SECTION 2

INSTRUCTION MANUAL

FOR

ANCHOR WINDLASS

ON

CCGS PIERRE RADISSON

HULL NO. 221

BURRARD DRY DOCK COMPANY LIMITED

PURCHASE ORDER NO. 221-190-19

JOHN T. HEPBURN, LIMITED SALES ORDER

ANCHOR WINDLASS 75-M-0527

JOHN T. HEPBURN, LIMITED
914 DUPONT STREET
TORONTO
ONTARIO M6H 1Z2

SERIAL NUMBER

C-1083

Please make reference to the above numbers in all correspondence and when ordering spare parts.

Operating Instruction 0.1.526

CCGS PIERRE RADISSON

ANCHOR WINDLASS

I N D E X

0.1.526 (Section 2)

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SECTION 2.0

LIST OF REFERENCE DRAWINGS (FIGURES)

FIGURE NO	DRAWING NO	REVISION NO	DRAWING TITLE
2-1	45241-0-A1	5	ANCHOR WINDLASS FOR 2" STUD LINK CABLE
2-2	45234-0-A1	2	GEAR BOX ASSEMBLY
2-3	MM-7222-2-E	2	ARRANGEMENT OF HYDRAULIC BRAKE
2-4	45229-0-A1	3	CLUTCH ASSEMBLY
2-5	45225-0-A1	2	HAND BRAKE ASSEMBLY
2-6	45998-0-A2	1	WINDLASS HYDRAULIC SCHEMATIC
2-7	46174-0-A2	0	HYDRAULIC PIPING LAYOUT
2-8	45981-0-A0	3	HYDRAULIC POWER UNIT
2-9	45992-0-A1	4	WINDLASS CONTROL CONSOLE
2-10	44899-0-A1	0	FATHOM INDICATOR ARRANGEMENT
2-11	60049-0-A1	0	ANCHOR WINDLASS CONTROL CONSOLE OUTLINE DIMENSIONS
2-12	60021-A2 SHEET 1 of 2	1	ELECTRICAL SCHEMATIC DIAGRAM
2-13	60021-A2 SHEET 2 of 2	1	ELECTRICAL CONNECTION WIRING DIAGRAM

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SECTION 2.1

RATING

SIZE OF STUD LINK CHAIN CABLE	2"
NUMBER OF WILDCATS	TWO (2)
DIAMETER OF WARPING DRUMS	24"
NUMBER OF WARPING DRUMS	TWO (2)
RATED PULL AT EACH WILDCAT	50,000 LB
RATED PULL 2 WILDCATS COMBINED	52,800 LB
RATED SPEED OF WILDCAT	45 F.P.M.
STALL PULL 2 WILDCATS COMBINED	68,000 LB
AUTOMATIC BRAKE HOLDING CAPACITY TWO WILDCATS COMBINED	58,600 LB
MANUAL BRAKE HOLDING CAPACITY AT EACH WILDCAT	45,322 LB
RATED PULL AT WARPING DRUM	13,000 LB
RATED SPEED AT WARPING DRUM	48 F.P.M.
STALL PULL AT WARPING DRUM	67,000 LB

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ANCHOR WINDLASS

SECTION 2.2

DESCRIPTION

2.2.1 The HEPBURN anchor windlass is of robust construction with all components mounted on a structural steel base.

2.2.2 Power to the windlass is provided by a remote mounted hydraulic power unit driven by a 100 HP electric motor. A detailed description of the hydraulic circuit is given in Section 2.3

2.2.3 The electric motor starter is remote mounted and supplied by others.

2.2.4 The windlass gearbox is driven by a hydraulic piston motor flange mounted to the gearbox. An automatic brake, Figure 2-3, is mounted on input pinion shaft, opposite the hydraulic motor.

2.2.5 The double output shaft of the gearbox supports two (2) cast steel, 5-whelp wildcats and two (2) 24" diameter warping heads.

2.2.6 All gears and pinions in the gearbox rotate in anti-friction bearings, except the final reduction double output shaft, which rotates in high quality bronze bearings. All gearing is oil bath lubricated.

