

FRV40-226-047-010

DESCRIPTION, OPERATION, INSTALLATION AND MAINTENANCE INSTRUCTIONS

Trawling and Scientific Winch System, Operating Manual

Halter Marine, Inc.
13085 Seaway Rd.
P.O. Box 3029
Gulfport, MS 39505
50-SPNA-1-00031



PUBLISHED BY DIRECTION OF NOAA

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09 MAR 2007

RECORD OF CHANGES

Change No.	Date	Title and/or Brief Description	Signature of Validating Officer

APPROVAL AND PROCUREMENT RECORD PAGE

APPROVAL DATA FOR: FRV40-226-047-010

TITLE OF MANUAL: Trawling and Scientific Winch System

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REMARKS:

CERTIFICATION: It is hereby certified that FRV40-226-047-010 to be provided under contract 50-SPNA-1-00031 has been approved by the approval data shown above.

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Trawling and Scientific Winch System

Contractor**Sub-Contractor (If
Performing Validation)**

Halter Marine, Inc.

Chand, LLC.

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50-SPNA-1-00031

Chapter**Section****Paragraph****Date
Validation
Completed****Check here if
Not Validated**

Contents of this manual have been validated and certified to be applicable to the equipment furnished under the above procurement as specified for Validation.

Name & Authority of Validating Officer:**Signature of Validating Officer:**

FOREWORD

This manual is intended to clearly and accurately reflect the actual configuration of the installed equipment described for the FRV40-226 Trawling and Scientific Winch System. Users are urged to report instances noted wherein the manual does not achieve this objective.

This technical manual provides the instructions necessary to operate, to perform maintenance on and troubleshooting of the Hydraulic System. The text is broken down as follows:

Section 1- List of Sections

Order Confirmation #FSV40-2

Section 2- General Information

Operation Instructions

Trouble Shooting

Section 9- Test Certificates



SERVICE & INSTRUCTION MANUAL

FOR

RAPP HYDEMA A/S

**HYDRAULIC SYSTEM FOR
FISHERY/RESEARCH EQUIPM.**

**PROJECT NAME:
NOAA FSV40-2/M282**

**PROJECT NO.:
80600-00/80622-00/86455**

**SALES ORDER:
FSV40-2**

**CUSTOMER:
RAPP HYDEMA US Inc.**

**SHIPYARD:
VT HALTER MARINE,
MOSS POINT**

**YARD NO.:
HULL #1953/JOB #M282**

VESSEL'S NAME:

1 LIST OF SECTIONS
ORDER CONFIRMATION
#FSV40-2

2 GENERAL INFORMATION
OPERATION INSTRUCTIONS
TROUBLE SHOOTING

3

4

5

6

7

8

9 TEST CERTIFICATES

10

SECTION 1

LIST OF SECTIONS ORDER CONFIRMATION #FSV40-2

SECTION 2

INSTRUCTIONS AND PROCEDURES

GENERAL INFORMATION

- GUARANTEE
- TECHNICAL BULLETIN 94004
- GUIDANCE FOR WIRE SPOOLING
- ADJUSTMENT OF AMPLIFIERS ins93080.amm

START-UP AND SEA-TRIAL PROCEDURES

OPERATION INSTRUCTION

- STANDARD PENTAGON, FISHERY
- PENTAGON RESEARCH (HYDROGRAPHIC)
- PENTAGON TRACTION (OCEANOGRAPHIC)
- MANUAL OPERATION TRAWL WINCHES
- MANUAL OPERATION SOUNDER WINCH
- MANUAL OPERATION NET DRUM
- MANUAL OPERATION GILSON/OUTHAUL WINCH
- MAP FOR START OF PUMPS

TROUBLE SHOOTING

SECTION 3

HYDRAULIC SYSTEM DRAWINGS AND SPECIFICATIONS

HYDRAULIC MAIN DIAGRAM, HYDRAULIC SPECIFICATION, HPU HYDRAULIC SPECIFICATION, LOOSE COMP.	DWG.: RH106179 SPEC.: RHHA1030H-1 SPEC.: RHHA1030H-2
HYDRAULIC DIAGRAM, TRAWL WINCH HYDRAULIC SPECIFICATION	DWG.: RH207011A SPEC.: RHHMTWS080TH-34A
HYDRAULIC DIAGRAM, GILSON WINCH HYDRAULIC SPECIFICATION	DWG.: RH309175 SPEC.: RHHGW045E-23A1Z
HYDRAULIC DIAGRAM, SPLIT NET DRUM HYDRAULIC SPECIFICATION	DWG.: RH207375 SPEC.: RHHSW045P-23A1Z
HYDRAULIC DIAGRAM, NET SOUNDER WINCH HYDRAULIC SPECIFICATION	DWG.: RH306975 SPEC.: RH601866Z SPEC.: RH601868S
HYDRAULIC DIAGRAM, TRACTION WINCH HYDRAULIC SPECIFICATION	DWG.: RH105959-2 SPEC.: RHHTRW045B-25A1
HYDRAULIC DIAGRAM, STORAGE DRUM HYDRAULIC SPECIFICATION	DWG.: RH207398 SPEC.: RHHTRS012B-23G1
HYDRAULIC DIAGRAM, SELF-CONT. UNIT HYDRAULIC SPECIFICATION HYDRAULIC DIAGRAM, HYDROGR. WINCH HYDRAULIC SPECIFICATION	DWG.: RH309558 DWG.: RHHA1030H-3 DWG.: RH207823 SPEC.: RHHHW012G-21J1
CONTROLS AFT GANTRY HYDRAULIC SPECIFICATION CONTROLS OUTRIGGERS HYDRAULIC SPECIFICATION CONTROLS SIDE A-FRAME HYDRAULIC SPECIFICATION CONTROLS STERN GATE HYDRAULIC SPECIFICATION	DWG.: RH408900 SPEC.: RHHWCDRZE001 DWG.: RH409404 SPEC.: RH606258S DWG.: RH408901 SPEC.: RHHWCDRZE002F DWG.: RH408902 SPEC.: RHHWCDRZE003F
CONTROLS OUTHAUL WINCH HYDRAULIC SPECIFICATION	DWG.: RH408903 SPEC.: RHHWCDRZERD001
DOUBLE SELECTOR VALVE HYDRAULIC REMOTE CONTROL VALVES	DWG.: 4R 56/16 DWG.: 4R 56/31

SECTION 4

ELECTRIC CABLE DIAGRAMS

ELECTRIC CABLE DIAGRAM, FISHERY SYSTEM ELECTRIC COMPONENTS, SPECIFICATION	DWG.: SPEC.:	RH106180 RHHA1030E-1
ELECTRIC CABLE DIAGRAM, HYDROGR. SYST. ELECTRIC COMPONENTS, SPECIFICATION	DWG.: SPEC.:	RH106181 RHHA1030E-2
ELECTRIC CABLE DIAGRAM, OCEANOGR. SYST. ELECTRIC COMPONENTS, SPECIFICATION	DWG.: SPEC.:	RH106182 RHHA1030E-3
CABLE DIAGRAM, ELECTRIC MOTORS	DWG.:	RH106178
CABLE DIAGRAM, SOUNDER WINCH	DWG.:	4R 76/56
CABLE DIAGRAM, SPLIT NET DRUM	DWG.:	RH309455
CABLE DIAGRAM, GILSON/OUTH. WINCHES	DWG.:	RH309454
CABLE DIAGRAM, AFT GANTRY/STERN GATE CABLE DIAGRAM, OUTRIGGERS	DWG.: DWG.:	RH408953 RH409405
CABLE DIAGRAM, SIDE A-FRAME	DWG.:	RH408510
CABLE LAY-OUT, Simrad ES 60	DWG.:	RH409411
CABLE LAY-OUT, Simrad FS 20/25	DWG.:	RH409412
CABLE LAY-OUT, Simrad ITI	DWG.:	RH409413
NMEA SIGNALS, Simrad and Rapp	DWG.:	RH310140

SECTION 5

ELECTRIC SYSTEM, DETAIL DIAGRAMS

FISHERY SYSTEM

PTS-PENTAGON, INITIATOR WIRING 1	DWG.:	3R 73/78
PTS-PENTAGON, INITIATOR WIRING 2	DWG.:	3R 73/79
PTS-PENTAGON, DIGITAL INPUT SIGNALS	DWG.:	3R 73/80
PTS-PENTAGON, L7 CONTROL PANEL	DWG.:	3R 73/86
PTS-PENTAGON, LOCATION OF CONNS.	DWG.:	3R 73/89
PTS-PENTAGON, L2B CONTROL PANEL	DWG.:	3R 73/90
PTS-PENTAGON, L2SF CONTROL PANEL	DWG.:	3R 73/92
PTS-PENTAGON, GROUNDING DETAILS	DWG.:	3R 73/00
RELAY BOX SOUNDER WINCH, R1	DWG.:	4R 65/29
FILTER SENSORS CONNECTION BOX	DWG.:	4R 76/19
JUNCTION BOX ON HYDR. UNIT, JB-A	DWG.:	RH309122
JUNCTION BOX ON HYDR. UNIT, JB-B	DWG.:	RH408580
JUNCTION BOX ON WINCH, JB-TWS etc.	DWG.:	RH309122
DIRECT STARTER, SERVO PUMP	DWG.:	RH408910
STAR/DELTA STARTER, MAIN PUMPS	DWG.:	RH309520
STAR/DELTA STARTER, SOW PUMP (NO.7)	DWG.:	RH309521
START/STOP PANEL PUMPS, L4A	DWG.:	RH105927
REMOTE CONTROL PANEL, SPLIT NET DRUM, L5A	DWG.:	RH207353
REMOTE CONTROL PANEL, SPLIT NET DRUM, L5B	DWG.:	RH207354
REMOTE CONTROL PANEL, GILSON/OUTHAUL, L10A	DWG.:	RH309456
REMOTE CONTROL PANEL, GILSON/OUTHAUL, L10B	DWG.:	RH309457
REMOTE CONTROL PANEL, AFT GANTRY/GATE, L10C	DWG.:	RH309583
REMOTE CONTROL PANEL, AFT GANTRY/GATE, L10D	DWG.:	RH309584

RESEARCH SYSTEM

PTS-PENTAGON-R, SYSTEM LAY-OUT	DWG.:	RH309091
PTS-PENTAGON-R, REMOTE CONTROL PANEL, L2B	DWG.:	RH309240
PTS-PENTAGON-R, REMOTE CONTROL PANEL, L2SF	DWG.:	RH309241
PTS-PENTAGON-R, AMPLIFIER TERMINAL, ABC	DWG.:	RH308451
REMOTE CONTROL PANEL, SIDE A-FRAME, L9	DWG.:	RH408509
START/STOP PANEL PUMPS, L4A	DWG.:	RH309562
START/STOP PANEL PUMPS, L4B	DWG.:	RH309563
STAR/DELTA STARTER, SELF-CONTAINED UNIT	DWG.:	RH207425
REMOTE CONTROL PANEL, GEN.PURP. WINCH 2, L10D	DWG.:	RH309201

OCEANOGRAPHIC SYSTEM

PTS-PENTAGON-TR, REMOTE CONTROL PANEL, L2	DWG.:	RH309519
INCLINOMETERS	DWG.:	RH409228

SECTION 6

HYDRAULIC COMPONENTS SPARE PARTS LISTS

LIST F102	:	RETURN FILTER	ITEM FR001/002/003
LIST F104	:	PRESSURE FILTER	ITEM FP001/002
LIST F106	:	PRESSURE FILTER	ITEM FP003
LIST F112	:	SERVO FILTER	ITEM FL001
LIST F120	:	OIL COOLER	ITEM OP001
LIST M156	:	ELECTRIC MOTORS	
LIST P110	:	HIGH PRESSURE PUMP	ITEM PP005
LIST P110	:	HIGH PRESSURE PUMP	ITEM PP005
LIST P111	:	HIGH PRESSURE PUMP	ITEM PP004
LIST P114	:	HIGH PRESSURE PUMP	ITEM PP001
LIST P122	:	HIGH PRESSURE PUMP	ITEM PP002
LIST P123	:	HIGH PRESSURE PUMP	ITEM PP003
LIST V101	:	SOLENOID VALVE	ITEM SV001-003
LIST V103	:	SELECTOR VALVE	ITEM SV001-003
LIST V104	:	RELIEF VALVE	ITEM RE001/RV002-003
LIST V107	:	BUTTERFLY VALVE	ITEM KS001
LIST V109	:	BRAKE VALVE	ITEM GW002/HW001-002
LIST V112	:	BRAKE VALVE	ITEM TW001
LIST V114	:	CONTROL VALVE	ITEM DL004
LIST V125	:	CONTROL VALVE	ITEM SO002
LIST V127	:	COUNTER BALANCE VALVE	ITEM SO001
LIST V133	:	COUNTER BALANCE VALVE	ITEM TW001
LIST V146	:	TWO-SPEED VALVE	ITEM GW002
LIST V154	:	VALVE BLOCK/CONTR.VALVE	ITEM GW002
LIST V159	:	CONTROL VALVE	ITEM DL001-002
LIST V161	:	CONTROL VALVE	ITEM DL003
LIST V162	:	CONTROL VALVE	ITEM GW002/SW001/TW004
LIST V169	:	TWO-SPEED VALVE	ITEM TW001
LIST V173	:	VALVE BLOCK	ITEM SW001/TW004
LIST V178	:	CONTROL VALVE BLOCK	ITEM TW001
LIST V180	:	CONTROL VALVE BLOCK	ITEM HW001-002/TW003

SECTION 7

ELECTRIC COMPONENTS DIMENSION DRAWINGS

FISHERY SYSTEM

PTS-PENTAGON, CABINET/PLC UNIT	ITEM PE001	DWG.: 4R 75/78
PTS-PENTAGON, OPERATION PANEL	ITEM PE004	DWG.: RH309864
PTS-PENTAGON, SCREEN/MONITOR (VGA)	ITEM PE003	DWG.: RH309859
PTS-PENTAGON, PC UNIT	ITEM PE002	DWG.: RH309735
CONTROL PANEL TRAWL WINCH, L2 B	ITEM PB001	DWG.: 3R 76/47
CONTROL PANEL SOUNDER WINCH, L7	ITEM PB003	DWG.: 4R 75/92
CONTROL PANEL PUMPS, L4	ITEM PB004	DWG.: 3R 78/55
CONTROL PANEL SPLIT NET DRUM, L5A	ITEM PB005	DWG.: RH308395
CONTROL PANEL GILSON WINCHES, L10A	ITEM PB006	DWG.: 3R 76/88
CONTROL PANEL AFT GANTRY/GATE, L10C	ITEM PB015	DWG.: 3R 76/88
AFT WORKING DECK CONTROL CONSOLE		DWG.: RH308126
ELECTRIC STARTER CABINETS (2ea. KD20124)		DWG.: 3R 63/59
FILTER SENSORS' CONNECTION BOX	ITEM BX001	DWG.: 3R 74/50
JUNCTION BOX SOUNDER WINCH, R1	ITEM BO001	DWG.: 3R 74/50
TRANSFORMER MASCOT 9260	ITEM TR002	DWG.: 3R 68/21

HYDROGRAPHIC SYSTEM

PTS-PENTAGON-R, CABINET, PLC UNIT	ITEM PR001	DWG.: 4R 75/78
PTS-PENTAGON-R, OPERATION PANEL	ITEM PR001/002	DWG.: RH308445
CONTROL PANEL SIDE A-FRAME. L9	ITEM PB014	DWG.: 3R 76/89
CONTROL PANELS, L2B/L4A+L2SF/L4B	ITEM PB010/012	DWG.: 3R 76/46

OCEANOGRAPHIC SYSTEM

PTS-PENTAGON-TR, CABINET, PLC UNIT	ITEM PR001	DWG.: 4R 75/78
PTS-PENTAGON-TR, OPERATION PANEL	ITEM PR001/002	DWG.: RH308445
CONTROL PANEL, L2	ITEM PB007	DWG.: 3R 76/46

SECTION 8

PERIODIC MAINTENANCE AND LUBING

TYPES OF FILTER ELEMENTS

GENERAL LUBRICATION CHART	3R 15/69
INSTRUCTION REGARDING HYDRAULIC OIL	ins. 93046.gt
LUBRICATION DATA INFORMATION	INS98004
TRAWL WINCHES / WDU-10002	RH408397
GILSON WINCH / WDU-4002	RH408148
SPLIT NET DRUM / WDU-4002	RH408653
NET SOUNDER WINCH	RH407913
OUTHAUL WINCH	4R 69/80
OCEANOGRAPHIC TRACTION WINCH / WDU-4002	RH409211
OCEANOGRAPHIC STORAGE DRUM / WDU-2300	RH409209
LEVEL WIND, HL-1000	RH409210
HYDROGRAPHIC SELF-CONTAINED WINCHES	RH409212

PERIODIC MAINTENANCE

FILTER ELEMENTS **FOR** **RAPP HYDEMA HYDRAULIC SYSTEM**

<i>Item no.</i>	<i>Quantity</i>	<i>Element part no.</i>	<i>Where fitted / function</i>
FP001/002	10	HFEFF004	PRESSURE FILTER
FP003	1	HFEFF003	PRESSURE FILTER
FL001	1	HFEFF003	SERVOFILTER
FR001/002/003	5	HFEFF009	RETURN/DRAIN FILTER

NAME OF VESSEL:

FRV HENRY B. BIGELOW

HYDRAULIC DIAGRAM:

RH106179/RH309558

SECTION 10

MECHANICAL DOCUMENTATION FOR THE WINCHES

TRAWL WINCH, TWS-10040/36.36

MECH. DIM. DRAWING AND FOUNDATION PLAN, RIGHT	DWG.: RH207240
MECH. DIM. DRAWING AND FOUNDATION PLAN, LEFT	DWG.: RH207241
ASSEMBLY DRAWING	DWG.: RH105725
ASSEMBLY SPECIFICATION	SPEC.:RHMTWS10040/URP
BEARING BRACKET UNIT DRAWING	DWG.: RH206735R
BEARING BRACKET UNIT SPECIFICATION	SPEC. RH605422/R
DRIVE UNIT SIDE DRAWING	DWG.. RH207009R
DRIVE UNIT SIDE SPECIFICATION	SPEC.:RH605721/R
LEVELWIND ARRANGEMENT DRAWING	DWG.: RH105564
LEVELWIND ARRANGEMENT SPECIFICATION	SPEC.:RH605418
LEVELWIND CARRIAGE ASSEMBLY DRAWING	DWG.: RH105554
LEVELWIND CARRIAGE ASSEMBLY SPECIFICATION	SPEC.:RH105554
BRAKE ARRANGEMENT DRAWING	DWG.: RH105560U
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RH105560/U
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH202598
BRAKE CYLINDER ASSEMBLY SPECIFICATION	SPEC.:RH601856
TIMING OF MOTORS	DWG.: 1R40/39
PICK-UP ARRANGEMENT DRAWING	DWG.: 4R57/40
PICK-UP ARRANGEMENT SPECIFICATION	SPEC.:RH507772
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M138

GILSON WINCH, GW-4000B/14.98

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH309421
ASSEMBLY DRAWING	DWG.: RH207251
ASSEMBLY SPECIFICATION	SPEC.:RHMGSW0400BSLU05
BRAKE ARRANGEMENT DRAWING	DWG.: RH105882
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RHMBRARR0850S01
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH202569
BRAKE CYLINDER SPECIFICATION	SPEC.:RH504844
DRIVE UNIT ASSEMBLY DRAWING	DWG.: RN205841
DRIVE UNIT SPECIFICATION	SPEC.:RHMWDU4002B
TIMING OF MOTORS	DWG.: RH309251A
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M136

NET REEL, NDD-4000B/16.94

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH207242
ASSEMBLY DRAWING	DWG.: RH105951
ASSEMBLY SPECIFICATION	SPEC.:RHMNDD0400BSNU03
BRAKE ARRANGEMENT DRAWING	DWG.: RH105882
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RHMBRARR0850S01
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH202569
BRAKE CYLINDER SPECIFICATION	SPEC.:RH504844
DRIVE UNIT ASSEMBLY DRAWING	DWG.: RH
DRIVE UNIT SPECIFICATION	SPEC.:RHMWDU4002B
TIMING OF MOTORS	DWG.: RH309251A
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M136

NET SOUNDER WINCH, SOW-500/2.47

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH207243
ASSEMBLY DRAWING	DWG.: RH105949
ASSEMBLY SPECIFICATION	SPEC.:RHMSOW0500S/LU01
LEVELWIND ARRANGEMENT DRAWING	DWG.: RH102418
LEVELWIND ARRANGEMENT SPECIFICATION	SPEC.:RH506011
LEVELWIND CARRIAGE ASSEMBLY DRAWING	DWG.: RH102420
LEVELWIND CARRIAGE ASSEMBLY SPECIFICATION	SPEC.:RH506025
BRAKE ARRANGEMENT DRAWING	DWG.: RH101504
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RH503386
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH202026
BRAKE CYLINDER SPECIFICATION	SPEC.:RH503234
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M127

TRACTION WINCH, TRW-4001B/34.44

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH207737
ASSEMBLY DRAWING	DWG.: RH106194
ASSEMBLY SPECIFICATION	SPEC.:RHMTRW0401B/RU01
BRAKE ARRANGEMENT DRAWING	DWG.: RH105391U
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RH605146S/U
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH202569
BRAKE CYLINDER SPECIFICATION	SPEC.:RH504844/NVA
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M136

OCEANOGRAPHIC STORAGE DRUM, RW-2326BS/8.30

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH207736
ASSEMBLY DRAWING	DWG.: RH106175
ASSEMBLY SPECIFICATION	SPEC.:RHMRW2326BS/LO01
BEARING BRACKET UNIT DRAWING	DWG.: RH207758
BEARING BRACKET UNIT SPECIFICATION	SPEC. RH207758/L
DRIVE UNIT SIDE DRAWING	DWG.. RH207763
DRIVE UNIT SIDE SPECIFICATION	SPEC.:RH207763/L
LEVELWIND ARRANGEMENT DRAWING	DWG.: RH105947
LEVELWIND ARRANGEMENT SPECIFICATION	SPEC.:RH605970
LEVELWIND CARRIAGE ASSEMBLY DRAWING	DWG.: RH201993
LEVELWIND CARRIAGE ASSEMBLY SPECIFICATION	SPEC.:RH605972/R
BRAKE ARRANGEMENT DRAWING	DWG.: RH105985
BRAKE ARRANGEMENT SPECIFICATION	SPEC.:RHMBRARR0850/04
BRAKE CYLINDER ASSEMBLY DRAWING	DWG.: RH201659
BRAKE CYLINDER SPECIFICATION	SPEC.:RH502495
HYDRAULIC MOTOR SPARE PARTS LIST	LIST: M134

HYDRAULIC LEVEL WIND, HL-1000

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH207738
ASSEMBLY DRAWING	DWG.: RH106196
ASSEMBLY SPECIFICATION	SPEC.:RHMHYDLEV010S/L1
GUIDING ROLLER UNIT DRAWING	DWG.: RH309953
GUIDING ROLLER UNIT SPECIFICATION	SPEC.:RH606213
SPOOLING INDICATOR DRAWING	DWG.: RH207834
SPOOLING INDICATOR SPECIFICATION	SPEC.:RH606216

SLACK WIRE COMPENSATOR, SWC-017

MECH. DIM. DRAWING AND FOUNDATION PLAN	DWG.: RH309935
ASSEMBLY DRAWING	DWG.: RH309867
ASSEMBLY SPECIFICATION	SPEC.:RHMSLCWRCMP017

SELF-CONTAINED HYDROGRAPHIC WINCH, HW-500/4.70

MECH. DIM. DRAWING AND FOUNDATION PLAN, UNIT	DWG.: RH106176DS
ASSEMBLY SPECIFICATION, UNIT	SPEC.:RHMSCHW0050S02/A
MECH. DIM. DRAWING AND FOUNDATION PLAN, WINCH	DWG.: RH207246
ASSEMBLY DRAWING, WINCH	DWG.: RH105969
ASSEMBLY SPECIFICATION, WINCH	SPEC.:RHMHW0050S04/LU
LEVELWIND ARRANGEMENT DRAWING	DWG.: RH102014
LEVELWIND ARRANGEMENT SPECIFICATION	SPEC.:RH605992
LEVELWIND CARRIAGE ASSEMBLY DRAWING	DWG.: RH105975
LEVELWIND CARRIAGE ASSEMBLY SPECIFICATION	SPEC.:RH605995

BRAKE ARRANGEMENT DRAWING
BRAKE ARRANGEMENT SPECIFICATION
BRAKE CYLINDER ASSEMBLY DRAWING
BRAKE CYLINDER SPECIFICATION
HYDRAULIC MOTOR SPARE PARTS LIST

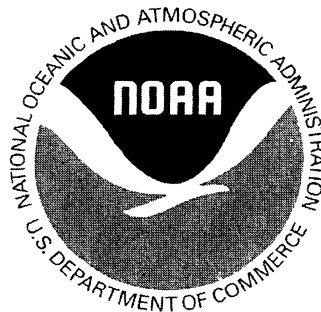
DWG.: RH101504
SPEC.: RHMBRARR0600S01
DWG.: RH202026
SPEC.: RH503234
LIST: M137



RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

**FISHERIES SURVEYOR VESSEL
M282 (FRV40)**



TRAWLING AND SCIENTIFIC WINCH DOCUMENTATION



CONTRACT M282

- **TRAWL WINCHES**
- **AUXILIARY WINCHES**
- **HYDROGRAPHIC AND CTD WINCHES**
- **OCEANOGRAPHIC TRACTION WINCH SYSTEM**
- **HYDRAULIC POWER UNIT**
- **CONTROLS AND MONITORING SYSTEMS**

Item 1.**2 ea. Combined bottom and Pelagic trawl winches, model TWS-10040 :****1 ea. RHMTWS10040/URP****1 ea. RHMTWS10040/ULP**

- Dimensional sketch RH207240 (RH) RH207241 (LH)
- Version One right (RH) and one left (LH) hand winch.
- Drum dimensions Dia. 521mm./dia.1780mm.x 1820mm.
- Wire capacity 4300 m. 28,6 mm. dia. wire at OD=1665 mm.
- Level wind synchronised for 28,6 mm dia. wire.
- Position of level wind under wound
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment. Brake function is positive, increased grip at increased load.
- Brake control system **(BS)** **(APER)** Automatic parking brake with electric release during automatic towing.
- Brake holding capacity 230 kNm with servo pressure applied.
131 kNm without servo pressure.
- Standard encoders Encoders for PTS-Pentagon installed.
- Measurement accuracy +/- 0,25 m (Standard feature)
- Weight approximately 8050 kg per unit, ex. wire.
19950 kg per unit, incl. Wire.

1 ea. RHMWDU10002B Drive unit.

- total displacement 4 motor heavy duty drive unit.
36,36 l/rev.

4 ea. RHHMOSA158 Hydraulic motors

1,6 l/rev.

1 ea. 001110 Control system

- Type Hydraulic system **(HT)** **(TWS)** Hydraulics for trawl winches.
- Main Control **(MC)** **(ERL)** Control of haul in/pay out is electric remote controlled from ACS on bridge, AWDCS on deck and local controlled from winch.
- Monitoring In ship control console on bridge.
- Spool type of main valve **(ST)** **(07)** Valve for open system with fixed oil flow.
- Main Control Location **(MCL)** **(I)** Internally installed on winch.
- Free Wheeling **(FW)** N/A.
- Tension Control **(TC)** **(ER)** Tension control to be manually electric remote controlled from panels in ACS on bridge, AWDCS on deck and automatic controlled from **PTS Pentagon**.
- Speed steps **(SP)** **3 steps** - 100%, 75% and 50 % displacement.
- Speed control operation **(SCO)** **(ER/S)** The speed is electric remote controlled from the **PTS Pentagon**.

Winch performance as described in table below is related to:

Oil flow	793 l/min
Cross port pressure	180 bar
Power requirement	320 kW

Wire layer	Dia.(mm)	Step 1	36,36	Step 2	27,27	Step 3	18,18	Shooting speed
First layer	549,6	35,2 t/	38 m/min	26 t/	50,4 m/min	17,6 t/	76 M/min	155 m/min
Half length	1236	15,7 t/	85 m/min	11,7 t/	113,34 m/min	7,8 t/	170 M/min	349 m/min
Top layer	1636	11,8 t/	113 m/min	8,9 t/	150,06 m/min	5,9 t/	225 M/min	463 m/min

Notes:

- Length measuring counters and load cells to be installed in turning blocks positioned underneath trawl deck below trawl gantry Blocks to be delivered by RH
- Wire spelter socket on trawl wire ends have a width of 115mm This will be pulled under no load, through spooling carriage and turning blocks
- Winches to be installed with drives inboard
- Winches to be delivered with 2 x 4000 m/ 28 6mm dia steel trawl wire 6 x 36 GEIPS+FC, all wound up on winch drums

Item 2.

1 ea. RHMGSW0400BSLU05

Gilson winch, model GW-4000B:

- Dimensional sketch RH309421
- Version Left hand winch
- Drum dimensions Dia 419mm /dia 990mm x400mm
- Storage capacity 250 m 24 mm dia Spectra rope at OD=796mm
- Level wind synchronised for N/A level wind not mounted
- Position of wire entrance under wound
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment Brake function is positive, increased grip at increased load
- Brake control system (BS) (AP) Automatic parking brake
- Weight approximately 2325 kg per unit, ex rope
2425 kg per unit, incl rope

1 ea. RHMWDU4002B

Drive unit, model WDU-4002B.

3 motor heavy-duty drive unit

- Total displacement 14,98 l/rev

3ea. RHHMOSA245 Hydraulic motors

0,90 l/rev

1 ea. 001110 Control system

- Type Hydraulic system (HT) (AUX) Hydraulics for auxiliary winches
- Main Control (MC) (ERL) Control of haul in/pay out is electric remote controlled from ACS on bridge, AWDCS on deck and local controlled from winch
- Spool type of main valve (ST) (07) Valve for open system with fixed oil flow
- Main Control Location (MCL) (I) Internally installed on winch
- Free Wheeling (FW) N/A
- Tension Control (TC) N/A
- Speed steps (SP) 2 steps - 100% and 67% displacement
- Speed control operation (SCO) (ER/S) Speed steps electrically remote controlled from ACS on bridge and AWDCS on deck

Winch performance as described in table below is related to:

Oil flow	312 l/min
Cross port pressure	195 bar
Power requirement	135 kW

Wire layer	Dia (mm)	Step 1	14,99	Step 2	9,99	Shooting speed
First layer	443	19 5 t/	29 m/min	13 t/	43 m/min	125 m/min
Half length	683	12 7 t/	45 m/min	8,4 t/	67 m/min	193 m/min
Top layer	875	9 9 t/	57 m/min	6,6 t/	85 m/min	247 m/min

Notes:

- Winch to be delivered with std parking brake
- Winch to be delivered with 250 m/ 24mm dia Spectra rope wound up on winch drum
- Bolts, nuts, washers and fittings exposed to weather or seawater spray to be stainless

Item 3.**1 ea. RHMNDD0400BSNU03****Double net drum, model NDD-4000B.**

- Dimensional sketch RH207242
- Classification ABS Crane certification
- Version Double net drum with two drive units
- Foundation spacers Included
- Drum dimensions 2 x Dia 419mm / dia 2750mm x 1760 mm
- Storage capacity 2 x 10 2 m³
- Level wind synchronized for N/A level wind not mounted
- Position of wire entrance under wound
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment Brake function is positive, increased grip at increased load
- Brake control system (BS) (AP) Automatic parking brake
- Brake holding capacity 2x 76 kNm/2x 36 4 tonns with servo pressure applied
2x 38 kNm/2x 17 5 tonns without servo pressure
- Weight approximately 10750 kg per unit, ex wire

2 ea. RHMWDU4002B Drive unit, model WDU-4002B 3 motor heavy duty drive unit
 • total displacement each drive 16,94 l/rev

6 ea. RHHMOSA246 Hydraulic motors 1,022 l/rev

2 ea. 001110 Control system

- Type Hydraulic system (HT) (AUX) Hydraulics for auxiliary winches
- Main Control (MC) (ERL) Control of haul in/pay out is electric remote controlled from ACS and deck control console
- Spool type of main valve (ST) (07) Valves for open system with fixed oil flow
- Main Control Location (MCL) (I) Internally installed on winch
- Free Wheeling (FW) N/A
- Tension Control (TC) (ER) Electrically remote controlled from ACS on deck and AWDCS on deck
- Speed steps (SP) 2 step - 100% and 66 % displacement
- Speed control operation (SCO) (ER/S) hauling and pay out speed is electrically remote controlled from ACS on bridge and AWDCS on deck

Winch performance as described in table below is related to:

Oil flow	319l/min
Cross port pressure	175bar
Power requirement	125kW

Wire layer	Dia (mm)	Step 1 16,94	Step 2 11,30	Shooting speed
First layer	443	19,9t/ 25m/min	13,2t/ 38m/min	125m/min
Half drum	1883	4,7t/ 106m/min	3,1t/ 159m/min	532m/min
Top layer	2603	3,4t/ 147m/min	2,3t/ 220m/min	736m/min

• **SWL for ABS certification 3.6 tonnes**

Notes:

- Inner flanges to be removable from their inner position Outer flanges to be prepared for an easy attachment of inner flanges when reel is used for pelagic nets
- Mode switch for single net operation – reel halves to be connected mechanically when operated for pelagic operations
- Bolts, nuts, washers and fittings exposed to weather or seawater spray to be stainless

Item 4.

1 ea. RHMSOW0500S/LU01 Net sounder winch, model SOW-500.

- Dimensional sketch RH207243
- Version left hand winch
- Drum dimensions Dia 406 mm / dia 880 mm x 1400 mm
- Lebus sleeve Included
- Storage capacity 4700 m 11 mm dia wire at OD=824 mm
- Level wind synchronized for 11 4 mm dia steel armored cable

- Position of wire entrance under wound.
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment. Brake function is positive – increased grip at increasing wire force.
- Brake control system (BS) (AP) Automatic parking brake
- Weight approximately 1700 kg per unit, ex. wire.
3714 kg per unit, incl. wire.
- Slip ring Included, as per SOR, type Meridian MXO-4.

1 ea. RHHMOSA223 Hydraulic motor 2,50 l/rev.

1 ea. 001110 Control system

- Type Hydraulic system (HT) (AUX) Hydraulics for auxiliary winches.
- Main Control (MC) N/A
- Spool type of main valve (ST) (07) Valves for open system with fixed oil flow.
- Main Control Location (MCL) (E) Delivered loose for installation on main deck.
- Free Wheeling (FW) N/A.
- Tension Control (TC) (ER) Step-less control from pot. meter in control panel in ACS on bridge.
- Speed steps (SP) 2 steps - Hauling and towing.
- Speed control operation (SCO) Automatic hydraulic control.

Winch performance as described in table below is related to:

- Oil flow, hauling mode 180 l/min
- Cross port pressure, hauling mode (max.) 65 bar
- Oil flow, towing mode 45 l/min
- Cross port pressure, towing mode (max.) 205 bar
- Power requirement 37 kW

Wire layer	Dia.	Step I (hauling)	Step II (towing)	Shooting speed
First	417 mm	1,1 t /0- 95 m/min	3,6 t /0- 23 m/min	0-118 m/min
Half wire length	659 mm	0,75 t /0-150 m/min	2,3 t /0- 36 m/min	0-186 m/min
Top layer	813 mm	0,57 t /0-185 m/min	1,8 t /0- 45 m/min	0-230 m/min

Notes:

- Length encoders and load cells for tension reading to be put in pulley installed behind winch. Pulley included in RHUS/RH contract.
- Counting and tension reading from PTS Pentagon.
- Standard local control on deck .
- Winch to be delivered with 4000 m/ 11.4mm dia. steel armored conducting cable all wound up on winch drum.
- Bolts, nuts, washers and fittings exposed to weather or seawater spray to be stainless.
- Wire supplied from RHUS.

Item 5.**1 ea. Out Haul Winch Pull Master, Model M12-3-97-1**

- Dimensional sketch Manufacturer's data sheet.
- Version right hand winch.
- Drum dimensions Dia. 194mm./dia.371mm.x 254mm.
- Storage capacity max. 110 m of 13 mm dia. wire.
- Level wind synchronised for N/A. level wind not mounted.
- Position of wire entrance under wound.
- Brake type Multi-disc brake.
- Brake control system (BS) Automatic, fail-safe.
- Weight approximately 150 kg. per unit, ex. wire.

1 ea. Planetary gear with medium speed hydraulic motor..**1 ea. 001110 Control system**

- Type hydraulic system (HT) (AUX) Hydraulics for auxiliary winches.
- Main Control (MC) (L) Control of haul in/pay out is locally controlled at location decided by owner and electric remote controlled from ACS on bridge and AWDSCS on deck.
- Spool type of main valve (ST) (07) Valves for open system with fixed oil flow.
- Main Control Location (MCL) (E) External; valve supplied loose.
- Free Wheeling (FW) N/A.
- Tension Control (TC) N/A.
- Speed steps (SP) N/A.
- Speed control operation (SCO) N/A.

Winch performance as described in table below is related to:

- Oil flow 205 l/min.
- Cross port pressure 175 bar.
- Power requirement Approximately 80 kW. per winch.

Layer	Dia.	Step I
First layer	207 mm.	5,8 t / 0 – 37 m/min.
Top layer	337 mm.	3,5 t / 0 - 60 m/min.

Notes:

- Manual control supplied loose to be installed on trawl gantry's starboard side. Valves included in RH's package.
- Dual cross-port relief valve supplied loose.
- Winch to be purchased and delivered direct from RHUS .
- Bolts, nuts, washers and fittings exposed to weather or seawater spray to be stainless.

RESEARCH WINCH PACKAGE

Item 6a.**1 ea. RHMTRW0401B/RU01****Oceanographic Traction winch- TRW-4001B.**

- Dimensional sketch RH207737
- Classification ABS Crane certification
- Version One right hand winch
- Drum dimensions Dia 1220mm root diameter for traction winch
- Position of level wind under wound
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment
- Brake control system **(BS)** **(AP)** Automatic parking brake
- Brake holding capacity 185 8 kNm/30 6 tonns with servo pressure applied
85 3 kNm/14 0 tonns without servo pressure
- Encoders Counting encoders installed on winch fair lead, and load cells for "PTS-Pentagon Research" installed on separate wire lead
- Weight approximately 7050 kg per unit, ex slack wire unit
- Weight approximately slack wire unit , 460 kg

2 ea. RHMWDU4002 Drive unit, model WDU-4002. 3 motor heavy duty drive unit

2 ea. RHHMOSA248 Hydraulic motors 1,2 l/rev

3 ea. RHHMOSA248 Hydraulic motors 1,2 l/rev

- total displacement 34,44 l/rev

1 ea. 001110 Control system

- Type Hydraulic system **(HT)** **(TWS)** Hydraulics for traction winches
- Main Control **(MC)** **(ERL)** Control of haul in/pay out is electric remote controlled from ACS on bridge and locally controlled from winch
- Spool type of main valve **(ST)** **(07)** Valve for open system with fixed oil flow
- Main Control Location **(MCL)** **(I)** Internally installed on winch
- Free Wheeling **(FW)** N/A
- Tension Control **(TC)** **(ER)** Tension control to be electric remote controlled from ACS on bridge and automatically controlled from **PTS-PentagonTR.**
- Speed steps **(SP)** 2 steps - 100%, and 40% displacement
- Speed control operation **(SCO)** **(ER/3D)** The speed is electric remote controlled from the **PTS PentagonTR**action system

Winch performance as described in table below is related to:

Oil flow	304	l/min
Cross port pressure	165	bar
Power requirement	112	kW

Wire layer	Dia (mm)	Step 1	34,44	Step 2	13,77	Shooting speed
Pull diam	1236	13,6 t/	32 m/min	5,4 t/	80 M/min	349 m/min

SWL for ABS certification 3.4 tonnes

Notes:

- See arrangement drawings RH206420 and \\Drawings\Hull Structural\Lay out\FA14-002-PA dwg
- Winch to be furnished with lead device for centering the wire to in – and outgoing grooves on either of the two winch heads
- Drives to be turned 90° on foundation to bring the gear sump pointing downwards when winch is installed in vertical position as shown on arrangement dwg FA14-002-PA
- All controls to be piped up and installed on winch drives
- The Traction Winch System must be capable of handling 17 mm (0 680 inch) diameter electromechanical cable, 17 mm (0 681 inch) fiber-optic cable, and 16 mm (5/8 inch) diameter 3x19 torque balanced GEIPS rope
- Individual winch heads to be angled vs each other to prevent wire to twist during operation
- Displacements for both drives to be calculated accurately using same ratio as used for traction winches delivered to “Oscar Sund”
- Counters for length measurement of wire to be installed on winch
- Load cell on pivoting block located on deck above and in center of wire outlet of traction winch
- Two-speed arrangement valves to be piped up on winch
- Device for absorbing slack wire between winch and storage reel to be installed on winch or supplied loose

Item 6b.**1 ea. RHMSLCWRCMP017 Slack Wire Compensator SWC-017.**

- Dimensional sketch RH309935
- Wire dia Max 17mm
- Weight 500 kg

Item 7a.**1 ea. RHMRW2326BS/LO01****Oceanographic storage winch RW-2326BS.**

- Dimensional sketch RH207736
- Classification ABS Crane certification
- Version One left hand winch
- Storage drum dimensions Dia 1220mm /dia 1750 x 1370 mm
- Wire capacity 5100 m 16 mm dia wire at OD=1690mm
- Level wind synchronised for 16 mm dia wire
- Position of level wind over wound
- Lebus groove 16 mm wire
- Slip ring Four conductor unit
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment

- Brake control system (BS) (AP) Automatic parking brake
- Brake holding capacity 27 8 kNm/3 4 tonns with servo pressure applied
9 3 kNm/1.2 tonns without servo pressure.
- Encoders N/A
- Weight approximately 4750 kg per unit, ex wire
9450 kg per unit, incl Wire

1 ea. RHMWDU2300 Drive unit, model WDU-2300. 3 motor heavy duty drive unit

3 ea. RHHMOSA340 Hydraulic motors 0,493 l/rev

- total displacement 8,30 l/rev

1 ea. 001110 Control system

- Type Hydraulic system (HT) (TWS) Hydraulics for storage reel in conjunction with a traction winch system
- Main Control (MC) (ERL) Control of haul in/pay out is electric automatic remote controlled from ACS on bridge and locally controlled from winch
- Spool type of main valve (ST) (08) Valve for closed system with variable oil flow
- Main Control Location (MCL) (I) Internally installed on winch
- Free Wheeling (FW) N/A
- Tension Control (TC) (ER) Tension control synchronized with the traction winch automatically controlled from **PTS-PentagonTR**.
- Speed steps (SP) 2 steps - 100% and 33 %
- Speed control operation (SCO) (ER/2D) The speed is electrically remote controlled from the PTS- PentagonTR system based on actual given hauling/shooting speed for the traction winch

Winch performance as described in table below is related to:

Oil flow	87 l/min
Cross port pressure	175 Bar
Power requirement	34 KW

Wire layer	Dia (mm)	Step 1	8,29	Step 2	2,76	Shooting speed
First layer	1236	3,4t/	34 m/min	1,1t/	102 m/min	349m/min
Half drum	1460	2,9t/	40 m/min	1,0t/	120 m/min	413m/min
Top layer	1652	2,6t/	45 m/min	0,9t/	136 m/min	467m/min

- The oceanographic storage winch must be provided with 5,100 meters of 16 mm (5/8 inch) diameter 3 x 19 wire rope and matching Lebus grooved shell
- The storage winch is to be fitted with a four-conductor slip-ring unit, **Meridian Laboratory Model MXO-4**, with Burton marine connector Cable pass through, armour clamping, and conductor access into the hollow main shaft is to be provided The winch shall accommodate a future fiber optic slip ring assembly
- A 1219 mm auxiliary pivoting sheave must be provided above and forward of the net reel, in direct line with the traction winder output A tension-sensing output load cell and speed sensors must be incorporated into the auxiliary pivoting sheave

The wire entry point to this sheave may not change position as the sheave pivots to serve alternative overboard locations. In addition, a 2000 mm circumference counterbalanced overboard sheave must be provided on the stern gantry.

- Diamond screw furnished with adjustment clutch to position wire carriage for level wind.
- Reinforced level wind to accept reduced distance between centre of reel and outlet of wire lead on traction winch.

Item 7b.

1 ea. RHMHYDLEV010S/L1 Hydraulic Level Wind for Storage Drum, HL-1000

- Dimensional sketch RH207738
- Level wind synchronised for 16 mm dia, wire
- Weight 1980 kg

Item 8.**2 ea. RHMSCHW0050S02/A Hydrographic winches, model HW-500.**

- Dimensional sketch RH106176DS
- Classification ABS Crane certification
- Version Two left hand winches.
- Drum dimensions Dia. 460mm./dia.1000mm.x905mm.
- Lebus groove 9,5 mm wire
- Storage capacity 3600 m of ø 9,5 mm wire at OD=822 mm
- Level wind synchronised for for 9,5 mm wire.
- Position of wire entrance over wound.
- Slip ring Four conductor unit
- Brake type Hydraulic actuated, spring operated band brake with manual adjustment.
- Brake control system (BS) (AP) Automatic parking brake.
- Weight approximately 3600 kg per unit, ex. wire.
4900 kg per unit, incl. Wire.

1 ea. RHHMOSA321 Hydraulic motors 4,7/ 1/rev.**1 ea. 001110 Control system**

- Type Hydraulic system (HT) (AUX)Hydraulics for hydrographic winches.
- Main Control (MC) (ERL) Control of haul in/pay out is electric remote controlled from the SBCC on bridge, SSSCB on deck and local controlled from winch.
- Spool type of main valve (ST) (08) Valves for open system with variable oil flow.
- Main Control Location (MCL) (I) Internally installed on winch.
- Free Wheeling (FW) N/A.
- Tension Control (TC) (ER) Tension to be electric remote controlled from SBCC on bridge and SSSCB on deck.
- Speed steps (SP) 2 steps - 100% - 46%.
- Speed control operation (SCO) Electrically remote controlled from SBCC on bridge and SSSCB on deck.

Winch performance as described in table below is related to:

Oil flow	115	l/min
Cross port pressure	170	bar
Power requirement	44	kW

Wire layer	Dia.(mm)	Step 1 4,71	Step 2 2,18	Shooting speed
First layer	469,5	5,0 t/ 36 m/min.	2,3 t/ 77 m/min.	133 m/min.
Half length	659,5	3,6 t/ 51 m/min.	1,7 t/ 108 m/min.	186 m/min.
Top layer	812	2,9 t/ 62 m/min.	1,4 t/ 134 m/min.	229 m/min.

- **SWL** for ABS certification: **1.3 tonnes**
- Each hydrographic winch is to be equipped with 3,500 meters of 9.5 mm (0.375 inch) torque balanced, double armored, single conductor, electromechanical cable. **A Lebus shell and chain driven diamond drive level-winding system is to be provided for each winch.**
- A four-conductor slip ring unit, **Meridian Laboratory, Model MXO-4**, is to be installed on each winch. The hydrographic winches shall be provided with three-sheave fairlead heads with sensors to provide signals for line speed, tension, and line out.
- Bolts, nuts, washers and fittings exposed to weather or seawater spray to be stainless.
- Integrated to each winch assembly, a hydraulic power pack is installed on flexible cushions along with the following:
 - Elec. hydraulic pump unit of 45 kW/3x600V/60Hz/1160rpm/IP54 S6-40% load rating, including variable displacement constant pressure piston pumps.
 - Star/delta starter cabinet for 45 kW. electric motors.
 - Mounting sets for hydraulic pumps comprising of hydraulic flanges, o-rings, bolts, hydraulic hoses and relief valves.
 - Mounting set for oil tank such as all required gate valves, breathing filter, oil level glasses and oil level switch.
 - Pressure line filters.
 - Return line filters.
 - Drain line filter.
 - Air cooler with cooling capacity 10 kW at max. 40 °C air temp.
 - Thermal switch.
 - Oil reservoir of 350 litres.
 - Furthermore included are required relief valves and check valves for the hydraulic pump units.
 - electric motor furnished with 220 V heater element.

Item 9.

1 ea. 001110 Complete hydraulic drive system, remote control and automatic trawl system.

- Main hydraulic diagram RH106179.

Complete system for all winches, Fishery winches and Research winches, mainly comprising of:

<u>Item 9 a.</u>	<u>1ea. Hydraulic main drive system, DELIVERED AS ONE COMPLETE UNIT; Dim. sketch RH106174.</u>
• 06 ea.	Elec. hydraulic pump units 128 kW/3x600V/60Hz/1180 rpm/IP 54 S6-40% load rating, including double Denison vane pumps.
• 01 ea.	Elec. Hydraulic pump unit 128kW/3x600V/60Hz/1180 rpm/IP 54 S6-40% load rating, including variable displacement piston pump.
• 01 ea.	Elec. hydraulic pump unit 37 kW/3x600V/60Hz/1170 rpm /IP-54 S1-100% load rating, included double Denison vane pump. This pump unit is for net sounding winch.
• 08 ea.	Mounting sets for hydraulic pumps comprising of hydraulic flanges, o-rings, hoses, bolts and relief valves.

- 01 ea. Elec. hydraulic pump unit 8,6 kW/3x600V/60Hz/1160rpm /IP-54 S1-100% load rating, included single Denison vane pump.
This pump unit is for remote control operation.
- 01 ea. Mounting set for hydraulic pump comprising of hydraulic flanges, o-rings, hoses, bolts and relief valves.
- 01 ea. Mounting set for oil tank such as all required gate valves, breathing filter, oil level glasses and oil level switches.
- 01 ea. Oil reservoir of 5000 litres.
- 11 ea. Pressure line filters.
- 04 ea. Return line filters.
- 01 ea. Drain line filter.
- 01 ea. Oil cooler, each with cooling capacity 130 kW at max.38 °C fresh water temp.
- 02 ea. Temperature transmitter
- 01 ea. set of required hydraulic valves such as pressure equalizing units and pressure return line units.
- 01 ea. Set of required sensors for the hydraulic system.
- 01 ea. Set of resilient mounts for main HPU, installed on unit.
- Weight approximately: 9500 kg excl. oil.

Separately delivered:

- 01 ea. Oil cooler, with cooling capacity 130 kW at max. 32°C seawater.

Separately delivered in two cabinets:

- 06 ea. Y-D Starter for 128 kW electric motors.
- 01 ea. Y-D Starter for 37 kW electric motor.
- 01 ea. Direct starter for 8,6 kW electric motor.

Notes:

- The cabinets made for one main power supply, prepared for back to back mounting or side by side.
- All starters with separate circuit/load breaker.
- All starters with isolation measurement system with non potential output alarm and internal alarm lamp in cabinet door.
- Output and control of heating to each motor above 30 kW are equipped with 220 V stand still heater element .
- All starters equipped with local and remote start feature. Local start in cabinet door.
- All starters made with 120V-60Hz control voltage.

Furthermore included are required relief valves, check valves and hoses for the hydraulic pump units.

Item 9 b. 1 ea. Electric/hydraulic remote control system comprising:**Fishery system- aft bridge control panels (ACS):**

- 01 ea. Control panel for 2 trawl winches according to dwg. no. 3R76/47.

- 01 ea. Control panel for net sounding winch-according to dwg. no. 4R75/92.
- 01 ea. Control panel for double net drum – according to dwg. no. RH308395
- 01 ea. Control panel for gilson/outhaul winches – according to dwg no. 3R76/88
- 01 ea. Start/stop panels for electrical motors - dwg. no. 3R78/55 to suit specified number of power packs above.

Oceanographic system – aft bridge control (ACS) panels:

- 01 ea. Control panel for oceanographic winch / traction winch – dwg. 3R76/46.
- 01 ea. Control panel for Aft A-frame/Stern Gate – dwg. 3R 76/88.

Hydrographic system – stbd bridge control panels (SBCC):

- 01 ea. control panel for Hydrographic winch – dwg 3R76/46

Hydrographic system – side sampling station (SSCB):

- 01 ea. control panel for Hydrographic winch – dwg 3R76/46
- 01 ea. Side A-frame control panel – dwg. 3R76/89

Item 9 c. 1 ea. Rapp Hydema Trawl Computer model PTS-Pentagon – for Fishery system.

Delivered according to product info PTS *Pentagon* with control of trawl winches.

The **PTS *Pentagon*** system is well tailored both for bottom trawling as well as for pelagic trawling and is based on our experience with the PTS-3000 system.

Required hardware comprises of:

– for ship control console:

- 01 ea. 19" monitor for graphic presentation of winch data.
Dwg.no. RH309859.
- 01 ea. PC communication/integration unit.
Dwg.no. RH309735.
- 01 ea. set of cable and opto isolator for integration to trawl mensuration system.
- 01 ea. set of cable and opto isolator for integration to the echo sounder system.
- 01 ea. set of cable and opto isolator for integration to the central computer system, SCS.

– for ship center console:

- 01 ea. PLC winch interface unit.
Dwg.no.4R75/78.

- for aft bridge console:

- 01 ea. Control/display panel with touch screen solution.
Dwg.no. RH309864.

Item 9 d. **1 ea. Rapp Hydema Computer model PTS-PentagonTR
For Oceanographic system.**

The **PTS-Pentagon TR** system will control the functions for the traction winch and the storage winch. The system will monitor speed, line pull, pressure, wire length. Logging of each sequence according to users specification can be integrated in the system.

Required hardware comprises of:

- for aft bridge console:

- 01 ea. Control/display panel with touch screen solution.
Dwg.no. RH308445.

- for winch room:

- 01 ea. Control/display panel with touch screen solution
Dwg.no. RH308445.

- for bridge center console:

- 01 ea. PLC winch interface unit.
Dwg.no. 4R75/78
- 01 ea. set of cable and opto isolator for integration to the central computer system, SCS.

- for aft A-frame, wire incline sensor:

- 01 ea. Wire angle sensor, acc. to drawing: RH207691

Item 9 e. **1 ea. Rapp Hydema Computer model PTS-Pentagon R
For Hydrographic system.**

The **PTS-Pentagon R** system will monitor speed, line pull, pressure, wire length. Logging of each sequence according to users specification can be integrated in the system.

Required hardware comprises of:

- for stbd bridge wing console:

- 01 ea. Control/display panel with touch screen solution.
Dwg.no. RH308445.

- for side sampling station :

- 01 ea. Control/display panel with touch screen solution.
Dwg.no. RH308445.

- for bridge center console:

- 01 ea. PC communication/integration unit.
Dwg.no. 4R75/78
- 01 ea. set of cable and opto isolator for integration to the central computer system, SCS.

- for side A-frame, wire incline sensor:

- 01 ea Wire angle sensor, acc to drawing RH207691

Item 9 f.**1 ea. Deck Control Panel for aft working deck (AWDCS).**

- 01 ea Deck control console, with remote control functions for the Stern Gate, the Aft Gantry, the Gilson Winch, the Outhaul Winch, the Trawl winches and the Net Reel, Dwg no RH308126

Item 10.**1 ea. Spare Parts included.****Mainly comprising of:**

- Pilot taps, one of each type
- Seal kit and springs for brake cylinders, one set for each type
- Two sets of filter elements
- Hydraulic pressure hoses, one of each type
- Seal kits for hydraulic pumps
- Amplifier cards and bulbs
- Set of special tools

Item 11.**1 ea. Service and assistance included:****A) 6 ea. Engineering manuals in English language including:**

- Hydraulic system schematics
- Electric wiring diagrams
- General installation instruction
- Dimension sketches of winches
- Dimension sketches of control panels and cabinets
- Flushing and cleaning procedures for hydraulic pipes

B) 6 ea. Operational manuals and spare part catalogues including:

- All relevant drawings with part lists and specifications
- Operational instruction for hydraulic system, PTS-Pentagon and winches
- Manufacturer's test certificates of winches
- Lubrication charts

C) Start up assistance/training covered by Rapp Hydema A/S as follows:

- Technical supervision and inspection of installation, start up assistance and dock trials will be carried out by one of our service engineers. Included are travel expenses, lodging and labour hours for inspection and guidance

A total stay of 21 days at the yard is included. Each working day shall not exceed 10 hours and shall be executed mainly during normal working hours and normal working week.

We require a notice from the yard 10 days before such assistance is to be performed.

- Assistance during full scale fishing trials out in the Atlantic Ocean including training of crew in operation and maintenance from one of our engineers is included with a stay of maximum 10-14 days out at sea. This activity is to take place during a 3 months testing period of the vessel. Owners will decide when in this period the training shall take place.
- If the allocated number of work hours for supervision and trials are exceeded due to reasons and delays at the yard which are beyond Rapp Hydema's control and/or responsibility.
- The hydraulic- and electric installation, winch foundations and alignments have to be completed before the trials can start.

Rapp Hydema's representative's involvement during start-up and final testing/sea trials is limited to ensuring that pipes are properly sealed and do not show any leakage under working conditions i.e. full system pressure and that all equipment supplied by Rapp Hydema is operating as specified.

Rapp Hydema is not responsible for starting prime movers or supervision of same during start-up or trials.

The yard and/or the owner are responsible for allocating their own personnel to carry out any supervision or remedial work required at their own expense.

Rapp Hydema is not responsible for installation that has been carried out different from submitted specifications.

Licence Production/Country of origin.

Rapp Hydema AS has an international production and service organization where it could occur components, complete products and services listed in the technical specification that have a different country of origin than Norway. Shipyard and the owners accept accordingly this information as a general and final notification that some of the specified products may have a different country of origin than Norway.

Hydraulic connections:

All internal fittings on pipes/tubes up to outer diameter of 38 mm. are of triple lock JIC 37 ° (flare type) according to SAE J514 and SAE J1453. These are steel fittings with yellow zinc cobalt plating in accordance with ASTM B117, except where use of stainless steel fittings has been agreed upon. SAE normal steel welding flanges are used on pipes with outer diameter bigger than 38 mm.

All internal pipes and tubes up to outer diameter of 25 mm. are of seamless stainless steel AISI 316.

Pipes with outer diameter from 30 mm. upwards are made of normal steel, according to DIN 2391-C St. 52,4, except where use of AISI 316 pipes has been agreed upon.

Alignment and foundation of winches on board the vessel:

All winches mounted on board the vessel shall be aligned in accordance with normal practice for this kind of machinery and as per instructions from Rapp Hydema A/S found in engineering manuals.

The shipyard is responsible for manufacturing and supplying foundations for all winches supplied from Rapp Hydema A/S with sufficient stiffness to resist a deflection at full load, no more than 0.1 mm/m if other requirements are not given.

Surface treatment:

Products manufactured by Rapp Hydema A/S, in this case all items are surface treated according to our standard specification:

- | | | |
|---------------------|-----------|--|
| • sand blasting to | Grade SA | 2,5-3,0/ISO standard 8501-1. |
| • sink metallizing | Thickness | 80 µ |
| • Tie coat (primer) | Thickness | 20 µ Hempadur 4520-50% diluted. |
| • Hi-build | Thickness | 80 µ Hempadur 4520 |
| • Top coat | Thickness | 50 µ Hemptthane 5521-1217. |
| • Colour code | RAL-7044. | Compatible with paint brand "International". |

Bodø, 10, January 2004
RAPP HYDEMA AS

SECTION 2

**GENERAL INFORMATION
OPERATION INSTRUCTIONS
TROUBLE SHOOTING**

SECTION 2

INSTRUCTIONS AND PROCEDURES

GENERAL INFORMATION

- GUARANTEE
- TECHNICAL BULLETIN 94004
- GUIDANCE FOR WIRE SPOOLING
- ADJUSTMENT OF AMPLIFIERS ins93080.amm

START-UP AND SEA-TRIAL PROCEDURES

OPERATION INSTRUCTION

- STANDARD PENTAGON, FISHERY
- PENTAGON RESEARCH (HYDROGRAPHIC)
- PENTAGON TRACTION (OCEANOGRAPHIC)
- MANUAL OPERATION TRAWL WINCHES
- MANUAL OPERATION SOUNDER WINCH
- MANUAL OPERATION NET DRUM
- MANUAL OPERATION GILSON/OUTHAUL WINCH
- MAP FOR START OF PUMPS

TROUBLE SHOOTING

GUARANTEE TERMS

General reference

RH equipment and spare parts are delivered according to standard delivery terms described in the NL 01 or UN doc 188.

The guarantee period is for the winches and system supplies described in the order confirmation for each delivery.

Normal conditions are unless something else is mentioned, 18 months from delivery from Rapp Hydema AS (RH) or 1 year from commissioning have been completed.

