

江苏韩通船舶重工有限公司

船型：**57000DWT** 散货船

船号：**HT088**

随

机

资

料

南通政田船舶机械有限公司

NANTONG MASADA SHIP MACHINERY CO., LTD

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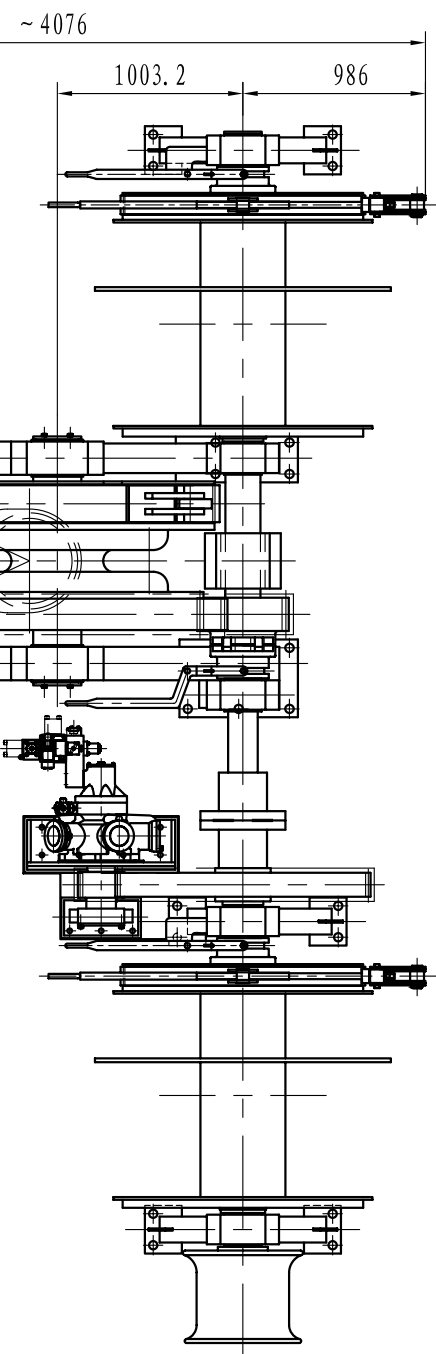
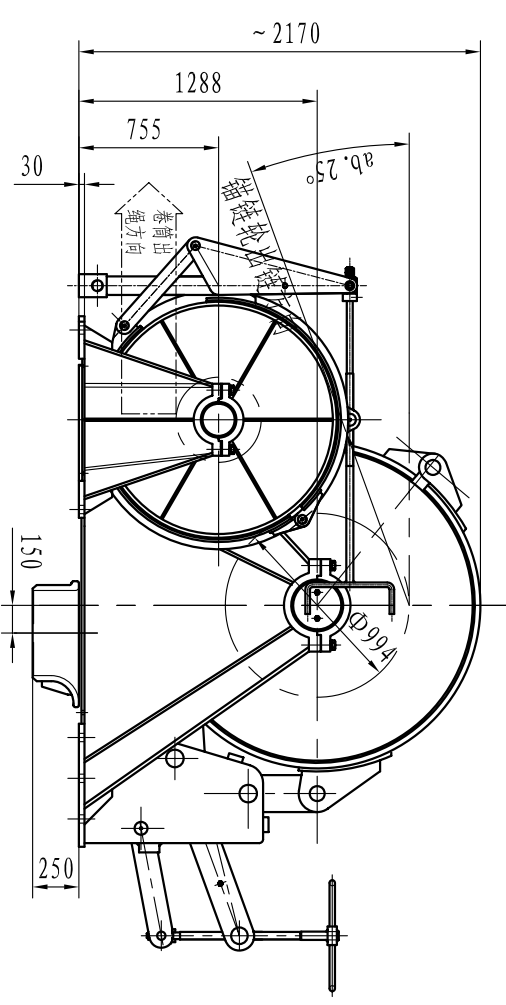
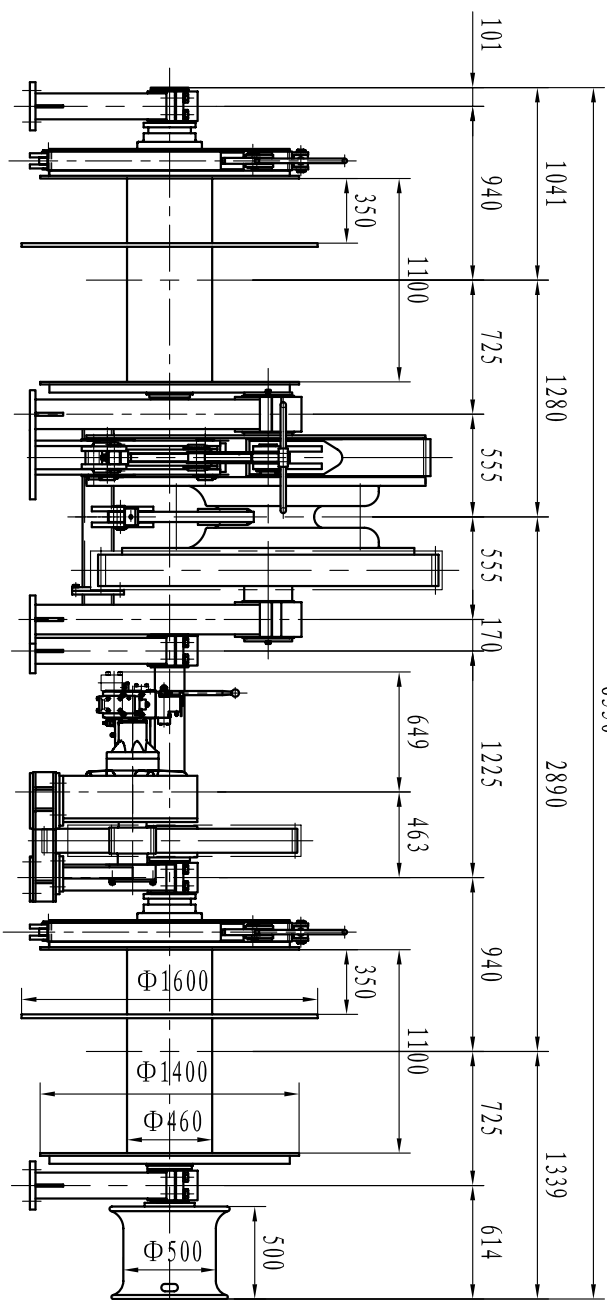
锚机/绞车使用说明书

液压马达使用说明书

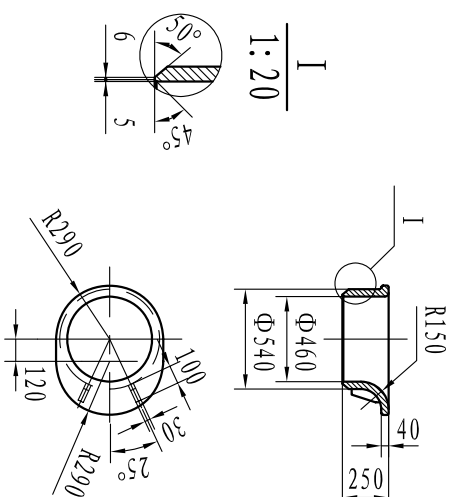
换向阀使用说明书

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锚链管头部详图
Details of the hawsepipe head



注意: 该机为右机, 左机与本图对称制造。
Note: This diagram is for the right side version, and the left side version is symmetrically arranged with it.

锚机部分 Winlass parts	
锚机负载×速度 Working load×speed	253kN×9m/min
锚链直径 Chain dia.	φ 73
计算圆直径 Calculation Dia.	φ929mm
主轴回转速 Speed of main shaft	3.08rpm
马达 Motor	型号 Type MRH2-3150-9-PPV 转速范围 Range of speed 71rpm
绞车部分 Winch parts	
卷筒负载×速度 Drum Working load×speed	147kN×15/45m/min
卷筒容量 Drum capacity	φ64×220m
计算圆直径 Calculation Dia.	φ524mm (第一层)
主轴回转速 Speed of main shaft	9.11/27.34rpm
副卷筒负载 Hawser drum working load	118kN
副卷筒容量 Hawser drum capacity	6 turns
马达 Motor	型号 Type MRH2-3150-9-PPV 转速范围 Range of speed 54/163rpm

Φ73 组合锚机

Φ73 Combined Winlass

南通政田船舶机械有限公司
Nantong Masada Ship Machinery Co., Ltd

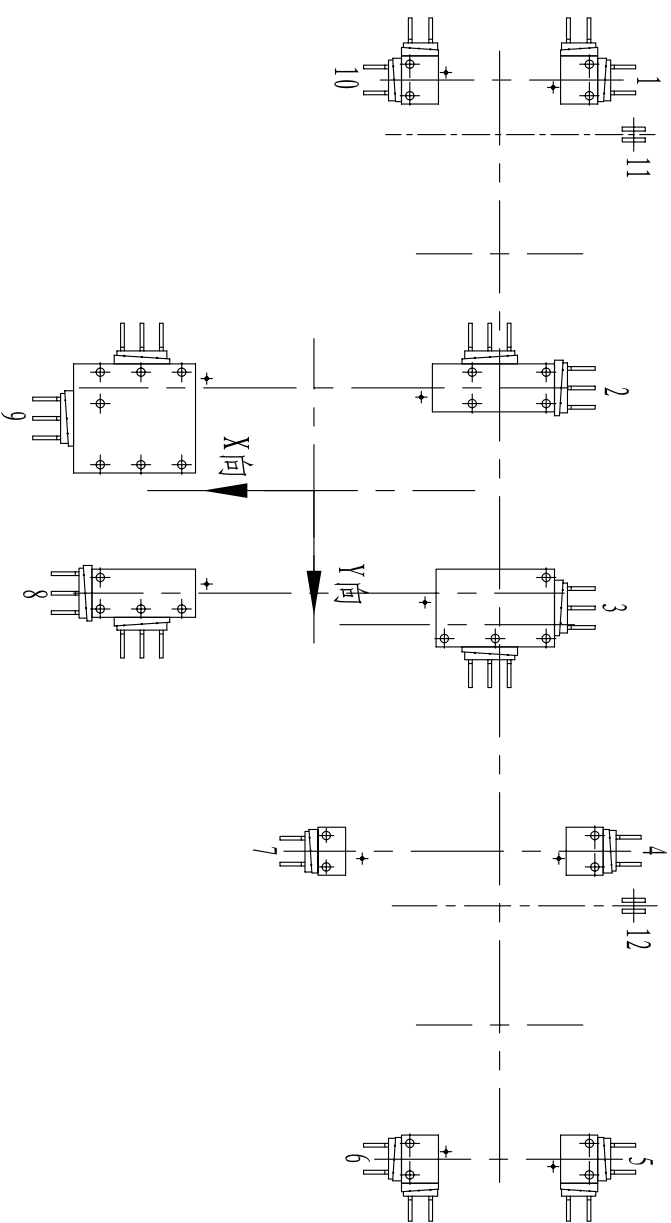
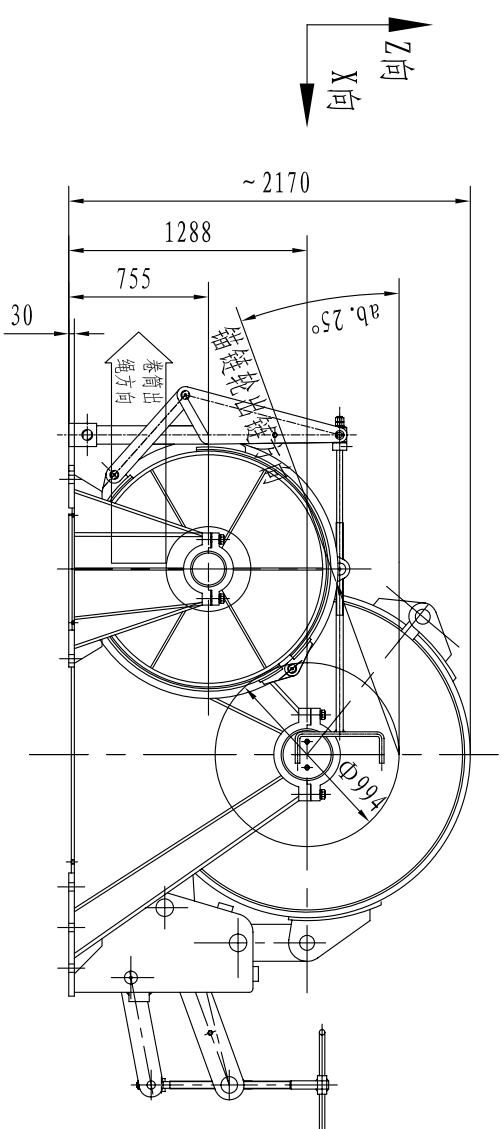
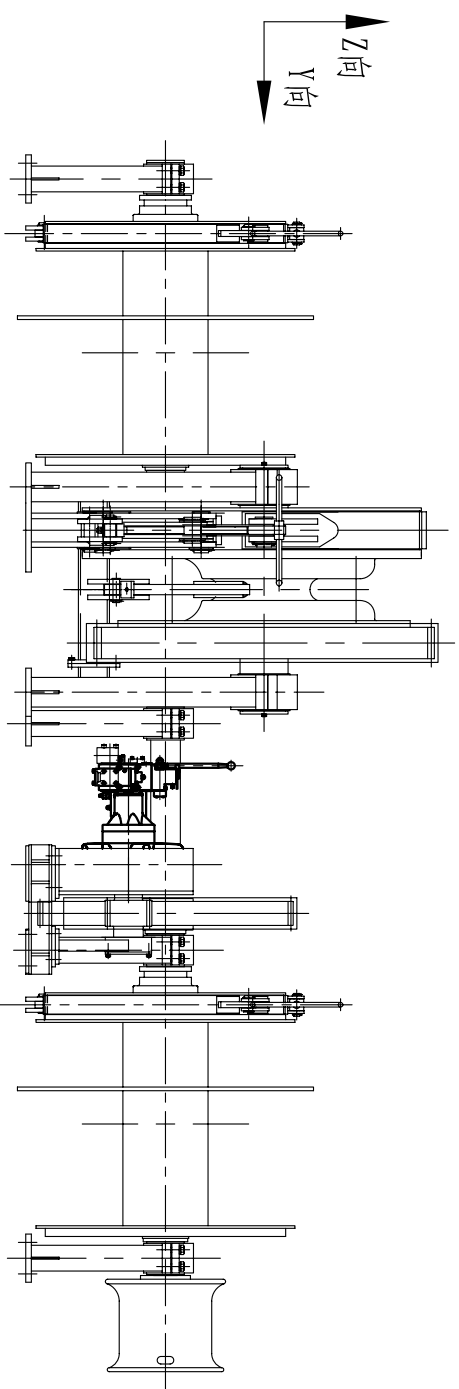
总图

General Drawing

2257T-118-00

图样标记 PIL.Marks	重量 Weight	比例 Scale
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设计 Designed	审核 Check	工艺 Craft
变更文件号 Revised No.	签字 Signature	日期 Date
郭强	郭强	
批准 Approved		

普通用件登记
描图
校描
旧底图总号
签字
日期
2010/07/28



FOOT	VERTICAL FORCES (kN) -Z	HORIZONTAL FORCES (kN) -X	HORIZONTAL SIDE FORCES (kN) -Y
1	259	-181	-263
2	335	-826	-1052
3	132	-826	789
4	228	-181	*
5	360	-235	526
6	217	370	526
7	91	370	*
8	346	370	789
9	1189	370	-1052
10	210	370	-263
11	189	*	*
12	189	*	*

普通用件登记

描 图

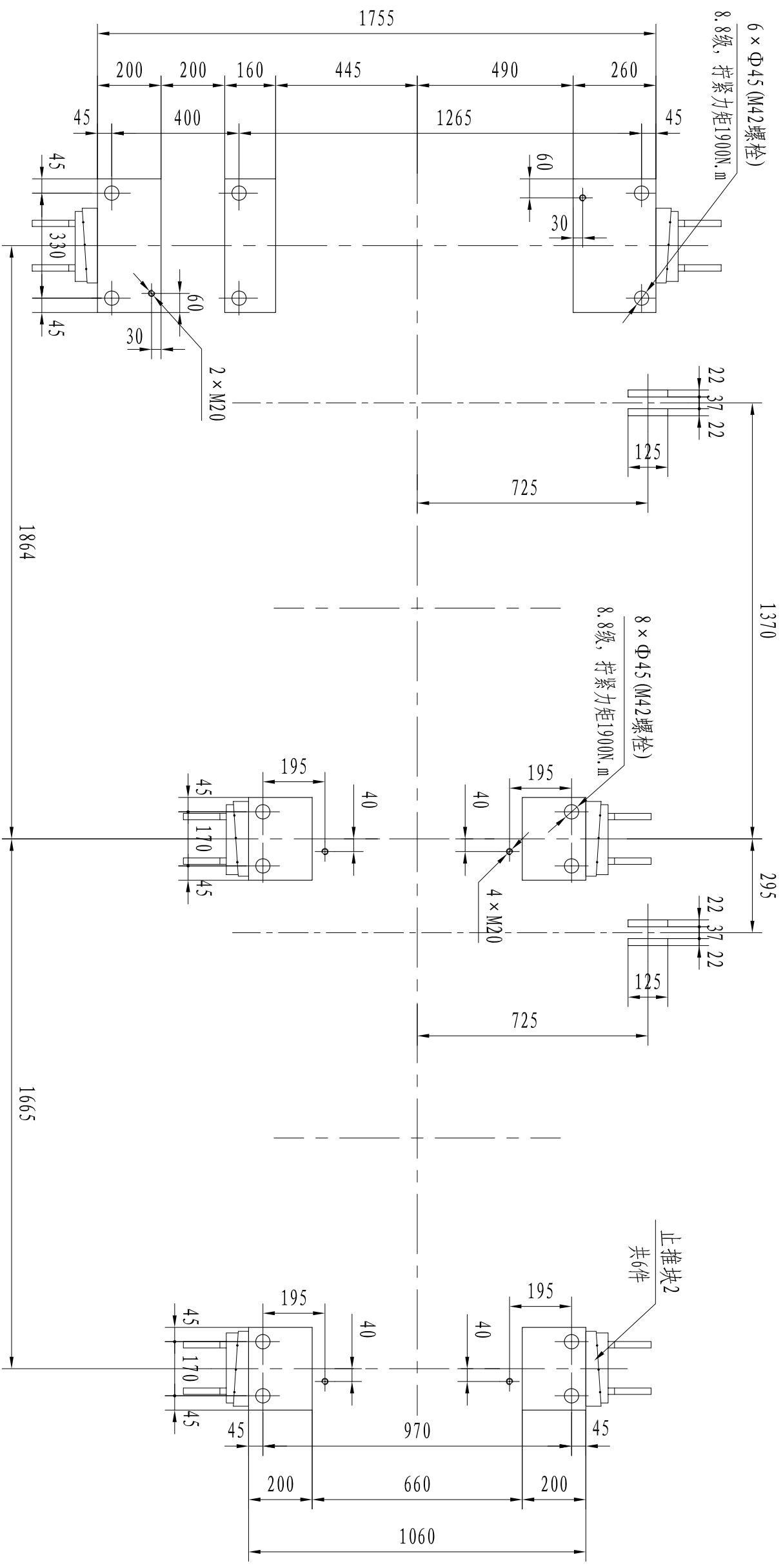
校 描

旧底图总号

签 字

日 期

图 样 标 记 PIL.Marks	重 量 Weight	比 例 Scale	南 通 政 田 船 舶 机 械 有 限 公 司 Nantong Masada Ship Machinery Co., Ltd
Φ73 Combined Windlass	1:40	底 座 受 力 图 Foundation Force Diagram	
共 页 Total Page	第 页 The Page	22527-118-00SL	



注意: 该机为右机底座, 左机与本图对称。
 Note: This diagram is for the right side version,
 and the left side version is symmetrically arranged with it.

借通用件登记

描图

校描

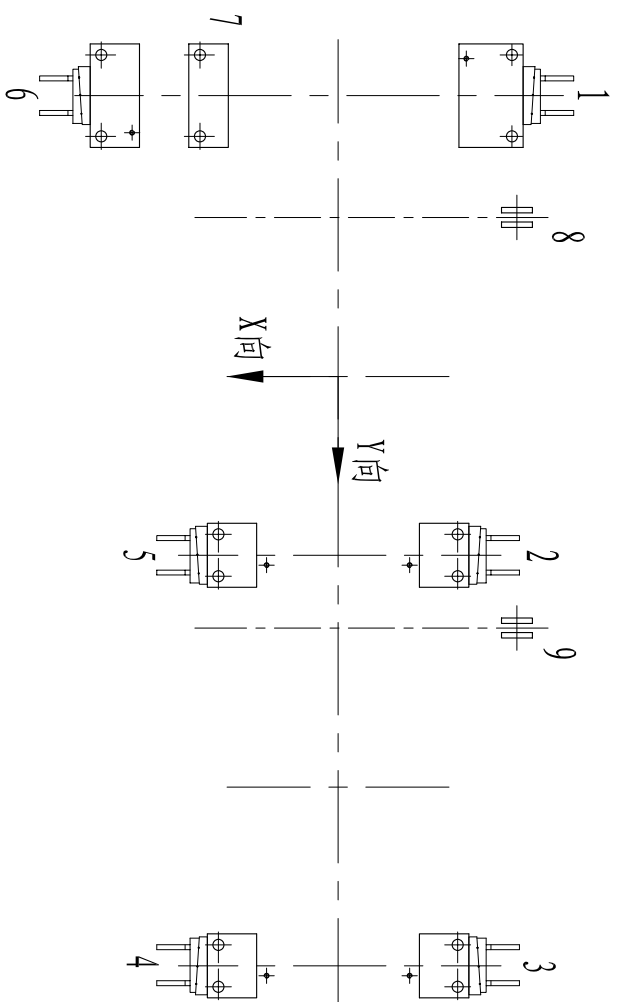
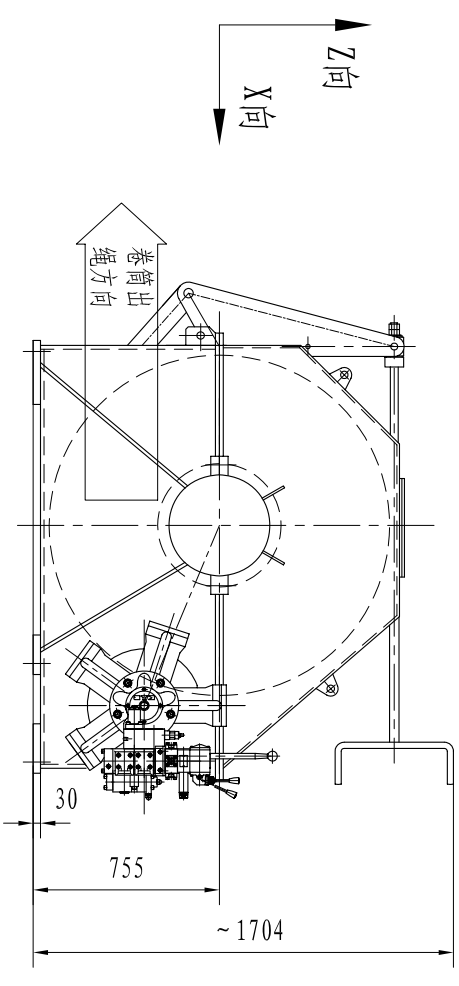
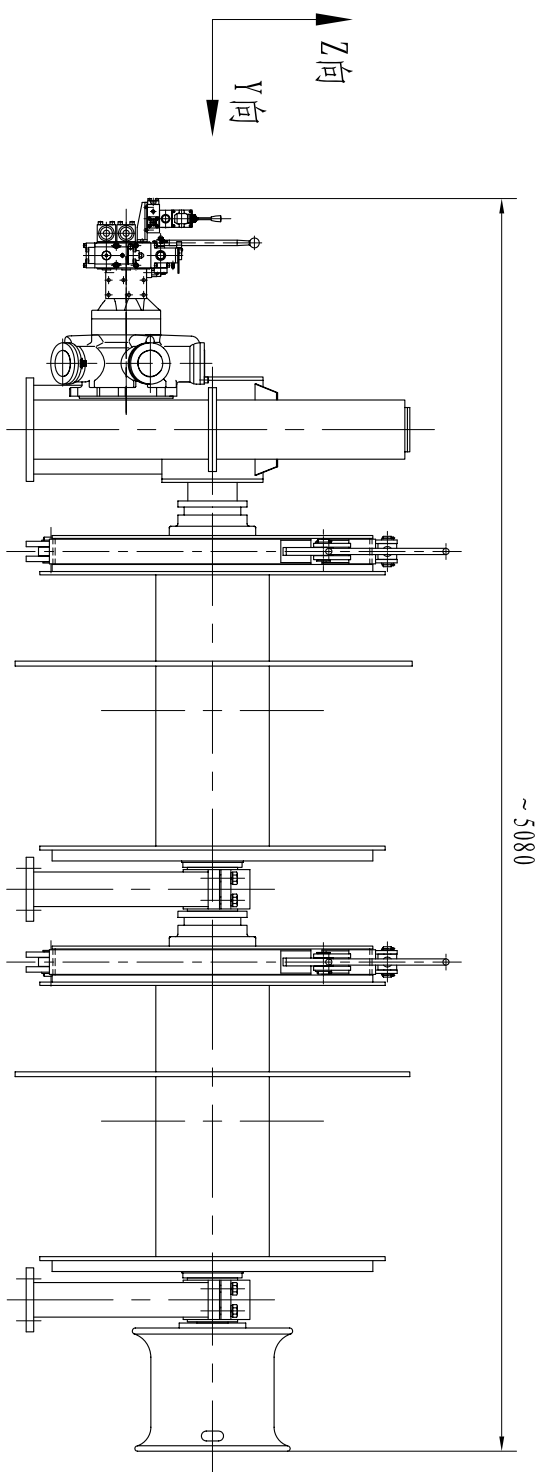
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签字

日期

2009, 11, 17

147kN系泊绞车		147kN Mooring Winch		南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co., Ltd	
图样标记 PII/Marks	图样重量 Weight	图样比例 Scale	图样日期 Date	图样审核 Checked	图样批准 Approved
共 页 Total Page	第 页 The Page	比例 1:15	日期 Date	审核 Checked	批准 Approved
底座安装尺寸图 Base Installation			245ZT-117-00DZ		



FOOT	VERTICAL FORCES (kN) -Z	HORIZONTAL FORCES (kN) -X	HORIZONTAL SIDE FORCES (kN) -Y
1	72	-162	*
2	189	-254	*
3	175	-235	*
4	175	235	*
5	189	254	*
6	72	162	*
7	*	*	*
8	189	*	*
9	189	*	*

借通用件登记

描 图

校 描

旧底图总号

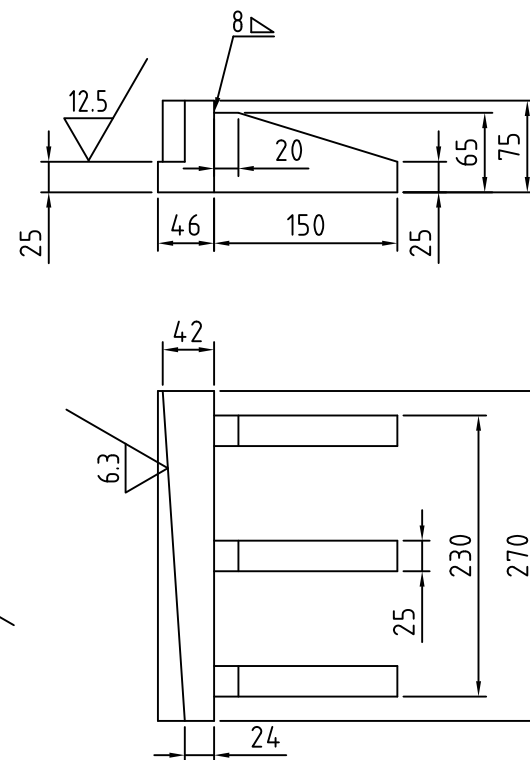
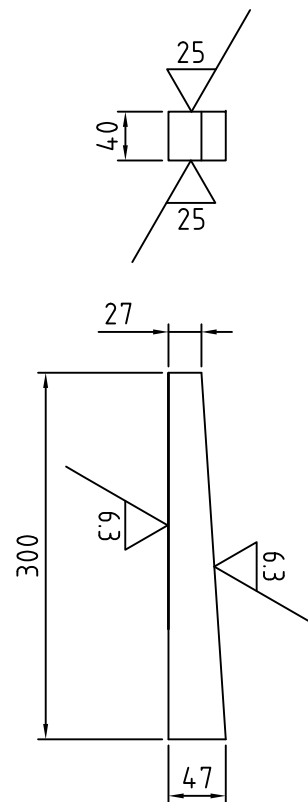
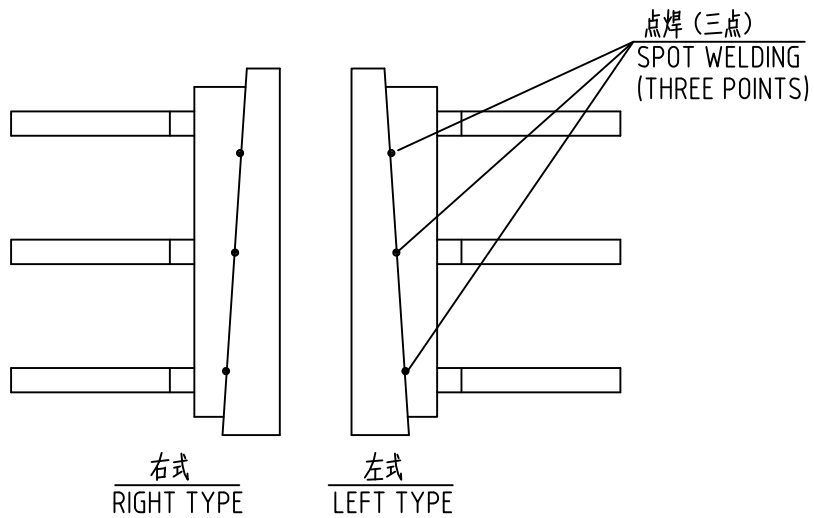
签 字

