) Ensure the Control Head Lever in the Full-Aster/Idle position.
- C) Close Jumper 2 on the Main Circuit Board. (Figure 13:) (Refer to Figure 10:, page 19, for location of Jumper 2)
 - If a nearly solid tone is heard and the motor control relay begins clicking THE SYSTEM WAS NOT in the Run State (Normal Operating Mode).
 - Place all Dip Switches in the Off position (Refer to Figure 12:) and place Jumper 2 in the Open State . Begin again with Step A) placing the system into Set-up Mode.
- D) When Set-up Mode is enabled:
 - All Control Heads will emit a solid three-second tone.
 - The Station-in-Command Control Head LED will turn Off. (On Twin Screw Systems the LED on just the side that is in Set-up Mode will turn Off. The other side will stay On and in Operating Mode.
 - The Run LED on the Processor Main Circuit Board will be unlit for three-seconds.
- E) Set-up adjustment steps can now be started.

CAUTION: The settings on all Processors Main Circuit Boards MUST be set the same for Twin Screw (or more) applications.


7.3.2 Throttle Maximum Signal

Change the throttle maximum signal by:



- A) Take command at a Station.
- B) Leave the Control Head lever(s) in the fully aft (Idle) position.
- C) Ensure that Potentiometer R7 is in the fully counter clockwise ↶ position.
 - Refer to Figure 10:, page 19, or the Drawing in Appendix C for R7 location.
- D) Enable Set-up Mode by closing  Jumper 2 on the Main Circuit Board.
 - When Set-up Mode is enabled all Control Heads will emit a three-second tone.
 - The Station-in-Command Control Head LED will turn Off.
 - The Run LED on the Processor Main Circuit Board will be unlit for three-seconds.
 - If a nearly solid tone is heard and the motor control relay is clicking place all Dip Switches in the Off position (Refer to Figure 10:, page 19) and place Jumper 2 in the Open State . Continue with Step B) again.
- E) Press the transfer button at the remote station being used during set-up.
 - Verify a tone is heard when depressing the transfer button.
 - The Control Head LED will not be lit, but the Control Head will be active for set-up procedures.
- F) Place the appropriate Dip Switches On to ready the Processor for adjustment.

NOTE: When selecting the Dip Switch setting, a nearly solid tone may sound and the motor control relay (located next to the Power Supply Terminal Block) will begin clicking. The tone and clicking will continue until a valid switch setting is completed.

IF THE TONE AND CLICKING CONTINUES place all Dip Switches in the Off position (Refer to Figure 10:, page 19) and place Jumper 2 in the Open State . Begin Step B) to enable Set-up Mode again.

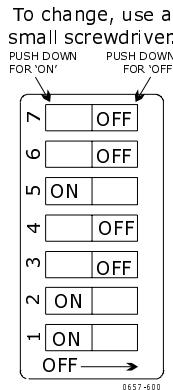
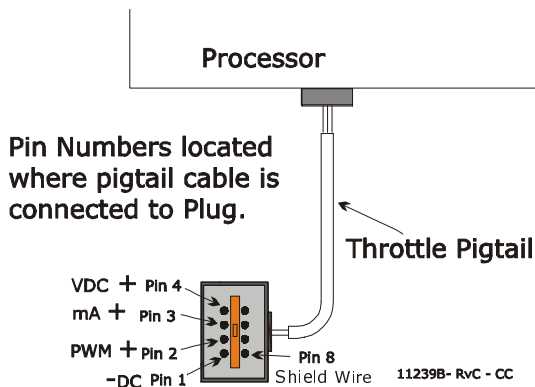


Figure 17: Dip Switch Setting Throttle Maximum

- Refer to Figure 17: for the Dip Switch settings.
- Refer to Figure 10:, page 19, for location of Dip Switch.

G) Adjust Throttle Maximum Output using the PWM, Voltage, or Current steps outlined in Table 2:



To Measure Throttle Signals:
8 Pin Throttle Connector at the Processor Pigtail
PIN 1 - DC Return
PIN 2 - PWM +
PIN 3 - mA (current) +
PIN 4 - VDC (voltage) +
PIN 8 - Shield Wire

Figure 18: Throttle Connector at Processor Pigtail

Table 2: Throttle Maximum Output Adjustments

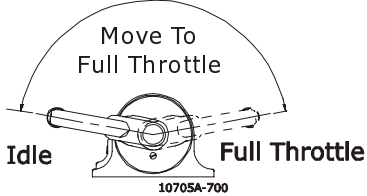
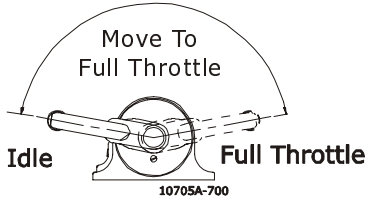
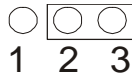
PWM (Duty Cycle)	Voltage (VDC)	Current (mA)
1) Disconnect the Throttle Wire Harness from the Throttle Pigtail at the Processor.	1) Disconnect the Throttle Wire Harness from the Throttle Pigtail at the Processor.	1) Place the Control Head lever into the Full Throttle position. 