Guarantee claims on hydraulic components are taken in consideration only if an oil sample is taken at the time the component was installed and at the time the component failed. The sample report has to be presented RH and has to contain full analysis. RH has to be contacted for further requirements.

A sample has to be taken every six months.

Guarantee on spare parts is 1 year from shipment date from RH.

A warranty claim has to be notified RH head office in writing without delay.

The guarantee on the winches and hydraulic system supplied by RH is valid only when operation within normal use of the equipment and maintenance has been carried out according to our instructions. Original spare parts have to be used to fulfil these guarantee conditions. (Filter elements, solenoids etc).

Furthermore we want to point out that guarantee is not honoured if the purchaser fail to notify and get instruction from a RH representative or RH head office before starting the repair.

All terms described in the sales contract have to be fulfilled by the purchaser before guarantee is taken into consideration.



TECHNICAL BULLETIN

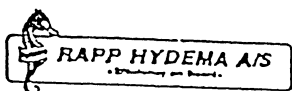
NO:
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Total no. of pages Incl.
drawings: 2

Bulletin grade:	INFORMATION:	(x)	Tech. Bulletin Issue date: 02.03.94
	INSTRUCTION:	(x) x	Valid from date: 02.03.94
In attention to: Rapp Hydema A/S Tech,Prod. / Rapp Hydema US,Inc. / Fishing Hydraulic Ltd. / RossNor Ltd. <i>02.03.94</i>			

Tech. Bulletin subject: Pre-filling of motor casing.			
Tech/Inst.	Mech.	Hydr. x	Elec.
Ref. Revision Bulletin no:		none	
List of drawings and specifications included in this bulletin: none			
Reason for this bulletin: To avoid any start up damage due to no internal lubrication.			
Description: <p>All motors on winches, gearboxes, motors sold as spare and warranty motors must be fitted with a red label which is in the receivers language (or a language we know the receiver understand). Text on label, see example below:</p> <p>Example in English : Before turning the winch, fill the motor completely with hydraulic fluid through drainage port. We have labels in English, Norwegian, German and Spanish language.</p> <p>Label to be fitted to a "Rapp" tag and fixed to the drain fitting by use of a string (on winches and gearboxes) or taped directly on the motor near to the drain port (spares and warranty motors).</p> <div data-bbox="724 1497 1088 1694" data-label="Image"></div> <p>Instruction manuals will be supplied with an extra page , see page 2 here.</p>			
continues on page 2 (yes / no): yes			

Done by: <i>SMA</i> Steinar M. Amundsen	Approved by: <i>Geir Thuv</i> Geir Thuv	Date: 02.03.94
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TECHNICAL BULLETIN

NO:
but94004.sma

Page:
2 of 2

Description: (continous from page 1.)

CAUTION / ATTENTION / ATTENZIONE / ACHTUNG / PRECAUCION / VIKTIG

GB

Before turning the winch, fill the motor completely with hydraulic fluid through drainage port.

F

Avant d'actionner le moteur, il faut le remplir entièrement d'huile hydraulique par le trou de drainage.

I

Prima di mettere in moto questo motore, riempirlo completamente dal foro di drenaggio con olio idraulico.

D

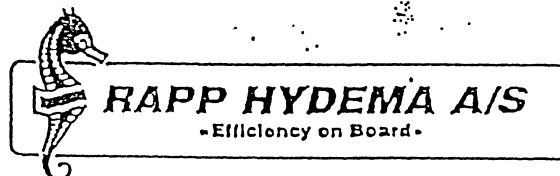
Den Motor komplett mit Hydrauliköl durch die Dränierungsöffnung auffüllen, bevor Sie die Winde in Betrieb nehmen.

E

Antes de activar el winche, llenar completamente los motores con aceite hidraulico a traves del orificio de drenaje.

N

Hydraulikkmotoren må fylles helt opp med hydraulikkolje før vinsjen tas i bruk. Fylles gjennom øvre drenport.



[illegible]

GUIDANCE FOR WIRE ROPE SPOOLING

[illegible]

Wire-rope spooling.

Technical Information.

Wire Rope Installation.

Checking the Diameter.

It is most important to check the diameter of the delivered rope before installation. This is to make certain that the rope diameter meets the specified requirements for the given machine or equipment.

With an undersize diameter rope, stresses will be higher than designed for and the probability of breaking the rope will be increased. An oversized rope will wear out prematurely, this because of abuse to the rope caused by pinching in the grooves of the sheave and drum.

How to Measure the Size of a Rope?

The size of a wire rope is the diameter or circumference of a true circle which will just enclose all the strands. Measure at each of three places at least 5 feet apart. The average of these measurements is to be taken as the diameter of the rope.

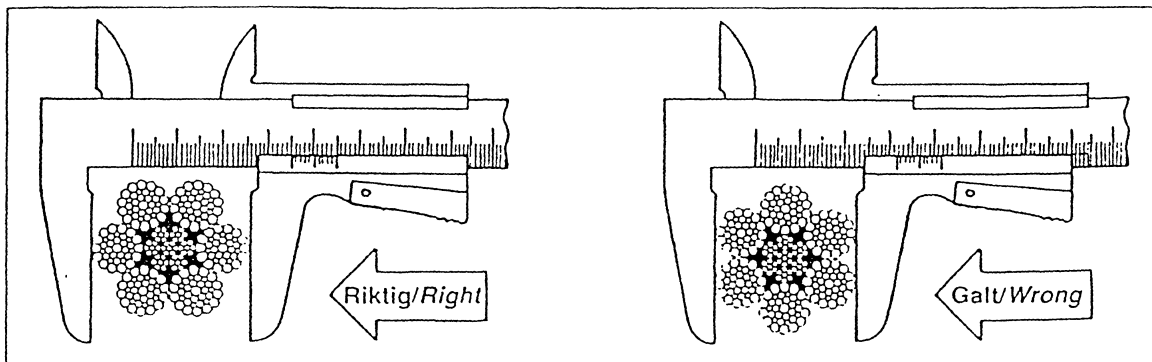


Fig.1.

Tolerances:

See Wire-rope suppliers catalog for tolerances.

Tolerances according to NS 5200, ISO 2408 and API 9A.

Unreeling and Uncoiling.

Wire rope is shipped in cut lengths, either in coils or on reels. Great care should be taken when the rope is unpacked as it can be permanently damaged by improper unreeling or uncoiling. Looping the rope over the head of the reel or pulling the rope off a coil while it is lying on the ground, will create loops in the line. Pulling on a loop will, at the very least, produce imbalance in the rope and may result in open or closed kinks.

A light coil of rope may be unrolled along the ground but should always be kept under control.

A reel may be placed on a turntable, or mounted on stands and supported by a bar or tube through the hole in its centre.

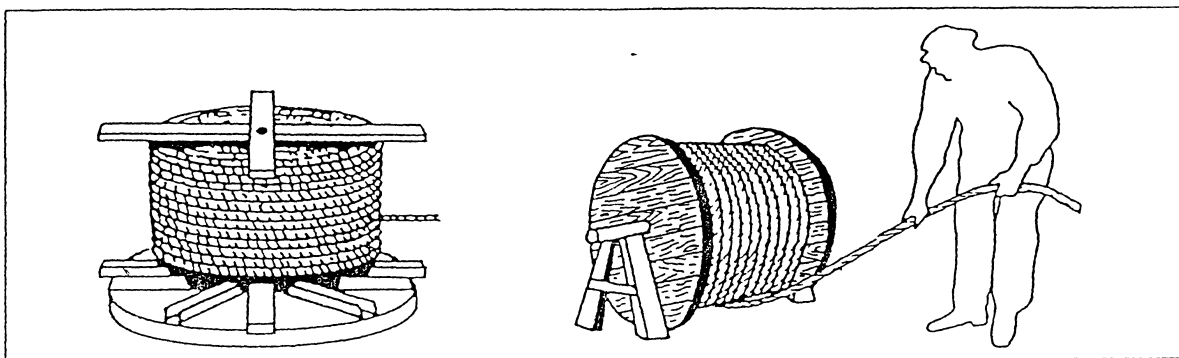


Fig.2.

Winding onto Drum or Reel.

When winding a rope onto a machine drum or onto another reel, make certain that it bends in the same direction. Re-reel from the top of one reel to the top of another, or from the bottom of one reel to the bottom of another. Follow the same procedure when winding onto machine drums.

It is also necessary to apply a tensioning load to the rope to achieve good spooling. A simple brake such as a plank, rigged to rub against the reel flanges, will provide ample rope tension throughout the winding.

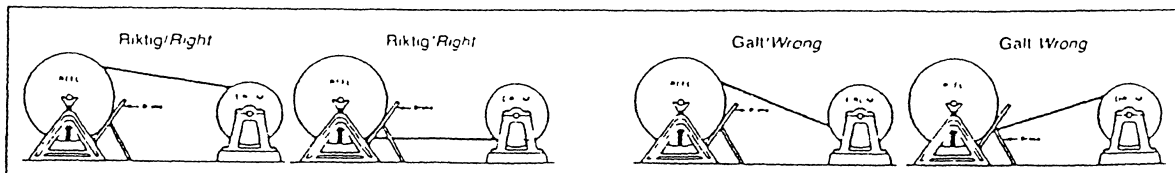


Fig.3.

Drums - Plain (Smooth)

Installation of wire rope on a plain (smooth) faced drum requires a great deal of care. The starting position should be at the drum end so that each turn of the rope will wind tightly against the preceding turn (see figure).

Here too, close supervision should be maintained during installation to ensure that:

1. the rope is properly attached to the drum,
2. appropriate tension on the rope is maintained as it is wound on the drum,
3. each turn is guided as close to the preceding turn as possible, so that there are no gaps between turns,
4. and that there are at least three dead turns on the drum when the rope is fully unwound during normal operating cycles.

Loose and uneven winding on a plain (smooth) faced drum can and usually does create excessive wear, crushing and distortion of the rope.

The results of such abuse are lower operating performance and a reduction in the rope's effective strength.

Påspoling på trommel

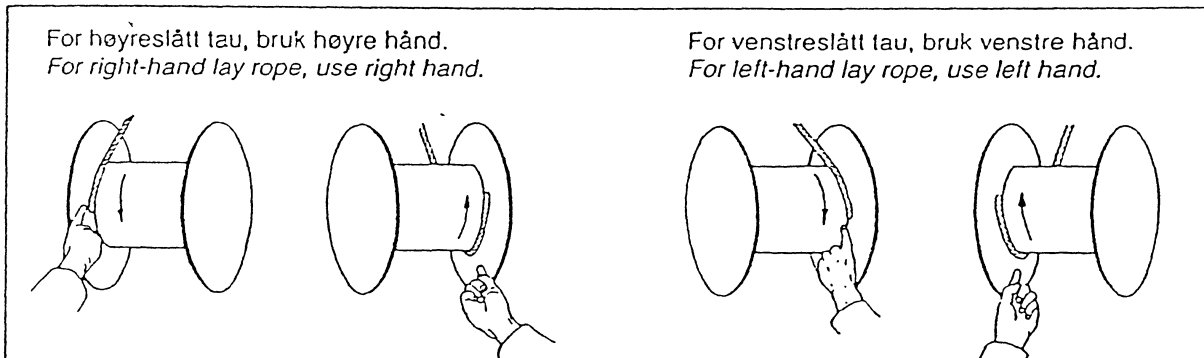


Fig.4.

Wire rope running-in.

After installation of a new wire rope is it recommended to run it several times in and out with low tension and low speed. This will gradually suit the wire rope to the real operation conditions. It means that the strands fits the permanent "grooves". There will be a certain change in length and the wire rope diameter will be reduced a bit because the strands and core become pressed together. The rope will therefore become more resistant against damage when it is maximal loaded. The costs in time to run-in the rope will later on save the expenses for the rope several times.

Fleet Angle (winch without levelwinding device)

The fleet angle is the included angle between the rope running to or from the extreme left or right of the drum and a line drawn from the centre of the sheave normal to the axis of the drum.

The fleet angle for grooved drums should lie between $1/4^\circ$ and 2° , and for smooth drums it should lie between $1/4^\circ$ and $1\ 1/2^\circ$.

When determining the fleet angle for grooved drums, the pitch angle of the helical groove should also be taken into account.

If the fleet angle is larger than the recommended limits, the rope may rub badly against the flanges of the groove in the sheave or be subjected to crushing and abrasion of the drum. Too small a fleet angle will cause the rope to pile up against the flange head - damaging both rope and equipment.

Severe scuffing of grooved drums can be the result when the rope wears against the groove walls. This action also bruises and crushes the rope.

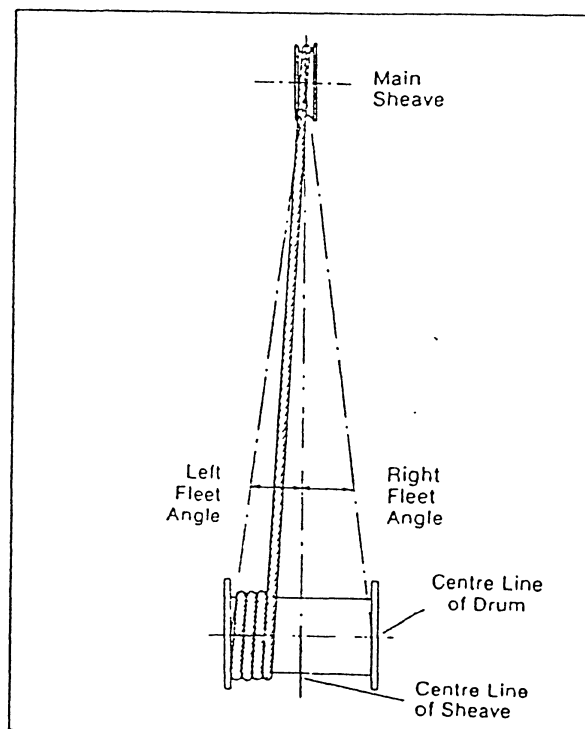


Fig.5.

Special care important to obtain acceptable spooling.
Drum (plain , smooth surface.)

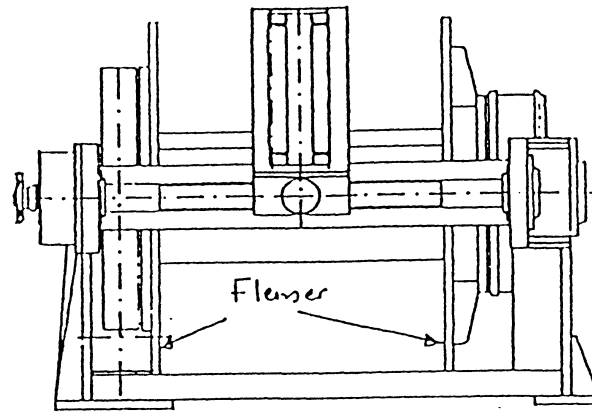


Fig.6.

1. Parallel flanges.

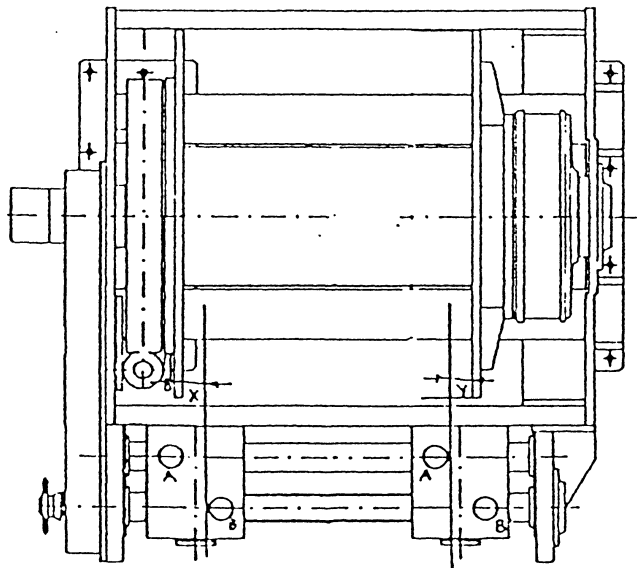


Fig.7.

2. Distance X between flange and guider roll B is equal to the Y-distance between the other flange and guider roll A.
It means; X and Y has to be equal and the levelwind wagon is then mounted to operate symmetric relative to radial centre of drum.

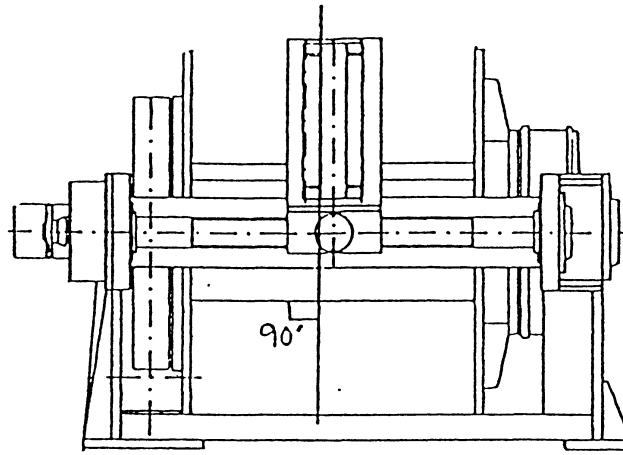


Fig.8.

3. Guide rolls will be 90° relative to drum.

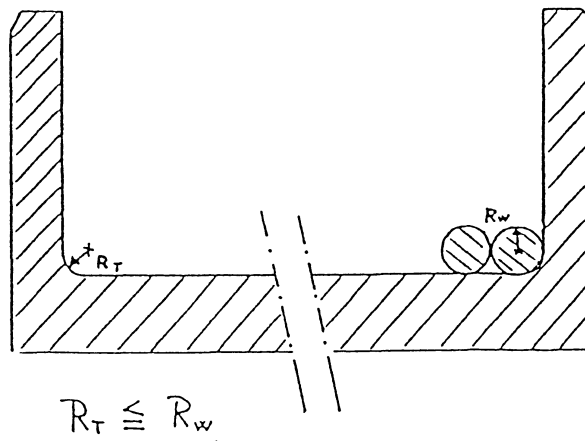


Fig.9.

4. Radius between drumcore and drumflange is smaller or equal to diameter of wire rope. It must be possible for the wire to fill the radius (R_T) already from the very first layer.

5. The moving of the guiderollers wagon is from RAPP HYDEMA A/S calculated for the specified wire meant for the winch. Change in wirediameter require also change in ratio between the rotation of the drum and the rotation of the diamond screw.

Related to wirediameter, calculations has to be done to find how many windings to be on first layer. Make sure that the calculations and the real situation are equal, this is very important if you want optimal spooling. This fitness of the first layer will make the base to succeed with the next ones. The first layer will work as a track for the next to follow.

Some winches have single ratio other do have double.

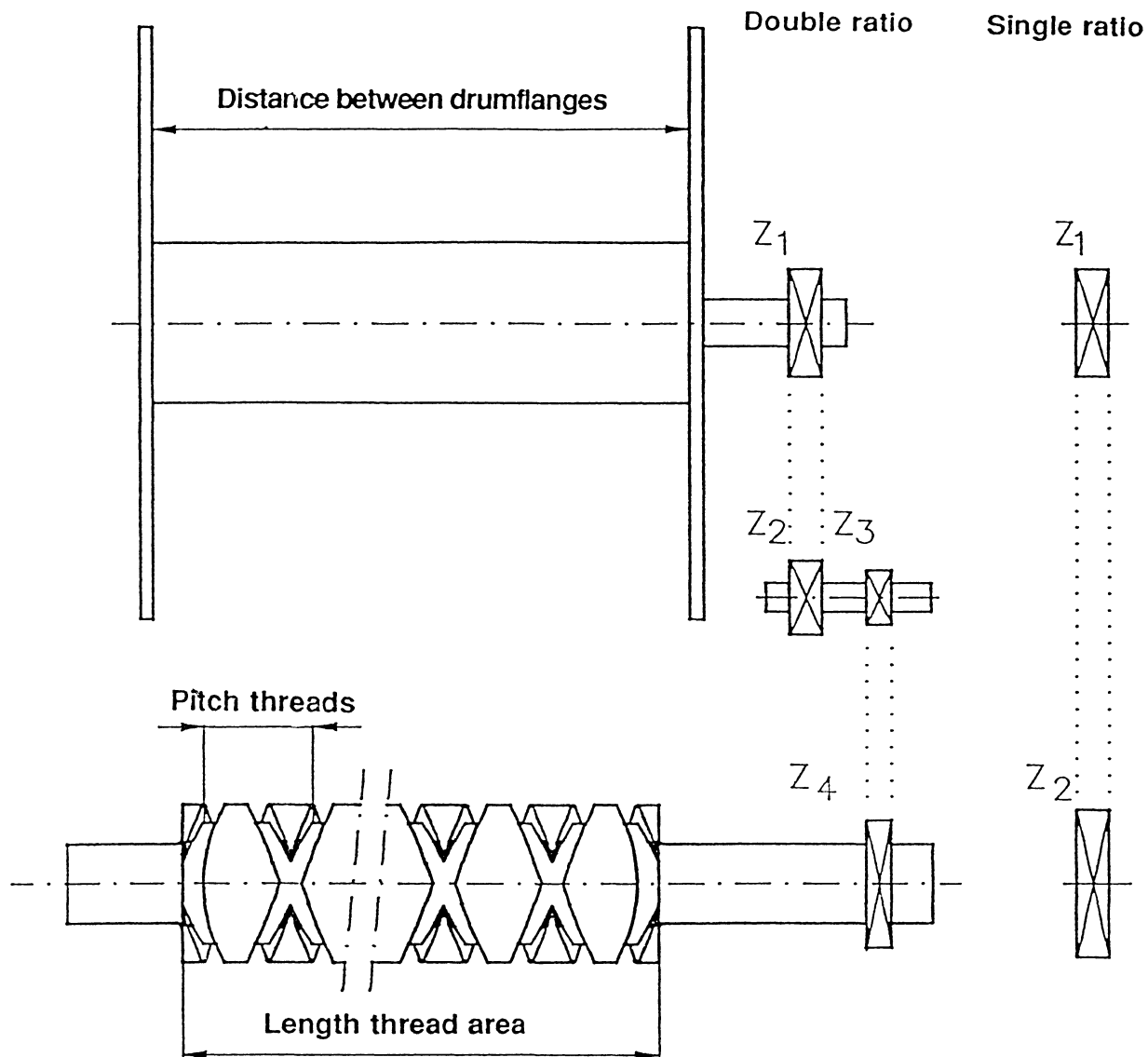
Following formulas for correct calculation of chainsprockets.:

The base for the calculations is to find the number of all around windings on 1st. layer and to find the number of full threads or full + 1/2 thread on diamond screw.

Number of windings	A=	$\frac{\text{Distance between drumflanges}}{\text{Wirediameter}}$
Number of threads diamond screw	G=	$\frac{\text{Length thread area}}{\text{Pitch threads}}$
Ratio	i=	$\frac{A}{G}$
Single ratio	i=	$\frac{Z2 \text{ (Sprocket diamond screw)}}{Z1 \text{ (Sprocket drum)}}$
Double ratio	i=	$\frac{Z2}{Z1} \cdot \frac{Z4}{Z3}$

1 st. ratio .: Z2=sprocket intermediate
Z1=sprocket drum
2 nd. ratio .: Z4=sprocket-diamond screw
Z3=sprocket intermediate

see illustrations next page...



Procedure:

Adequate wire tension is important to keep the 1st. layer from shifting and to prevent upper layers from pulling down into the lower layers creating nests which can destroy the wire. Preferably, a tensioning device that is self powered should be used at the dock. This is better than dragging chain overboard at sea because you can make timing adjustments on first layer without fear of losing the wire. Another reason is that the technician and crew can take time to do it right. One less reason to prolong sea trials.

Start spooling.

To begin, the winch should be run until the levelwind wagon is in the middle of the diamond screw turn-around and the wire anchor is at 6:00 if it's overwound, or 12:00 with underwinding.

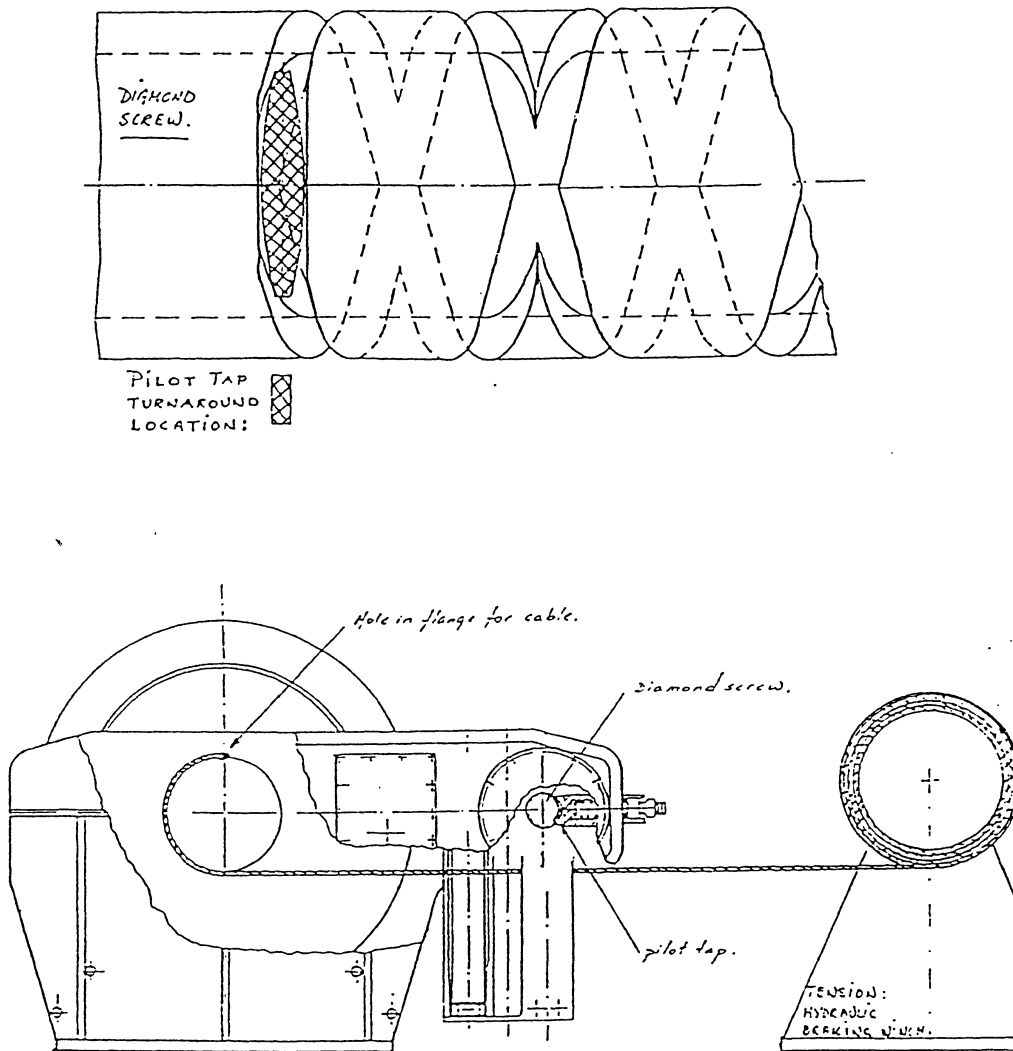


Fig.10. Details show an underwound set up.

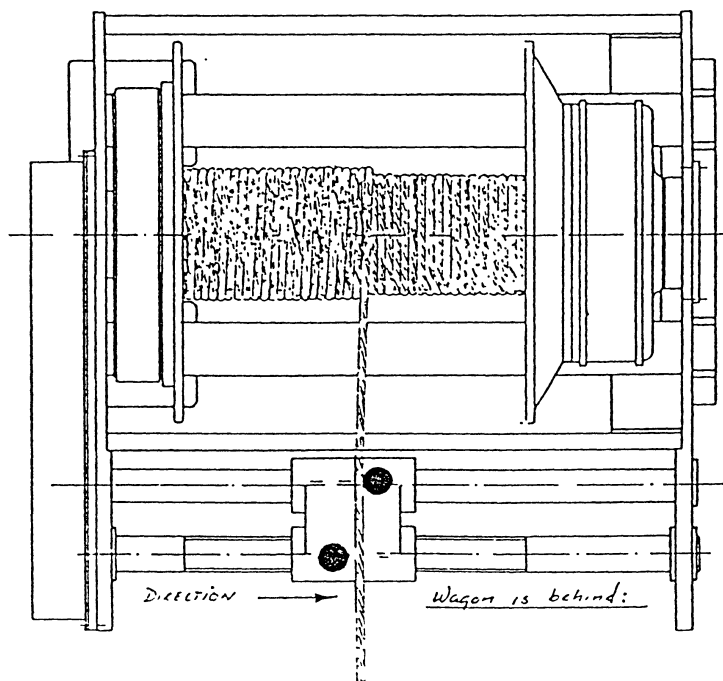
The wire may now be hauled in.

Success can be noted after 2 or 3 layers by whether the wagon is in time with the wire on the drum.

Correction Procedure:

If the wagon gets ahead of where the cable is going on the drum, then there are **TOO MANY** windings on the first layer. If the wagon gets behind, then there are **TOO FEW** windings on the first layer.

Wagon is behind.
Too few windings on first layer.



Wagon is ahead.
Too many windings on first layer.

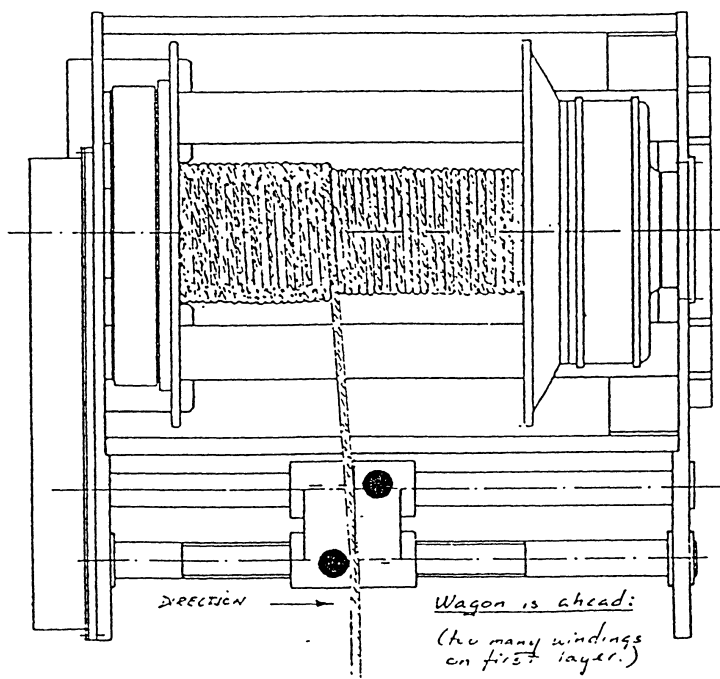


Fig.11.

The easiest way to change the number of windings on the first layer is to go back to the very beginning and change the location of the wire anchor in relation to the pilot tap and diamond screw.

This requires disconnecting the levelwind drive chain.

If the timing is done at sea you must leave about 4 or 5 windings on the drum and make sure the wire anchor is secured.

Then you can disconnect the chain and move the wagon ahead or back slightly.

Final Adjustment

Minimum alignment error can be had by retiming the wagon when approximately half (1/2) of the fishing length remains to be spooled.

This requires disconnecting the chain of course.

It does, however, minimize the error by putting half of it at each extreme of the wire length used in fishing.

And in the end but not less important:

Splice on the wire or wire marks as fibre rope fixed to the wire will make it difficult or impossible to obtain optimal spooling.

The same is present when using 3-parts wire rope.

RAPP HYDEMA A/S
8000 BODØ

Date: 30.08.91
TECHNICAL DEPARTMENT.

Space for your own notes:

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Description of **RP2KV324V**

Updated: 21 August 2003

I:\Teknisk\Electric engineering\amplifier\TS products\RP2KV....24V\Description of RP2KV324V.doc

Card used as Haul in and Pay out remote control, AUX panels.:

Card switched to: **100HZ**, and **10V ± 9V**

Connections: +24V = pin 2

0V = pin 3, (also 10 and 1, to the valves)

Output channel A = pin 9

Output channel B = pin 11

- pot meter (+) = pin(8)

- signal = pin(7)

- ref. (-) = pin(5)

- U/2 = pin 6 , not in use in this application. , (used when tension mode, conn. To one side of pot meter).

Note: The pot meter conn. in this application are pin 7, 8 and 5.

Adjustments: I_{max} channel A (45til 100% of range),

I_{max} channel B (45til 100% of range) ,

I_{min} current (inside, close to the Microcont.(10 to 40% of full range)

Ramp,

Dead band.

Card used as Tension remote control, in AUX panels.:

Card switched to **250HZ**, and **10V±9V**

Connections: Input +24V = pin 2

Input 0V = pin 3, (also 10 and 1 to the valves)

Output channel A = pin 9, to the valve. (this is the only output channel, when switched to 250HZ.)

- pot meter (+) pin(8)

- signal pin(7)

- ref. (U/2) pin 6

Note: The pot meter connection in this application are pins 7, 8, and 6.

Adjustments: I_{max} A (45til 100% of range)

I_{max} B pot meter is now I_{min}, with range 0-25% of max. range, to be understood as a floor level).

Ramp,

Dead band to be adjusted fully out, means disengaged.

Colorcoding of cards , type RP2KV324V

RP2KV324V

Card with yellow
Front+black
script are cards
for PentagonLT.

RP2KV324V

Card with blue
front + white
script, are cards
for aux panel in
all variations.

Description of **RP2KV324V**

Updated: 21 August 2003

I:\Teknisk\Electric engineering\amplifier\TS products\RP2KV....24V\Description of RP2KV324V.doc

General description:

The card has a program chip, that maintain the special functions acc. to what the switches , 100HZ/250HZ and 10V/2,5V, are set to.

Safety function –	All cards, when switched to 100HZ, has a safety range that is intended to detect if the joystick or pot meter fails. A full input in both directions will result in no output. Normally, the pot meter in the joystick uses only 80% of the full turn, both directions. When this happens, the red diode in the front starts blinking.
Normal input -	The red light, diode is steady on. (Goes off when operating the joystick)
Setting 100HZ –	100HZ setting used for direction control use. Output in both channels, according to the joystick positions.
Setting 250HZ -	Tension reg. mode or pressure reg. mode. This setting make the card to give output in only channel A. The potmeter I _{max} for channel B, becomes the adjustment for the I _{min} (floor range). Dead band to be adjusted fullyout.
Setting 10V+/-9V	This setting is used for cards used for aux. Panels.
Setting 2,5V+/-2,2V	This setting is used for cards in the Pentagon .
Standby light	Red diode, lit when input is I neutral and condition OK. Blinking if potmeter is outside range.
Ramp	Adjustment for delay of output signal.
Deadband	Adjustment for the deadband of the joystick. <u>When 100HZ mode.</u> When the joystick reaches the point set by deadband, the output , the card gives a fixed output as a starting current. This fixed output start point can be adjusted by I _{min} potmeter, (inside, close to the microcontroller) in range (10-40%of total range, factory setting 25%). <u>When 250HZ mode.</u> To be adjusted out so the led unlit. This means that the deadband is turned off, and this is the must, when card is used for 250HZ mode.
I _{max} A	Maximum output adjustment channel A.(Floor), (45-100% of range.)
I _{max} B	Maximum output adjustment channel B. (45-100% of range.) Note! Also used to I _{min} , when switched to 250HZ, tension reg. Mode, The range 0-25% of full range.
I _{min}	Common adjustment for start current , both channels, to solenoid, adjusting range 25% ±16% (9% to 41% of I _{max} .)

Description of **RP2KV324V**

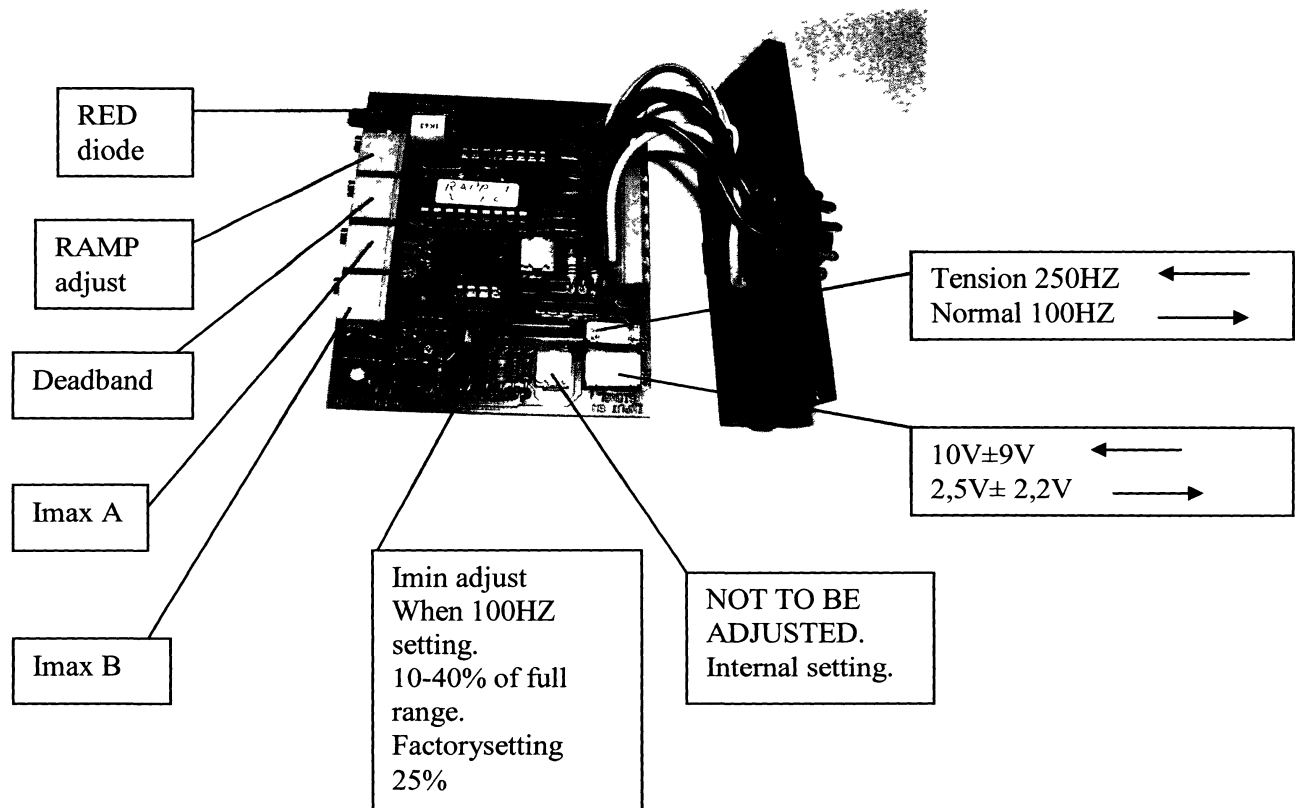
Updated: 21 August 2003

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RP2KV324V

Description break down:

- RP = Rapp Hydema
- 2K = 2 channel
- V3 = version 3
- 24V= 24V



Special use and application of the cards.

2 each cards in operation, controlled by one joystick.

Ex. For sweepline winches in a twin trawl setup.

The joystick to be wired to one card as normal, and slave card to be connected to signal = pin 7, and ref = pin 5. This can be done through/over a switch, if the other winch also have joystick.

Description of **RP2KV324V**

Updated: 21 August 2003

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Factory settings:

Haul/pay card to Pentagon adjusted as standard:

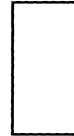
- 100HZ setting
- 2,5V± 2,2V setting
- I max A adj. to 100% , PWM w/ scope, gives 4,7V insignal.
- I max B adj. to 100% , PWM w/ scope, gives 0,3V insignal.
- Ramp = 0.
- Imin = 25%(middlepos.).
- Deadband = equal to ±150mV



Factory setting:

Tension card to Pentagon adjusted as standard:

- 250HZ setting
- 2,5V± 2,2V setting
- I max A adj. to 100% , PWM w/ scope, gives 4,7V insignal.
- I max B adj. to 100% , PWM w/ scope, gives 0,3V insignal.
- Ramp = 0.
- Function disengaged (Imin setting = 25%(middlepos.).
- Deadband = fully out /off position



Factory settings:

Haul/pay card to aux panel, adjusted as standard:

- 100HZ setting
- 10V± 9V setting
- I max A adj. to 100% , PWM w/ scope, gives 19V insignal.
- I max B adj. to 100% , PWM w/ scope, gives 1V insignal.
- Ramp = 0.
- Imin = 25%(middlepos.).
- Deadband = equal to ±150mV

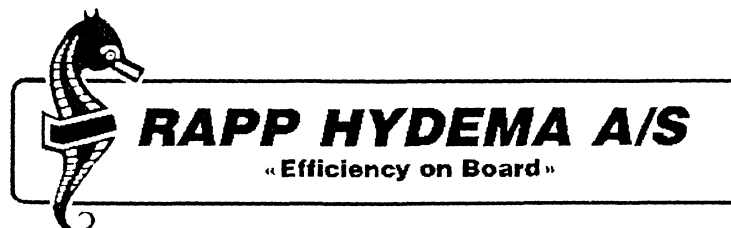


Factory setting:

Tension card to aux panel, adjusted as standard:

- 250HZ setting
- 10V± 9V setting (from 10V to 19V)
- I max A adj. to 100% , PWM w/ scope, gives 19V insignal.
- I max B adj. to 100% , PWM w/ scope, gives 1V insignal.
- Ramp = 0.
- Function disengaged (Imin setting = 25%(middlepos.).
- Deadband = fully out /off position





HYDRAULIC DECK MACHINERY

INSTALLATION ON BOARD

CHECK FORMS

I:\TEKNISK\INSTRUCTIONS\ORIGINALS\EN-IM TEST FORMS.DOC

Last updated: 22.02.01

<u>Control of mechanic installation</u>	3
<u>Control of hydraulic installation</u>	4
<u>Control of electric installation</u>	8
<u>Test program - function testing</u>	9
<u>Test program - dock testing</u>	11
<u>Test program - sea trials</u>	13

Control of mechanic installation

Item	Description	Check point	Remarks	Accepted date / sign.	
1	Winches	A	No mechanical defects		
		B	Foundation type, accepted		
		C	Foundation stoppers mounted according dim. sketches		
		D	Correct distance to first block		
		E	Block mounted in center line of drum		
		F	Service distances correct		
		G	Support of connection pipes		
		H			
2	Gear winches	A	Installed according to RAPP instructions		
		B	Run out tolerances checked after installation		
		C	Pull test for foundation stiffness		
		D	Correct type of gear oil filled		
		E			
3	Servicing	A	Future servicing of all components possible		
		B			

Control of hydraulic installation

Item	Description	Check point	Remarks	Accepted date / sign.	
1.	Oil tank	A	Made by yard <input type="checkbox"/> Made by Rapp Hydema <input type="checkbox"/>		
		B	Painted inside with oil resistance paint (type)		
		C	Cleanliness checked		
		D	Suction pipe ends min. 100 mm and cut 45°		
		E	“Long” circulation from filter to suction (dividing plates)		
		F	Return line filters correct placed		
		G	Correct service distance for return line filters		
		H	Manholes correct placed		
		I	Oil tank is not part of ship side		
		J	Breather cap correct mounted		
		K	Well placed in relation to pumps		
		L	One suction to each pump		
		M	Level switch correct mounted		
		N	Oil level glasses mounted		
		O	Thermal switch correct mounted		
		P	Gate valves of accepted type		
		Q	Gate valves well placed		
		R	Volume		
		S			

Control of hydraulic installation (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
2	Suction pipes	A	Cleanliness checked		
		B	Dimensions according to hydraulic diagram		
		C	No air traps		
		D	Suction hoses correct mounted		
		E	Used correct type of the clamps		
		F	Suction hose length checked		
		G			
3	Pumps	A	Type of pump according to hydraulic diagram		
		B	Mounted vertically (V) or horizontally (H)		
		C	Rotation directions of all pumps checked		
		D	Line up of pumps checked		
		E	Pumps mounted by shipyard - others		
		F	No 90° bends of pressure lines directly on pumps		
		G	Plastic plugs removed		
		H	No mechanical forces from pipes		
		I	Hoses correct mounted		
		J	All pumps mounted below oil level (min 300 mm)		
		K	All pumps protected by relief valves		
		L			

Control of hydraulic installation (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
4	Pressure / return / drain lines	A	Dimensions according to hydraulic diagram		
		B	Piped up according to hydraulic diagram.		
		C	Cleanliness checked		
		D	Fittings / flanges of acceptable type		
		E	Pipes / tubes of acceptable quality		
		F	Well bended, numbers of bends kept at minimum		
		G	Well clamped, elastic clamps of acceptable type		
		H	Elastic trough hole connections		
		I	Length compensators mounted		
		J			
5	Pressure filters	A	Type according to hydraulic specification		
		B	Filter indicators correct mounted		
		C	Service distance correct		
		D	Correct elements installed		
		K	Filtration ratio, μm		
		E			
6	Check valves	A	All check valves according to hydraulic diagram		
		B	Direction checked		
		C			
7	Relief valves	A	All relief valves according to hydraulic diagram		
		B	Relief to the tank trough oil cooler and return filters		
		C			

Control of hydraulic installation (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
8	El./hydr. valves	A	Piped according hydraulic diagram		
		B	Service distances as specified		
		C			
9	Oil cooler	A	Type according to hydraulic specification		
		B	Mounted according to hydraulic diagram		
		C	Mounted vertically (V) or horizontally (H)		
		D	Cooling water upstream to oil		
		E	Water supply described capacity (l/min)		
		F	Service distance correct		
		G			
10	Return line manifold	A	Placed according to hydraulic diagram		
		B			
11	Valve panels	A	According to specification No defects		
		B	Piped according hydraulic diagram		
		C			
12	Servicing	A	Future servicing of all components possible		
		B			

Control of electric installation

Item	Description	Check point	Remarks	Accepted date / sign.	
1	Electric motors	A	Mounted on rubber legs		
		B	Voltage / frequency correct		
		C	Motor heating Environment acc. to IP class		
		D	Mounted vertically (V) or horizontally (H)		
		E	Overload setting correct		
		F	Rotated according to the pump working direction		
2	Electric components	A	Cables dimensions as specified on cable diagrams		
		B	All power supplies as specified on cable diagrams		
		C	Relay cabinets vertically placed		
		D	All electric components in dry conditions		
		E	Additional junction boxes		
		F	Polarity and voltage checked		
		G	Grounding as specified		
		H	Breakers as specified on cable diagram		
		I	El. cable support / protection		
		J			
3	El./hydr. valves	A	Installed in dry conditions, sealed		
		B	Voltage checked, no grounding on coils		
		C	Diodes installed for 24VDC ON/OFF valves		
		D	PG inputs are sealed		
		E	Valve boxes are filled with hydraulic oil		
		F			
4	Servicing	A	Future servicing of all components possible		
		B			

Test program - function testing

Item	Description		Check point	Remarks	Accepted date / sign.	
1	Hydraulic oil	A	Filled according to RH instructions			
		B	Correct type of oil filled			
		C				
2	Air bleeding	A	All gate valves fully open			
		B	All pump sections are air-bleeded			
		C				
3	Relief valves	A	Pressure relief valves, all items fully open			
		B	Return line - relief valve fully open			
		C				
4	Starting pumps`	A	El. motors rotation direction checked			
		B	No cavitation noise from pumps			
		C	No vibration or abnormal noise			
		D	Pumps do not generate heat			
		E	Oil level switch tested			
		F				
5	Flushing	A	By pass hoses installed			
		B	Increase pressure to circulate through system			
		C	Pressure drop STBD side max. flow at 40°C			
		E	Pressure drop PORT side max. flow at 40°C			
		D	No filter indicators actuated			
		F	Flashing time / temperature min. 8 hours / 60°C			
		G	Oil sample checked Pass. ISO-16/13			
		H				

Test program – function testing (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
6	Pressure testing	A	System pressure tested for working pressure x 1.5 (max. 250 bar)		
		B	Control system pressure tested for 80 bar		
		C			
7	Relief valves setting	A	All pumps relief valves set to working pressure (max.210 bar)		
		B	Servo pressure set (45 bar)		
		B	Heating pressure set to circulate oil trough motors (~10 bar)		
		D			
8	Return /drain lines	A	Return line pressure checked		
		B	Drain line pressure checked		
		C			
9	Selector valves	A	Function of all selector valves checked		
		B			
10	Thermal switches Analog temperature transmitter	A	Thermal switches ON/OFF adjusted I=40°C (cooling) / II=60°C(alarm)		
		B	Start/Stop cooling 33°C/ 37°C Alarm at 60°C		
		C			
11	Local control	A	All winches rotate to the correct direction		
		C			
12	Remote control	A	Pilot lines air-bleeded		
		B	Winches remote control tested haul in / pay out, 2 speed ...		
		C	Power packs local/remote control tested		
		D	Panels controls tested		
		E			
13	Filters	A	Filter element / housing checked for particles		
		B			

Test program - dock testing

Item	Description		Check point	Remarks	Accepted date / sign.	
1	Overcenter valves	A	Overcenter valves set at max. oil flow			
		B	Restrictor valves set			
		C	Overcenter valves on both winches - equal			
		D				
2	Crossport valves	A	Crossport relief / shock valves set			
		B				
3	Relief valves	A	Relief valves on winches set at max. flow and oil temp. 40°C			
		B	Restrictor valve on pilot line adjusted			
		C	Remote control function tested			
		D				
4	Feeding valves	A	Feeding pressure to A, B set (min. 10 bar)			
		B				
5	Break release valves	A	Safe brake function tested			
		B	Break release in towing function tested			
		C				
6	Control valves	A	Haul in / pay out function tested			
		B	Remote control function tested			
		C				
7	Selector valves	A	2/3-speed function tested			
		B	Freewheeling function tested			
		C				
8	Drain line pressure	A	Drain line pressure checked			
		B				

Test program – dock testing (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
9	Valve panels	A	Freewheeling function tested		
		B	Haul in / Pay out function tested		
		C	Break control function tested		
		D	2/3- speed function tested		
		E	Mooring function tested		
		F			
10	PTS - autotrawl	A	All automatic modes checked by simulation		
		B			

After dock tests the Certificate should be signed by the representatives of Customer, Shipyard and Supplier

Test program - sea trials

Item	Description	Check point	Remarks	Accepted date / sign.	
1	Wire ropes	A	Wire ropes, stretched up before sea trials		
		B	Dimension of wire rope		
		C	Length of wire rope		
		D			
2	PTS - autotrawl	A	Correct parameters for system and TWS are in PTS memory		
		B	Winches checked/adjusted for equal pull		
		C	Emergency stop function checked		
		D			
3	Pay out	A	Speed on ship when Auto Pay Out		
		B	Pay Out mode starts automatically when crossing "safe distance"		
		C	No pulsation on overcenter valves		
		D	AUTO SPEED function is working		
		E	No difference on PORT and STBD length		
		F	Pay out pressure measured		
		G	No extreme heat development noted		
		H	Auto stop at Set Point		
		I	Control handles return to neutral smoothly		
		J	Overspeed setting checked		
		K	By-pass function checked		
		L			

Test program – sea trials (continued)

Item	Description	Check point	Remarks	Accepted date / sign.	
4	Towing	A	Normal towing mode, pressure measured		
		B	Setpoint update when min. alarm		
		C	Setpoint update when max. alarm		
		D	When min. alarm RPM is on motors		
		E	When max. alarm RPM is on motors		
		F	Equalizing compensates when vessel turns		
		G	Both relief valves on winches working		
		H	Return line pressure in towing checked		
		I	Adjustment of towing pressure tested		
		J	Stops at max. alarms when simulating snags		
		K	Oil cooler works sufficient		
		L	Overspeed setting checked		
		M	Length counting correct		
		N			
5	Haul In	A	Hauling pressure		
		B	Hauling speed, RPM		
		C	Reduction on speed when POWER STEP		
		D	Extra hauling speed tested		
		E	2/3-SPEED function tested		
		F	RPM on winches at 2/3-SPEED		
		G	Without equalizing - same speed		
		H	Stops at “safe distance” (50 length units)		
		I			

After sea trials the Certificate should be signed by the representatives of Customer, Shipyard and Supplier

PTS *Pentagon*® - OPERATION MANUAL

**Fishery research vessel “Oscar Dyson”
NOAA**



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Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

PTS *Pentagon*® - OPERATION MANUAL

Fishery research vessel “Oscar Dyson”
NOAA

SYSTEM DESCRIPTION

SYSTEM
DESCRIPTION

FUNCTION DESCRIPTION

FUNCTION
DESCRIPTION

SYSTEM SET UP

SYSTEM
SET UP

MODES OF OPERATION

MODES OF
OPERATION

CONTROL FROM THE PC SCREEN

CONTROL
FROM THE PC

TOUCH PANEL SCREENS

TOUCH PANEL
SCREENS

PC-MONITOR PICTURES

NMEA TELEGRAMS



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Doc.no. RHDOM-PENTAGON-E, Release 2.0, Version 4.10, last updated: 25/06/03*

CHAPTER 01

CHAPTER 02

CHAPTER 03

CHAPTER 04

CHAPTER 05

CHAPTER 06

CHAPTER 07

CHAPTER 08



SYSTEM DESCRIPTION

FUNCTION DESCRIPTION

SYSTEM SET UP

MODES OF OPERATION

CONTROL FROM THE PC SCREEN

TOUCH PANEL SCREENS

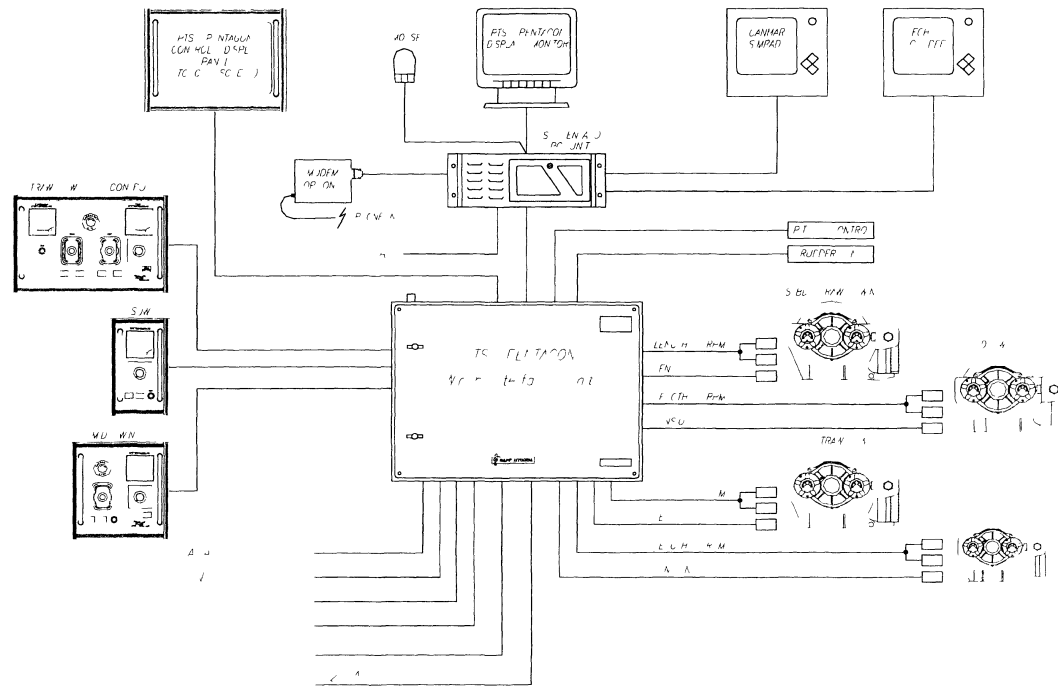
PC-MONITOR PICTURES

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PTS *Pentagon*® - SYSTEM DESCRIPTION

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Doc.no RHDOM-PENTAGON-E, Release 2.0, Version 4.10, last updated: 25/06/03



PTS Pentagon is a trawl winch control system that controls all the active winches during trawling. The system receives signals and information from the external trawl/net monitoring systems, echo sounder and rudder indicator. The system handles single, twin and pair trawl operation. Communication with the external systems on board uses the standard NMEA signal format. The system can communicate with land-based equipment using a modem over a phone/satellite phone line. The system is also ready for wireless vessel-to-vessel communication during pair trawling with two fishing vessels. The system is built up from several main units that are connected together to form a unified system.

SYSTEM COMPONENTS

PTS Pentagon®, Winch Interface Unit

This is the main component in the system, and it is connected to the hydraulic system, winches, control panels and PC unit. The cabinet contains the PLC and analog/digital multiplexer, in addition to the winch interface unit with amplifier cards for control of the winches. All the cabling to the winches and hydraulic system emerges from this cabinet. This cabinet should be placed in the pilot house or the instrument room in the pilot house.

PTS Pentagon®, Control Display Panel

This is the main control display panel and is of the touch screen type, point and press. All the vital data for the system, winches and cable is entered here. All operation of the automatic control and manual control functions can be controlled from here. In addition, historical data can be read and information can be logged from this panel. Located on the aft control desk in the pilot house.

PTS Pentagon®, Trawl Winch Control Panel

This is the control panel for the trawl winches, for manual control.

The panel contains:

- Joystick with a built-in activation button, one for each winch.
- Electric pressure gauges for each winch and light dimmer.
- Emergency stop button and a button for emergency pump start.
- Potentiometer and activation button for manual control of tension.
- Optional switches for special functions.

Located on the aft control desk in the pilot house.

PTS Pentagon®, Mid Winch Control Panel

This is the control panel for the third winch, for manual control.

The panel contains:

- Joystick with built-in activation button.
- Electric pressure gauge for indication of pressure.
- Emergency stop button.
- Potentiometer and activation button for manual control of tension.

Located on the aft control desk in the pilot house.

PTS Pentagon®, Sounder Winch Control Panel

This is the control panel for the sounder winch, for tension control.

The panel contains:

- Electric pressure gauge for indication of pressure.



- Potentiometer and activation button for mooring control.
- Optional switches for special functions.

Located on the aft control desk in the pilot house.

PTS Pentagon®, PC unit

The PC unit operates the display monitor and also functions as the communication link between the external equipment and PTS Pentagon. Primary functions can be controlled by means of a computer mouse from this unit.

Located on the fore control desk in the pilot house.

PTS Pentagon®, Display Monitor

VGA computer monitor of the flat screen LCD type.

Located on the forward control desk in the pilot house. Should be mounted with the monitor base recessed into the control desk.

PTS Pentagon®, Computer Mouse or Pointing Device

The system can use a standard computer mouse, track ball or other standard equipment. A computer mouse is delivered as standard equipment.

PTS Pentagon®, External Alarm Unit

This unit is connected to the system's alarm output and will sound a system alarm. The volume and type of signal may be selected.

Optional location in the pilot house.



PTS *Pentagon*® - FUNCTION DESCRIPTION



I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch02'EN.doc
DOC.NO. RHDOM-PENTAGON-E, RELEASE 1.0, VERSION 4.10, LAST UPDATED: 25/06/03





RAPP HYDEMA

2/3 SPEED TOWING	9
ALARM OUTPUT	5
ALARM SELECT	5
ALARMS	5
AMPLIFIER SETTINGS	13
AUTO BRAKE CONTROL	15
BLOCK COUNTING	12
DIFF STBD/PORT ALARM	8
ECHO SOUNDER	14
ENCREASE/DECREASE	6
EXTRA POWER	6
EXTRA SPEED	5
FREEZE	7
HAUL IN	5
INITIAL SETTINGS	12
INITIATE	12
INTEGRATION	14
LENGTH UNITS SELECT	9
LINE SPEED	8
LOAD CELL	11
MAIN PUMPS	3 15
MANUAL	4
MANUAL OPTIMIZE	6
MANUAL OVERRIDE	6
MASTER	7
MASTER ENGAGE CONTROL	14
MAX TENSION	8
OPERATION SETTINGS	10
OPERATIONAL SETTINGS	8
OPTIMIZE	6
OPTIMIZE 30 SEC	6
OUTPUTS CONTROL	14
PAY OUT	4
POWER STEP	3
PRESSURE OFFSET	7
RESET LENGTH	8
RETURN PRESSURE	16
RUDDER SIGNAL CALIBRATION	14
SAFETY BRAKE	4
SERVO PUMP CONTROL	15
SIMULATION	16
SPEED	3
START/STOP AUTOMATIC MODE	7
STEERING	9
SYSTEM PARAMETERS	5
TDE	5
TENSION MONITOR	5
TENSION MONITORING	13
TENSION REG PAY OUT	15
TOWING	12
TOWING RPM LIMIT	8
TRAWL INSTRUMENTS	14
TRAWL TYPE SELECT	6
WEATHER FACTOR	6
WINCH PARAMETERS	5
WIRE COVERED ANGLE	7

FUNCTIONS

MAIN PUMPS

System power

This function activates an output (gives constant signal or pulse) that engages the central gear (P.T.O.), when this drives the pumps, or makes it possible to start electric motors operating pumps. This function acts as a general stop function in the event of an oil level alarm, gate valve alarm or emergency stop.