日 期

2009, 11. 17

147kN系泊绞车		南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co., Ltd	
147kN Mooring winch		底座受力图 Foundation Force Diagram	
图样标记 PIL/Marks	重量 Weight	比例 Scale	245ZT - 117 - 00SL
共 Total	页 Page	第 The	页 Page
设计 Designed	更改文件号 Rename No.	签字 Signature	
校对 Check	郭强	日期 Date	
审核 Verified			
工艺 Craft			

其余 



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借通用件登记

描图

校描

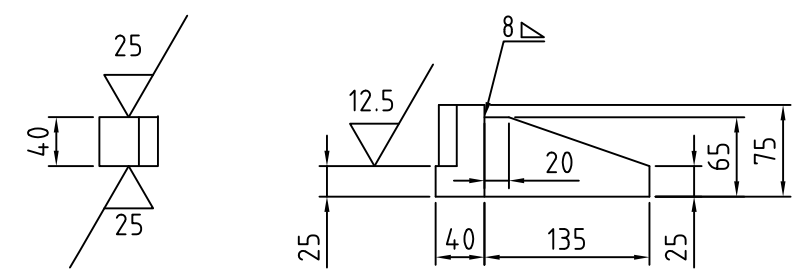
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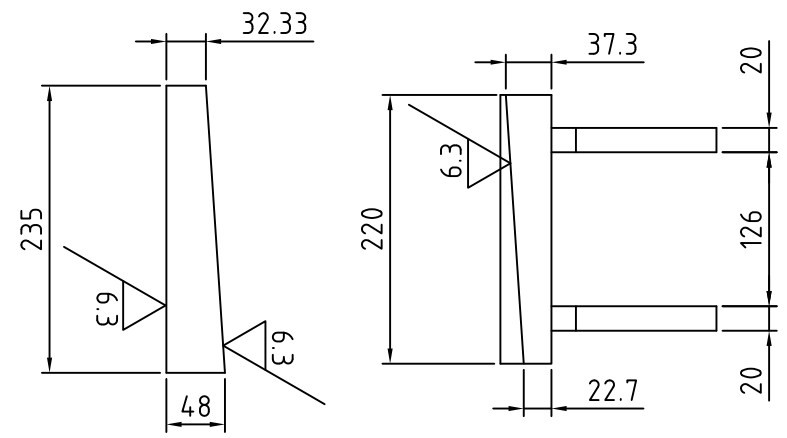
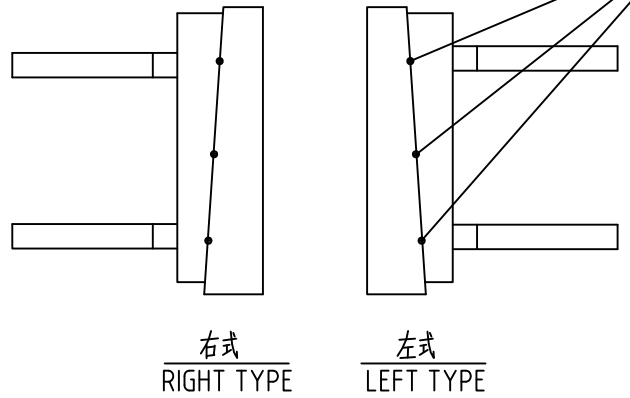
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审核 Verified									
工艺 Craft			批准 Approved		共 页 Total Page		第 页 The Page		

其余 



安装完成后
点焊 (三点)
SPOT WELDING
(THREE POINTS)
AFTER INSTALLATION



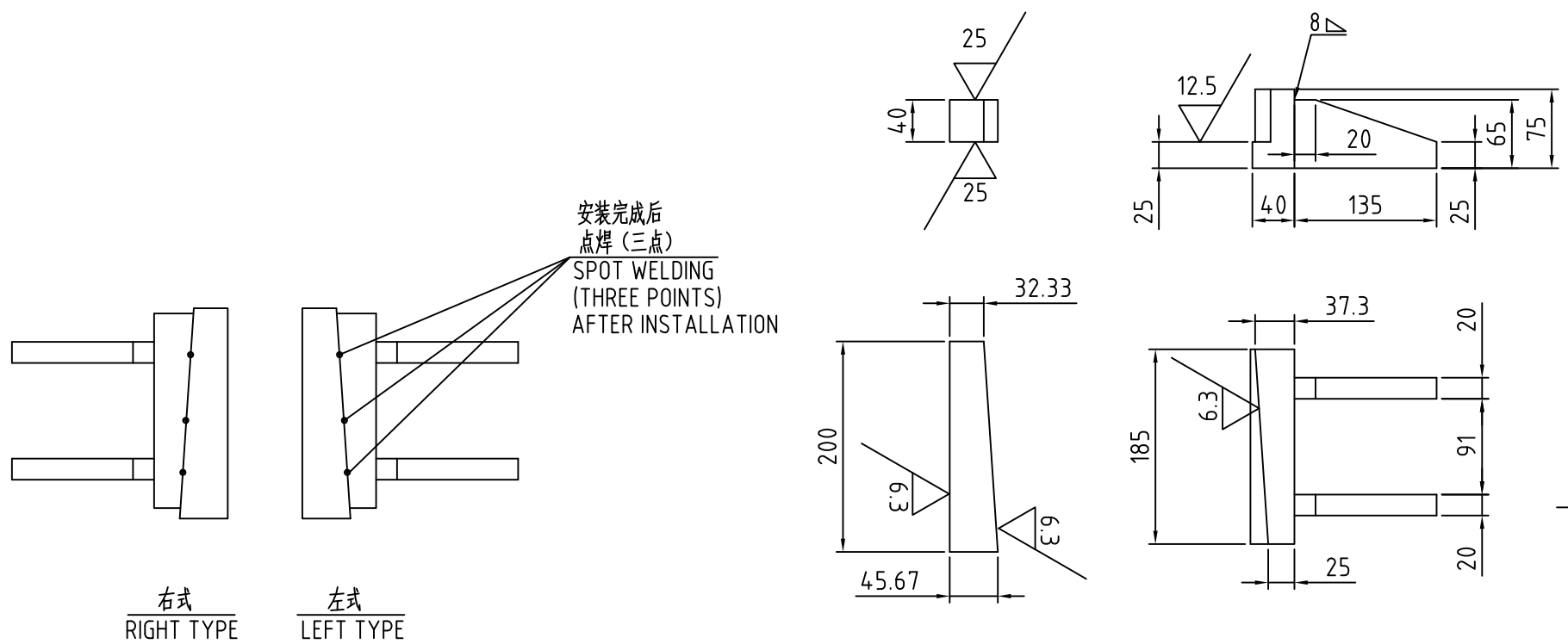
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签 字
日 期

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工艺 Craft			批准 Approved		共 页 Total Page		第 页 The Page		

其余 



借通用件登记

描 图
校 描
旧底图总号
签 字
日 期

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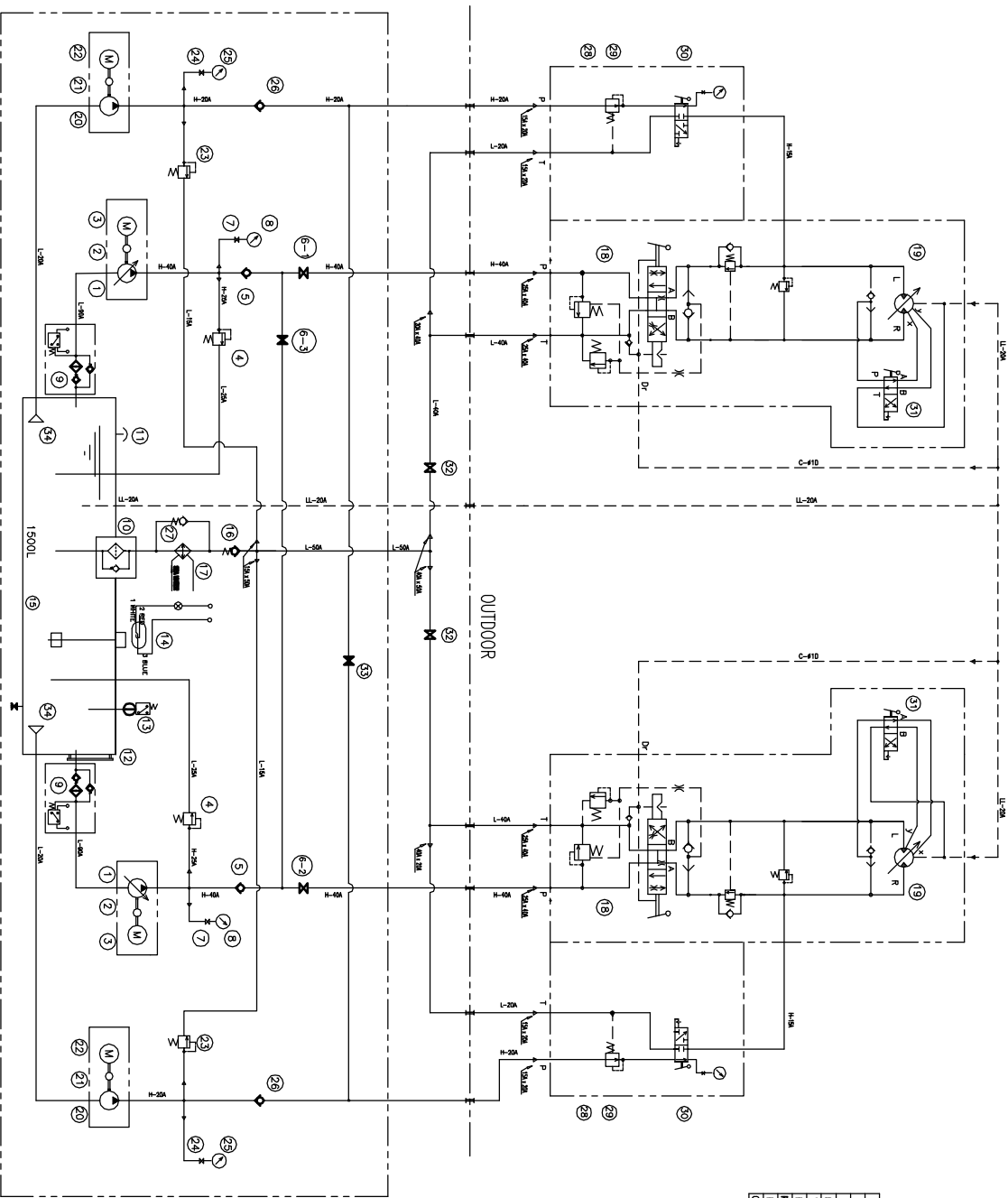
ISLAND SIDE WIND ASS/MOORING WINCH 左邊艙口絞車

CAPABILITY (CD) 額定絞車能力	253kN x 90m/min
CAPABILITY (HD) 最高絞車能力	14.7kN x 15.45m/min
HYDRAULIC 液壓系統	NH02-3150-9-PPV-MR08
PRESSURE 工作壓力	15.0/16.0MPa
DELIVERY 流量	233/180L/MIN

PORT SIDE WIND ASS/MOORING WINCH 右邊艙口絞車

CAPABILITY (CD) 額定絞車能力	253kN x 90m/min
CAPABILITY (HD) 最高絞車能力	14.7kN x 15.45m/min
HYDRAULIC 液壓系統	NH02-3150-9-PPV-MR08
PRESSURE 工作壓力	15.0/16.0MPa
DELIVERY 流量	233/180L/MIN

FOR GROUP



PIPING 配管

H	HIGH PRESSURE LINE 高壓管線	20.6 MPa	SP3370 Sch360 60mm DIA 鋼管
L	LOW PRESSURE LINE 低壓管線	1.0 MPa	SP3370 Sch40 60mm DIA 鋼管
LL	LOW PRESSURE LINE 低壓管線	0.1 MPa	SP8 SUPPLY BY THE SHIP YARD 船塢供應
←	REDUCER 變徑管		

NOTES

1. PIPING MATERIALS ARE TO BE PREPARED BY SHIP YARD 配管材料由船塢準備
2. 90° ELBOW SHALL BE AVOIDED TO BE USED AS POSSIBLE 90° 彎頭 儘可能 避免
3. PART NUMBER 6-3 STOP VALVES ARE NORMAL CLOSED 6-3 截止閥常閉

ISLAND WIND ASS/MOORING WINCH 左邊艙口絞車

ITEM NO	DESCRIPTION	QTY
1	ELECTRIC MOTOR 電動機	2
2	TYPE 12500-4-H HYDRAULIC PUMP 液壓泵	2
3	STOP VALVE 截止閥	2
4	TYPE 1750 1750 mm ³ /min 截止閥	2
5	TYPE 250 250 mm ³ /min 截止閥	2
6	TYPE 90 90 mm ³ /min 截止閥	2
7	TYPE 20.6 20.6 MPa 截止閥	2
8	TYPE 1.0 1.0 MPa 截止閥	2
9	TYPE 0.1 0.1 MPa 截止閥	2

PORT WIND ASS/MOORING WINCH 右邊艙口絞車

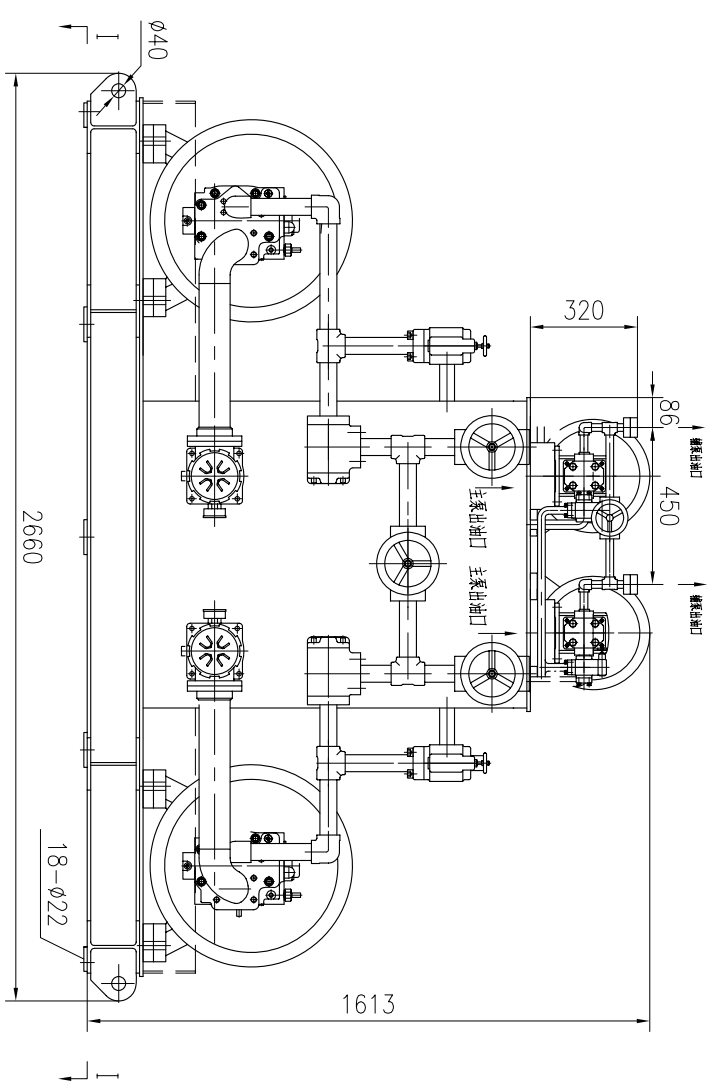
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2	TYPE 12500-4-H HYDRAULIC PUMP 液壓泵	2
3	STOP VALVE 截止閥	2
4	TYPE 1750 1750 mm ³ /min 截止閥	2
5	TYPE 250 250 mm ³ /min 截止閥	2
6	TYPE 90 90 mm ³ /min 截止閥	2
7	TYPE 20.6 20.6 MPa 截止閥	2
8	TYPE 1.0 1.0 MPa 截止閥	2
9	TYPE 0.1 0.1 MPa 截止閥	2

No	NAME	TYPE	REMARKS
3.4	STRAINER 過濾器	WU-100X180TY	2
3.5	STOP VALVE 截止閥	ZFS-020FH	2
3.6	STOP VALVE 截止閥	1.41H	2
3.7	STOP VALVE 截止閥	4MM605X/F	2
3.8	STOP VALVE 截止閥	3MM410A3X/F	2
3.9	STOP VALVE 截止閥	ZDR10DP2-SX/210YM	2
2.8	PIPING 配管	AJ-H650F	2
2.7	CHECK VALVE 止回閥	DF-120H-S	1
2.6	CHECK VALVE 止回閥	VN-63-140	2
2.5	PRESSURE GAUGE 壓力錶	KJF-L8H-S	2
2.4	CHECK VALVE 止回閥	R81-04F	2
2.3	RELIEF VALVE 安全閥	11kw44P 440V/60Hz	2
2.2	ELECTRIC MOTOR 電動機	GSP2-A0516A8-40	2
2.1	COUPLING 联轴器	MRF2-3150-9-PPV	2
20	WIND PUMP 絞車	FDS-08CRK	2
19	HYDRAULIC PUMP 液壓泵	HXHYL-4.0-00	2
18	MANUAL CONTROL VALVE 手動控制閥	AJ-H650F	1
17	RELIEF VALVE 安全閥	YWZ-300T	1
16	CHECK VALVE 止回閥	WSSX-41T(O-200)	1
15	RELIEF VALVE 安全閥	FE5-66	1
14	RELIEF VALVE 安全閥	REF-1000X30F	1
13	RELIEF VALVE 安全閥	TF-1000X180TY	1
12	RELIEF VALVE 安全閥	KN-63-H0	2
11	RELIEF VALVE 安全閥	KJF-L8H-S	2
10	RELIEF VALVE 安全閥	ZFS-040FH	2
9	RELIEF VALVE 安全閥	AJ-H650F	2
8	RELIEF VALVE 安全閥	R81-08F-D	2
7	RELIEF VALVE 安全閥	90kw44P 440V/60Hz	2
6	RELIEF VALVE 安全閥	1500L	2
5	RELIEF VALVE 安全閥	AWO180LRD/63RNPB01	2
4	RELIEF VALVE 安全閥		2
3	RELIEF VALVE 安全閥		2
2	RELIEF VALVE 安全閥		2
1	RELIEF VALVE 安全閥		2

日期	2010/03/26
簽字	
日期	
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日期	
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南通中興船塢有限公司
南通中興船塢有限公司

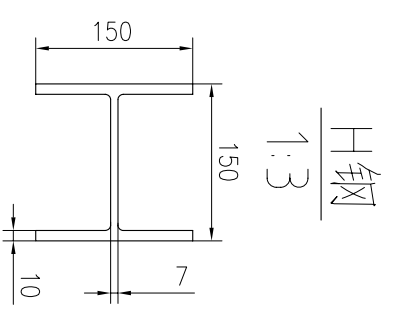
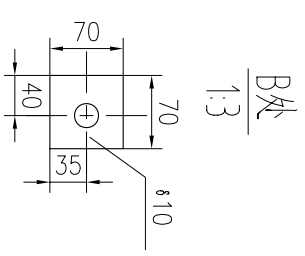
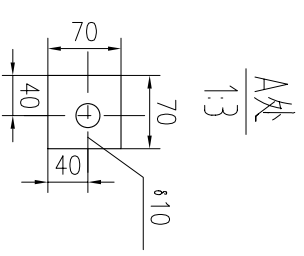
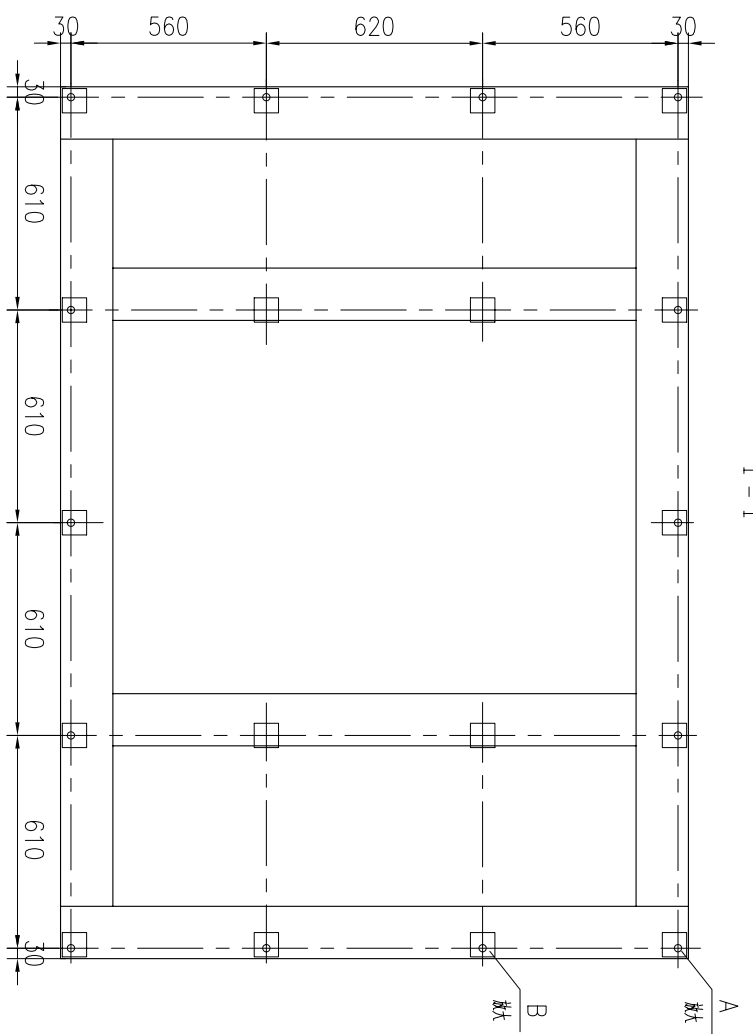
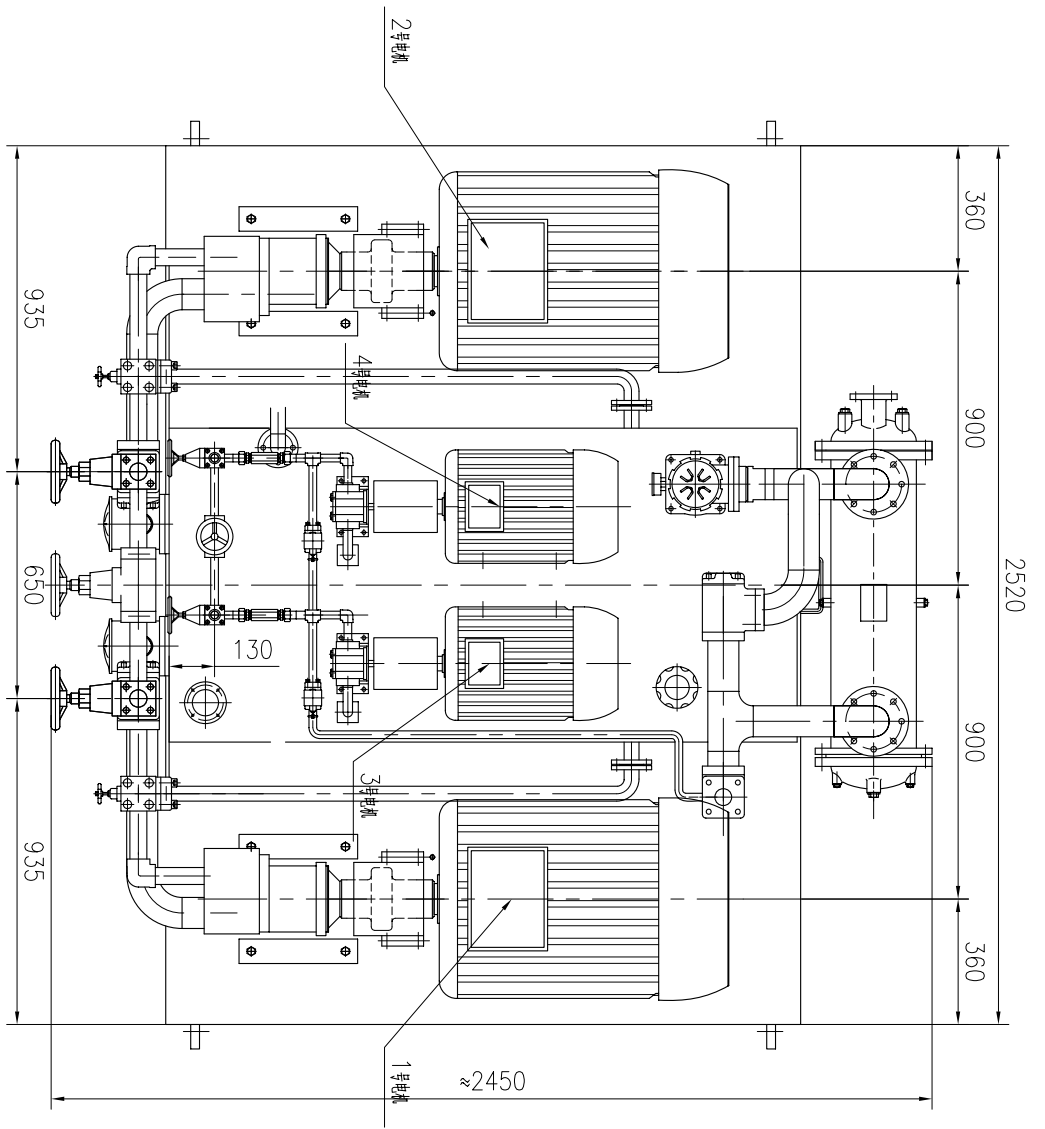
5/071-A



技术参数

项目	单位	数值	项目	单位	数值
主泵流量	L/min	260	辅泵流量	L/min	28
主泵压力	MPa	20.6	辅泵压力	MPa	18
主电机功率	Kw	90X2	辅电机功率	Kw	11X2
油箱容积	L	1500	吸油过滤精度	μm	180
			回油过滤精度	μm	30

DN20-H	高压管	18MPa	φ27×4	20#
DN40-H	高压管	20.6MPa	φ50×7	20#
DN20-LL	低压管	0.1MPa	φ27×2.5	20#
DN50-L	低压管	1.0MPa	φ57×3.0	20#

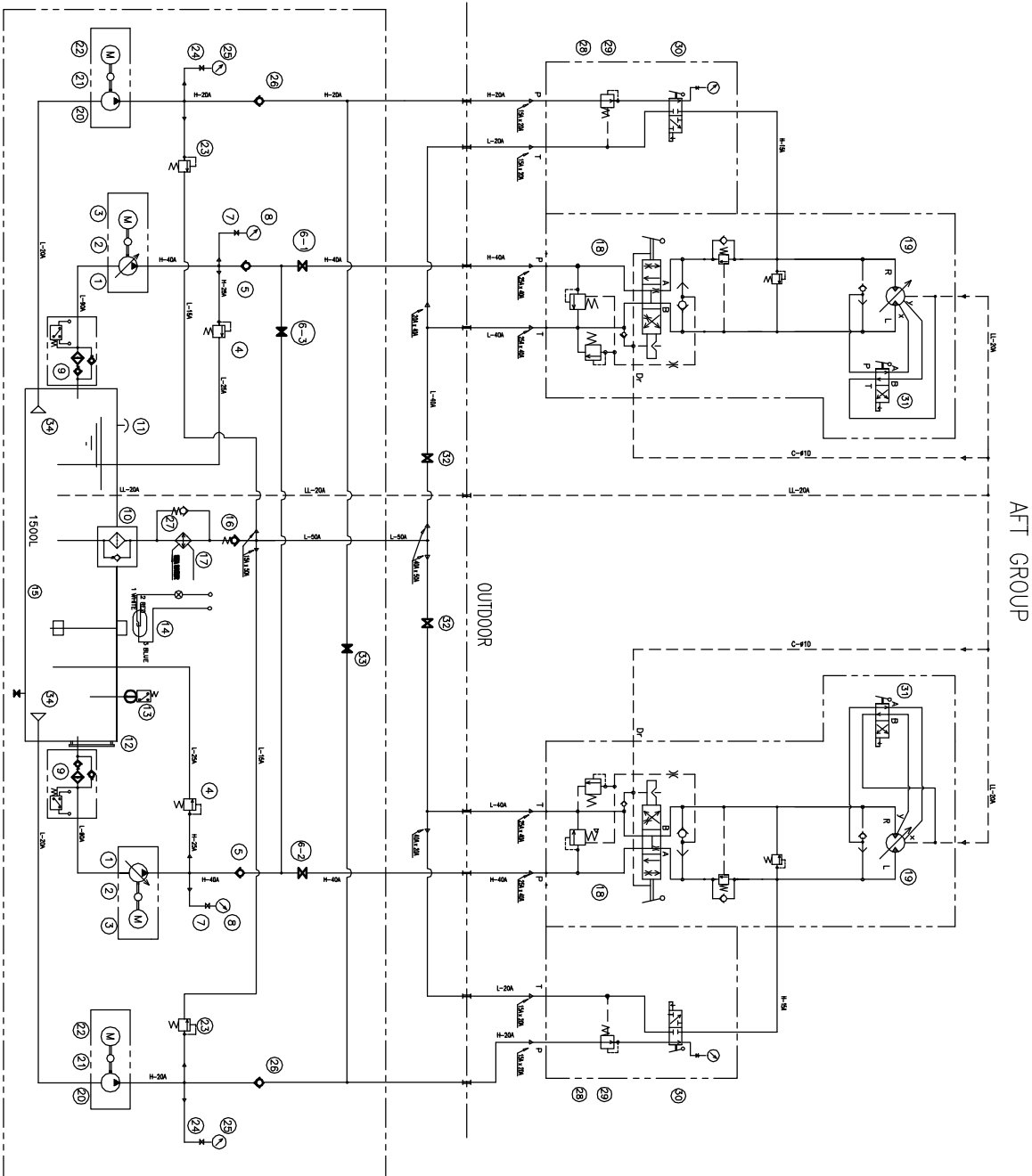


借通用件登记
插图
校描
旧底图总号
签字
日期

总图				南通政巴船舶机械有限公司	
设计	审核	日期	图样标记	重量	比例
设计	审核	日期	共	页	第
				5702T-11A-00	
				韩通锚机液压站	