2.2.7 Two (2) jaw clutch assemblies, Figure 2-4, provide for independent operation of the wildcats.

2.2.8 A manually operated band brake, Figure 2-5, is provided for each wildcat.

2.2.9 The remote mounted hydraulic power unit is illustrated in Figure 2-8.

2.2.10 The windlass control console is illustrated in Figure 2-9 and 2-11.

2.2.11 A fathom indicator arrangement is incorporated in the windlass and is illustrated in Figure 2-10. The fathom counters are incorporated in the control console.

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ANCHOR WINDLASS

SECTION 2.3

HYDRAULIC SYSTEM AND CONTROLS

2.3.1 The hydraulic system and itemized components are detailed in the following:-

Figure 2-6 - Hydraulic Schematic

Figure 2-7 - Hydraulic Piping Layout

Figure 2-8 - Hydraulic Power Unit

2.3.2 The hydraulic system is an open loop arrangement, utilizing a pressure compensated main pump, Figure 2-6, Item 4, a super-charging pump, Figure 2-6, Item 2 and a manual control valve, Figure 2-6, Item 5 to control the speed and direction of the hydraulic motor rotation Figure 2-6, Item 8.

2.3.3 A holding valve, Figure 2-6, Item 7, is provided to partially support the load whilst paying out the anchor.

2.3.4 An automatic brake, Figure 2-6, Item 9 will hold the anchor and chain whenever the control valve is placed in the neutral position or released.

2.3.5 To minimize the heat generated in the hydraulic system when working on partial load and less than the maximum windlass speed, flow from the pump compensator vent port is directed through a needle valve, Figure 2-6, Item 11 and the shuttle valve, Figure 2-6, Item 6 to the motor high pressure port, so that the pressure compensator has a variable setting in accordance with the load requirements.

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SECTION 2.4

ELECTRICAL CONTROLS

2.4.1 The hydraulic pump is driven by a 100 HP squirrel cage motor, power to which is turned on and off by a reduced voltage starter, supplied by the shipyard.

2.4.2 An AC ammeter, located in the control console, is incorporated in the motor circuit to sense the current drawn by the motor.

2.4.3 When the pump motor is switched on, a light on the control console is illuminated, indicating that power is ON.

2.4.4 The hydraulic fluid reservoir heating controls are fed from the 440-volt ships power supply.

2.4.5 A further 115-volt supply is fed to the operator's control console to provide power to the indicating instruments.

2.4.6 The hydraulic fluid reservoir heaters are thermostatically controlled.

2.4.7 The heaters in the operator's console are controlled by a solid state controller using a thermistor. The operating temperature can be adjusted by means of the associated potentiometer.

2.4.8 The numbers displayed in the fathom counters are in fathoms and the displayed value is 11% less than the actual number paid out.

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Should the counter register negative numbers whilst paying out the anchor, the two (2) wires 62P and 66P to the "DIRECTIONAL" proximity switch should be interchanged or alternatively, switch the reversing toggle switch at the back of the counter.

NOTE: This procedure should be necessary only during the initial set-up of the equipment.

2.4.9 The length of chain paid out is detected by proximity switches Figure 2-10, Items 3 and 5, which transmit the "COUNT" and "DIRECTION" signals to the counters.

2.4.10 All electrical components of the anchor windlass are described on the following pages of Unit Parts Lists 8813-A-2.