NT-Panel screens:

*** MANUAL *, * PAY OUT *, * MANUAL OVERRIDE ***

SPEED

Speed steps

This function activates speed steps on the main winches, automatic pressure control based on calculation of the winches' current pressure, maximum pressure and motor configuration.

The system activates speed step 2 and speed step 3 automatically if the winch is equipped with this. The system deactivates the speed step in the same manner as indicated by the system pressure.

This function can be configured (Initial Settings, Output Control) to be active:

- a) only in Auto Haul In;
- b) Auto Haul In and Manual;
- c) Manual, Auto Haul In and Auto Pay Out.

NT-Panel screens:

*** MANUAL *, * HAUL IN ***

POWER STEP

Fine control

This function disconnects certain pumps and decreases the displacement speed (normal speed).

This function can be configured to be active during Towing.

NT-Panel screens:

*** MANUAL *, * HAUL IN *, * PAY OUT ***

**SAFETY
BRAKE****Parking brake**

This function activates the band brakes on the main winches.

The winches' brake control has a dual function:

- a) the brakes will always disengage when the winch is operated because of the main manoeuvring valve.
- b) The brakes are disengaged when the length is outside the safety range.

This function is configurable. When function b) is selected the **SAFETY BRAKE** button can reengage the brakes when the length is outside the safety range.

NT-Panel screens: * **MANUAL** *

TDE**Tension differential equalizer, pressure equalization**

This function activates pressure equalization.

TDE is normally turned off in manual mode, and switched on in auto modes.

TDE is also kept off in connection with some special functions such as the OPTIMIZE and FREEZE functions when the winches are to be controlled separately.

NT-Panel screens: * **MANUAL** *, * **HAUL IN** *, * **TOWING** *

MANUAL**Manual control**

Display screen where you can start the main pumps, stop the system and swap screens.

NT-Panel screens: * **PAY OUT** *, * **TOWING** *, * **HAUL IN** *

PAY OUT**Auto Pay Out mode**

Display screen where you can start the auto function "Pay Out".

NT-Panel screens: * **MANUAL** *, * **TOWING** *, * **HAUL IN** *

TOWING**Auto Towing mode**

Display screen where you can start the auto function "Towing".

NT-Panel screens: * **MANUAL** *, * **PAY OUT** *, * **HAUL IN** *

HAUL IN**Auto Haul In mode**

Display screen where you can start the auto function "Haul In". Here you can also select "Extra Haul Speed", a function that activates towing pumps in addition during Auto Haul In to increase the speed. This speed is automatically disengaged at the safety range limit.

NT-Panel screens: * **MANUAL** *, * **PAY OUT** *, * **TOWING** *

ALARMS**Alarms overview**

Indicates the specific alarm status for each alarm type. It is possible to inhibit some alarms temporarily. Provides an overview of the number of active and inhibited alarms in all operational screens.

NT-Panel screens: * **MANUAL** *, * **PAY OUT** *, * **TOWING** *, * **HAUL IN** *

**ALARM
OUTPUT****Alarm select**

Press this button to get an access to the ALARM SELECT screen. From here it is possible to configure up to 7 different outputs for alarms to be delivered outside the system (e.g. to engine room). .

NT-Panel screens: * **ALARM OVERVIEW** *

OIL LEVEL
OIL FILTER
RET PRESS MAIN
MAX/MIN DIFF.
END OF WIRE
OIL TEMP
OVERSPEED

Press corresponding button(s) to choose type of alarm(s) to be sent outside the system. Button receives green background once alarm has been selected. Red field on the left indicates when alarm is presently active.

OUTPUTMONITOR

Output monitor, red circle, will turn ON if one or more alarms have been selected.

NT-Panel screens: * **ALARM OUT SELECT** *

**EXTRA
SPEED**

The function provides an extra oil flow to the trawl winches (gives more speed) during HAUL IN/PAY OUT by means of auto start/stop towing pump(s) in addition to main pumps. The button is active only if corresponding option TOWING OPER. ON AT EXTRA SPEED has been selected on OUTPUT CONTROL screen.

**MANUAL
OVERRIDE****System tuning while in auto modes**

This function has been improved with advanced manual control of system's regulation of pressure and possibilities for individual winch tuning while still in auto modes. Indication for manual Pressure control is also provided on the screen. Message's MANUAL ON background will flush if corresponding button has been pressed on L2 trawl panel.

NT-Panel screens: * **MANUAL** *, * **PAY OUT** *, * **TOWING** *, * **HAUL IN** *

**MANUAL
OPTIMIZE**

When button is pressed system turns off TDE function and allows separate winches control. Present master winch will be kept as a master for single trawl. Mid winch always will be the master when operate with double trawl. Activates MANUAL ADJUST UP/DOWN menu. User is able to increase/decrease wire length for non-master winch(es) by pressing +/- buttons.

When leaving MANUAL OPTIMIZE mode system will proceed towing automatically. Current length for master winch and achieved off set for MID winch (twin trawl) will be taken as new values for further regulation.

OPTIMIZE

This engages integration with trawl instruments. TDE function goes off thus allow separate winches control. Integration type and trawl adjustment parameters have to be set in advance from PC interface *Settings/Trawl Instrumentation*.

Optimization/trawl position update happens once in 1 min period. The button OPTIMIZE is also placed in the NT panel TOWING screen.

**OPTIMIZE 30
SEC.**

It has the same function as OPTIMIZE only with 30 sec period for calculation/update. Also winches will react faster, it may in some cases cause unstable trawl behaviour.

**EXTRA
POWER**

Engages extra motor(s) on main winches (if system equipped with such). May be useful to increase winch pull in conjunction with extra heavy weather conditions or/and bigger trawl/door utilizing.

INCREASE

Increases the system's regulating pressure regardless of whether the system is at its set point.

The system pressure will return to the regulating pressure after a given period of time when the button is not activated. The active period is defined in the Initial Settings menu.

DECREASE

Decreases the system's regulating pressure regardless of whether the system is at its set point.

The system pressure will return to the regulating pressure after a given period of time when the button is not activated. The active period is defined in the Initial Settings menu.

**PRESSURE
OFFSET**

Here you can enter compensation for a pressure drop differential on the control side of the winches. The compensation is added to the winch with the lowest pressure.

FREEZE

This function disengages TDE, blocks normal regulation and freezes existing difference in length. The system will regulate according to this difference so that it is constant, up to the safety range limit. This function can be used during Auto Pay Out, Towing and Auto Haul In.

NT-Panel screens:

*** MANUAL OVERRIDE ***

START/STOP**Start or stop automatic mode**

Start and stop button for the main function in the current screen, for example Towing.

NT-Panel screens:

*** PAY OUT *, * TOWING *, * HAUL IN ***

MASTER**Master Winch control**

Function Button that leads to the Master Winch Control menu. In this menu you can select whether the STBD or PORT winch is to be the master in the various operating phases. User can also select whether the angle of the rudder is to determine the master. If the rudder selects the master, user chooses also whether Shortest or Longest winch will be the master then. The rudder angle, which engages and disengages this function, is entered in the Integration menu.

NT-Panel screens:

*** MANUAL *, * PAY OUT *, * TOWING *, * HAUL IN ***

SETTINGS**Operational settings**

Button submitted to access menus for setting parameters and function options.

function options.

NT-Panel screens:	* MANUAL *, * PAY OUT *, * TOWING *, * HAUL IN *
LENGTH SET VALUE	Set length of main cable.
MAX/MIN VALUE	Alarm limit for deviation from set point.
WEATHER FACTOR	Regulation response. Refers to Beaufort's wind scale, force 1 to 10. Option 1 is very responsive, while 10 gives a very slack response, which satisfies for example the requirements for regulation in poor weather.
TOW MAIN, MAX TENSION	Regulator limit for maximum allowed tension for main winches.
TOW MID, MAX TENSION	Regulator limit for maximum allowed tension for MID winch.
DIFF. STBD/PORT ALARM	Alarm limit for length difference between the starboard and port winches.
TOWING, RPM LIMIT	Alarm limit for main winches RPM while set point update in Towing.
PAY OUT LINESPEED	Speed regulated pay out, where the desired line speed (units/min.) the winches are to operate at is selected. This function is active in Auto Pay Out when Auto Speed is active.
PAY OUT TENSION	Tension regulated pay out, where the desired tension (tones) the winches are to operate at is selected. During the regulation period the tension will remain constant at around the selected value. This function is active in Auto Pay Out when Auto Speed is active.
SOW LENGTH	Shows NET SOUNDER WINCH cable current length.

NT-Panel screens: *** OPERATION SETTINGS ***

**RESET
LENGTH**

Reset length will set all the length measurements for the trawl winches to 0. This function is used when the doors are in the gallows or wherever you want to start.

**2ND
LANGUAGE**

The button is placed in Operational settings allows you to select between English or your national language if such is supported by NT panel software.

**2 SPEED
TOWING**

**3 SPEED
TOWING**

**SYS.
SETTINGS**

Buttons **2 speed towing** and **3 speed towing** give an opportunity to engage speed steps while in towing. The function may be useful during hard turns and fishing on the rough grounds.

Menu for setting system parameters

Button for access to the menu for setting system parameters.

This menu is password protected, Password Level 1. Here the system is configured according to the individual vessel's winch set up. See separate description.

NT-Panel screens:

*** OPERATION SETTINGS ***

**PASSWORD
LEVEL 1**

Here the access code for the menu is entered, a 4 digit code. For example: 1-2-3-4.

This is done by means of the onscreen keypad.

**SINGL TRAWL /
TWIN TRAWL /
PAIR TRAWL**

Selection of trawl mode:

Single trawl will only regulate the main winches, starboard and port.

Twin Trawl will regulate the main winches and the Mid winch at the same time in auto functions.

Pair Trawl will regulate the starboard winch as the bottom line winch and the port winch as the head line winch.

**WARNING
TEST**

Test button for external sound alarm unit. The alarm will be heard as long as the button is pressed.

**METERS /
FATHOMS**

The length measurement units are selected here, meters or fathoms.

DATE / TIME

The system date and clock can be set here.

- Date (dd mm yy) –two digits for each day, month, year.

- Clock (HH.MM) –two digits for hour and minute, separated by a period.

PARAMETERS	AUTO START LEN	limit for Auto Pay out start, value is set in length units.
	AUTO SPEED START	limit for starting Auto speed control in Auto Pay out mode, value is set in length units.
	AUTO SPEED STOP	limit for stopping Auto speed control in Auto Pay out mode, value is set in length units. When Auto speed control stops, pay out will continue anyway with normal speed.
	NEAR SET POINT WRNG	Warning beep sounds when trawl is near by the set point. Figure set in length units.
	TENSION UPDATE	filtration of values for indication of tension, to set the degree of calmness on the display, value 1, 2 or 3, where 3 is the highest level of filtration.
	PAY OUT MIN. TENS	Min tension in Pay out. The desired value in tones is entered here.
	PAIR TRAWL DIFF.	fixed difference between starboard and port winch, value is set in meters.
	SOW DIF INITIAL	limit for sounder winch length offset during pay out. Value is set in length units.
	SOW DIFF TOWING	limit for sounder winch offset during Towing. Value is set in length units.
	WARNING TYPE	signal pattern for external alarm. Figures 1-4 are different patterns and 5 is a constant sound.

NT-Panel screens: *** SYSTEM SETTINGS ***

**WINCH
PARAMETERS**

Menu for setting winch parameters

Button for access to the menu for setting parameters for winches. Here the parameters for both main winches and mid winch are set. Press value to be changed to and pop up key board appears.

NT-Panel screens: *** SYSTEM SETTINGS ***

DRIVE TORQUE	is a specific torque for the winch, value is set in Nm/Bar.
OUTER CIRC.	outer circumference on external diameter of the drum with all the cable on it, value is set in mm.
DRUM LENGTH	drum length measured between drum shields, value is set in mm.
WIRE DIAMETER	wire diameter, value is set in mm.
CORE DIAMETER	net drum core diameter, value is set in mm.

WIRE LENGTH	total wire length on the winch, value is set in meters.
WIRE CUT OFF	value for recalculation wire length if wire is cut off, value is set in meters.
POWER x 2SP.	ratio for winch with 2 speed function, driving power reduction, 1/10000.
POWER x 3SP.	ratio for winch with 3 speed function, driving power reduction, 1/10000.
LENGTH ADJUST	factor for calibration of length calculation by the system. Compensates for spooling deviation, value is set from 1 to 18 (default - 9).
BLOCK CIRCUMF	counting block circumference, value provided by Rapp Hydema, set in mm
<div style="border: 1px solid black; padding: 5px; display: inline-block;">TENSION MONITOR</div>	<p>Menu for tension settings Button for access separate menu with settings for winches tension measuring.</p>
LOAD CELL MEASURING RANGE	Maximum calibrated force for the load cell. Settings are separate for STBD, Port and net sounder winches
ALWAYS USE LOAD CELL	This means that tension is measured always only by Load Cell. This particular situation is indicated by sign BLOCK (next to TENSION) with green back ground, on the COMMAND screen.
ALWAYS USE PRESSURE TRANS.	When option selected, pressure drop across the winch drive is a source for wire tension calculation. System Pressure is constantly measured by two pressure transmitters one installed in the pressure line another in the return. When winch stands still there is no pressure drop in the system and tension therefore will display zero regardless to the real tension of the wire.
STATIC/ DYNAMIC SELECT	This option provides an active system scan control. When winch is moving (haul in, pay out, towing or manual control) pressure drop is sensed and recalculated to tension. When winch stops (does not move at any direction for more then 4 sec., or oil pressure is less then 30 bar measured in pressure line) tension is read directly from load cell.

**WIRE
COVERED
ANGLE**

A parameter that is used in tension calculation. Set by Rapp Hydema personnel.

INITIATE

Press INITIATE button to calibrate zero when wire is free from any load (device).

**BLOCK
COUNTING****Counting type option**

Press the button to choose wire length counting from the block. Otherwise standard counting on winch drum will be used

NT-Panel screens:

*** WINCH PARAMETERS ***

**INITIAL
SETTING****Menu for basic system settings**

Button is submitted to gain an access to the menu for system's bases settings. To enter this menu the system requires an access code "*Password Level 2*". In general, only service personnel from Rapp have access here.

See separate instructions for Initial Settings.

NT-Panel screens:

*** SYSTEM SETTINGS *, * WINCH PARAMETERS ***

**PAY OUT,
RPM LMT**

alarm limit for RPM on main winches. If RPM are too high during Auto pay out System stops auto speed control and give out alarm.

**TOW START
VALUE**

a coefficient which defines system regulator behavior in the moment when entering Towing mode. Value can be set between 400 and 800. Higher values used if trawl continue creeping out after reaching the set point. Lower values prevent system from hauling trawl in at the beginning of Auto Towing mode.

**DEAD END
STOP**

it is maximum length of wire allowed to be paid out from the winch drum. When value is reached system stops current auto mode and sets winches on brakes. Only manual winch control will be available unless length back inside allowable range.

**RET. RP. AL.
LMT. MAIN**

alarm limit for minimum allowable pressure in the return line for main winches.

**RET. RP. AL.
LMT. MID**

alarm limit for minimum allowable pressure in the return line for the mid winch.

**INCR/DECR
ACTIVE**

sets time in seconds for the function increase/decrease to be active after the button has been pressed once.

**JOYSTICK
ACTIVE**

this is winches remote control safety factor. It sets time in seconds for main winches joysticks to continue being activated after they've been put in neutral position.

SYSTEM MAX PRESS	maximum allowable system pressure when shifting SPEED steps, bar.
COOLING PUMP START	temperature of hydraulic oil when system starts oil cooling.
COOLING PUMP STOP	temperature of hydraulic oil when system stops oil cooling.
EXTRA POWER	specific torque for extra motor(s). Value sets in nm/bar
COOLING PUMP PAY OUT	when function is activated, system always turns cooling pump on during auto pay out mode regardless of actual oil temperature.

NT-Panel screens: *** INITIAL SETTINGS ***

AMPLIFIERS	Displays an overview screen for amplifiers (driver cards) and setting values Button for access to the menu for modulation of the remote control of control valves and pressure valves is set, minimum, maximum and ramp time settings.
-------------------	--

NT-Panel screens: *** SYSTEM SETTINGS ***

STBD / PORT / MIDW / SOW	Menu for control card settings for each winch If you select one of the winches the Haul In, Pay Out and Pressure values are displayed. Here you can set Start Value, Max Value, Ramp Up Auto, Ramp Down Auto, Ramp Up Manual, Ramp Down Manual.
RAMP UP AUTO	Delay for signal, time from start to max point for auto function (for example, Auto Pay Out), value is set in seconds. Base value = 5.
RAMP DOWN AUTO	Delay for signal, time from start to minimum point for auto function (for example, Auto Pay Out), value is set in seconds. Base value = 5.
RAMP UP MANUAL	Delay for signal, time from start to max point for manual function (from joystick), value is set in seconds (default = 0).
RAMP DOWN MANUAL	Delay for signal, time from start to max point for manual function (from joystick), value is set in seconds (default = 0).
START VALUE	This is the relationship between joystick (potmeter) movement and the modulation signal. The value is set in units (mAmp) between 0 and 350. Base value = 120.
MAX VALUE	Max modulation signal, which gives the signal that moves the main valve all the way out. The value is set in units (mAmp) between 0 and 1000. Base value = 700.

NT-Panel screens: *** SETTING AMPLIFIERS ***

INTEGRATE

Integration with another equipment

Button for access to the menu for implementation of integration with other equipment such as echo sounder or/and trawl instrumentation.

NT-Panel screens:

*** OPERATIONAL SETTINGS *****ECHO
SOUNDER**

Press ON / OFF for engage/disengage integration with echo sounder. Here the empirical value for the relationship between length/depth is entered as a calculation factor, which is used by the system to automatically calculate the set length based on the depth information from the echo sounder. (For example, 3.2)

**TRAWL
INSTRUMENTS**

Press ON / OFF for engage/disengage integration of PTS *Pentagon* ® with Simrad ITI trawl sensors. Software version 5.30 or higher from Simrad is required then.

STEERING:**ENGAGE
MASTER
CONTROL**

Angle for change of master winch, to be determined by rudder angle. Value is set in rudder angle degrees.

**DISENGAGE
MASTER
CONTROL**

Angle for changing master winch back from rudder control. Value is set in rudder angle degrees.

**ADJUST
SIGNAL**

Value for calibrating Pentagon according to rudder signal received. Value is set in rudder angle degrees.

Before start calibration adjust zero rudder position/signal using potmeter on rudder interface card. Then use steering control to put rudder in maximum angle and enter to PTS reading value.

NT-Panel screens:

*** INTEGRATION ***

OUTPUT

Menu for configuration of digital outputs to solenoid valves, as well as configuration of control functions and coordinated functions.

All of these settings for the system are carried out during startup.

NT-Panel screens:

*** INITIAL SETTINGS *****POWER STEP****Control of power step**

POWER STEP
IN TOWING

Power Step works in Towing mode.

MAIN PUMP	Control of main pump 24VDC output OFF AT TOWING	Main pump 24VDC output will automatically be switched off when the system automatically changes over to towing. Used when pump is driven from gearbox, PTO.
	ON AT TOWING	Main pump 24VDC output will remain on when the system automatically changes over to towing. Used when pump is driven from electric motors.
	INHIBIT AUTO ON	Main pump 24VDC output will remain turned off when stop Towing
TWO SPEED OPER.	Control of 2 speed output and 3 speed output	
	HAUL IN ONLY	Speed switching only takes place when Auto Haul In is active.
	HAUL IN & MANUAL	Speed switching only takes place in Manual mode and when Auto Haul In is active.
	MANUAL HAUL IN & PAY OUT	Speed switching only takes place in Manual mode and when Auto Haul In or Auto Pay Out is active.
BRAKE OFF CNTR.	Control of brake off signal output	
	OFF OUTSIDE SAFETY RANGE	Sets the brake output always on when the length is greater than the safety range.
	OFF AT TOWING	Sets the brake output always on during towing. NOTE! If Auto Towing is switched off the brake engages.
SERVO PUMP	Control of servo pump signal output	
	OFF WHEN EMERGENCY STOP	Servo pump output is switched off in the event of an emergency stop.
	ON WHEN EMERGENCY STOP	Servo pump output is kept on in the event of an emergency stop.
RETURN PR. TOWING	Control of return press. during towing signal output	
	EXTRA SPEED	Sets output for Return Pressure Towing on when Extra Speed function is used during Auto Haul In.

RETURN PR. NORMAL	Control of return press. during towing signal output	
	EXTRA SPEED	Sets output for Return Pressure Normal on when Extra Speed function is used during Auto Haul In.
	RPN ALWAYS ON EXCEPT TOWING	Sets output always on except during towing when the output is off. NOTE! This option is only for special systems and older multacom systems.

TOWING	Control of towing output	
	HAUL IN W/TOWING	Sets Haul in output on during Auto Towing mode.
	AUTO ON AT SET POINT	After pay out, automatically turns Towing mode on at a set point
	OFF AT SET POINT	Does not turn on Towing mode automatically
	ON AT EXTRA SPEED	Turns Towing output on while Extra Speed operation

NT-Panel screens:

*** OUTPUT CONTROL***

SIMULATE

Simulation menu

This is a menu for simulation of running the winches and the sensor values in the system.

This is used at start-up and for troubleshooting that is carried out by Rapp personnel.

When PTS is in Simulation Mode there is a button SIMULATION on all Operational screens for quick access to Simulation screen.

NT-Panel screens:

*** INITIAL SETTINGS ***

LENGTH SIMULATE	Here length counting is simulated as if the winches were rotating. The system is given values for the length measuring display and memory.	
	OUT	This button starts counting out.
	IN	This button starts counting in.
	STOP STBD STOP MID STOP PORT	These buttons are used to stop simulation counting on winches you do not want to simulate. With these buttons you can simulate only one winch by stopping the two others, etc. The simulation stops automatically when the set point length is reached when in auto mode.
	SIMULATE RPM Select 1,2,3	Selection of speed during simulation, corresponds to 10 to 30 RPM.
SENSOR VALUES	Here you can simulate pressure or temperature sensor values. The values that can be set here are from 0 to 200 Bar for pressure and 0 to 100 Degrees for temperature.	
	SENSOR VALUES	Button for simulation of values or normal logging of values from sensors. Light indicator on when simulation of values is selected. Then you can enter values from the keypad and cursor.
	OIL LEVEL OIL FILTER	The oil level and oil filter alarm can be simulated by means of buttons. Inserting different sensor values can simulate all other alarms.
	RESET ALL	All simulation values are reset by means of this button.

NT-Panel screens: *** SIMULATION ***

PTS *Pentagon*® - SYSTEM SETUP

*I:\TEKNISK\Pentagon2-Operation manual\English\Version 4.10 NOAA\Ch03\EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03*

For setting up PTS Pentagon® for specific boat correct parameters in the following menus must be set:

- * OPERATIONAL SETTINGS *
- * SYSTEM SETTINGS *
- * INITIAL SETTINGS *
- * WINCH PARAMETERS *
- * OUTPUT CONTROL *
- * SETTINGS AMPLIFIERS *

PTS Pentagon® computer delivered with default values set in memory.

Correct values must be set before sea trials.

Following tables have to be filling out during starting up the system. Copy of this document must be send to Rapp Hydema A/S, Bodø, Norway.

VESSEL / SYSTEM INFORMATION

Boat name:		Installation date:	
Owner:		HA No.:	
PENTAGON ID. NUMBER			

Program version PLC:	
Program version NT:	
Program Version, PC:	

Integration to trawl instrumentation: Yes If Yes, system name:	Cable installed: yes/no Yes	Opto coupler adapter installed: yes/no Yes	Function checked OK: yes/no Yes
Integration to ECHO sounder system: Yes If Yes, system name:	Cable installed: yes/no Yes	Opto coupler adapter installed: yes/no Yes	Function checked OK: yes/no Yes
Integration to Rudder system: Yes If Yes, system name:	Cable installed: yes/no Yes	N/A.	Function checked OK: yes/no Yes

Power supply modification done. yes/no: Yes	Power supply for Amplifiers, name and type:	UPS for the PC only. Name and type:	Power supply for AUX winches:
WIU, winch interface card modified: yes/no Yes	ID number:	PLC interface card modified: yes/no Yes	ID number:
PC unit with CD rom drive: yes/no Yes	VGA splitter box mounted and tested OK: yes/no Yes	VGA screen type:	

AMPLIFIER CARDS IN PTS PENTAGON:

Directional STBD Haul/Pay	Model	Min adjustment in mA	Max adjustment in mA
Directional PORT Haul/Pay	Model	Min adjustment in mA	Max adjustment in mA
Pressure STBD	Model	Min adjustment in mA	Max adjustment in mA
Pressure PORT	Model	Min adjustment in mA	Max adjustment in mA
Directional MIDW. Haul/Pay	Model	Min adjustment in mA	Max adjustment in mA
Pressure MIDWINCH	Model	Min adjustment in mA	Max adjustment in mA
Pressure NET SONDW:	Model	Min adjustment in mA	Max adjustment in mA

AMPLIFIER CARDS AT AUX. WINCHES:

WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA
WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA
WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA
WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA
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WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA
WINCH NAME	Model	Min adjustment in mA	Max adjustment in mA

SYSTEM SETTINGS		WINCH PARAMETERS	STBD	PORT	MID	SOW
Towing min. tension	(1 ton)	Drive Torque	(500 Nm/bar)	(500 Nm/bar)	(500 Nm/bar)	
Pay Out min tension	(2ton)	Outer circumference				
Towing start value	(650)	Drum Length:	(1500 mm)	(1500 mm)	(1500 mm)	(1000 mm)
Auto speed start	(50 units)	Wire diameter	(28.0 mm)	(28.0 mm)	(28.0 mm)	(9 mm)
Auto speed stop	(50 units)	Core diameter	(400 mm)	(400 mm)	(400 mm)	
Near set point wrng	(100 units)	Wire length	(2000 units)	(2000 units)	(2000 units)	(3000 units)
Tension update	(1)	Wire cut off	(0m)	(0m)	(0m)	
Pay Out Min tension	(1 ton)	Power X 2 speed	(6666)	(6666)	(6666)	
Pair trawl diff.	(8 units)	Power X 3 speed	(5000)	(5000)	(5000)	
Sow difference initial	()	Length adjust (1 ...18)	(9)	(9)	(9)	
Sow difference towing	()					
Warning type (0 ... 5)	(1)					

SETTINGS REMOTE CONTROLS AMPLIFIERS**STBD winch**

Ramp up auto	(5 sec.)
Ramp down auto	(5 sec.)
Ramp up manual	(0 sec.)
Ramp down manual	(0 sec.)
Start value pressure	(75 mAmp)
Max value pressure	(600 mAmp)
Start value haul in	(120 mAmp)
Max value haul in	(700 mAmp)
Start value pay out	(120 mAmp)
Max value pay out	(700 mAmp)

PORT winch

Ramp up auto	(5 sec.)
Ramp down auto	(5 sec.)
Ramp up manual	(0 sec.)
Ramp down manual	(0 sec.)
Start value pressure	(75 mAmp)
Max value pressure	(600 mAmp)
Start value haul in	(120 mAmp)
Max value haul in	(700 mAmp)
Start value pay out	(120 mAmp)
Max value pay out	(700 mAmp)

MID winch

Ramp up auto	(5 sec.)
Ramp down auto	(5 sec.)
Ramp up manual	(0 sec.)
Ramp down manual	(0 sec.)
Start value pressure	(75 mAmp)
Max value pressure	(600 mAmp)
Start value haul in	(120 mAmp)
Max value haul in	(700 mAmp)
Start value pay out	(120 mAmp)
Max value pay out	(700 mAmp)

SOW winch

Ramp up auto	(5 sec.)
Ramp down auto	(5 sec.)
Ramp up manual	(0 sec.)
Ramp down manual	(0 sec.)
Start value pressure	(75 mAmp)
Max value pressure	(600 mAmp)

INITIAL SETTINGS

Pay out, RPM limit	(60 rpm)
Tow start value	(600)
Dead end stop	(1500 units)
Return Pressure Alarm limit Main winches	(5 bar)
Return Pressure Alarm limit, MID	(5 bar)
Incr/decr active	(5 sec.)
Joystick active	(5 sec.)
System max press. (1/2/3 speed switch)	(170 bar)
Cooling pump start	(38°C)
Cooling pump stop	(33°C)
Extra power	(0 Nm/bar)

OUTPUT CONTROL

Power Step	<input type="checkbox"/> Pwer step in Towing		
Main Pumps	<input type="checkbox"/> OFF at Towing	<input type="checkbox"/> ON at Towing	<input type="checkbox"/> Inhibit Auto on
Two Speed operation	<input type="checkbox"/> Haul In only	<input type="checkbox"/> Haul In & Manual	<input type="checkbox"/> Manual, Haul In & Pay Out.
Brake OFF CTR	<input type="checkbox"/> OFF outside safety range	<input type="checkbox"/> OFF at towing	
Servo Pump	<input type="checkbox"/> OFF when emergency stop	<input type="checkbox"/> ON when emergency stop	
Return Pressure Towing	<input type="checkbox"/> Extra Speed		<input type="checkbox"/> RPN always ON except Towing
Return Pressure Normal		<input type="checkbox"/> Extra Speed	
Towing	<input type="checkbox"/> Haul in w/towing	<input type="checkbox"/> Auto ON at Setpoint	<input type="checkbox"/> OFF at Setpoint
			<input type="checkbox"/> ON at Extra Speed

PTS *Pentagon*® - MODES OF OPERATION

I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch04\EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

PREPARATION FOR START UP HYDRAULIC SYSTEM.....	36
MANUAL MODE.....	36
AUTOMATIC MODES	38
AUTO PAY OUT	39
AUTO TOWING	40
AUTO HAUL IN	41
INTEGRATION	42

All data for the winch system normally loaded to the memory during start up by Rapp Hydema's service engineer. To check/correct system parameters go through settings menus (* SYSTEM SETTINGS *, * INITIAL SETTINGS *, * WINCH PARAMETERS *) and make sure that all data and parameters are correct. You will find initial data for the system in Chapter "SYSTEM SET UP".

We recommend you do not to change values under PASSWORD LEVEL 2 without consulting with Rapp Hydema A/S.

PREPARATION FOR START UP HYDRAULIC SYSTEM

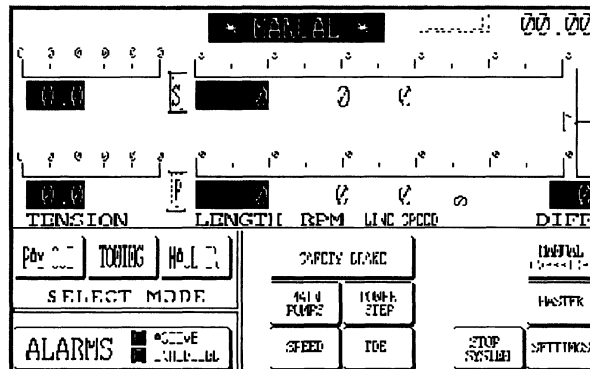
Turn on power supply for **PTS Pentagon®**.

Choose the language on the initial screen and read/accept warning.

After this you will see manual mode screen (* MANUAL *). In the same time servo pump is starting and system is ready for remote control. Press **MAIN PUMPS** button on the touch panel and start pumps from the separate panel.

MANUAL MODE

This is normal mode for the system operation inside "safety range", (when non-of automatic modes can be started). System also coming to the manual mode outside safety range, if operator stops automatic modes. In manual mode winches can be controlled both from the bridge (joysticks) and from local position (control valves).



For the trawl winches on the touch panel will be monitored:

- Length (meters or fathoms) both graphic scale and numbers;
- RPM;
- Tension (tons) both graphic scale and numbers;
- Different in length (meters or fathoms) between STBD and PORT winch.

Number of current active and inhibited alarms monitored on the **ALARM** button area. By pressing it you can check status of current alarms on the * ALARM OVERVIEW * screen.

If brake function setting up to be open outside safety range you can always close it by pressing **SAFETY BRAKE** button. This switch cannot override self-opening

brake function, which is activated by moving control valve handle out from neutral position on local winch control stand.

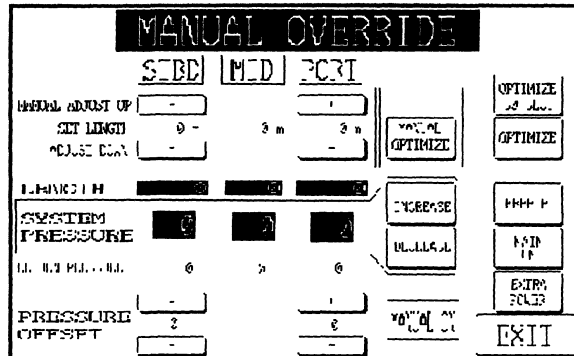
By pressing **TDE** button it is possible to turn ON and OFF pressure equalizing mode for main trawl winches.

If the system is equipped and setting up for special functions (2/3 **SPEED** operation and **POWER STEP**) you can also use them in manual mode.

Starting from version 3.06 program supports advanced manual control while in auto modes. Manual control options placed in *MANUAL OVERRIDE* screen that operator can access by pressing **MANUAL OVERRIDE** button.

Manual Override options can be used for single or double trawl together with integration or without it.

1) Normal towing mode, single trawl, and no integration engaged. Pressing **MANUAL OPTIMIZE** turns TDE function off. Operator is now able to adjust the winch other then master. Lit up letters shows master winch.



Thus user can try to optimize trawl opening him self, referring on the monitor picture from the trawl measuring system. When result satisfies it can be saved by pressing **FREEZE** button, then system will continue automatic towing with the difference as adjusted and TDE turned off.

Note! This works only if no integration with trawl measuring system is selected.

2) Normal towing mode, single trawl, integration active.

When integration with ITI Simrad is engaged, the spread and trawl height is received from ITI sensors. Pressing **OPTIMIZE**, turns TDE function off, and system itself will try to make trawl opening as big as possible by operating non-master winch in or out direction, checking the tendency, and stabilizing on maximum. Signals from the trawl instruments are received as often as this specified by NMEA communication protocol (normally 5-10 sec period). However to get the most reliable readings system filters meaningless signals and process an average in 60 sec period. Based on that information, trawl adjustment is also executed ones in one minute.

If conditions for trawling are good (moderate weather, smooth bottom etc) trawl adjustments can be done double as fast in 30 sec intervals. To make it happens press **OPTIMIZE 30sec** button. Observe carefully trawl behaviour. Go back to **OPTIMIZE** if system gets unstable.

3) Normal towing mode, twin trawl, no integration.

Pressing **MANUAL OPTIMIZE**, will make TDE function go off, and force MID winch to be the master. Now user is able to tune both Stbd and Port winches independently, using MANUAL ADJUST UP/DOWN function and pressing +/- buttons to change Set length. Thus user can try to optimize trawl opening manually, referring on the monitor picture from the trawl measuring system or flow sensors.

Stop adjustments when result satisfies, system will continue automatic towing with the difference as adjusted and TDE switched off. If you want still keep this when leaving Towing mode press **FREEZE** button.

Note! This works only if no integration with trawl measuring system is selected.

4) Normal towing mode, twin trawl, integration active.

When integrated with ITI Simrad, the door-to-door angle (STBD angle) + spread and trawl height is received from ITI sensors. Pressing **OPTIMIZE**, will turn TDE function off and force Mid winch to be the master. System will now attempt to adjust and keep the door-to-door angle 90 degree (or other desired) in relation to the door-to-door heading (TVG), by checking the tendency and adjusting length both Stbd and Port winches. Mid winch offset to the Stbd/Port winches will always be kept as specified by user.

PRESSURE OFFSET function should be only used as fixed compensation, when one winch is obviously stronger than the other. Offset value could only be positive thus it is possible to add to the weakest winch only.

SYSTEM PRESSURE ENCREASE/DECREASE function can be useful when relatively fast trawl lowering/raising is required while still in Towing mode.

AUTOMATIC MODES

Before you start any automatic modes operation make sure that all operational settings are correct.

From * MANUAL * screen press **MASTER** button and select whether the STBD or PORT winch is to be the master in the various operating phases. To go back from * MASTER CONTROL * menu press **EXIT** button.

To review operational settings press **SETTINGS** button. The panel picture will be changed to * OPERATIONAL SETTINGS * screen.

Correct LENGTH SET VALUE, MAX/MIN VALUE, TOWING MAX TENSION and WEATHER FACTOR according to the fishing area and weather conditions.

OPERATIONAL SETTINGS			INTEGRATE
LENGTH SET VALUE		0	HELP
MAX/MIN VALUE		0	3% SETTINGS
WEATHER FACTOR		0	5 sec. 5 min.
TOW MAIN, MAX TENSION		0.0	2 SPEED TOWING
TOW MID, MAX TENSION		0.0	3 SPEED TOWING
TOW MAIN, MIN TENSION		0.0	RESET
TOW MID, MIN TENSION		0.0	1.000000
DIFF. STBD/PORT ALARM		0	
TOWING RPM LIMIT		0	
PAY OUT LINESPEED	LINE SP	0	UNIT: KPH
PAY OUT TENSION	TENSION	0.0	UNIT: KPH
			EXIT

Value of DIFF. STBD/PORT ALARM used in **PTS Pentagon®** program for warning alarm and like one of the factors of trawl snagging mode.

TOWING RPM LIMIT sets max RPM (value and alarm) for main winches while set point update during auto towing mode. That allows faster set point update in outward direction. Note, that inward set point update speed is restricted by max oil flow available during towing.

Auto Pay Out speed can be controlled by “constant line speed” - **LINE SP** button or “constant tension” - **TENSION** button.

If using “line speed control” method, make sure that set trawl speed value is less than boat speed during pay out. Otherwise it may result in trawl doors failure.

Only from this screen it is possible to reset length counters to zero by pressing **RESET LENGTH** button. To confirm counters resetting press **YES** button.

To go back from * OPERATIONAL SETTINGS * screen, press **EXIT** button.

In all automatic modes number of current active and inhibited alarms monitored on the **ALARM** button area. By pressing it you can check status of current alarms on the * ALARM OVERVIEW * screen.

To go back from * ALARM OVERVIEW * screen, press **EXIT** button.

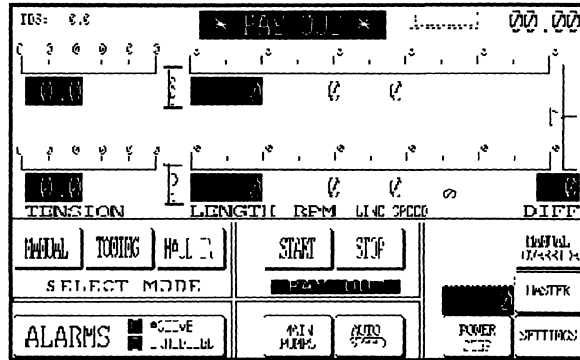
AUTO PAY OUT

From * MANUAL * screen press **PAY OUT** button. The panel picture will be changed to * PAY OUT * screen.

To review operational settings press **SETTINGS** button.

When trawl is ready, set out doors by manual control. You can use **POWER STEP** button to reduce speed of the winches for smooth control.

An audible alarm will sound when doors pass safety range and Auto Pay Out mode takes over.



Auto Pay Out will be on till doors reached the set point.

During Auto Pay Out mode system controls speed and tension in accordance with operational settings.

Auto speed control can be turned OFF/ON any time during Auto Pay Out by pressing **AUTO SPEED** button.

On the touch panel will be monitored:

- Length (meters or fathoms) both graphic scale and numbers;
- RPM;
- Tension (tons) both graphic scale and numbers;
- Different in length (meters or fathoms) between STBD and PORT winch.

Number of current active and inhibited alarms monitored on the **ALARM** button area. By pressing it you can check status of current alarms on the * ALARM OVERVIEW * screen. To go back from * ALARM OVERVIEW * screen to * PAY OUT * screen press **EXIT** button.

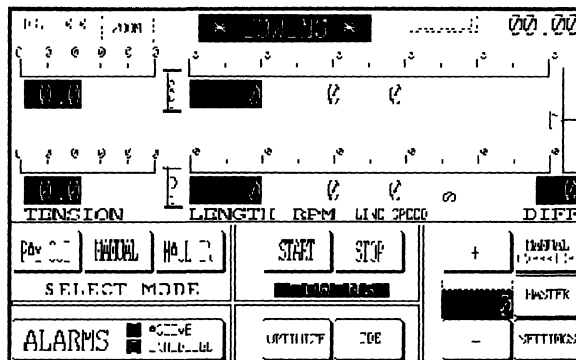
Auto Pay Out mode can be stopped any time by pressing **STOP** button. To start Auto Pay Out again press **START** button. These switches are in operation only when master length is inside auto pay out range.

AUTO TOWING

Auto Towing mode will start automatically when wire length reaches the set point.

During towing the pressure and tension will automatically be adjusted for keeping the length at set point.

A change of set point length can be done during Auto Towing and the system will bring the length to the new set point.



Changes can be done both from the * TOWING * screen by \pm buttons or from * OPERATIONAL SETTINGS * screen by entering new LENGTH SET VALUE. To go back from * OPERATIONAL SETTINGS * screen to * TOWING * screen press **EXIT** button.

Pressure equalizing mode can be turned ON/OFF any time during Auto Towing by pressing **TDE** button.

If system is equipped with integration interface/sensors Optimizing mode can be turned ON/OFF any time during Auto Towing by pressing **OPTIMIZE** button. While Integration is still active, trawl angle can be adjusted directly from PC operational screen.

On the touch panel will be monitored:

- Length (meters or fathoms) both graphic scale and numbers;
- RPM;
- Tension (tons) both graphic scale and numbers;
- Different in length (meters or fathoms) between STBD and PORT winch.

Graphic presentation of towing data has zoom function, which can be turned ON/OFF by **ZOOM** button. The length bars will be scaled close to Setpoint area.

Number of current active and inhibited alarms monitored on the **ALARM** button area. By pressing it you can check status of current alarms on the * ALARM OVERVIEW * screen. To go back from * ALARM OVERVIEW * screen to * TOWING * screen press **EXIT** button.

Auto Towing mode can be stopped any time by pressing **STOP** button. To start Auto Towing again press **START** button. These switches are only available when master length is outside safety range.

AUTO HAUL IN

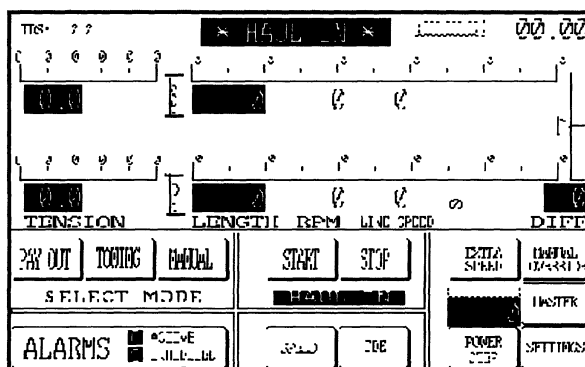
Make sure that Auto Towing is turned OFF.

From * TOWING * screen press **STOP** button and then **HAUL IN** button. The panel picture will be changed to * HAUL IN * screen.

If necessary start all main pumps again by pressing **MAIN PUMP** button and starting each pump from separate panel.

Press **START** button to start Auto Haul In mode.

Selected **SPEED** function to increase haul in speed. System will engage 2/3 speed steps automatically but only if pressure is low enough.



If system has separate towing pump(s) **EXTRA SPEED** function can be selected in addition to **SPEED** option in order to accelerate haul in process even more. **EXTRA SPEED** option (if present) works irrespective to system pressure.

You can use **POWER STEP** button to reduce speed of the winches as they approach safety range/gallows.

An audible alarm will sound when doors pass safety range and Auto Haul In mode will stop.

On the touch panel following will be monitored:

- Length (meters or fathoms) both graphic scale and numbers;
- RPM;
- Tension (tons) both graphic scale and numbers;
- Different in length (meters or fathoms) between STBD and PORT winch.

Number of current active and inhibited alarms monitored on the **ALARM** button area. By pressing it you can check status of current alarms on the * ALARM OVERVIEW * screen. To go back from * ALARM OVERVIEW * screen to * HAUL IN * screen press **EXIT** button.

Auto Haul In mode can be stopped any time by pressing **STOP** button. To start Auto Haul In again, press **START** button. These switches are in operation only when master length is outside safety range.

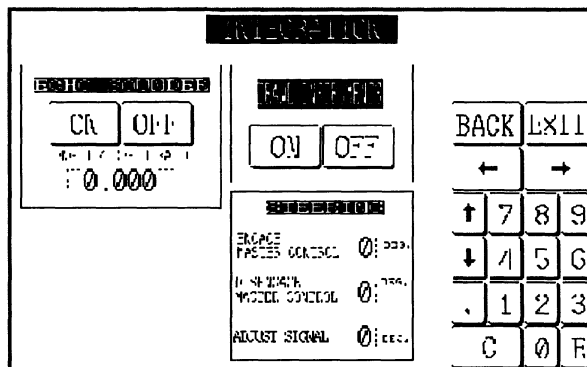
INTEGRATION

PTS *Pentagon*® program has built in functions for optimizing trawl opening during different fazes of Auto Towing.

Press **INTEGRATE** button from the * OPERATIONAL SETTINGS * menu. The panel picture will be changed to * INTEGRATION * screen.

Signal from ECHO SOUNDER can be used for automatic adjustment of Set Length value. The current sea depth will be multiplied with LENGTH to DEPTH ratio for constant towing length calculation.

To activate function press **ON** button on ECHO SOUNDER area.



OPTIMIZE function can work together with ECHO SOUNDER integration in TOWING mode if both option have been selected in INTEGRATION screen. Thus system will automatically adjust master winch length accordingly to current sea depth. At the same time trawl position/opening will also be optimized.

Optimize function can be switched on/off at any time just by pressing the button. It will also be cancelled automatically by Emergency Stop or when leaving Towing mode.

Signal from STEERING (rudder angle monitoring equipment) can be used for automatic change of Master Winch Control function during hard turns. Signal calibration conditions (ADJUST SIGNAL) specified below in the STEERING area (see separate function description). To activate automatic Master Winch Control function choose between RUDDER ACTIVE SHORTEST or LONGEST in * MASTER CONTROL * menu.

ITI SIMRAD INTERFACE SET UP

Following type of sensors are actually used in conjunction with calculation of trawl position and geometry: spread, temp, depth and combined.

In order to get correct angle and distance from these sensors through NMEA telegram following are to be set in the ITI interface menu:

SYSTEM SETUP

| SERIAL OUT
| AUX-DUMP OUT ON

In the submenu has to be set:

AUX (port B)
| PSIMS1 + PSIMS2 ON

Following NMEA telegrams could be then read out from port B: \$PSIMS1....., \$PSIMS2....., \$PSIMDE....., \$PSIMTM....

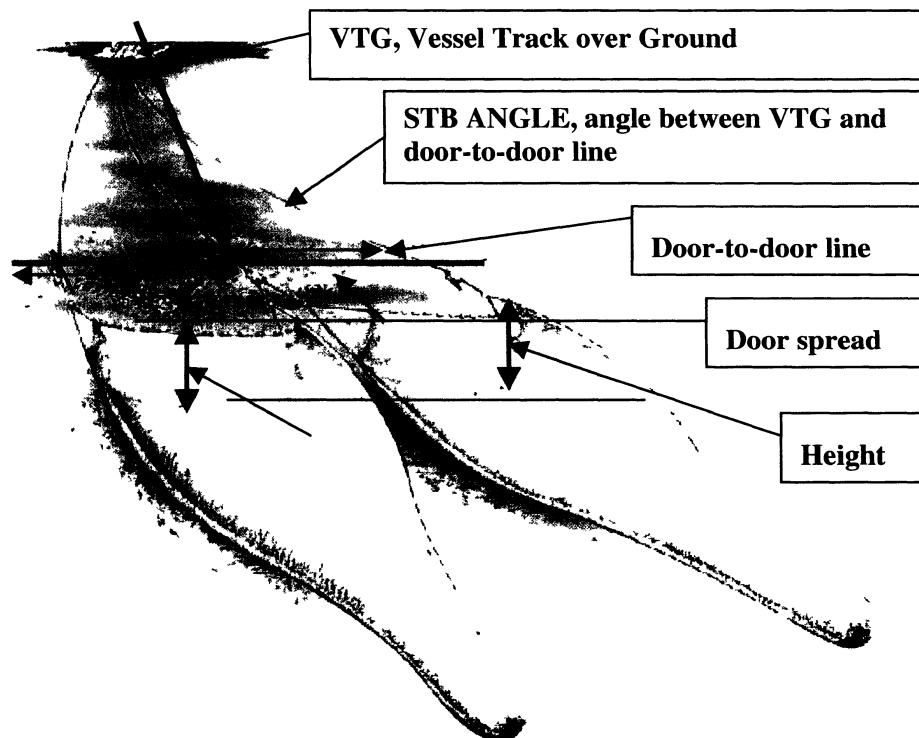
To get out calculated deviation of chosen clump sensor and angle between true GPS course and door-to-door line set following:

PSIMMW ON

These settings make NMEA telegram \$PSIMMW to be sent out. Only sensors that are activated will give out position telegrams.

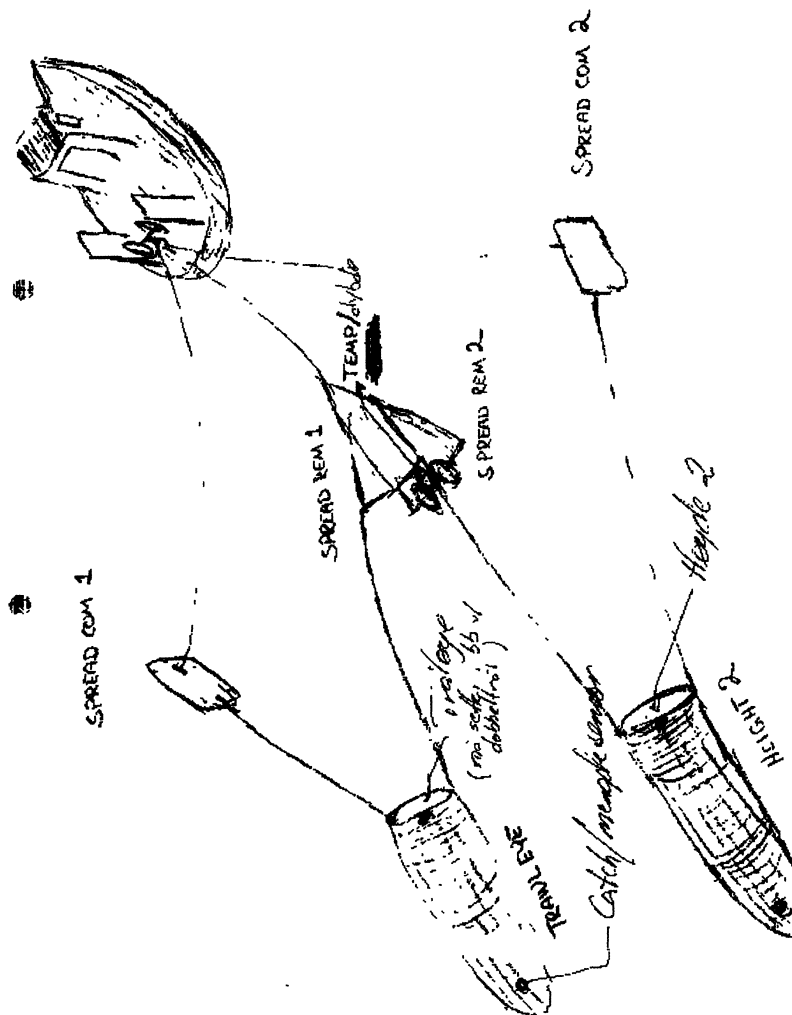
Above mentioned will also send out position telegrams for other activated sensors which are Height, Catch and Grid.

Some definitions related to the PTS Pentagon trawl instruments integration



Simrad ITI approach is based on the presumption that fishing is best when angle between vessel true course over the ground (VTG) and door-to-door line is 90 degrees. In addition extra sensors are used both for vertical and horizontal trawl opening measurements.

In PTS Pentagon trawl integration we try to optimize fishing conditions by either adjusting STBD ANGLE aiming for preset value (normally 90 degrees) or optimizing Door Spread. Both tasks are to be achieved when regulating trawl wire length.



PTS *Pentagon*® - CONTROL FROM THE PC SCREEN

I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch05'EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

GRAPHIC PRESENTATION	47
ALARMS	48
TOWING TIME	49
VISUAL SETTINGS.....	49
INTEGRATION SETTINGS	50
MONITORING INTERFACE COMMUNICATION	51
PTS PENTAGON LOG.....	52
HELP MENU INFO	53
HELP MENU GENERAL	53
ADMINISTRATOR MODE	53

PTS *Pentagon*® PLC unit connected to the PC via COM2 port. PC screen used for:

- graphic presentation of trawl position data;
- slave control station at the forward bridge console.

Different screens pictures shown on Chapter “PC-MONITOR PICTURES”.

Software for control and graphic presentation is a MS Windows based program which autoloaded in to memory when computer starts. Mouse used for pointer device.

To finish work with a program click *Quit* from the pull-down menu.

GRAPHIC PRESENTATION

14” color LCD screen divided in two areas – graphic and text.

On graphic area shown is trawl connected to the winches. Pictures are different for the single, twin and pair trawl.

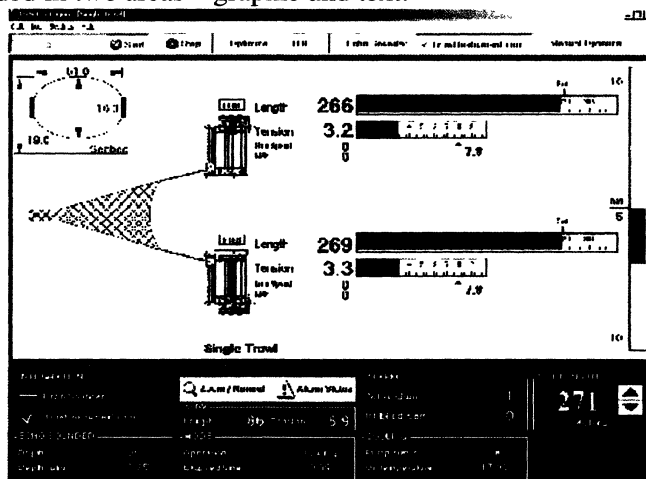
If Optimizing mode is ON Trawl opening picture is included in the graphic area.

There are two horizontal graph bars for each winch to present current wire length and tension.

Vertical graph bar shows difference in length between main trawl winches.

There is difference of length presentation for twin trawl Mid winch. Mid winch length graph bar shows only length out from offset point.

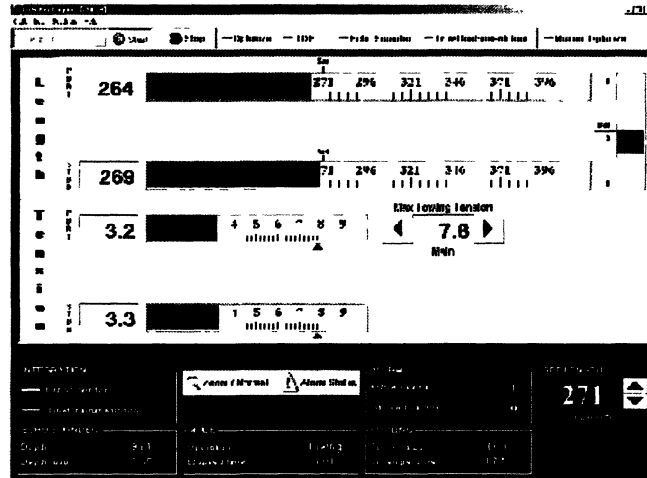
In Auto Towing mode zoom function will scale trawl winches length graph bars close to the Setpoint area, when “Zoom graph enabled in Towing ☒” selected from



the *Visual Settings* menu. Mid winch offset length bar will be aligned with length bars for the main winches.

Graphic presentation can be changed by clicking **ZOOM** button from the text screen area. The picture will be changed to zoom mode screen with bigger graphs and numbers.

To go back to the graphic window click **EXIT** button.



ALARMS

When system receives alarm signal "ALARM!" window activates on the PC screen with the name of specific alarm. Click **Acknowledge Alarm** button on the Alarm window for resetting alarm. When alarm has been reset operational window is restored back.



ALARM STATUS button from the text screen area gives access to the Alarm Overview window.

Alarm Overview window indicates all specific system alarms. Click on **RESET ALARMS** button for resetting alarms status.

Some of the alarms can be temporarily inhibited. This is only possible to do from NT panel interface. If an alarm has been inhibited it prevents alarm message showing up on the screen. Audible alarm will not sound too. However in alarm status screen even inhibited alarms lit up if they are really active at a moment.

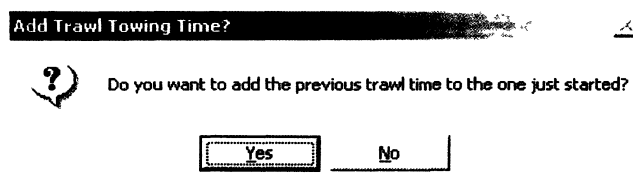
OK	Oil level
OK	Cable Valve
OK	End of Wire
OK	Oil temperature
OK	Oil Filter
OK	Max / Min difference
OK	STED / PORT difference
Inhibit	Low fuel pressure
OK	Return Pressure Min
OK	Return Pressure Mid
OK	Over speed
Reset Alarm	
Exit	

To go out from the Alarm Overview Window click on **EXIT** button.

TOWING TIME

In auto towing mode elapsed time since the mode has been started is shown on PC screen. Timer is stopped when you Stop auto towing.

When towing mode is started next time, system asks whether you want to continue counting previous towing time or start it from zero. Choose **Yes** to add previous timer value to the one just started. Click **No** to reset time counter.



VISUAL SETTINGS

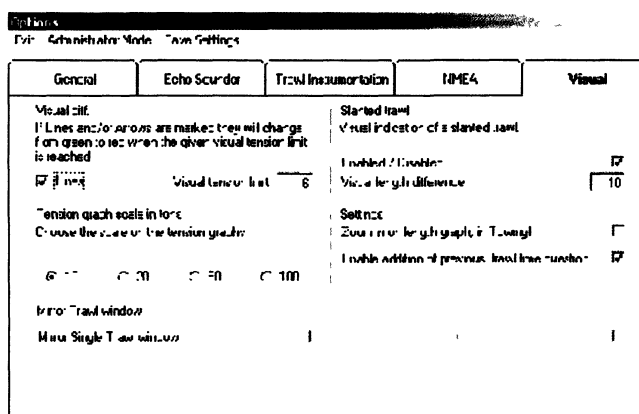
Click **Settings/Options/Visual** from the pull down menu to access Visual Settings window.

Change value of Visual tension limit for changing colour on wire when tension reached this limit.

Choose the scale for tension graph (10, 20, 50, or 100) depending of maximum pull of main winches.

Change value of length difference for visual indication of slanted trawl. If difference of wire length between STBD and PORT winch reached this limit, trawl picture will change to slanted trawl.

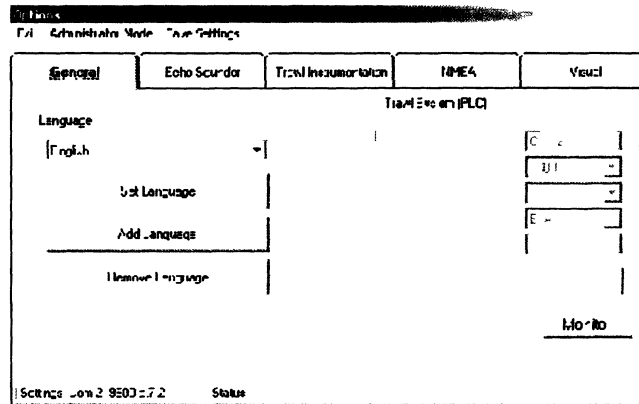
Click on **Save Settings** button to save new settings. To go out from the Visual Settings Window click on **EXIT** button.



Settings/Options/General folder has system language and PLC communication settings.

Choose your preferred Pentagon PC interface language from drop down list and press Set Language to activate it.

To add a new language click on Add Language and check for available “language.txt” files in opened dialog box.