PORT SIDE NOORING WINCH 左舷絞車	CAPABILITY (HD) 牽引能力	14.7 KN x 5/5/4.5m/min
HD MOTOR 起旋機	NRH-350-9-PPV-MKLR8	
PRESSURE 工作压力	16.0 MPa	
DELIVERY 流量	180L/MIN	

STARBOARD SIDE NOORING WINCH 右舷絞車	CAPABILITY (HD) 牽引能力	14.7 KN x 5/5/4.5m/min
HD MOTOR 起旋機	NRH-350-9-PPV-MKLR8	
PRESSURE 工作压力	16.0 MPa	
DELIVERY 流量	180L/MIN	



PIPING 配管

H	HIGH PRESSURE LINE 高压管	20.6 MPa	STS20, Sash160, SUMIKAWA 聚四氟乙烯
L	LOW PRESSURE LINE 低压管	1.0 MPa	SIP6370, Sash160, SUMIKAWA 聚四氟乙烯
LL	LOW PRESSURE LINE 软管	0.1 MPa	SPP
⇐	REDUCER 变径管		SUPPLIED BY THE SUPPLIER 由供应商提供

NOTES

1. PIPING MATERIALS ARE TO BE PREPARED BY SHIP YARD 配管材料由船厂准备
2. 90 ELBOW SHALL BE AVOIDED TO BE USED AS POSSIBLE 90° 弯头尽可能不要使用
3. PART NUMBER 6.3 STOP VALVES ARE NORMAL CLOSED ← 3. 止回阀常闭

INDOOR PUMP UNIT 室内泵组

ITEM NO. 序号	DESCRIPTION 描述	ITEM NO. 序号	DESCRIPTION 描述
1	ELECTRIC MOTOR 电动机	1	TYPE 1720S-4H
2	HYDRAULIC PUMP 液压泵	2	TYPE 1750
3	STOP VALVE 止回阀	3	TYPE 41H
4	MANUAL CONTROL VALVE 手动控制阀	4	4MM605X/F
5	RELIEF VALVE 安全阀	5	3MM610A3X/F
6	PRESSURE GAUGE 压力表	6	ZOR10DP2-SY/2101M
7	SOLENOID VALVE 电磁阀	7	AJ-H4S0F
8	RELIEF VALVE 安全阀	8	DI-120H-S
9	PRESSURE GAUGE 压力表	9	NV-63-140
10	SOLENOID VALVE 电磁阀	10	KJF-L8H-S
11	RELIEF VALVE 安全阀	11	R81-04F
12	ELECTRIC MOTOR 电动机	12	11kw44P 440V/60Hz
13	COUPLING 联轴器	13	GS92-A0516A8-40
14	INDICATOR 指示器	14	M8PZ-3150-9-PPV
15	MANUAL CONTROL VALVE 手动控制阀	15	FDS-08CRK
16	RELIEF VALVE 安全阀	16	HXHYL-4.0-00
17	SOLENOID VALVE 电磁阀	17	AJ-H6S0F
18	RELIEF VALVE 安全阀	18	KCJD24-600
19	SOLENOID VALVE 电磁阀	19	1500L
20	LEVEL SWITCH 液位开关	20	WSSX-411(O-200)
21	LEVEL GAUGE 液位计	21	YVZ-300T
22	REVERSE FILTER 反向过滤器	22	FEA-1000X30F
23	STOP VALVE 止回阀	23	VF-1000X100FY
24	STOP VALVE 止回阀	24	NV-63-140
25	STOP VALVE 止回阀	25	KJF-L8H-S
26	STOP VALVE 止回阀	26	ZJFS-140FH
27	CHECK VALVE 止回阀	27	AJ-H6S0F
28	CHECK VALVE 止回阀	28	R81-08F-D
29	ELECTRIC MOTOR 电动机	29	75kw44P 440V/60Hz
30	COUPLING 联轴器	30	75kw44P 440V/60Hz
31	INDICATOR 指示器	31	GS92-A0516A8-40
32	INDICATOR 指示器	32	M8PZ-3150-9-PPV
33	MANUAL CONTROL VALVE 手动控制阀	33	FDS-08CRK
34	RELIEF VALVE 安全阀	34	HXHYL-4.0-00
35	SOLENOID VALVE 电磁阀	35	AJ-H6S0F
36	RELIEF VALVE 安全阀	36	KCJD24-600
37	SOLENOID VALVE 电磁阀	37	1500L
38	LEVEL SWITCH 液位开关	38	WSSX-411(O-200)
39	LEVEL GAUGE 液位计	39	YVZ-300T
40	REVERSE FILTER 反向过滤器	40	FEA-1000X30F
41	STOP VALVE 止回阀	41	VF-1000X100FY
42	STOP VALVE 止回阀	42	NV-63-140
43	STOP VALVE 止回阀	43	KJF-L8H-S
44	STOP VALVE 止回阀	44	ZJFS-140FH
45	CHECK VALVE 止回阀	45	AJ-H6S0F
46	CHECK VALVE 止回阀	46	R81-08F-D
47	ELECTRIC MOTOR 电动机	47	75kw44P 440V/60Hz
48	COUPLING 联轴器	48	75kw44P 440V/60Hz
49	INDICATOR 指示器	49	GS92-A0516A8-40
50	INDICATOR 指示器	50	M8PZ-3150-9-PPV
51	MANUAL CONTROL VALVE 手动控制阀	51	FDS-08CRK
52	RELIEF VALVE 安全阀	52	HXHYL-4.0-00
53	SOLENOID VALVE 电磁阀	53	AJ-H6S0F
54	RELIEF VALVE 安全阀	54	KCJD24-600
55	SOLENOID VALVE 电磁阀	55	1500L
56	LEVEL SWITCH 液位开关	56	WSSX-411(O-200)
57	LEVEL GAUGE 液位计	57	YVZ-300T
58	REVERSE FILTER 反向过滤器	58	FEA-1000X30F
59	STOP VALVE 止回阀	59	VF-1000X100FY
60	STOP VALVE 止回阀	60	NV-63-140
61	STOP VALVE 止回阀	61	KJF-L8H-S
62	STOP VALVE 止回阀	62	ZJFS-140FH
63	CHECK VALVE 止回阀	63	AJ-H6S0F
64	CHECK VALVE 止回阀	64	R81-08F-D
65	ELECTRIC MOTOR 电动机	65	75kw44P 440V/60Hz
66	COUPLING 联轴器	66	75kw44P 440V/60Hz
67	INDICATOR 指示器	67	GS92-A0516A8-40
68	INDICATOR 指示器	68	M8PZ-3150-9-PPV
69	MANUAL CONTROL VALVE 手动控制阀	69	FDS-08CRK
70	RELIEF VALVE 安全阀	70	HXHYL-4.0-00
71	SOLENOID VALVE 电磁阀	71	AJ-H6S0F
72	RELIEF VALVE 安全阀	72	KCJD24-600
73	SOLENOID VALVE 电磁阀	73	1500L
74	LEVEL SWITCH 液位开关	74	WSSX-411(O-200)
75	LEVEL GAUGE 液位计	75	YVZ-300T
76	REVERSE FILTER 反向过滤器	76	FEA-1000X30F
77	STOP VALVE 止回阀	77	VF-1000X100FY
78	STOP VALVE 止回阀	78	NV-63-140
79	STOP VALVE 止回阀	79	KJF-L8H-S
80	STOP VALVE 止回阀	80	ZJFS-140FH
81	CHECK VALVE 止回阀	81	AJ-H6S0F
82	CHECK VALVE 止回阀	82	R81-08F-D
83	ELECTRIC MOTOR 电动机	83	75kw44P 440V/60Hz
84	COUPLING 联轴器	84	75kw44P 440V/60Hz
85	INDICATOR 指示器	85	GS92-A0516A8-40
86	INDICATOR 指示器	86	M8PZ-3150-9-PPV
87	MANUAL CONTROL VALVE 手动控制阀	87	FDS-08CRK
88	RELIEF VALVE 安全阀	88	HXHYL-4.0-00
89	SOLENOID VALVE 电磁阀	89	AJ-H6S0F
90	RELIEF VALVE 安全阀	90	KCJD24-600
91	SOLENOID VALVE 电磁阀	91	1500L
92	LEVEL SWITCH 液位开关	92	WSSX-411(O-200)
93	LEVEL GAUGE 液位计	93	YVZ-300T
94	REVERSE FILTER 反向过滤器	94	FEA-1000X30F
95	STOP VALVE 止回阀	95	VF-1000X100FY
96	STOP VALVE 止回阀	96	NV-63-140
97	STOP VALVE 止回阀	97	KJF-L8H-S
98	STOP VALVE 止回阀	98	ZJFS-140FH
99	CHECK VALVE 止回阀	99	AJ-H6S0F
100	CHECK VALVE 止回阀	100	R81-08F-D

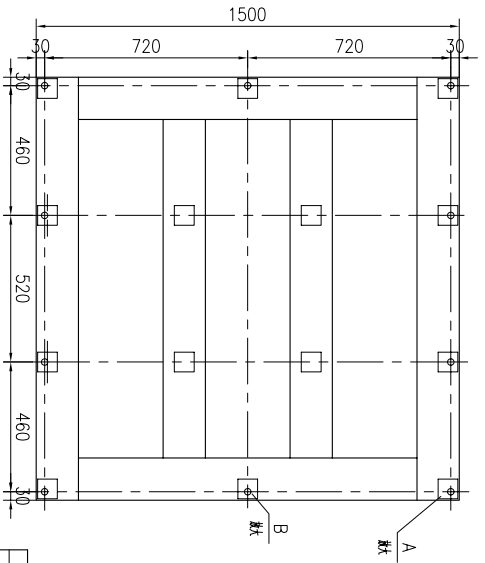
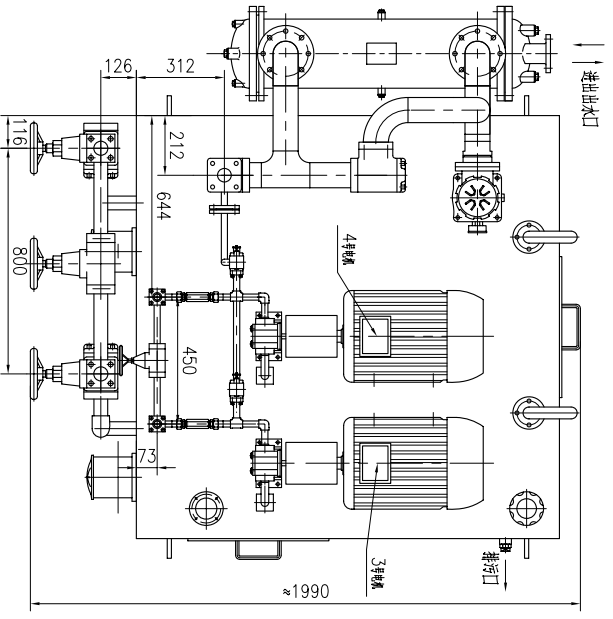
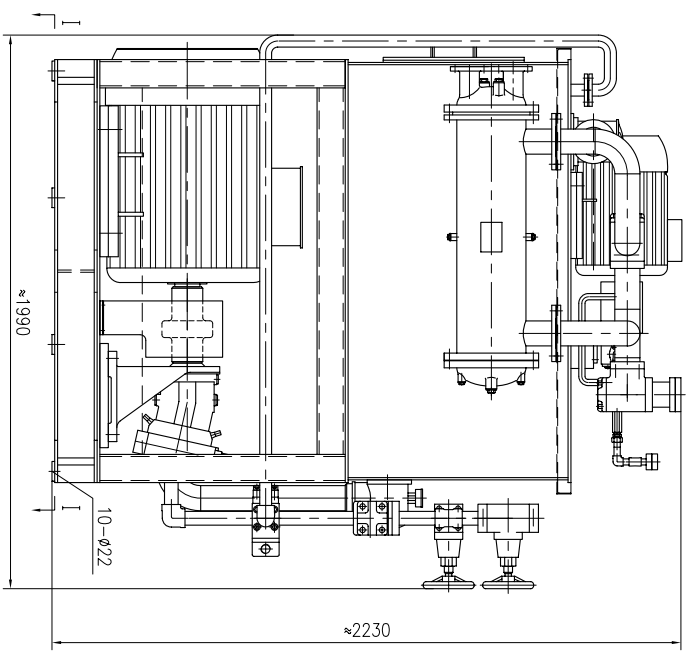
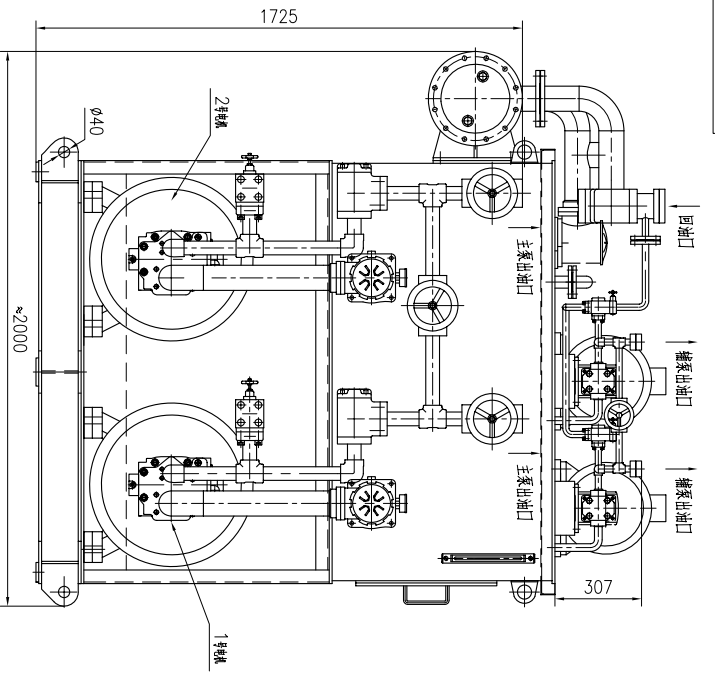
AFT TENSION PUMP UNIT 后张紧泵组

ITEM NO. 序号	DESCRIPTION 描述	ITEM NO. 序号	DESCRIPTION 描述
1	ELECTRIC MOTOR 电动机	1	TYPE 1710B-4H
2	HYDRAULIC PUMP 液压泵	2	TYPE 1750
3	STOP VALVE 止回阀	3	TYPE 41H
4	MANUAL CONTROL VALVE 手动控制阀	4	4MM605X/F
5	RELIEF VALVE 安全阀	5	3MM610A3X/F
6	PRESSURE GAUGE 压力表	6	ZOR10DP2-SY/2101M
7	SOLENOID VALVE 电磁阀	7	AJ-H4S0F
8	RELIEF VALVE 安全阀	8	DI-120H-S
9	PRESSURE GAUGE 压力表	9	NV-63-140
10	SOLENOID VALVE 电磁阀	10	KJF-L8H-S
11	RELIEF VALVE 安全阀	11	R81-04F
12	ELECTRIC MOTOR 电动机	12	11kw44P 440V/60Hz
13	COUPLING 联轴器	13	11kw44P 440V/60Hz
14	INDICATOR 指示器	14	GS92-A0516A8-40
15	INDICATOR 指示器	15	M8PZ-3150-9-PPV
16	MANUAL CONTROL VALVE 手动控制阀	16	FDS-08CRK
17	RELIEF VALVE 安全阀	17	HXHYL-4.0-00
18	SOLENOID VALVE 电磁阀	18	AJ-H6S0F
19	RELIEF VALVE 安全阀	19	KCJD24-600
20	SOLENOID VALVE 电磁阀	20	1500L
21	LEVEL SWITCH 液位开关	21	WSSX-411(O-200)
22	LEVEL GAUGE 液位计	22	YVZ-300T
23	REVERSE FILTER 反向过滤器	23	FEA-1000X30F
24	STOP VALVE 止回阀	24	VF-1000X100FY
25	STOP VALVE 止回阀	25	NV-63-140
26	STOP VALVE 止回阀	26	KJF-L8H-S
27	STOP VALVE 止回阀	27	ZJFS-140FH
28	CHECK VALVE 止回阀	28	AJ-H6S0F
29	CHECK VALVE 止回阀	29	R81-08F-D
30	ELECTRIC MOTOR 电动机	30	75kw44P 440V/60Hz
31	COUPLING 联轴器	31	75kw44P 440V/60Hz
32	INDICATOR 指示器	32	GS92-A0516A8-40
33	INDICATOR 指示器	33	M8PZ-3150-9-PPV
34	MANUAL CONTROL VALVE 手动控制阀	34	FDS-08CRK
35	RELIEF VALVE 安全阀	35	HXHYL-4.0-00
36	SOLENOID VALVE 电磁阀	36	AJ-H6S0F
37	RELIEF VALVE 安全阀	37	KCJD24-600
38	SOLENOID VALVE 电磁阀	38	1500L
39	LEVEL SWITCH 液位开关	39	WSSX-411(O-200)
40	LEVEL GAUGE 液位计	40	YVZ-300T
41	REVERSE FILTER 反向过滤器	41	FEA-1000X30F
42	STOP VALVE 止回阀	42	VF-1000X100FY
43	STOP VALVE 止回阀	43	NV-63-140
44	STOP VALVE 止回阀	44	KJF-L8H-S
45	STOP VALVE 止回阀	45	ZJFS-140FH
46	CHECK VALVE 止回阀	46	AJ-H6S0F
47	CHECK VALVE 止回阀	47	R81-08F-D
48	ELECTRIC MOTOR 电动机	48	75kw44P 440V/60Hz
49	COUPLING 联轴器	49	75kw44P 440V/60Hz
50	INDICATOR 指示器	50	GS92-A0516A8-40
51	INDICATOR 指示器	51	M8PZ-3150-9-PPV
52	MANUAL CONTROL VALVE 手动控制阀	52	FDS-08CRK
53	RELIEF VALVE 安全阀	53	HXHYL-4.0-00
54	SOLENOID VALVE 电磁阀	54	AJ-H6S0F
55	RELIEF VALVE 安全阀	55	KCJD24-600
56	SOLENOID VALVE 电磁阀	56	1500L
57	LEVEL SWITCH 液位开关	57	WSSX-411(O-200)
58	LEVEL GAUGE 液位计	58	YVZ-300T
59	REVERSE FILTER 反向过滤器	59	FEA-1000X30F
60	STOP VALVE 止回阀	60	VF-1000X100FY
61	STOP VALVE 止回阀	61	NV-63-140
62	STOP VALVE 止回阀	62	KJF-L8H-S
63	STOP VALVE 止回阀	63	ZJFS-140FH
64	CHECK VALVE 止回阀	64	AJ-H6S0F
65	CHECK VALVE 止回阀	65	R81-08F-D

No.	NAME	TYPE	REMARKS
1	INDICATOR 指示器	A7V0160LRD/638NDB01	轴径: 160mm
2	INDICATOR 指示器		

设计	审核	制图	校对	日期	2010/03/26
张明	李强	王磊	赵刚	日期	2010/03/26
张明	李强	王磊	赵刚	日期	2010/03/26

南通欧亚特机械有限公司
南通欧亚特机械有限公司



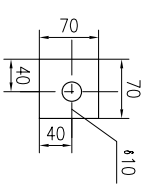
I-I

技术参数

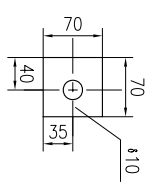
项目	单位	数值	项目	单位	数值
主泵流量	L/min	260	排泵流量	L/min	28
主泵压力	MPa	20.6	排泵压力	MPa	18
主电机功率	Kw	75X2	排电机功率	Kw	11X2
油箱容积	L	1500	喷油过滤器精度	μm	180
			回油过滤器精度	μm	30

DN20-H	高压管	18MPa	φ27×3.5	20#
DN4.0-H	高压管	20.6MPa	φ4.8×5.0	20#
DN20-LL	低压管	0.1MPa	φ27×2.5	20#
DN50-L	低压管	1.0MPa	φ57×3.0	20#

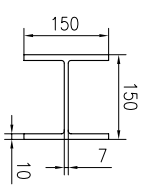
A处 1:3



B处 1:3



H钢 1:2



总图

标准/代号	更改/版本号	签字	日期	图样/备注	重量	比例
设计						
审核						
工艺						
				共 页	第 页	

南通政申船舶机械有限公司

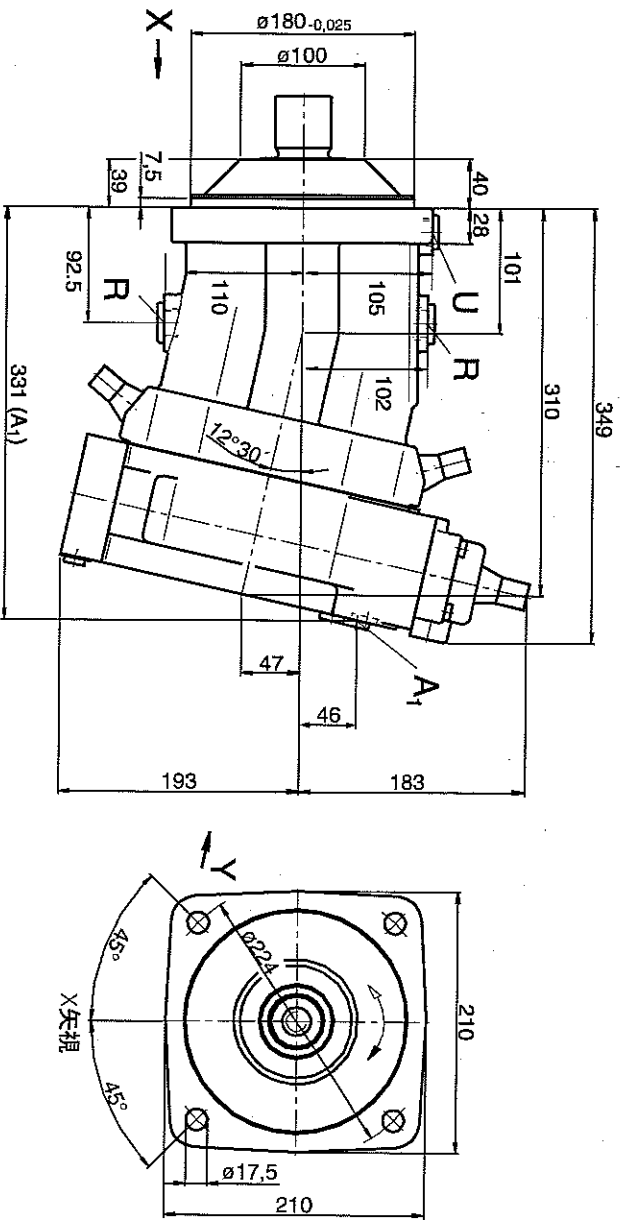
南通绞车液压站

570Z1-11B-00

普通零件登记
插图
校核
日期
签字
日期

外形寸法図 サイズ160

設計を完了する前に、外形寸法図を之請求ください。

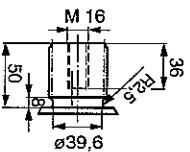


軸端形状

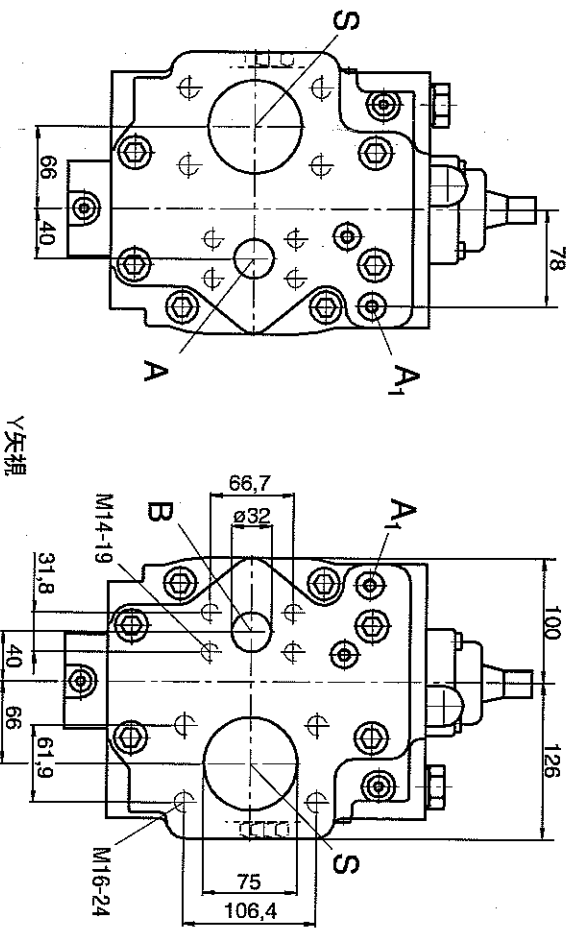
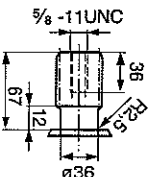
反時計回り

時計回り

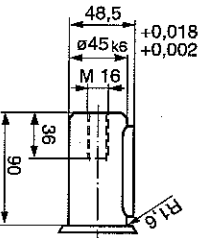
Z DINスライオン軸
W45X2X30X21X9g
DIN5480



S SAEスライオン軸
歯数13, 直径ピッチ $\frac{9}{16}$
ANSI B92.1a 1976



P ストリート軸
AS 14⁰_{-0.0043}X9X70
DIN6885



接続ポート
A: B 吐出ポート
(取付ボルトはメートルネジ)
S 吸入ポート
(取付ボルトはメートルネジ)
U 給油ポート
R エア抜きポート
A₁ 高圧ポート

SAE 1 1/4" (高圧形)
42MPa
SAE 3" (標準形)
14MPa
M22x1.5 (フラグ付)
M26x1.5 (フラグ付)
M16x1.5 (フラグ付)

フレセサリ

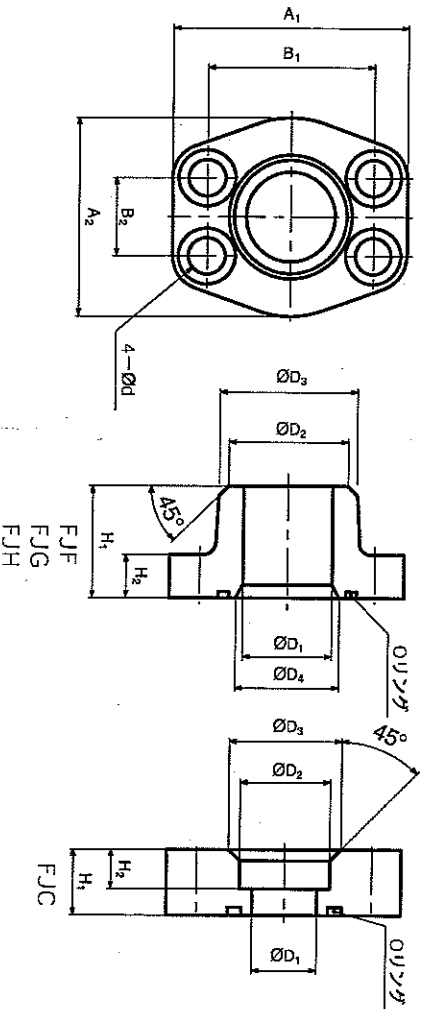
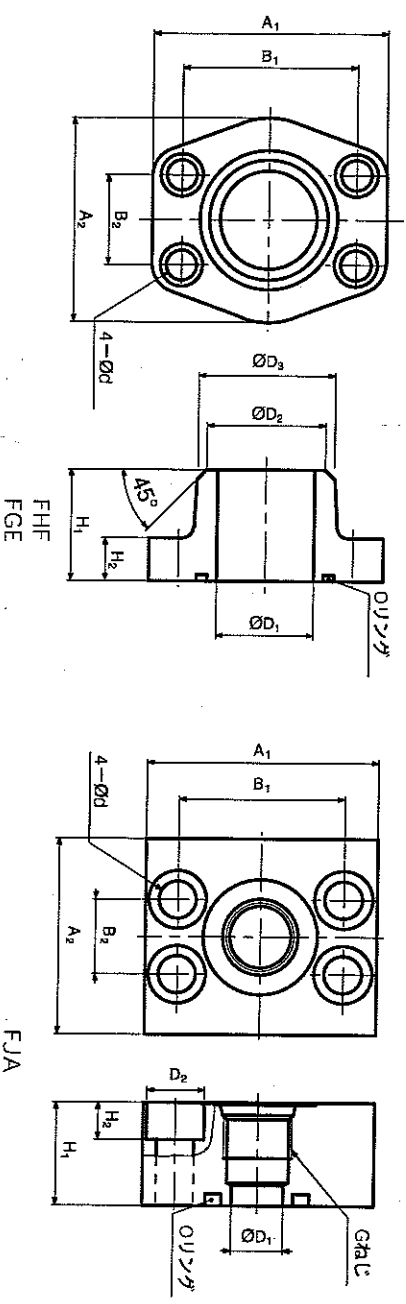
● 吸入フランジ