DATE	LINE	REVISION	BY	CHK'D

DATE	LINE	REVI	BY	CHK'D

DATE	LINE	REVISION	CHK'D

UAN PER NIT	PCS PER FAB	PCS TO CUT	S. STEEL MAT'L-MECH. DESCRIPTION SHAPE DESCRIPTION	THICK-NESS	WEIGHT PER FT	FIN. LENGTH FT.	FIN. LENGTH INS.	MILL ENDS	EST WEIGHT	MECHANICAL MATERIAL MATERIAL SPECS.	PATTERN NO. FAB NOTES	CAT. ITEM	DRAWING NUMBER	PART NO. OR MARK NO.	BOURCE	ORDER NO.	INDEX NO. DATE REC'D	SHIPPING DATE PROMISED	REMARKS DATE TO ASS'Y
			ELECTRICAL DIAGRAM										60021-A2						
													SH. # 1 TO 2						
1		2	OPERATORS CONSOLE, BUILT ON TO VALVE CONSOLE TO DWG. 46055-0 -A2										60049-A1		DEL. Ont.	60048-11			TH. 1 & 2
3		6	APPLETON ELECTRIC COVERS, GUE MK-1C												GESCAN	4584-E9			
			CONTAINS THE FOLLOWING:-																
1		2	MDS SERIES STC-20 TEMPERATURE CONTROLLER MODEL # 10B. 1T (10AMPS)							HEATING POWER CONTROLLER					M.S.D. LTD.	3957-E9			
1		2	PHILIPS NTC THERMISTOR, ROD TYPE #8 320 08PISK (15KΩ ± 20% @ 25°C)												ELECTROSONIC	6221-E6			
1		2	PHILIPS CARBON DEPOSITED RESISTOR STYLE #52 1WATT 15 KΩ ± 5% TOL.												— " —	— " —			
1		2	MALLORY 4WATT TYPE M WIREWOUND POTENTIOMETER 15KΩ # 15MPK												— " —	— " —			
5		10	CHROMALOX STRIP HEATERS # SE-1505							COUNTER ENCLOSURE HEATERS					CAN. CHROM.	6563-E6			
1		2	JONES BARRIER TEMINAL BLOCKS 6-140												CARST. EL.	6518-E6			
1		2	JONES FANNING STRIP STRAIGHT TYPE 6-160-L												— " —	— " —			
2		4	DALE WIREWOUND RESISTORS TYPE RH50 300Ω 5% TOL.												— " —	— " —			
2		4	VEEDER-ROOT 4 DIGIT BIDIRECTIONAL COUNTER SERIES 771304-0XX TOTALISER WITH TWO LINE SWITCH CLOSURE INPUT, REMOTE RESET, RACK MOUNT							LEFT & RIGHT FATHOMS COUNTER					VEEDER-ROOT	5796-E6			

CRIPTION CONTROL UNITS FOR ANCHOR WINDLASS

CUSTOMER BURRARD DRY DOCKS

NO. OF UNITS IN JOB TWO

SALES ORDER NO. 75-M-0527/

DISTRIBUTION - W2 W3 W4 W5 W6 SS-2 P2 P3 P4 P5 P6 B6-4 FY QB F2 F3 F4 F5 F6

SPECIAL STD

UNIT PARTS LIST NO. 8813-A-2

JOB PARTS LIST NO. 7385/6-A-2

FORM NO. 205 REV.-8-63

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ANCHOR WINDLASS

SECTION 2.5

OPERATING INSTRUCTIONS

2.5.1 Start the electric motor and allow it to run for 5 minutes.

NOTE: The motor will not start if the hydraulic oil temperature is 10^{o} C or less.

2.5.2 The rotation of the wildcats is controlled by the valve located on the control console.

2.5.3 Engage the appropriate cable lifter clutch, Figure 2-1, Item 11 and release the cable lifter manual brake, Figure 2-1, Item 12.

2.5.4 At the control console, remove the control lever locking pin, Figure 2-9, Item 5 and operate the windlass by pushing the lever away from the operator for PAY-OUT and pulling the lever towards the operator for HAUL-IN.

2.5.5 For operation of the warping head only, apply the manual brake Figure 2-1, Item 12 and dis-engage the clutch, Figure 2-1, Item 11.