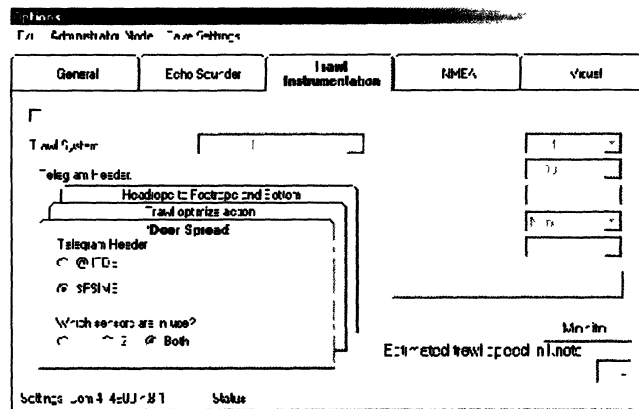
INTEGRATION SETTINGS

Click on *Settings/Option/Integration* from the pull down menu to access Trawl Instrumentation window.

Set value for estimated trawl speed in knots.

Tick of integration entities presented in the system.

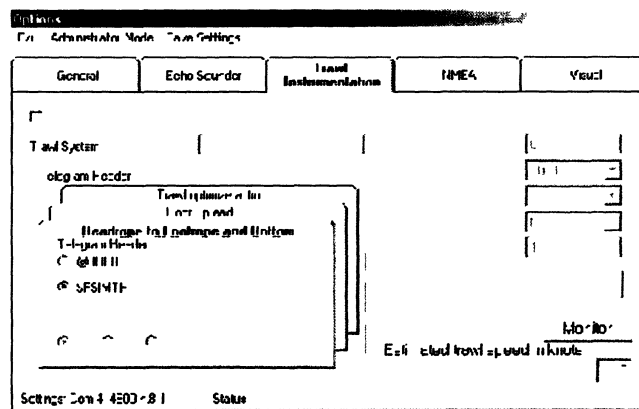
Choose Door Spread folder and tick of preferred Door Sensor(s) and type of telegram.



Click on Headrope to Footrope and Bottom folder.

Choose preferred telegram header for Headrope to Footrope and Bottom trawl opening sensor(s).

If telegram type @IIHFB is chosen information about sensors is to be also specified.

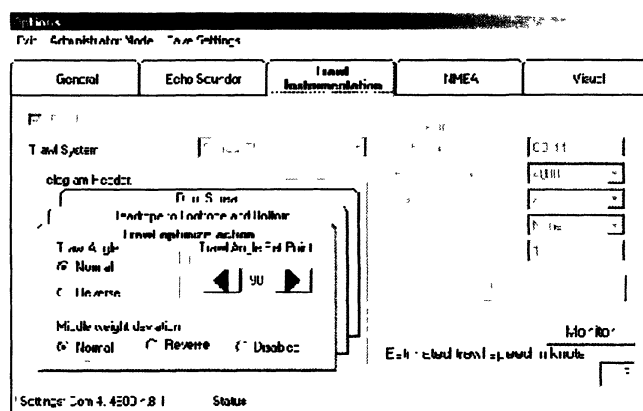


Click on Trawl optimize action folder.

Tick of preferred options for Trawl Angle and Middle weight deviation

Adjust trawl set point angle using arrows to the actual course of the ship to be maintained while Integration is enabled (OPTIMIZE is pressed on the NT touch panel).

To get an access to communication window for Trawl instruments press corresponding **Monitor** button.



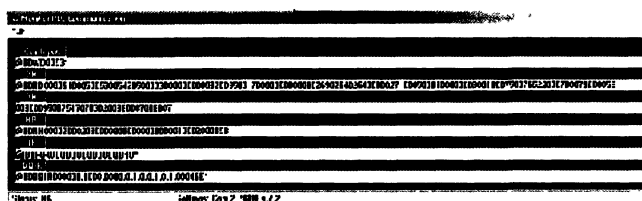
If regulation shows in opposite direction, tick off **Reverse** to establish it right.

In case any adjustments have been made press **Save Settings** before closing Options window. Otherwise old settings remain stored. Click **EXIT** to close the window.

MONITORING INTERFACE COMMUNICATION

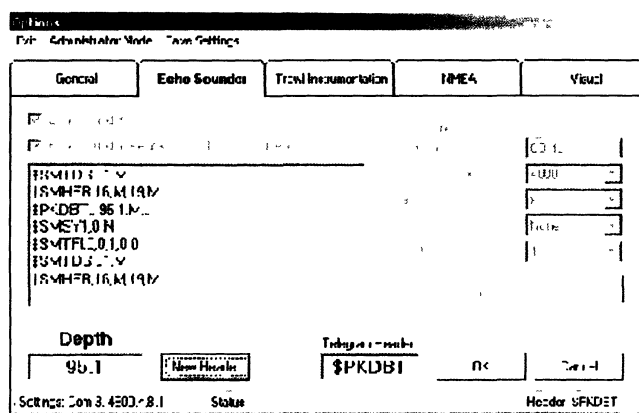
All interface-connected devices can be monitored on PC *Pentagon* screen. Make sure that interface you are going to use has been set up properly and switched on. Status string on the very bottom of pop-up communication window shows current communication status and due comport settings for each particular interface. Information in the window is casually changing if communication has been established.

Monitoring PLC window. Received from PLC telegrams are represented in the window if proper connection has been established.



Monitoring Echo sounder window. When communication with echo sounder has been established information in the window is casually changing.

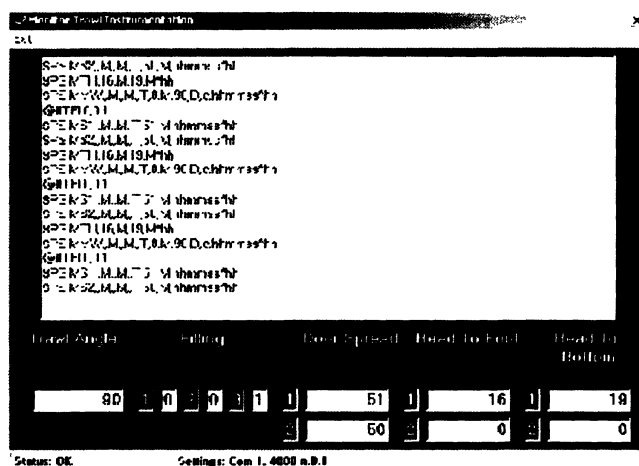
In order to change telegram header click on **New header** and choose from the drop down list.



Monitoring Trawl instrumentation window.

To get an access to communication window for Trawl instruments press **Monitor** button while in *Settings/Option/Trawl instrumentation*.

Information is constantly updating in the window when communication between PC and trawl instrument interface has been established.



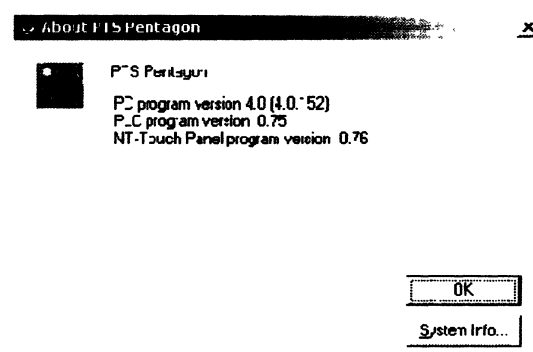
PTS PENTAGON LOG

Click LOG up in the menu bar while in one of the operational screens to get an access to the system log. All major system parameters e.g. pressure, oil temperature, time and so on are logged in different operational stages and are therefore available for review at any time.

In order to transfer PTS Pentagon LOG to external data storage choose corresponding option from the pull down LOG menu.

HELP MENU INFO

Click on *Help/About* from the pull down menu to get information about current PTS Pentagon PC, PLC and NT panel software versions.



HELP MENU GENERAL

From the pull down menu choose *Help/General* to get an access to **Operation manual**. Click on desired heading from the table of contents to view corresponding manual chapter on PC screen.

ADMINISTRATOR MODE

To change communication port settings you have to be logged as system administrator. Administrator password is provided for system software supervisor on board the vessel.

Click on the *Options/Administrator mode*. Punch the password in the pop up keyboard to proceed or press CANCEL to go back to Operation screen.

PTS *Pentagon*® - TOUCH PANEL SCREENS

I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch06\EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

Screen No. 1 Introduction.....	56
Screen No. 2 Warning	56
Screen No. 3 Manual operation single trawl	56
Screen No. 4 Manual Operation twin trawl.....	57
Screen No. 5 Pay Out single trawl.....	57
Screen No. 6 Pay Out twin trawl.....	58
Screen No. 7 Towing single trawl	58
Screen No. 8 Towing twin trawl.....	59
Screen No. 9 Haul in single trawl.....	59
Screen No. 10 Haul in twin trawl	60
Screen No. 11 Operational settings	60
Screen No. 12 Master winch control	61
Screen No. 13 Integration.....	61
Screen No. 14 Manual override	62
Screen No. 15 Help settings	62
Screen No. 16 Reset length.....	63
Screen No. 17 Stop system	63
Screen No. 18 Password level 1	64
Screen No. 19 Password level 2	64
Screen No. 20 System settings	65
Screen No. 21 Winch parameters	65
Screen No. 22 Initial settings.....	66
Screen No. 23 Output control	66
Screen No. 24 Alarm Overview	66
Screen No. 25 Emergency stop.....	67
Screen No. 26 Gate valve alarm	67
Screen No. 27 Amplifiers setting values	68
Screen No. 28 Setting amplifiers STBD winch.....	68
Screen No. 29 Setting amplifiers for PORT winch	69
Screen No. 30 Settings amplifiers for MID winch	69
Screen No. 31 Setting amplifiers SOW	70
Screen No. 32 Simulation.....	70

Screen No. 1 Introduction

PTS *Pentagon*®

PROGRAMMABLE TRAWL SYSTEM

ENGLISH

NORWEGIAN

RUSSIAN

SPANISH

Screen No. 2 Warning

WARNING !!!

THIS PRODUCT MUST BE USED IN ACCORDANCE WITH RAPP INSTRUCTIONS AND LIMITATIONS AND APPLICABLE INDUSTRY STANDARDS. FAILURE TO FOLLOW THESE INSTRUCTIONS AND LIMITATIONS COULD RESULT IN EQUIPMENT MALFUNCTION, PROPERTY DAMAGE, SERIOUS INJURY, OR DEATH.

RETURN

ACCEPTED

Screen No. 3 Manual operation single trawl

* MANUAL *					00.00				
0 0 0 0 0					0 0 0 0 0				
0.0					0 0 0 0 0				
TENSION					LENGTH RPM LINE SPEED				
PAY OUT TOWING HAUL IN					SAFETY BRAKE				
SELECT MODE					MAIN PUMPS POWER STEP				
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED					SPEED TDE STOP SYSTEM SETTINGS				

Screen No. 4 Manual Operation twin trawl

MANUAL TWIN					00.00				
0 0 0 0 0					0 0 0 0 0				
0.0					0 0 0 0 0				
TENSION					LENGTH RPM LINE SPEED				
PAY OUT TOWING HAUL IN					SAFETY BRAKE				
SELECT MODE					MAIN PUMPS POWER STEP				
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED					SPEED TDE STOP SYSTEM SETTINGS				

Screen No. 5 Pay Out single trawl

TDS: 0.0		* PAY OUT *		00.00	
0 0 0 0 0 0		0 0 0 0 0 0		0 0 0 0 0 0	
0.0		0 0 0 0		0 0 0 0	
TENSION		LENGTH		RPM LINE SPEED	
MANUAL TOWING HAUL IN		START STOP		MANUAL OVERRIDE	
SELECT MODE		PAY OUT		MASTER	
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED		MAIN PUMPS AUTO SPEED		POWER STEP SETTINGS	

Screen No. 6 Pay Out twin trawl

TDS: 0.0		PAY OUT TWIN		00.00	
0 0 0 0 0 0		0 0 0 0 0 0		0 0 0 0 0 0	
0.0		0 0 0 0		0 0 0 0	
TENSION		LENGTH		RPM LINE SPEED	
MANUAL TOWING HAUL IN		START STOP		MANUAL OVERRIDE	
SELECT MODE		PAY OUT		MASTER	
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED		MAIN PUMPS AUTO SPEED		POWER STEP SETTINGS	

Screen No. 7 Towing single trawl

TDS: 0.0	ZOOM	* TOWING *		00.00
0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0		
0.0	0.0	0.0	0.0	0.0
0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0		
0.0	0.0	0.0	0.0	0.0
TENSION	LENGTH	RPM	LINE SPEED	DIFF
PAY OUT	MANUAL	HAUL IN	START	STOP
SELECT MODE			TOWING	
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED			OPTIMIZE	TDE
			+	MANUAL OVERRIDE
			0	MASTER
			-	SETTINGS

Screen No. 8 Towing twin trawl

TDS: 0.0	ZOOM	TOWING TWIN		00.00
0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0		
0.0	0.0	0.0	0.0	0.0
0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0		
0.0	0.0	0.0	0.0	0.0
TENSION	LENGTH	RPM	LINE SPEED	DIFF
PAY OUT	MANUAL	HAUL IN	START	STOP
SELECT MODE			TOWING	
ALARMS <input type="checkbox"/> ACTIVE <input type="checkbox"/> INHIBITED			OPTIMIZE	TDE
			+	MANUAL OVERRIDE
			← 0 →	MASTER
			-	SETTINGS

Screen No. 9 Haul in single trawl

TDS: 0.0		* HAUL IN *		00.00	
0 0 0 0 0 0		0 0 0 0 0 0		0 0 0 0 0 0	
0.0		0 0 0 0		0 0 0 0	
TENSION		LENGTH		RPM LINE SPEED	
PAY OUT		TOWING		MANUAL	
SELECT MODE		START		STOP	
ALARMS		HAUL IN		EXTRA SPEED	
<input type="checkbox"/> ACTIVE		SPEED		MANUAL OVERRIDE	
<input type="checkbox"/> INHIBITED		TDE		MASTER	
				POWER STEP	
				SETTINGS	

Screen No. 10 Haul in twin trawl

TDS: 0.0		HAUL IN TWIN		00.00	
0 0 0 0 0 0		0 0 0 0 0 0		0 0 0 0 0 0	
0.0		0 0 0 0		0 0 0 0	
TENSION		LENGTH		RPM LINE SPEED	
PAY OUT		TOWING		MANUAL	
SELECT MODE		START		STOP	
ALARMS		HAUL IN		EXTRA SPEED	
<input type="checkbox"/> ACTIVE		SPEED		MANUAL OVERRIDE	
<input type="checkbox"/> INHIBITED		TDE		MASTER	
				POWER STEP	
				SETTINGS	

Screen No. 11 Operational settings

OPERATIONAL SETTINGS				INTEGRATE	
LENGTH SET VALUE		0		HELP	
MAX/MIN VALUE		0		SYS. SETTINGS	
WEATHER FACTOR		0		Select Spanish	
TOW MAIN, MAX TENSION		0.0		2 SPEED TOWING	
TOW MID, MAX TENSION		0.0		3 SPEED TOWING	
TOW MAIN, MIN TENSION		0.0		RESET LENGTH	
TOW MID, MIN TENSION		0.0		SOW LENGTH <input type="checkbox"/>	
DIFF. STBD/PORT ALARM		0		EXIT	
TOWING, RPM LIMIT		0			
PAY OUT LINESPEED	LINE SP	0	UNITS/MIN		
PAY OUT TENSION	TENSION	0.0	TONS		

Screen No. 12 Master winch control

MASTER CONTROL					
PAY OUT	STBD	LONGEST	SHORTEST	PORT	
TOWING	STBD	LONGEST	SHORTEST	PORT	
HAUL IN	STBD	LONGEST	SHORTEST	PORT	
RUDDER	ENGAGE DEG.	0	DISENGAGE DEG.	0	RUDDER DEG.
					P <input type="checkbox"/> S
				RUDDER ACTIVE SHORTEST	
				RUDDER ACTIVE LONGEST	
CURRENT MASTER:			PORT		
			RUDDER OVERRIDE		
			EXIT		

Screen No. 13 Integration

INTEGRATION		
<div style="background-color: black; color: white; text-align: center; padding: 2px; font-weight: bold;">ECHO SOUNDER</div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">ON</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">OFF</div> </div> <p style="text-align: center; font-size: small;">LENGTH / DEPTH RATIO</p> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 80px; margin: 5px auto;">0.000</div>	<div style="background-color: black; color: white; text-align: center; padding: 2px; font-weight: bold;">TRAWL INSTRUMENTS</div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">ON</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">OFF</div> </div>	<div style="background-color: black; color: white; text-align: center; padding: 2px; font-weight: bold;">STEERING</div> <div style="margin-top: 10px;"> ENGAGE MASTER CONTROL: 0 DEG. DISENGAGE MASTER CONTROL: 0 DEG. ADJUST SIGNAL: 0 DEG. </div>
<div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">BACK</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">EXIT</div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">←</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">→</div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">↑</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">7</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">8</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">9</div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">↓</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">4</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">5</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">6</div> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">,</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">1</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">2</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">3</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">C</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 20px; text-align: center;">E</div> </div>		

Screen No. 14 Manual override

MANUAL OVERRIDE			
<div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> STBD MID PORT </div>			
MANUAL ADJUST UP SET LENGTH ADJUST DOWN	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">+</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0 m</div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">-</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0 m</div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">+</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0 m</div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">-</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0 m</div> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">MANUAL OPTIMIZE</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">OPTIMIZE</div>
LENGTH	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">INCREASE</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">DECREASE</div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">OPTIMIZE 30 SEC.</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">OPTIMIZE</div>
SYSTEM PRESSURE	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">INCREASE</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">DECREASE</div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">FREEZE</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">MAIN PUMP</div>
RETURN PRESSURE	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">MANUAL ON</div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">EXTRA POWER</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">EXIT</div>
PRESSURE OFFSET	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">+</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">-</div> <div style="border: 1px solid black; padding: 5px; width: 40px; text-align: center;">0</div> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">MANUAL ON</div>	<div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">EXTRA POWER</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">EXIT</div>

Screen No. 15 Help settings

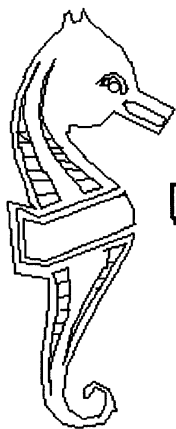
HELP SETTINGS

1. Select value to change with arrow keys.
The FRAME cursor will indicate selected item.
2. Enter new value. Press E-key.
3. The old value is active until E-key is pressed.

NOTE: Access to System Settings, Integration, and Log Information is restricted while active Auto Mode.

EXIT

Screen No. 16 Reset length



RESET LENGTH

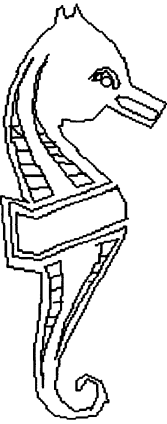
ARE YOU SURE YOU REALLY
WANT TO RESET THE LENGTH?

YES!

NO!

RAPP HYDEMA AS
Efficiency on Board

Screen No. 17 Stop system



SYSTEM STOP

ARE YOU SURE YOU REALLY
WANT TO STOP THE SYSTEM?

YES!

NO!

Panel Program Ver. 1.26 PTS Program Ver. 0.00

RAPP HYDEMA AS

Efficiency on Board

Screen No. 18 Password level 1

PASSWORDLEVEL 1

CHANGE OF SYSTEM PARAMETERS
ONLY BY AUTHORIZED PERSONNEL

ENTER THE ACCESS-CODE FOR SYSTEMLEVEL 1:

0000

EXIT

7	8	9
4	5	6
1	2	3
C	0	E

Screen No. 19 Password level 2

PASSWORDLEVEL 2

CHANGE OF INITIAL PARAMETERS
ONLY BY AUTHORIZED PERSONNEL

ENTER THE ACCESS CODE FOR SYSTEM LEVEL 2:

0000

7

8

9

4

5

6

1

2

3

C

0

E

EXIT

Screen No. 20 System settings

SYSTEM SETTINGS

PARAMETERS MAY ONLY BE CHANGED
BY PTS Pentagon SUPERVISOR!

SINGLE
TRAWL

TWIN
TRAWL

PAIR
TRAWL

SELECT UNITS

METERS

FATHOMS

SIMULATE

WARNING TEST

DATE SETTING: 000000 ddmmyy

TIME SETTING: 00.00 HH.MM

Select value. Change and press ENTER!

AMPLIFIERS

WINCH PARAMETERS

INITIAL
SETTINGS

PASSWORD ENABLE

EXIT

AUTO START LEN	0	UNITS	
AUTO SPEED START	0	UNITS	
AUTO SPEED STOP	0	UNITS	
NEAR SETPOINT WRNG	0	UNITS	
TENSION UPDATE	0	1-2-3	
PAY OUT MIN.TENS	0.0	Tons	
PAIR TRAWL DIFF.	0	METRES	
SOW DIFF INITIAL	0	UNITS	
SOW DIFF TOWING	0	UNITS	
WARNING TYPE	0	0 - 5	

Screen No. 21 Winch parameters

WINCH PARAMETERS					INITIAL SETTINGS
	STED	PORT	MID	SCW	
DRIVE TORQUE	0	0	0	0	Nm/bar
OUTER CIRC.	0	0	0	0	mm
DRUM LENGTH	0	0	0	0	mm
WIRE DIAMETER	0.0	0.0	0.0	0.0	mm
CORE DIAMETER	0	0	0	0	mm
WIRE LENGTH	0	0	0	0	METERS
WIRE CUT-OFF	0	0	0	0	METERS
POWER X 2 SP	0	0	0		1/10000
POWER X 3 SP	0	0	0		1/10000
LENGTH ADJUST	0	0	0	0	1-18 [9]
BLOCK CIRCUMF	0.00	0.00		0.00	mm
BLOCK COUNTING					EXIT

Screen No. 22 Initial settings

Screen No. 23 Output control

OUTPUT CONTROL			EXIT
POWER STEP	POWER STEP IN TOWING		
MAIN PUMPS	OFF AT TOWING	ON AT TOWING	INHIBIT AUTO ON
TWO SPEED OPER.	HAUL IN ONLY	HAUL IN & MANUAL	MANUAL, HAUL & PAY OUT
BRAKE OFF CTR.	OFF OUTSIDE SAFETY RANGE	OFF AT TOWING	
SERVO PUMP	OFF WHEN EMERGENCY STOP	ON WHEN EMERGENCY STOP	
RETURN PR. TOWING	EXTRA SPEED	EXTRA SPEED	RPN ALWAYS ON EXCEPT TOWING
RETURN PR. NORMAL			
TOWING	HAUL IN W/ TOWING	AUTO ON AT SETPOINT	OFF AT SETPOINT
			ON AT EXTRA SPEED

Screen No. 24 Alarm Overview

ALARM OVERVIEW				ALARM OUTPUT	
<input type="radio"/>	OIL LEVEL	<input type="radio"/>	GATE VALVE	<input type="radio"/>	END OF WIRE
<input type="button" value="INHIBIT"/>	<input type="radio"/>	OIL FILTER	<input type="button" value="INHIBIT"/>	<input type="radio"/>	OIL TEMPERATURE
<input type="button" value="INHIBIT"/>	<input type="radio"/>	RETURN PRESSURE MAIN	<input type="button" value="INHIBIT"/>	<input type="radio"/>	OVERSPEED
<input type="button" value="INHIBIT"/>	<input type="radio"/>	MAX / MIN DIFFERENCE	<input type="button" value="INHIBIT"/>	<input type="radio"/>	RETURN PRESSURE MID
<input type="button" value="INHIBIT"/>	<input type="radio"/>	SOW FOLLOW DIFFERENCE	<input type="button" value="INHIBIT"/>	<input type="radio"/>	STBD/PORT DIFFERENCE
ACTIVE ALARMS <input type="radio"/>		WARNING TOWING TENSION HIGH STBD		<input type="button" value="EXIT"/>	
INHIBITED ALARMS <input type="radio"/>		WARNING TOWING TENSION HIGH PORT			
		WARNING TOWING TENSION HIGH MID			
		WARNING PAY OUT TENSION LOW			

Screen No. 25 Emergency stop

<p>EMERGENCY STOP</p> <p>NØDSTOPP</p> <p>PARADA EMERGENCIA</p>
--

Screen No. 26 Gate valve alarm

GATE VALVE ON THE
RETURN LINE CIRCUIT
IS CLOSED

Screen No. 27 Amplifiers setting values

SETTING AMPLIFIERS				
	STBD	PORT	MID W	SOW
RAMP UP AUTO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAMP DOWN AUTO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAMP UP MAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAMP DOWN MAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
START VALUE PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAX VALUE PR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
START VALUE HI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MAX VALUE HI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
START VALUE PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MAX VALUE PO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RAMPS FOR PRESSURE CONTROL ARE NOT SHOWN				
				EXIT

Screen No. 28 Setting amplifiers STBD winch

SETTING AMPLIFIERS				
STARBOARD WINCH				
	HAUL IN	PAY OUT	PRESSURE	EXIT
START VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	← →
MAX VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	
RAMP UP AUTO		<input type="text"/>	<input type="text"/>	↑
RAMP DOWN AUTO		<input type="text"/>	<input type="text"/>	
RAMP UP MAN		<input type="text"/>	<input type="text"/>	↓
RAMP DOWN MAN		<input type="text"/>	<input type="text"/>	
				7 8 9
				4 5 6
				1 2 3
				C 0 E

Screen No. 29 Setting amplifiers for PORT winch

SETTING AMPLIFIERS				
PORT WINCH				
	HAUL IN	PAY OUT	PRESSURE	EXIT
START VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	← →
MAX VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	
RAMP UP AUTO		<input type="text"/>	<input type="text"/>	↑
RAMP DOWN AUTO		<input type="text"/>	<input type="text"/>	
RAMP UP MAN		<input type="text"/>	<input type="text"/>	↓
RAMP DOWN MAN		<input type="text"/>	<input type="text"/>	
				7 8 9
				4 5 6
				1 2 3
				C 0 E

Screen No. 30 Settings amplifiers for MID winch

SETTING AMPLIFIERS				
MID WINCH				
	HAUL IN	PAY OUT	PRESSURE	EXIT
START VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	← →
MAX VALUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	
RAMP UP AUTO	<input type="text"/>	<input type="text"/>	<input type="text"/>	↑
RAMP DOWN AUTO	<input type="text"/>	<input type="text"/>	<input type="text"/>	
RAMP UP MAN	<input type="text"/>	<input type="text"/>	<input type="text"/>	↓
RAMP DOWN MAN	<input type="text"/>	<input type="text"/>	<input type="text"/>	
				7 8 9
				4 5 6
				1 2 3
				C 0 E

Screen No. 31 Setting amplifiers SOW

SETTING AMPLIFIERS	
SOW PRESSURE	
START VALUE	<input type="text"/>
MAX VALUE	<input type="text"/>
RAMP UP AUTO	<input type="text"/>
RAMP DOWN AUTO	<input type="text"/>
RAMP UP MAN	<input type="text"/>
RAMP DOWN MAN	<input type="text"/>
	EXIT
	← →
	↑
	7 8 9
	4 5 6
	↓
	1 2 3
	C 0 E

Screen No. 32 Simulation

SIMULATION			
LENGTH SIMULATE		SENSOR VALUES	SIMULATE ALARMS
OUT	IN	STBD P 0	OIL LEV
STOP STBD	STOP MID	STBD H 0	OIL FLTR
STOP PORT		PORT P 0	
Simulate RPM Select 1, 2, 3 0		PORT H 0	
		MID P 0	
		MID H 0	
		SOW 0	
		TEMP. 0	
RESET ALL			
			EXIT
			← →
			↑ 7 8 9
			4 5 6
			↓ 1 2 3
			C 0 E

Screen No. 33 Tension Monitor

TENSION MONITOR

LOAD CELL MEASURING RANGE

STARBOARD 0.0

PORT 0.0

SOW 0.0

ALWAYS USE LOAD CELLS

ALWAYS USE PRESSURE TRANSM.

STATIC / DYNAMIC SELECT

ON

ON

ON

WIRE COVERED ANGLE α

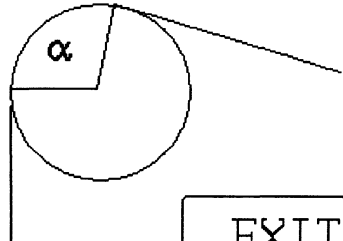
SOW 0

MAIN 0

SOW 0.0 INITIATE

STBD 0.1 INITIATE

PORT 0.0 INITIATE



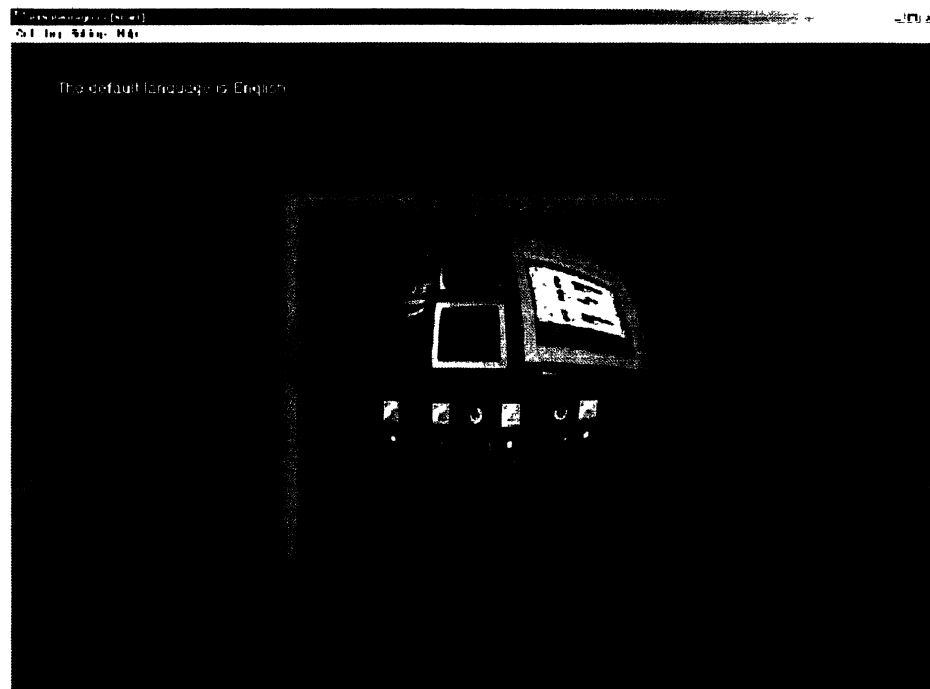
EXIT

PTS *Pentagon*® - PC-MONITOR PICTURES

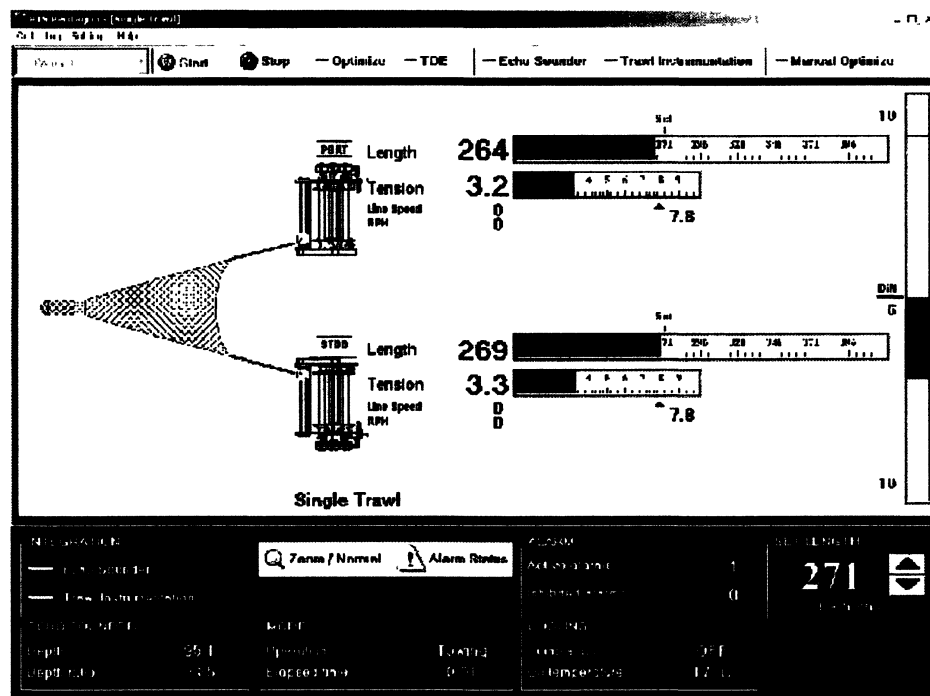
I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch07\EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

Screen No. 1 Initial screen.....	75
Screen No. 2 Single trawl	75
Screen No. 3 Twin trawl.....	75
Screen No. 4 Pair trawl.....	76
Screen No. 5 Zoom mode – single trawl	76
Screen No. 6 Zoom mode – twin trawl.....	77
Screen No. 7 Command mode –Zoom	77
Screen No. 8 Single trawl – Integration	78
Screen No. 9 Double trawl - Integration.....	78
Screen No. 10 Pair trawling - Integration.....	79
Screen No. 11 Log Alarms oil filter.	79
Screen No. 12 Log Max Pressure.	80
Screen No. 13 Log Max RPM.	80
Screen No. 14 Log Max Temperature.	80
Screen No. 15 NMEA Telegrams.....	81
Screen No. 16 Monitoring of PLC communication.....	81
Screen No. 17 Monitoring of trawl sensors communication	81
Screen No. 18 Monitoring of echo sounder communication.....	82
Screen No. 19 Trawl instrumentation options	82

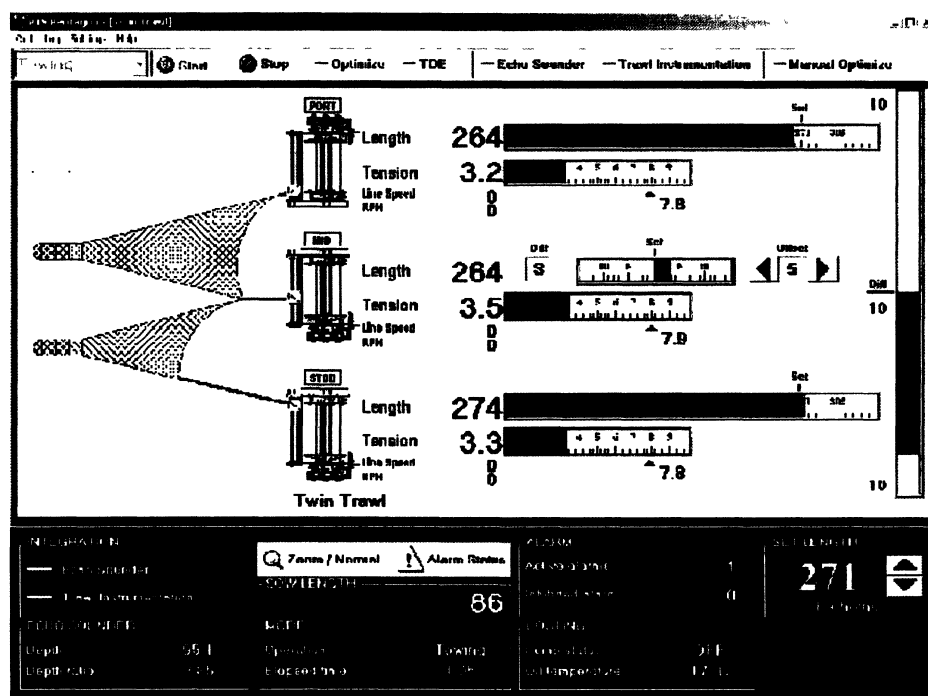
Screen No. 34 Initial screen



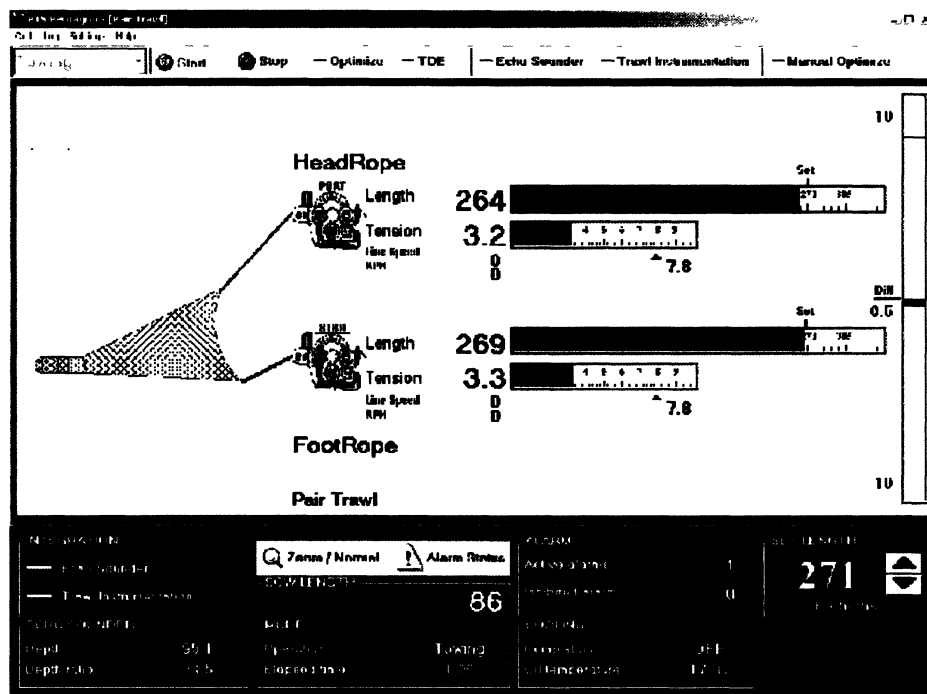
Screen No. 35 Single trawl



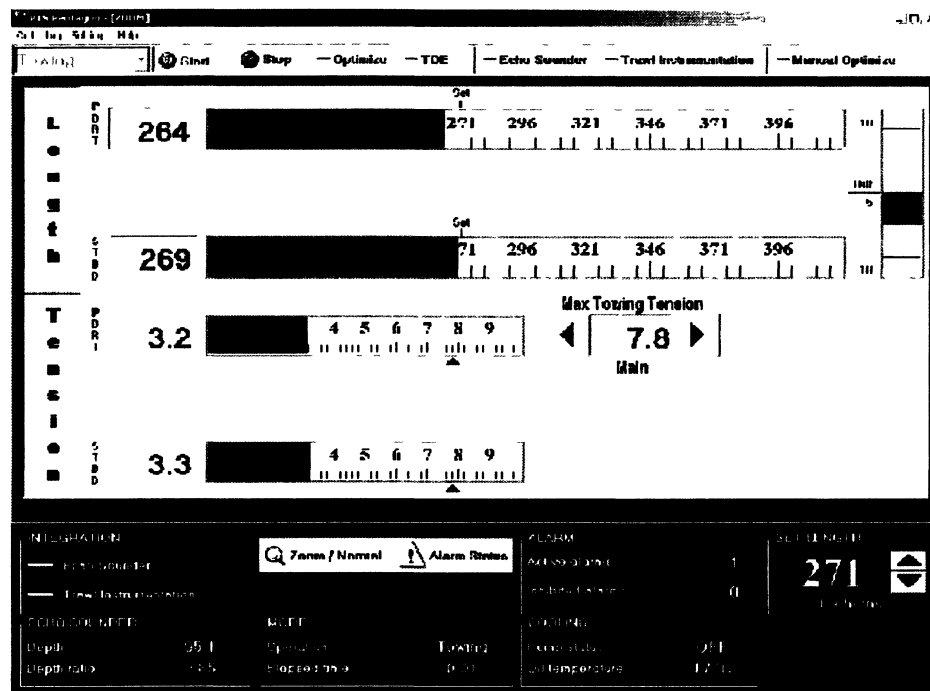
Screen No. 36 Twin trawl



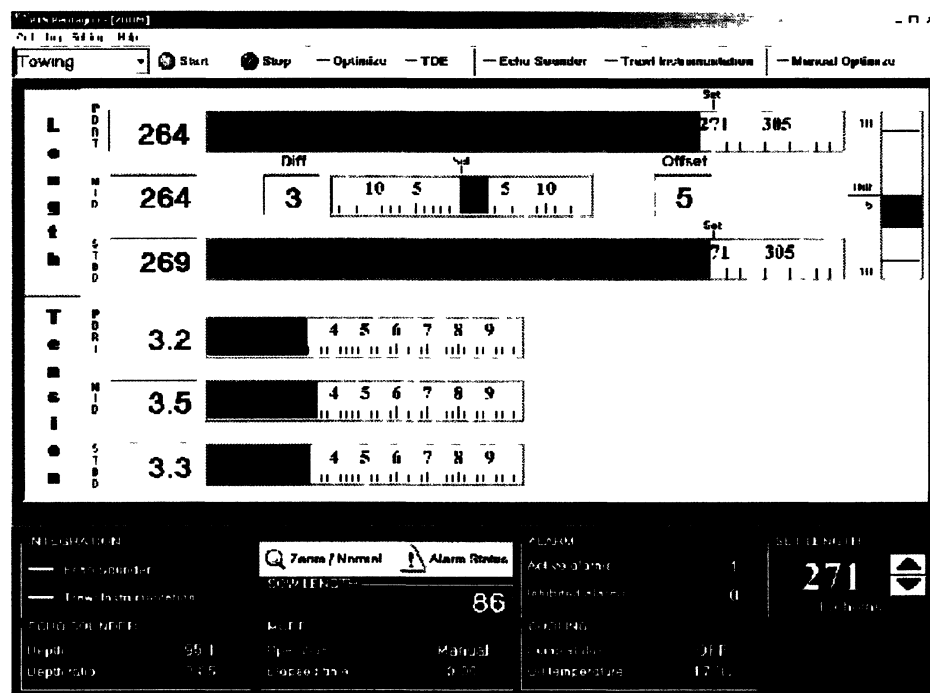
Screen No. 37 Pair trawl



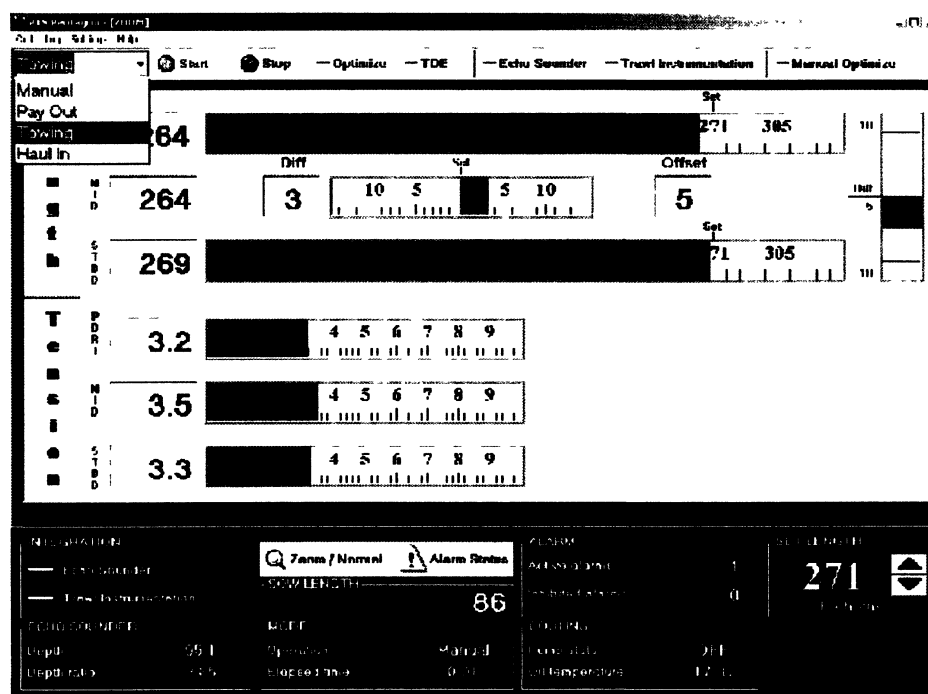
Screen No. 38 Zoom mode – single trawl



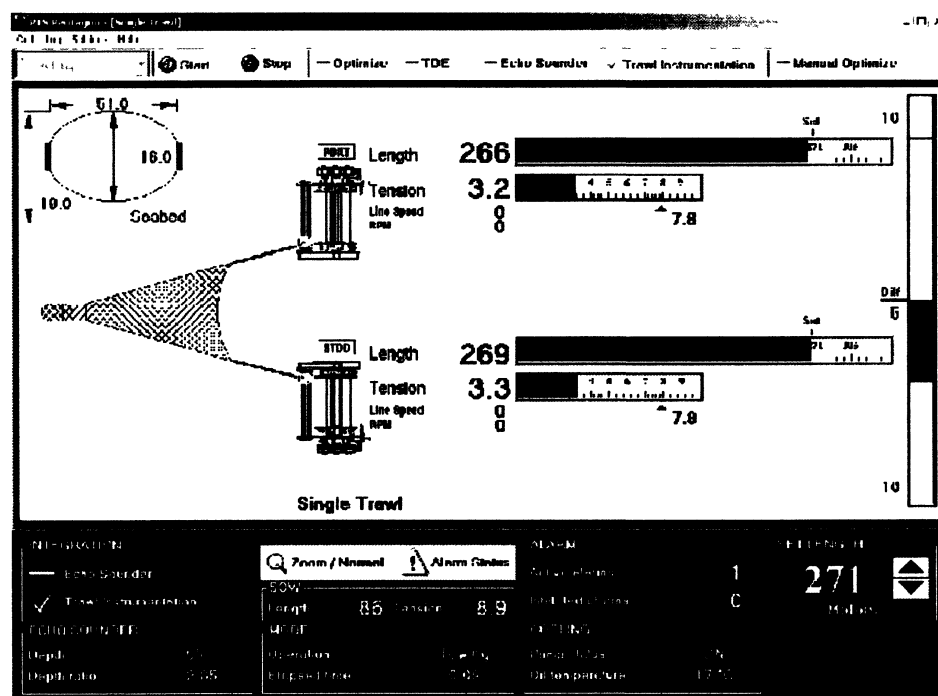
Screen No. 39 Zoom mode – twin trawl



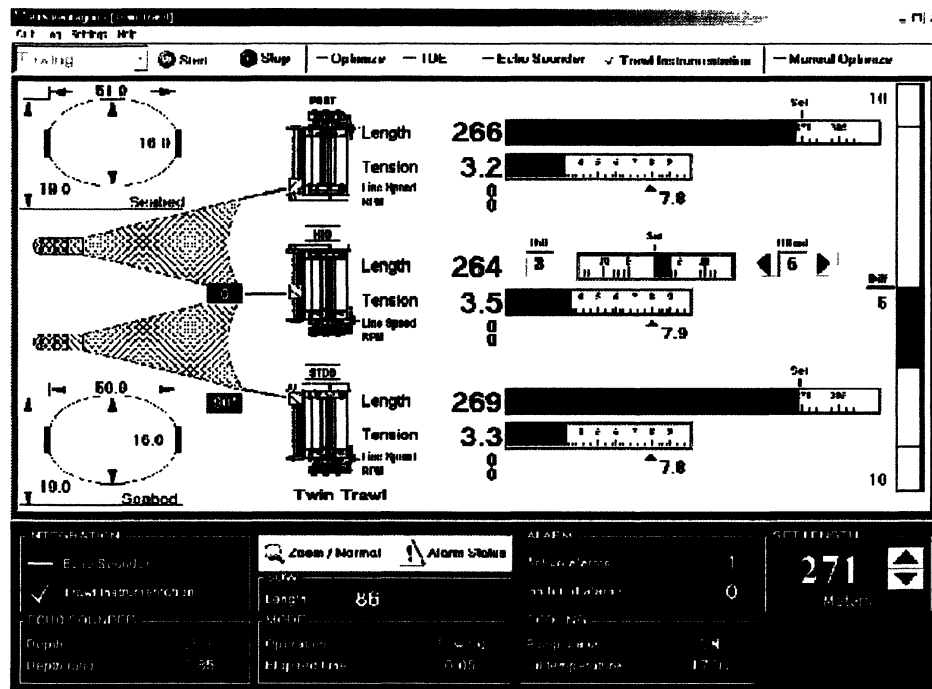
Screen No. 40 Command mode – Zoom



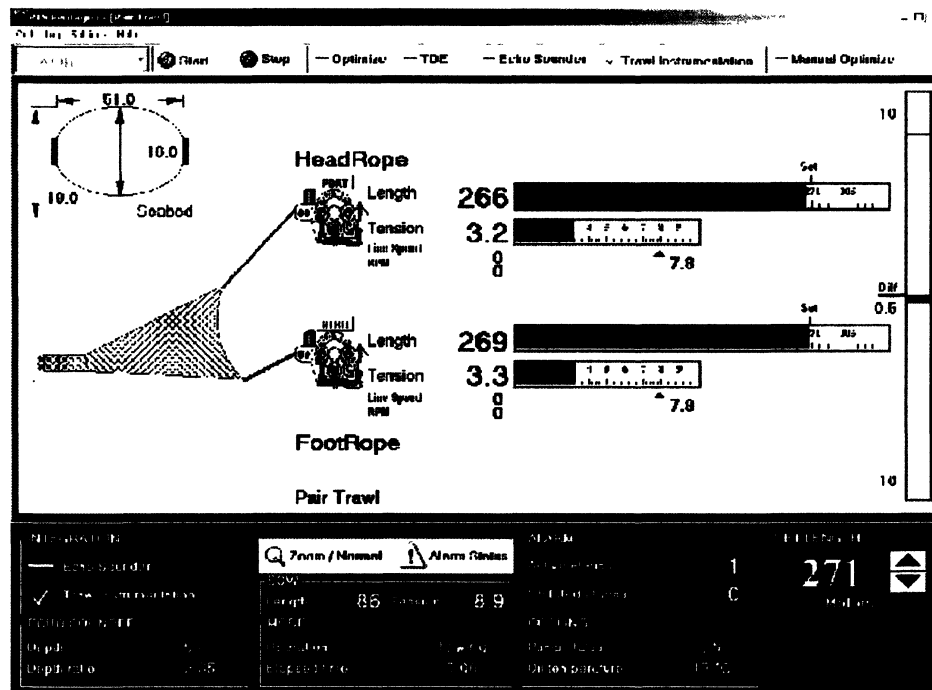
Screen No. 41 Single trawl – Integration



Screen No. 42 Double trawl - Integration



Screen No. 43 Pair trawling - Integration



Screen No. 44 Log Alarms oil filter.

Screen No. 45 Log Max Pressure.

Screen No. 46 Log Max RPM.

Screen No. 47 Log Max Temperature.

Log Window			
File Edit View Options Window Help			
Form 1		100.00	100.00
Max Temperature 100			
Index	Code	Time	Temp
1	0000	00:00:00	100.00
2	0001	00:01:00	100.00
3	0002	00:02:00	100.00
4	0003	00:03:00	100.00
5	0004	00:04:00	100.00
6	0005	00:05:00	100.00
7	0006	00:06:00	100.00
8	0007	00:07:00	100.00
9	0008	00:08:00	100.00
10	0009	00:09:00	100.00
11	0010	00:10:00	100.00
12	0011	00:11:00	100.00
13	0012	00:12:00	100.00
14	0013	00:13:00	100.00
15	0014	00:14:00	100.00
16	0015	00:15:00	100.00
17	0016	00:16:00	100.00
18	0017	00:17:00	100.00
19	0018	00:18:00	100.00
20	0019	00:19:00	100.00
21	0020	00:20:00	100.00
22	0021	00:21:00	100.00
23	0022	00:22:00	100.00
24	0023	00:23:00	100.00
25	0024	00:24:00	100.00
26	0025	00:25:00	100.00
27	0026	00:26:00	100.00
28	0027	00:27:00	100.00
29	0028	00:28:00	100.00
30	0029	00:29:00	100.00
31	0030	00:30:00	100.00
32	0031	00:31:00	100.00
33	0032	00:32:00	100.00
34	0033	00:33:00	100.00
35	0034	00:34:00	100.00
36	0035	00:35:00	100.00
37	0036	00:36:00	100.00
38	0037	00:37:00	100.00
39	0038	00:38:00	100.00
40	0039	00:39:00	100.00
41	0040	00:40:00	100.00
42	0041	00:41:00	100.00
43	0042	00:42:00	100.00
44	0043	00:43:00	100.00
45	0044	00:44:00	100.00
46	0045	00:45:00	100.00
47	0046	00:46:00	100.00
48	0047	00:47:00	100.00
49	0048	00:48:00	100.00
50	0049	00:49:00	100.00
51	0050	00:50:00	100.00
52	0051	00:51:00	100.00
53	0052	00:52:00	100.00
54	0053	00:53:00	100.00
55	0054	00:54:00	100.00
56	0055	00:55:00	100.00
57	0056	00:56:00	100.00
58	0057	00:57:00	100.00
59	0058	00:58:00	100.00
60	0059	00:59:00	100.00
61	0060	01:00:00	100.00
62	0061	01:01:00	100.00
63	0062	01:02:00	100.00
64	0063	01:03:00	100.00
65	0064	01:04:00	100.00
66	0065	01:05:00	100.00
67	0066	01:06:00	100.00
68	0067	01:07:00	100.00
69	0068	01:08:00	100.00
70	0069	01:09:00	100.00
71	0070	01:10:00	100.00
72	0071	01:11:00	100.00
73	0072	01:12:00	100.00
74	0073	01:13:00	100.00
75	0074	01:14:00	100.00
76	0075	01:15:00	100.00
77	0076	01:16:00	100.00
78	0077	01:17:00	100.00
79	0078	01:18:00	100.00
80	0079	01:19:00	100.00
81	0080	01:20:00	100.00
82	0081	01:21:00	100.00
83	0082	01:22:00	100.00
84	0083	01:23:00	100.00
85	0084	01:24:00	100.00
86	0085	01:25:00	100.00
87	0086	01:26:00	100.00
88	0087	01:27:00	100.00
89	0088	01:28:00	100.00
90	0089	01:29:00	100.00
91	0090	01:30:00	100.00
92	0091	01:31:00	100.00
93	0092	01:32:00	100.00
94	0093	01:33:00	100.00
95	0094	01:34:00	100.00
96	0095	01:35:00	100.00
97	0096	01:36:00	100.00
98	0097	01:37:00	100.00
99	0098	01:38:00	100.00
100	0099	01:39:00	100.00

Screen No. 48 NMEA Telegrams

```

@TAWWL,269,M,266,M,,M
@TAWWT,3.3,T,3.2,T,,T
@TAWWS,0,M,0,M,,M,0,0
@TAWL1,0,0,0,
@TAWL2,0,0,0,0
@TAWMD,2
@TAWWL,269,M,266,M,,M
@TAWWT,3.3,T,3.2,T,,T
@TAWWS,0,M,0,M,,M,0,0
@TAWL1,0,0,0,
@TAWL2,0,0,0,0
@TAWMD,2
@TAWWL,269,M,266,M,,M
@TAWWT,3.3,T,3.2,T,,T
@TAWWS,0,M,0,M,,M,0,0
@TAWL1,0,0,0,
@TAWL2,0,0,0,0
@TAWMD,2
@TAWWL,269,M,266,M,,M
@TAWWT,3.3,T,3.2,T,,T
@TAWWS,0,M,0,M,,M,0,0
@TAWL1,0,0,0,
@TAWL2,0,0,0,0

```

Screen No. 49 Monitoring of PLC communication

[illegible]

Screen No. 50 Monitoring of trawl sensors communication

Monitor Trawl Instrumentation

Exit

```

$PSIMS2,M,M,T 50,M,hhmmss*hh
$PSIMTH,16,M,1,M*hh
$PSIMMW,M,M,T 0,M,90,D,,hhmmss*hh
@ITF,0,0,1
$PSIMS1,M,M,T 51,M,hhmmss*hh
$PSIMS2,M,M,T 50,M,hhmmss*hh
$PSIMTH,16,M,1,M*hh
$PSIMMW,M,M,T 0,M,90,D,,hhmmss*hh
@ITF,0,0,1
$PSIMS1,M,M,T 51,M,hhmmss*hh
$PSIMS2,M,M,T 50,M,hhmmss*hh
$PSIMTH,16,M,1,M*hh
$PSIMMW,M,M,T 0,M,90,D,,hhmmss*hh
@ITF,0,0,1
$PSIMS1,M,M,T 51,M,hhmmss*hh
$PSIMS2,M,M,T 50,M,hhmmss*hh

```

Trawl Angle	Filling	Door Spread	Head To Foot	Head To Bottom
90	1 0 2 0 3 1	51	16	19
	2	50	0	0

Status: OK Settings: Com 1, 4800,n,8,1

Screen No. 51 Monitoring of echo sounder communication

Options

Exit Administrator Mode Save Settings

General	Echo Sounder	Trawl Instrumentation	NMEA	Visual
<p> <input checked="" type="checkbox"/> SMTDS,51,M <input checked="" type="checkbox"/> SMHFB,16,M,19,M <input type="checkbox"/> PKDBT,,,95 1,M,,, <input type="checkbox"/> SMSY1,0,N <input type="checkbox"/> SMTFI,0,0,1,0,0,f <input type="checkbox"/> SMTDS,51,M <input type="checkbox"/> SMHFB,16,M,19,M </p>				
<p>Depth</p> <p>95 1 New Header</p>		<p>Telegram Header</p> <p>\$PKDBT OK Cancel</p>		
Settings Com 3, 4800,n,8,1 Status		Header \$PKDBT		

Screen No. 52 Trawl instrumentation options

Options
Exit Administrator Mode Save Settings

General	Echo Sounder	Trawl Instrumentation	NMEA	Visual
---------	--------------	------------------------------	------	--------

Trawl System

Telegram Header

Trawl optimize action

Door Spread

Headrope to Footrope and Bottom

Telegram Header

☐ @IIHFB

☒ \$PSIMTH

☐ ☐ ☐

Estimated trawl speed in knots

Monitor

Settings Com 4 4800,n,8,1 Status

PTS *Pentagon*® - NMEA TELEGRAMS

I:\TEKNISK\Pentagon\2-Operation manual\English\Version 4.10 NOAA\Ch08'EN.doc
Doc.no. RHDOM-PENTAGON-E, Release 1.0, Version 4.10, last updated: 25/06/03

NMEA Telegrams for PTS Pentagon®

Following information can be used to configure NMEA interface communication between *PTS Pentagon®* and other electronic equipment on board.

Mode

"@TAWMD,x<cr><lf>"

- 0 = Manual
- 1 = Pay Out
- 2 = Towing
- 3 = Haul In

Length

The length value is always in meters and with out any decimals.

"@TAWWL,x,M,y,M,z,M<cr><lf>"

- x = STBD Winch Length
- y = PORT Winch Length
- z = Mid Winch Length

Tension

The tension value is always in metric tons and with one decimal.

"@TAWWT,x.x,T,y.y,T,z.z,T<cr><lf>"

- x.x = STBD Winch Tension
- y.y = PORT Winch Tension
- z.z = Mid Winch Tension

Linespeed & RPM

The linespeed value is always in meters per minutes and with out any decimal. RPM is also with out any decimals.