(R.B2906/07.01)

適用 サイズ	型式	パーツ No.	定格圧力 MPa	A ₁	A ₂	B ₁	B ₂	D ₁	D ₂	D ₃	H ₁	H ₂	φd	鋼管 材料	取付 ボルト	オリング JIS
28	FJF040/040/00	4100020245	1.0以下	94	84	69.8±0.25	35.7±0.25	38	42	52	45	16	13	40A×SGP	SGP	M12×30 1A-G50
55	FJF050/050/00	4100020254	1.0以下	102	98	77.8±0.25	42.9±0.25	51	55	65	45	16	13	50A×SGP	SGP	M12×30 1A-G60
80,107	FJF065/065/00	4100020263	1.0以下	114	110	88.9±0.25	50.8±0.25	63	68	78	50	19	13	65A×SGP	SGP	M12×35 1A-G75
160	FGE080/080/00	4171515002	1.0以下	135	130	106.4±0.2	61.9±0.2	80.7	84	89	50	22	18	80A×SGP	SGP	M16×40 1A-G85

● 吐出フランジ

適用 サイズ	型式	パーツ No.	定格圧力 MPa	A ₁	A ₂	B ₁	B ₂	D ₁	D ₂	D ₃	D ₄	H ₁	H ₂	φd	鋼管 / 適用継手	鋼管 材料	取付 ボルト	オリング JIS
28,55	FJ020/020/00	4171506503	27以下 40以下	71.6	60.4	50.8±0.1	28.8±0.1	20	34.5	27.7	-	20	12	11	20A×Sch 80 20A×Sch 160	STPG38	M10×35	1B-G30
80,107	FJ025/025/00	4100674723	-	71.5	46.5	-	-	22	17.5	-	-	32	12	-	G3/4	-	-	-
	FJ025/025/00	4171506804	21以下	81	70	57.1±0.2	27.8±0.2	25	28	34	-	44	22	13	25A×Sch 80 25A×Sch 160	STPG38	M12×40	1B-G35
	FJ025/025/00	4171506308	40以下	81	70	57.1±0.2	27.8±0.2	21.2	24	34	-	44	22	13	25A×Sch 80 25A×Sch 160	STPG38	M12×40	1B-G35
	FJ025/025/00	4171506705	21以下	81	70	57.1±0.2	27.8±0.2	32.9	34	40	-	50	26	16	32A×Sch 80 32A×Sch 160	STPG38	M14×45	1B-G40
	FJ025/025/00	4171506806	27以下	81	70	57.1±0.2	27.8±0.2	29.9	34	40	-	50	26	16	32A×Sch 80 32A×Sch 160	STPG38	M14×45	1B-G40
	FJ025/025/00	4171506907	37以下	81	70	57.1±0.2	27.8±0.2	28.7	33	40	-	50	26	16	32A×71 32A×91	STKM13A STKM13A	M14×45	1B-G40
160	FJH032/032/00	4100675388	40以下	94.7	78	66.7±0.2	31.8±0.2	24.7	29	32	-	50	26	16	32A×91	STKM13A	M16×40	1A-G85

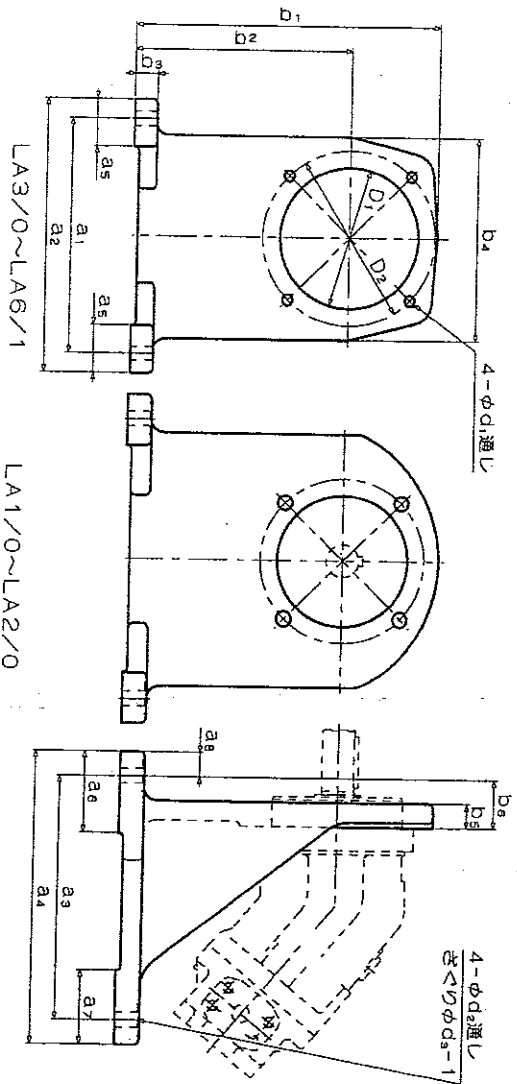


シートカタログ
 RJ 92202 可変容量ポンプ A7VO シリーズ 63 用 アクセサリ
 RJ B1001 固定容量ポンプ A7FO

● フォート

サイズ	型式	パーツ No.	質量 [kg]	D ₁	D ₂	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈
28	LA2/0	4100020328	9.0	100	125	210	245	190	225	41.5	60	50	17.5
55	LA3/0	4100020337	13.2	125	160	220	260	190	230	49	65	50	20
80	LA4/0	4100020346	17.1	140	180	240	280	230	270	50	75	65	20
107	LA5/0	4100020355	23.1	160	200	270	320	240	290	59	80	65	25
160	LA6/1	4100020364	30.6	180	224	300	350	270	320	61	90	65	25

型式	b ₁	b ₂	b ₃	b ₄	b ₅	b ₆	d ₁	d ₂	d ₃	ポンプ・モータ取付			シヤッキ ボルト用 タツチ
										六角穴付 ボルト	六角 タツチ	ばね座金	
LA2/0	235	160	20	182	18	35	M10	11	24	M10×40	-	-	*10
LA3/0	280	200	22	186	20	40	M12	13	28	M12×45	-	-	*12
LA4/0	325	225	25	206	22	45	M12	13	28	M12×50	-	-	*12
LA5/0	355	250	27	230	24	50	M16	18	35	M16×55	-	-	*16
LA6/1	395	280	30	260	26	55	M16	18	35	M16×60	-	-	*16



仕様 SPEC.

形式 MODEL	押しのけ容積 DISPLACEMENT		最高セット圧力 MAX. SET PRESSURE MPa (kgf/cm ²)	回転速度範囲 SPEED RANGE r.p.m.				質量 WEIGHT kg
	大容積 LARGE DISP.	小容積 SMALL DISP.		大容積 LARGE DISP.		小容積 SMALL DISP.		
	at 20.6MPa (210kgf/cm ²)	at 24.5MPa (250kgf/cm ²)		at 20.6MPa (210kgf/cm ²)	at 24.5MPa (250kgf/cm ²)	at 20.6MPa (210kgf/cm ²)	at 24.5MPa (250kgf/cm ²)	
MRH2-3150	-1	1570	24.5 (250)	3~175	5~100	5~260	10~130	315
	-2	0				※0~2000	※0~2000	
	-5	2100				5~220	10~115	
	-9	1040				10~260	10~130	

※フリーホイール時最高使用圧力は1.0MPa(10kgf/cm²)、連続運転時間は10分以内でご利用下さい。
The main-line pressure should be less than 1.0MPa(10kgf/cm²) when free-wheeling.
And free-wheeling should not exceed 10 minutes at an operation.

回転方向 DIRECTION OF ROTATION

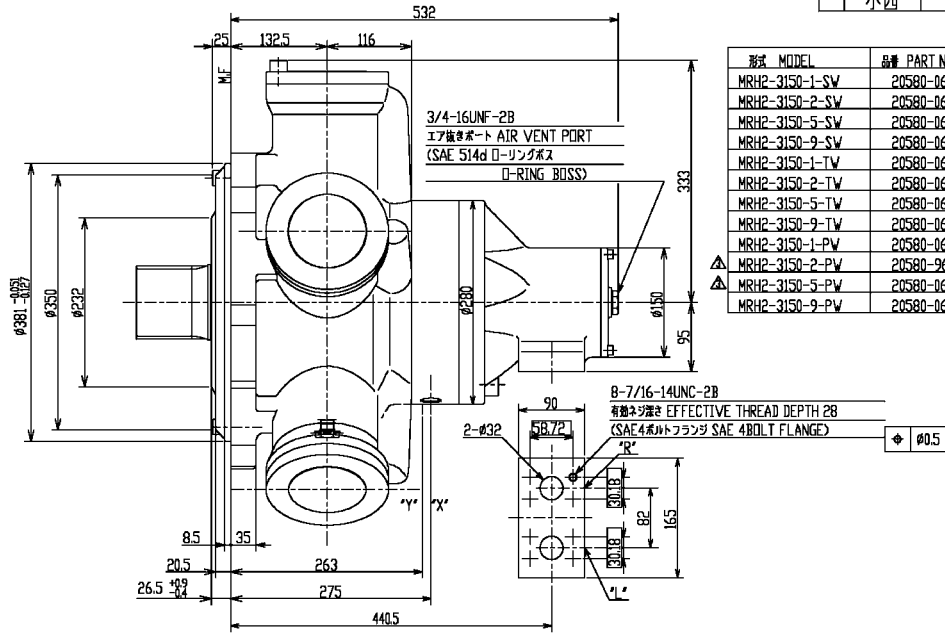
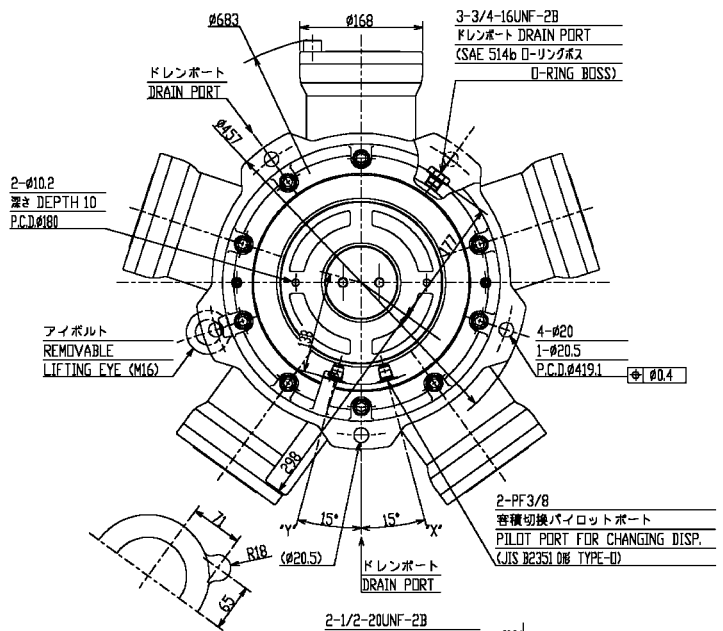
(出力軸側から見て AS SEEN FROM THE SHAFT)

流入ポート INLET PORT	流出ポート OUTLET PORT	回転方向 DIRECTION OF ROTATION
R	L	右回転 CLOCKWISE
L	R	左回転 ANTI-CLOCKWISE

訂正 REVISION	日付 DATE	記号 DESCRIPTION	訂正番号 CHANGE ORDER NO.	発注記号 VALID FROM	担当 DESIGN	検討 CHECKED	承認 CHECKED	承認 APPROVED
△	96.4.2	和美併記, 多品番一業団化			森			小西
△	03.02.08	品番を追加			網代			山本

CAD図に移行

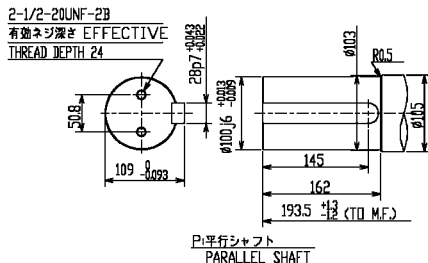
承認	承認	承認	承認
年 月 日 '96.4.2	移行訂正番号 △		
承認 小西	照査 網代	検討 森	担当 森



形式 MODEL	品番 PART No.	軸系
MRH2-3150-1-SV	20580-06505	S:スプラインシャフト SPLINE SHAFT
MRH2-3150-2-SV	20580-06506	
MRH2-3150-5-SV	20580-06525	
MRH2-3150-9-SV	20580-06526	
MRH2-3150-1-TV	20580-06503	T:テーパシャフト TAPER SHAFT
MRH2-3150-2-TV	20580-06504	
MRH2-3150-5-TV	20580-06524	
MRH2-3150-9-TV	20580-06522	
MRH2-3150-1-PV	20580-06501	P:平行シャフト PARALLEL SHAFT
MRH2-3150-2-PV	20580-06573	
MRH2-3150-5-PV	20580-06561	
MRH2-3150-9-PV	20580-06536	

容量切換パイロットポート
PILOT PORT FOR CHANGING DISP.

	Xポート PORT X*	Yポート PORT Y*
大容積 LARGE DISP.	高圧 PRESSURIZE	タンクへ TO RESERVOIR
小容積 SMALL DISP.	タンクへ TO RESERVOIR	高圧 PRESSURIZE



- 注記
- ドレン配管は、モータ取付状態にて最も高い位置にあるドレンポートから取り出し、直接タンクに戻して下さい。
 - ケース内圧力は0.1MPa (1kgf/cm²) 以下にしてください。
 - 常時、ケーシング内に作動油を充填させて下さい。
 - 単位は mm。
 - 本モータを使用する際は取扱説明書を御覧下さい。
 - 容量切換パイロットポートへの供給圧力は、モータ作動圧力以上にして下さい。但し、モータ作動圧力が1.0MPa (10kgf/cm²)未満の場合に切換を行うには、1.0MPa (10kgf/cm²)以上の外側圧力が必要です。
 - 容量切換パイロットポートのうち、1ヶ所には必ず圧力を供給し、他のポートはタンクへ戻して下さい。

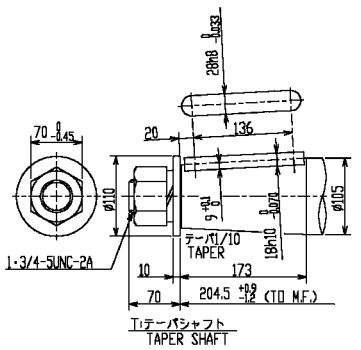
- NOTES
- DRAIN LINE SHOULD BE CONNECTED FROM THE HIGHEST DRAIN PORT OF MOTOR. LOADED ABOVE THE HIGHEST POINT OF MOTOR AND CONNECTED DIRECTLY TO RESERVOIR.
 - CASE PRESSURE SHOULD BE KEPT LESS THAN 0.1MPa (1kgf/cm²).
 - CASE SHOULD BE ALWAYS FILLED WITH OIL.
 - ALL DIMENSIONS ARE IN mm.
 - READ INSTRUCTION MANUAL CARE FULLY BEFORE USE.
 - REQUIRED PILOT PRESSURE TO CHANGE DISPLACEMENT IS AT LEAST EQUAL OR MORE THAN LINE PRESSURE (MOTOR PRESSURE). WHEN LINE PRESSURE IS LESS THAN 1.0MPa (10kgf/cm²) EXTRA PRESSURE SOURCE OVER 1.0MPa (10kgf/cm²) IS REQUIRED FOR PILOT LINE TO CHANGE DISPLACEMENT.
 - ONE OF THE PILOT PORTS SHOULD BE ALWAYS PRESSURIZED AND THE OTHER PORT SHOULD BE CONNECTED TO RESERVOIR.

インボリュートスプライン諸元
SPEC. OF INVOLUTE SPLINE

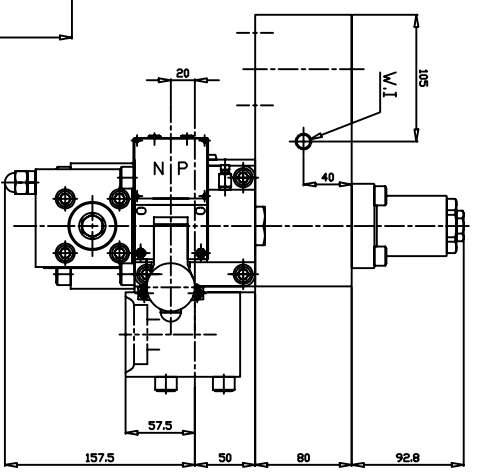
SAE J498b フラットルートサイドフィット (クラス1)
FLATROOT SIDE FIT (CLASS 1)

DP	6/12
歯数 NUMBER OF TEETH	23
ピッチ円径 PITCH CIRCLE DIAMETER	φ97.367
大径 MAJOR DIAMETER	φ100.653
小径 MINOR DIAMETER	φ92.184

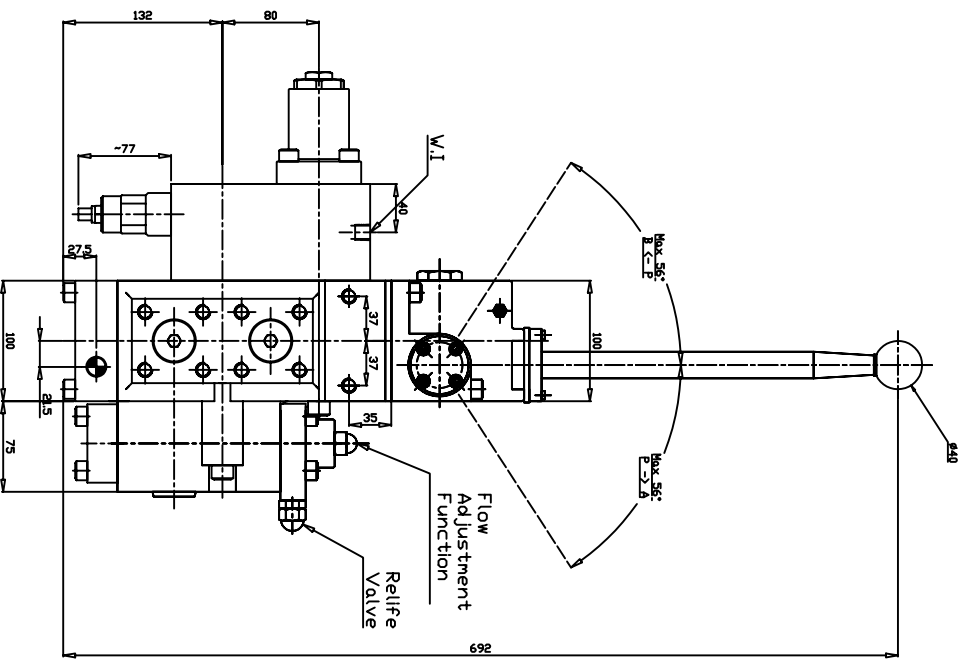
S:スプラインシャフト
SPLINE SHAFT



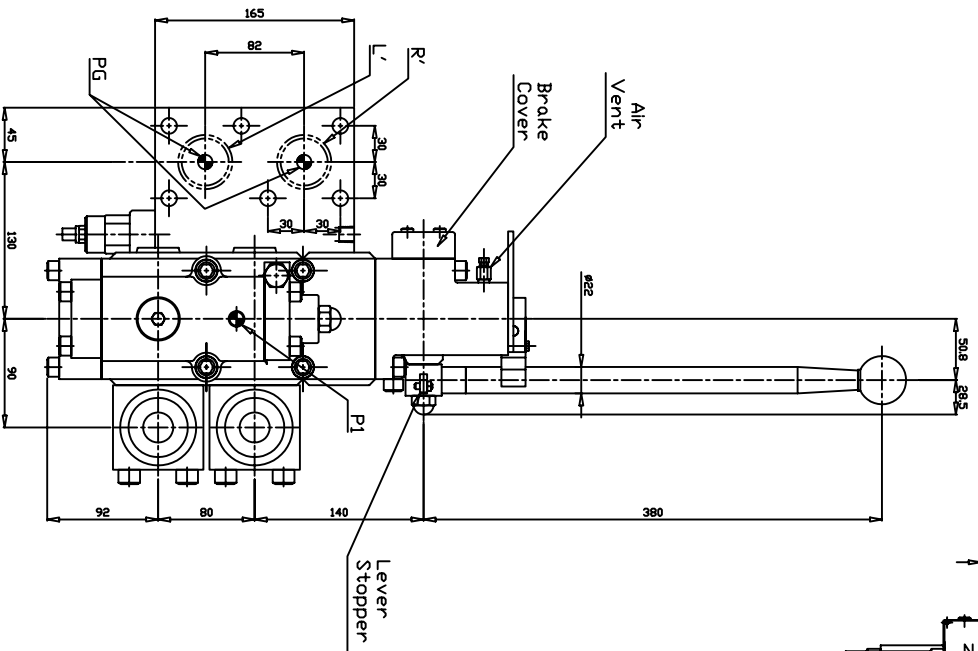
記号 MARK	項目 ITEM NO.	品番 PART NO.	名称 NAME	数量 QTY	材質 MATERIAL	寸法・質量・適用 REMARKS
承認	表面粗さ	表面粗さ	SURFACE ROUGHNESS	三角油	形式	MRH2-3150-0-0-W
高橋	材料	材料	MATERIAL	投影角	MODEL	ハイドロスター/HYDROSTAR
承認	熱処理	熱処理	HEAT TREATMENT	名義	NAME	外形図/OUTLINE
承認	引張強さ	引張強さ	TENSILE STRENGTH	尺長	SCALE	20580-06501,03~06,22 ,24~26,36,61,96573
承認	表面処理	表面処理	SURFACE TREATMENT	品番	PART NO.	20580-06501,03~06,22 ,24~26,36,61,96573
承認				15		KAYABA INDUSTRY CO., LTD.



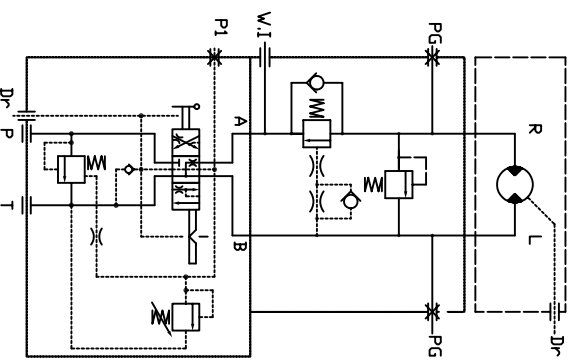
Upper View



Left View



Front View



Symbol

Spool Function

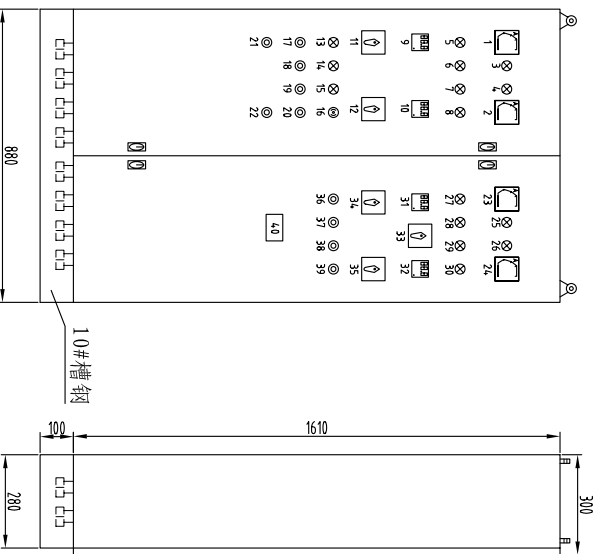


Specification

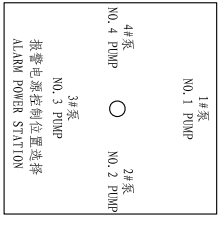
Nominal Size	25
Rated Pressure	27 MPa
Rated Oil Flow	C-300L/min
Relief Valve Set Pressure	20.6 MPa
Working Angle	±5°
Working Torque	43N

Connecting Port	P T
Port Flange	25Ax40A
Port Rc	1/4
Port Pg, W.I.	

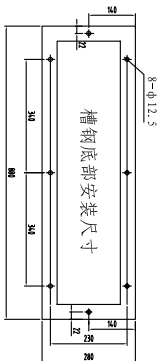
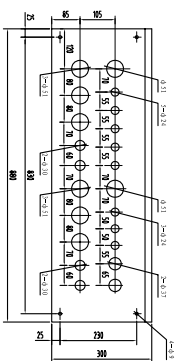
MARK	NAME OF PARTS	MATERIAL	QTY	NOTE	WEIGHT
	DRAWN BY			MODEL	
	H.YOSHIZAWA			FDS08CRQH MCR08-H-L	
	CHECKED BY			NAME	
	KUCHIDA			Marine Valve	
	DATE DRAWN			DRAWING NO.	
	2007.5.9				
	SCALE				
	VIEW				
	IN				
	HYDRO-GEAR CO., LTD.				