T. HEPBURN, LIMITED TORONTO, CANADA

NO.	MADE BY	CHK'D BY	APP'D BY	S NO.	ENGR'D AT	DATE
	PF			C10083, C10084	MD	22/2/77

LINE	REVISION	BY	CHK'D	DATE	LINE	REVISION	BY	CHK'D	DATE	LINE	REVISION	BY	CHK'D

PCS PER FAB	PCS TO CUT	S. STEEL MAT'L-MECH. DESCRIPTION	MECHANICAL MATERIAL	INDEX NO.	SHIPPING	REMARKS

SHAPE	DESCRIPTION	THICKNESS	WEIGHT PER FT	FIN. LENGTH FT.	FIN. LENGTH INS.	MILL ENDS	EST WEIGHT	MATERIAL SPECS.	PATTERN NO. FAB NOTES	CAT. ITEM	DRAWING NUMBER	PART NO. OR MARK NO.	SOURCE	ORDER NO.	DATE REC'D	DATE PROMISED	DATE TO ASS'Y
	4 SQ.D OPERATORS CAT. KR1U											VALL. BROWN		6619-E6			
	4 —"— BLOCKS CAT. KA-2											"	"	"			
	4 —"— CAPS CAT. KU3 (BLUE)							"COUNTER RESET"				"	"	"			
	4 —"— LEGEND PLATES CAT. SKN-800											"	"	"			
	2 SQ.D OPERATOR CAT. KR1U											"	"	6619-E6			
	2 —"— BLOCK CAT. KA-2											"	"	"			
	2 —"— CAP CAT. KU-5 (GREEN)							"MOTOR RUN"				"	"	"			
	2 —"— LEGEND PLATE CAT. SKN-836											"	"	"			
	2 SQ.D OPERATOR CAT. KR1U											"	"	"			
	2 —"— BLOCK CAT. KA-3											"	"	"			
	2 —"— CAP CAT. KU-2 (RED)							"MOTOR STOP"				"	"	"			
	2 —"— LEGEND PLATE CAT. SKN-337											"	"	"			
	2 SQ.D AMMETER ILLUMINATION CAT. JP-1R26 WITH RED LENS.							AMMETER ILLUMINATION				"	"	"			
	2 CROMPTON-PARKINSON CURRENT TRANSFORMER RATIO 200:5 # 6NA408 (MOUNTED BY SHIPYARD)											CROM-PARK.		5900-E6			
	2 CROMPTON-PARKINSON SERIES 800 MODEL 087-080 4 1/2" SQ. FLANGE HI-O TAUT-BAND "HIGH SHOCK" SEALED CASE 5 AMP AC AMMETER SCALED 0-200 RED MARKER AT 120 AMPS.							AMMETER				"	"	"			
	40 BUCHANAN TERMINALS CAT. 221							FOR CUSTOMERS INCOMING WIRING					STOCK				
	2 " END PIECES CAT 230												"				

DESCRIPTION: CONTROL UNITS FOR ANCHOR WINDLASS

CUSTOMER: BURRARD DRY DOCKS

NO. OF UNITS IN JOB: TWO

SALES ORDER NO.: 75-M-0527/8

DISTRIBUTION — FY GS: W2 P2 F2; W3 P3 F3; W4 P4 F4; W5 P5 F5; W6 P6 F6; SS-2; SS-4

SPECIAL: STD

UNIT PARTS LIST NO.: 8813-B-2

JOB PARTS LIST NO.: 7385/6-A-2

FORM NO. 205 REV.-8-63

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SECTION 2.6

INSTALLATION INSTRUCTIONS AND START-UP PROCEDURES

2.6.1 The windlass is to be installed in the appropriate location on re-inforced seatings to the approval of the Classification Society.

2.6.2 The seating is to be prepared in one plane to ensure that when the windlass is placed on the seating, all the mounting pads make contact with the seating.

Any discrepancy between mounting pad and seating is to be made up by using steel shims.

Sixteen (16) 1" diameter bolts and four (4) shear blocks are used to secure the windlass in position. Bolt and shear block details are shown on Figure 2-1.

2.6.3 Install the hydraulic power unit, Figure 2-8, following the procedure described in para. 2.6.2.

2.6.4 Complete interconnecting electrical wiring between main power source, hydraulic power unit, control console and anchor windlass, in accordance with Figures 2-12 and 2-13.

2.6.5 Complete interconnecting hydraulic piping between the hydraulic power unit, control console and anchor windlass.

2.6.6 Fill the hydraulic power unit reservoir, Figure 2-8, Item 24, with the specified grade of hydraulic fluid, to the level indicated on the level gauge, Figure 2-8, Item 29.