""@TAWWS,x,M,y,M,z,M,m,n,o<cr><lf>"

- x = STBD Winch Linespeed
- y = PORT Winch Linespeed
- z = Mid Winch Linespeed

- m = STBD Winch RPM
- n = PORT Winch RPM
- o = Mid Winch RPM

High Priority Alarms:

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@TAAL1,k,l,m,n<cr><lf>"

k = Oil Level Alarm
l = Wire End Alarm
m = Oil Temp Alarm
n = reserve

Low Priority Alarms

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@TAAL2,u,v,w,x<cr><lf>"

u = Filter Alarm
v = Return Pressure Alarm
w = Overspeed Alarm
x = Max/Min Alarm



RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

PTS *Pentagon*[®]
Research

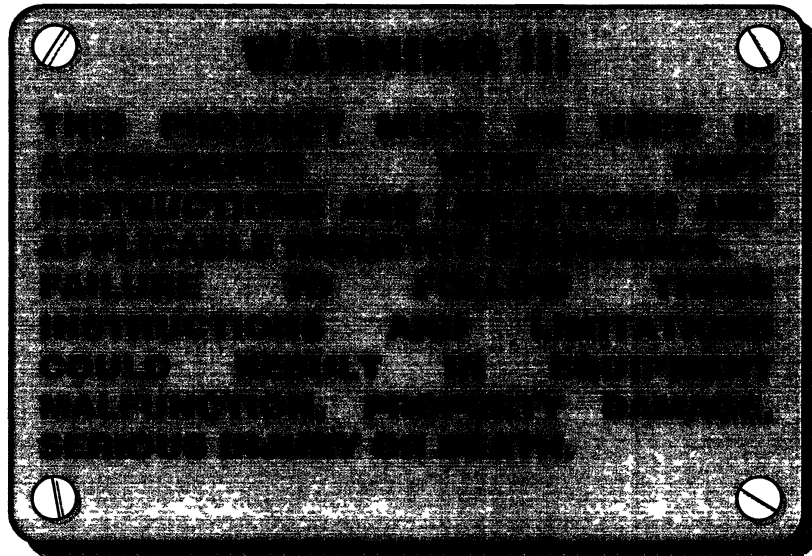
OPERATION MANUAL

Fishery research vessel "Oscar Dyson"

NOAA

PTS *Pentagon*[®]
Research

CHAPTER 01	SYSTEM DESCRIPTION
CHAPTER 02	FUNCTION DESCRIPTION
CHAPTER 03	SYSTEM SET UP
CHAPTER 04	MODES OF OPERATION
CHAPTER 05	TOUCH PANEL SCREENS
CHAPTER 06	NMEA TELEGRAMS





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PTS *Pentagon[®]*
Research

SYSTEM DESCRIPTION

SYSTEM COMPONENTS

PTS *Pentagon* Research **Processing Interface Cabinet**

Processing Interface comprises of Omron Programmable controller and PLC original interface card connected together and built into common steel cabinet to protect and screen electronic components from interference with radio equipment on board. Processing Interface receives information from entire system e.g. switches and analog transducers, processes it and sends back to the system driving commands directly or via ABC Winch Interface. Processing Interface is also hooked up to the Touch Screen (NT Panel). Processing Interface unit requires 110v AC type power supply. Unit has to be mounted in the wheelhouse or any other dry environment room in accordance with cable diagram RH 105924.

PTS *Pentagon* Research **ABC Interface**

ABC (amplifier base card) Interface is a separate unit, supplied loose. It is wired out to Processing Interface when installed on board. The ABC Interface amplifies analog signals received from Processing Interface. Further signals are being transferred to executive proportional solenoid valves in hydraulic system. ABC Interface card can be equipped with up to four original Rapp Amplifier Cards for proportional pressure/directional control of main winches. Four built-in relays are employed to control on/off solenoids. ABC Interface has to be mounted in the wheelhouse or any other dry environment room. It does not require separate power supply.

PTS *Pentagon* Research **Touch Screen (NT Panel)**

As a matter of fact Touch Screen is the control panel and is of the LCD color touch screen type, point and press. All the vital data for the system is entered via and displayed on the Touch Screen. From this panel operator is able to control all automatic modes, observe system current status and retrieve logged information. Touch Screen is normally placed in the wheelhouse nearby Research Winches Control Panel.

PTS *Pentagon* Research **Research Winches Control Panel**

This is electric remote control panel for the research winches manual direction and pressure control. The panel contains:

- Joysticks with a built-in activation button, one for each winch.
- Electric pressure gauges for each winch and illumination dimmer.
- General Emergency Stop switch.
- Potentiometer and its activation button for manual pressure control.
- Control activate switch.

PTS *Pentagon* Research **External Alarm Unit**

This unit is connected to the system's alarm output and will sound a system alarm. The volume and type of signal may be selected. Unit is located in the wheelhouse.



RAPP HYDEMA

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Research

FUNCTION DESCRIPTION

I:\TEKNISK\Pentagon research\Operational Instruction\English\Ver.2.0\NOAA\Ch02R'EN.doc
Version 2,0, last updated: 22/05/03

2-speed ratio	10	Outer circumference.....	9
Alarm count	13	Outputs	12
Alarm out select.....	14	Over speed alarm	5
Alarm sound pattern	9	Password	16
Alarm unit test	9	Pay out RPM limit	7
Alarms	4	Pay out speed control	7
Alarms history	5	Pop up keyboard	9
Block.....	3	Potmeter control programming	12
Block counting.....	10	Pprogram version	11
Block sircumference	10	Pressure readings	10
Command	3	Protected settings	13
Control of line speed in haul in mode	7	Reg. trend.....	12
Dead End Stop limit	10	Reset length.....	9
Decrease	6	Reset sound alarm	4
Drum width.....	9	Return pressure alarm	5
Fathoms	8	Return pressure alarm limit.....	8
Gain control	7	RPM	3
High tension alarm	5	Safety Range	8
Increase.....	6	Select winch	13
Increase/Decreases active	9	Sensor values simulation.....	10
Initial Settings.....	7	Set Length	3
Initiate.....	14	Simulation	10
Joystick active period	9	Simulation alarms	11
Joystick control programming	12	Simulation length.....	10
Limits.....	8	Simulation speed.....	10
Linear Speed.....	3	Specific torque for WDU	9
Load cell	14	Speed steps control	4
Log.....	11	Start/Stop Automodes	6
Low tension alarm	5	Stop system	11
Main pump(s) on/off.....	4	System parameters settings	7
Manual.....	3	System pressure control	6
Manual override.....	6	Tension.....	3
Manual pressure control	6	Tension monitoring	14
Max/min alarm limits	7	Tension update.....	8
Max/min difference alarm	5	Towing flow settings.....	7
Menu.....	7	Towing output control.....	12
Minimum Pay Out Tension	8	Towing RPM limit.	8
Multi set point.....	15	Towing tension limit.....	7
Near Safety Range warning.....	9	Two speed operation pressure.....	8
Near Set Point warning.....	8	Two Speed output	12
Next	15	Two speed towing	6
NMEA out select	15	Winch parameters	9
Number of winches.....	7	Wire angle.....	13
Oil filters dirt alarm.....	5	Wire covered angle	14
Oil high temperature alarm.....	5	Wire diameter.....	9
Oil level alarm	5	Wire end.....	5
Oil temperature.....	3	Wire length calculation	10
Operation screen	3	Working hours log	11

FUNCTIONS

OPERATION

Operation menu access. The button leads to OPERATION screen once pressed. By pressing OPERATION button you will get into one of those specific screens Pay Out, Haul In or Towing depending on which mode has been previously started in COMMAND screen. MANUAL operation screen will appear if none of auto modes has been selected.

NT-Panel screens: * **COMMAND** *, * **MENU***

COMMAND

This button is used to return to Command screen.



Arrows for manual increase/decrease of Set Length.

TENSION

Displays current tension on cables in all active operation modes. If sign BLOCK on the green back ground present on the screen then tension figure is read out from the block load cell, otherwise it is recalculated from system pressure.

TENSION STATIC

Displays current tension on in wire when winches are parked on the brakes, if the system is equipped with tension sensors.

Normally not equipped.

RPM

Displays revolutions per minute RPM on the winch drum. Sign “-“ comes up in front of figures when Haul In.

LINE SPEED

Displays current Linear Speed value of winch wire in units per minute.

ACTIVE

Displays number of currently active alarms.

INHIBIT

Displays number of inhibited alarms



Green color of this icon indicates that main pump output is on.



Displays current oil temperature.

NT-Panel screens: * **OPERATION** *



MAIN PUMP**Main pump(s) on/off switch**

This function activates an output that makes it possible to start electric motor to operate hydraulic pump. This function acts as a system's general stop in the event of an oil level alarm or emergency stop.

NT-Panel screens: * **COMMAND** *, * **MANUAL OVERRIDE***

SPEED

Speed steps. This function activates speed steps on the winches. At this automatic pressure control is based on calculation of the winches' current pressure, maximum pressure and Winch Drive Unit configuration. When the button has been pressed, system automatically activates speed step 2. The system deactivates the speed step automatically in the same manner as indicated by sensing the system pressure.

This function has to be configured in screens INITIAL SETTINGS, WINCH PARAMETERS and OUTPUT CONTROL.

This function may also be engaged in manual mode.

NT-Panel screens: * **COMMAND** *

ALARMS

By pressing ALARMS button, operator enter **Alarms overview** screen

It gives specific alarm status for each alarm type. All alarms except Oil level and Wire end alarms can be temporarily inhibited.

Number of active and inhibited alarms is also displayed in the Operation screen.

NT-Panel screens: * **MENU** *, * **OPERATIONS***

**OFF**

Button to reset sound alarm.

Button to return in previous screen or enter set value.

OIL LEVEL	Oil level alarm. Alarm and System General STOP when oil level in main hydraulic tank drops below limit. It is not possible to work with system when this alarm is active. The alarm cannot be inhibited.
WIRE END	Wire end alarm. Alarm and System General STOP when wire length reaches Dead End Stop, configured in the WINCH PARAMETERS screen. The alarm cannot be inhibited.
OIL FILTER	Oil filter alarm. Oil filters dirt alarm. Check light indication on filter's cap to find out which particular filter(s) has been plugged. There is 15 min cold start delay on oil filter alarm.
OIL TEMP	Oil temperature alarm. Oil high temperature alarm. Appears when temperature of oil rises above 55-60 degrees Celsius, also depending in the acceleration of the heat increase.
RETURN PRESSURE	Return pressure alarm. It indicates when pressure in the return line drops below set value while in Auto TOWING mode. This could occur if towing pump(s) stop by any reason or when winches rushing out because of a snag. Alarm is only to warn skipper, it does not stop Auto Towing mode. Limit value is set in screen INITIAL SETTINGS.
OVERSPEED	Over speed alarm. May occur only during Auto Pay Out and Towing when RPM on winch drum exceed set value. The alarm does not affect any function during Towing. Alarm limit value is set in the screen INITIAL SETTINGS, PAY OUR RPM LIMIT and TOWING RPM LIMIT.
MAX/MIN DIFF	Max/min difference alarm. It goes ON if actual wire length is outside min/max range set in menu SETTINGS WINCH.
TOWTENS HI	Alarm of high tension while towing. Green color of the sign TOW TENS HI in ALARM OVERVIEW will turn to red, that indicates a warning that the towing tension is higher than the limit set in SETTINGS MENU
PAY OUT LO	Alarm of low tension while Pay Out. Green color of the sign PAY OUT LO in ALARM OVERVIEW screen will turn to red when tension on winch is dropping below set value. Alarm Limits are established in INITIAL SETTINGS menu. When alarm occurs, pressure regulation will be suspended. Increase vessel's speed or decrease shooting speed to avoid emerging of this alarm.

ALARM HISTORY

Alarm history. The button, if pressed, leads to the separate screen ALARM HISTORY that has overview of all recently engaged modes and appeared alarms. Operation mode or type of alarm together with its date (yy/mm/dd) and time (hh:mm) are shown in the log. Latest mode/alarm comes always on top of the list. Searching in the list is available by using scroll/page up/down arrows on the side of the screen.

NT-Panel screens: * **ALARM OVERVIEW** *

**MANUAL
OVERRIDE**

System pressure control.

This button brings up MANUAL OVERRIDE screen with the set of functions for advanced winch control.

Temporarily override the system's regulation of pressure (tension) by means of the "INCREASE" and "DECREASE" buttons.

The background of message MANUAL will turn green if corresponding button has been pressed on L2 remote control panel.

NT-Panel screens: * **COMMAND** *

INCREASE

Increases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

DECREASE

Decreases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

**2 SPEED
TOWING**

Two-speed in towing on/off switch. The button gives an opportunity to engage speed step(s) while in Towing. Note that only 2-speed could be engaged. This function may be useful sampling on rough grounds as well as to increase winches' sensitivity when towing pressure is too low. This button has direct control on engaging 2-speed in Towing while SPEED button has no function assigned. Located in the MANUAL OVERRIDE MENU

MANUAL

Manual system pressure control. Green background of MANUAL sign indicates that system pressure control has been switched over to Manual mode. Hereby pressure on both winches is controlled simultaneously.

NT-Panel screens: * **MANUAL OVERRIDE** *

START

STOP

Start or Stop automatic mode. Start/Stop buttons activate/deactivate specific auto-function in the COMMAND screen. These functions are Pay out, Towing and Haul in.

NT-Panel screens: * **COMMAND** *



SETTINGS

Menu for setting system parameters. Button gives an access to the menu for setting system parameters. It is advisable to use it only for personnel authorized to work with **PTS Pentagon** Research.

**MAX/MIN
VALUE**

**MAX TOWING
TENSION**

**TOWING
FLOW**

**GAIN
CONTROL**

Min/Max deviation from set point. Max/min alarm limits of wire length deviation (+/-) from the set point.

Towing tension limit. Maximum allowed tension during towing.

Value in the **TOWING FLOW** setting sets the control valve in a fixed position during towing means action speed on the winch. Default value 40%.

Winches behavior during towing. Figure 1 gives quick system response (good weather). Winches become most sensitive. Figure 10 provides very slack system response (poor weather). Winches become stiffer.

HAUL IN LINE SP

Regulation by line speed in haul in mode. Constant pull in speed will be maintained at around the selected value while tension of wire will vary.

PAY OUT LINE SP

Regulation by line speed in pay out mode. Constant pay out speed will be maintained at around the selected value while tension of wire will vary.

NT-Panel screens: * **COMMAND** *, * **MENU** *

MENU

Main Menu. The button leads to Main MENU screen where all other screen access buttons are placed.

NT-Panel screens: * **OPERATION** *

INITIAL

Initial Settings menu Button gives access to menu for setting parameters and function options.

NT-Panel screens: * **PROTECTED MENU** *

NUMBER OF WINCHES

NUMBER OF WINCHES hooked up to and controlled by the Pentagon Research system.

The system configuration is based also on the amount of the winches you have totally in the system, that are included in the system.

PAY OUT, RPM LMT

Pay out RPM limit. Maximum RPM on main drums limited for Pay out mode.



MIN P/O TENSION

Minimum Pay Out Tension. Factor for setting minimum allowable tension in tons in AUTO PAY OUT mode when regulation by PAY OUT LINE SP has been chosen (screen SETTINGS). If value is reached, alarm PAY OUT LO will show up (ALARM OVERWIEV screen). While alarm is active automatic shooting speed regulation will be temporarily terminated unless tension stabilizes above set value.

TOWING, RPM LMT

Towing RPM limit. Factor for setting maximum allowable RPM while in Auto Towing mode. System will turn on Over speed Alarm when winches RPM exceed set value.

RET. PR. AL. LIMIT

Return pressure alarm limit. It sets return pressure limit for alarm on low return pressure on winches only when in auto TOWING mode.

2 SP OPER PRESS

Two speed operation pressure. Sets maximum pressure in bar as upper limit for the system while shifting SPEED steps.

TENSION UPDATE

Tension figures display update. Tension is calculated/updated as an average of few tension readings for given period of time. This period of time can be set from relatively short (1) to relatively long (3) depending of weather conditions/experience.

METERS

Selects meters as wire length measuring units.

FATHOMS

Selects fathoms as wire length measuring units.

NT-Panel screens: * **INITIAL SETTINGS** *

LIMITS

Limits menu button gives an access to menu for setting more parameters and function options.

NT-Panel screens: * **PROTECTED MENU** *

AUTO START/STOP

Defines **Safety Range limit**. Value from 10 to 999 could be set in meters/fathoms. Crossing this border the system will automatically start/stop PayOut/HaulIn mode. Only Manual operations are allowed within the Safety Range.

NEAR SET POINT

Near Set Point warning. Sets the distance to the Set Point where the system will give short beep signal to warn the operator to reduce boat speed near Set Point.



PREP. STOP HAUL

Near Safety Range warning. Sets the distance to the Safety Range where the system will give short beep signal to warn the operator before Haul In mode is automatically disengaged.

JOYSTICK ACTIVE

Joystick active period. Sets time in seconds for winches remote control electric joysticks to be active after safety (yellow) button on tip of the grip has been pressed.

INCR/DECR ACTIVE

Increase/Decreases active. Time in seconds for INCREASE/DECREASE function buttons to be active once pressed. Buttons are placed in the MANUAL OVERRIDE NT-panel screen.

ALARM TYPE

Defines type of sound pattern. Five different patterns are available. Pattern 5 is continuous sound. This must be set when external alarm unit is used.

ALARM TEST

Alarm unit test button. Sound alarm will be heard as long as the button is pressed.

NT-Panel screens: * **LIMITS** *

RESET LENGTH

Reset length counters. The button is built into pop-up keyboard. To get keyboard up on screen press SET LENGTH area in OPERATION screen or any other field in menus where digital parameters are entered. The function resets length counter on the hydrographic winch to zero. It is used when device is hooked up and ready for shooting or wherever you want to start. Reset has to be confirmed by pressing YES! in RESET LENGTH pop-up window.

NT-Panel screens: * **POP UP KEYBOARD** *

**WINCH
PARAMETERS**

Winch parameters Button provides an access to the separate menu screen for setting hydrographic winch parameters. Values are set separately for each winch. Parameters are used in the program for length and pull calculation.

NT-Panel screens: * **PROTECTED MENU** *

DRIVE TORQUE

Specific torque for the Winch Drive Unit, value is provided by Rapp Hydema A/S, set in Nm/Bar.

OUTER CIRC.

Outer circumference of the winch drum external diameter with all cable spooled on, set in mm.

DRUM LENGTH

Distance measured between drum shields, set in mm.

**WIRE
DIAMETER**

Wire diameter, set in mm.



DEAD END STOP

Safety operation limit – maximum length of wire allowed the system to be paid out from the winch drum in any of Auto modes. Value is set in length measuring units. When crossing Dead End Stop limit, system will terminate Auto mode and close winch parking brake. Only Manual mode will be available unless wire length back in working range.

**LENGTH
ADJUST**

Calibration value, which is used for wire length calculation. Compensates for spooling deviation, value is set from 1 to 18 (default - 9).

**POWER X
2SPEED**

Reduction ratio is used for winch pull calculation in the program when 2-speed option is engaged. Parameter set in units 1/10000. Same value is applied for Stbd and Port winch.

BLOCK CIRCUMF.

Circumference of the block in the spooling device which is used for wire length/speed counting.

BLOCK COUNTING

Button to switch wire length/speed counting between counting from the block or from the winch drum. If button background is green COUNTING from BLOCK has been selected.

NT-Panel screens: * **WINCH PARAMETERS** *

SIMULATION

The button leads to Simulation menu. This is a menu for simulation of running the winches and the sensor values in the system during start up or troubleshooting/adjustment.

NT-Panel screens: * **MENU** *

**SENSOR
VALUES**

The button enables/disables pressure and temperature simulation. Green background of the button indicates that pressure/temperature simulation is currently active.

PRESS P

Pressure Pay Out. Winch pressure on Pay Out side.

PRESS H

Pressure Haul In. Winch pressure on Haul In side.

OIL TEMP

Oil temperature. Temperature of oil in the return line.

**LENGTH
SIMULATE**

Length simulation. Displays figures of current simulated length.

OUT

Button to start simulation of Pay Out mode. Green background indicates when simulation OUTwards is active.

IN

Button to start simulation of Haul In mode. Green background indicates when simulation INwards is active.

PULSE CYCLE

Defines IN/OUT simulation speed. Figures 1, 2 and 3 can be entered. Figure 1 gives max simulation speed.



**OIL LEVEL
ALARM**

Simulates Oil Level alarm.

**OIL FILTER
ALARM**

Simulates Oil Filter Plugged alarm.

NT-Panel screens: * **SIMULATION** ***STOP SYSTEM**

Brings up SYSTEM STOP screen. Operator is asked if he really wants to Stop the system. To proceed press YES! To go back to MENU screen press NO!

NT-Panel screens: * **MENU** ***VERSION NO. HMI**

Displays NT touch screen program version.

VERSION NO. PLC

PLC program version.

NT-Panel screens: * **SYSTEM STOP** ***LOG INFO**

Brings up WORKING HOURS screen. Working hours are logged separate for servo and main pumps.

NT-Panel screens: * **MENU** ***PAY OUT AUTO**

PAY OUT mode running hours log.

HAUL IN AUTO

HAUL IN mode running hours log.

TOWING 80-110 BAR

Logging system working hours when pressure is in range 80-110 bar in towing mode of operation.

TOWING 110-140 BAR

Logging system working hours when pressure is in range 110-140 bar in towing mode of operation.

TOWING > 140 BAR

Logging system working hours when pressure is over 140 bar in towing mode of operation.

NT-Panel screens: * **WORKING HOURS** *

OUTPUTS

Button to access OUTPUT CONTROL screen. Outputs settings are related to the system design and normally carried out during startup by Rapp Hydema engineer.

NT-Panel screens: * **PROTECTED MENU** *

TWO SPEED OPER.**Control of 2 - 3 speed output.****HAUL**

Speed shifting only takes place when Auto Haul In mode is active.

H & P

Speed shifting takes place in both Auto Haul In and Auto Pay Out modes.

ON TOW

Speed shifting takes place also in towing mode.

TOWING OPER.**Control of Towing output.****AUTO ON**

Program turns ON Towing output automatically when master length reaches Set Point.

NOT ON

Program does not turn ON Towing output when master length reaches Set Point. Operator has to start Towing mode manually by pressing corresponding START button.

JOYSTICKS**COMMON**

Program the system to use only one joystick. Always set to COMMON for hydrographic winch.

JOYSTICKS**SEPARATE**

Program the system to use only separate joystick, and each respective joystick will be controlling the winch selected. Must not be used for hydrographic winch set up.

POTMETER**COMMON**

Program the system to use only one potmeter, and this will be controlling the winch selected. Always set to COMMON for hydrographic winch.

POTMETER**SEPARATE**

Program the system to use only separate potmeter, and each respective potmeter will be controlling the winch selected. Must not be used for hydrographic winch set up.

NT-Panel screens: * **OUTPUT CONTROL** *

REG. TREND

The button, once pressed, brings up REGULATOR OPERATION screen. This screen is submitted for troubleshooting carried out by RAPP HYDEMA AS authorized personnel.

NT-Panel screens: * **MENU** *

WIRE ANGLE

The button to access WIRE ANGLE MONITOR screen. This option provides wire direction control both in longitudinal and transversal directions.

NT-Panel screens: * **MENU** *

INIT↔**INIT↑**

This buttons are submitted for zero-calibration of the inclinometer. There are 2 buttons of the same type for every winch (all together 4 buttons for two winches). Buttons on top are to calibrate angle athwart-ships. Lower buttons are for longitudinal zeroing. Sign WIRE 1 or 2 indicates which winch it belongs to. Measured angle presented by both graphs and figures. Negative figures (red graphs) means that wire angled to the bow and inwards. Positive values (green graphs) indicates that wire angled to the stern and outwards. Boat silhouette represents the reference point. Zeroing has to be done when wire pointing straight down, e.g. device hanging out of board, ready for launching. Online angle monitoring is always performed for both winches irrespectively which one has currently active control.

NT-Panel screens: * **WIRE ANGLE MONITOR** *

SELECT WINCH

Only one hydrographic winch at a time can be controlled by PTS Pentagon Research. This button activates screen SELECT WINCH where operator can choose which winch is to be presently active (controlled).

NT-Panel screens: * **MENU***, ***COMMAND***

WINCH 1(2)

Press corresponding button to select the winch that will be automatically controlled by PTS Pentagon Research.
NB! Be very attentive and careful doing your prime move. Make sure you selected the winch that you were really intending to operate.

NT-Panel screens: * **SELECT WINCH***

ALARM COUNT

This button brings up ALARM COUNTS screen. It is used to present number of main system alarms and working hours. Screen ALARM COUNTS shows number of oil level, oil temperature, filter and return pressure alarms together with working hours for the system, main pump and high temperature operation. Figures are valid for the winch that is currently selected (active).

NT-Panel screens: * **MENU** *

**PROTECTED
SETTINGS**

The button submitted to reach PROTECTED MENU screen. Protected menu has in turn 10 different buttons to access other system parameters and settings.

NT-Panel screens: * **MENU** *



**TENSION
MONITOR**

The button leads to settings for wire tension monitoring. Operator may choose one of three different set ups available in conjunction with wire tension measuring.

NT-Panel screens: *** PROTECTED MENU ***

WH1(2)

Load cell range - maximum calibrated tension value for winch 1 and winch 2, sets in tons.

INITIATE

Press INITIATE button to calibrate zero when wire free from any load (device).

**WIRE COVERED
ANGLE**

A parameter that is used in tension calculation. Set by Rapp Hydema personnel.

**LOAD CELL
ALWAYSON**

This means that tension is measured always only by Load Cell. This particular situation is indicated by sign BLOCK (next to TENSION) with green back ground, on the COMMAND screen.

**PRESS TR. ALWAYS
ON**

When option selected, pressure drop across the winch drive is a source for wire tension calculation. System Pressure is constantly measured by two pressure transmitters one installed in the pressure line another in the return. When winch stands still there is no pressure drop in the system and tension therefore will display zero regardless to the real tension of the wire.

STAT/DYN SELECT

This option provides an active system scan control. When winch is moving (haul in, pay out, towing or manual control) pressure drop is sensed and recalculated to tension. When winch stops (does not move at any direction for more then 4 sec., or oil pressure is less then 30 bar measured in pressure line) tension is read directly from load cell.

NT-Panel screens: *** TENSION MONITOR***

**ALARM
SELECT**

Press this button to get an access to the ALARM OUT SELECT screen. This makes it possible to configure alarms delivered outside the system (e.g. to engine room).

NT-Panel screens: *** PROTECTED MENU ***

**OIL LEVEL
WIRE END
OIL FILTER
OIL TEMP
OVERSPEED**

Press corresponding button(s) to choose type of alarm(s) to be sent outside the system. Button receives green background once alarm has been selected. Red field on the left indicates when alarm is presently active.

OUTPUTMONITOR

Output monitor, red circle, will turn ON if one or more alarms have been selected.

NT-Panel screens: *** ALARM OUT SELECT ***

**NMEA OUTPUT
SELECT**

The button gives an access to NMEA OUT SELECT screen. This option provides an opportunity to configure system information that can be sent outside the system via com port using NMEA telegram.

NT-Panel screens: * **PROTECTED MENU** *

WINCH MODE
WIRE LENGTH
WIRE TENSION
WIRE SPEED
WIRE ANGLE

Select required information to be included in the telegram by pressing corresponding button. It turns green when selected. Information is always collected/transferred simultaneously from winch 1 and 2 irrespective of which one is presently controlled.

ALARM 1
ALARM 2

ALARM 1 means Oil Level Alarm, Wire End Alarm, Oil Temp Alarm.

ALARM 2 means Filter Alarm, Overspeed Alarm, Max/Min Alarm.

Only one of these alarms sets can be chosen for output telegram.

REPEAT EVERY

This figure sets frequency of telegram exchange. More information regarding telegrams format is described in Chapter 6.

NT-Panel screens: * **NMEA OUT SELECT** *


MULTI SETPOINT

Press this button to bring up MULTI SET POINT screen. The screen allows programming up to ten different set points and activating Multi Set Point mode.

NT-Panel screens: * **PROTECTED MENU** *


MULTI

MULTI SETPOINT screen has an opportunity to program in advance up to 10 different Set Length points.

If MULTI button is pressed (green background) Multi Setpoint mode is active. Symbol  pops up automatically on the OPERATION screen also indicating that Multi Setpoint mode is currently active.

NEXT

When MULTI mode is ON, pressing button NEXT makes the system jump over to the next set point in the list. However in order to reach this new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).

Symbol  on the Operational screen may also be used to jump over to the next set point.

NT-Panel screens: * **MULTI SETPOINT** *



PASSWORD ENABLE

Button sets/removes password protection for PROTECTED SETTINGS menu. Background green color indicates that password has been enabled.

NT-Panel screens: * **PROTECTED MENU** *

Enter Password No

Passwords are provided on a special security card. There is a table containing 20 four digits passwords numbered from 1 to 20. If password option is enabled, system asks for the password No. before operator will be able to reach PROTECTED MENU. Corresponding password has to be looked up at the security table and punched on the screen. When password no. 20 has been used, sequence begins with no.1 again.

NT-Panel screens: * **PASSWORD** *



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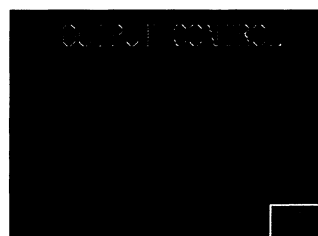
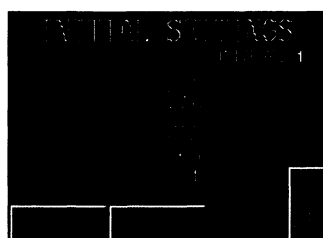
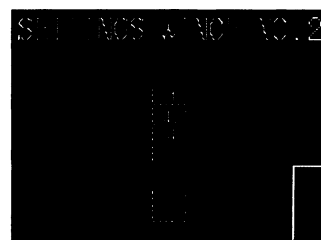
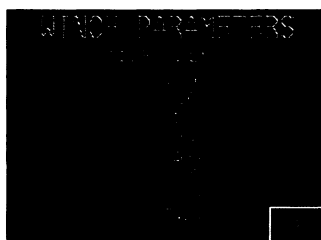
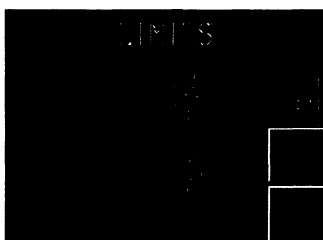
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SYSTEM SET UP

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Version 2.0, last updated: 22/05/03

For setting up the system for a specific vessel, correct parameters in the following menus have to be set:

- * LIMITS * for each winch.
- * WINCH PARAMETERS * for each winch (**important**)
- * SETTINGS * for each winch (**important**)
- * INITIAL SETTINGS * for each winch.
- * OUTPUT CONTROL * common setting for all winches.



PTS *Pentagon*^{research} computer is delivered with default values set in memory. However, correct figures valid for the project must be set before sea trials.

NB! Following tables have to be filled in during starting up the system. Copy of this document must be send to Rapp Hydema A/S, Bodø, Norway, and also kept onboard for default checking.

VESSEL / SYSTEM INFORMATION

Boat name:	Installation date:
Owner:	HA No.:

Program version PLC:	
Program version NT:	

*Figures in brackets are default values***LIMITS****WINCH NO 1****WINCH NO 2**

AUTO START/STOP	(50 units)	(50 units)
NEAR SETPOINT	(75 units)	(75 units)
PREP. STOP HAUL	(50 units)	(50 units)
JOYSTICK ACTIVE	(5 sec)	(5 sec)
INCR/DECR ACTIVE	(5 sec)	(5 sec)
ALARM TYPE	(5)	(5)

WINCH PARAMETERS**WINCH NO 1****WINCH NO 2**

DRIVE TORQUE	(70 Nm/bar)	(70 Nm/bar)
OUTER CIRCUMF.	(3500 mm)	(3500 mm)
DRUM LENGTH	(905 mm)	(905 mm)
WIRE DIAMETER	(9.5 mm)	(9.5 mm)
DEAD END STOP	(3500 m)	(3500 m)
LENGTH ADJUST	(9)	(9)
POWER X 2 SPEED	(5000)	(5000)
BLOCK CIRCUMF.	(990 mm)	(990 mm)
BLOCK COUNTING	(YES)	(YES)

INITIAL SETTINGS**WINCH NO 1****WINCH NO 2**

NUMBER OF WINCHES	(2)	(2)
PAY OUT, RPM LMT	(60 rpm)	(60 rpm)
MIN P/O TENSION	(0.5 ton)	(0.5 ton)
TOWING, RPM LMT	(10 rpm)	(10 rpm)
RET. PR. AL. LMT	(8 bar)	(8 bar)
2 SP OPER PRESS	(160 bar)	(160 bar)
TENSION UPDATE	(2)	(2)
SELECT UNITS	<input type="checkbox"/> METERS <input type="checkbox"/> FATHOMS	<input type="checkbox"/> METERS <input type="checkbox"/> FATHOMS

OUTPUT CONTROL

TWO SPEED OPER.	<input type="checkbox"/> HAUL	<input type="checkbox"/> H & P	<input type="checkbox"/> ON TOW
TOWING OPER.	<input type="checkbox"/> AUTO ON	<input type="checkbox"/> NOT ON	
JOYSTICKS	<input type="checkbox"/> COMMON	<input type="checkbox"/> SEPARATE	
POTMETER	<input type="checkbox"/> COMMON	<input type="checkbox"/> SEPARATE	

SETTINGS WINCH**NO 1****NO 2**

MAX/MIN VALUE	(10 units)	(10 units)
MAX TOW TENSION	(1 ton)	(1 ton)
TOWING FLOW	(40%)	(40%)
GAIN CONTROL	(5)	(5)
HAUL IN LINE SPEED	(100 units/min)	(100 units/min)
PAY OUT LINE SPEED	(100 units/min)	(100 units/min)



WORKING HOURS LOG**WINCH 1****WINCH 2**

SYSTEM ON		
MAIN PUMP		
TEMPERATURE > 60° C		
PAY OUT AUTO		
HAUL IN AUTO		
TOWING 80-100 BAR		
TOWING 100- 140 BAR		
TOWING > 140 BAR		

ALARM COUNTS**WINCH 1****WINCH 2**

OIL LEVEL		
OIL TEMPERATURE		
FILTER ALARM		
RETURN PRESSURE		

*Figures were set by:**(Company, name and signature)**Date:*

Other notes:





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MODES OF OPERATION

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Version 2 0, last updated 22/05/03

PREPARATION FOR STARTING UP THE SYSTEM3

MANUAL MODE.....3

AUTOMATIC MODES4

AUTO PAY OUT5

AUTO TOWING.....6

AUTO HAUL IN7

AUTOMATIC MODES (advanced control)8

All data for the winch system normally loaded to the memory during start up by Rapp Hydema's service engineer. To check/correct system parameters go through settings menus (*SETTINGS*, *INITIAL SETTINGS*, *WINCH PARAMETERS*, *LIMITS*, *OUTPUT CONTROL*, for every winch and make sure that all data and parameters are correct. You will find initial data for the system in Chapter "SYSTEM SET UP".

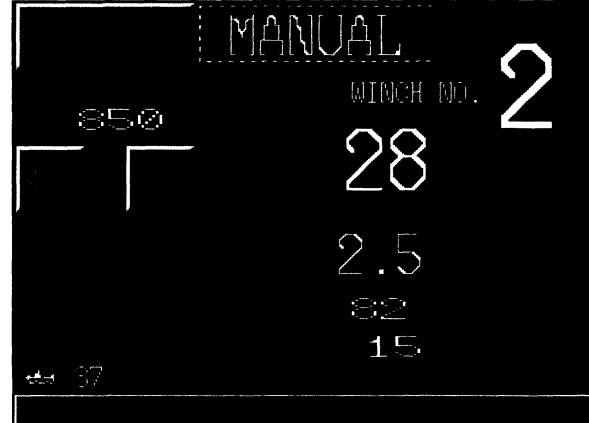
PREPARATION FOR STARTING UP THE SYSTEM

Turn on power supply for the system. Choose the language on the initial screen and read/accept warning message.

After this system enters MANUAL mode screen. In order to make it possible to start winch's hydraulic pump press COMMAND button to reach COMMAND screen and there press MAIN PUMPS button. Pump is driven by electric motor and in additional requires start from the separate (L4) panel. All winch automatic modes and remote controls are available only if hydraulic pump is running.

MANUAL MODE

This is general mode for the system operation inside "safety range", (when none of automatic modes can be started). System always returns to the manual mode outside safety range if operator stops automatic modes. In manual mode winches can be controlled both from the bridge (joysticks) and from local stand (control valves).



Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Winch no. in operation, indication (no in window);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign – appears when heaving);
- Tension (tons) both dynamic and static (when winches parked on the brakes);
- Line speed (units/min).



Number of current active and inhibited alarms monitored on the bottom line of the screen. By pressing this area you can check status of all current alarms on the *ALARM OVERVIEW* screen.

Press COMMAND button to enter into the corresponding screen. Some extra functions for the manual mode are only available from this screen.

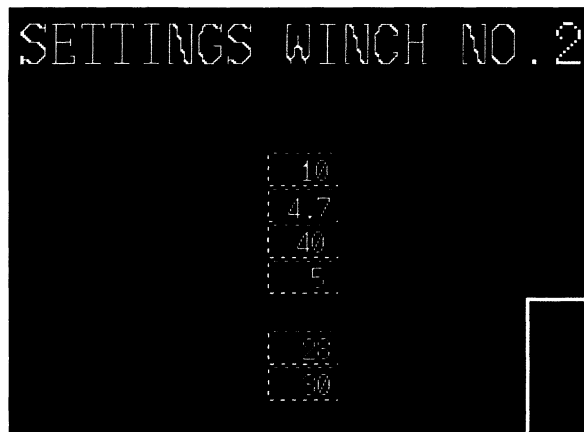
The system is equipped with 2-Speed functions. When button SPEED is activated winch speed will double also in manual mode.

AUTOMATIC MODES

Before starting any automatic modes, make sure that all operational settings are correct. From *COMMAND* screen, press SELECT WINCH to enter corresponding screen where you choose specific winch to operate.

To review operational settings press SETTINGS button, in the COMMAND MENU. The panel picture will be changed to * SETTINGS* screen.

Set desired values for:
MAX/MIN, TOWING MAX
TENSION, TOWING FLOW,
and GAIN CONTROL
according to the exploration
and weather conditions. Also
set the Line speed both for
Haul in and Pay out modes.



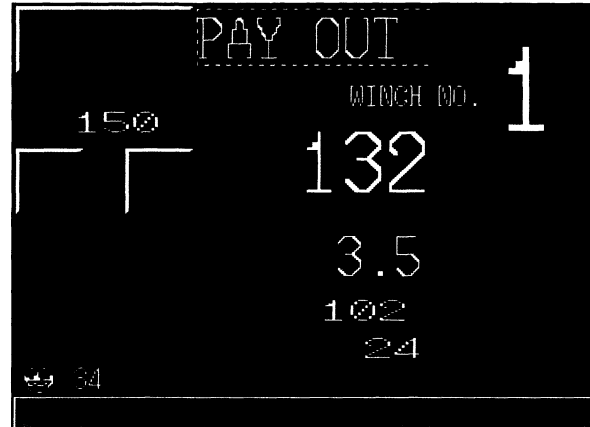
In all automatic modes, number of current active and inhibited alarms is monitored on the ALARM button area. By pressing this area you can check status of current alarms on the *ALARM OVERVIEW* screen.

AUTO PAY OUT

Press corresponding START button in *COMMAND* screen. Go back to *OPERATION* screen. The picture there will change to *PAY OUT* screen. Underline green strip will flash indicating that Auto Pay Out is in stand by mode.

When winch is ready, set out the scientific device by using manual control. Within the Safety Range (sets in LIMITS screen) only Manual Control is available.

An audible alarm will sound when master length is passing safety limit and Auto Pay Out mode takes over. Green strip will stop flashing then.



Auto Pay Out will be active till length reaches the set point.

During Auto Pay Out the system will control shooting speed and/or tension in accordance with preset values.

Following information will be on-line monitored on the touch screen:

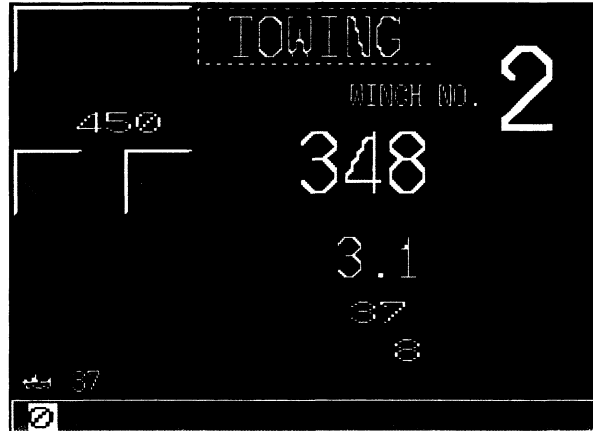
- Set length value (units);
- Length (meters or fathoms);
- Active Winch Number;
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Dynamic Tension (tons);
- Line speed (units/min).

Auto Pay Out mode can be stopped any time by pressing STOP button, in the *COMMAND MENU*. To start Auto Pay Out again, press START. These switches are enabled only when master length is inside auto pay out range.

AUTO TOWING

Depending on settings in OUTPUT CONTROL screen, Auto Towing mode can be engaged automatically/manually when master length reaches the set point.

During Auto Towing mode the system will tune the pressure on winches automatically, winches work on dynamic positioning, aiming to keep master length on the set point.



New value of set point length can be entered without stopping Auto Towing mode and the system will bring master length to the new set point. Use arrow buttons for minor adjustments of set point, or press the window for set length, and you get a keyboard for entering new value.

Following information will be on-line monitored on the touch screen:

- Set length value (units);
- Length (meters or fathoms);
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Tension (tons) dynamic or static (when towing on the brakes);
- Line speed (units/min).

Auto Towing mode can be stopped any time by pressing STOP button, from the *COMMAND MENU*. To start Auto Towing again press START button. These switches are only enabled when master length is outside safety range and DEAD END STOP is not reached.



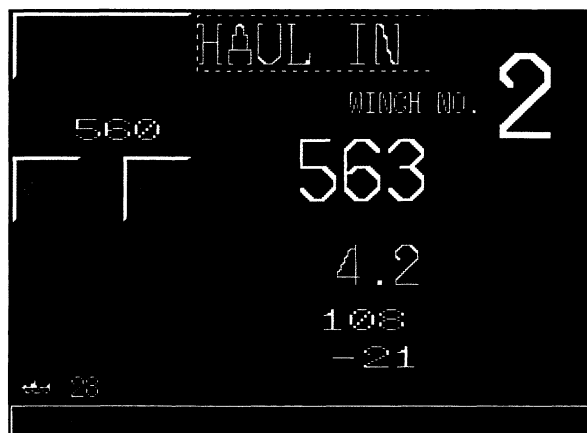
AUTO HAUL IN

Before starting Auto Haul In, make sure that Auto Towing mode has been turned OFF. If necessary start all main pumps again by pressing MAIN PUMP button and/or start each pump from separate panel.

Press START button related to HAUL IN mode in COMMAND screen.

To increase hauling speed, press SPEED button, (if such function is installed on the winch). Thereby you engage 2-3 speed options. Available SPEED steps will shift automatically if system pressure is low enough.

If the system is equipped with separate towing pump(s), EXTRA HAUL SPEED function can be selected to increase hauling speed.



An audible alarm will sound when doors are passing Near Safety Range limit. Auto Haul In mode will stop when passing Safety Range limit (page 11, chapter 2).

Following information will be on-line monitored on the touch screen:

- Set length value (units);
- Length (meters or fathoms);
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Dynamic Tension (tons);
- Line speed (units/min).

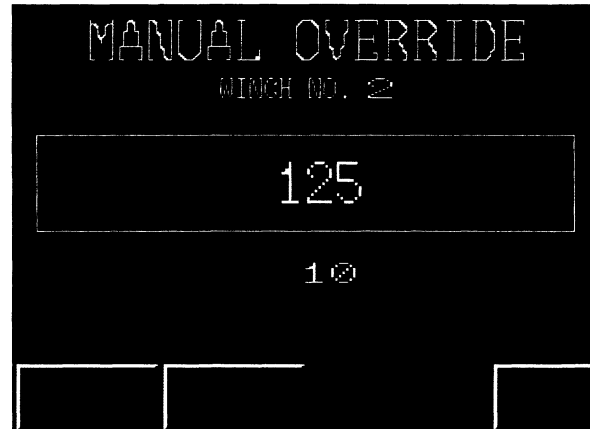
Auto Haul In mode can be stopped any time by pressing STOP button, from the *COMMAND MENU*. To start Auto Haul In again, press START button. These switches are enabled only when master length is outside safety range.



AUTOMATIC MODES (advanced control)

Press MANUAL OVERRIDE button in COMMAND screen for advanced winch control. Use INCREASE/DECREASE buttons to rise/lower system pressure in event of the scientific device, creeping out or snag.

Values can be altered without stopping Auto modes and the system will respond at once.



2-SP TOW button engages two-speed option while in towing. The option might be useful to enhance winch response if towing pressure is low (50-70bar).

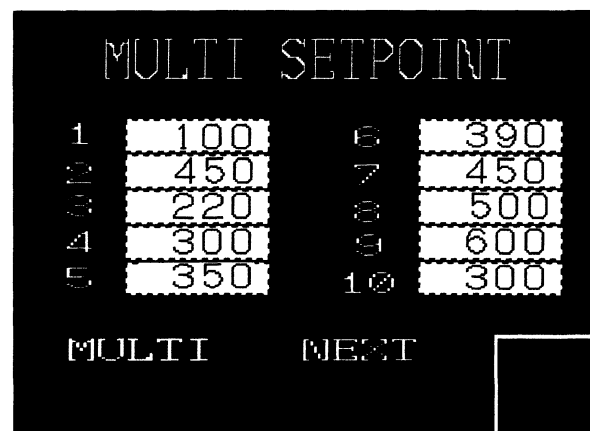
Following information will be on-line monitored on the touch screen:

- System pressure, on winches haul in side (bar);
- Return pressure, on winches pay out side (bar);
- Pressure offset (units).

Green background of the sign MANUAL indicates that Manual Pressure control button has been pressed on L2 panel (optional). Thus operator controls pressure on the winch manually, by the potmeter mounted on the bridge control panel. Under these circumstances Automatic pressure regulation is disabled.

Up to 10 different Lenth set points can be programmed in advance and set in the MULTI SETPOINT screen. In order to jump from one set length to the other button NEXT is pressed on the screen. The same will happen if sign M is pressed on the OPERATIONAL screen. "M" appears only when MULTI mode has been selected.

However in order to reach new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).





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TOUCH PANEL SCREENS

*I \TEKNISK\Pentagon research\Operational Instruction\English\Ver 2 0\NOAA\Ch05R\EN doc
Version 2 0, last updated 19/05/03*

Screen No. 1 Introduction.....	3
Screen No. 2 Warning message.....	3
Screen No. 3 Operation menu, manual mode.	3
Screen No. 4 Command Menu	4
Screen No. 5 Winch select menu.	4
Screen No. 6 Operation menu, pay out mode.	4
Screen No. 7 Operation menu, towing mode.....	5
Screen No. 8 Operation menu, Haul in mode.....	5
Screen No. 9 Manual override menu	5
Screen No. 10 Settings Menu.....	6
Screen No. 11 Menu to other Menu`s.	6
Screen No. 12 Protected Menu.	6
Screen No. 13 Limits Menu.	7
Screen No. 14 Initial setting menu.....	7
Screen No. 15. Alarm overview menu.	7
Screen No. 16 Winch parameter menu.	8
Screen No. 17 Alarm counting menu.....	8
Screen No. 18 Password Protected Menu.	8
Screen No. 19 Reset length menu.	9
Screen No. 20 Emergency stop.....	9
Screen No. 21 Working hours log.....	9
Screen No. 22 Output control menu.	10
Screen No. 23 Simulation menu.....	10
Screen No. 24 System stop menu.....	10
Screen No. 25 Alarm history.....	11
Screen No. 26 Regulator operation.	11
Screen No. 27 Multi set point	11
Screen No. 28 Wire angle monitor	12
Screen No. 29 Tension Monitoring Menu	12
Screen No. 30 NMEA out select.....	12
Screen No. 31 Alarm Out select Menu	13

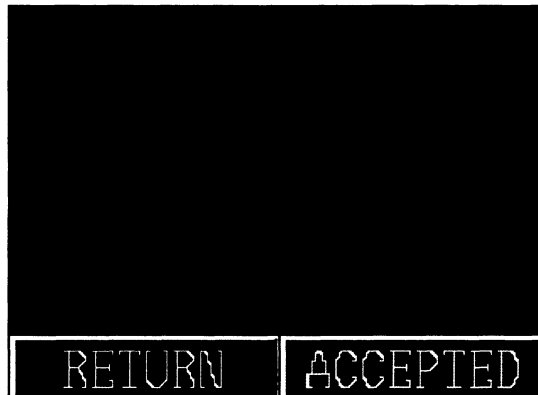


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Doc.no. RHDOPELT, , Version 2.0, last updated: 19/05/03

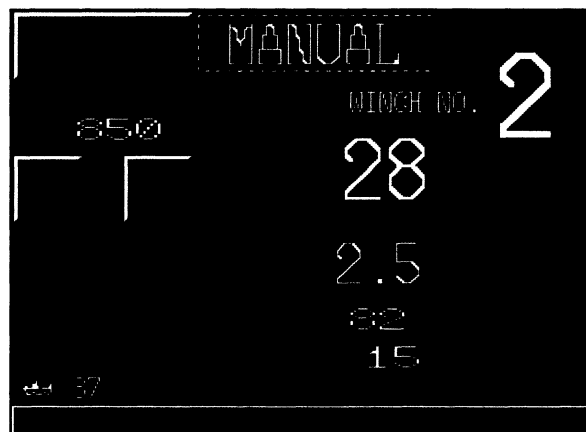
Screen No. 1 Introduction



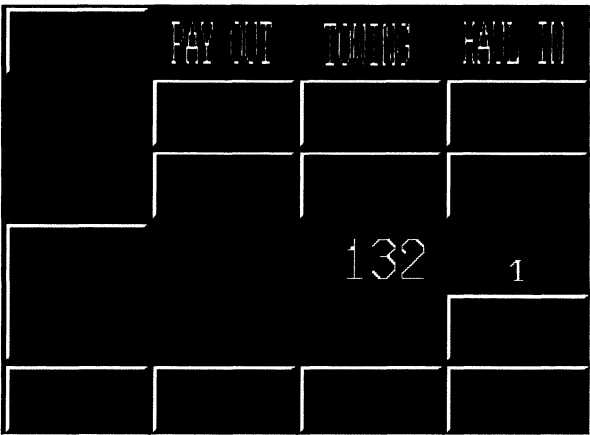
Screen No. 2 Warning message



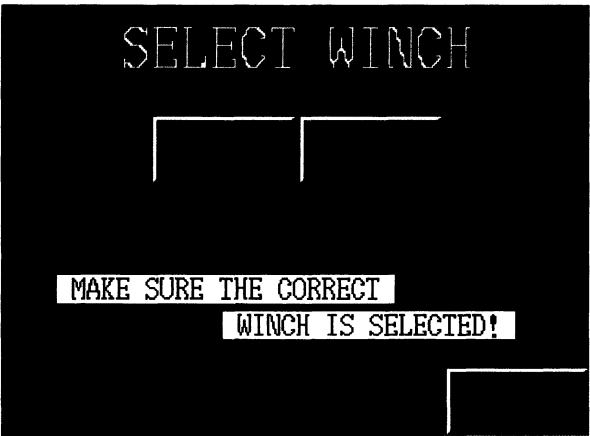
Screen No. 3 Operation menu, manual mode.



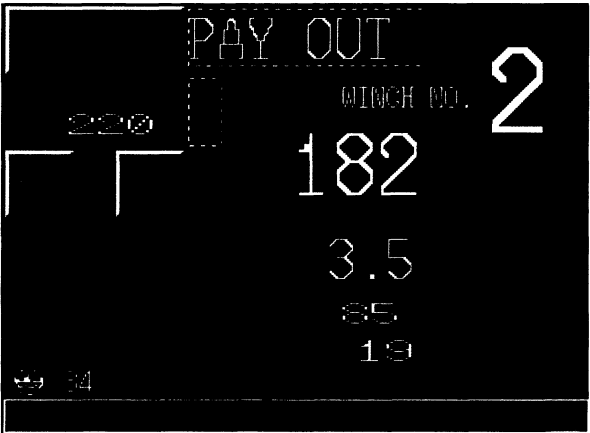
Screen No. 4 Command Menu

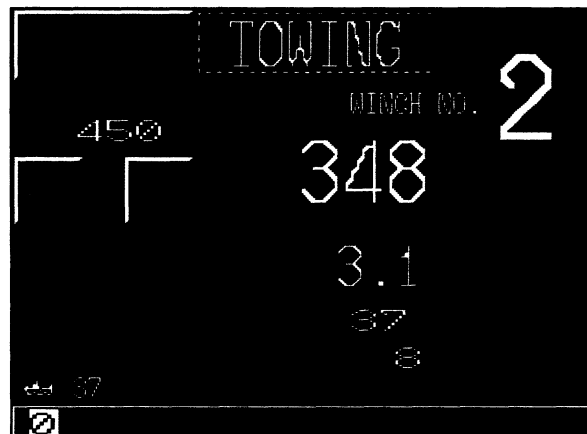
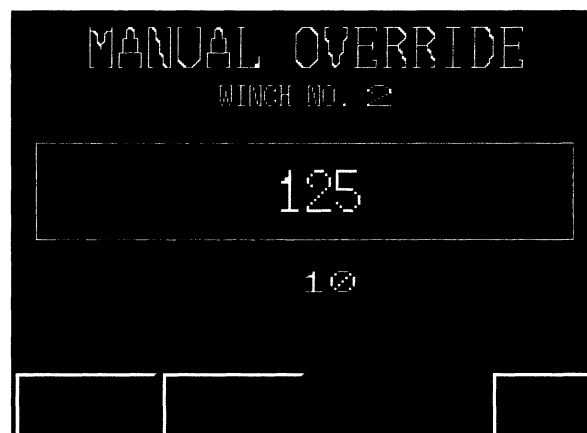


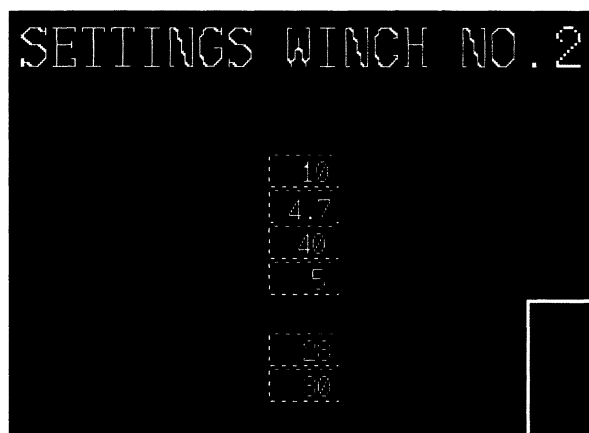
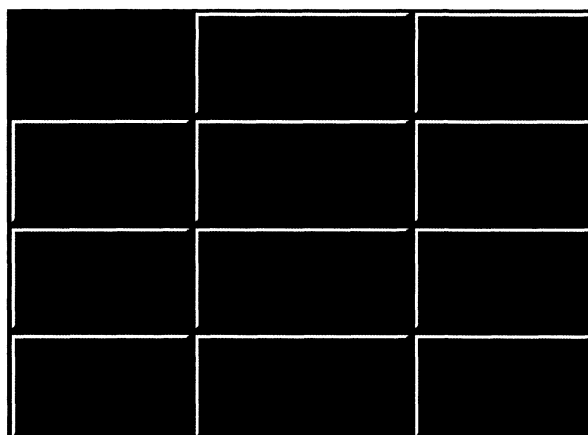
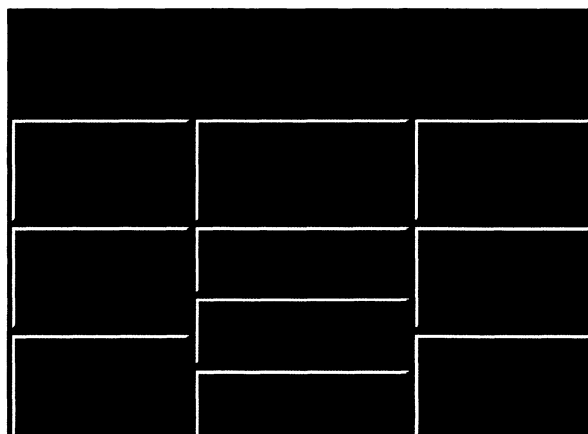
Screen No. 5 Winch select menu.



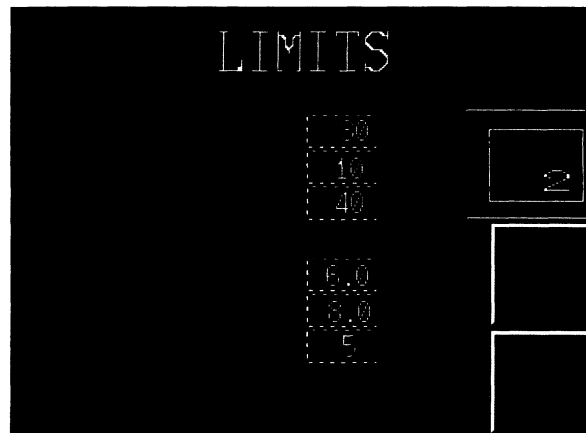
Screen No. 6 Operation menu, pay out mode.



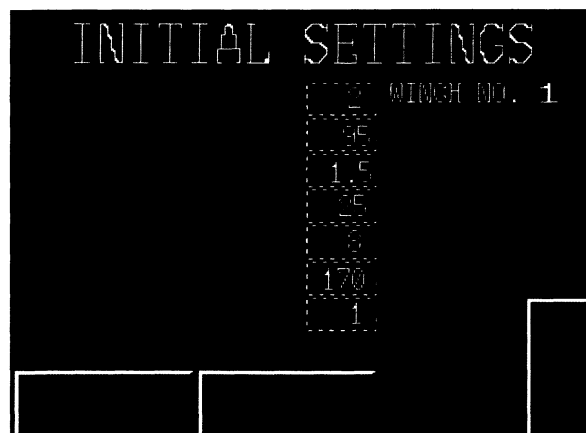
Screen No. 7 Operation menu, towing mode.**Screen No. 8 Operation menu, Haul in mode.****Screen No. 9 Manual override menu**

Screen No. 10 Settings Menu.**Screen No. 11 Menu to other Menu's.****Screen No. 12 Protected Menu.**

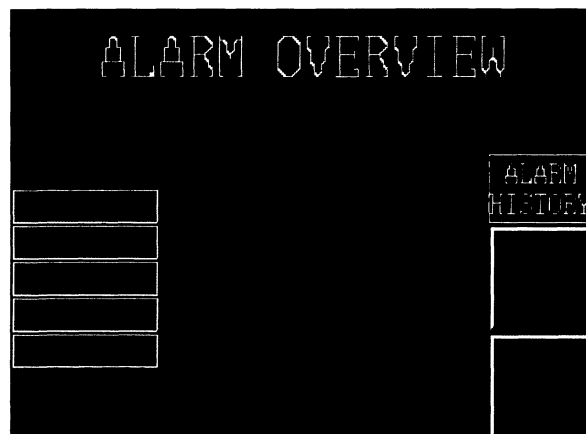
Screen No. 13 Limits Menu.

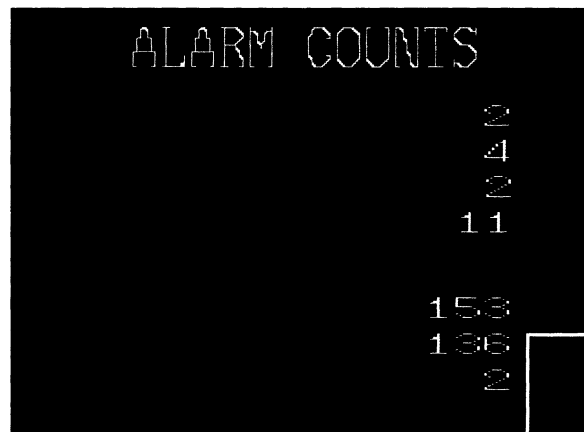
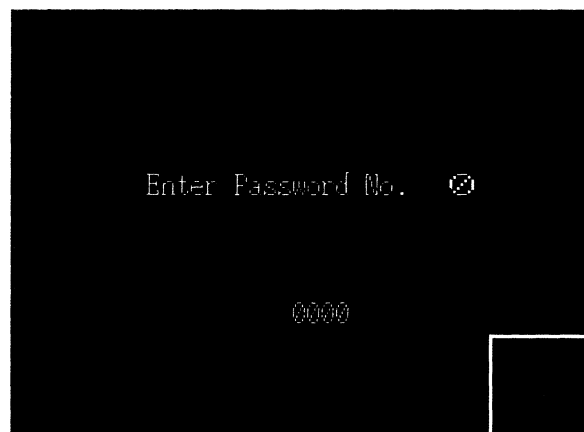


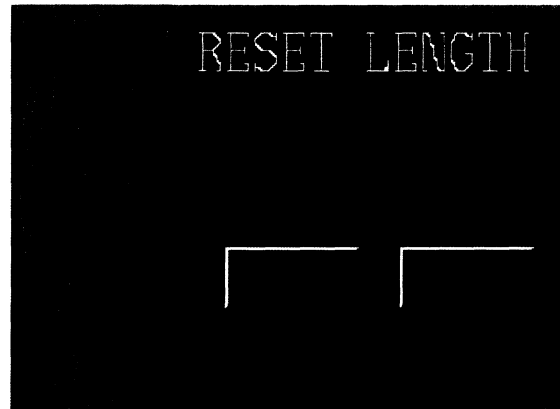
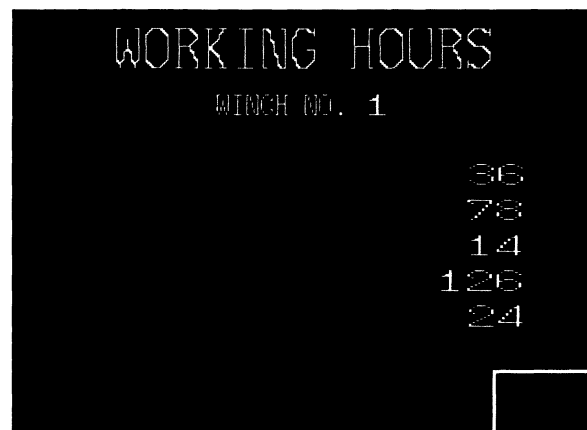
Screen No. 14 Initial setting menu.