- 1.1# 泵电流表 NO.1 PUMP AMMETER
- 2.2# 泵电流表 NO.2 PUMP AMMETER
- 3.1# 泵电源指示 NO.1 PUMP POWER
- 4.2# 泵电源指示 NO.2 PUMP POWER
- 5.1# 泵运行指示 NO.1 PUMP RUN.
- 6.1# 电机加热指示 NO.1 MOTOR HEATER
- 7.2# 泵运行指示 NO.2 PUMP RUN.
- 8.2# 电机加热指示 NO.2 MOTOR HEATER
- 9.1# 泵计时器 NO.1 PUMP TIMER
- 10.2# 泵计时器 NO.2 PUMP TIMER
- 11.1# 泵电流表转换开关 NO.1 PUMP AMMETER SWITCH
- 12.2# 泵电流表转换开关 NO.2 PUMP AMMETER SWITCH
- 13.油阻塞报警 OIL BLOCK
- 14.高油温报警 OIL TEMPERATURE H.
- 15.低油位报警 OIL LEVEL L.
- 16.报警 ALARM
- 17.1# 泵启动 NO.1 PUMP START
- 18.1# 泵停止 NO.1 PUMP STOP
- 19.2# 泵启动 NO.2 PUMP START
- 20.2# 泵停止 NO.2 PUMP STOP
- 21.试验 TEST
- 22.消音 BUZZER STOP



- 23.3# 泵电流表 NO.3 PUMP AMMETER
- 24.4# 泵电流表 NO.4 PUMP AMMETER
- 25.3# 泵电源指示 NO.3 PUMP POWER
- 26.4# 泵电源指示 NO.4 PUMP POWER
- 27.3# 泵运行指示 NO.3 PUMP RUN.
- 28.3# 电机加热指示 NO.3 MOTOR HEATER
- 29.4# 泵运行指示 NO.4 PUMP RUN.
- 30.4# 电机加热指示 NO.4 MOTOR HEATER
- 31.3# 泵计时器 NO.3 PUMP TIMER
- 32.4# 泵计时器 NO.4 PUMP TIMER
- 33.
- 34.3# 泵电流表转换开关 NO.3 PUMP AMMETER SWITCH
- 35.4# 泵电流表转换开关 NO.4 PUMP AMMETER SWITCH
- 36.3# 泵启动 NO.3 PUMP START
- 37.3# 泵停止 NO.3 PUMP STOP
- 38.4# 泵启动 NO.4 PUMP START
- 39.4# 泵停止 NO.4 PUMP STOP
- 40.出厂铭牌



- 注:
- 1. 填料函: 8*TI42 (3*35)
 - 2. 填料函: 4*TI24 (3*2.5)
 - 3. 填料函: 2*TI30 (14*1.5)
 - 4. 填料函: 8*TI19 (2*1.5, 3*1.5)

注:

- 1. 控制箱防护等级: IP44
- 2. 填料函材质: 铜, 表面镀铬
- 3. 控制箱为座壁式
- 4. 控制箱颜色: Munsell code 7.5 BG 7/2

锚机泵站控制箱外形图				ANCHOR WINDLASS PUMP CONTROL BOX OUTLINE		南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.Ltd	
标记	处数	更改文件号	签字	日期	图样标记	重量	比例
设计							1:1
审核							
工艺					共 页	第 页	ZT-1/1

借通用件登记

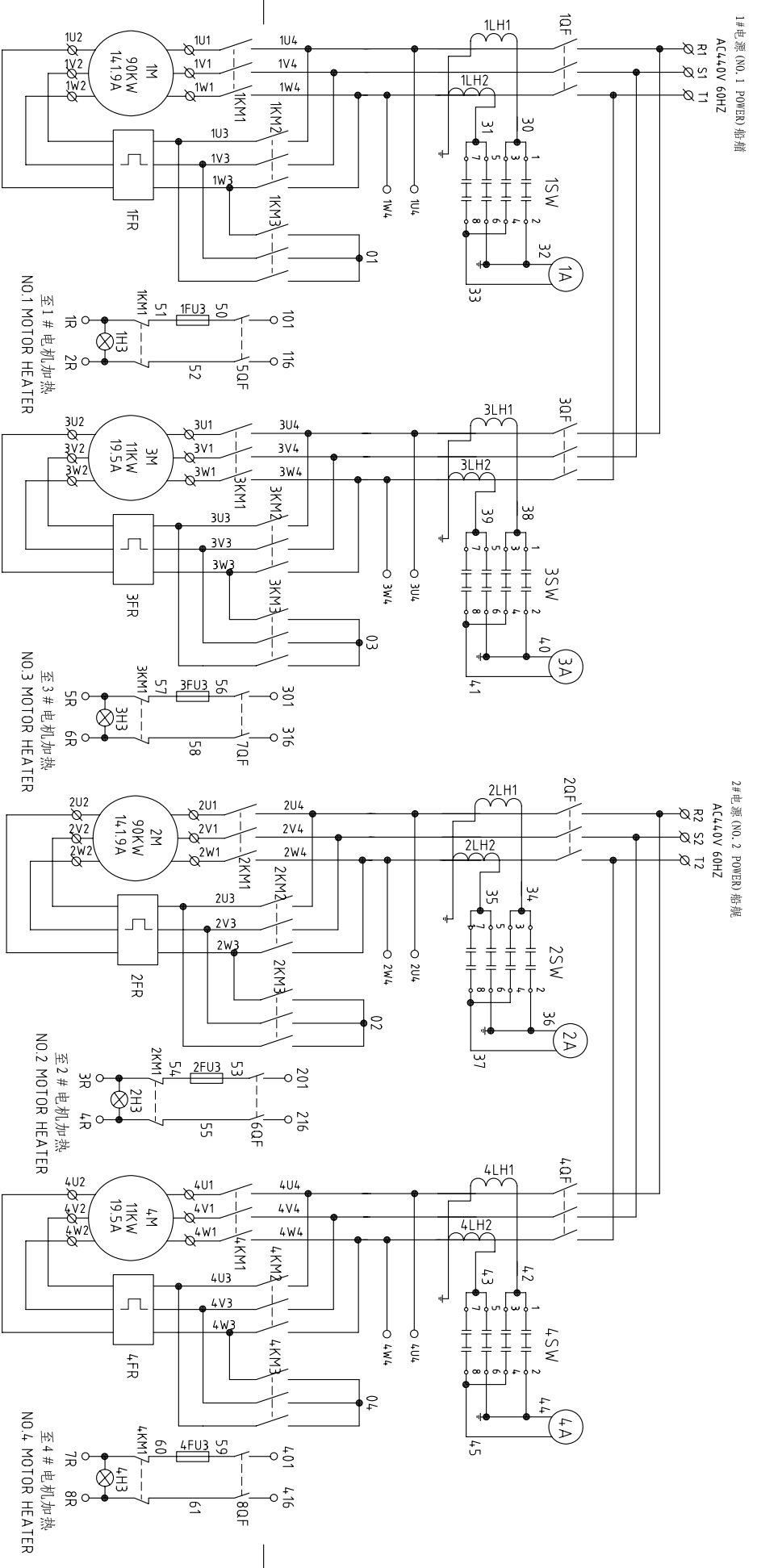
描图

校描

旧底图总号

签字

日期



普通用件登记

描图

校描

旧底图总号

签字

日期

标记	处数	更改文件号	签字	日期
设计				
审核				
工艺				

锚机泵站控制箱电器
原理图
ANCHOR WINDLASS PUMP
CONTROL BOX ELECTRICAL
SCHEMATIC DIAGRAM

图样标记

重量

比例

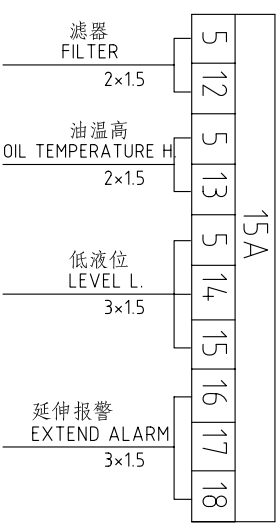
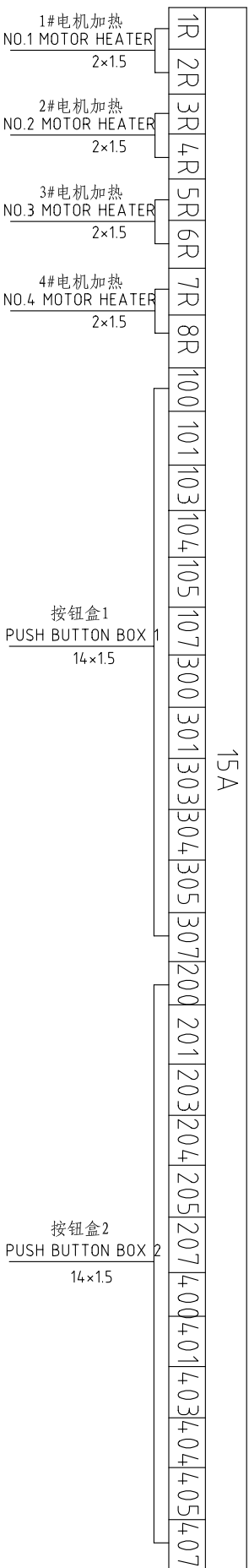
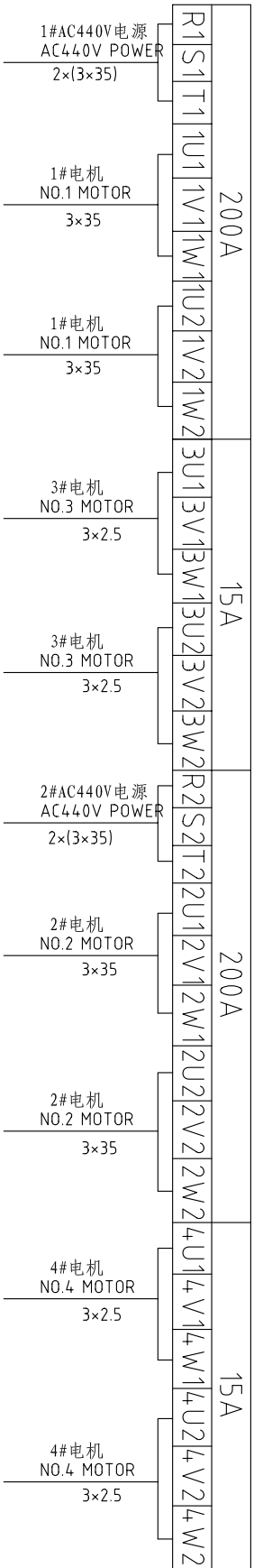
1:1

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南通政田船舶机械有限公司
Nantong Masada Ship Machinery Co.Ltd



借通用户登记

插图

校描

旧底图总号

签字

日期

设计	处数	更改文件号	签字	日期	锚机泵站控制箱电器 原理图 ANCHOR WINDLASS PUMP CONTROL BOX ELECTRICAL SCHEMATIC DIAGRAM		南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.Ltd
审核					图样标记	重量	
工艺					标准化	比例	
					日期	1:1	
					共 页	第 页	ZT-1/4

	32	SW	位置选择开关 STATION SWICH	LW38C2-169E6128/4	1			
	31	YH	蜂鸣器 BUZZER	CDY-22/21 DC24V	1			
	30	1-4SJ	计时器 TRANSFOMRER	JSS48-L AC220V	4			
	29	T1-4	变压器 TRANSFOMRER	JBK3-250 380-440V/220V	4			
	28	3-4A	电流表 AMMETER	F72-A 0-50A 50/5	2	过载6倍		
	27	1-2A	电流表 AMMETER	F72-A 0-300A 300/5	2	过载6倍		
	26	3-4LH1-2	电流互感器 CURRENT TRANSFORMER	BH-0.66 50/5	4			
	25	1-2LH1-2	电流互感器 CURRENT TRANSFORMER	BH-0.66 300/50	4			
	24	ANH1-2	按钮盒 PUSH BUTTON	ANHX-8J	2			
	23	JG	报警板 ALARM PANEL	ZQD-2	1			
	22	WY	稳压电源 POWER	S-15-24	1	0.7A		
	21	K1	继电器 RELAY	HH54P DC24V	2			
	20	K	继电器 RELAY	HH54P DC24V	1			
	19	1-4HL1-2	运行指示灯 INDICATOR LAMP	AD11-22/21 AC220V	8	绿 G.		
	18	H1-3	报警指示灯 INDICATOR LAMP	AD11-22/21 DC24V	3	红 R.		
	17	1-4H3	加热指示灯 INDICATOR LAMP	AD11-22/21 AC220V	4	黄 Y.		
	16	1-4H1-2	电源指示灯 INDICATOR LAMP	AD11-22/21 AC220V	8	白 W.		
	15	1-4KT	时间继电器 TIME RELAY	JS14P 99S AC220V	4	整定12S		
	14	SB, 1-4SB1-2	停止按钮 PUSH BUTTER	LA38-11/204	9	绿 G.		
	13	SA, 1-4SA1-2	停止按钮 PUSH BUTTER	LA38-11/204	9	红 R.		
	12	1-4FU1, 1-4FU3 FU5	熔断器 FUSE	RL98-16 2A	9			
	11	1-4FU2	熔断器 FUSE	RL98-16 6A	4			
	10	3-4FR	热继电器 HEATER RELAY	LRD16KN 9-13A	2	整定12A		
	9	1-2FR	热继电器 HEATER RELAY	LRD3365C 80-104A	2	整定86A		
	8	3-4KM1-3	交流接触器 A. C CONTACTOR	LC1-D2510 AC220V	6			
	7	1-2KM1-3	交流接触器 A. C CONTACTOR	LC1-D115 AC220V	6			
	6	1-4SW	转换开关 CHANGEOVER SWICH	LW38C2-164LH1/2	4			
	5	5-8QF	开关 SWICH	C65N/2P C10A	4			
	4	3-4QF	开关 SWICH	EZD100E 40A	2			
	3	1-2QF	开关 SWICH	EZD160E 160A	2			
	2	3-4M	电动机 MOTOR	Y160M-4-H 11kW 19.5A	2			
	1	1-2M	电动机 MOTOR	Y280M-4-H 90kW 141.9A	2			
	序号 NO.	代号 NO.	名称及型号 NAME & TYPE			数量 QUA	备注 RAMARK	
			锚机泵站控制箱电器 原理图 ANCHOR WINDLASS PUMP CONTROL BOX ELECTRICAL SCHEMATIC DIAGRAN			南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.,Ltd		
						数量		备注
	标记	处数	更改文件号	签字	日期			
	设计		标准化			图样标记	重量	比例
	日期							1:1
	审核							
	工艺		日期			共 页	第 页	
								ZT-1/5

借通用件登记

描图

校描

旧底图总号

签字

日期

借用件登记

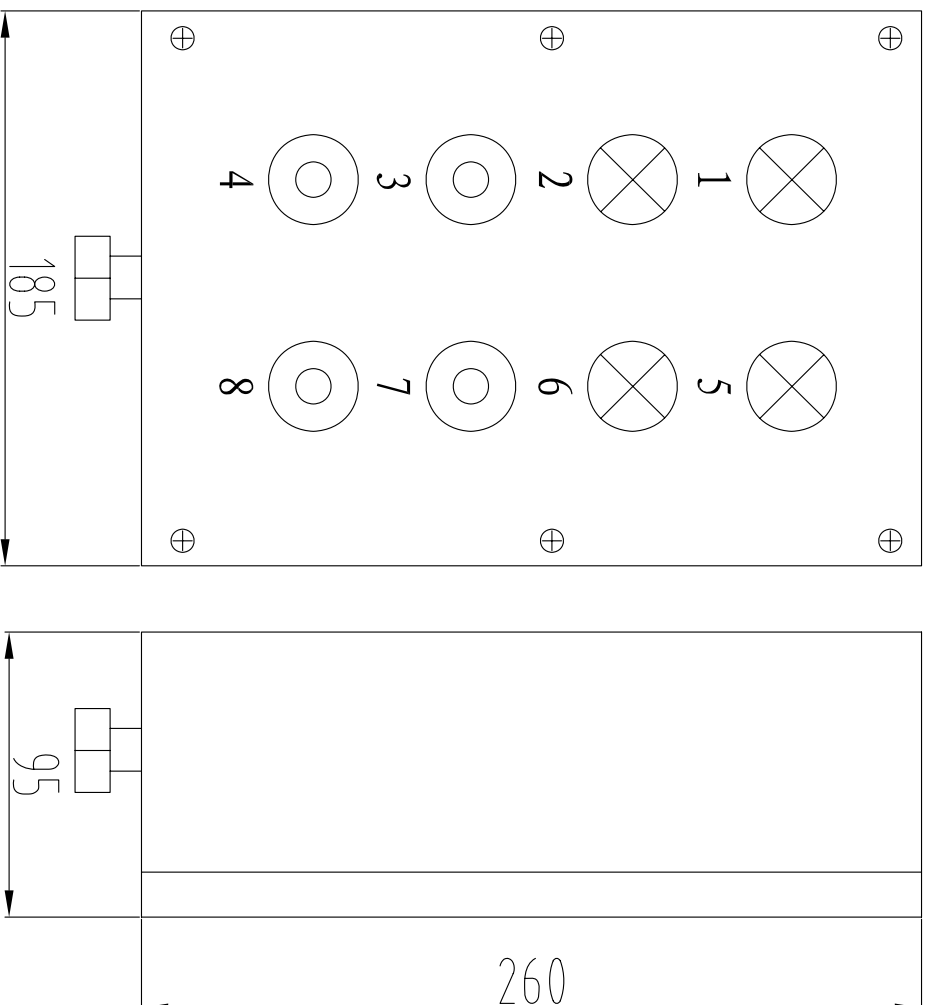
描图

校描

旧底图总号

签字

日期



来自控制箱
FROM CONTROL BOX
12x15

100 101 103 104 105 107 300 301 303 304 305 307

铭牌:

- | | |
|------------|------------------|
| 1. 1#泵电源指示 | NO. 1 PUMP POWER |
| 2. 1#泵运行指示 | NO. 1 PUMP RUN. |
| 3. 1#泵启动 | NO. 1 PUMP START |
| 4. 1#泵停止 | NO. 1 PUMP STOP |
| 5. 3#泵电源指示 | NO. 3 PUMP POWER |
| 6. 3#泵运行指示 | NO. 3 PUMP RUN. |
| 7. 3#泵启动 | NO. 3 PUMP START |
| 8. 3#泵停止 | NO. 3 PUMP STOP |

注:

按钮盒1防护等级: IP56

note:

1. classification of NO. 1 button
protect box: IP56

锚机遥控按钮盒外形
图
ANCHOR REMOTE CONTROL
BOX OUTLINE

南通坎田船舶机械有限公司
Nantong Masada Ship Machinery Co., Ltd

标记	处数	更改文件号	签字	日期
设计				
审核				
工艺				

图样标记	重量	比例
		1:1
共 页	第 页	

ZT-1/6

借用件登记

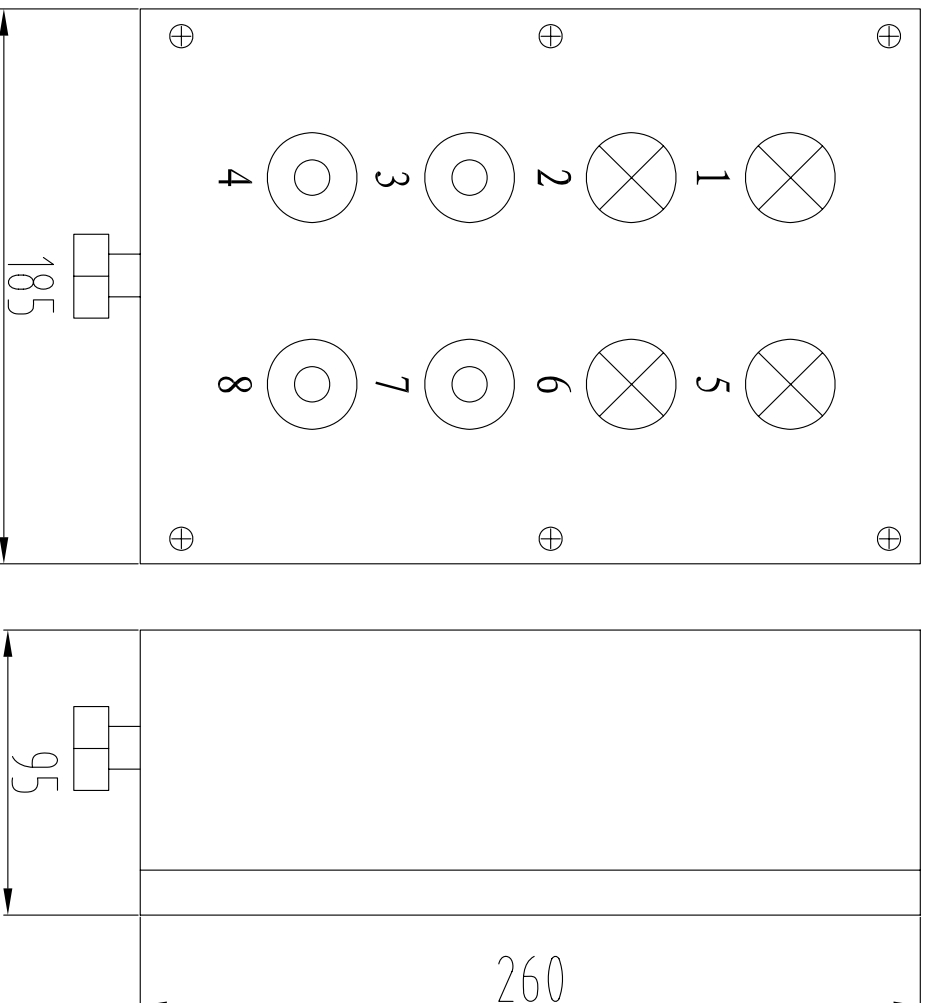
描图

校描

旧底图总号

签字

日期



200 201 203 204 205 207 400 401 403 404 405 407

来自控制箱
FROM CONTROL BOX
12×15

铭牌:

- | | |
|------------|------------------|
| 1. 2#泵电源指示 | NO. 2 PUMP POWER |
| 2. 2#泵运行指示 | NO. 2 PUMP RUN. |
| 3. 2#泵启动 | NO. 2 PUMP START |
| 4. 2#泵停止 | NO. 2 PUMP STOP |
| 5. 4#泵电源指示 | NO. 4 PUMP POWER |
| 6. 4#泵运行指示 | NO. 4 PUMP RUN. |
| 7. 4#泵启动 | NO. 4 PUMP START |
| 8. 4#泵停止 | NO. 4 PUMP STOP |

注:

按钮盒2防护等级: IP56

note:

1. classification of NO. 2 button
protect box: IP56

标记	处数	更改文件号	签字	日期
设计				
审核				
工艺				

锚机遥控按钮盒外形
图
ANCHOR REMOTE CONTROL
BOX OUTLINE

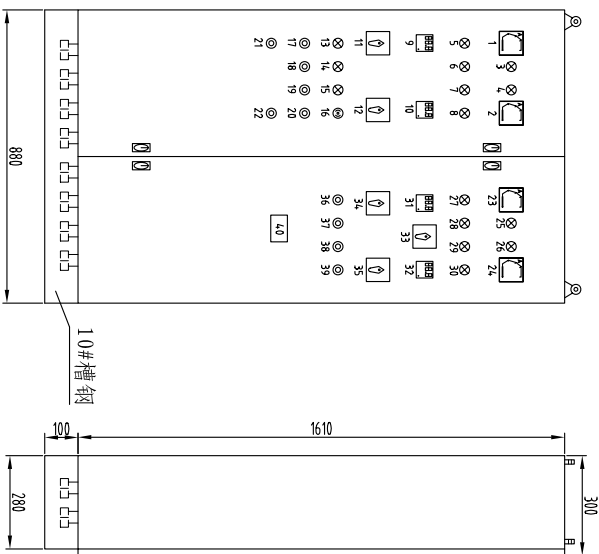
图样标记 重量 比例

1:1

共 页 第 页

南通坂田船舶机械有限公司
Nantong Masada Ship Machinery Co., Ltd

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借通用件登记

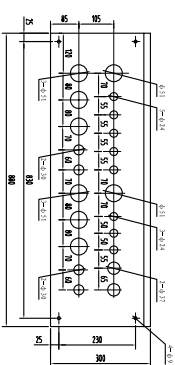
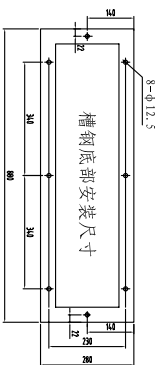
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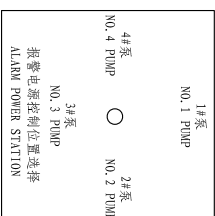
日期



- 注:
1. 控制箱防护等级: IP44
 2. 填料函材质: 铜, 表面镀铬
 3. 控制箱为座壁式
 4. 控制箱颜色: Munsell code 7.5 BG 7/2

1. 1# 泵电流表 NO. 1 PUMP AMMETER
2. 2# 泵电流表 NO. 2 PUMP AMMETER
3. 1# 泵电源指示 NO. 1 PUMP POWER
4. 2# 泵电源指示 NO. 2 PUMP POWER
5. 1# 泵运行指示 NO. 1 PUMP RUN.
6. 1# 电机加热指示 NO. 1 MOTOR HEATER
7. 2# 泵运行指示 NO. 2 PUMP RUN.
8. 2# 电机加热指示 NO. 2 MOTOR HEATER
9. 1# 泵计时器 NO. 1 PUMP TIMER
10. 2# 泵计时器 NO. 2 PUMP TIMER
11. 1# 泵电流表转换开关 NO. 1 PUMP AMMETER SWITCH
12. 2# 泵电流表转换开关 NO. 2 PUMP AMMETER SWITCH
13. 油阻塞报警 OIL BLOCK
14. 高油温报警 OIL TEMPERATURE H.
15. 低油位报警 OIL LEVEL L.
16. 报警 ALARM
17. 1# 泵启动 NO. 1 PUMP START
18. 1# 泵停止 NO. 1 PUMP STOP
19. 2# 泵启动 NO. 2 PUMP START
20. 2# 泵停止 NO. 2 PUMP STOP
21. 试验 TEST
22. 消音 BUZZER STOP

23. 3# 泵电流表 NO. 3 PUMP AMMETER
24. 4# 泵电流表 NO. 4 PUMP AMMETER
25. 3# 泵电源指示 NO. 3 PUMP POWER
26. 4# 泵电源指示 NO. 4 PUMP POWER
27. 3# 泵运行指示 NO. 3 PUMP RUN.
28. 3# 电机加热指示 NO. 3 MOTOR HEATER
29. 4# 泵运行指示 NO. 4 PUMP RUN.
30. 4# 电机加热指示 NO. 4 MOTOR HEATER
31. 3# 泵计时器 NO. 3 PUMP TIMER
32. 4# 泵计时器 NO. 4 PUMP TIMER
- 33.

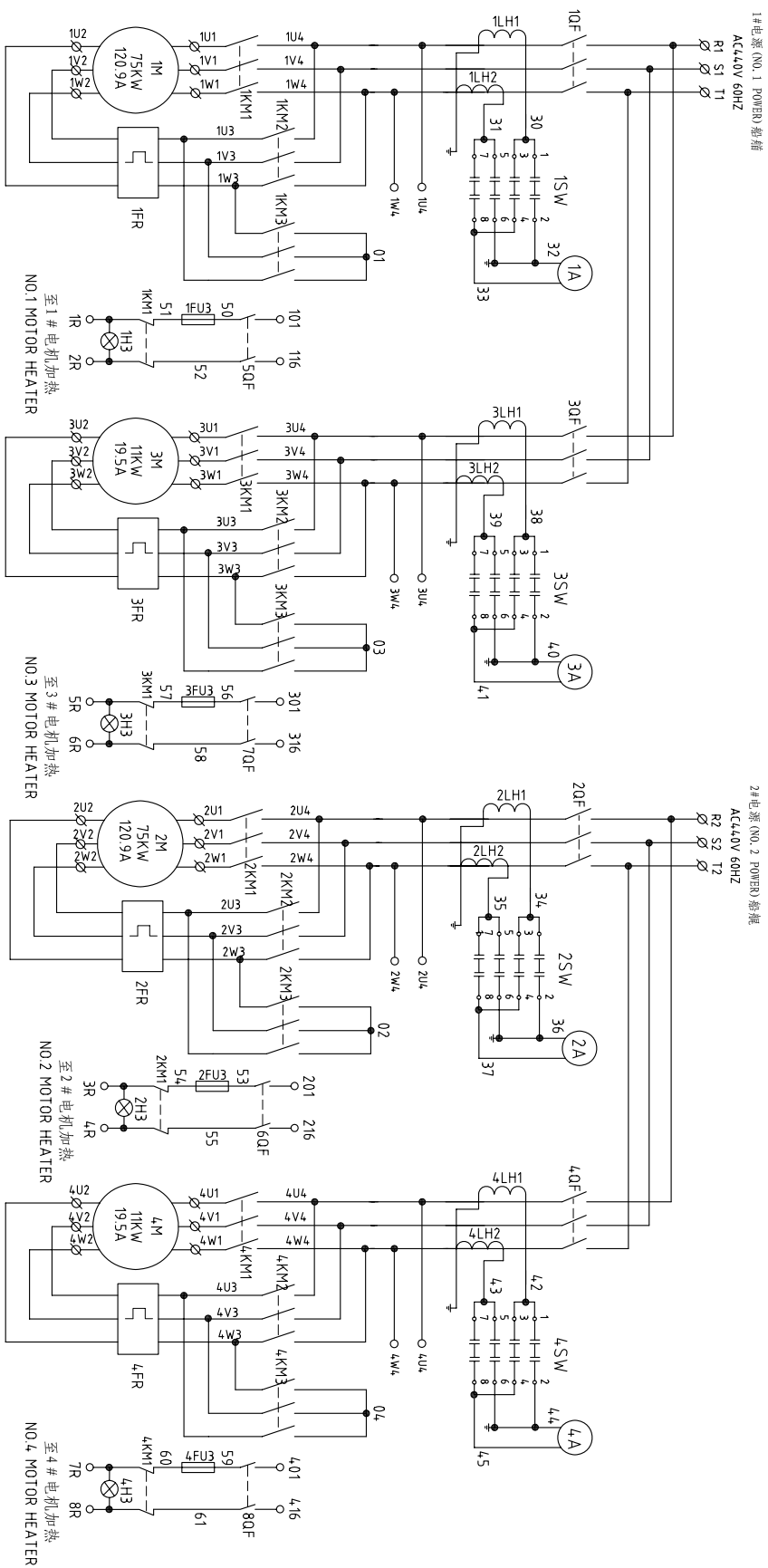


34. 3# 泵电流表转换开关 NO. 3 PUMP AMMETER SWITCH
35. 4# 泵电流表转换开关 NO. 4 PUMP AMMETER SWITCH
36. 3# 泵启动 NO. 3 PUMP START
37. 3# 泵停止 NO. 3 PUMP STOP
38. 4# 泵启动 NO. 4 PUMP START
39. 4# 泵停止 NO. 4 PUMP STOP
40. 出厂铭牌

注:

1. 填料函: 8*TJ42 (3*35)
2. 填料函: 4*TJ24 (3*2.5)
3. 填料函: 2*TJ30 (14*1.5)
4. 填料函: 8*TJ19 (2*1.5, 3*1.5)

绞车泵站控制箱外形图		WINCH PUMP CONTROL BOX OUTLINE		南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.Ltd	
标记	处数	更改文件号	签字	日期	
设计		标准化			
审核					
工艺					
日期					
图样标记		重量	比例		
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日期