Table 2: Throttle Maximum Output Adjustments

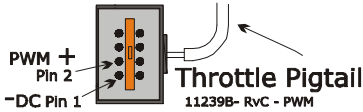
2) Place the Control Head lever into the Full Throttle position.



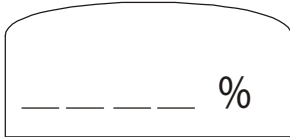
3) Move Jumper 6 on Auxiliary Board to Pins 2-3 (voltage/current setting). Refer to Figure 10:, page 19 for location.



4) Connect the Multi meter to PWM Pins on the Throttle Connector (Refer to Figure 16:).



5) Set Multi meter to Duty Cycle setting.



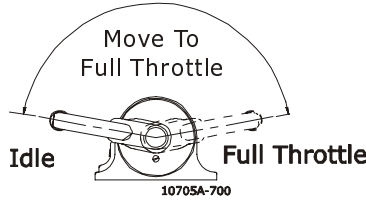
6) Rotate Potentiometer R7 slowly clockwise until minimum throttle signal is achieved. Refer to Figure 10:, page 19 for R7 location.



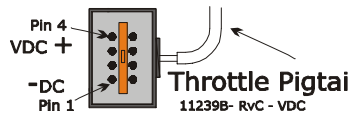
7) Store the value by depressing PB1 located on the Auxiliary Board. (Refer to Figure 10:, page 19 for location of PB1)

- The motor control relay will click once to confirm the value has been stored.

2) Place the Control Head lever into the Full Throttle position.



3) Connect the Multi meter to Pins 1 and 4 of the Throttle Connector



4) Set Multi meter to the Voltage setting.



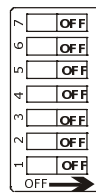
5) Rotate Potentiometer R7 slowly clockwise until minimum throttle signal is achieved.



6) Store the value by depressing PB1 located on the Auxiliary Board. (Refer to Figure 10:, page 19 for location of PB1)

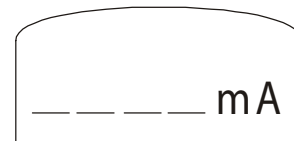
- The motor control relay will click once to confirm the value has been stored.

7) Reset all of the Dip Switches to the Off position (Run State).



2) Disconnect the positive (+) throttle signal wire from the governor (refer to the System Drawing in Appendix C)

3) Set the Multi meter up as an Amp Meter (current).



4) Connect one Multi meter probe to the disconnected positive (+) throttle signal wire

5) Connect the other Multi meter probe to the terminal on the governor.

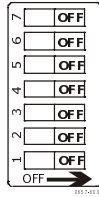
6) Rotate Potentiometer R7 slowly clockwise until minimum throttle signal is achieved. Refer to Figure 10:, page 19 for R7 location.



7) Store the value by depressing PB1 located on the Auxiliary Board. (Refer to Figure 10:, page 19 for location of PB1)

- The motor control relay will click once to confirm the value has been stored.

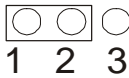
8) Reset all of the Dip Switches to the Off position (Run State).



9) Return Potentiometer R7 fully counter clockwise ↺.



10) Replace Jumper 6 on Auxiliary Board to its original position.



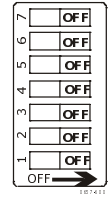
11) Reconnect the Throttle Wire Harness to the Throttle Pigtail at the Processor.

8) Return Potentiometer R7 fully counter clockwise ↺.



9) Reconnect the Throttle Wire Harness to the Throttle Pigtail at the Processor.

8) Reset all of the Dip Switches to the Off position (Run State).



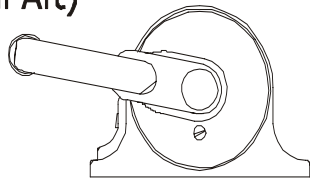
9) Return Potentiometer R7 fully counter clockwise ↺.