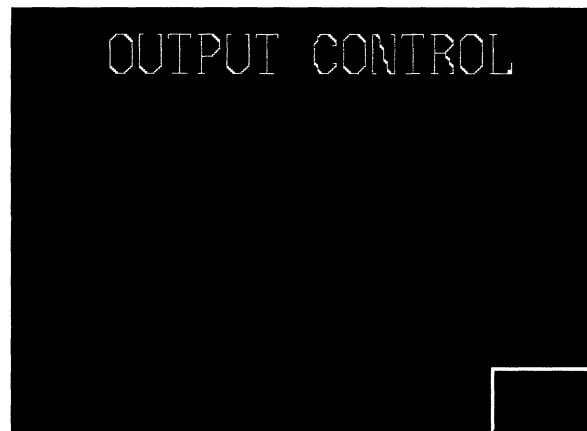
Screen No. 15. Alarm overview menu.



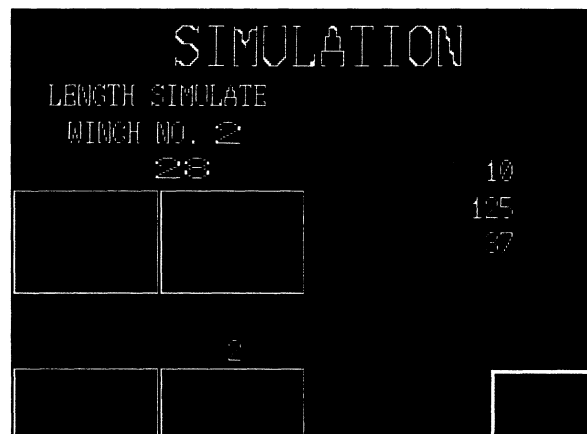
Screen No. 16 Winch parameter menu.**Screen No. 17 Alarm counting menu.****Screen No. 18 Password Protected Menu.**

Screen No. 19 Reset length menu.**Screen No. 20 Emergency stop.****Screen No. 21 Working hours log.**

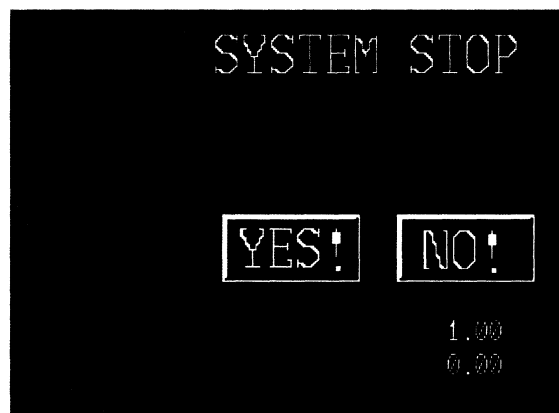
Screen No. 22 Output control menu.



Screen No. 23 Simulation menu.



Screen No. 24 System stop menu.



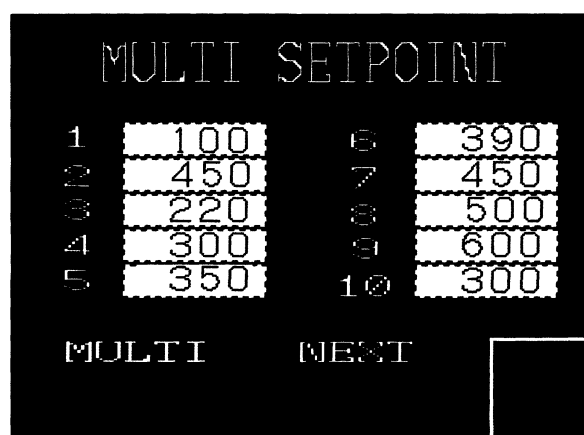
Screen No. 25 Alarm history.



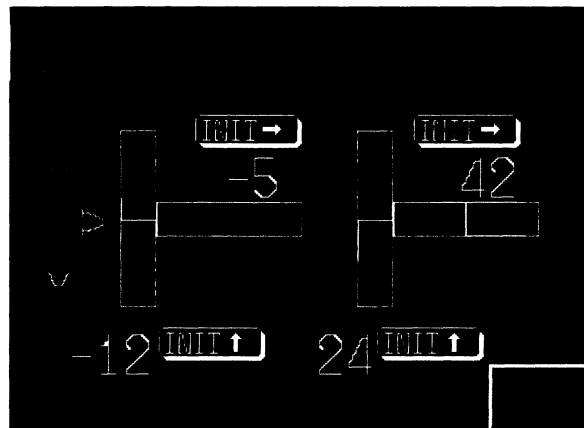
Screen No. 26 Regulator operation.



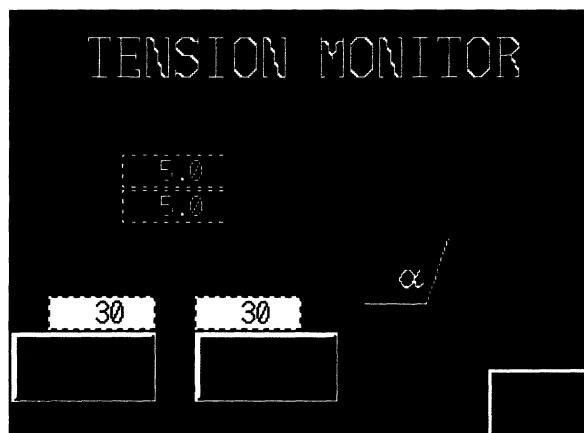
Screen No. 27 Multi set point



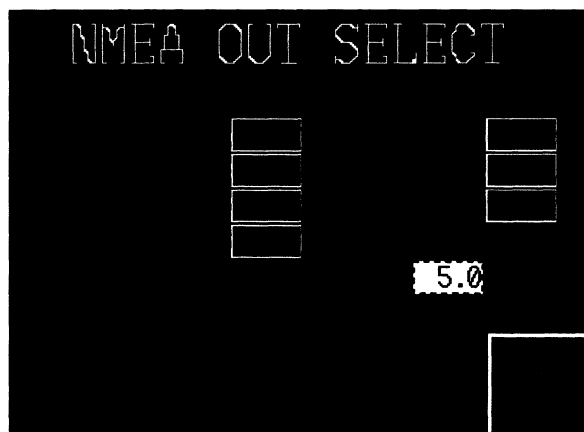
Screen No. 28 Wire angle monitor

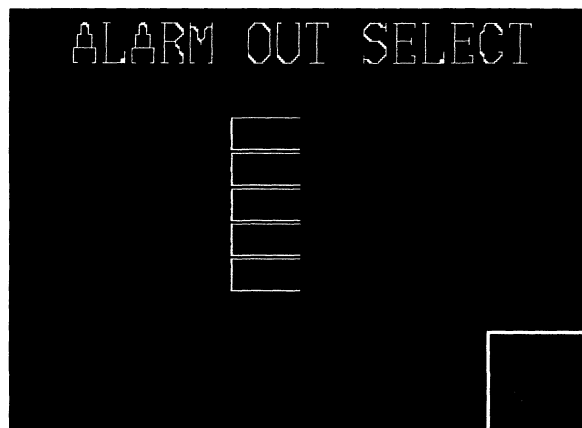


Screen No. 29 Tension Monitoring Menu



Screen No. 30 NMEA out select



Screen No. 31 Alarm Out select Menu



RAPP HYDEMA

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Research

NMEA TELEGRAMS

NMEA Telegrams for PTS Pentagon® Research Two winch system

Following information can be used to configure NMEA interface communication between PTS Pentagon® Research and other electronic equipment on board.

Mode

"@RCWMD,x<cr><lf>" (research computer winch mode)

- 0 = Manual
- 1 = Pay Out
- 2 = Towing
- 3 = Haul In

Length

The length value is always in meters and without decimals.

"@RCWWL,x,M,y,M <cr><lf>" (research computer winch wire length)

- x = Winch 1 Length
- y = Winch 2 Length

Tension

The tension value is always in tons and with one decimal.

"@RCWWT,x.x,T,y.y,T <cr><lf>" (research computer winch wire tension)

- x.x = Winch 1 Tension
- y.y = Winch 2 Tension

Linespeed & RPM

The linespeed value is always in meters per minute and with out any decimal. RPM is also with out any decimals.

"@RCWWS,x,M,y,M,m,n <cr><lf>" (research computer winch wire speed)

- x = Winch 1 Linespeed
- y = Winch 2 Linespeed

m = Winch 1 RPM

n = Winch 2 RPM

Wire Outlet Angle

The angles are given in degrees with negative angles forwards and to port.

"@RCWOA,k,D,l,D,m,D,n,D<cr><lf>"

- k = Wire 1 angle alongships, negative if forwards
- l = Wire 1 angle widships, negative if towards port
- m = Wire 2 angle alongside, negative if forwards
- n = Wire 2 angle widships, negative if towards port

High Priority Alarms:

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@RCAL1,x,N,k,l,m,n<cr><lf>" (research computer alarm 1)

x = Active winch number
k = Oil Level Alarm
l = Wire End Alarm
m = Oil Temp Alarm
n = spare

Low Priority Alarms

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@RCAL2,y,N,u,v,w,x<cr><lf> (research computer alarm 2)

y = Active winch number
u = Filter Alarm
v = Overspeed Alarm
w = Max/Min Alarm
x = spare



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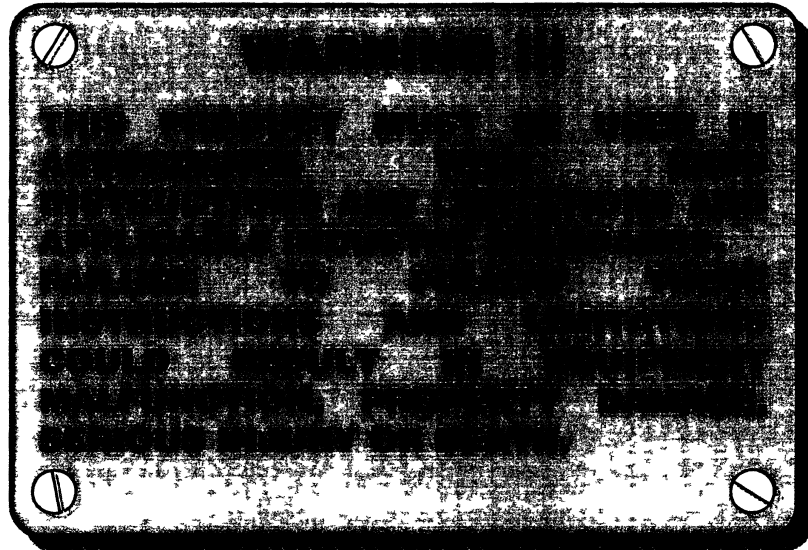
OPERATION MANUAL

Fishery research vessel "Oscar Dyson"

NOAA

PTS *Pentagon*[®]
Research

CHAPTER 01	SYSTEM DESCRIPTION
CHAPTER 02	FUNCTION DESCRIPTION
CHAPTER 03	SYSTEM SET UP
CHAPTER 04	MODES OF OPERATION
CHAPTER 05	TOUCH PANEL SCREENS
CHAPTER 06	NMEA TELEGRAMS





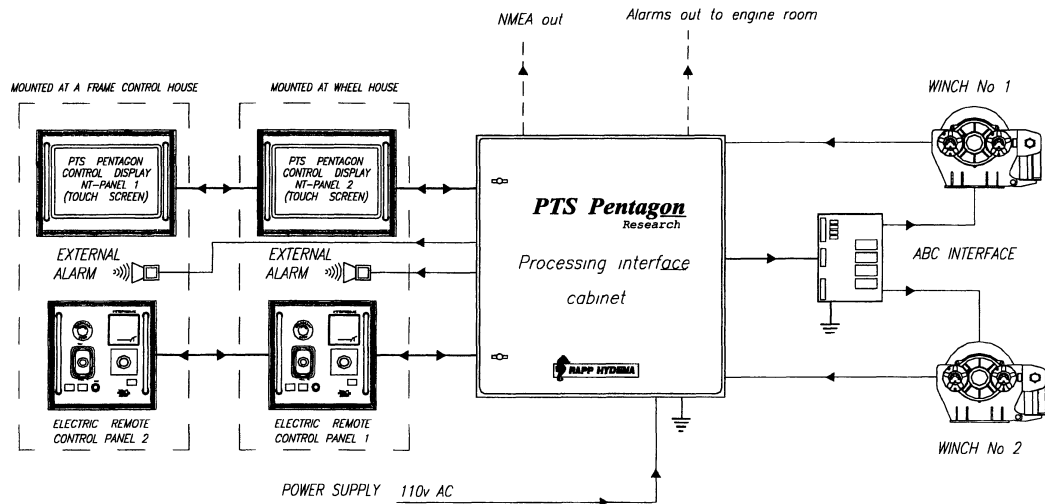
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Research

SYSTEM DESCRIPTION

I:\TEKNISK\Pentagon research\Operational Instruction\English\Ver 2 0\NOAA\Ch01R'EN doc
Version 2 0, last updated 21/05/03



PTS Pentagon^{research} is Rapp Hydema's last generation of winch computers.

PTS Pentagon^{research} is a computer based on the same technology as our fully integrated **PTS Pentagon[®]** trawl computer. It has a compact design but yet provides efficient winches control in shooting, towing and haul in modes.

PTS Pentagon^{research} provides control of all automatic modes from easy to use touch screen panel. Optionally electric remote control panel can be provided for manual control of the scientific winches.

PTS Pentagon^{research} has a speed selecting menu for each winch, 2 speed function (if equipped on the winch), manually selectable, and controlled by system pressure. Additionally 2-speed can be chosen while in towing mode.

PTS Pentagon^{research} is equipped with alarms for different system events e.g. Low oil level, Overspeed, Filter plugged etc.



SYSTEM COMPONENTS

PTS *Pentagon* Research , Processing Interface Cabinet

Processing Interface comprises of Omron Programmable controller and PLC original interface card connected together and built into common steel cabinet to protect and screen electronic components from interference with radio equipment on board. Processing Interface receives information from entire system e.g. switches and analog transducers, processes it and sends back to the system driving commands directly or via ABC Winch Interface. Processing Interface is also hooked up to the Touch Screen (NT Panel). Processing Interface unit requires 110v AC type power supply. Unit has to be mounted in the wheelhouse or any other dry environment room in accordance with cable diagram RH 105924.

PTS *Pentagon* Research , ABC Interface

ABC (amplifier base card) Interface is a separate unit, supplied loose. It is wired out to Processing Interface when installed on board. The ABC Interface amplifies analog signals received from Processing Interface. Further signals are being transferred to executive proportional solenoid valves in hydraulic system. ABC Interface card can be equipped with up to four original Rapp Amplifier Cards for proportional pressure/directional control of main winches. Four built-in relays are employed to control on/off solenoids. ABC Interface has to be mounted in the wheelhouse or any other dry environment room. It does not require separate power supply.

PTS *Pentagon* Research , Touch Screen (NT Panel)

As a matter of fact Touch Screen is the control panel and is of the LCD color touch screen type, point and press. All the vital data for the system is entered via and displayed on the Touch Screen. From this panel operator is able to control all automatic modes, observe system current status and retrieve logged information. Touch Screen is normally placed in the wheelhouse nearby Research Winches Control Panel.

PTS *Pentagon* Research , Research Winches Control Panel

This is electric remote control panel for the research winches manual direction and pressure control. The panel contains:

- Joysticks with a built-in activation button, one for each winch.
- Electric pressure gauges for each winch and illumination dimmer.
- General Emergency Stop switch.
- Potentiometer and its activation button for manual pressure control.
- Control activate switch.

PTS *Pentagon* Research , External Alarm Unit

This unit is connected to the system's alarm output and will sound a system alarm. The volume and type of signal may be selected. Unit is located in the wheelhouse.





RAPP HYDEMA

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PTS *Pentagon*[®]
Research

FUNCTION DESCRIPTION

I:\TEKNISK\Pentagon research\Operational Instruction\English\Ver.2.0\NOAA\Ch02R\EN.doc
Version 2,0, last updated: 22/05/03

2-speed ratio	10	Outer circumference.....	9
Alarm count	13	Outputs.....	12
Alarm out select.....	14	Over speed alarm	5
Alarm sound pattern	9	Password	16
Alarm unit test	9	Pay out RPM limit	7
Alarms	4	Pay out speed control.....	7
Alarms history	5	Pop up keyboard	9
Block.....	3	Potmeter control programming.....	12
Block counting.....	10	Pprogram version	11
Block sircumference	10	Pressure readings	10
Command	3	Protected settings	13
Control of line speed in haul in mode	7	Reg. trend.....	12
Dead End Stop limit	10	Reset length.....	9
Decrease	6	Reset sound alarm	4
Drum width.....	9	Return pressure alarm	5
Fathoms	8	Return pressure alarm limit.....	8
Gain control	7	RPM	3
High tension alarm	5	Safety Range	8
Increase.....	6	Select winch	13
Increase/Decreases active	9	Sensor values simulation.....	10
Initial Settings.....	7	Set Length	3
Initiate.....	14	Simulation	10
Joystick active period	9	Simulation alarms	11
Joystick control programming.....	12	Simulation length	10
Limits.....	8	Simulation speed.....	10
Linear Speed.....	3	Specific torque for WDU	9
Load cell	14	Speed steps control	4
Log.....	11	Start/Stop Automodes	6
Low tension alarm	5	Stop system	11
Main pump(s) on/off.....	4	System parameters settings	7
Manual	3	System pressure control	6
Manual override.....	6	Tension.....	3
Manual pressure control	6	Tension monitoring.....	14
Max/min alarm limits	7	Tension update	8
Max/min difference alarm	5	Towing flow settings.....	7
Menu	7	Towing output control.....	12
Minimum Pay Out Tension	8	Towing RPM limit.	8
Multi set point.....	15	Towing tension limit.....	7
Near Safety Range warning	9	Two speed operation pressure.....	8
Near Set Point warning.....	8	Two Speed output	12
Next	15	Two speed towing	6
NMEA out select	15	Winch parameters	9
Number of winches.....	7	Wire angle	13
Oil filters dirt alarm	5	Wire covered angle	14
Oil high temperature alarm.....	5	Wire diameter.....	9
Oil level alarm	5	Wire end.....	5
Oil temperature	3	Wire length calculation	10
Operation screen.....	3	Working hours log	11



FUNCTIONS

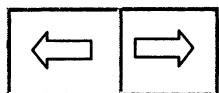
OPERATION

Operation menu access. The button leads to OPERATION screen once pressed. By pressing OPERATION button you will get into one of those specific screens Pay Out, Haul In or Towing depending on which mode has been previously started in COMMAND screen. MANUAL operation screen will appear if none of auto modes has been selected.

NT-Panel screens: * **COMMAND** *, * **MENU** *

COMMAND

This button is used to return to Command screen.



Arrows for manual increase/decrease of Set Length.

TENSION

Displays current tension on cables in all active operation modes. If sign BLOCK on the green back ground present on the screen then tension figure is read out from the block load cell, otherwise it is recalculated from system pressure.

TENSION STATIC

Displays current tension on in wire when winches are parked on the brakes, if the system is equipped with tension sensors.

Normally not equipped.

RPM

Displays revolutions per minute RPM on the winch drum. Sign “-“ comes up in front of figures when Haul In.

LINE SPEED

Displays current Linear Speed value of winch wire in units per minute.

ACTIVE

Displays number of currently active alarms.

INHIBIT

Displays number of inhibited alarms



Green color of this icon indicates that main pump output is on.



Displays current oil temperature.

NT-Panel screens: * **OPERATION** *



MAIN PUMP**Main pump(s) on/off switch**

This function activates an output that makes it possible to start electric motor to operate hydraulic pump. This function acts as a system's general stop in the event of an oil level alarm or emergency stop.

NT-Panel screens: * **COMMAND** *, * **MANUAL OVERRIDE***

SPEED

Speed steps. This function activates speed steps on the winches. At this automatic pressure control is based on calculation of the winches' current pressure, maximum pressure and Winch Drive Unit configuration. When the button has been pressed, system automatically activates speed step 2. The system deactivates the speed step automatically in the same manner as indicated by sensing the system pressure.

This function has to be configured in screens **INITIAL SETTINGS**, **WINCH PARAMETERS** and **OUTPUT CONTROL**.

This function may also be engaged in manual mode.

NT-Panel screens: * **COMMAND** *

ALARMS

By pressing **ALARMS** button, operator enter **Alarms overview** screen

It gives specific alarm status for each alarm type. All alarms except Oil level and Wire end alarms can be temporarily inhibited.

Number of active and inhibited alarms is also displayed in the **Operation** screen.

NT-Panel screens: * **MENU** *, * **OPERATIONS***

**OFF**

Button to reset sound alarm.

Button to return in previous screen or enter set value.



OIL LEVEL	Oil level alarm. Alarm and System General STOP when oil level in main hydraulic tank drops below limit. It is not possible to work with system when this alarm is active. The alarm cannot be inhibited.
WIRE END	Wire end alarm. Alarm and System General STOP when wire length reaches Dead End Stop, configured in the WINCH PARAMETERS screen. The alarm cannot be inhibited.
OIL FILTER	Oil filter alarm. Oil filters dirt alarm. Check light indication on filter's cap to find out which particular filter(s) has been plugged. There is 15 min cold start delay on oil filter alarm.
OIL TEMP	Oil temperature alarm. Oil high temperature alarm. Appears when temperature of oil rises above 55-60 degrees Celsius, also depending in the acceleration of the heat increase.
RETURN PRESSURE	Return pressure alarm. It indicates when pressure in the return line drops below set value while in Auto TOWING mode. This could occur if towing pump(s) stop by any reason or when winches rushing out because of a snag. Alarm is only to warn skipper, it does not stop Auto Towing mode. Limit value is set in screen INITIAL SETTINGS.
OVERSPEED	Over speed alarm. May occur only during Auto Pay Out and Towing when RPM on winch drum exceed set value. The alarm does not affect any function during Towing. Alarm limit value is set in the screen INITIAL SETTINGS, PAY OUR RPM LIMIT and TOWING RPM LIMIT.
MAX/MIN DIFF	Max/min difference alarm. It goes ON if actual wire length is outside min/max range set in menu SETTINGS WINCH.
TOWIENSHI	Alarm of high tension while towing. Green color of the sign TOW TENS HI in ALARM OVERVIEW will turn to red, that indicates a warning that the towing tension is higher than the limit set in SETTINGS MENU
PAY OUT LO	Alarm of low tension while Pay Out. Green color of the sign PAY OUT LO in ALARM OVERVIEW screen will turn to red when tension on winch is dropping below set value. Alarm Limits are established in INITIAL SETTINGS menu. When alarm occurs, pressure regulation will be suspended. Increase vessel's speed or decrease shooting speed to avoid emerging of this alarm.
<div style="border: 1px solid black; padding: 5px; display: inline-block;">ALARM HISTORY</div>	Alarm history. The button, if pressed, leads to the separate screen ALARM HISTORY that has overview of all recently engaged modes and appeared alarms. Operation mode or type of alarm together with its date (yy/mm/dd) and time (hh:mm) are shown in the log. Latest mode/alarm comes always on top of the list. Searching in the list is available by using scroll/page up/down arrows on the side of the screen.

NT-Panel screens: * **ALARM OVERWIEV** *



MANUAL OVERRIDE

System pressure control.

This button brings up MANUAL OVERRIDE screen with the set of functions for advanced winch control.

Temporarily override the system's regulation of pressure (tension) by means of the "INCREASE" and "DECREASE" buttons.

The background of message MANUAL will turn green if corresponding button has been pressed on L2 remote control panel.

NT-Panel screens: * **COMMAND** *

INCREASE

Increases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

DECREASE

Decreases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

2 SPEED TOWING

Two-speed in towing on/off switch. The button gives an opportunity to engage speed step(s) while in Towing. Note that only 2-speed could be engaged. This function may be useful sampling on rough grounds as well as to increase winches' sensitivity when towing pressure is too low. This button has direct control on engaging 2-speed in Towing while SPEED button has no function assigned. Located in the MANUAL OVERRIDE MENU

MANUAL

Manual system pressure control. Green background of MANUAL sign indicates that system pressure control has been switched over to Manual mode. Hereby pressure on both winches is controlled simultaneously.

NT-Panel screens: * **MANUAL OVERRIDE** *

START

STOP

Start or Stop automatic mode. Start/Stop buttons activate/deactivate specific auto-function in the COMMAND screen. These functions are Pay out, Towing and Haul in.

NT-Panel screens: * **COMMAND** *



SETTINGS

Menu for setting system parameters. Button gives an access to the menu for setting system parameters. It is advisable to use it only for personnel authorized to work with **PTS Pentagon** Research.

MAX/MIN
VALUE

Min/Max deviation from set point. Max/min alarm limits of wire length deviation (+/-) from the set point.

MAX TOWING
TENSION

Towing tension limit. Maximum allowed tension during towing.

TOWING
FLOW

Value in the **TOWING FLOW** setting sets the control valve in a fixed position during towing means action speed on the winch. Default value 40%.

GAIN
CONTROL

Winches behavior during towing. Figure 1 gives quick system response (good weather). Winches become most sensitive. Figure 10 provides very slack system response (poor weather). Winches become stiffer.

HAUL IN LINE SP

Regulation by line speed in haul in mode. Constant pull in speed will be maintained at around the selected value while tension of wire will vary.

PAY OUT LINE SP

Regulation by line speed in pay out mode. Constant pay out speed will be maintained at around the selected value while tension of wire will vary.

NT-Panel screens: * **COMMAND** *, * **MENU** *

MENU

Main Menu. The button leads to Main MENU screen where all other screen access buttons are placed.

NT-Panel screens: * **OPERATION** *

INITIAL

Initial Settings menu Button gives access to menu for setting parameters and function options.

NT-Panel screens: * **PROTECTED MENU** *

NUMBER OF WINCHES

NUMBER OF WINCHES hooked up to and controlled by the Pentagon Research system.

The system configuration is based also on the amount of the winches you have totally in the system, that are included in the system.

PAY OUT, RPM LMT

Pay out RPM limit. Maximum RPM on main drums limited for Pay out mode.



MIN P/O TENSION

Minimum Pay Out Tension. Factor for setting minimum allowable tension in tons in AUTO PAY OUT mode when regulation by PAY OUT LINE SP has been chosen (screen SETTINGS). If value is reached, alarm PAY OUT LO will show up (ALARM OVERWIEV screen). While alarm is active automatic shooting speed regulation will be temporarily terminated unless tension stabilizes above set value.

TOWING, RPM LMT

Towing RPM limit. Factor for setting maximum allowable RPM while in Auto Towing mode. System will turn on Over speed Alarm when winches RPM exceed set value.

RET. PR. AL. LIMIT

Return pressure alarm limit. It sets return pressure limit for alarm on low return pressure on winches only when in auto TOWING mode.

2 SP OPER PRESS

Two speed operation pressure. Sets maximum pressure in bar as upper limit for the system while shifting SPEED steps.

TENSION UPDATE

Tension figures display update. Tension is calculated/updated as an average of few tension readings for given period of time. This period of time can be set from relatively short (1) to relatively long (3) depending of weather conditions/experience.

METERS

Selects meters as wire length measuring units.

FATHOMS

Selects fathoms as wire length measuring units.

NT-Panel screens: * **INITIAL SETTINGS** *

LIMITS

Limits menu button gives an access to menu for setting more parameters and function options.

NT-Panel screens: * **PROTECTED MENU** *

AUTO START/STOP

Defines **Safety Range limit**. Value from 10 to 999 could be set in meters/fathoms. Crossing this border the system will automatically start/stop PayOut/HaulIn mode. Only Manual operations are allowed within the Safety Range.

NEAR SET POINT

Near Set Point warning. Sets the distance to the Set Point where the system will give short beep signal to warn the operator to reduce boat speed near Set Point.



PREP. STOP HAUL

Near Safety Range warning. Sets the distance to the Safety Range where the system will give short beep signal to warn the operator before Haul In mode is automatically disengaged.

JOYSTICK ACTIVE

Joystick active period. Sets time in seconds for winches remote control electric joysticks to be active after safety (yellow) button on tip of the grip has been pressed.

INCR/DECR ACTIVE

Increase/Decreases active. Time in seconds for INCREASE/DECREASE function buttons to be active once pressed. Buttons are placed in the MANUAL OVERRIDE NT-panel screen.

ALARM TYPE

Defines type of sound pattern. Five different patterns are available. Pattern 5 is continuous sound. This must be set when external alarm unit is used.

ALARM TEST

Alarm unit test button. Sound alarm will be heard as long as the button is pressed.

NT-Panel screens: * **LIMITS** *

RESET LENGTH

Reset length counters. The button is built into pop-up keyboard. To get keyboard up on screen press SET LENGTH area in OPERATION screen or any other field in menus where digital parameters are entered. The function resets length counter on the hydrographic winch to zero. It is used when device is hooked up and ready for shooting or wherever you want to start. Reset has to be confirmed by pressing YES! in RESET LENGTH pop-up window.

NT-Panel screens: * **POP UP KEYBOARD** *

**WINCH
PARAMETERS**

Winch parameters Button provides an access to the separate menu screen for setting hydrographic winch parameters. Values are set separately for each winch. Parameters are used in the program for length and pull calculation.

NT-Panel screens: * **PROTECTED MENU** *

DRIVE TORQUE

Specific torque for the Winch Drive Unit, value is provided by Rapp Hydema A/S, set in Nm/Bar.

OUTER CIRC.

Outer circumference of the winch drum external diameter with all cable spooled on, set in mm.

DRUM LENGTH

Distance measured between drum shields, set in mm.

**WIRE
DIAMETER**

Wire diameter, set in mm.



DEAD END STOP

Safety operation limit – maximum length of wire allowed the system to be paid out from the winch drum in any of Auto modes. Value is set in length measuring units. When crossing Dead End Stop limit, system will terminate Auto mode and close winch parking brake. Only Manual mode will be available unless wire length back in working range.

**LENGTH
ADJUST**

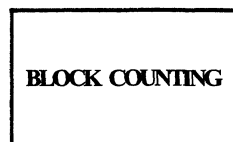
Calibration value, which is used for wire length calculation. Compensates for spooling deviation, value is set from 1 to 18 (default - 9).

**POWER X
2SPEED**

Reduction ratio is used for winch pull calculation in the program when 2-speed option is engaged. Parameter set in units 1/10000. Same value is applied for Stbd and Port winch.

BLOCK CIRCUMF.

Circumference of the block in the spooling device which is used for wire length/speed counting.



Button to switch wire length/speed counting between counting from the block or from the winch drum. If button background is green COUNTING from BLOCK has been selected.

NT-Panel screens: * **WINCH PARAMETERS** *



The button leads to Simulation menu. This is a menu for simulation of running the winches and the sensor values in the system during start up or troubleshooting/adjustment.

NT-Panel screens: * **MENU** *



The button enables/disables pressure and temperature simulation. Green background of the button indicates that pressure/temperature simulation is currently active.

PRESS P

Pressure Pay Out. Winch pressure on Pay Out side.

PRESS H

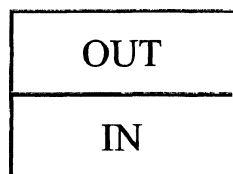
Pressure Haul In. Winch pressure on Haul In side.

OIL TEMP

Oil temperature. Temperature of oil in the return line.

**LENGTH
SIMULATE**

Length simulation. Displays figures of current simulated length.



Button to start simulation of Pay Out mode. Green background indicates when simulation OUTwards is active.

Button to start simulation of Haul In mode. Green background indicates when simulation INwards is active.

PULSE CYCLE

Defines IN/OUT simulation speed. Figures 1, 2 and 3 can be entered. Figure 1 gives max simulation speed.



**OIL LEVEL
ALARM**

Simulates Oil Level alarm.

**OIL FILTER
ALARM**

Simulates Oil Filter Plugged alarm.

NT-Panel screens: * **SIMULATION** ***STOP SYSTEM**

Brings up SYSTEM STOP screen. Operator is asked if he really wants to Stop the system. To proceed press YES! To go back to MENU screen press NO!

NT-Panel screens: * **MENU** ***VERSION NO. HMI**

Displays NT touch screen program version.

VERSION NO. PLC

PLC program version.

NT-Panel screens: * **SYSTEM STOP** ***LOG INFO**

Brings up WORKING HOURS screen. Working hours are logged separate for servo and main pumps.

NT-Panel screens: * **MENU** ***PAY OUT AUTO**

PAY OUT mode running hours log.

HAUL IN AUTO

HAUL IN mode running hours log.

TOWING 80-110 BAR

Logging system working hours when pressure is in range 80-110 bar in towing mode of operation.

TOWING 110-140 BAR

Logging system working hours when pressure is in range 110-140 bar in towing mode of operation.

TOWING > 140 BAR

Logging system working hours when pressure is over 140 bar in towing mode of operation.

NT-Panel screens: * **WORKING HOURS** *

OUTPUTS

Button to access OUTPUT CONTROL screen. Outputs settings are related to the system design and normally carried out during startup by Rapp Hydema engineer.

NT-Panel screens: * **PROTECTED MENU** *

TWO SPEED OPER.**Control of 2 - 3 speed output.****HAUL**

Speed shifting only takes place when Auto Haul In mode is active.

H & P

Speed shifting takes place in both Auto Haul In and Auto Pay Out modes.

ON TOW

Speed shifting takes place also in towing mode.

TOWING OPER.**Control of Towing output.****AUTO ON**

Program turns ON Towing output automatically when master length reaches Set Point.

NOT ON

Program does not turn ON Towing output when master length reaches Set Point. Operator has to start Towing mode manually by pressing corresponding START button.

JOYSTICKS

Program the system to use only one joystick. Always set to COMMON for hydrographic winch.

COMMON**JOYSTICKS**

Program the system to use only separate joystick, and each respective joystick will be controlling the winch selected. Must not be used for hydrographic winch set up.

SEPARATE**POTMETER**

Program the system to use only one potmeter, and this will be controlling the winch selected. Always set to COMMON for hydrographic winch.

COMMON**POTMETER**

Program the system to use only separate potmeter, and each respective potmeter will be controlling the winch selected. Must not be used for hydrographic winch set up.

SEPARATE

NT-Panel screens: * **OUTPUT CONTROL** *

REG. TREND

The button, once pressed, brings up REGULATOR OPERATION screen. This screen is submitted for troubleshooting carried out by RAPP HYDEMA AS authorized personnel.

NT-Panel screens: * **MENU** *



WIRE ANGLE

The button to access WIRE ANGLE MONITOR screen. This option provides wire direction control both in longitudinal and transversal directions.

NT-Panel screens: * **MENU** *

INIT →**INIT ↑**

This buttons are submitted for zero-calibration of the inclinometer. There are 2 buttons of the same type for every winch (all together 4 buttons for two winches). Buttons on top are to calibrate angle athwart-ships. Lower buttons are for longitudinal zeroing. Sign WIRE 1 or 2 indicates which winch it belongs to. Measured angle presented by both graphs and figures. Negative figures (red graphs) means that wire angled to the bow and inwards. Positive values (green graphs) indicates that wire angled to the stern and outwards. Boat silhouette represents the reference point. Zeroing has to be done when wire pointing straight down, e.g. device hanging out of board, ready for launching. Online angle monitoring is always performed for both winches irrespectively which one has currently active control.

NT-Panel screens: * **WIRE ANGLE MONITOR** *

SELECT WINCH

Only one hydrographic winch at a time can be controlled by PTS Pentagon Research. This button activates screen SELECT WINCH where operator can choose which winch is to be presently active (controlled).

NT-Panel screens: * **MENU***, ***COMMAND***

WINCH 1(2)

Press corresponding button to select the winch that will be automatically controlled by PTS Pentagon Research.

NB! Be very attentive and careful doing your prime move. Make sure you selected the winch that you were really intending to operate.

NT-Panel screens: * **SELECT WINCH***

ALARM COUNT

This button brings up ALARM COUNTS screen. It is used to present number of main system alarms and working hours. Screen ALARM COUNTS shows number of oil level, oil temperature, filter and return pressure alarms together with working hours for the system, main pump and high temperature operation. Figures are valid for the winch that is currently selected (active).

NT-Panel screens: * **MENU** *

**PROTECTED
SETTINGS**

The button submitted to reach PROTECTED MENU screen. Protected menu has in turn 10 different buttons to access other system parameters and settings.

NT-Panel screens: * **MENU** *

**TENSION
MONITOR**

The button leads to settings for wire tension monitoring. Operator may choose one of three different set ups available in conjunction with wire tension measuring.

NT-Panel screens: * **PROTECTED MENU** *

WH1(2)

Load cell range - maximum calibrated tension value for winch 1 and winch 2, sets in tons.

INITIATE

Press INITIATE button to calibrate zero when wire free from any load (device).

WIRE COVERED
ANGLE

A parameter that is used in tension calculation. Set by Rapp Hydema personnel.

LOAD CELL
ALWAYSON

This means that tension is measured always only by Load Cell. This particular situation is indicated by sign BLOCK (next to TENSION) with green back ground, on the COMMAND screen.

PRESS TR. ALWAYS
ON

When option selected, pressure drop across the winch drive is a source for wire tension calculation. System Pressure is constantly measured by two pressure transmitters one installed in the pressure line another in the return. When winch stands still there is no pressure drop in the system and tension therefore will display zero regardless to the real tension of the wire.

STAT/DYN SELECT

This option provides an active system scan control. When winch is moving (haul in, pay out, towing or manual control) pressure drop is sensed and recalculated to tension. When winch stops (does not move at any direction for more then 4 sec., or oil pressure is less then 30 bar measured in pressure line) tension is read directly from load cell.

NT-Panel screens: * **TENSION MONITOR***

**ALARM
SELECT**

Press this button to get an access to the ALARM OUT SELECT screen. This makes it possible to configure alarms delivered outside the system (e.g. to engine room).

NT-Panel screens: * **PROTECTED MENU** *

OIL LEVEL
WIRE END
OIL FILTER
OIL TEMP
OVERSPEED

Press corresponding button(s) to choose type of alarm(s) to be sent outside the system. Button receives green background once alarm has been selected. Red field on the left indicates when alarm is presently active.

OUTPUTMONITOR

Output monitor, red circle, will turn ON if one or more alarms have been selected.

NT-Panel screens: * **ALARM OUT SELECT** *



**NMEA OUTPUT
SELECT**

The button gives an access to NMEA OUT SELECT screen. This option provides an opportunity to configure system information that can be sent outside the system via com port using NMEA telegram.

NT-Panel screens: * **PROTECTED MENU** *

WINCH MODE
WIRE LENGTH
WIRE TENSION
WIRE SPEED
WIRE ANGLE

Select required information to be included in the telegram by pressing corresponding button. It turns green when selected. Information is always collected/transferred simultaneously from winch 1 and 2 irrespective of which one is presently controlled.

ALARM 1
ALARM 2

ALARM 1 means Oil Level Alarm, Wire End Alarm, Oil Temp Alarm.

ALARM 2 means Filter Alarm, Overspeed Alarm, Max/Min Alarm.

Only one of these alarms sets can be chosen for output telegram.

REPEAT EVERY

This figure sets frequency of telegram exchange. More information regarding telegrams format is described in Chapter 6.

NT-Panel screens: * **NMEA OUT SELECT** *


MULTI SETPOINT

Press this button to bring up MULTI SET POINT screen. The screen allows programming up to ten different set points and activating Multi Set Point mode.

NT-Panel screens: * **PROTECTED MENU** *


MULTI

MULTI SETPOINT screen has an opportunity to program in advance up to 10 different Set Length points.

If MULTI button is pressed (green background) Multi Setpoint mode is active. Symbol  pops up automatically on the OPERATION screen also indicating that Multi Setpoint mode is currently active.

NEXT

When MULTI mode is ON, pressing button NEXT makes the system jump over to the next set point in the list. However in order to reach this new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).

Symbol  on the Operational screen may also be used to jump over to the next set point.

NT-Panel screens: * **MULTI SETPOINT** *

PASSWORD ENABLE

Button sets/removes password protection for PROTECTED SETTINGS menu. Background green color indicates that password has been enabled.

NT-Panel screens: * **PROTECTED MENU** *

Enter Password No

Passwords are provided on a special security card. There is a table containing 20 four digits passwords numbered from 1 to 20. If password option is enabled, system asks for the password No. before operator will be able to reach PROTECTED MENU. Corresponding password has to be looked up at the security table and punched on the screen. When password no. 20 has been used, sequence begins with no.1 again.

NT-Panel screens: * **PASSWORD** *





RAPP HYDEMA

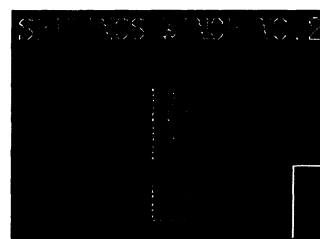
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SYSTEM SET UP

For setting up the system for a specific vessel, correct parameters in the following menus have to be set:

- * LIMITS * for each winch.
- * WINCH PARAMETERS * for each winch (**important**)
- * SETTINGS * for each winch (**important**)
- * INITIAL SETTINGS * for each winch.
- * OUTPUT CONTROL * common setting for all winches.



PTS **Pentagon**research computer is delivered with default values set in memory. However, correct figures valid for the project must be set before sea trials.

NB! Following tables have to be filled in during starting up the system. Copy of this document must be send to Rapp Hydema A/S, Bodø, Norway, and also kept onboard for default checking.

VESSEL / SYSTEM INFORMATION

Boat name:	Installation date:
Owner:	HA No.:

Program version PLC:	
Program version NT:	

Figures in brackets are default values

LIMITS	WINCH NO 1	WINCH NO 2
AUTO START/STOP	(50 units)	(50 units)
NEAR SETPOINT	(75 units)	(75 units)
PREP. STOP HAUL	(50 units)	(50 units)
JOYSTICK ACTIVE	(5 sec)	(5 sec)
INCR/DECR ACTIVE	(5 sec)	(5 sec)
ALARM TYPE	(5)	(5)

WINCH PARAMETERS	WINCH NO 1	WINCH NO 2
DRIVE TORQUE	(70 Nm/bar)	(70 Nm/bar)
OUTER CIRCUMF.	(3500 mm)	(3500 mm)
DRUM LENGTH	(905 mm)	(905 mm)
WIRE DIAMETER	(9.5 mm)	(9.5 mm)
DEAD END STOP	(3500 m)	(3500 m)
LENGTH ADJUST	(9)	(9)
POWER X 2 SPEED	(5000)	(5000)
BLOCK CIRCUMF.	(990 mm)	(990 mm)
BLOCK COUNTING	(YES)	(YES)



INITIAL SETTINGS**WINCH NO 1****WINCH NO 2**

NUMBER OF WINCHES	(2)	(2)
PAY OUT, RPM LMT	(60 rpm)	(60 rpm)
MIN P/O TENSION	(0.5 ton)	(0.5 ton)
TOWING, RPM LMT	(10 rpm)	(10 rpm)
RET. PR. AL. LMT	(8 bar)	(8 bar)
2 SP OPER PRESS	(160 bar)	(160 bar)
TENSION UPDATE	(2)	(2)
SELECT UNITS	<input type="checkbox"/> METERS <input type="checkbox"/> FATHOMS	<input type="checkbox"/> METERS <input type="checkbox"/> FATHOMS

OUTPUT CONTROL

TWO SPEED OPER.	<input type="checkbox"/> HAUL	<input type="checkbox"/> H & P	<input type="checkbox"/> ON TOW
TOWING OPER.	<input type="checkbox"/> AUTO ON	<input type="checkbox"/> NOT ON	
JOYSTICKS	<input type="checkbox"/> COMMON	<input type="checkbox"/> SEPARATE	
POTMETER	<input type="checkbox"/> COMMON	<input type="checkbox"/> SEPARATE	

SETTINGS WINCH**NO 1****NO 2**

MAX/MIN VALUE	(10 units)	(10 units)
MAX TOW TENSION	(1 ton)	(1 ton)
TOWING FLOW	(40%)	(40%)
GAIN CONTROL	(5)	(5)
HAUL IN LINE SPEED	(100 units/min)	(100 units/min)
PAY OUT LINE SPEED	(100 units/min)	(100 units/min)



WORKING HOURS LOG**WINCH 1****WINCH 2**

SYSTEM ON		
MAIN PUMP		
TEMPERATURE > 60° C		
PAY OUT AUTO		
HAUL IN AUTO		
TOWING 80-100 BAR		
TOWING 100- 140 BAR		
TOWING > 140 BAR		

ALARM COUNTS**WINCH 1****WINCH 2**

OIL LEVEL		
OIL TEMPERATURE		
FILTER ALARM		
RETURN PRESSURE		

<i>Figures were set by:</i>	<i>(Company, name and signature)</i>	<i>Date:</i>
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Other notes:



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MODES OF OPERATION

*I:\TEKNISK\Pentagon research\Operational Instruction\English\Ver.2.0\NOAA\Ch04R'EN.doc
Version 2.0, last updated: 22/03/03*

PREPARATION FOR STARTING UP THE SYSTEM	3
MANUAL MODE.....	3
AUTOMATIC MODES	4
AUTO PAY OUT.....	5
AUTO TOWING.....	6
AUTO HAUL IN	7
AUTOMATIC MODES (advanced control)	8



All data for the winch system normally loaded to the memory during start up by Rapp Hydema's service engineer. To check/correct system parameters go through settings menus (*SETTINGS*, *INITIAL SETTINGS*, *WINCH PARAMETERS*, *LIMITS*, *OUTPUT CONTROL*, for every winch and make sure that all data and parameters are correct. You will find initial data for the system in Chapter "SYSTEM SET UP".

PREPARATION FOR STARTING UP THE SYSTEM

Turn on power supply for the system. Choose the language on the initial screen and read/accept warning message.

After this system enters MANUAL mode screen. In order to make it possible to start winch's hydraulic pump press COMMAND button to reach COMMAND screen and there press MAIN PUMPS button. Pump is driven by electric motor and in additional requires start from the separate (L4) panel. All winch automatic modes and remote controls are available only if hydraulic pump is running.

MANUAL MODE

This is general mode for the system operation inside "safety range", (when none of automatic modes can be started). System always returns to the manual mode outside safety range if operator stops automatic modes. In manual mode winches can be controlled both from the bridge (joysticks) and from local stand (control valves).



Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Winch no. in operation, indication (no in window);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign – appears when heaving);
- Tension (tons) both dynamic and static (when winches parked on the brakes);
- Line speed (units/min).



Number of current active and inhibited alarms monitored on the bottom line of the screen. By pressing this area you can check status of all current alarms on the *ALARM OVERVIEW* screen.

Press COMMAND button to enter into the corresponding screen. Some extra functions for the manual mode are only available from this screen.

The system is equipped with 2-Speed functions. When button SPEED is activated winch speed will double also in manual mode.

AUTOMATIC MODES

Before starting any automatic modes, make sure that all operational settings are correct. From *COMMAND* screen, press SELECT WINCH to enter corresponding screen where you choose specific winch to operate.

To review operational settings press SETTINGS button, in the COMMAND MENU. The panel picture will be changed to * SETTINGS* screen.

Set desired values for:
MAX/MIN, TOWING MAX
TENSION, TOWING FLOW,
and GAIN CONTROL
according to the exploration
and weather conditions. Also
set the Line speed both for
Haul in and Pay out modes.



In all automatic modes, number of current active and inhibited alarms is monitored on the ALARM button area. By pressing this area you can check status of current alarms on the *ALARM OVERVIEW* screen.

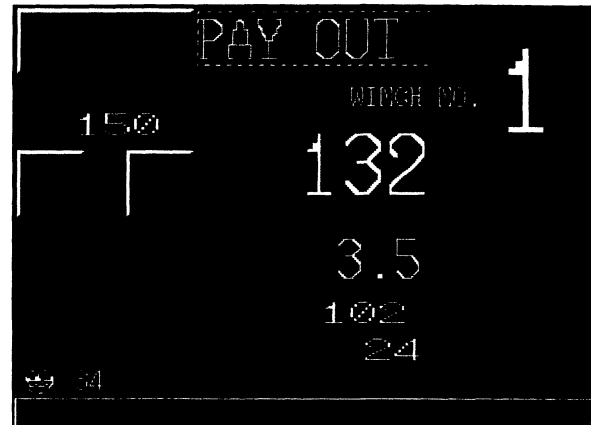


AUTO PAY OUT

Press corresponding START button in *COMMAND* screen. Go back to *OPERATION* screen. The picture there will change to *PAY OUT* screen. Underline green strip will flash indicating that Auto Pay Out is in stand by mode.

When winch is ready, set out the scientific device by using manual control. Within the Safety Range (sets in LIMITS screen) only Manual Control is available.

An audible alarm will sound when master length is passing safety limit and Auto Pay Out mode takes over. Green strip will stop flashing then.



Auto Pay Out will be active till length reaches the set point.

During Auto Pay Out the system will control shooting speed and/or tension in accordance with preset values.

Following information will be on-line monitored on the touch screen:

- Set length value (units);
- Length (meters or fathoms);
- Active Winch Number;
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Dynamic Tension (tons);
- Line speed (units/min).

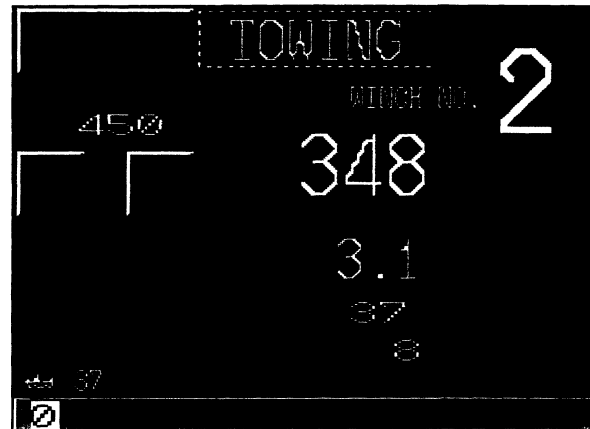
Auto Pay Out mode can be stopped any time by pressing STOP button, in the *COMMAND MENU*. To start Auto Pay Out again, press START. These switches are enabled only when master length is inside auto pay out range.



AUTO TOWING

Depending on settings in OUTPUT CONTROL screen, Auto Towing mode can be engaged automatically/manually when master length reaches the set point.

During Auto Towing mode the system will tune the pressure on winches automatically, winches work on dynamic positioning, aiming to keep master length on the set point.



New value of set point length can be entered without stopping Auto Towing mode and the system will bring master length to the new set point. Use arrow buttons for minor adjustments of set point, or press the window for set length, and you get a keyboard for entering new value.

Following information will be on-line monitored on the touch screen:

- Set length value (units);
- Length (meters or fathoms);
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Tension (tons) dynamic or static (when towing on the brakes);
- Line speed (units/min).

Auto Towing mode can be stopped any time by pressing STOP button, from the *COMMAND MENU*. To start Auto Towing again press START button. These switches are only enabled when master length is outside safety range and DEAD END STOP is not reached.



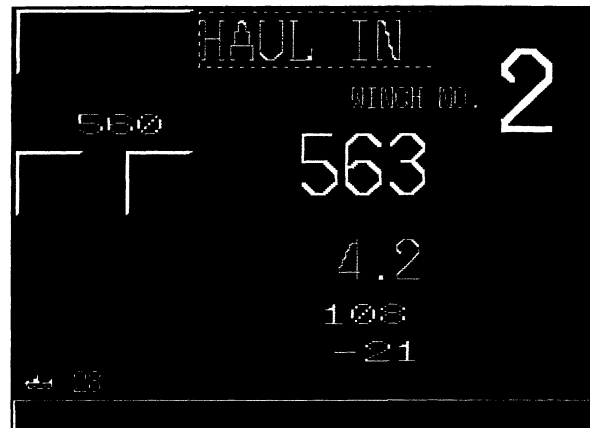
AUTO HAUL IN

Before starting Auto Haul In, make sure that Auto Towing mode has been turned OFF. If necessary start all main pumps again by pressing MAIN PUMP button and/or start each pump from separate panel.

Press START button related to HAUL IN mode in COMMAND screen.

To increase hauling speed, press SPEED button, (if such function is installed on the winch). Thereby you engage 2-3 speed options. Available SPEED steps will shift automatically if system pressure is low enough.

If the system is equipped with separate towing pump(s), EXTRA HAUL SPEED function can be selected to increase hauling speed.



An audible alarm will sound when doors are passing Near Safety Range limit. Auto Haul In mode will stop when passing Safety Range limit (page 11, chapter 2).

Following information will be on-line monitored on the touch screen:

- Set length value (units);
- Length (meters or fathoms);
- Revolutions (RPM) counted on the drums (a minus appears when heaving);
- Dynamic Tension (tons);
- Line speed (units/min).

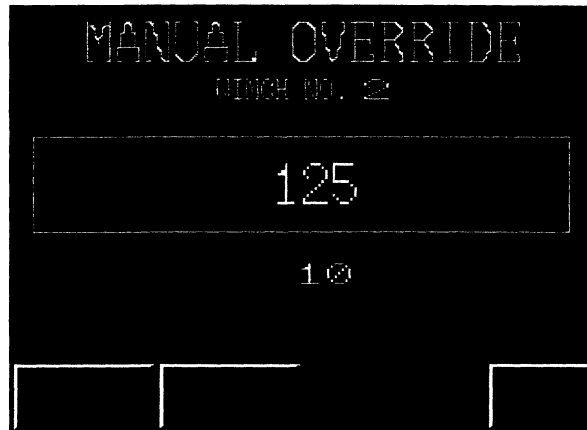
Auto Haul In mode can be stopped any time by pressing STOP button, from the *COMMAND MENU*. To start Auto Haul In again, press START button. These switches are enabled only when master length is outside safety range.



AUTOMATIC MODES (advanced control)

Press MANUAL OVERRIDE button in COMMAND screen for advanced winch control. Use INCREASE/DECREASE buttons to rise/lower system pressure in event of the scientific device, creeping out or snag.

Values can be altered without stopping Auto modes and the system will respond at once.



2-SP TOW button engages two-speed option while in towing. The option might be useful to enhance winch response if towing pressure is low (50-70bar).

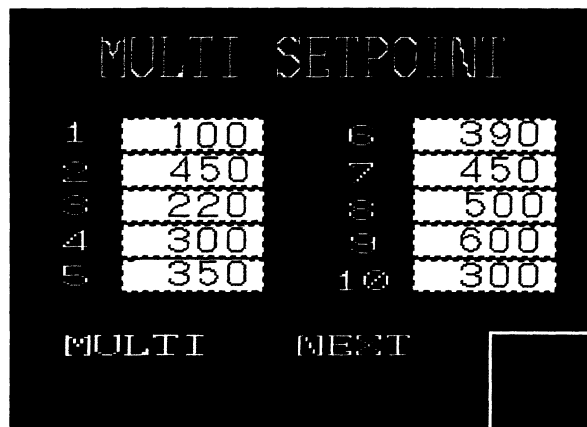
Following information will be on-line monitored on the touch screen:

- System pressure, on winches haul in side (bar);
- Return pressure, on winches pay out side (bar);
- Pressure offset (units).

Green background of the sign MANUAL indicates that Manual Pressure control button has been pressed on L2 panel (optional). Thus operator controls pressure on the winch manually, by the potmeter mounted on the bridge control panel. Under these circumstances Automatic pressure regulation is disabled.

Up to 10 different Lenth set points can be programmed in advance and set in the MULTI SETPOINT screen. In order to jump from one set length to the other button NEXT is pressed on the screen. The same will happen if sign M is pressed on the OPERATIONAL screen. "M" appears only when MULTI mode has been selected.

However in order to reach new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).





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TOUCH PANEL SCREENS

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Version 2.0, last updated 19/05/03

Screen No. 1 Introduction.....	3
Screen No. 2 Warning message.....	3
Screen No. 3 Operation menu, manual mode.	3
Screen No. 4 Command Menu	4
Screen No. 5 Winch select menu.	4
Screen No. 6 Operation menu, pay out mode.	4
Screen No. 7 Operation menu, towing mode.....	5
Screen No. 8 Operation menu, Haul in mode.....	5
Screen No. 9 Manual override menu	5
Screen No. 10 Settings Menu.....	6
Screen No. 11 Menu to other Menu`s.	6
Screen No. 12 Protected Menu.	6
Screen No. 13 Limits Menu.	7
Screen No. 14 Initial setting menu.....	7
Screen No. 15. Alarm overview menu.	7
Screen No. 16 Winch parameter menu.	8
Screen No. 17 Alarm counting menu.....	8
Screen No. 18 Password Protected Menu.	8
Screen No. 19 Reset length menu.	9
Screen No. 20 Emergency stop.....	9
Screen No. 21 Working hours log.....	9
Screen No. 22 Output control menu.	10
Screen No. 23 Simulation menu.....	10
Screen No. 24 System stop menu.	10
Screen No. 25 Alarm history.....	11
Screen No. 26 Regulator operation.	11
Screen No. 27 Multi set point	11
Screen No. 28 Wire angle monitor	12
Screen No. 29 Tension Monitoring Menu	12
Screen No. 30 NMEA out select.....	12
Screen No. 31 Alarm Out select Menu	13



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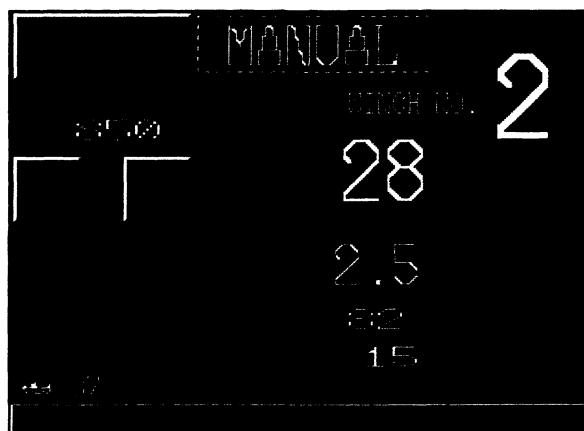
Screen No. 1 Introduction

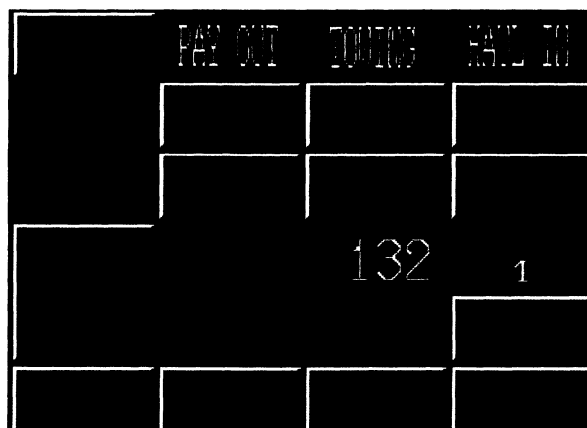
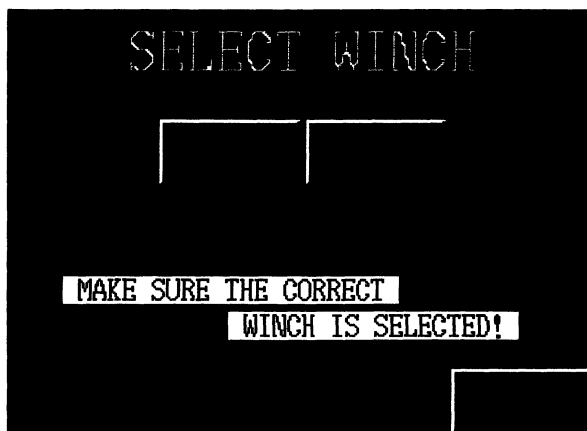
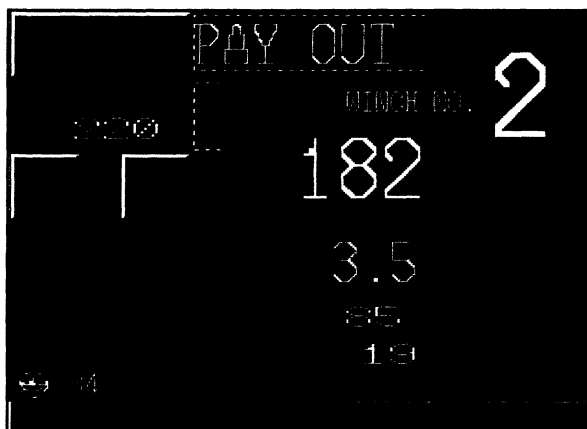


Screen No. 2 Warning message

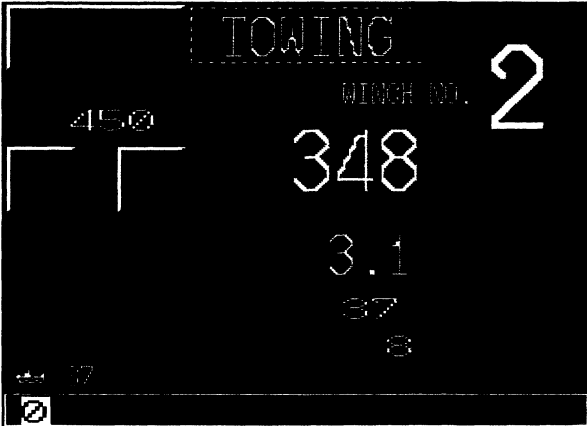


Screen No. 3 Operation menu, manual mode.