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设计				
审核				
工艺				

图样标记	重量	比例
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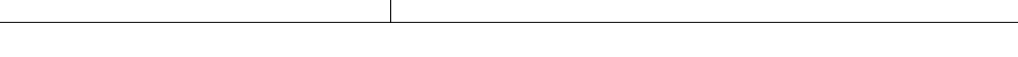
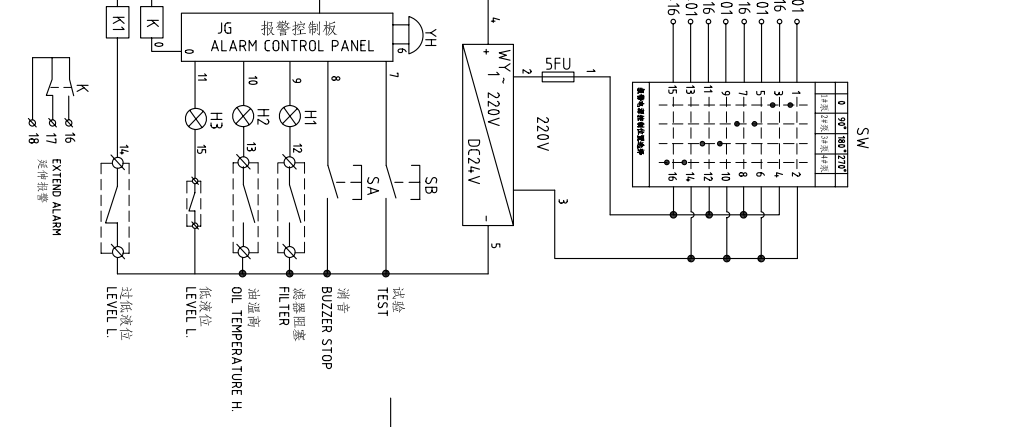
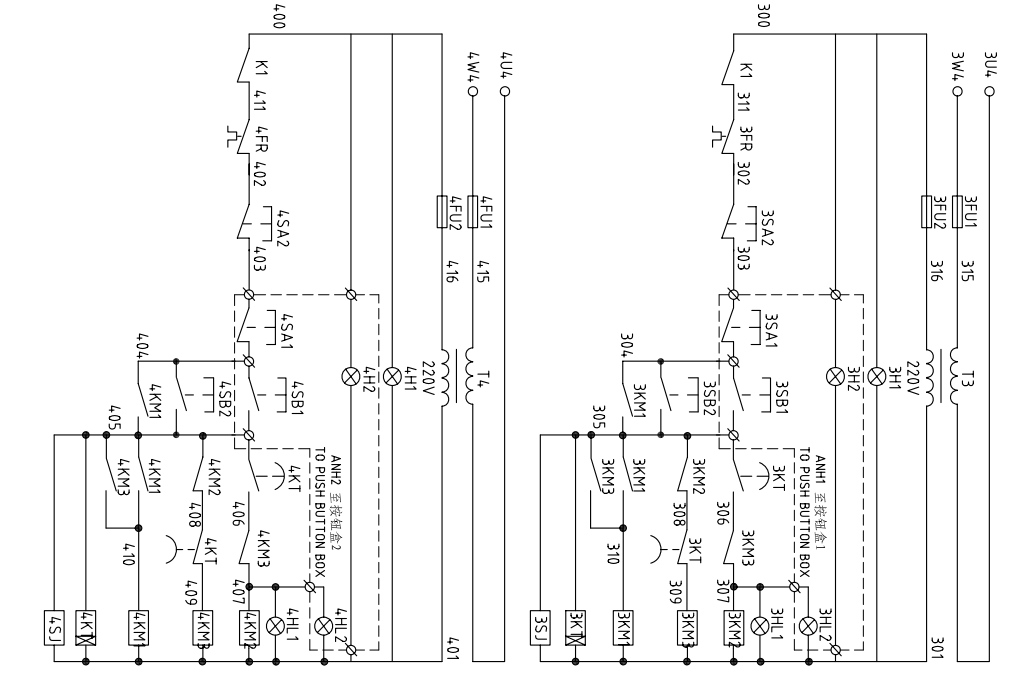
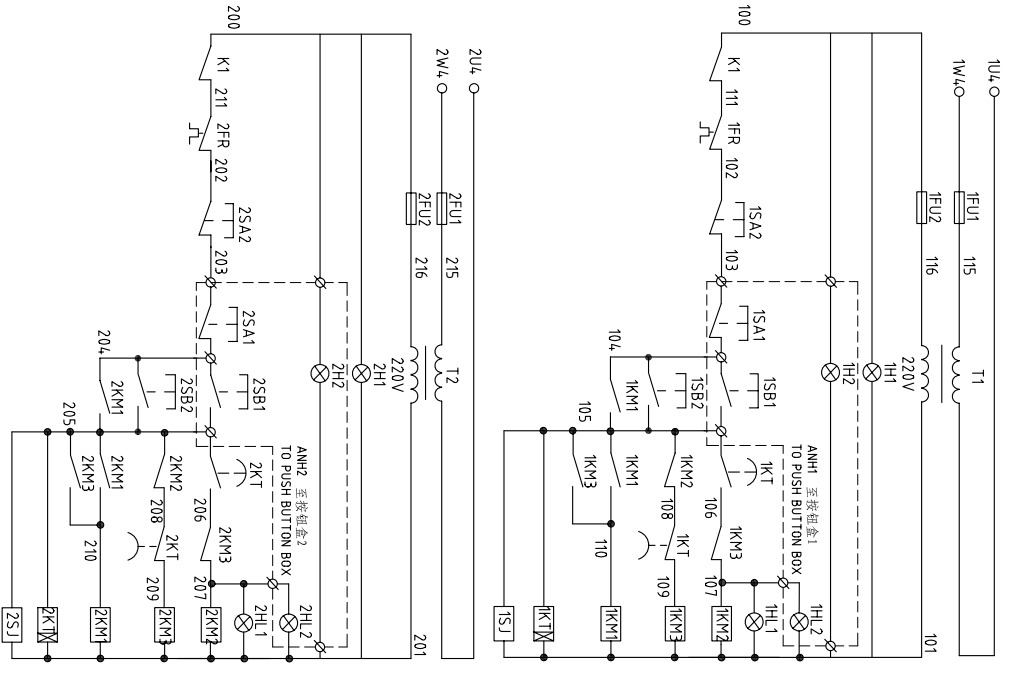
绞车泵站控制箱电器原理图
WINCH PUMP CONTROL BOX
ELECTRICAL SCHEMATIC
DIAGRAM

南通政田船舶机械有限公司
Nantong Masada Ship Machinery Co.Ltd

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描图

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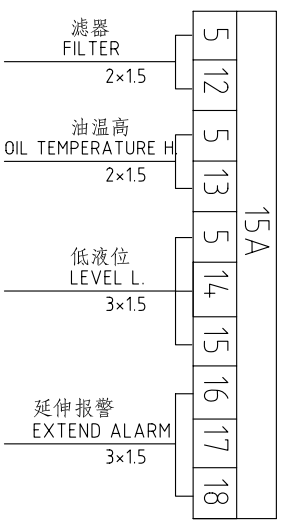
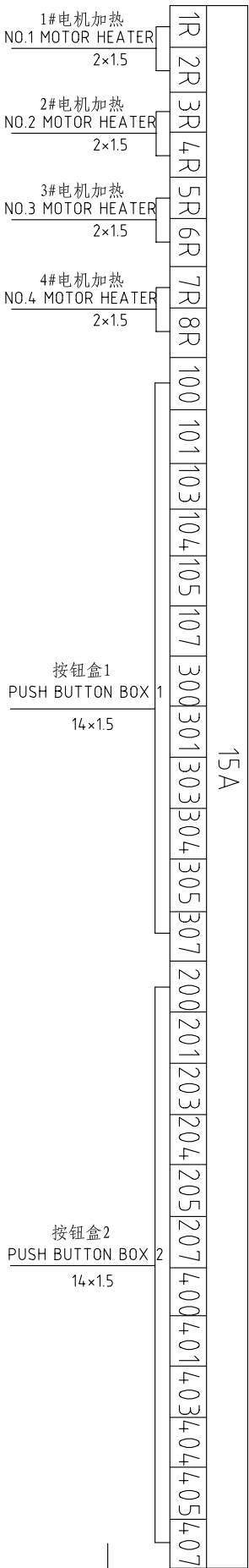
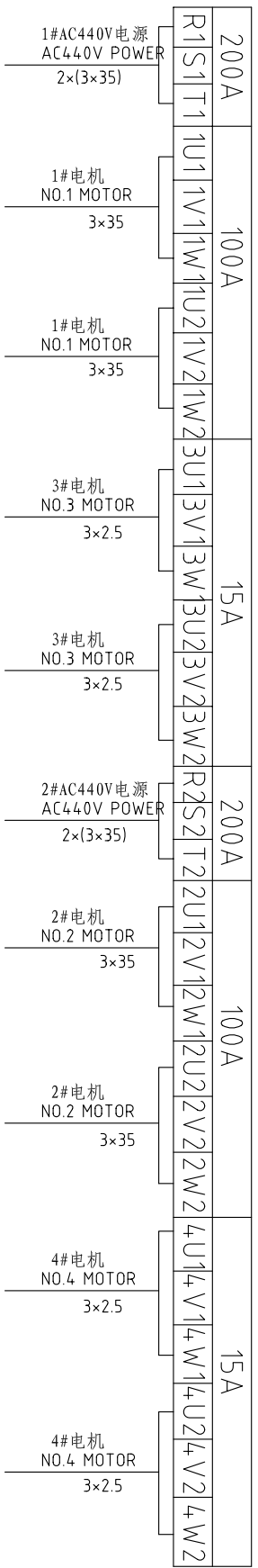
日期

标记	处数	更改文件号	签字	日期	图样标记	重量	比例
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审核							
工艺							
日期					共 页	第 页	

绞车泵站控制箱电器原理图
WINCH PUMP CONTROL BOX
ELECTRICAL SCHEMATIC
DIAGRAM

南通政田船舶机械有限公司
Nantong Masada Ship Machinery Co.Ltd

ZT-2/3



借通用作登记

插图

校描

旧底图总号

签字

日期

设计	处数	更改文件号	签字	日期	绞车泵站控制箱电器 原理图 WINCH PUMP CONTROL BOX ELECTRICAL SCHEMATIC DIAGRAM	图样标记 重量 比例 1:1	南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.Ltd
审核	工艺	日期	日期				
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	32	SW	位置选择开关 STATION SWICH	LW38C2-169E6128/4	1			
	31	YH	蜂鸣器 BUZZER	CDY-22/21 DC24V	1			
	30	1-4SJ	计时器 TRANSFOMRER	JSS48-L AC220V	4			
	29	T1-4	变压器 TRANSFOMRER	JBK3-250 380-440V/220V	4			
	28	3-4A	电流表 AMMETER	F72-A 0-50A 50/5	2	过载6倍		
	27	1-2A	电流表 AMMETER	F72-A 0-200A 200/5	2	过载6倍		
	26	3-4LH1-2	电流互感器 CURRENT TRANSFORMER	BH-0.66 50/5	4			
	25	1-2LH1-2	电流互感器 CURRENT TRANSFORMER	BH-0.66 200/50	4			
	24	ANH1-2	按钮盒 PUSH BUTTON	ANHX-8J	2			
	23	JG	报警板 ALARM PANEL	ZQD-2	1			
	22	WY	稳压电源 POWER	S-15-24	1	0.7A		
	21	K1	继电器 RELAY	HH54P DC24V	2			
	20	K	继电器 RELAY	HH54P DC24V	1			
	19	1-4HL1-2	运行指示灯 INDICATOR LAMP	AD11-22/21 AC220V	8	绿 G.		
	18	H1-3	报警指示灯 INDICATOR LAMP	AD11-22/21 DC24V	3	红 R.		
	17	1-4H3	加热指示灯 INDICATOR LAMP	AD11-22/21 AC220V	4	黄 Y.		
	16	1-4H1-2	电源指示灯 INDICATOR LAMP	AD11-22/21 AC220V	8	白 W.		
	15	1-4KT	时间继电器 TIME RELAY	JS14P 99S AC220V	4	整定12S		
	14	SB, 1-4SB1-2	停止按钮 PUSH BUTTER	LA38-11/204	9	绿 G.		
	13	SA, 1-4SA1-2	停止按钮 PUSH BUTTER	LA38-11/204	9	红 R.		
	12	1-4FU1, 1-4FU3 FU5	熔断器 FUSE	RL98-16 2A	9			
	11	1-4FU2	熔断器 FUSE	RL98-16 6A	4			
	10	3-4FR	热继电器 HEATER RELAY	LRD16KN 9-13A	2	整定12A		
	9	1-2FR	热继电器 HEATER RELAY	LRD3363C 63-80A	2	整定73A		
	8	3-4KM1-3	交流接触器 A. C CONTACTOR	LC1-D2510 AC220V	6			
	7	1-2KM1-3	交流接触器 A. C CONTACTOR	LC1-D9511 AC220V	6			
	6	1-4SW	转换开关 CHANGEOVER SWICH	LW38C2-164LH1/2	4			
	5	5-8QF	开关 SWICH	C65N/2P C10A	4			
	4	3-4QF	开关 SWICH	EZD100E 40A	2			
	3	1-2QF	开关 SWICH	EZD160E 160A	2			
	2	3-4M	电动机 MOTOR	Y160M-4-H 11kW 19.5A	2			
	1	1-2M	电动机 MOTOR	Y280M-4-H 75kW 120.9A	2			
	序号 NO.	代号 NO.	名称及型号 NAME & TYPE			数量 QUA	备注 RAMARK	
			绞车泵站控制箱电器 原理图			南通政田船舶机械有限公司 Nantong Masada Ship Machinery Co.,Ltd		
			WINCH PUMP CONTROL BOX ELECTRICAL SCHEMATIC DIAGRAN					
	标记	处数	更改文件号	签字	日期			
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	工艺		日期			第 页		

借通用件登记

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签字

日期

借通用件登记

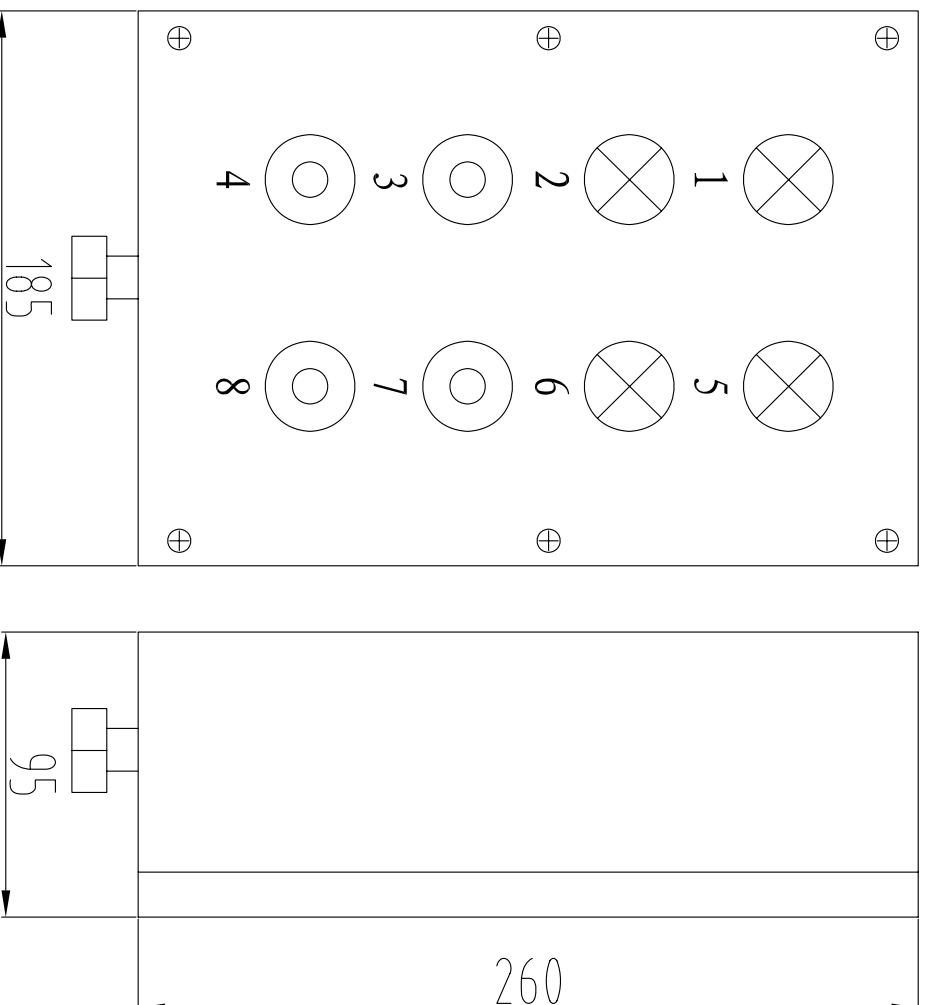
描图

校描

旧底图总号

签字

日期



100|101|103|104|105|107|300|301|303|304|305|307

来自控制箱
FROM CONTROL BOX
12x1.5

铭牌:

- | | |
|------------|------------------|
| 1. 1#泵电源指示 | NO. 1 PUMP POWER |
| 2. 1#泵运行指示 | NO. 1 PUMP RUN. |
| 3. 1#泵启动 | NO. 1 PUMP START |
| 4. 1#泵停止 | NO. 1 PUMP STOP |
| 5. 3#泵电源指示 | NO. 3 PUMP POWER |
| 6. 3#泵运行指示 | NO. 3 PUMP RUN. |
| 7. 3#泵启动 | NO. 3 PUMP START |
| 8. 3#泵停止 | NO. 3 PUMP STOP |

注:

按钮盒1防护等级: IP56

note:

1. classification of NO. 1 button
protect box: IP56

绞车遥控按钮盒外形

图

WINCH REMOTE CONTROL BOX OUTLINE

标记	处数	更改文件号	签字	日期
设计				
审核				
工艺				

图样标记	重量	比例
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南通坂田船舶机械有限公司
Nantong Masada Ship Machinery Co., Ltd

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借用附件登记

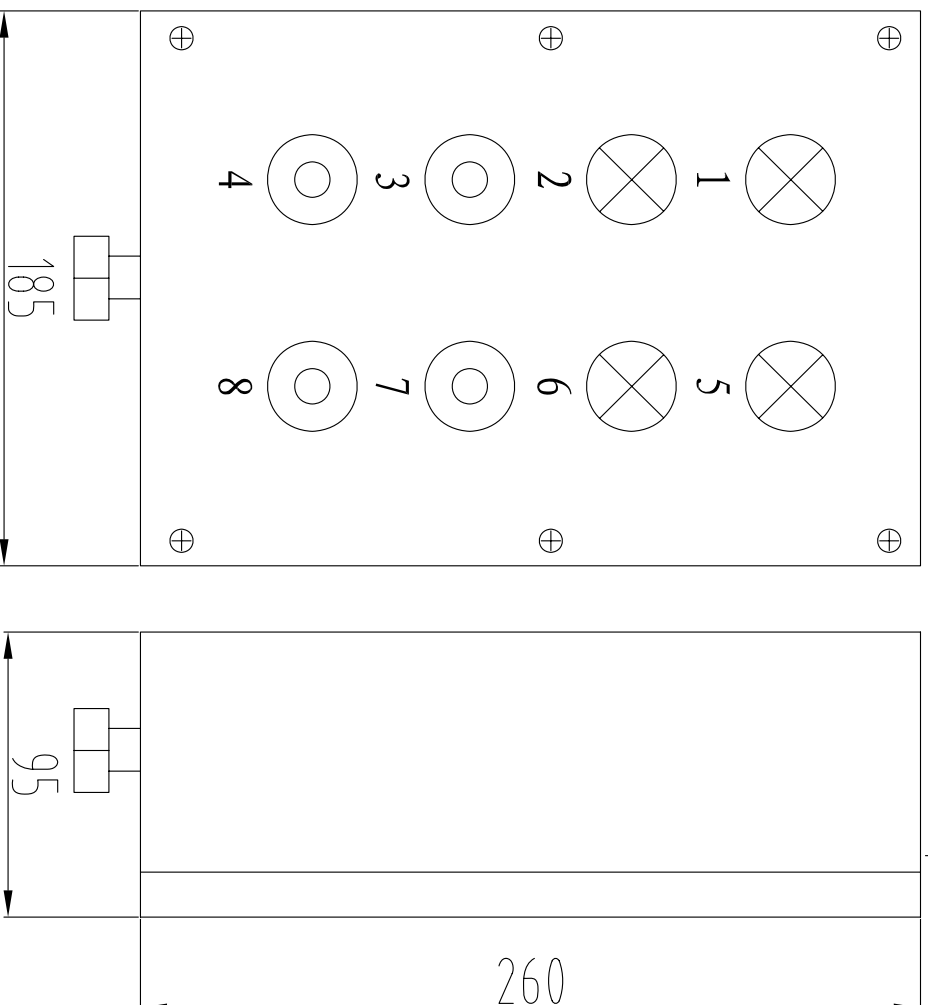
描图

校描

旧底图总号

签字

日期



200|201|203|204|205|207|400|401|403|404|405|407

FROM CONTROL BOX
12×1.5
来自控制箱

铭牌:

- | | |
|------------|------------------|
| 1. 2#泵电源指示 | NO. 2 PUMP POWER |
| 2. 2#泵运行指示 | NO. 2 PUMP RUN. |
| 3. 2#泵启动 | NO. 2 PUMP START |
| 4. 2#泵停止 | NO. 2 PUMP STOP |
| 5. 4#泵电源指示 | NO. 4 PUMP POWER |
| 6. 4#泵运行指示 | NO. 4 PUMP RUN. |
| 7. 4#泵启动 | NO. 4 PUMP START |
| 8. 4#泵停止 | NO. 4 PUMP STOP |

注:

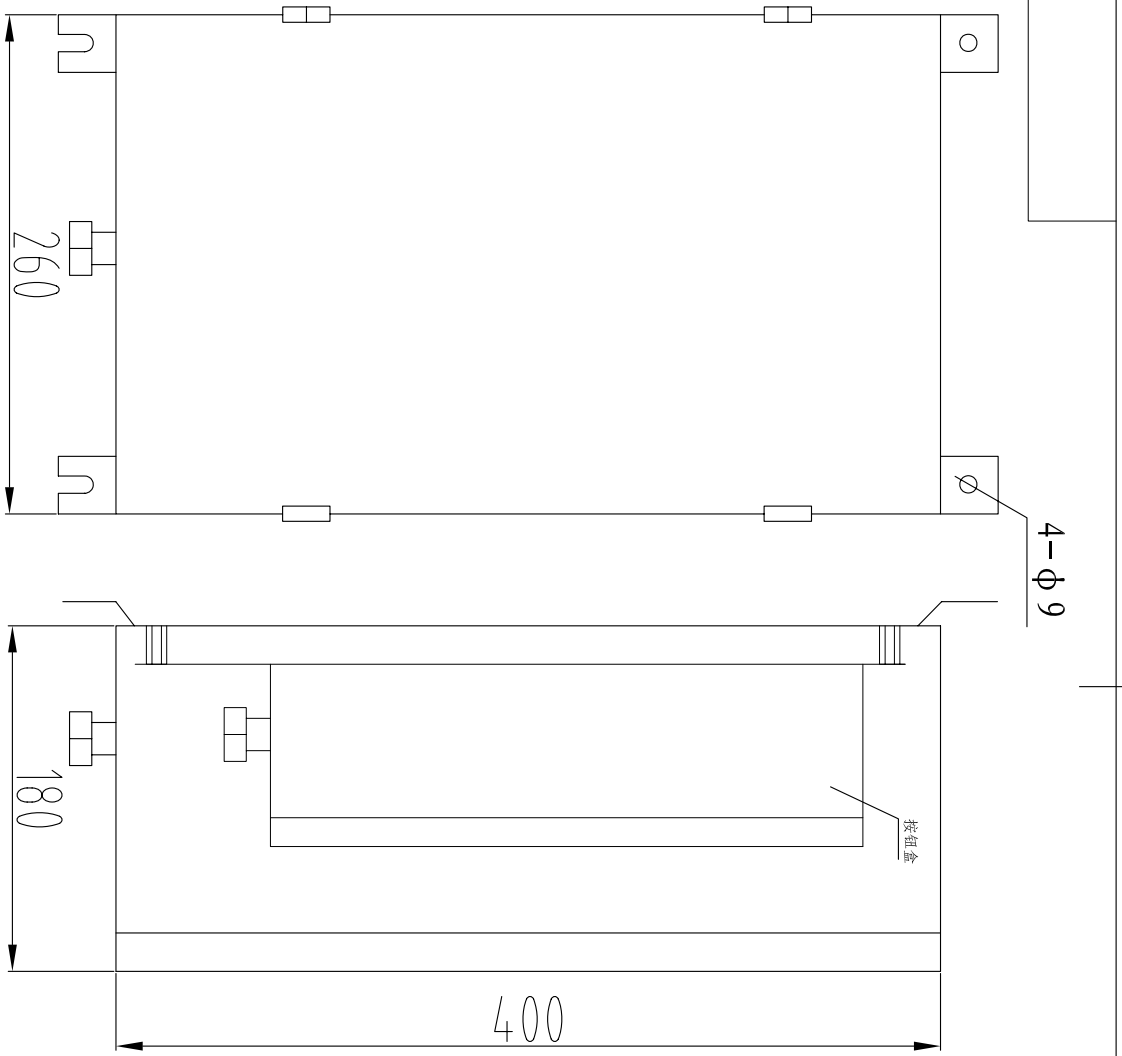
按钮盒2防护等级: IP56

note:

1. classification of NO. 2 button
protect box: IP56

绞车遥控按钮盒外形				南通坂田船舶机械有限公司	
图				Nantong Masada Ship Machinery Co., Ltd	
WINCH REMOTE CONTROL BOX					
OUTLINE					
标记	处数	更改文件号	签字	日期	
设计			标准化		
审核					
工艺					
日期					
图样标记			重量	比例	
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第 页					
					ZT-217

借通用件登记
描图
校描
旧底图总号
签字
日期



注:

1. 按钮盒防护箱防护等级: IP56
 2. 按钮盒防护箱材料为: 2MM不锈钢
 3. 数量: 2台
- note:
1. classification of button protect box: IP56
 2. material of button protect box: 2MM stainless steel
 3. quantity: 2pcs

绞车遥控按钮盒外形				南通坂田船舶机械有限公司			
图				Nantong Masada Ship Machinery Co.,Ltd			
WINCH REMOTE CONTROL BOX							
OUTLINE							
标记	处数	更改文件号	签字	日期	图样标记	重量	比例
设计		标准化					1:1
审核							
工艺					共	第	
					页	页	
							ZT-2/8

使
用
说
明
书

南通政田船舶机械有限公司

简介

本说明书包含政田部件、系统、操作说明、维护、故障排除、备件信息。

在订购备件时，请与我们客户服务部门联系，并告知政田产品系列号。.