10) Reconnect the positive (+) throttle signal wire from the governor

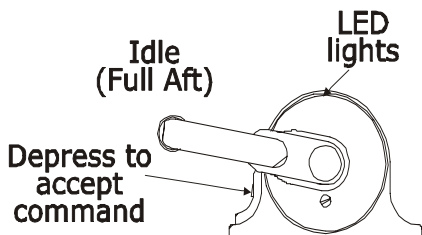
H) Return Control Head lever to the vertical detent.

Idle (Full Aft)



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- If another adjustment setting is necessary, continue with the appropriate adjustment instruction Section.
- If another adjustment setting is not necessary, continue with the next Step



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I) Open Jumper 2 .

- A low repetitious rate tone is heard indicating that the Control System is out of Set-up Mode and no Station is in command.

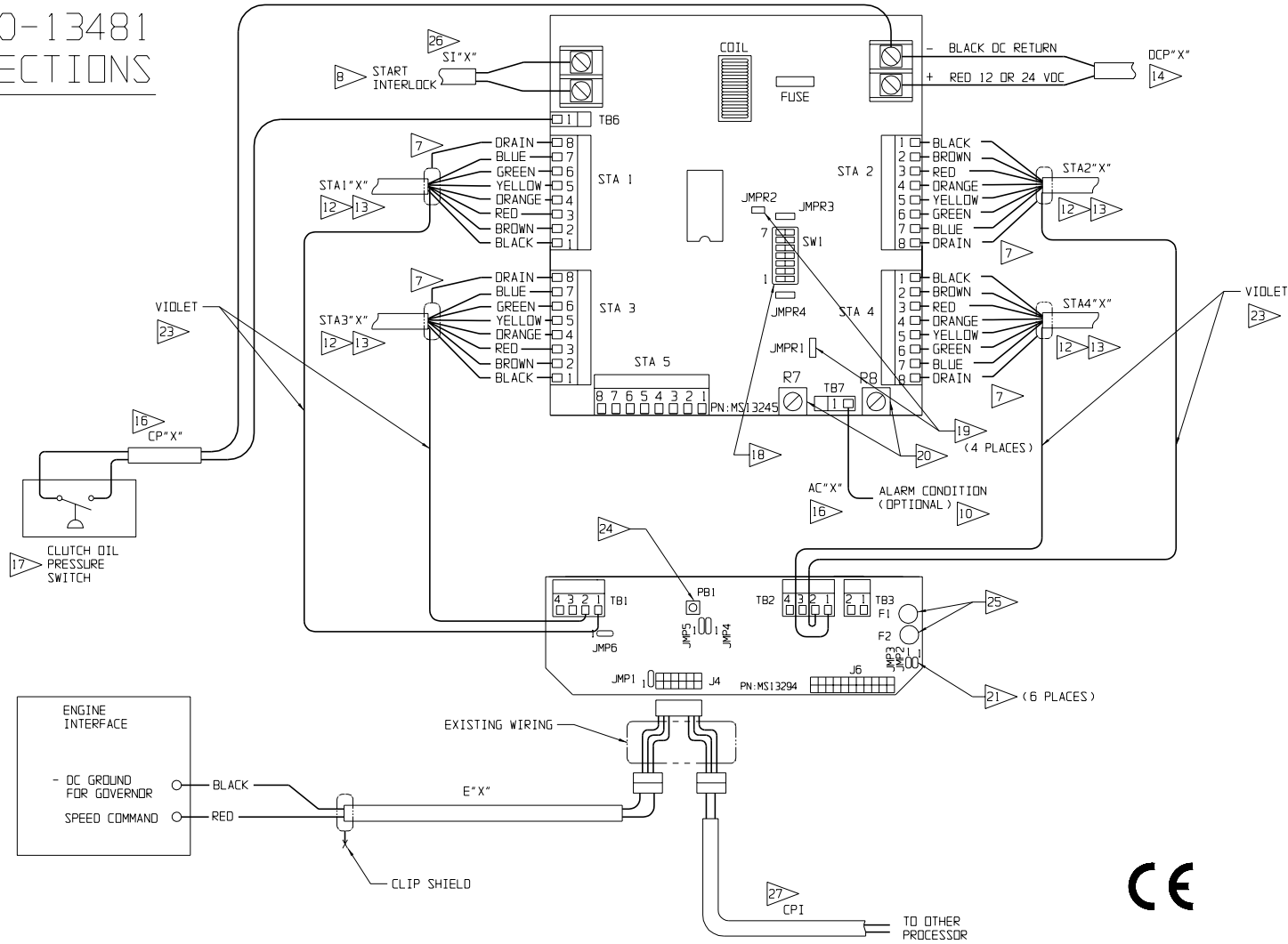
J) Take command at a Station.