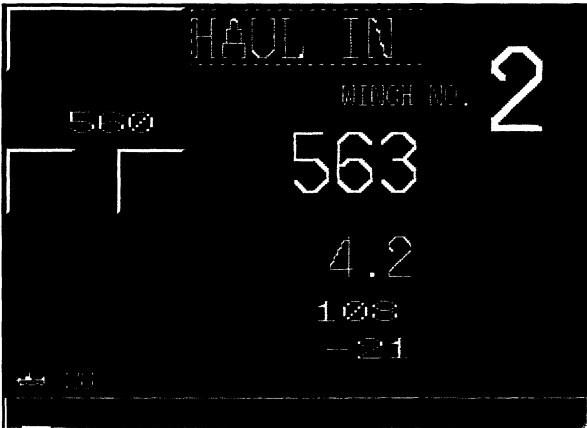


Screen No. 4 Command Menu**Screen No. 5 Winch select menu.****Screen No. 6 Operation menu, pay out mode.**

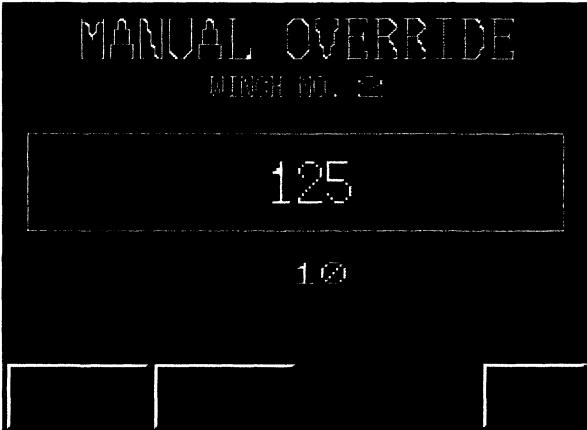
Screen No. 7 Operation menu, towing mode.

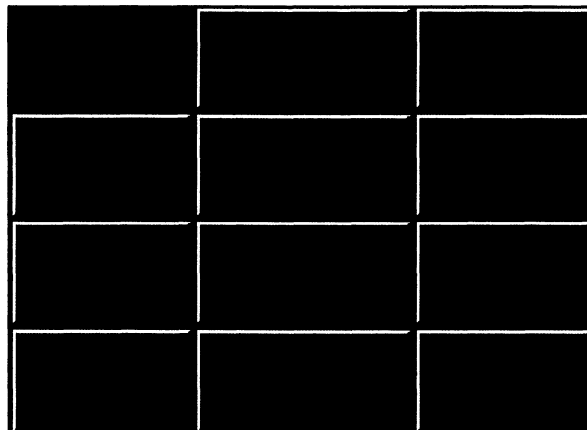
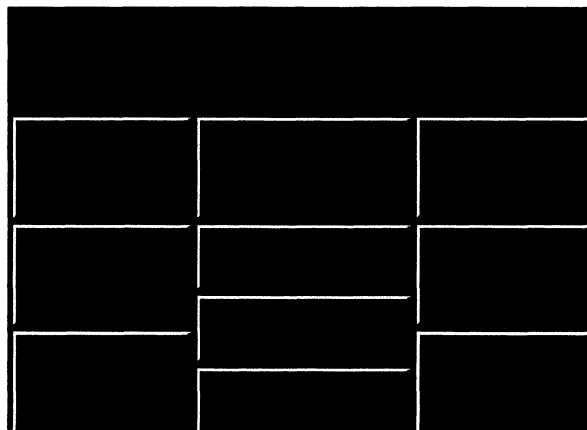


Screen No. 8 Operation menu, Haul in mode.

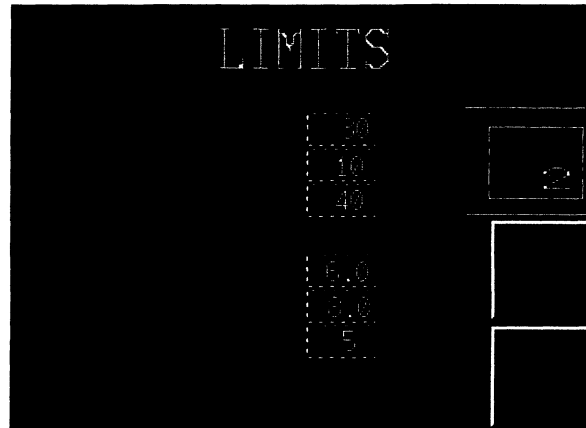


Screen No. 9 Manual override menu

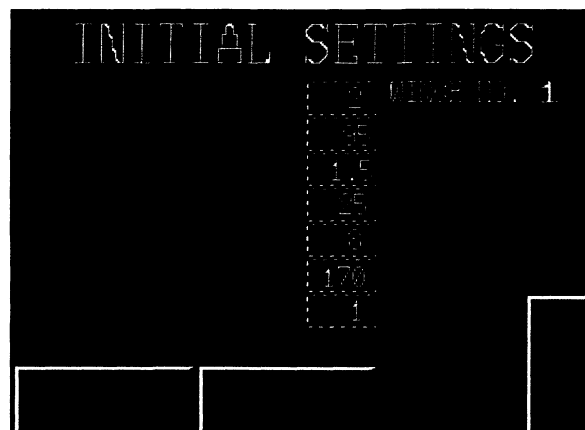


Screen No. 10 Settings Menu.**Screen No. 11 Menu to other Menu's.****Screen No. 12 Protected Menu.**

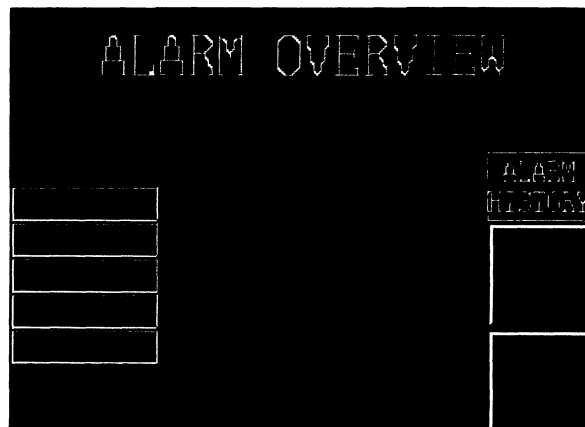
Screen No. 13 Limits Menu.



Screen No. 14 Initial setting menu.



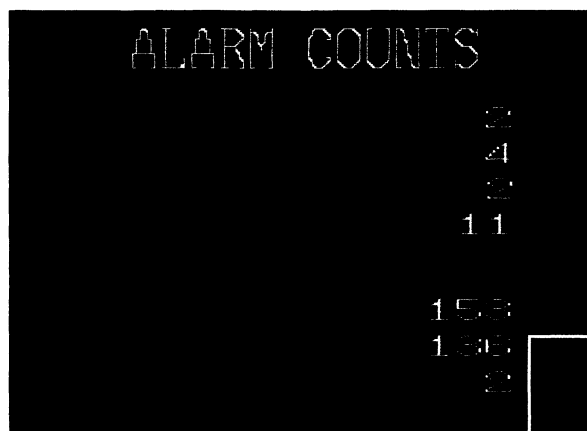
Screen No. 15. Alarm overview menu.



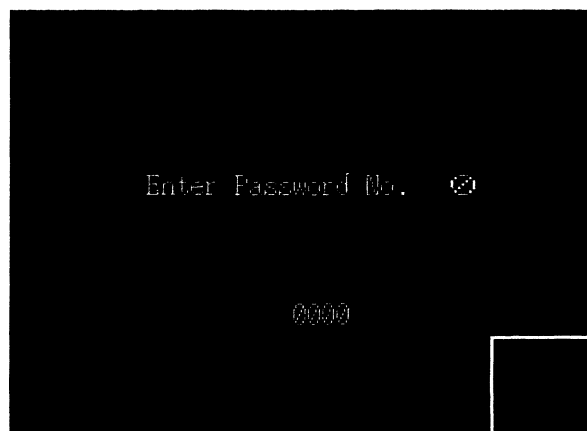
Screen No. 16 Winch parameter menu.



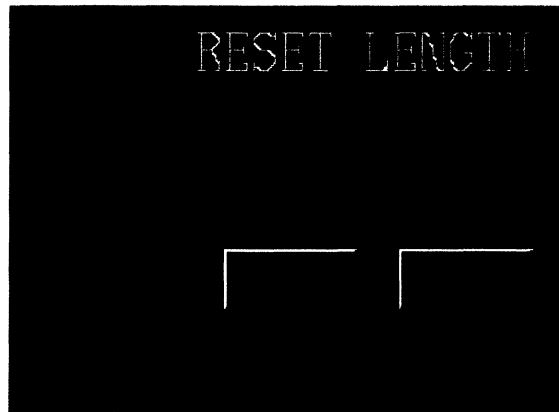
Screen No. 17 Alarm counting menu.



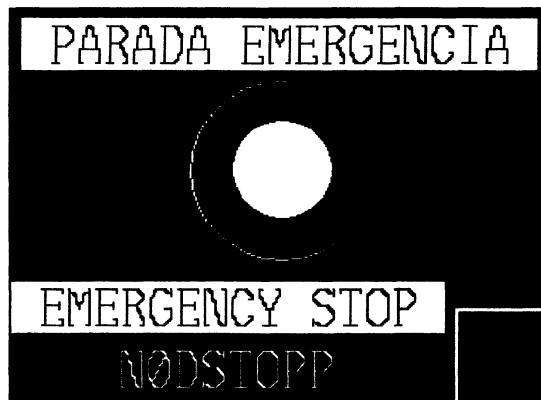
Screen No. 18 Password Protected Menu.



Screen No. 19 Reset length menu.



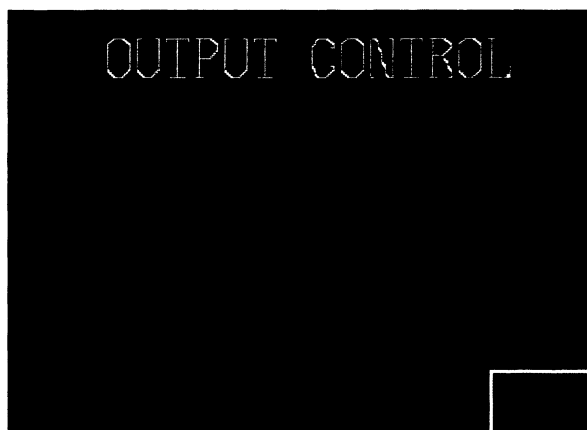
Screen No. 20 Emergency stop.



Screen No. 21 Working hours log.



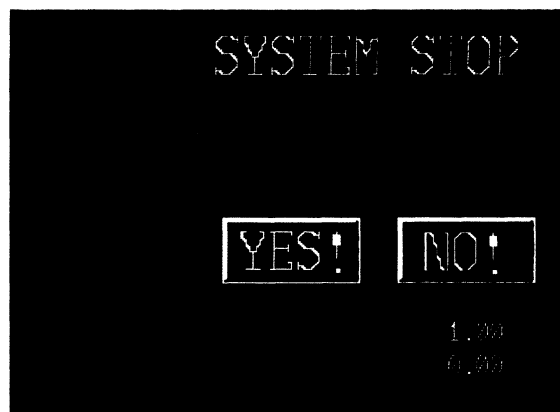
Screen No. 22 Output control menu.



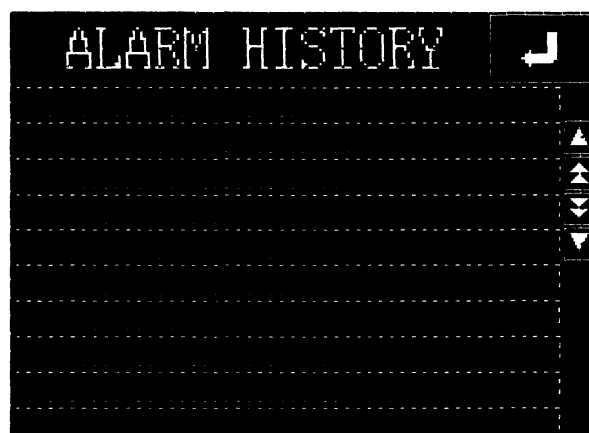
Screen No. 23 Simulation menu.



Screen No. 24 System stop menu.



Screen No. 25 Alarm history.



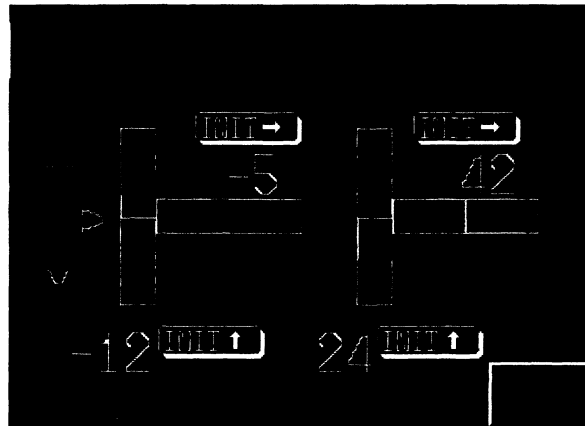
Screen No. 26 Regulator operation.



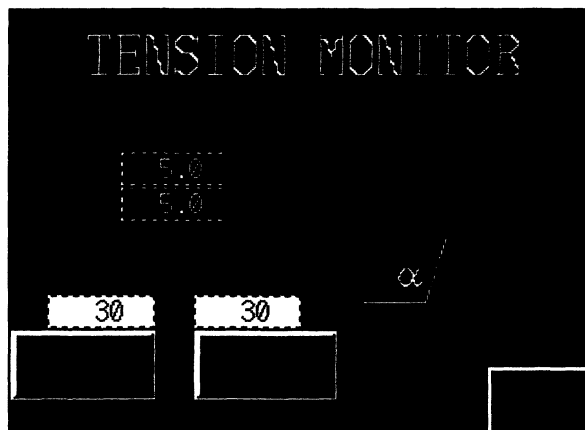
Screen No. 27 Multi set point



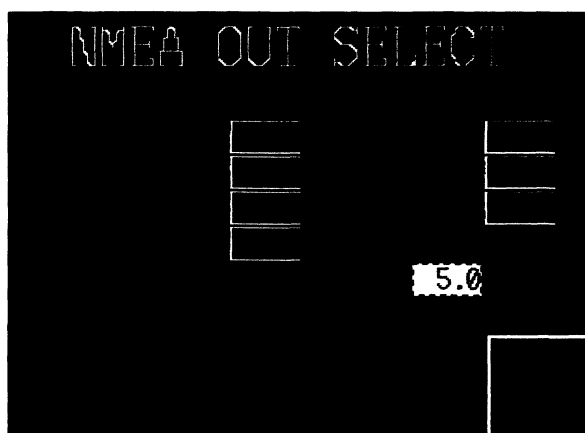
Screen No. 28 Wire angle monitor

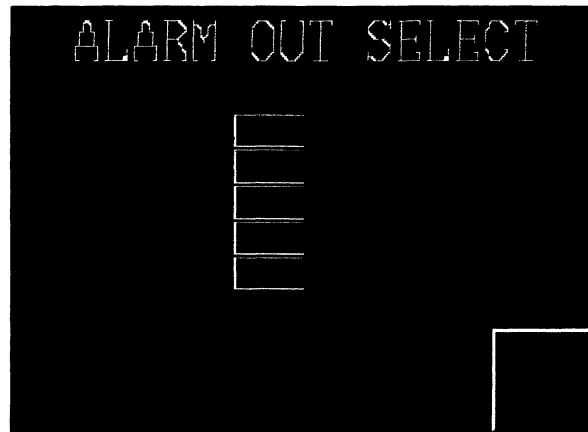


Screen No. 29 Tension Monitoring Menu



Screen No. 30 NMEA out select



Screen No. 31 Alarm Out select Menu



RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

PTS *Pentagon*[®]
Research

NMEA TELEGRAMS

NMEA Telegrams for PTS Pentagon® Research Two winch system

Following information can be used to configure NMEA interface communication between *PTS Pentagon® Research* and other electronic equipment on board.

Mode

"@RCWMD,x<cr><lf>" (research computer winch mode)

- 0 = Manual
- 1 = Pay Out
- 2 = Towing
- 3 = Haul In

Length

The length value is always in meters and without decimals.

"@RCWWL,x,M,y,M <cr><lf>" (research computer winch wire length)

- x = Winch 1 Length
- y = Winch 2 Length

Tension

The tension value is always in tons and with one decimal.

"@RCWWT,x.x,T,y.y,T <cr><lf>" (research computer winch wire tension)

- x.x = Winch 1 Tension
- y.y = Winch 2 Tension

Linespeed & RPM

The linespeed value is always in meters per minute and with out any decimal. RPM is also with out any decimals.

"@RCWWS,x,M,y,M,m,n <cr><lf>" (research computer winch wire speed)

- x = Winch 1 Linespeed
- y = Winch 2 Linespeed

m = Winch 1 RPM

n = Winch 2 RPM

Wire Outlet Angle

The angles are given in degrees with negative angles forwards and to port.

"@RCWOA,k,D,l,D,m,D,n,D<cr><lf>"

- k = Wire 1 angle alongships, negative if forwards
- l = Wire 1 angle wideships, negative if towards port
- m = Wire 2 angle alongside, negative if forwards
- n = Wire 2 angle wideships, negative if towards port

High Priority Alarms:

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@RCAL1,x,N,k,l,m,n<cr><lf>" (research computer alarm 1)



x = Active winch number
k = Oil Level Alarm
l = Wire End Alarm
m = Oil Temp Alarm
n = spare

Low Priority Alarms

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@RCAL2,y,N,u,v,w,x<cr><lf> (research computer alarm 2)

y = Active winch number
u = Filter Alarm
v = Overspeed Alarm
w = Max/Min Alarm
x = spare



RAPP HYDEMA

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PTS *Pentagon*[®] ***Traction***

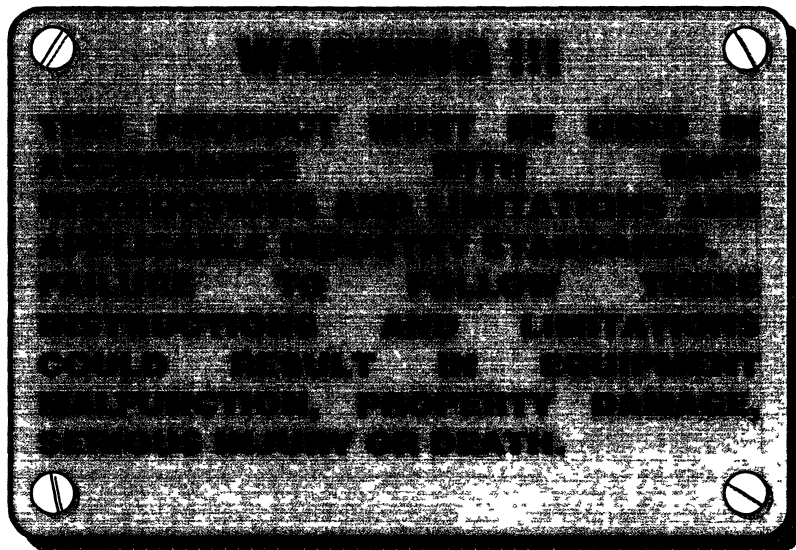
OPERATION MANUAL

Fishery research vessel “Oscar Dyson”

NOAA

PTS *Pentagon*[®]
Traction

CHAPTER 01	SYSTEM DESCRIPTION
CHAPTER 02	FUNCTION DESCRIPTION
CHAPTER 03	SYSTEM SET UP
CHAPTER 04	MODES OF OPERATION
CHAPTER 05	TOUCH PANEL SCREENS
CHAPTER 06	NMEA TELEGRAMS





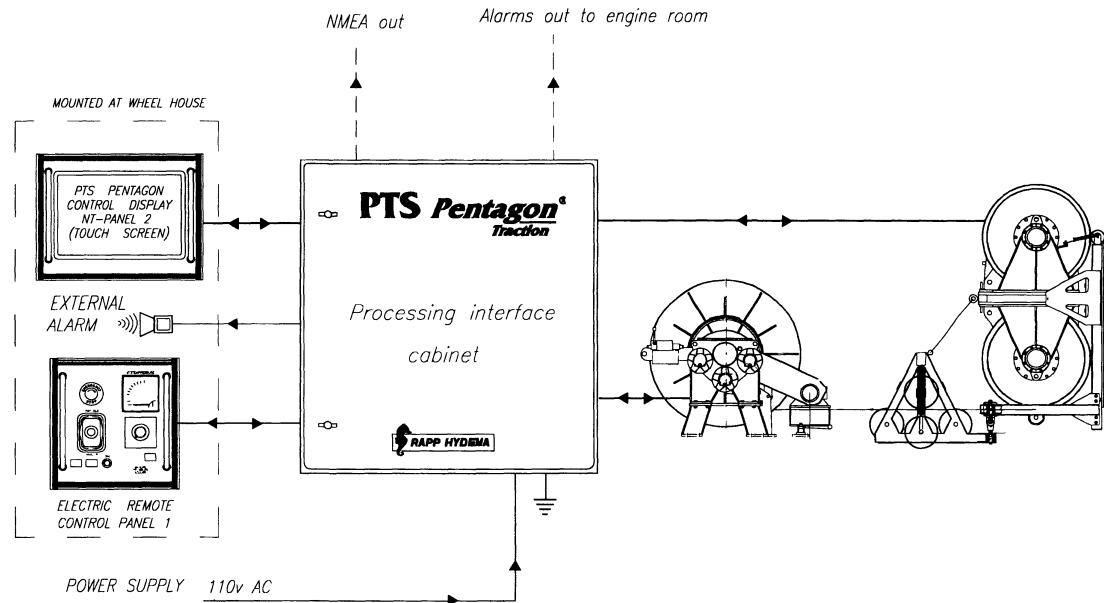
RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

PTS *Pentagon*[®] ***Traction***

SYSTEM DESCRIPTION

I:\TEKNISK\PentagonTR\Operational Instruction\English\NOAA\Ch01R\EN.doc
Version 2.0, last updated: 13/06/03



PTS Pentagon[®] Traction is Rapp Hydema's last generation of winch computers specially built for advanced automatic control of both traction winch and storage drum in different scientific applications.

PTS Pentagon[®] Traction has a compact design and provides efficient control both for storage drum and traction winch in shooting, towing and haul in modes.

PTS Pentagon[®] Traction allows control of all automatic modes from easy to use touch screen panel. Electric remote control panel is provided for manual control of the winch system.

PTS Pentagon[®] Traction has a speed selecting menu, 2 speed function, manually selectable, and controlled by system pressure. Additionally 2-speed can be chosen while in towing mode.

PTS Pentagon[®] Traction is equipped with alarms for different system events e.g. Low oil level, Overspeed, Wire slip etc.



SYSTEM COMPONENTS

PTS *Pentagon*[®] ***Traction*** , Processing Interface Cabinet

Processing Interface comprises of Omron Programmable controller and PLC original interface card connected together and built into common steel cabinet to protect and screen electronic components from interference with radio equipment on board. Processing Interface receives information from entire system e.g. switches and analog transducers, processes it and sends back to the system driving commands directly or via ABC Winch Interface. Processing Interface is also hooked up to the Touch Screen (NT Panel). Processing Interface unit requires 110v AC type power supply. Unit has to be mounted in the wheelhouse or any other dry environment room in accordance with cable diagram RH 105925.

ABC (amplifier base card) is mounted a separate rack inside Interface Cabinet. The ABC Interface amplifies analog signals received from Processing Interface. Further signals are being transferred to executive proportional solenoid valves in hydraulic system. ABC Interface card can be equipped with up to four original Rapp Amplifier Cards for proportional pressure/directional control of the winch system. Four built-in relays are employed to control on/off solenoids.

PTS *Pentagon*[®] ***Traction*** , Touch Screen (NT Panel)

As a matter of fact Touch Screen is the control panel and is of the LCD color touch screen type, point and press. All the vital data for the system is entered via and displayed on the Touch Screen. From this panel operator is able to control all automatic modes, observe system current status and retrieve logged information. Touch Screen is normally placed in the wheelhouse nearby Traction Winch Control Panel.

PTS *Pentagon*[®] ***Traction*** , Traction Winch Control Panel

This is electric remote control panel for traction winch manual direction and pressure control. The panel contains:

- Joystick with a built-in activation button.
- Electric pressure gauge and illumination dimmer.
- General Emergency Stop switch.
- Potentiometer and its activation button for manual pressure control.
- Control activate switch.

PTS *Pentagon*[®] ***Traction*** , External Alarm Unit

This unit is connected to the system's alarm output and will sound a system alarm. The volume and type of signal may be selected. Unit is located in the wheelhouse.





RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

PTS *Pentagon*[®]
Traction

FUNCTION DESCRIPTION

I:\TEKNISK\PentagonTR\Operational Instruction\English\NOAA\Ch02R'EN.doc
Version 2,0, last updated: 13/06/03

2-speed ratio	12	Over speed alarm	6
Alarm count	15	Password	18
Alarm out select	16	Pay out RPM limit	9
Alarm sound pattern	11	Pay out speed control	9
Alarm unit test	11	Pop up keyboard	11
Alarms	4	Pprogram version	13
Alarms history	6	Pressure readings	12
Block	3	Protected settings	15
Block counting	12	Reg. trend	14
Command	3	Reset length	11
Control of line speed in haul in mode	9	Return pressure alarm	6
Dead End Stop limit	12	Return pressure alarm limit	10
Decrease	8	RPM	3
Drum width	12	Safety Range	10
Fathoms	10	Sensor values simulation	12
Gain control	9	Set Length	3
Haul in/pay out ramp	11	Simulation	12
High tension alarm	6	Simulation alarms	13
Increase	8	Simulation length	12
Increase/Decreases active	11	Simulation speed	13
Initial Settings	9	Specific torque	12
Initiate	15	Speed steps control	4
Joystick active period	11	Start/Stop Automodes	8
Limits	10	Stop system	13
Linear Speed	3	Storage drum	3, 4, 18
Load cell	15	Storage drum inertia	18
Log	13	System parameters settings	9
Low tension alarm	6	System pressure control	8
Main pump(s) on/off	4	Tension	3
Manual	3	Tension monitoring	15
Manual override	8	Tension update	10
Manual pressure control	8	Towing flow settings	9
Max/min alarm limits	9	Towing output control	14
Max/min difference alarm	6	Towing RPM limit	10
Menu	9	Towing tension limit	9
Minimum Pay Out Tension	10	Two speed operation pressure	10
Multi set point	17	Two Speed output	14
Near Safety Range warning	11	Two speed storage	8
Near Set Point warning	11	Two speed towing	8
Next	17	Winch parameters	11
NMEA out select	17	Winch slip alarm	6
Oil filters dirt alarm	6	Wire angle	14, 15
Oil high temperature alarm	6	Wire covered angle	15
Oil level alarm	6	Wire diameter	12
Oil temperature	3	Wire end	6
Operation screen	3	Wire length calculation	12
Outer circumference	12	Wire slip limit	10
Outputs	14	Working hours log	13



FUNCTIONS

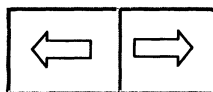
OPERATION

Operation menu access. The button leads to OPERATION screen once pressed. By pressing OPERATION button you will get into one of those specific screens Pay Out, Haul In or Towing depending on which mode has been previously started in COMMAND screen. MANUAL operation screen will appear if none of auto modes has been selected.

NT-Panel screens: * **COMMAND** *, * **MENU** *

COMMAND

This button is used to return to Command screen.



Arrows for manual increase/decrease of Set Length.

TENSION

Displays current tension on cables in all active operation modes. If sign BLOCK on the green back ground present on the screen then tension figure is read out from the block load cell, otherwise it is recalculated from system pressure.

STORAGE DRUM ACTIVE

Message STORAGE DRUM ACTIVE comes on the screen when Storage drum is being turned on. _This can be done out from COMMAND screen.

RPM

Displays revolutions per minute RPM on the winch drum. Sign “-“ comes up in front of figures when Haul In.

LINE SPEED

Displays current Linear Speed value of winch wire in units per minute.

ACTIVE

Displays number of currently active alarms.

INHIBIT

Displays number of inhibited alarms



Green color of this icon indicates that main pump output is on.



Displays current oil temperature.

NT-Panel screens: * **OPERATION** *



MAIN PUMP**Main pump(s) on/off switch**

This function activates an output that makes it possible to start electric motor to operate hydraulic pump. This function acts as a system's general stop in the event of an oil level alarm or emergency stop.

NT-Panel screens: * **COMMAND** *, * **MANUAL OVERRIDE***

SPEED

Speed steps. This function activates speed steps both on the storage drum and traction winch. At this automatic pressure control is based on calculation of the winches' current pressure, maximum pressure and Winch Drive Unit configuration. When the button has been pressed, system automatically activates speed step 2. The system deactivates the speed step automatically in the same manner as indicated by sensing the system pressure.

This function related figures have to be configured in screens **INITIAL SETTINGS** and **WINCH PARAMETERS**.

This function may also be engaged in manual mode.

NT-Panel screens: * **COMMAND** *

**STORAGE
DRUM
ENGAGE**

Storage drum start function. Press this button to turn on storage drum. System blocks traction winch control operations unless storage drum has been engaged.

NT-Panel screens: * **COMMAND** *

ALARMS

By pressing **ALARMS** button, operator enter **Alarms overview** screen

It gives specific alarm status for each alarm type. All alarms except Oil level and Wire end alarms can be temporarily inhibited.

Number of active and inhibited alarms is also displayed in the **Operation** screen.

NT-Panel screens: * **MENU** *, * **OPERATIONS***

**OFF**

Button to reset sound alarm.

Button to return in previous screen or enter set value.



OIL LEVEL	Oil level alarm. Alarm and System General STOP when oil level in main hydraulic tank drops below limit. It is not possible to work with system when this alarm is active. The alarm cannot be inhibited.
WIRE END	Wire end alarm. Alarm and System General STOP when wire length reaches Dead End Stop, configured in the WINCH PARAMETERS screen. The alarm cannot be inhibited.
WINCH SLIP	Winch slip alarm. . Alarm indicates that there is RPM difference between heads on the traction winch which means that wire is slipping.
OIL FILTER	Oil filter alarm. Oil filters dirt alarm. Check light indication on filter's cap to find out which particular filter(s) has been plugged. There is 15 min cold start delay on oil filter alarm.
OIL TEMP	Oil temperature alarm. Oil high temperature alarm. Appears when temperature of oil rises above 55-60 degrees Celsius, also depending in the acceleration of the heat increase.
RETURN PRESSURE	Return pressure alarm. It indicates when pressure in the return line drops below set value while in Auto TOWING mode. This could occur if towing pump(s) stop by any reason or when winch rushing out because of a snag. Alarm is only to warn the skipper, it does not stop Auto Towing mode. Limit value is set in screen INITIAL SETTINGS.
OVERSPEED	Over speed alarm. May occur only during Auto Pay Out and Towing when winch RPM exceed set value. The alarm does not affect any function during Towing. Alarm limit value is set in the screen INITIAL SETTINGS, PAY OUR RPM LIMIT and TOWING RPM LIMIT.
MAX/MIN DIFF	Max/min difference alarm. It goes ON if actual wire length is outside min/max range set in menu SETTINGS WINCH.
TOW TENS HI	Alarm of high tension while towing. Green color of the sign TOW TENS HI in ALARM OVERVIEW will turn to red, that indicates a warning that the towing tension is higher than the limit set in SETTINGS MENU
PAY OUT LO	Alarm of low tension while Pay Out. Green color of the sign PAY OUT LO in ALARM OVERVIEW screen will turn to red when tension on the winch is dropping below set value. Alarm Limits are established in INITIAL SETTINGS menu. When alarm occurs, pressure regulation will be suspended. Increase vessel's speed or decrease shooting speed to avoid emerging of this alarm.



**ALARM
HISTORY**

Alarm history. The button, if pressed, leads to the separate screen ALARM HISTORY that has overview of all recently engaged modes and appeared alarms. Operation mode or type of alarm together with its date (yy/mm/dd) and time (hh:mm) are shown in the log. Latest mode/alarm comes always on top of the list. Searching in the list is available by using scroll/page up/down arrows on the side of the screen.

NT-Panel screens: * **ALARM OVERVIEW** *

**MANUAL
OVERRIDE****System pressure control.**

This button brings up MANUAL OVERRIDE screen with the set of functions for advanced winch control.

Temporarily override the system's regulation of pressure (tension) by means of "INCREASE" and "DECREASE" buttons.

The background of message MANUAL will turn green if corresponding button has been pressed on L2 remote control panel.

NT-Panel screens: * **COMMAND** *

INCREASE

Increases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

DECREASE

Decreases the system's regulating pressure regardless of whether the system is at its set point. The system will return to automatic pressure regulation after a given period of time when the button has been released. Function's active period is defined in the LIMITS menu.

**2 SPEED
TOWING**

Two-speed in towing on/off switch. The button gives an opportunity to engage speed step(s) only for traction winch while in Towing. Note that only 2-speed could be engaged. This function may be useful sampling on rough grounds as well as to increase traction winch sensitivity when towing pressure is too low. This button has direct control on engaging 2-speed in Towing while SPEED button has no function assigned.

**2 SPEED
STORAGE**

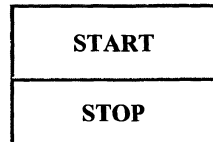
Two-speed for storage drum. The button turns on 2-speed option on the storage drum. Could be useful to keep wire tight while traction winch also works at 2-speed.



MANUAL

Manual system pressure control. Green background of MANUAL sign indicates that system pressure control has been switched over to Manual mode. Hereby pressure on both winches is controlled simultaneously.

NT-Panel screens: * **MANUAL OVERRIDE** *



Start or Stop automatic mode. Start/Stop buttons activate/deactivate specific auto-function in the COMMAND screen. These functions are Pay out, Towing and Haul in.

NT-Panel screens: * **COMMAND** *



Menu for setting system parameters. Button gives an access to the menu for setting system parameters. It is advisable to use it only for personnel authorized to work with **PTS Pentagon** traction.

**MAX/MIN
VALUE**

**MAX TOWING
TENSION**

**TOWING
FLOW**

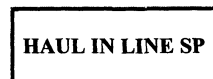
**GAIN
CONTROL**

Min/Max deviation from set point. Max/min alarm limits of wire length deviation (+/-) from the set point.

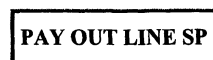
Towing tension limit. Maximum allowed tension during towing.

Value in the **TOWING FLOW** setting sets the control valve in a fixed position during towing means action speed on the traction winch. Default value is 40%.

Winches behavior during towing. Figure 1 gives quick system response (good weather). Winch becomes most sensitive. Figure 10 provides very slack system response (poor weather). Winch becomes stiffer.



Regulation by line speed in haul in mode. Constant pull in speed will be maintained at around the selected value while tension of wire will vary.



Regulation by line speed in pay out mode. Constant pay out speed will be maintained at around the selected value while tension of wire will vary.

NT-Panel screens: * **COMMAND** *, * **MENU** *



Main Menu. The button leads to Main MENU screen where all other screen access buttons are placed.

NT-Panel screens: * **OPERATION** *

INITIAL	Initial Settings menu Button gives access to menu for setting parameters and function options.
<i>NT-Panel screens:</i> * PROTECTED MENU *	
PAY OUT, RPM LMT	Pay out RPM limit. Maximum RPM on main drums limited for Pay out mode.
MIN P/O TENSION	Minimum Pay Out Tension. Factor for setting minimum allowable tension in tons in AUTO PAY OUT mode when regulation by PAY OUT LINE SP has been chosen (screen SETTINGS). If value is reached, alarm PAY OUT LO will show up (ALARM OVERWIEV screen). While alarm is active automatic shooting speed regulation will be temporarily terminated unless tension stabilizes above set value.
TOWING, RPM LMT	Towing RPM limit. Factor for setting maximum allowable RPM while in Auto Towing mode. System will turn on Over speed Alarm when winches RPM exceed set value.
WINCH WIRE SLIP	Winch wire slip alarm limit.. Sets allowable difference in RPM between warping heads 1 and 2. When value is exceeded alarm Wire slip occurs.
RET. PR. AL. LIMIT	Return pressure alarm limit. It sets return pressure limit for alarm on low return pressure on winches only when in auto TOWING mode.
2 SP OPER PRESS	Two speed operation pressure. Sets maximum pressure in bar as upper limit for the system while shifting SPEED steps.
TENSION UPDATE	Tension figures display update. Tension is calculated/updated as an average of few tension readings for given period of time. This period of time can be set from relatively short (1) to relatively long (3) depending of weather conditions/experience.
METERS	Selects meters as wire length measuring units.
FATHOMS	Selects fathoms as wire length measuring units.
<i>NT-Panel screens:</i> * INITIAL SETTINGS *	
LIMITS	Limits menu button gives an access to menu for setting more parameters and function options.
<i>NT-Panel screens:</i> * PROTECTED MENU *	



AUTO START/STOP	Defines Safety Range limit. Value from 10 to 999 could be set in meters/fathoms. Crossing this border the system will automatically start/stop PayOut/HaulIn mode. Only Manual operations are allowed within the Safety Range.
NEAR SET POINT	Near Set Point warning. Sets the distance to the Set Point where the system will give short beep signal to warn the operator to reduce boat speed near Set Point.
PREP. STOP HAUL	Near Safety Range warning. Sets the distance to the Safety Range where the system will give short beep signal to warn the operator before Haul In mode is automatically disengaged.
HAUL/PAY RAMP SPEED	Haul in/pay out delay. This parameter is used to adjust automatic ramp control in haul in and pay out modes for winch system smooth start and stop. Figure 8 gives maximum delay – very smooth operation. Figure 1 gives instantly no delay –hard start/stop.
JOYSTICK ACTIVE	Joystick active period. Sets time in seconds for winch remote control electric joystick to be active after safety (yellow) button on tip of the grip has been pressed.
INCR/DECR ACTIVE	Increase/Decreases active. Time in seconds for INCREASE/DECREASE function buttons to be active once pressed. Buttons are placed in the MANUAL OVERRIDE NT-panel screen.
ALARM TYPE	Defines type of sound pattern. Five different patterns are available. Pattern 5 is continuous sound. This must be set when external alarm unit is used.
ALARM TEST	Alarm unit test button. Sound alarm will be heard as long as the button is pressed.

NT-Panel screens: * **LIMITS** *

RESET LENGTH

Reset length counters. The button is built into pop-up keyboard. To get keyboard up on screen press SET LENGTH area in OPERATION screen or any other field in menus where digital parameters are entered. The function resets length counter both on the traction and storage drum to zero. It is used when device is hooked up and ready for shooting or wherever you want to start. Reset has to be confirmed by pressing YES! in RESET LENGTH pop-up window.

NT-Panel screens: * **POP UP KEYBOARD** *



**WINCH
PARAMETERS**

Winch parameters. Button provides an access to the separate menu screen for setting traction winch and storage drum geometrical characteristics. These parameters are used in the program for length and pull calculation.

NT-Panel screens: * **PROTECTED MENU** *

DRIVE TORQUE

Specific torque for the Winch Drive Unit, value is provided by Rapp Hydema A/S, set in Nm/Bar.

**POWER X
2SPEED**

Reduction ratio is used for winch pull calculation in the program when 2-speed option is engaged. Parameter set in units 1/10000.

**OUTER
CIRCUMF.**

Outer circumference of the traction winch head external diameter. For the storage drum it must be measured when all the cable has been spooled on. Value sets in mm.

DRUM LENGTH

Distance measured between drum shields for storage winch drum, set in mm.

**WIRE
DIAMETER**

Wire diameter, set in mm.

DEAD END STOP

Safety operation limit – maximum length of wire allowed the system to be paid out from the winch drum in any of Auto modes. Value is set in length measuring units. When crossing Dead End Stop limit, system will terminate Auto mode and close winch parking brake. Only Manual mode will be available unless wire length back in working range.

**LENGTH
ADJUST**

Calibration value, which is used for wire length calculation. Compensates for spooling deviation, value is set from 1 to 18 (default - 9).

HEAD 2 COUNTING

Button to switch wire length/speed counting between counting from HEAD 1 or HEAD 2 of the traction winch. Head 1 counting is system default.

NT-Panel screens: * **WINCH PARAMETERS** *

SIMULATION

The button leads to Simulation menu. This is a menu for simulation of running the winches and the sensor values in the system during start up or troubleshooting/adjustment.

NT-Panel screens: * **MENU** *

**SENSOR
VALUES**

The button enables/disables pressure and temperature simulation. Green background of the button indicates that pressure/temperature simulation is currently active.

PRESS P

Pressure Pay Out. Winch pressure on Pay Out side.

PRESS H

Pressure Haul In. Winch pressure on Haul In side.

OIL TEMP

Oil temperature. Temperature of oil in the return line.



**LENGTH
SIMULATE**

Length simulation. Displays figures of current simulated length.

OUT

Button to start simulation of Pay Out mode. Green background indicates when simulation OUTwards is active.

IN

Button to start simulation of Haul In mode. Green background indicates when simulation INwards is active.

PULSE CYCLE

Defines IN/OUT simulation speed. Figures 1, 2 and 3 can be entered. Figure 1 gives max simulation speed.

OIL LEVEL
ALARM

Simulates Oil Level alarm.

OIL FILTER
ALARM

Simulates Oil Filter Plugged alarm.

NT-Panel screens: * **SIMULATION** *

STOP SYSTEM

Brings up SYSTEM STOP screen. Operator is asked if he really wants to Stop the system. To proceed press YES! To go back to MENU screen press NO!

NT-Panel screens: * **MENU** *

VERSION NO. HMI

Displays NT touch screen program version.

VERSION NO. PLC

PLC program version.

NT-Panel screens: * **SYSTEM STOP** *

LOG INFO

Brings up WORKING HOURS screen. Working hours are logged separate for different operation modes.

NT-Panel screens: * **MENU** *

PAY OUT AUTO

PAY OUT mode running hours log.

HAUL IN AUTO

HAUL IN mode running hours log.

TOWING 80-110 BAR

Logging system working hours when pressure is in range 80-110 bar in towing mode of operation.

TOWING 110-140 BAR

Logging system working hours when pressure is in range 110-140 bar in towing mode of operation.



TOWING > 140 BAR

Logging system working hours when pressure is over 140 bar in towing mode of operation.

NT-Panel screens: * **WORKING HOURS** *

OUTPUTS

Button to access OUTPUT CONTROL screen. Outputs settings are related to the system design and normally carried out during startup by Rapp Hydema engineer.

NT-Panel screens: * **PROTECTED MENU** *

TWO SPEED OPER.

Control of 2 - 3 speed output.

HAUL

Speed shifting only takes place when Auto Haul In mode is active.

H & P

Speed shifting takes place in both Auto Haul In and Auto Pay Out modes.

ON TOW

Speed shifting takes place also in towing mode.

TOWING OPER.

Control of Towing output.

AUTO ON

Program turns ON Towing output automatically when master length reaches Set Point.

NOT ON

Program does not turn ON Towing output when master length reaches Set Point. Operator has to start Towing mode manually by pressing corresponding START button.

NT-Panel screens: * **OUTPUT CONTROL** *

REG. TREND

The button, once pressed, brings up REGULATOR OPERATION screen. This screen is submitted for troubleshooting carried out by RAPP HYDEMA AS authorized personnel.

NT-Panel screens: * **MENU** *

WIRE ANGLE

The button to access WIRE ANGLE MONITOR screen. This option provides wire direction control both in longitudinal and transversal directions.

NT-Panel screens: * **MENU** *



INIT →

INIT ↑

This buttons are submitted for zero-calibration of the inclinometer. Buttons on top are to calibrate athwart-ships angle. Lower buttons are for longitudinal zeroing. WIRE 1 submitted for traction winch angle adjustment/monitoring. WIRE 2 is optional setup submitted to use together with hydrographic winch when it has been configured to work in the aft direction.

Measured angle presented by both graphs and figures. Negative figures (red graphs) means that wire angled to the bow/Port. Positive values (green graphs) indicates that wire angled to the stern/Starboard. Boat silhouette represents the reference point. Zeroing has to be done when wire pointing straight down, e.g. device hanging out of board, ready for launching.

NT-Panel screens: * **WIRE ANGLE MONITOR** *

ALARM COUNT

This button brings up ALARM COUNTS screen. It is used to present number of main system alarms and working hours. Screen ALARM COUNTS shows number of oil level, oil temperature, filter and return pressure alarms together with working hours for the system, main pump and high temperature operation.

NT-Panel screens: * **MENU** *

PROTECTED
SETTINGS

The button is submitted to reach PROTECTED MENU screen. Protected menu has in turn 10 different buttons to access other system parameters and settings.

NT-Panel screens: * **MENU** *

TENSION
MONITOR

The button leads to settings for wire tension monitoring. Operator may choose one of three different set ups available in conjunction with wire tension monitoring.

NT-Panel screens: * **PROTECTED MENU** *

INITIATE

Press INITIATE button to calibrate zero when wire free from any load (device).

WIRE COVERED
ANGLE

A parameter that is used in tension calculation. Set by Rapp Hydema personnel.

LOAD CELL
ALWAYS ON

This means that tension is measured always only by Load Cell. This particular situation is indicated by sign BLOCK (next to TENSION) with green back ground, on the COMMAND screen.



**PRESS TR. ALWAYS
ON**

When option selected, pressure drop across the winch drive is a source for wire tension calculation. System Pressure is constantly measured by two pressure transmitters one installed in the pressure line another in the return. When winch stands still there is no pressure drop in the system and tension therefore will display zero regardless to the real tension of the wire.

STAT/DYN SELECT

This option provides an active system scan control. When winch is moving (haul in, pay out, towing or manual control) pressure drop is sensed and recalculated to tension. When winch stops (does not move at any direction for more then 4 sec., or oil pressure is less then 30 bar measured in pressure line) tension is read directly from load cell.

NT-Panel screens: * **TENSION MONITOR** *

**ALARM
SELECT**

Press this button to get an access to the ALARM OUT SELECT screen. This makes it possible to configure alarms delivered outside the system (e.g. to engine room).

NT-Panel screens: * **PROTECTED MENU** *

**OIL LEVEL
WIRE END
WINCH SLIP
OIL TEMP
OVERSPEED**

Press corresponding button(s) to choose type of alarm(s) to be sent outside the system. Button receives green background once alarm has been selected. Red field on the left indicates when alarm is presently active.

OUTPUT MONITOR

Output monitor, red circle, will turn ON if one or more alarms have been selected.

NT-Panel screens: * **ALARM OUT SELECT** *

**NMEA OUTPUT
SELECT**

The button gives an access to NMEA OUT SELECT screen. This option provides an opportunity to configure system information that can be sent outside the system via com port using NMEA telegram.

NT-Panel screens: * **PROTECTED MENU** *

**WINCH MODE
WIRE LENGTH
WIRE TENSION
WIRE SPEED
WIRE ANGLE**

Select required information to be included in the telegram by pressing corresponding button. It turns green when selected. Information is always collected/transferred simultaneously from winch 1 and 2 irrespective of which one is presently controlled.

**ALARM 1
ALARM 2**

ALARM 1 means Oil Level Alarm, Wire End Alarm, Oil Temp Alarm.

ALARM 2 means Filter Alarm, Overspeed Alarm, Max/Min Alarm.

Only one of these alarms sets can be chosen for output telegram.



REPEAT EVERY

This figure sets frequency of telegram exchange. More information regarding telegrams format is described in Chapter 6.

NT-Panel screens: * **NMEA OUT SELECT** *


MULTI SETPOINT

Press this button to bring up MULTI SET POINT screen. The screen allows programming up to ten different set points and activating Multi Set Point mode.

NT-Panel screens: * **PROTECTED MENU** *


MULTI

MULTI SETPOINT screen has an opportunity to program in advance up to 10 different Set Length points.

If MULTI button is pressed (green background) Multi Setpoint mode is active. Symbol  pops up automatically on the OPERATION screen also indicating that Multi Setpoint mode is currently active.

NEXT

When MULTI mode is ON, pressing button NEXT makes the system jump over to the next set point in the list. However in order to reach this new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).

Symbol  on the Operational screen may also be used to jump over to the next set point.

NT-Panel screens: * **MULTI SETPOINT** *

**PASSWORD
ENABLE**

Button sets/removes password protection for PROTECTED SETTINGS menu. Background green color indicates that password has been enabled.

NT-Panel screens: * **PROTECTED MENU** *

Enter Password No

Passwords are provided on a special security card. There is a table containing 20 four digits passwords numbered from 1 to 20. If password option is enabled, system asks for the password No. before operator will be able to reach PROTECTED MENU. Corresponding password has to be looked up at the security table and punched on the screen. When password no. 20 has been used, sequence begins with no.1 again.

NT-Panel screens: * **PASSWORD** *



**STORAGE
DRUM**

This button gives an access to the separate screen with Storage drum tightening parameters.

NT-Panel screens: * **PROTECTED MENU** *

TIGHTENING**FIXED**

Fixed value (tons) allows keeping the same tension of the wire between storage drum and traction winch while in operation. Tension on the storage drum will not vary in the entire range of wire length and wire tension measured on the traction winch.

VARIABLE

If variable parameter is chosen wire tension on the storage drum will be maintained as per set ratio (percent) to wire tension measured on the traction winch. Figures from 1 up to max 15 % can be set.

**ACTIVE INERTIA
COMPENSATION**

This option allows the system to bring storage drum pressure shortly up to its maximum when winches are slowing down right before they are stopped. This is to avoid wire slack from inertia forces.

NT-Panel screens: * **STORAGE DRUM** *





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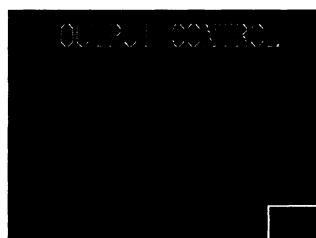
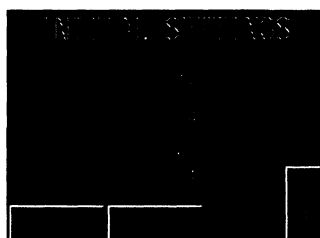
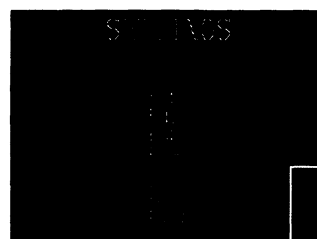
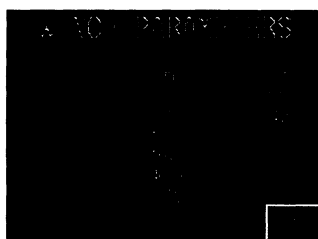
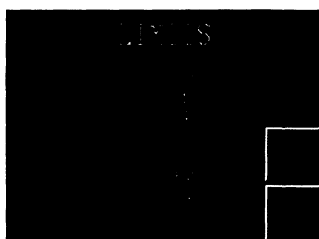
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SYSTEM SET UP

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Version 2.0, last updated: 13/06/03

For setting up the system for a specific vessel, correct parameters in the following menus have to be set:

- * LIMITS *.
- * WINCH PARAMETERS * both for traction winch and storage drum
(important)
- * SETTINGS * (important)
- * INITIAL SETTINGS *.
- * OUTPUT CONTROL *.



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Traction computer is delivered with default values set in memory.
However, correct figures valid for the project must be set before sea trials.

NB! Following tables have to be filled in during starting up the system. Copy of this document must be sent to Rapp Hydema A/S, Bodø, Norway, and also kept onboard for default checking.



VESSEL / SYSTEM INFORMATION

Boat name:	Installation date:
Owner:	HA No.:

Program version PLC:	
Program version NT:	

Figures in brackets are default values

LIMITS

AUTO START/STOP	(50 units)
NEAR SETPOINT	(75 units)
PREP. STOP HAUL	(50 units)
HAUL/PAY RAMP SPEED	(3 sec)
JOYSTICK ACTIVE	(5 sec)
INCR/DECR ACTIVE	(5 sec)
ALARM TYPE	(5)

WINCH PARAMETERS**STORAGE DRUM TRACTION WINCH**

DRIVE TORQUE	(70 Nm/bar)	(70 Nm/bar)
POWER X 2 SPEED	(5000)	(5000)
OUTER CIRCUMF.	(3500 mm)	(3500 mm)
DRUM LENGTH	(905 mm)	
WIRE DIAMETER	(9.5 mm)	
DEAD END STOP	(3500 m)	
LENGTH ADJUST	(9)	
HEAD 2 COUNTING	(NO)	



INITIAL SETTINGS

PAY OUT, RPM LMT	(60 rpm)
MIN P/O TENSION	(0.5 ton)
TOWING, RPM LMT	(10 rpm)
WINCH WIRE SLIP	(4 counts)
RET. PR. AL. LMT	(8 bar)
2 SP OPER PRESS	(160 bar)
TENSION UPDATE	(2)
SELECT UNITS	<input type="checkbox"/> METERS <input type="checkbox"/> FATHOMS

OUTPUT CONTROL

TWO SPEED OPER.	<input type="checkbox"/> HAUL	<input type="checkbox"/> H & P	<input type="checkbox"/> ON TOW
TOWING OPER.	<input type="checkbox"/> AUTO ON	<input type="checkbox"/> NOT ON	

SETTINGS

MAX/MIN VALUE	(10 units)
MAX TOW TENSION	(1 ton)
TOWING FLOW	(40%)
GAIN CONTROL	(5)
HAUL IN LINE SPEED	(100 units/min)
PAY OUT LINE SPEED	(100 units/min)



WORKING HOURS LOG

SYSTEM ON	
MAIN PUMP	
TEMPERATURE > 60° C	
PAY OUT AUTO	
HAUL IN AUTO	
TOWING 80-100 BAR	
TOWING 100- 140 BAR	
TOWING > 140 BAR	

ALARM COUNTS

OIL LEVEL	
OIL TEMPERATURE	
FILTER ALARM	
RETURN PRESSURE	

<i>Figures were set by:</i>	<i>(Company, name and signature)</i>	<i>Date:</i>
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Other notes:





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MODES OF OPERATION

*I:\TEKNISK\PentagonTR\Operational Instruction\English\NOAA\Ch04R'EN.doc
Version 2.0, last updated: 13/06/03*

PREPARATION FOR STARTING UP THE SYSTEM	3
MANUAL MODE.....	3
AUTOMATIC MODES	4
AUTO PAY OUT.....	5
AUTO TOWING.....	6
AUTO HAUL IN	7
AUTOMATIC MODES (advanced control)	8



All data for the winch system normally loaded to the memory during start up by Rapp Hydema's service engineer. To check/correct system parameters go through settings menus (*SETTINGS*, *INITIAL SETTINGS*, *WINCH PARAMETERS*, *LIMITS*, *OUTPUT CONTROL*, for traction winch and storage drum. Make sure that all data and parameters are correct. You will find initial data for the system in Chapter "SYSTEM SET UP".

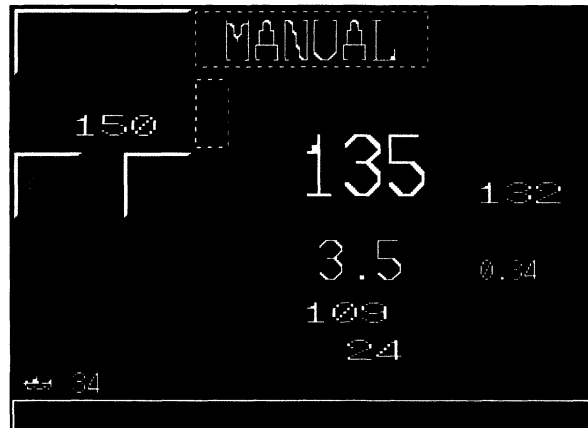
PREPARATION FOR STARTING UP THE SYSTEM

Turn on power supply for the system. Choose the language on the initial screen and read/accept warning message.

After this system enters MANUAL mode screen. In order to make it possible to start winch's hydraulic pump press COMMAND button to reach COMMAND screen and there press MAIN PUMPS button. If pump is driven by electric motor in additional it requires starting from the separate (L4) panel. All winch automatic modes and remote controls are available only if hydraulic pump(s) is running.

MANUAL MODE

This is general mode for the system operation inside "safety range", (when none of automatic modes can be started). System always returns to the manual mode outside safety range if operator stops automatic modes. In manual mode traction winch can be controlled both from the bridge (joysticks) and from local stand (control valves).



Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Multi set point mode (if engaged);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign "--" appears when heaving);
- Tension (tons) both dynamic and static (when winches parked on the brakes)
Indication BLOCK means that tension red out from load cell;
- Line speed (units/min).
- Hydraulic oil temperature
- Storage drum data: wire length and tension.



Number of current active and inhibited alarms monitored on the bottom line of the screen. By pressing this area you can check status of all current alarms on the *ALARM OVERVIEW* screen.

Press COMMAND button to enter into the corresponding screen. Some extra functions for the manual mode are only available from this screen.

The system is equipped with 2-Speed functions. When button SPEED is activated winch speed will double both for traction winch and storage drum. SPEED option can be assigned to work in the Haul in, Haul in & Pay out or/and in Towing modes. In addition it also works in the Manual mode.

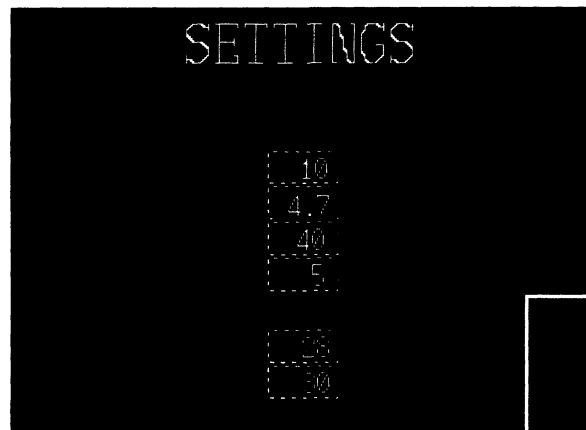
AUTOMATIC MODES

Before starting any automatic modes, make sure that all operational settings are correct.

To review operational settings press SETTINGS button, in the COMMAND MENU. The panel picture will be changed to * SETTINGS* screen.

Set desired values for:

MAX/MIN, TOWING MAX TENSION, TOWING FLOW, and GAIN CONTROL according to the exploration and weather conditions. Also set the Line speed both for Haul in and Pay out modes.



Prior to start any operation with traction winch storage drum has to be turned on. In the COMMAND MENU press STORAGE DRUM ENGAGE button. Corresponding sigh comes up on the OPERATION screen indicating that storage drum has been activated.

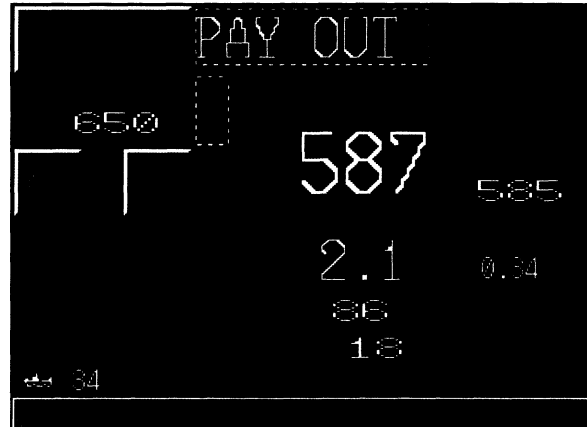
In all automatic modes, number of current active and inhibited alarms is monitored on the ALARM button area. By pressing this area you can check status of current alarms on the *ALARM OVERVIEW* screen.