需要了解更多信息请联系:

总公司:

南通政田船舶机械有限公司

地址 : 江苏省南通市港闸开发区黄海路 118 号

邮编 : 226005

电话 : 0513-85306822/85306826

传真 : 0513-85306811

邮箱 : nt@masada.cn

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章节 1. 液压组合锚机

1.1 概述

电动-液压型，两台液压组合锚机艙部左右对称布置。

每台 1 个锚链轮，2 个卷筒，1 个副卷筒。采用双轴结构，由一台低速大扭矩液压马达通过一级齿轮传动带动卷筒主轴，合上卷筒离合器即可带动卷筒工作；合上锚链轮离合器，通过二级齿轮传动，带动锚链轮轴及锚链轮工作。两者不可同时操作。采用手动离合器、手动刹车。

动力单元安装在主甲板下面，由 4 个油泵机组和 1 个油箱组成，动力单元设低液位、高油温、过滤器堵塞报警。并带恒张力系统。

艙部泵站有一个组合式的电器控制柜。

1.2 参数：

起锚部分：

锚链直径	$\Phi 73$	mm (AM3)
起锚负载	253	kN
过载拉力	379.5	kN
支持负载	1795.5	kN
起锚速度	≥ 9	m/min
抛锚深度	≤ 82.5	m

系泊部分：

卷筒工作负载	147	kN(第一层)
卷筒公称速度	15	m/min(第一层)
卷筒支持负载	416	kN
缆索直径	$\Phi 64$	mm (PP)
卷筒容绳量	220	m

动力部分：

液压马达	型号：	MRH2-3150-9-PPV
	排量：	3140ml/r
	压力：	24.5MPa
油 泵	型号：	A7V0160LRD
	排量：	160ml/r
	转速	1750rpm
电动机	型号：	Y280M-4-H
	功率：	90 kW
	转速：	1750rpm
	电压：	AC440V
	频率：	60HZ

1.3 操作说明

A) 启动动力单元

电源启动之前确保检查以下项目：

- 确认油泵的吸入口的阀门是否打开(如果需要)。
- 确认液压出口的截止阀处于打开状态。
- 检查油箱里油量是否达到液位计量程的 3/4 以上。
- 检查所有液压连接处是否连接好。
- 确认比例换向阀的操作手柄处于中立位置。
- 确认舷边操作手柄处于中立位置（如果有舷边遥控）。
- 按控制器上电机“启动”按钮来启动泵站。

B) 收锚

- 确认马达的快慢速切换阀的操作杆置在大容量位置。
- 确认卷筒的离合器是脱开的状态，其制动器是刹紧状态。
- 确认锚链轮的制动器是刹紧状态。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，同时将锚链轮用的离合器拨向合的状态，插上插销，一旦离合器完全合上，立即将比例换向阀的操作手柄拉回中立位置。
- 打开掣链器的闸刀。
- 打开锚链轮的制动器。
- 将比例换向阀的操作手柄推向“卷入”的方向。
- 收锚结束，将比例换向阀的操作手柄拉回中立位置。
- 合上掣链器的闸刀。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，使掣链器与锚链轮之间的锚链处于松弛状态。然后将比例换向阀的操作手柄拉回中立位置，并扣上安全扣。
- 刹紧锚链轮制动器。
- 脱开锚链轮离合器，插上插销。

警告！

1、收锚操作时当锚将要出水面时，要观察其位置并缓慢收起，防止碰撞船体。

C) 动力抛锚

- 确认马达的快慢速切换阀的操作杆置在大容量位置。
- 确认锚链轮的制动器是刹紧状态。

- 确认卷筒的离合器是脱开的状态，其制动器是刹紧状态。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，同时将锚链轮用的离合器拨向合的状态，一但离合器完全合上，立即将比例换向阀的操作手柄拉向中立位置。
- 打开掣链器的闸刀。
- 打开锚链轮的制动器。
- 将比例换向阀的操作手柄推向“卷出”的方向。
- 抛锚结束，将比例换向阀的操作手柄拉向中立位置。
- 合上掣链器的闸刀。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，让锚链处于松弛状态，将锚链轮的离合器脱开，插上插销，然后将比例换向阀的操作手柄拉向中立位置，并扣上安全扣。刹紧锚链轮制动器。

警告！

- 1、锚链和锚的支持负荷不能单独由链轮制动器承担，抛锚之后先合上止链器，再刹紧链轮制动器，并使掣链器与链轮之间的锚链处于松弛状态。
- 2、当锚链轮的离合器是合上时并且制动器是刹紧的状态，不能将比例换向阀的操作手柄拉向“卷入”的方向，那会破坏制动器和掣链器。

D) 无动力抛锚

- 打开掣链器的闸刀。
- 打开锚链轮的制动器。
- 抛锚结束，合上掣链器的闸刀。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，让锚链处于松弛状

态，将锚链轮的离合器脱开，插上插销，然后将比例换向阀的操作手柄拉向中立位置，并扣上安全扣。刹紧锚链轮制动器。

警告！

1、当抛锚链时，以每半节锚链重复进行制动器的刹紧—松开操作以限制锚的抛落速度。如果一次全部抛出，则制动器刹车带会产生异常的磨损和温升。制动器的失效将造成锚链的猛烈飞出，易于造成伤害。

E) 收放缆操作

- 确认锚链轮的离合器是脱开的状态。
- 确认锚链轮的制动器是刹紧的状态。
- 确认卷筒的制动器是刹紧的状态。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，同时将卷筒用的离合器拨向合的状态，一旦离合器完全合上，立即将比例换向阀的操作手柄拉回中立位置。
- 松开卷筒的制动器，将比例换向阀的操作手柄推向“卷出”或拉向“卷入”，实现卷筒的放缆或收缆。
- 放缆或收缆结束后，刹紧卷筒的制动器。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，将卷筒用的离合器脱开，插上插销，然后将比例换向阀的操作手柄拉回中立位置，并扣上安全扣。
- 两个卷筒不同时使用。

特别注意：恒张力状态时马达切换成大容量。

F) 副卷筒操作

- 确认锚链轮和卷筒的离合器是脱开的状态。
- 操作比例换向阀的手柄，就能使副卷筒卷动，一但操作手柄处于中立位置，副卷筒就停止卷动。
- 副卷筒和卷筒不同时使用。

G) 停机操作

- 确认所有制动器都是刹紧的状态。
- 确认所有离合器都是脱开的状态。
- 关闭电源。
- 检查设备是否有松动，液压系统部件损坏必须更正。
- 停机操作结束后，润滑裸露地方。

特别提示：

- 1、 新机运行 3 个月后，应更换液压油。
- 2、 操纵收缆、放缆到停止位置时，应缓慢过渡，不应急停以避免太大的液压冲击。
- 3、 本机每年应保养一次。特别注意：
- 4、 如果在起锚过程中突然断电，锚可以保持一段时间（至少一分钟），不会明显下落。此时，应该迅速刹紧刹车，合上掣链器，防止发生意外。

章节 2. 液压系泊绞车

2.1 概述

电动-液压型，两台系泊绞车艙部左右对称布置。

每台 2 个卷筒，1 个副卷筒，由一台低速大扭矩液压马达通过一对齿轮传动带动卷筒主轴，合上离合器即可带动卷筒工作。

采用手动离合器、手动刹车。

动力单元安装在主甲板下面，由 4 个油泵机组和 1 个油箱组成，动力单元设低液位、高油温、过滤器堵塞报警。并带恒张力系统。

艙部泵站有一个组合式的电器控制柜。

2.2 参数：

系泊部分：

卷筒工作负载	147	kN(第一层)
卷筒公称速度	15	m/min(第一层)
卷筒支持负载	416	kN
缆索直径	Φ64	mm (PP)
卷筒容绳量	220	m

动力部分：

液压马达	}	型号:	MRH2-3150-9-PPV
		排量:	3140ml/r
		压力:	24.5MPa
油 泵	}	型号:	A7V0160LRD
		排量:	160ml/r
		转速:	1750rpm

电动机	型号:	Y280S-4-H
	功率:	75 kW
	转速:	1750rpm
	电压:	AC440V
	频率:	60HZ

2.3 操作说明

A) 启动动力单元

电源启动之前确保检查以下项目：

- 确认油泵的吸入口的阀门是否打开(如果需要)。
- 确认液压出口的截止阀处于打开状态。
- 检查油箱里油量是否达到液位计量程的 3/4 以上。
- 检查所有液压连接处是否连接好。
- 确认比例换向阀的操作手柄处于中立位置。
- 确认舷边操作手柄处于中立位置（如果有舷边遥控）。
- 按控制器上电机“启动”按钮来启动泵站。

B) 收放缆操作

- 确认卷筒的制动器是刹紧的状态。
- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，同时将卷筒用的离合器拨向合的状态，一旦离合器完全合上，立即将比例换向阀的操作手柄拉回中立位置。
- 松开卷筒的制动器，将比例换向阀的操作手柄推向“卷出”或拉向“卷入”，实现卷筒的放缆或收缆。
- 放缆或收缆结束后，刹紧卷筒的制动器。

- 轻轻将比例换向阀的操作手柄推向“卷出”的方向，将卷筒用的离合器脱开，插上插销，然后将比例换向阀的操作手柄拉回中立位置，并扣上安全扣。
- 两个卷筒不同时使用。

C) 副卷筒操作

- 确认锚链轮和卷筒的离合器是脱开的状态。
- 操作比例换向阀的手柄，就能使副卷筒卷动，一旦操作手柄处于中立位置，副卷筒就停止卷动。
- 副卷筒和卷筒不同时使用。

D) 停机操作

- 确认所有制动器都是刹紧的状态。
- 确认所有离合器都是脱开的状态。
- 关闭电源。
- 检查设备是否有松动，液压系统部件损坏必须更正。
- 停机操作结束后，润滑裸露地方。

特别提示：

- 1、 新机运行 3 个月后，应更换液压油。
- 2、 操纵收缆、放缆到停止位置时，应缓慢过渡，不应急停以避免太大的液压冲击。
- 3、 本机每年应保养一次。

章节 3. 管理与维护

- 1、锚机和绞车是船舶重要设备之一。做好日常的维护管理，保证随时可用是非常重要的。机器的机械部分应在良好的润滑条件下工作。每次加油后应使机器空转片刻，使油脂均匀地涂布在运行表面上。
- 2、机器外露的不工作表面也要保持清洁，并涂上油漆以防锈蚀。
- 3、不要在机器周围堆放杂物，以免妨碍正常工作。
- 4、机器本体和固定螺栓，应经常检查其完整情况和紧固程度。
- 5、机器的刹车应定期检查，不允许油脂附着于制动表面，制动带铆钉与刹车轮毂摩擦时要及时更换刹车带。
- 6、对液压系统，要做日常检查，检查的内容主要有：油箱的油位和油温；接头、阀件、马达、油泵和密封部位的漏油情况；各部位的温度；压力表的指示情况是否正常。
- 7、过滤器要经常清洗，充注和更换液压油时，要注意清洁。清洁油箱后，从空气过滤器注入液压。特别注意液压油牌号，要符合说明书要求。
- 8、油温应适当。油箱的油温不能超过 60°C ，一般液压机械在 $35\sim 60^{\circ}\text{C}$ 范围内工作比较合适。从维护的角度看，也应绝对避免油温过高。若油温有异常的上升时，应进行检查，详见“液压常见故障及排除”。
- 9、在液压泵启动和停止时，应使溢流阀卸荷。
- 10、溢流阀的调定压力不得超过液压系统的最高压力。
- 11、应尽量保持电磁阀的电压稳定，否则可能会导致线圈过热。
- 12、易损零件，如密封圈等，应经常有备件，以便及时更换。

章节 4. 液压常见故障及排除

1、压力不正常的故障分析和排除方法

故障现象	故障分析	排除方法
没有压力	1、油泵吸不进油液	油箱加油、换过滤器等
	2、油液全部从溢流阀溢回油箱	调整溢流阀
	3、液压泵损坏	更换或修理
压力不稳定	1、油液中有空气	排气、堵漏、加油
	2、溢流阀内部磨损	修理或更换
	3、泵、马达磨损	修理或更换
	4、油液被污染	冲洗、换油
压力偏低	1、减压阀或溢流阀设定值过低	重新调整
	2、减压阀或溢流阀损坏	修理或更换
	3、油箱液面低	加油至标定高度
	4、泵转速过低	检查原动机及控制
	5、马达损坏，内泄大	修理或更换
压力过高	1、溢流阀或减压阀失调	重新设定调整
	2、溢流阀、减压阀损坏或堵塞	更换、修理或清洗

2、噪声过大的故障分析和排除方法

故障现象	故障分析		排除方法
泵噪声大	1、 泵 内 有 气 穴	油液温度太低或粘度太高	加热油液或更换
		吸入管太长、太细、弯头太多	更改管道设计
		进油过滤器太小或堵塞	更换或清洗
		泵离液面太高	更改泵安装位置
		辅助泵故障	修理或更换
		泵转速太快	减小到合理转速
	2、 油 液 有 空 气	油液选用不合适	更换油液
		油箱中回油管在液面上	管伸到液面下
		油箱液面太低	油加至规定范围
		进油管接头进入空气	更换或紧固接头
		泵轴油封损坏	更换油封
		系统排气不好	重新排气
3、	泵磨损或损坏	更换或修理	
4、	泵与原动机同轴度低	重新调整	
马达噪声大	1、	管接头密封件不良	换密封件
	2、	马达磨损或损坏	更换或修理
	3、	马达与工作机同轴度低	重新调整
溢流阀尖叫声	1、	压力调整过低或与其他阀太近	换密封件
	2、	锥阀、阀座磨损	重新调节、组装或更换
管道噪声大	油流剧烈运动		加粗管道、少用弯头、采用胶管、采用蓄能器等

3、振动过大的故障分析和排除方法

故障现象	故障分析	排除方法
泵振动	1、联轴器不平衡大	更换
	2、泵与原动机同轴度低	调整
	3、泵安装不正确	重新安装
	4、系统内有空气	排除空气
管道振动	1、管道长、固定不良	增加管夹，加防振垫并安装压板
	2、溢流阀、卸荷阀、单向阀、平衡阀、方向阀等工作不良	对回路进行检查在管道的某一部分装入节流阀
油箱振动	没有防振措施	在油箱脚下、泵的底座下增加防振垫

4、油温过高的故障分析和排除方法

故障现象	故障分析	排除方法
油温过高	1、系统压力太高	尽量调低至合适的压力
	2、油液粘度不对	更换合适粘度的油液
	3、油液脏或供油不足	清洗或更换滤油器；加油至规定油位
	4、油液冷却不足	清洗、修理或更换冷却器
	5、泵、马达、阀件磨损	更换或修理
	6、油液阻力大	装适合尺寸的管道和阀
	7、附近有热源影响，辐射热大	通风、冷却、采用隔热板

使用说明书

泵过热	1、油液温度过高	见“油温过高故障排除”
	2、由气穴现象	见“噪声过大故障排除”
	3、油液中有空气	见“噪声过大故障排除”
	4、溢流阀或卸荷阀压力调的太高	调整至合适压力
	5、油液粘度过低或过高	选择合适粘度的液压油
	6、过载	检查支承与密封状况，检查超出设计要求的载荷
	7、泵磨损或损坏	修理或更换
马达过热	1、油液温度过高	见“油温过高故障排除”
	2、溢流阀、卸荷阀压力调的太高	调至正确压力
	3、过载	检查支承与密封状况，检查超出设计要求的载荷
	4、马达磨损或损坏	修理或更换
溢流阀温度 过高	1、油液温度过高	见“油温过高故障排除”
	2、阀调整错误	调至正确压力
	3、阀磨损或损坏	修理或更换

Instruction

NANTONG MASADA SHIP MACHINERY CO., LTD

Introduction

This instruction is consisted of component, system, operation instruction, maintenance, troubleshooting and spare parts information.

Please contact with our Service Department when you order the spare parts with the serials number of our products.

Please contact the following if you want to know more:

Company Information:

NANTONG MASADA SHIP MACHINERY CO., LTD

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Nantong, Jiangsu

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Chapter 1 Hydraulic Combined Windlass

1.1 General

Two (2) combined windlasses of electro-hydraulic type should be located on forecastle deck.

Each combined windlass composed of one (1) gypsy wheel, two (2) drums and one (1) warping drum serving both port and starboard side. With double shaft construction, drum main shaft to be driven via hydraulic motor of low speed and large torque through the first stage gear, and to drive the drum working by closed the drum clutch. Close the gypsy wheel clutch, and through the second stage gear to control the gypsy wheel shaft and gypsy wheel. Hawser drum and gypsy wheel can not be operated simultaneously. To be provided manual clutch and manual brake.

Power unit composed of four (4) oil pump units and one (1) oil tank is fitted under the main deck. Driving unit with auto-tension system is fitted with alarms for low level、high oil temperature and filter blocked.

There is a combined electric control cabinet in fore pump unit.

1.2 Particulars

Parts of Anchor:

Dia. of Anchor Chain:	φ73 mm (AM3)
Working Load:	253kN
Overload Pulling:	379.5kN
Support Load:	1795.5kN
Anchor Heaving Up Speed:	≥ 9 m/min
Anchor Dropping Depth:	≤ 82.5m

Mooring Parts:

Working Load of Drum:	147 kN(on the fist layer)
Nominal Speed of Drum:	15 m/min(on the first layer)
Support Load of Drum:	416 kN
Dia. of Wire Rope:	φ64 mm(PP)
Capacity of Drum:	220m

Power Unit Parts:

Hydraulic Motor:	Model:	MRH2-3150-9-PPV
	Output:	3140ml/r
	Pressure:	24.5MPa
Oil Pump:	Model:	A7V0160LRD
	Output:	160ml/r
	RPM:	1750rpm
Electric Motor:	Model:	Y280M-4-H
	Power:	90kW
	RPM:	1750rpm
	Voltage:	AC440V
	Frequency:	60HZ

1.3 Operation Instruction

A) Start the Power Unit

Please check the following items before start the power:

- If necessary, please check the valve of oil pump suction inlet.
- Check the opening condition of stop valve of hydraulic outlet.
- Check if the oil tank capacity above the 3/4 of liquid indicator.
- Check all hydraulic connections.
- Make sure the handle of marine valve on the Neutral position.
- Make sure the side control handle on Neutral position (if there is side remote control).
- Push the “start” button on the E-motor of controller to start pump station.

B) Anchor Heaving Up

- Make sure the operation handle of motor changeover valve placed on the large capacity position.
- Make sure the clutch of drum is in the release condition and the brake is in engaged state.
- Make sure the brake of cable lifter is in engaged state.
- Slightly make the operation handle of the marine valve to the direction of “out” and make the clutch of cable lifter to the engaged condition, plug the bolt. If the clutch engaged completely, to make the operation handle of marine valve to the Neutral position immediately.
- Release the brake of chain stopper.
- Release the brake of cable lifter.
- Make the operation handle of the marine valve to the direction of “in”.
- After Anchor Heaving Up finished, make the operation handle of marine valve to the Neutral position.
- Engage the clutch of Chain stopper.
- Slightly push the operation handle of the marine valve to the direction of “out”, and to make the chain between chain stopper and cable lifter to keep a state of loosen. Then make the operation handle of marine valve to the Neutral position and fasten the safety interlocks.
- Engage tightly the brake of cable lifter.
- Release the clutch of the cable lifter and plug the bolt.

Notice!

1. During the operation of anchor heaving up with the anchor near seawater surface, to observe its position and heave up slowly in case of the collision of the hull body.

C) Dropping anchor by power

- Make sure the operation handle of motor changeover valve placed on the large capacity position.
- Make sure the brake of cable lifter is in engaged state.
- Make sure the clutch of drum is in the release condition and the brake is in engaged state.
- Slightly make the operation handle of the marine valve to the direction of

“out” and make the clutch of cable lifter to the engaged condition. If the clutch engaged completely, to make the operation handle of marine valve to the Neutral position immediately.

- Release the brake of chain stopper.
- Release the brake of cable lifter.
- Make the operation handle of the marine valve to the direction of “out”.
- After dropping anchor finished, make the operation handle of marine valve to the Neutral position.
- Engage the brake of Chain stopper.
- Slightly push the operation handle of the marine valve to the direction of “out”, and to make the chain to keep a state of loosen and release the clutch of cable lifter. Then make the operation handle of marine valve to the Neutral position and fasten the safety interlocks. Engage tightly the brake of cable lifter.

Notice!

1. The cable lifter brake can't independently bear the support load of chain and anchor. Engage the chain stopper firstly after dropping the anchor, then tight the brake of cable lifter, with the chain between the brake and cable lifter in the condition of loosen.

2. It can't make the operation handle of marine valve in the “IN” direction with the brake of cable lifter engaged and the brake tighten. If so , it will break the brake and chain stopper.

D) Dropping anchor without power

- Release the brake of chain stopper.
- Release the brake of cable lifter.
- After dropping anchor finished, engage the brake of Chain stopper.
- Slightly push the operation handle of the marine valve to the direction of “out”, and to make the chain to keep a state of loosen and release the clutch of cable lifter, plug the bolt. Then make the operation handle of marine valve to the Neutral position and fasten the safety interlocks. Engage tightly the brake of cable lifter.

Notice!

1. When dropping the chain, to repeatedly engage and release the brake with each half knot chain to limit the dropping speed. If dropping the whole at one time, the brake will be damaged and with high temperature. The chain will fly off caused by the failure of the brake and lead to a great loss.

E) The Operation of hauling up/ dropping rope

- Make sure the clutch of cable lifter is in the disengaged condition.
- Make sure the brake of cable lifter is in the engaged condition.
- Make sure the brake of drum is in the engaged condition.
- Slightly push the operation handle of the marine valve to the direction of “out”, and to make the clutch of drum engaged. Once the clutch totally

engaged, the operation handle of marine valve be to Neutral position.

- Release the brake of drum and make the operation handle of marine valve to the “out” or “in” direction to drop or haul up rope.
- After finishing dropping or hauling up rope, engage tightly the brake of drum.
- Slightly push the operation handle of the marine valve to the direction of “out”, and release the clutch of drum and plug the bolt. Then make the operation handle of marine valve to the Neutral position and fasten the safety interlocks.
- Two drums can not operate simultaneously.

F) The Operation of Warping Drum

- Make sure the clutch of cable lifter and drum is in the disengaged condition.
- Warping drum will be worked by operating marine valve handle. Once the operation handle in the Neutral position, the warping drum will stop to work.
- Warping drum and drum can not operate simultaneously.

G) Stop Operation

- Make sure all brakes are in engaged condition.
- Make sure all clutches are in released condition.
- Turn off the power.
- To check whether the equipments are loosened and hydraulic parts damaged. If so, it must be modified.
- After stop operation, lubricated the surface in the open air.

Special Notice:

1. The hydraulic oil of new machine shall be changed after running 3 months.
2. It should be slowly to operate hauling up and dropping rope in stop position to avoid extra-high hydraulic pressure impact.
3. A yearly maintenance is required.

Chapter 2 Hydraulic Mooring Winch

2.1 General

Two (2) mooring winches of electro-hydraulic type should be located on aft deck. Each mooring winch composed of two (2) drums and one (1) warping drum serving both port and starboard side. Drum main shaft to be driven via hydraulic motor of low speed and large torque through a pair gear, and to drive the drum working by closed the drum clutch.

To be provided manual clutch and manual brake.

Power unit composed of four (4) oil pump units and one (1) oil tank is fitted under the main deck. Driving unit with auto-tension system is fitted with alarms for low level, high oil temperature and filter blocked.

There is a combined electric control cabinet in aft pump unit.

2.2 Particulars

Mooring Parts:

Working Load of Drum:	147 kN (on the fist layer)
Nominal Speed of Drum:	15 m/min (on the first layer)
Support Load of Drum:	416 kN
Dia. of Wire Rope:	φ64 mm (PP)
Capacity of Drum:	220m

Power Parts:

Hydraulic Motor:	Model:	MRH2-3150-9-PPV
	Output:	3140ml/r
	Pressure:	24.5MPa
Oil Pump:	Model:	A7V0160LRD
	Output:	160ml/r
	RPM:	1750rpm
Electric Motor:	Model:	Y280S-4-H
	Power:	75kW
	RPM:	1750rpm
	Voltage:	AC440V
	Frequency:	60HZ

2.3 Operation Instruction

A) Start the Power Unit

Please check the following items before start the power:

- If necessary, please check the valve of oil pump suction inlet.
- Check the opening condition of stop valve of hydraulic outlet.
- Check if the oil tank capacity above the 3/4 of liquid indicator.
- Check all hydraulic connections.
- Make sure the handle of marine valve on the Neutral position.
- Make sure the side control handle on Neutral position (if there is side remote control).
- Push the “start” button on the E-motor of controller to start pump station.

B) The Operation of hauling up/ dropping rope

- Make sure the brake of drum is in the engaged condition.
- Slightly push the operation handle of the marine valve to the direction of “out”, and to make the clutch of drum engaged. Once the clutch totally engaged, the operation handle of marine valve be to Neutral position.
- Release the brake of drum and make the operation handle of marine valve to the “out” or “in” direction to drop or haul up rope.
- After finishing dropping or hauling up rope, engage tightly the brake of drum.
- Slightly push the operation handle of the marine valve to the direction of “out”, and release the clutch of drum and plug the bolt. Then make the operation handle of marine valve to the Neutral position and fasten the safety interlocks.
- Two drums can not operate simultaneously.

C) The Operation of Warping Drum

- Make sure the clutch of cable lifter and drum is in the disengaged condition.
- Warping drum will be worked by operating marine valve handle. Once the operation handle in the Neutral position, the warping drum will stop to work.
- Warping drum and drum can not operate simultaneously.

D) Stop Operation

- Make sure all brakes are in engaged condition.
- Make sure all clutches are in released condition.
- Turn off the power.
- To check whether the equipments are loosened and hydraulic parts damaged. If so, it must be modified.
- After stop operation, lubricated the surface in the open air.

Special Notice:

1. The hydraulic oil of new machine shall be changed after running 3 months.
2. It should be slowly to operate hauling up and dropping rope in stop position to avoid extra-high hydraulic pressure impact.
3. A yearly maintenance is required.

Chapter3 Management and Maintenance

1. The combined windlasses and the mooring winches are the essential equipment on the ship. It is important to make a regular maintenance for ensuring the availability to operate at any time. The mechanical parts of machines shall be properly and well lubricated. The machine shall be run without load for a while after filling to make the grease on the moving surface uniformly.
2. The exposed no-working surface of machines shall be cleaned regularly and painted for anti-rust.
3. No material around the machines so as to avoid obstructing the normal operation.
4. It should be checked the completeness and fastening of the machine body and fixed bolts regularly.
5. The brake shall be regularly inspected. The braking surface shall be free of grease. In case the rivet on brake belt scrubs against the brake ring, the brake belt shall be replaced immediately.
6. A regular inspection for hydraulic system shall be done as followings:
The oil level and temperature for the oil tank, the leakage for joint, valve, motor, oil pump and sealing parts, the temperature of all parts, and the pressure gauge indication.
7. The filter shall be cleaned regularly. When filling or replacing the hydraulic oil, the oil shall be clean. The hydraulic oil shall be filled to the cleaned oil tank through air filter. Particular attention shall be paid to the brand of hydraulic oil in accordance with the requirements of instruction.
8. The suitable oil temperature in oil tank is no more than 60°C. Commonly the temperature of hydraulic machines is about 35~36°C. From the view of maintenance, it is necessary to avoid the high oil temperature. Check it when the temperature of oil is high according to “*General troubles and troubleshooting for Hydraulic System*”.
9. The relief valve should be without load while the hydraulic pumps started and stopped.
10. The pressure of relief valve is not more than the highest pressure of hydraulic system.
11. Keep the voltage of electric valve stable, otherwise lead to the winding too hot.
12. Easily damaged parts, such as seal rings, should have the spare parts for replacing in time.

Chapter4 *General troubles and troubleshooting for Hydraulic System*

1. *Troubles and troubleshooting for abnormal pressure*

Troubles	Analysis	Troubleshooting
Without pressure	Oil pump can't absorb oil	Add oil or change filter
	Oil returned to oil tank from relief valve	Adjust relief valve
	Oil pump damaged	Change or repair
Unstable pressure	Air in oil	Exhaust, fill in or add oil
	Relief valve damaged inside	Change or repair
	Pump or motor wearing	Change or repair
	Oil polluted	Wash or change the oil
Pressure too low	Setting value of reducing valve or relief valve too low	Readjust
	Reducing valve or relief valve damaged	Change or repair
	Oil level too low	Add oil to standard level
	RPM of pump too low	Check prime move and controlling
	Motor damaged	Change and repair
Pressure too high	Reducing valve or relief valve lose control	Set and Readjust
	Reducing valve or relief valve damaged or blocked	Change, repair and wash

2. Troubles and troubleshooting for high noise

<i>Troubles</i>	<i>Analysis</i>		<i>Troubleshooting</i>
Pump with high noises	Air pocket In pump	Oil temperature too low or viscosity too high	Heat oil or change
		Absorbed pipe too long, too thin or with too many bends	Change the design of the pipe
		Oil filter too small or blocked	Change or clean
		Pump high away from the oil level	Change position of pump
		Auxiliary Pump damaged	Repair or change
		RPM too fast	Reduce to reasonable RPM
	Air pocket In Oil	Use unfitted oil	Change oil
		Returning oil pipe above the oil level	Pipe under oil level
		Oil level too low	Oil added to the fixed level
		Air into the oil inlet joints	Change or fasten joints
		Oil seal of pump shaft damaged	Change oil seal
		Exhaust system works bad	Exhaust again
		Pump wearing or damaged	Change or repair
	Axiality of pump and prime move low	Readjust	
Motor with high noises	Sealing parts of pipe joints bad	Change sealing	
	Motor wearing or damaged	Change or repair	
	Axiality of motor and working machine low	Readjust	
Relief valve with abnormal noise	Pressure adjustment too low or too close to other valves	Change sealings	
	Cone valve or valve seat wearing	Readjust, assembly or change	
Pipe with high noises	Oil flowed acutely	Widen pipe without bends, use rubber tube or accumulator	

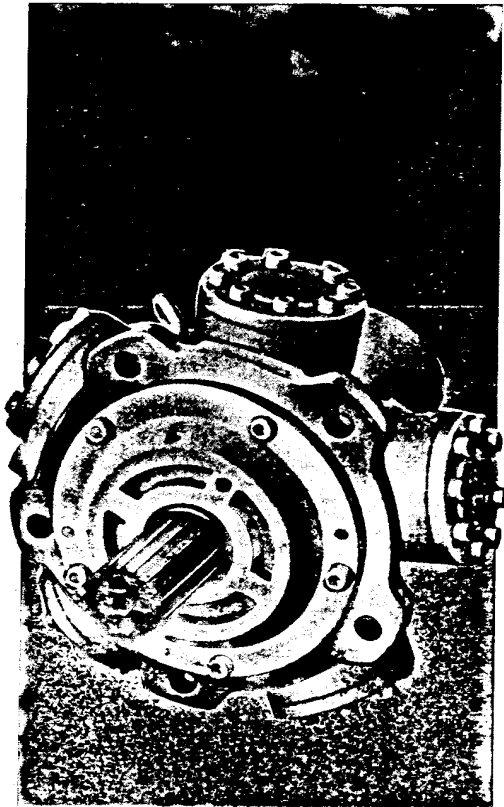
3. Troubles and troubleshooting for large Vibration

<i>Troubles</i>	<i>Analysis</i>	<i>Troubleshooting</i>
Pump Vibration	Couplings without balance	Change
	Axiality of pump and prime move low	Adjustment
	Pump installation wrong	Assembly again
	Air into system	Exhaust air
Pipe Vibration	Pipe too long, fixed not well	Increase pipe clamp, anti-vibration pad and pressure plate
	Relief valve, unloading valve, check valve, balance valve and direction valve work badly	Check the return circuit, and install the choke valve in some part of pipe
Oil tank Vibration	Without anti-vibration	Add anti-vibration pad under oil tank and pump seat

4. *Troubles and troubleshooting for high oil temperature*

<i>Troubles</i>	<i>Analysis</i>	<i>Troubleshooting</i>
Oil temperature too high	System pressure too high	Adjust to proper pressure
	Oil viscosity wrong	Change to proper oil
	Oil dirty or oil insufficient	Clean or change filter, add oil to proper oil level
	Oil cooling insufficient	Clean, repair or change cooler
	Pump, motor, valve wearing	change or repair
	Oil with large resistance	Change pipe and valve with proper size
	heat source influence, with large radiant heat	Use ventilation, cooling and heat shield
Pump too hot	Oil temperature too high	Refer to <i>Troubleshooting for High Oil Temperature</i>
	Oil with air pocket	Refer to <i>Troubleshooting for High Noise</i>
	Air into oil	Refer to <i>Troubleshooting for High Noise</i>
	Relief valve or unloading valve with high pressure	Adjust to the proper pressure
	Oil viscosity too low or too high	Choose proper viscosity
	Overload	Check support and sealing, and check the load over the design
	Motor wearing or damaged	Repair or change
Motor too hot	Oil temperature too high	Refer to <i>Troubleshooting for High Oil Temperature</i>
	Relief valve or unloading valve with high pressure	Adjust to proper pressure
	Overload	Check support and sealing, and check the load over the design
	Motor wearing or damaged	Repair or change
Relief valve too hot	Oil temperature too high	Refer to <i>Troubleshooting for High Oil Temperature</i>
	Wrong adjustment of valve	Adjust to proper pressure
	Valve wearing or damaged	Repair or change

GZ-115-R8 : Δ '87.6.19



**Low Speed-High Torque
HYDRAULIC
MOTORS**

**INSTRUCTION
MANUAL**



KAYABA INDUSTRY CO., LTD.