- The LED will light indicating Station is in command.

CAUTION: The settings on all Processors Main Circuit Boards **MUST** be set the same for Twin Screw (or more) applications.

Drawing 11413B-2

PART NUMBER
MS550-13481
CONNECTIONS



SEE SHEET 3 FOR NOTES

B	JC	3-01	SEE SHEET 3.
A	JC	10-00	"PB1" WAS "SW1" ON AUX BOARD.
REV	BY	DATE	DESCRIPTION
MATHERS CONTROLS INC.			
675 PEASE ROAD BURLINGTON WA. 98233			
CLEARCOMMAND MS550-13481, TWIN SCREW, MAX FOUR STATIONS, ELECTRONIC THROTTLE			
ENG.	J.H.C.	DWN.	M.WILSON
CKD.	R.S.A.	DATE	3-27-00
SCALE:	NONE	SHT.	2 OF 3
		SIZE	B
			DWG. NO. 11413

Drawing 11413B-3 Notes Page

- NOTES -

1. DO NOT MOUNT CONTROL SYSTEM COMPONENTS ON ENGINE OR REDUCTION GEAR.
2. DO NOT MOUNT CONTROL COMPONENTS NEAR SOURCES OF HIGH HEAT. (EXHAUST DUCTS, ETC.)
3. DO NOT MOUNT CONTROL COMPONENTS NEAR SOURCES OF STRONG ELECTROMAGNETIC FIELDS. (STARTERS GENERATORS, ETC.)
4. MOUNT CONTROL COMPONENTS IN A LOCATION ACCESSIBLE FOR CHECKOUT, MONITORING AND MAINTENANCE.
5. THE "X" SHOWN IN THE CABLE DESIGNATORS CAN BE EITHER P OR S, CORRESPONDING TO PORT OR STARBOARD AS APPROPRIATE.
6. ALL ELECTRICAL CABLES ARE TO BE SUITABLE FOR MARINE APPLICATION AND MEET ALL APPLICABLE REGULATORY REQUIREMENTS.
7. INSURE THAT DRAIN WIRE ON ALL SHIELDED CABLE IS CONNECTED ONLY AT ONE END AS SHOWN ON SCHEMATIC AND THAT THE DRAIN WIRE DOES NOT TOUCH ANY OTHER CONDUCTIVE SURFACE.
8. START INTERLOCK RELAY WITH NORMALLY OPEN CONTACTS. CONTACTS ARE CLOSED WHEN SYSTEM IS OPERATING AND COMMANDING NEUTRAL. MAXIMUM OF 30 AMP, MAXIMUM OF 50V.
9. THE CONTROL PROCESSOR WILL BE PROVIDED SHIPS SUPPLY OF 12 OR 24 VDC, PROTECTED BY A 5 AMP RATED CIRCUIT BREAKER PROVIDED BY THE SHIPYARD.
10. CONTROL FAILURE ALARM RATED FOR A MAXIMUM OF 200mA. DO NOT EXCEED THIS RATING. NORMAL OPERATION IS 21 OHMS TO DC RETURN, HIGH IMPEDENCE INDICATES ALARM CONDITION. IT IS THE SHIPYARD'S RESPONSIBILITY TO UTILIZE THE ALARM CONNECTION IN AN APPROPRIATE ALARM CIRCUIT THAT HAS THE SAME COMMON MODE VOLTAGE.
11. CAUTION:
THIS PART CONTAINS ELECTRONIC COMPONENTS WHICH CAN BE DESTROYED BY STATIC ELECTRICITY. PERSONNEL SHOULD GROUND THEMSELVES TO DISSIPATE ANY STATIC ELECTRICITY PRIOR TO WORKING INSIDE THE PART.
12. 8 CONDUCTOR 20 AWG SHIELDED CABLE (P/N 00350) WITH COLOR CODE AS SHOWN.
13. REMOVE THE JUMPER IF CONNECTING A CONTROL HEAD TO THIS TERMINAL BLOCK. PLACE A JUMPER BETWEEN PINS 5 AND 6 ON THE TERMINAL BLOCK IF REMOVING A CONTROL HEAD FROM THIS STATION
14. ELECTRICAL CABLING MUST BE 14 AWG OR LARGER.
15. ELECTRICAL CABLING MUST BE 16-20 AWG SHIELDED CABLE.
16. ELECTRICAL CABLING MUST BE 16-20 AWG.
17. PRESSURE SWITCH SETPOINT (N.O. CONTACTS) MUST BE SET AT 150 PSI OR AS RECOMMENDED BY TRANSMISSION MANUFACTURER. WHEN CONTACTS CLOSE THIS INDICATES TO THE CONTROL PROCESSOR WHEN THE CLUTCH IS SUFFICIENTLY ENGAGED TO ALLOW A SPEED COMMAND ABOVE IDLE SPEED. IT IS A SAFETY FEATURE THAT PROTECTS THE CLUTCH AND ITS USE IS RECOMMENDED. IF THE SWITCH IS USED, REMOVE THE JUMPER INSTALLED BETWEEN TB6-1 AND - DC RETURN ON THE MAIN BOARD PN: MS13245 AND REPLACE WITH THE PRESSURE SWITCH CONNECTIONS.