2.6.7 Check the rotation of the electric motor, Figure 2-8, Item 13, as indicated on the main pump casing, Figure 2-8, Item 77.

2.6.8 Fill the gearbox, Figure 2-1, Item 2 to the level indicated on Figure 2-2, with the specified grade of oil.

1.6.9 Lubricate all points on the windlass and Hydraulic power unit as described in Section 2.7.

2.6.10 Apply the two (2) cable lifter manual brakes, Figure 2-1, Item 12.

2.6.11 Dis-engage the two (2) cable lifter clutches, Figure 2-1, Item 11.

2.6.12 Start the electric motor and allow to run for 15 minutes to permit circulation of the hydraulic fluid.

2.6.13 Tie back the control lever, Figure 2-9, in the HAUL-IN mode, at maximum speed, and run the windlass for 30 minutes.

2.6.14 On completion of 2.6.13, release the control lever and insert the lever locking pin with the lever in NEUTRAL position.

2.6.15 Stop the electric motor.

2.6.16 Change the element in the filter, Figure 2-8, Item 42.

2.6.17 TO PREPARE THE WINDLASS FOR LOAD TEST:

2.6.17.1 Start the electric motor.

2.6.17.2 Engage the desired cable lifter clutch, Figure 2-1, Item 11.

2.6.17.3 Release the manual brake, Figure 2-1, Item 12 of the appropriate cable lifter.

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ANCHOR WINDLASS

SECTION 2.7

MAINTENANCE INSTRUCTIONS

2.7.0 LUBRICATION

2.7.1 TWICE WEEKLY

2.7.1.1 Apply grease by hand gun to the following locations:-

ASSEMBLY	FIGURE NO.	No. of LOCATIONS
Cable Lifter Bearings	2-1	2
Warping Head Bearings	2-1	2
Automatic Brake	2-3	1
Manual Brake	2-5	6
Clutch Assembly	2-4	16

2.7.1.2 Apply grease by brush to the following locations:-

The threaded length of the manual brake control rod, Figure 2-5, Item 4.

Each side of the clutch collar, Figure 2-4, Item 2.

The groove on the outside of the clutch collar to lubricate the operating fork bushings.

2.7.2 EVERY TWO WEEKS

2.7.2.1 Check the level of oil in the windlass gearbox, Figure 2-1, Item 2 and replenish with the specified grade of oil, as required.

2.7.3 SIX MONTHS

2.7.3.1 Replace filter elements in the hydraulic power unit, Figure 2-8, Item 42.

2.7.3.2 Check the level of the hydraulic fluid in the reservoir, Figure 2-8, Item 24 and replenish with the specified hydraulic fluid, as required.

2.7.4 Instructions for the repair of hydraulic components are found in the respective manufacturers repair and maintenance manuals in Section 8 of this manual.

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SECTION 2.8

MECHANICAL AND ELECTRICAL SPARES

QUANTITY	HEPBURN PART NO	MANUFACTURERS PART NO	DESCRIPTION
MECHANICAL			
12	5-122-H	MM7225-2-D/4	BRAKE PADS
36	5-124-G	MM7225-2-D/29	BRASS MACHINE SCREWS 12-24 NC x 12"
2	5-126-M	45226-0-A1/3	BRAKE LINING 5-1/2"w x 1/2" thk x 4'-6" lg
2	5-128-M	45226-0-A1/4	BRAKE LINING 5-1/2" w x 1/2" thk x 4'-6" lg
188	5-132-G	45226-0-A1/5	FLAT HEAD SCREWS COMPLETE WITH STEEL NUT 1/4-20 x 1-1/2"
2	5-130-G	J10	ELEMENT FOR FILTER #RLF-12-080-10
ELECTRICAL			
	5-134-G	100 HP ELECTRIC MOTOR REPAIR KIT CONSISTING OF:	
1	-	31552-46	FRONT BEARING
1	-	31552-46	REAR BEARING
1	-	99-2991-76	SLOT INSULATION
1	-	99-2992-76	PHASE INSULATION
1	-	99-2993-76	STATOR COIL