AUTO PAY OUT

Press corresponding START button in *COMMAND* screen. Go back to *OPERATION* screen. The picture there will change to *PAY OUT* screen. Underline green strip will flash indicating that Auto Pay Out is in stand by mode.

When winch is ready, set out the scientific device by using manual control. Within the Safety Range (sets in LIMITS screen) only Manual Control is available.

An audible alarm will sound when master length is passing safety limit and Auto Pay Out mode takes over. Green strip will stop flashing then.



Auto Pay Out will be active till length reaches the set point.

During Auto Pay Out the system will control shooting speed and/or tension in accordance with preset values.

Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Multi set point mode (if engaged);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign “-“ appears when heaving);
- Dynamic tension (tons)
Indication BLOCK means that tension red out from load cell;
- Line speed (units/min).
- Hydraulic oil temperature
- Storage drum data: wire length and tension.

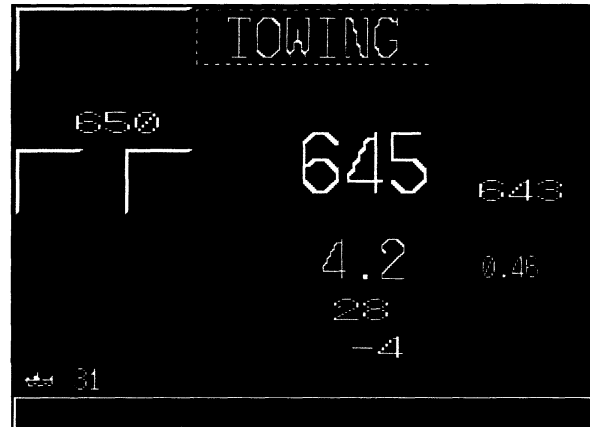
Auto Pay Out mode can be stopped any time by pressing STOP button, in the *COMMAND MENU*. To start Auto Pay Out again, press START. These switches are enabled only when master length is inside auto pay out range.



AUTO TOWING

Depending on settings in OUTPUT CONTROL screen, Auto Towing mode can be engaged automatically/manually when master length reaches the set point.

During Auto Towing mode the system will tune the pressure on the traction winch automatically, winch works on dynamic positioning, aiming to keep master length on the set point.



New value of set point length can be entered without stopping Auto Towing mode and the system will bring master length to the new set point. Use arrow buttons for minor adjustments of set point, or press the window for set length, and you get a pop-up keyboard for entering new value.

If multi set point mode is active, pressing symbol “M” makes the system jump over to the next set point. Adjustment of multi set length is available from MULTI SETPOINT screen (PROTECTED MENU). In order to reach new set point faster operator has to stop Towing mode and engage Haul in or Pay out from the COMMAND screen.

Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Multi set point mode (if engaged);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign “-“ appears when heaving);
- Dynamic tension (tons)
Indication BLOCK means that tension red out from load cell;
- Line speed (units/min).
- Hydraulic oil temperature
- Storage drum data: wire length and tension.

Auto Towing mode can be stopped any time by pressing STOP button, from the COMMAND MENU. To start Auto Towing again press START button. These switches are only enabled when master length is outside safety range and DEAD END STOP is not reached.

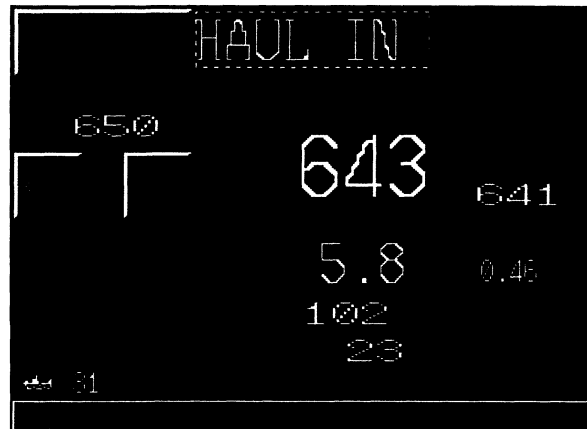
AUTO HAUL IN

Before starting Auto Haul In, make sure that Auto Towing mode has been turned OFF. If necessary start all main pumps again by pressing MAIN PUMP button and/or start each pump from separate panel.

Press START button related to HAUL IN mode in COMMAND screen.

To increase hauling speed, press SPEED button, (COMMAND MENU). Thereby you engage 2 speed options. SPEED step will shift automatically if system pressure is low enough.

If the system is equipped with separate towing pump(s), EXTRA HAUL SPEED function can be selected to increase hauling speed.



An audible alarm will sound when doors are passing Near Safety Range limit. Auto Haul In mode will stop when passing Safety Range limit (page 11, chapter 2).

Following information will be on-line monitored on the touch screen:

- Set length value (meters or fathoms);
- Multi set point mode (if engaged);
- Current length (meters or fathoms);
- Revolutions (RPM) counted on the drum (sign “-“ appears when heaving);
- Dynamic tension (tons)
Indication BLOCK means that tension red out from load cell;
- Line speed (units/min).
- Hydraulic oil temperature
- Storage drum data: wire length and tension.

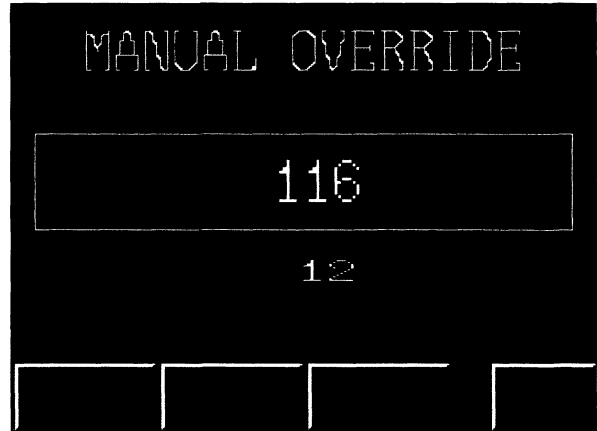
Auto Haul In mode can be stopped any time by pressing STOP button, from the COMMAND MENU. To start Auto Haul In again, press START button. These switches are enabled only when master length is outside safety range.



AUTOMATIC MODES (advanced control)

Press MANUAL OVERRIDE button in COMMAND screen for advanced winch control. Use INCREASE/DECREASE buttons to rise/lower system pressure in event of the scientific device, creeping out or snag.

Values can be altered without stopping Auto modes and the system will respond at once.



2-SP TOWING button engages two-speed option only for traction winch while in towing. 2-SP STORAGE is a separate switch that turns on/off double speed option only for the storage drum.

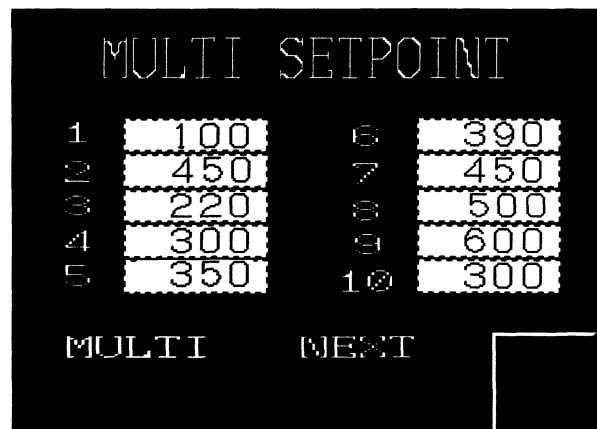
Following information will be on-line monitored on the touch screen:

- System pressure, on traction winch haul in side (bar);
- Return pressure, on traction winch pay out side (bar);

Green background of the sign MANUAL indicates that Manual Pressure control button has been pressed on L2 panel (optional). Thus operator controls pressure on the winch manually, by the potmeter mounted on the bridge control panel. Under these circumstances Automatic pressure regulation is disabled.

Up to 10 different Lenth set points can be programmed in advance and set in the MULTI SETPOINT screen. In order to jump from one set length to the other button NEXT is pressed on the screen. The same will happen if sign M is pressed on the OPERATIONAL screen. "M" appears only when MULTI mode has been selected.

However in order to reach new set point operator has to select COMMAND screen and start appropriate mode (haul in or pay out).





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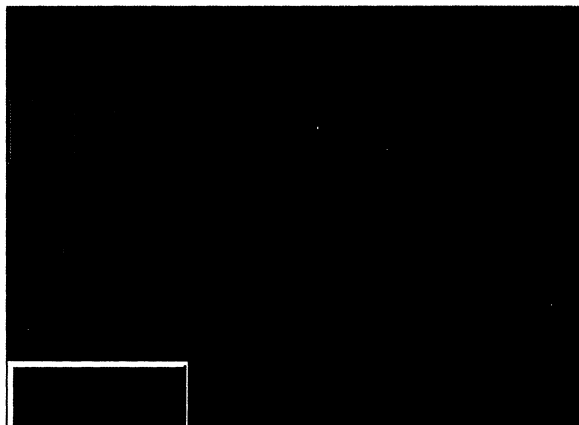
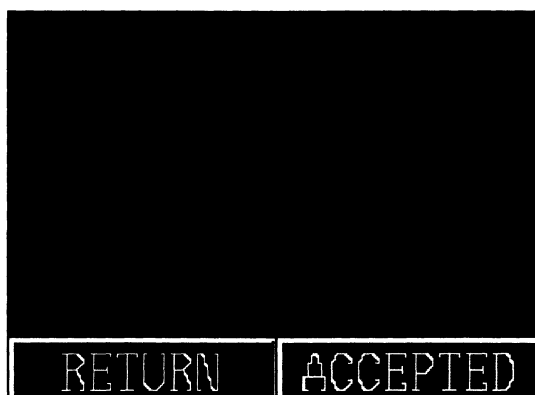
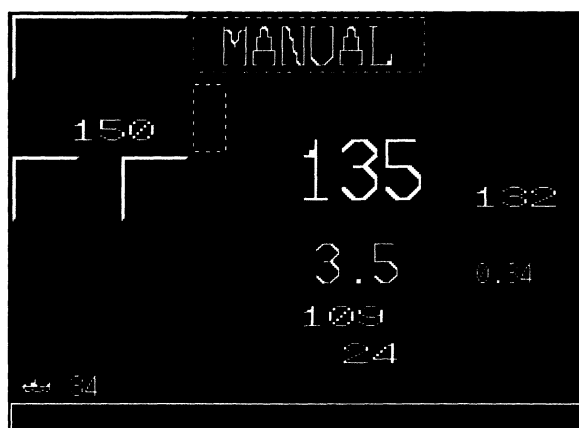
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TOUCH PANEL SCREENS

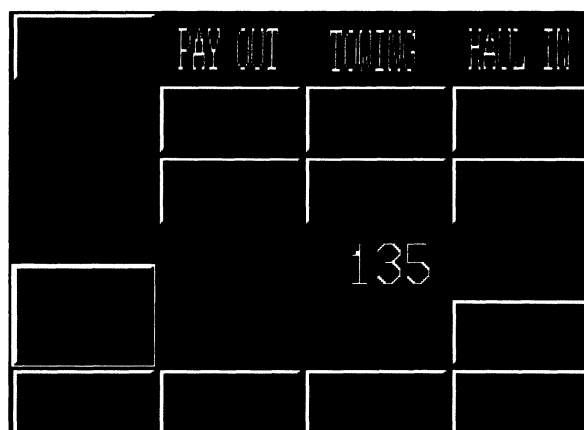
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Version 2.0, last updated 11/06/03

Screen No. 1 Introduction.....	3
Screen No. 2 Warning message.....	3
Screen No. 3 Operation menu, manual mode.	3
Screen No. 4 Command Menu	4
Screen No. 5 Operation menu, pay out mode.	4
Screen No. 6 Operation menu, towing mode.....	4
Screen No. 7 Operation menu, Haul in mode.....	5
Screen No. 8 Manual override menu	5
Screen No. 9 Settings Menu.....	5
Screen No. 10 Menu to other Menu`s.	6
Screen No. 11 Protected Menu.	6
Screen No. 12 Limits Menu.	6
Screen No. 13 Initial setting menu.....	7
Screen No. 14. Alarm overview menu.	7
Screen No. 15 Winch parameter menu.	7
Screen No. 16 Alarm counting menu.....	8
Screen No. 17 Password Protected Menu.	8
Screen No. 18 Reset length menu.	8
Screen No. 19 Emergency stop.....	9
Screen No. 20 Working hours log.....	9
Screen No. 21 Output control menu.	9
Screen No. 22 Simulation menu.....	10
Screen No. 23 System stop menu.	10
Screen No. 24 Alarm history.....	10
Screen No. 25 Regulator operation.	11
Screen No. 26 Multi set point	11
Screen No. 27 Wire angle monitor	11
Screen No. 28 Tension Monitoring Menu	12
Screen No. 29 NMEA out select.....	12
Screen No. 30 Alarm Out select Menu	12

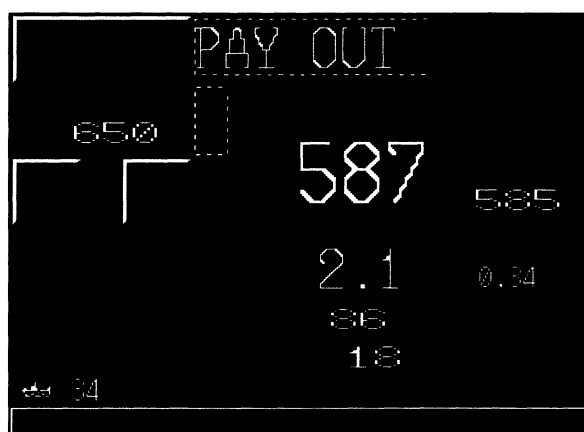


Screen No. 1 Introduction**Screen No. 2 Warning message****Screen No. 3 Operation menu, manual mode.**

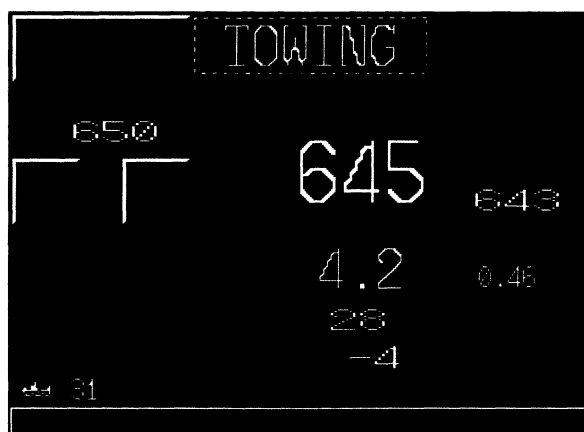
Screen No. 4 Command Menu

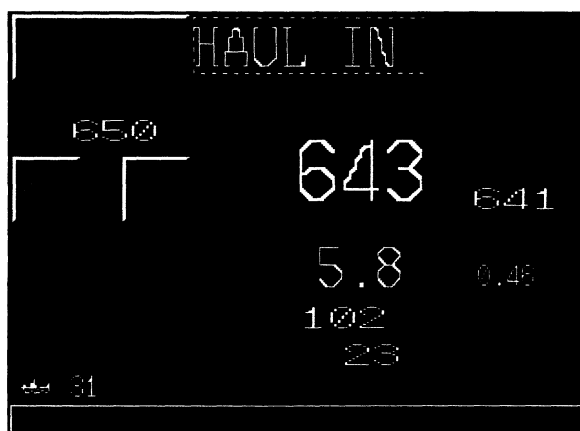
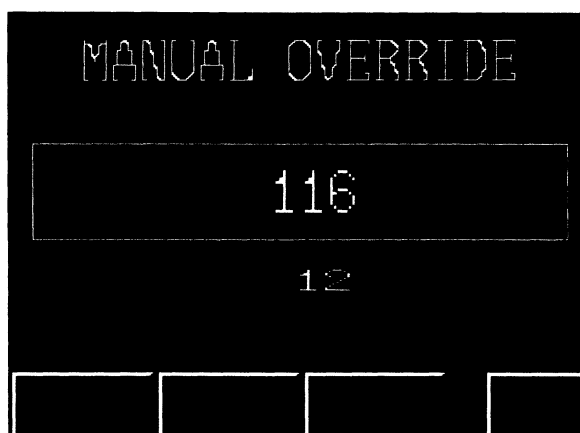
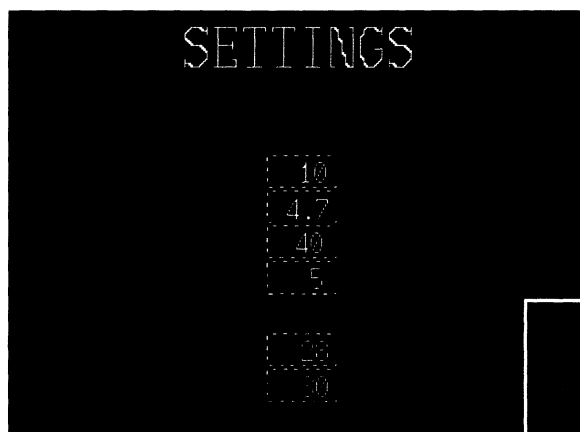


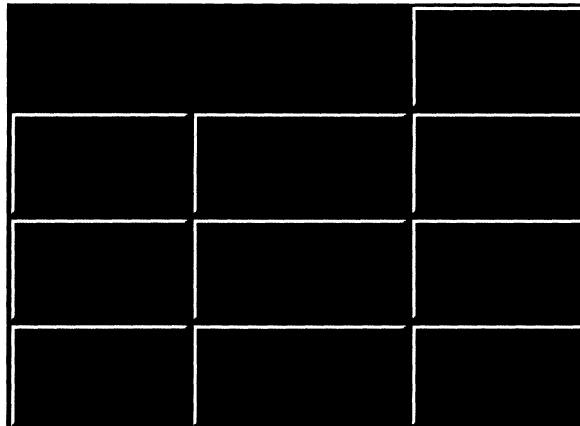
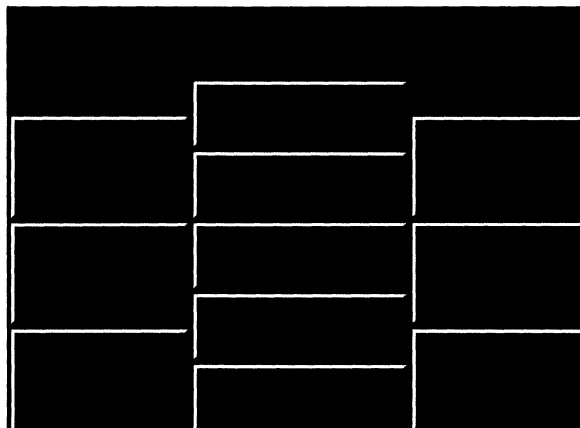
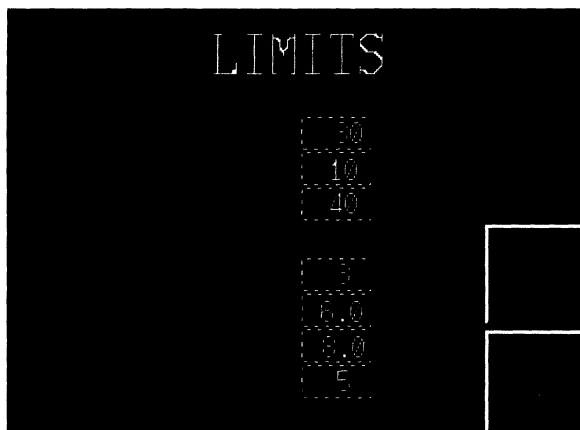
Screen No. 5 Operation menu, pay out mode.

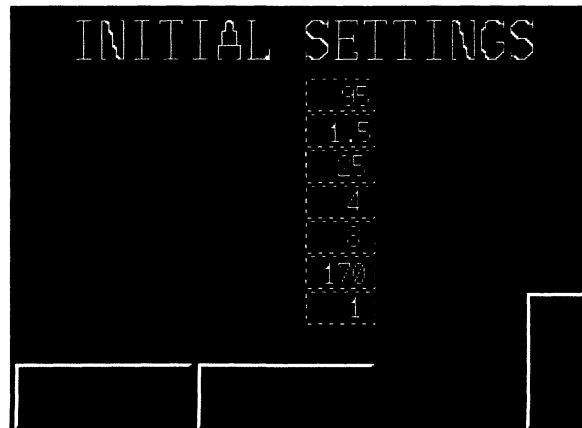
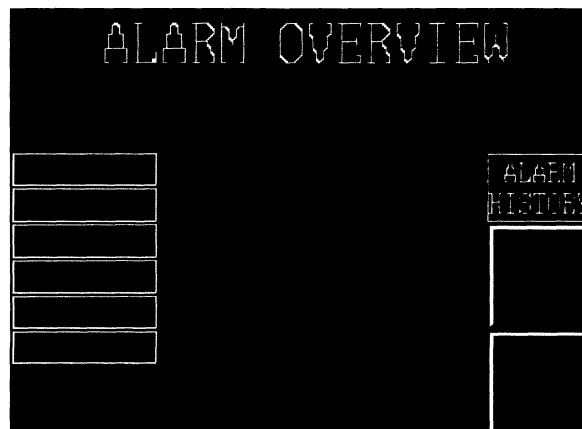


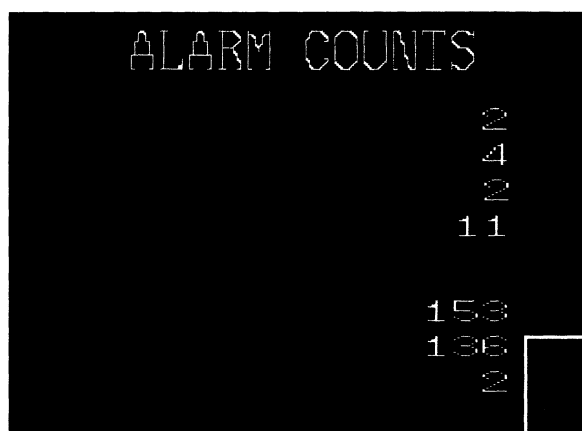
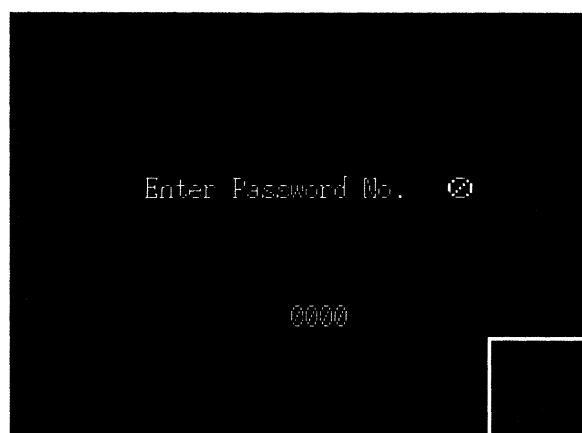
Screen No. 6 Operation menu, towing mode.



Screen No. 7 Operation menu, Haul in mode.**Screen No. 8 Manual override menu****Screen No. 9 Settings Menu.**

Screen No. 10 Menu to other Menu`s.**Screen No. 11 Protected Menu.****Screen No. 12 Limits Menu.**

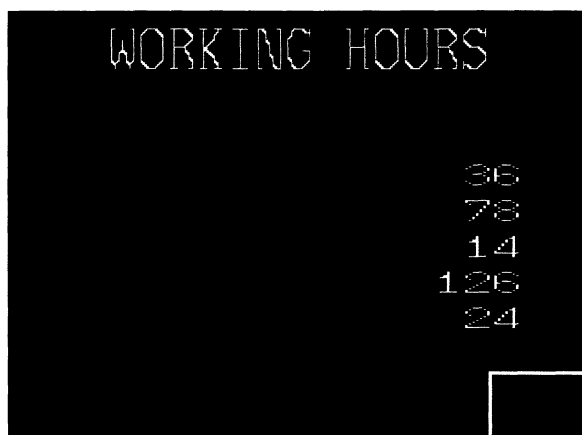
Screen No. 13 Initial setting menu.**Screen No. 14. Alarm overview menu.****Screen No. 15 Winch parameter menu.**

Screen No. 16 Alarm counting menu.**Screen No. 17 Password Protected Menu.****Screen No. 18 Reset length menu.**

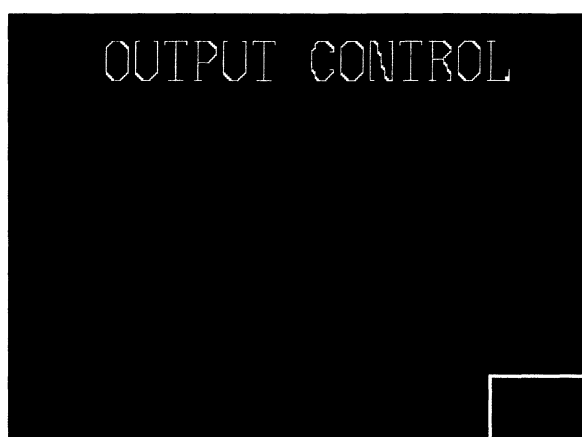
Screen No. 19 Emergency stop.



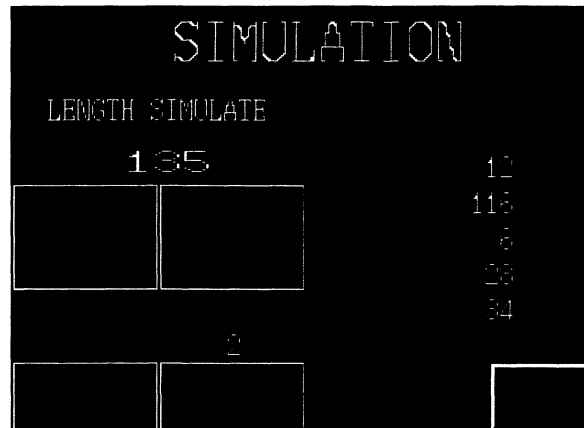
Screen No. 20 Working hours log.



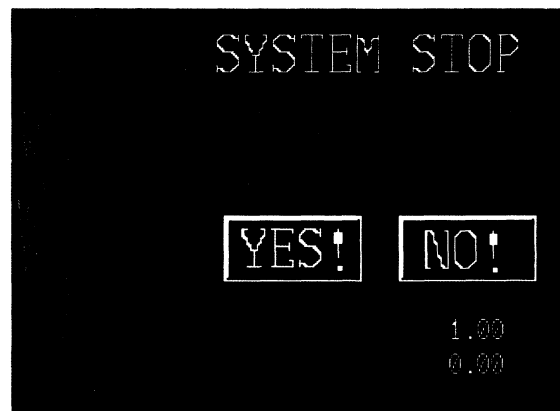
Screen No. 21 Output control menu.



Screen No. 22 Simulation menu.



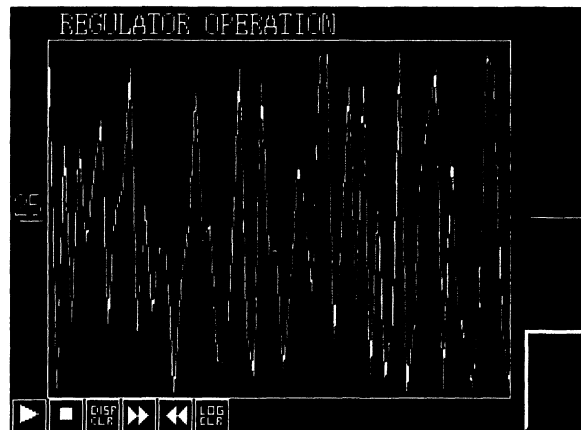
Screen No. 23 System stop menu.



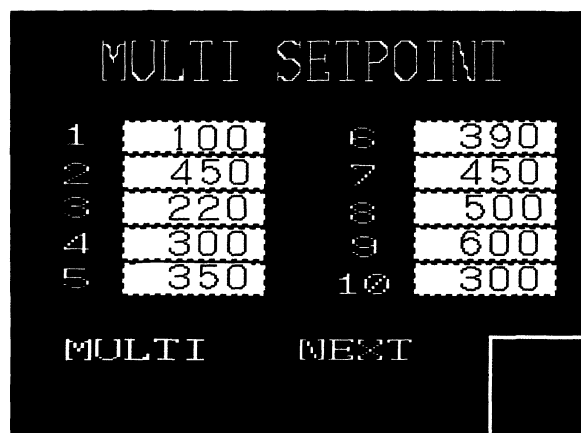
Screen No. 24 Alarm history.



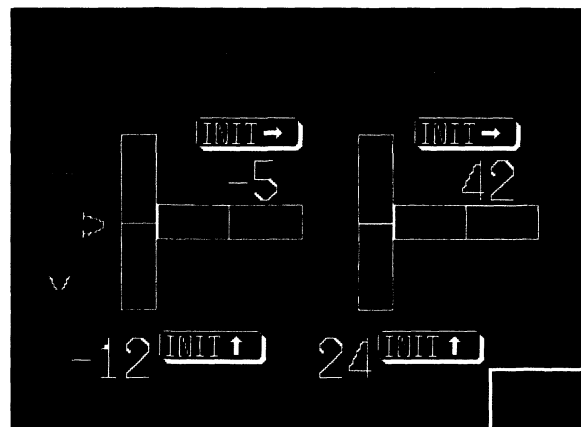
Screen No. 25 Regulator operation.



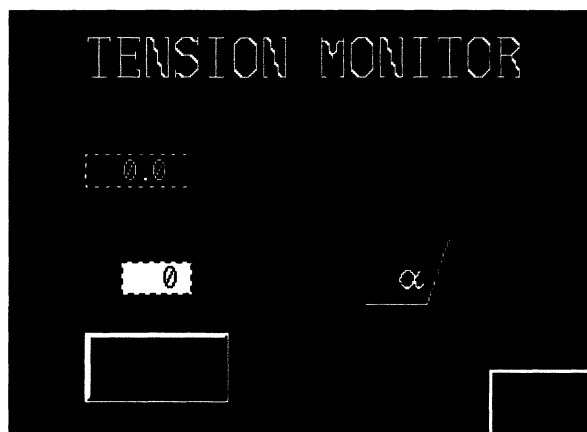
Screen No. 26 Multi set point



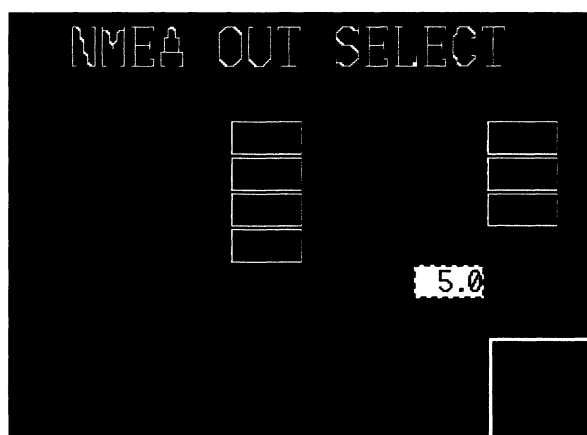
Screen No. 27 Wire angle monitor



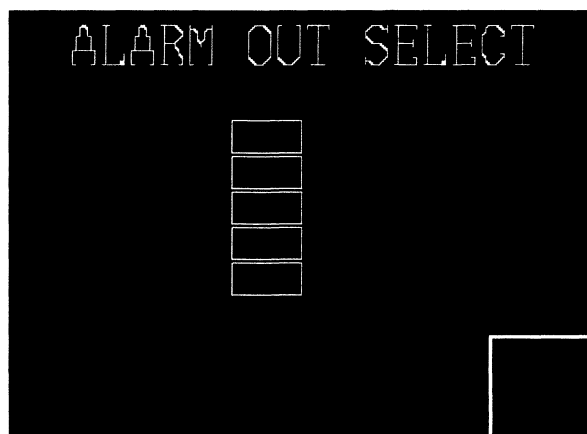
Screen No. 28 Tension Monitoring Menu



Screen No. 29 NMEA out select



Screen No. 30 Alarm Out select Menu





RAPP HYDEMA

COMMITTED TO INNOVATING THE INDUSTRY

PTS ***Pentagon[®]***
Traction

NMEA TELEGRAMS

NMEA Telegrams for PTS Pentagon® Traction

Following information can be used to configure NMEA interface communication between PTS Pentagon® Research and other electronic equipment on board.

Mode

"@TCWMD,x<cr><lf>" (traction computer winch mode)

- 0 = Manual
- 1 = Pay Out
- 2 = Towing
- 3 = Haul In

Length

The length value is always in meters and without decimals.

"@TCWWL,x,M,y,M <cr><lf>" (traction computer winch wire length)

- x = Winch 1 Length in meters
- y = Winch 2 Length in meters

Tension

The tension value is always in tons and with one decimal.

"@TCWWT,x.x,T,y.y,T <cr><lf>" (traction computer winch wire tension)

- x.x = Winch 1 Tension in tons
- y.y = Winch 2 Tension in tons

Linespeed & RPM

The linespeed value is always in meters per minute and with out any decimal. RPM is also with out any decimals.

"@TCWWS,x,M,y,M,m,n <cr><lf>" (traction computer winch wire speed)

- x = Winch 1 Linespeed
- y = Winch 2 Linespeed

m = Winch 1 RPM

n = Winch 2 RPM

Wire Outlet Angle

The angles are given in degrees with negative angles forwards and to port.

"@TCWOA,k,D,l,D <cr><lf>"

- k = Wire 1 angle alongships, negative if forwards
- l = Wire 1 angle widships, negative if towards port

High Priority Alarms:

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@TCAL1,x,N,k,l,m,n<cr><lf>" (traction computer alarm 1)

- x = Active winch number
- k = Oil Level Alarm



l = Wire End Alarm
m = Oil Temp Alarm
n = spare

Low Priority Alarms

When an alarm is active it is shown as 1. If not active it is shown as 0.

"@TCAL2,y,N,u,v,w,x<cr><lf> (traction computer alarm 2)

y = Active winch number
u = Wire Slip Alarm
v = Overspeed Alarm
w = Max/Min Alarm
x = spare



NOAA FRV40-1

OPERATION INSTRUCTIONS

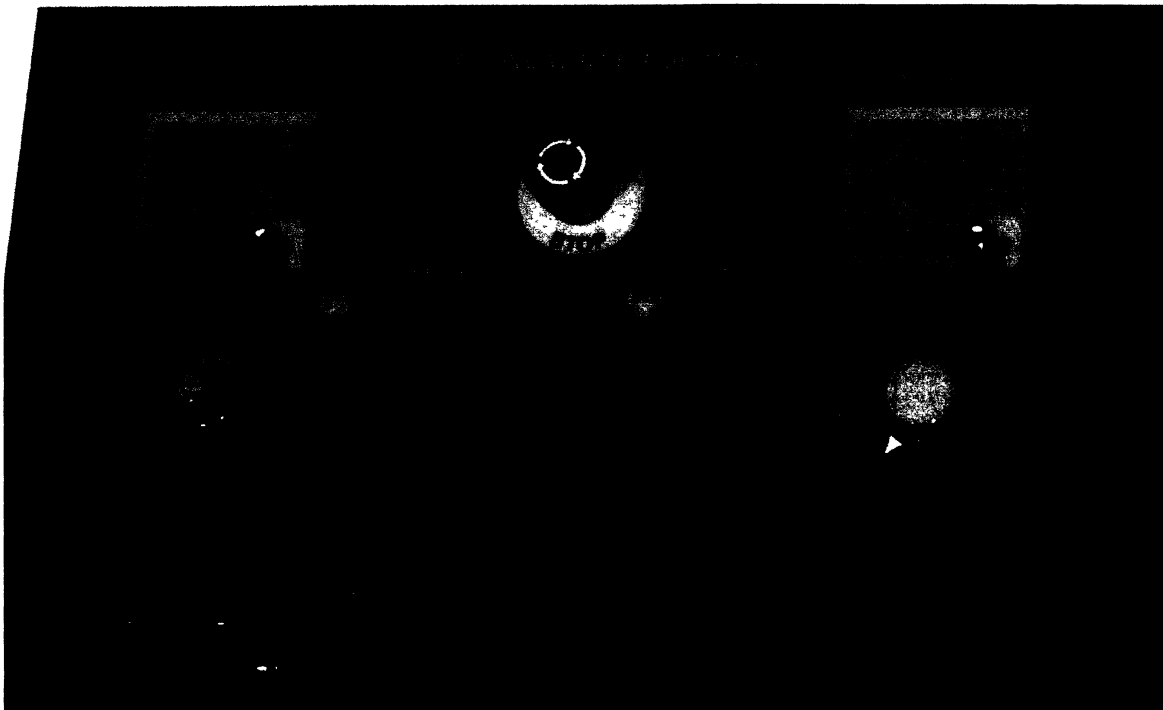
Trawl Winches

Relevant dimension drawing: 3R 76/47

Relevant electric diagram: RH105923, 3R 73/92 and 3R 73/90

The winches are operated from the L2B-panel in the Aft Control Station (ACS), from the L2SF-panel in the Aft Working Deck Control Station (AWD-CS) or locally at the winch itself.

It is clearly marked on the L2SF- and L2B-panels which joystick operates which winch.



Haul in/Pay out:

- Press the yellow button on top of the joystick. The joystick will now be active for 30 seconds, where after it will deactivate itself.
- The speed of the winch is proportional to the stroke of the joystick.
- Normally, there is no need for selecting control station; the joystick you press the button on will be active whether it is in the ACS or in the AWD-CS. However, in the L2SF-panel in the AWD-CS there is a "Control Here" button, which after a few seconds will put the AWD-CS panel in operation even if the winch is currently being operated from the ACS.
- At all times the winch may be operated locally by the handle on the main control valve on the winch.

Emergency start of Main pumps:

- If the main pumps stop, caused by PLC failure, they can be engaged by activating EMERGENCY START PUMPS in ACS' L2B panel.
- This function only to be used as an emergency function in order to retrieve the trawl gear.

Emergency Stop:

- The emergency stop button in the panels can be pressed at all times. It will stop all main pumps on the HPU. Thereby all winches will stop and all brakes on the winches will be applied. All emergency stop switches in our system works like this.

Pressure Control (mooring):

- The pressure control feature provides the possibility of adjusting the hydraulic pressure to the hydraulic motors and thereby controlling the pull of the winches.
- **Pressure Control during Haul In:**
 - o Haul like normal by pulling the joystick towards you.
 - o Ensure that the pressure control potentiometer is set to 100%.
 - o Press the button "Pressure Control". The pressure control potentiometer is now active.
 - o Turning the potentiometer counter-clockwise will reduce the hauling pressure and thereby the pull. The speed of the winches will also be reduced when they are loaded.
 - o Turning the potentiometer clock-wise will increase the hauling pressure and thereby the pull. The speed of the winches will also be increased when they are loaded.
 - o When the button "Pressure Control" is pressed again/released the pressure control output will automatically be set to 100% regardless of the position of the potentiometer.
- **Pressure Control during Pay Out:**
 - o Pay out like normal by pushing the joystick away from you.
 - o Ensure that the pressure control potentiometer is set to 100%.
 - o Press the button "Pressure Control". The pressure control potentiometer is now active.
 - o Turning the potentiometer counter-clockwise will reduce the pressure working against the winches and the winches will increase their pay-out speed accordingly if they are loaded.
 - o Turning the potentiometer clockwise will increase the pressure working against the winches and the drums will slow down.
 - o When the button "Pressure Control" is pressed again/released the pressure control output will automatically be set to 100% regardless of the position of the potentiometer.

NOAA FRV40-1

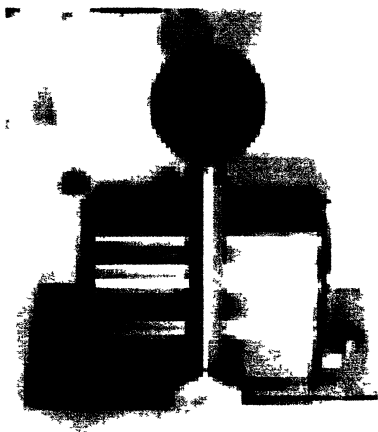
OPERATION INSTRUCTIONS

Net Sounder Winch

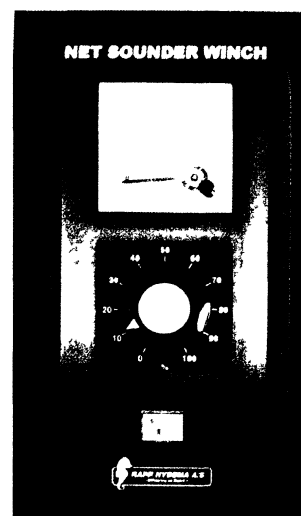
Relevant dimension drawing: 4R 75/92

Relevant electric diagram: RH105923, 3R 73/86 and 4R 76/56

The winches are operated from the L7-panel in the Aft Control Station (ACS) or by means of remote control valve located in aft deck gantry control station.



Remote control valve



L7 panel (ACS)

Manual control from Remote control valve:

- Requires PRESSURE CONTROL in L7-panel NOT to be pressed.
- By moving the joystick, the winch wind/rewind, according to joystick movement direction. The speed of the winch is proportional to the stroke of the joystick. The max. pressure, and thereby the max. pull, is always available.

Control from L7-panel and PTS Pentagon auto trawl system:

- PRESSURE CONTROL in L7-panel has to be pressed for this to work.
- When PRESSURE CONTROL is pressed, the main control valve is forced to Haul In position and the winch will start moving in inward direction. The pull (pressure) is decided by the potentiometer setting, 0-100%.
- **Note! Caution has to be taken when using Manual Pressure Control. To prevent human endanger make sure no-one is working on or close to the cable or the winch. Also, if the potentiometer is set too high, it could cause the cable to snap.**

- **Pressure Control during Pay Out:**
 - Make sure the cable is properly attached to the trawl if used in combination with fishing gear.
 - Take up the slack on the cable, if there is any, by means of the Manual remote control and ensure that the pressure control potentiometer is not set to high. A good start value should not exceed 20%.
 - Press the button "Pressure Control". The pressure control potentiometer is now active.
 - Turning the potentiometer counter-clockwise will reduce the pressure working against the winch and the winch will increase its payout speed accordingly if it is loaded.
 - Turning the potentiometer clockwise will increase the pressure working against the winch and the winch will slow down.
 - The Net Sounder Winch length measuring devices are connected to PTS Pentagon auto trawl system. If the cable length exceeds what is defined as SOW DIFF INITIAL in SYSTEM SETTINGS, an alarm will sound as well as being displayed on both Touch screen panel and PC-screen.
- **Pressure control during towing:**
 - When towing is selected from PTS Pentagon touch screen panel or PC, one might have to adjust the pressure potentiometer to prevent the winch from continuing paying out cable.
 - When in towing, if the cable length exceeds what is defined as SOW DIFF TOWING in SYSTEM SETTINGS, an alarm will sound as well as being displayed on both Touch screen panel and PC-screen.
- **Pressure control during Haul In:**
 - No extra actions have to be taken. If the cable seems to come in more slowly than the trawl, one can adjust the pressure and increase the pull.
 - Valid length alarm limit is now SOW DIFF INITIAL.
 - When the cable attachment is close to the vessel, leave automatic mode by disengaging PRESSURE CONTROL and finish the job by using Manual remote control on deck.

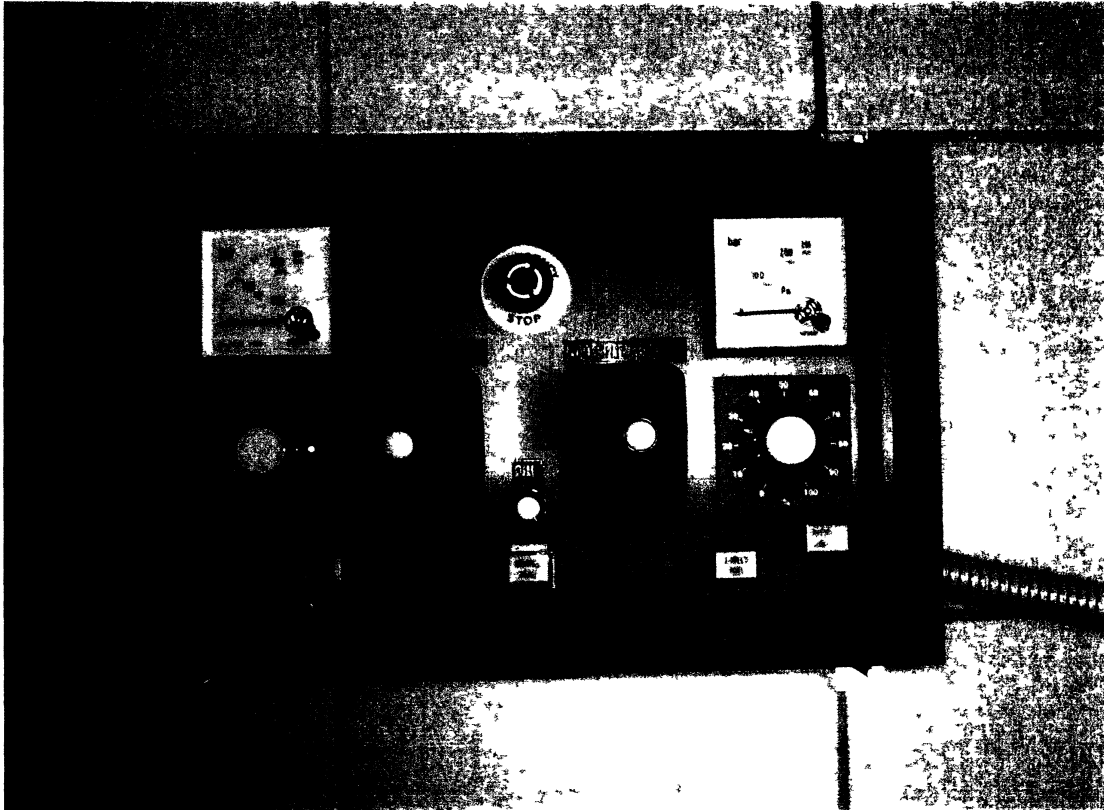
NOAA FRV40-1

OPERATION INSTRUCTIONS

Double/Split Net Drum

Relevant dimension drawing: RH308395

Relevant electric detail drawings: RH105623, RH207353 and RH207354



The net drum is operated from the L5A-panel in the Aft Control Station (ACS), from the L5B-panel in the Aft Working Deck Control Station (AWD-CS) or locally at the winch itself.

It is clearly marked on the L5A- and L5B-panels which joystick operates which drum.

Haul in/Pay out:

- Press the yellow button on top of the joystick. The joystick will now be active for 30 seconds, where after it will deactivate itself.
- The speed of the drum is proportional to the stroke of the joystick.
- Normally, there is no need for selecting control station; the joystick you press the button on will be active whether it is in the ACS or in the AWD-CS. However, in the L5A-panel in the ACS there is a "Control Here" button, which after a few seconds will put the ACS panel in operation even if the drum is currently being operated from the AWS-CS.

- At all times the winch may be operated locally by the handle on the main control valve on the winch.

2-speed function:

- The “2-speed” function of the Net Drum provides 50% more speed and 33% less pull.
- There are individual “2-speed” buttons for each of the two drums on the Net Drum in the L5A-panel and in the L5B-panel.
- The “2-speed” button may be pressed anytime during hauling in or paying out. It will only be active in the panel where there currently is an active joystick, i.e. the 2-speed will work from the L5A-panel when the joystick in the L5A-panel is active/being used.

Pressure Control (mooring):

- The pressure control feature provides the possibility of adjusting the hydraulic pressure to the hydraulic motors on the drums and thereby controlling the pull of the drums.
- There are separate pressure controls for the two drums in the L5A-panel and in the L5B-panel.
- **Pressure Control during Haul In:**
 - o Haul like normal by pulling the joystick towards you.
 - o Ensure that the pressure control potentiometer is set to 100%.
 - o Press the button “Pressure Control”. The pressure control potentiometer is now active.
 - o Turning the potentiometer counter-clockwise will reduce the hauling pressure and thereby the pull. The speed of drum will also be reduced when it is loaded.
 - o Turning the potentiometer clock-wise will increase the hauling pressure and thereby the pull. The speed of the drum will also be increased when it is loaded.
 - o When the button “Pressure Control” is pressed again/released the pressure control output will automatically be set to 100% regardless of the position of the potentiometer.
- **Pressure Control during Pay Out:**
 - o Pay out like normal by pushing the joystick away from you.
 - o Ensure that the pressure control potentiometer is set to 100%.
 - o Press the button “Pressure Control”. The pressure control potentiometer is now active.
 - o Turning the potentiometer counter-clockwise will reduce the pressure working against the winch and the winch will increase its pay-out speed accordingly if it is loaded.
 - o Turning the potentiometer clockwise will increase the pressure working against the winch and the drum will slow down.
 - o When the button “Pressure Control” is pressed again/released the pressure control output will automatically be set to 100% regardless of the position of the potentiometer.

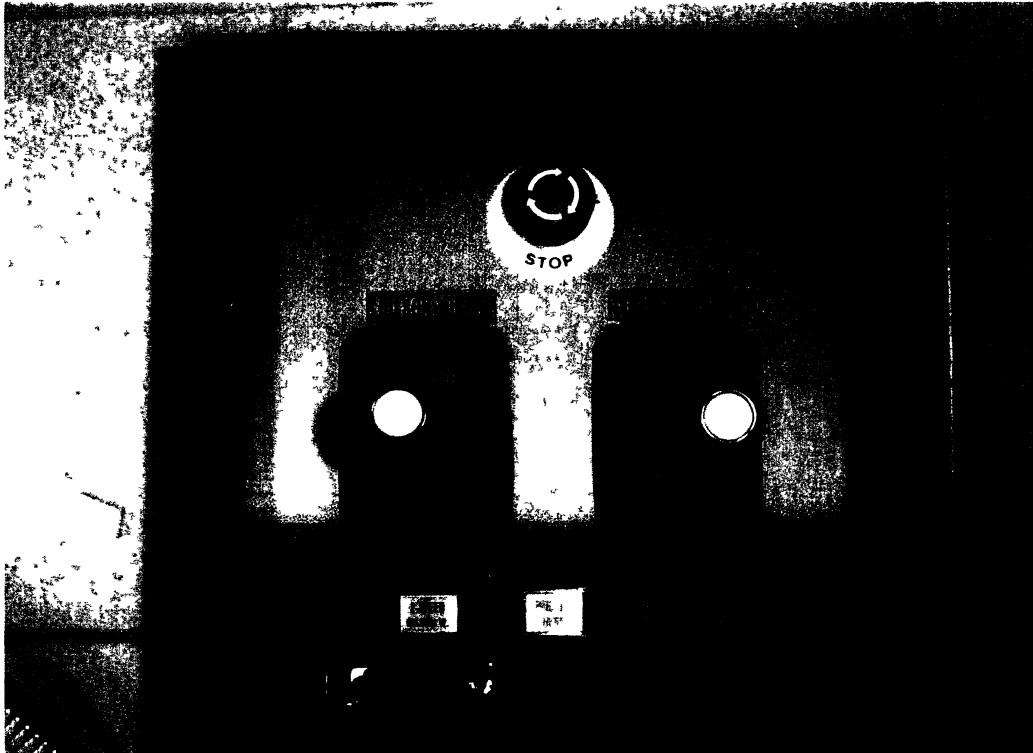
NOAA FRV40-1

OPERATION INSTRUCTIONS

Gilson Winch and Outhaul Winch

Relevant dimension drawing: 3R 76/88

Relevant electric diagram: RH105623, RH309456 and RH309457



The winches are operated from the L10A-panel in the Aft Control Station (ACS), from the L10B-panel in the Aft Working Deck Control Station (AWD-CS) or locally at the winch itself.

It is clearly marked on the L10A- and L10B-panels which joystick operates which winch.

Haul in/Pay out:

- Press the yellow button on top of the joystick. The joystick will now be active for 30 seconds, where after it will deactivate itself.
- The speed of the winch is proportional to the stroke of the joystick.
- Normally, there is no need for selecting control station; the joystick you press the button on will be active whether it is in the ACS or in the AWD-CS. However, in the L10A-panel in the ACS there is a "Control Here" button which after a few seconds will put the ACS panel in operation even if the winch is currently being operated from the AWS-CS.
- At all times the winch may be operated locally by the handle on the main control valve on the winch.

2-speed Gilson Winch:

- The "2-speed" function of the Gilson Winch provides 50% more speed and 33% less pull.
- There is a "2-speed" button for the Gilson winch in the L10A-panel and in the L10B-panel. The "2-speed" button may be pressed anytime during hauling in our paying out. It will only be active in the panel where there currently is an active joystick, i.e. the 2-speed will work from the L10A-panel when the joystick in the L10A-panel is active/being used.

Emergency Stop:

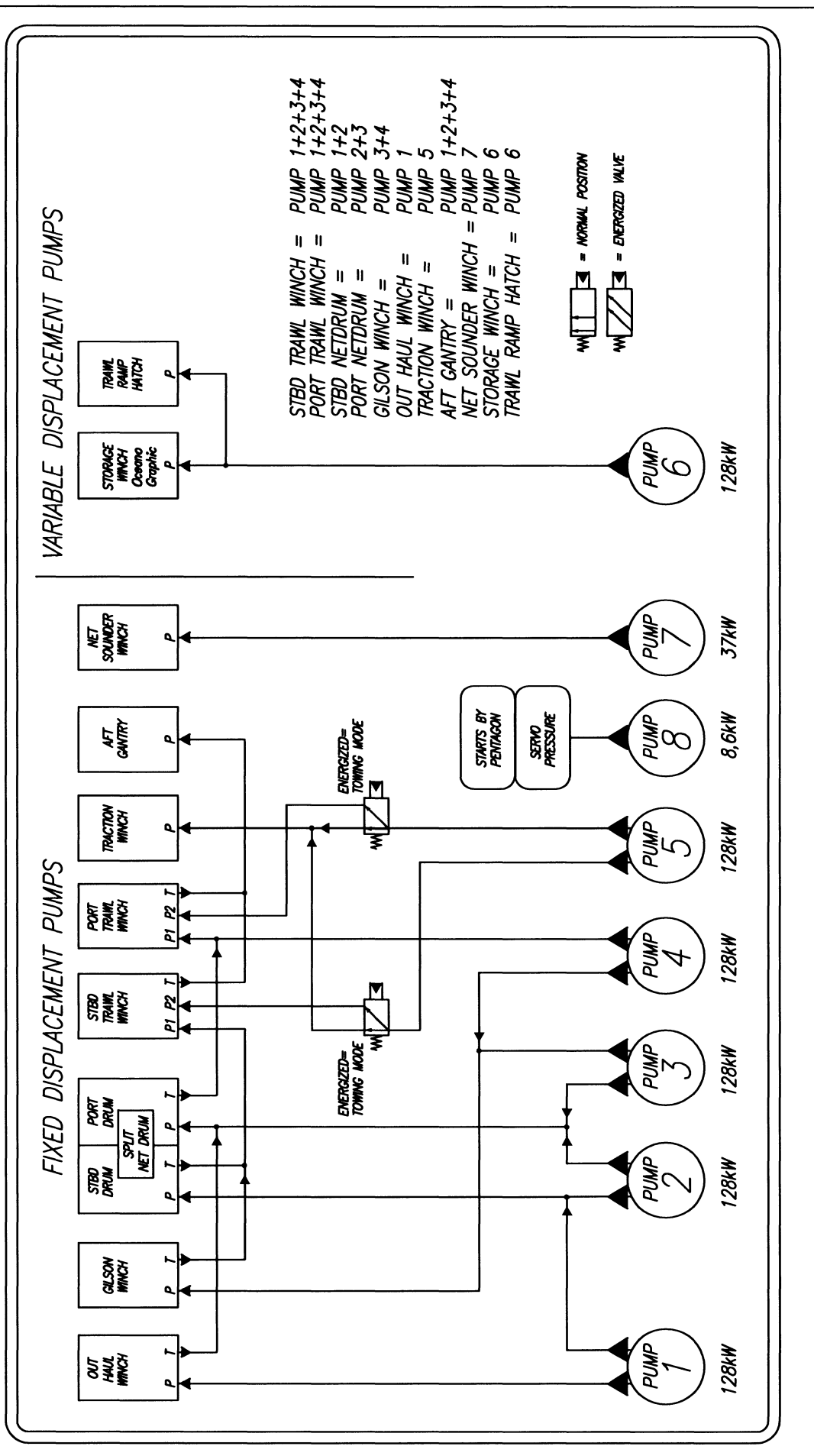
- The emergency stop button in the panels can be pressed at all times. It will stop all main pumps on the HPU. Thereby all winches will stop and all brakes on the winches will be applied. This is how all emergency stop switches in our system work.

TROUBLE SHOOTING DIAGRAM RAPP TRAWL WINCH SYSTEM

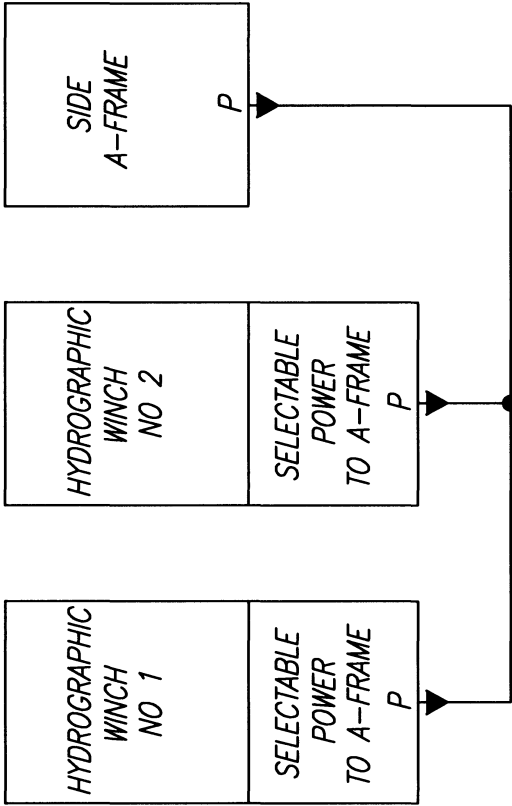
PROBLEM	CAUSE	SOLUTION
Remote controls do not operate winches	Pilot pump is not running.	Check drive unit for pilot pump.
	Pilot pressure too low.	Check pressure, should be approx. 45 bar.
	No 24VDC power supply to remote control amplifiers	Check fuses for 24VDC power supply.
	Automatic fuse in amplifier has tripped.	Pull out the amplifier in question and put it back in after a few seconds. The amplifier is then reset and should work as before.
Oil level alarm.	Too low level in the reservoir.	Check for hydraulic leaks. Fill up oil tank.
Winches do not operate	Main pumps do not running	Start main pumps.
	The motors do not give sufficient torque due to low differential pressure across the motors, compared to the load.	Check the relief valve in engine room or on winch.
	The relief valves in the engine room are stuck in unloaded position.	Dismount relief valves and remove impurities.
	Remote controls not working.	See above.

PROBLEM	CAUSE	SOLUTION
Excessive system pressure variations when the winches are in pay-out mode.	The counterbalance setting has been changed.	Readjust counterbalance valve.
Winch operates only at one speed. (Only for winch with two-speed valve).	Two speed valve is stuck.	Check the valve. Dismount valve and remove impurities.
	No pilot pressure.	Check pressure and pilot pump.
The brake does not work.	The brake valve does not work.	Check the valve. Dismount valve and remove impurities.
The brake does not release sufficiently.	Pilot pressure is too low.	Check pressure. Should be approx. 45 bar.
The brake will not hold drums in standstill.	The load is too heavy.	Check load.
	Brake adjustment has changed.	Readjust brake.
Irregular "bangs" in pumps and pipes.	Too much air in the oil.	Check level in reservoir. Oil level should be above return-oil inlet.

PUMP FLOW CHART. NOAA FRV40/FSV40 FISHERY SYSTEM + OCEANOGRAPHIC SYSTEM



HYDROGRAPHIC WINCH SYSTEM



IMPORTANT NOTICE!

POWER TO A-FRAME:
THE WINCH THAT POWERS THE A-FRAME,
4 BALLVALVES IN OPEN POSITION.

THE OTHER WINCH WITH
4 BALLVALVES IN CLOSED POSITION.

SECTION 9

TEST CERTIFICATES

The Metric System and Equivalents

Linear Measure Liquid Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigram = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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