- NOTES - (CONTINUED)

18. DIP SWITCH SETTINGS. (PRESET IN RUN STATE FROM PRODUCTION)

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	RUN STATE
ON	OFF	OFF	OFF	OFF	OFF	OFF	SINGLE SCREW
OFF	ON	OFF	OFF	OFF	OFF	OFF	TWIN SCREW (OR MORE)
OFF	ON	OFF	OFF	ON	OFF	OFF	THROTTLE MINIMUM (R7)
ON	ON	OFF	OFF	ON	OFF	OFF	THROTTLE MAXIMUM (R7)

19. MAIN BOARD JUMPER SETTINGS: (PRESET FROM PRODUCTION)

JUMPER 1	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION
JUMPER 2	<input type="radio"/> 2 <input checked="" type="radio"/> 1	NORMAL OPERATION (CLOSED FOR SETUP MODE)
JUMPER 3	<input type="radio"/> 3 <input type="radio"/> 2 <input type="radio"/> 1	NOT FUNCTIONAL
JUMPER 4	<input type="radio"/> 3 <input type="radio"/> 2 <input type="radio"/> 1	NOT FUNCTIONAL

20. R8 IS NOT FUNCTIONAL. R7 SETUP (SEE TABLE) SETTING: FULLY COUNTER CLOCKWISE.

21. AUXILIARY BOARD JUMPER SETTINGS: (PRESET FROM PRODUCTION)

JUMPER 1	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION
JUMPER 2	<input type="radio"/> 1 <input checked="" type="radio"/> 2	NOT FUNCTIONAL
JUMPER 3	<input type="radio"/> 1 <input checked="" type="radio"/> 2	NOT FUNCTIONAL
JUMPER 4	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION
JUMPER 5	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION
JUMPER 6	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	THROTTLE SETTING
	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION FOR PWM SIGNAL
	<input type="radio"/> 3 <input checked="" type="radio"/> 2 <input type="radio"/> 1	MUST BE IN THIS POSITION FOR VOLTAGE OR CURRENT THROTTLE

- NOTES - (CONTINUED)

22. THE CONTROL PROCESSOR'S MOUNTING FEET MUST BE CONNECTED TO THE VESSELS BONDING SYSTEM.
23. CONNECT ONLY ON STARBOARD CONTROL PROCESSOR.
24. PB1 USED FOR SETUP.
25. 6 AMP FUSES, F1 - LOGIC CIRCUIT POWER, F2 - NOT USED
26. ELECTRICAL CABLING MUST BE 14-16 AWG.
27. SERIAL COMMUNICATION WIRE HARNESS REQUIRED ONLY FOR MATHERS SYNCHRONIZATION.

B	JC	3-01	REVISED FLAGNOTE 21 TO ADD JUMPERS TO 4 & 5.
A	JC	10-00	REVISED FLAGNOTE 19 AND 21 JUMPER ORIENTATIONS. FLAGNOTE 24 "PB1" WAS "SW1".
REV BY DATE DESCRIPTION			
MATHERS CONTROLS INC. 675 PEASE ROAD BURLINGTON WA. 98233			
CLEARCOMMAND MS550-13481 TWIN SCREW, MAX FOUR STATIONS, ELECTRONIC THROTTLE			
	ENG.	J.H.C.	DWN. M.WILSON
	CKD.	R.S.A.	DATE 3-27-00
	SCALE:	NONE	SHT. 3 OF 3
			SIZE B
DWG. NO. 11413			