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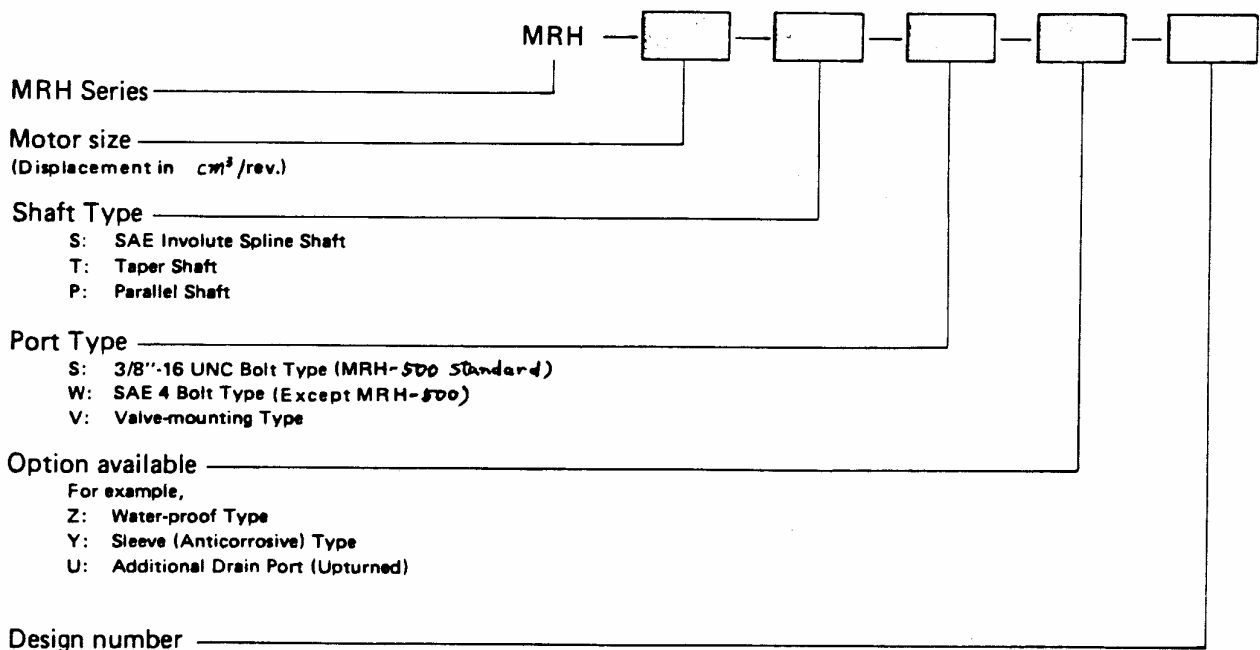
1. FEATURES

- Capable of continuous running with a pressure of 250 kgf/cm².
- Stable performance ensured even in low speed. Continuous running free from stick slips is permitted at a speed of as low as 3 PRM.
- A higher output horse power and a reduced weight per output horse power are available as compared with the MR Series.
- Excellent in cost effectiveness and durability due to long service life and continuous high performance.
- Reduced number of parts employed and simple construction design result in good serviceability.

2. SPECIFICATIONS

Item	Model	MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Number of Pistons		5	5	5	5	5	5	7
Piston diameter	mm	42	65	65	80	90	100	100
Stroke	mm	30	30	45	61	69	80	80
Displacement	cc/rev	208	498	745	1530	2195	3140	4398
Maximum speed	RPM	600	500	400	300	220	175	125
Maximum pressure	kgf/cm ²	250	250	250	250	250	250	250
Maximum torque	kgf-m	74	180	275	570	820	1170	1610
Maximum output horse power	P.S.	42	85	120	190	200	230	225
Maximum outer diameter	mm	311	363	448	554	617	683	692
Weight	kg	37	78	115	165	225	280	372
Drain port size (O-ring seal type)		1/2"-20 UNF		3/4"-16 UNF				

3. MODEL DESIGNATION



4. CONSTRUCTION AND PRINCIPLES OF OPERATION

Fig. 4-1 shows the sectional view of the single-capacity type of HYDROSTAR[®], and the sectional view of the piston assembly and shaft part.

The body ① consists of 5 to 7 cylinders ② arranged in radial direction and oil-passage is provided within the body and the flange for fixing the motor. A rotary valve ③ is provided in the body in one-body type and in the valve-casing in the case of separate type.

The valve is supported by the valve bearing ④, ⑤.

By mounting the shaft casing ⑥, the ring nut (except for MRH-200) and the piston cap ⑦ on the body the inside of the body becomes a tightly closed oil chamber.

The crank shaft ⑧ is supported by the bearings ⑨, ⑩, and one end of the shaft is connected to the rotary valve through Oldham's coupling ⑪.

The valve is always lead to 5 to 7 pistons, and nearly half of them (2 or 3 pistons in the case of 5 pistons; 3 or 4 pistons in the case of 7 pistons) are connected to the high pressure side (inlet side), while the other half of them are connected to the low pressure side (outlet side), thus the pressurized oil supplied to the motor acts on the upper surface of the piston of side and gives the linear motion power to the piston.

The linear motion power given to the piston is transferred to the connecting rod and shaft-eccentric part, and by giving the rotary power to the eccentric part (cam), the shaft is made to rotate.

In accordance with the rotation of the shaft, the rotary valve rotates, through the Oldham's coupling. The valve keeps supplying the pressurized oil in good timing towards each piston chamber, and it makes the continuous rotation of the motor possible.

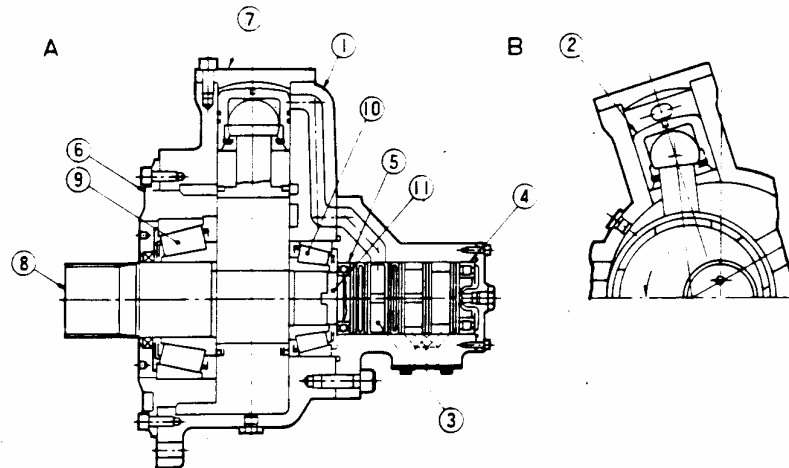


Fig. 4-1

5. GENERAL OPERATING INSTRUCTION

5-1. Inspections

Check the following before operating a new motor:

- 1) Any part of the motor has not been damaged during transportation and there are any parts missing.
- 2) Make sure all connections are tight.
- 3) Any dirt particles has not entered in from the main port, drain port, etc.

5-2. Direction of Rotation

The relation between the outlet flow and the direction of shaft rotation is as shown in Fig. 5-1 and Table 5-1. "R" and "L" marks embossed on the side of the valve casing indicate the direction.

Table 5-1

Flow inlet	Flow outlet	Direction of rotation as seen from the shaft
R port	L port	Right
L port	R port	Left

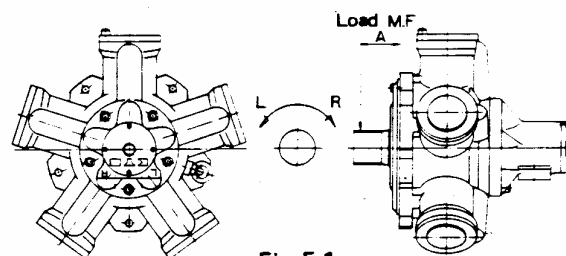


Fig. 5-1

Note. Only for MRH-500, ports are left side right.

5-3. Radial Load

A radial load is effected on the motor shaft when the motor is driven by pinion, sprocket etc.

Table 5-2 shows maximum allowable radial loads as the load center is at the position from A (Fig. 5-1) the motor mounting surface.

In case load is applied in other positions or load applied exceeds the maximum allowable radial load, please consult us for necessary measures to be taken.

Table 5-2

Item \ Model	MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Position of Load center A (mm) (from the motor mounting surface)	66.0	102.8	105.3	104.3	103.9	91.9	101.6
Maximum allowable radial load (kgf)	1800	3000	3500	5000	6000	8000	8000

5-4. Hydraulic Fluids

Hydraulic fluids must be carefully selected in consideration of the important role it plays in transmitting power and lubricating each part of equipment in hydraulic circuits.

5-4-1. Fluid Compatibility

Hydraulic fluid to be used must be excellent in wear resistance, anti-foam, anticorrosiveness and oxidation stability. Furthermore, it must be one with a minimum viscosity of 20 cst or more under maximum working temperature (35–70 cst for high-horse power continuous operation) among fluid products of various viscosity ranges. Please consult us if a fluid with a viscosity of over 500 cst is to be used at low temperature.

5-4-2. Fire Resistance Fluid

1) Phosphate Ester

Its properties, etc., are more or less the same as those of mineral oil. Consult us before its use, because special seal (fluoro-elastomer) is required.

2) Water-glycol (including W/O emulsion)

Consult us before its use because of limited applications in terms of lubrication.

5-4-3. Others

1) Consult us for use of fluid under a temperature of lower than -15°C or higher than $+80^{\circ}\text{C}$.

2) Keep maximum working temperature lower than 60°C during continuous operation of the motor and maintain the fluid viscosity at recommended level by providing cooling and heating facilities.

5-5. Filter

Care must be taken to prevent contaminants from being entrained in the fluid reservoir and also to provide the circuit with a filter of $20\mu\text{m}$ or finer.

Contamination control of fluid: NAS Class 9 to 11 is strongly recommended.

5-6. Back Pressure

Under an appropriate back pressure, the motor can be used both for open and closed circuits. Required minimum back pressure under a working condition when the motor is normally operated is obtained from the following formula:

$$\text{Internal Case Pressure} + 1 \text{ kgf/cm}^2$$

When the motor is used for the application in which it is made to be as a pump or when the load overruns the motor, or working conditions are such that back pressure is caused by series circuits, meter-out circuits, etc., please consult us.

5-7. Installation

While the motor can be installed in any direction, instructions given in paragraph 5-7-3 must be followed for applications with the shaft vertically upwards.

5-7-1. Mounting

The motor can be mounted directly on a foot mount bracket or on a machine frame, shaft, etc. For mounting pilot diameter and bolt sizes applicable, refer to Table 5-3. Under working conditions involving high shock load or frequent load snatch, pilot clearance must be 0.07 or less to prevent the motor from being moved by reaction force of torque.

Table 5-3

Item \ Model	MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Pilot diameter and its tolerance (mm)	ϕ 204 +0.072 0	ϕ 224 +0.122 +0.050	ϕ 225.5 +0.047 -0.025	ϕ 301.6 +0.111 +0.030	ϕ 381 +0.100 +0.011	ϕ 381 +0.100 +0.011	ϕ 457.2 +0.114 +0.017
Bolt size	M12	M18	M16	M18	M18	M18	M18
Bolt strength	JISB-1051 (ISOR 898/1) Strength classification 10.9 100 kgf/mm ² (981 N/mm ²) or 12.9 120 kgf/mm ² (1177 N/mm ²)						

5-7-2. Coupling Boss

- i) Coupling boss must be made of S45C (JIS 4051) equivalent or better material and with a Brinell hardness of more than 277.
- ii) Coupling inner diameter and its tolerance
S Type Shaft: SAE J 498b flat route side fit equivalent
T Type Shaft: 1/10 Taper; 8T (± 0.0002 equivalent, JIS-B-0612)
P Type Shaft: H6 or J6 (JIS-B-0401)
- iii) Key way dimensions of T Type Shaft and P Type Shaft
T Type Shaft: JIS-B-1301-1959 Type 2
P Type Shaft: JIS-B-1301-1959 Type 1
- iv) Handle the coupling without giving it strong impact in mounting or dismounting it to or from the shaft.
- v) Alignment of the shaft and the coupling when the motor is connected to a driven shaft must be within 0.05 mm FIR.
- vi) For tightening torque recommended for taper shaft, refer to Table 5-4.

Table 5-4

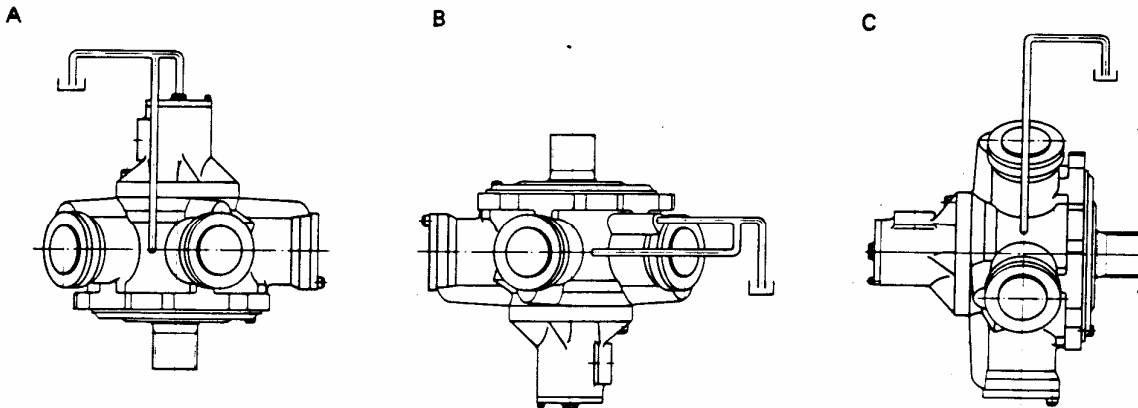
Item \ Model	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Screw size	1 1/4"-7UNC	1 1/2"-6UNC	1 1/2"-6UNC	1 3/4"-5UNC	1 3/4"-5UNC	2"-4 1/2UNC
Tightening torque (kgf-m)	28	48	48	77	77	114

5-7-3. Piping

All materials used for piping must be clean.

Remove scales and dirt particles, if any, attached to materials and hoses during work and wash them carefully before assembling. Keep the covers and plugs of the joints mounted as they are until the time of assembling.

- i) In selecting main pipings, see that flow speed inside the pipe be normally 5m/s or less from the viewpoint of motor running efficiency. High flow speed would cause lowered system efficiency and excessive heat generation.
- ii) As component parts in the motor are all lubricated by hydraulic fluid, use hydraulic fluid which is to be used in actual operation for washing before running and then fill the case with the same hydraulic fluid. For required fluid volume refer to Table 5-5.
- iii) Let the drain piping return directly to the reservoir. Typical examples of drain piping are shown in Fig. 5-2. Drain pressure in the casing must be maintained within 1 kgf/cm².
- iv) When the reservoir is located higher than the motor, the height of fluid level must be kept within 5 m.
- v) Typical examples of drain piping are shown below.



In the case of (A), piping must be made from the valve end in addition to standard drain port.

In the case of (B), piping must be made from the front side in addition to standard drain port.

In the case of (C), standard piping will do.

- vi) Take care not to give any abnormal force on the motor resulting from improper piping.
- vii) Avoid welding or cutting pipes near the motor.

Table 5-5

Model	MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Item							
Fluid volume (cm ³)	700	1000	2000	3000	5000	7000	8000

5-8. Checking Before and After Start Up

5-8-1. Checking Before Start Up.

- i) Is the mounting bracket rigid enough?
- ii) Are the bolts for mounting bracket, piping joints, etc., tightened properly?
- iii) Is drain piping higher than the upper drain port of the motor and returned to the reservoir?
- iv) Is the motor free from abnormal force by improper pipings?
- v) Are pipings all appropriate?
- vi) Is the alignment between the motor shaft and the driven shaft within specified value?

5-8-2. Checking During Operation

- i) Aren't there any oil leakage?
- ii) Is the direction of rotation correct?
- iii) Aren't there any large discrepancies in pressure and number of revolution from the planned values?
- iv) Is the sound normal?
- v) Hasn't there been any abnormal heat generated in the system and the motor?
- vi) Is the case drain leakage appropriate? (Table 5-6)
- vii) Has air been fully purged off? (Incomplete deaeration would cause malfunction and damage.)

Table 5-6

Model		MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150	MRH-4400
Item								
Press.	140kgf/cm ²	800cm ³ /min or less	1000cm ³ /min or less		1500cm ³ /min or less			2000cm ³ /min or less
	250kgf/cm ²	1400cm ³ /min or less	1800cm ³ /min or less		2700cm ³ /min or less			3600cm ³ /min or less



6. TROUBLESHOOTING

6-1. General

Proper selection of hydraulic circuits and equipment for the prospective working conditions, will ensure stable operation for a long time to the user's satisfaction. In case of unsatisfactory operation, however, take necessary measures after full investigation into whether the cause of trouble lies in the motor or other equipment.

The following are major causes of trouble anticipated and the corresponding countermeasures.

6-2. Causes of Trouble and Countermeasures

6-2-1. Motor Fails to Rotate.

Causes	Countermeasures
i) Overload	i) Lower the load.
ii) Pressure insufficient	ii) Check and correct set pressure of the pump relief valve and other circuit elements and ensure appropriate pressure setting.
iii) Viscosity of oil too low.	iii) Check oil temperature and brand, and either lower the temperature or replace the oil with higher viscosity one
iv) Oldham's coupling damaged.	iv) Replace it with a new one.
v) Seisure of moving part	v) Check the seized part and replace it with a new one or repair it.

6-2-2. Number of Revolutions is Different from Planned Value.

Causes	Countermeasures
i) Insuficient of Inflow	i) Check pump output, leakage from the valve, etc.
ii) Excessive leakage.	
a) High fluid temp. (thin oil viscosity)	a) Operate at an appropriate viscosity (35-37 cst).
b) Rotary valve and piston ring worn out or damaged.	b) Replace or repair the worn-out or damaged parts.

6-2-3. Rotation is Reverse Direction.

Causes	Countermeasures
i) Piping in reverse.	i) Make appropriate piping.
ii) Crank shaft and rotary valve out of phase.	ii) Disassemble and assemble them properly.

6-2-4. Oil Leaks

Causes	Countermeasures
i) Oil leaks from oil seal	
a) Lip damaged	a) Replace the oil seal.
b) Lip torn off.	b) Correct drain pressure which is too high. (Refer to para. 5-7-3.)
c) Shaft damaged	c) Set the seal lip position out of alignment or replace the shaft.
d) Shaft rusted	d) Remove rust by oilstone, etc., or replace the shaft.
ii) Leak from joints	
a) Bolt loosened	a) Fasten it with appropriate torque.
b) O-ring missing	b) Assemble properly.
c) O-ring damaged	c) Replace it with a new one.
d) Seal surface damaged	d) Repair or replace it.

6-2-5. Sound is Abnormal.

Causes	Countermeasures
i) Air in the circuit and motor not deaerated sufficiently.	i) Deaerate sufficiently.
ii) Incorrect mounting	ii) Properly fasten bolts, if any.
iii) Internal parts damaged.	iii) Repair or replace damaged parts.

6-2-6. Output Torque is Lower than Planned Value.

Causes	Countermeasures
i) Pressure is too low.	i) Set to appropriate pressure.
ii) High back pressure, resulting in failure to obtain sufficient differential pressure.	ii) Check circuits, pipings, and check if return filter is clogged or not etc.

7. DISASSEMBLING AND ASSEMBLING

7-1. General Precautions

- i) Let oil in the motor discharged from the port before dismantling the motor, and cover the port not to allow contaminants, into the motor.
- ii) Wash the motor housing with cleaning solvent, etc.
- iii) Prepare a clean place to put the disassembled parts on.
- iv) Check whether there are any missing tools, replacement parts and washing facilities required for the work.
- v) Handle carefully all the parts which are to be disassembled and assembled.
- vi) In assembling, all the parts must be washed, dried with compressed air and applied new hydraulic fluid completely.

7-2. Tools Required for Disassembling and Assembling

Mark	Tool Name	Tool Size (mm)	Applicable Model						Items Purchased from Outside Sources	Part Number	Remarks
			MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2200	MRH-3150			
A	Allen wrench	3	■	■	■	■	■	■	○	(For example) 6H-3	
		4	■	■	■	■	■	■	○	6H-4	
		5	■	■	■	■	■	■	○	6H-5	
		6	■	■	■	■	■	■	○	6H-6	
		8	■	■	■	■	■	■	○	6H-8	
		12	■	■	■	■	■	■	○	6H-12	
		14	■	■	■	■	■	■	○	6H-14	
B	Snap ring plier	φ32	■	■	■	■	■	■	○	RT-2	
		φ52	■	■	■	■	■	■	○	RT-3	
		φ60	■	■	■	■	■	■	○	RT-3	
		φ68	■	■	■	■	■	■	○	RT-3	
		φ80	■	■	■	■	■	■	○	RT-3	
C	Piston ring expander	φ42	■	■	■	■	■	■	○	203	
		φ65	■	■	■	■	■	■	○	201	
		φ80	■	■	■	■	■	■	○	201	
		φ90	■	■	■	■	■	■	○	201	
		φ100	■	■	■	■	■	■	○	202	
D	Piston compressor	φ42	■	■	■	■	■	■	○		
		φ65	■	■	■	■	■	■	○		
		φ80	■	■	■	■	■	■	○		
		φ90	■	■	■	■	■	■	○		
E	Torque wrench		■	■	■	■	■	■	○	TMK-***	
			■	■	■	■	■	■	○		
			■	■	■	■	■	■	○		
			■	■	■	■	■	■	○		
F	Allen socket	5	■	■	■	■	■	■	○		
		6	■	■	■	■	■	■	○		
		8	■	■	■	■	■	■	○		
		12	■	■	■	■	■	■	○		
		14	■	■	■	■	■	■	○		
G	Jacking screw	M8x1.25x60 ^φ	■	■	■	■	■	■	○		
		M10x1.5x100 ^φ	■	■	■	■	■	■	○		
		M14x2.0x100 ^φ	■	■	■	■	■	■	○		
		M16x2.0x100 ^φ	■	■	■	■	■	■	○		
H	Valve bearing press-fitting jig	φ2.0 φ62	■	■	■	■	■	■	○		
		φ2.5 φ80	■	■	■	■	■	■	○		
		φ2.0 φ100	■	■	■	■	■	■	○		
I	Rotary valve inserting jig	φ62	■	■	■	■	■	■	○		
		φ80	■	■	■	■	■	■	○		
		φ100	■	■	■	■	■	■	○		
J	Crankshaft bearing (rear) press-fitting jig (outer race)	φ100	■	■	■	■	■	■	○		
		φ120	■	■	■	■	■	■	○		
		φ140	■	■	■	■	■	■	○		
		φ150	■	■	■	■	■	■	○		
		φ160	■	■	■	■	■	■	○		
		φ180	■	■	■	■	■	■	○		
K	Crankshaft bearing (front) press-fitting jig (outer race)	φ100	■	■	■	■	■	■	○		
		φ140	■	■	■	■	■	■	○		
		φ160	■	■	■	■	■	■	○		
		φ180	■	■	■	■	■	■	○		
		φ190	■	■	■	■	■	■	○		
		φ225	■	■	■	■	■	■	○		

Mark	Tool Name	Tool Size	☐ Applicable Model						Items Purchased from Outside Sources	Part Number	Remark	
			MRH-200	MRH-500	MRH-750	MRH-1500	MRH-2100	MRH-3150				MRH-4000
L	Crankshaft bearing (front) press-fitting jig (inner race)	φ45										
		φ65										
		φ75										
		φ85										
		φ95										
		φ105										
		φ120										
M	Crankshaft bearing (rear) press-fitting jig (inner race)	φ45										
		φ55										
		φ65										
		φ70										
		φ85										
		φ75										
N	Ring nut tightener	P.C.D. φ114										
		φ140										
		φ150										
		φ180										
		φ200										
O	Shaft adjusting jig (for spline)	φ56										
		φ65										
		φ80										
		φ88										
		φ100										
	Shaft adjusting jig (taper)	1 1/2" - 7UNC										
		1 1/2" - 6UNC										
		1 1/2" - 5UNC										
		2" - 4 1/2UNC										
	Shaft adjusting jig (straight)	φ40										
φ55												
φ65												
φ80												
φ90												
	φ100											
P	Hammer											
Q	Brass bar											

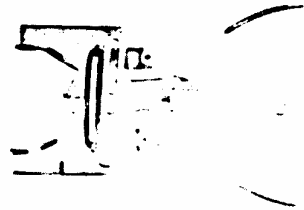
A



B



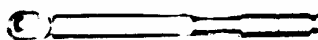
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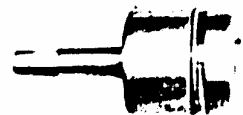
D



E



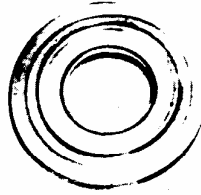
F



G



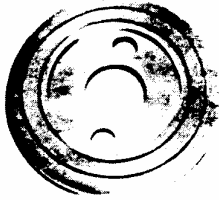
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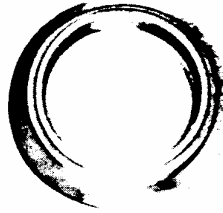
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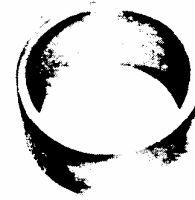
J



K



L



M



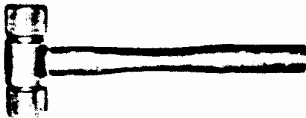
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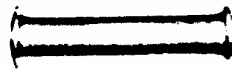
O



P



Q



7-3. Size of bolts used for MRH series and their tightening torque

Bolt size	Tightening torque (kgf-m)	Shaft casing	Piston cap	Valve end cap	Valve casing	Flange
M6 x 1.0 * (5)	1.14 ~ 1.86 Median 1.4			MRH-200		
M8 x 1.25 (6)	2.7 ~ 3.9 Median 3.3	MRH-200	MRH-200	MRH-500, 750 1500, 2200 3150, 4400		
M10 x 1.5 (8)	5.24 ~ 7.86 Median 6.45	MRH-500 750	MRH-500 750			
M14 x 2.0 (12)	14.8 ~ 21.7 Median 18.25	MRH-1500 2200, 3150	MRH-1500 2200, 3150			
M16 x 2.0 (14)	22.9 ~ 33.4 Median 28.15	MRH-4400	MRH-4400			
M18 x 2.5 (14)	31.7 ~ 46.4 Median 39.05				MRH-750 1500, 2200	
M20 x 2.5 (17)	45.0 ~ 65.7 Median 55.35				MRH-3150 4400	
M22 x 2.5 (17)	61.5 ~ 90.0 Median 75.75					
3/8"-16UNC (5/16")	Median 5.5					MRH-200 500 750
7/16"-14UNC (3/8")	Median 8.5					MRH-1500 2200 3150 4400

* () mark denoted the size of Allen Wrench

7-4. Disassembly (For the number indicated refer to the Exploded Views on pages from 20 to 24.)

7-4-1. Shaft Casing (18)

- i) Remove bolts (34).
- ii) Pull out the shaft casing (18) using a jacking screw.

CAUTION

- Take care not to damage the shaft and oil seal, especially their lips.

TOOL

- Allen wrench – A
- Jacking screw – G

7-4-2. Piston Cap (16)

- Remove bolts (35) and then the piston cap by tapping with a hammer.

TOOL

- Allen wrench – A
- Hammer – P

7-4-3. Crankshaft (8)

- i) Remove front guide ring (17), raise con-rod (12) and remove it from rear guide ring (17). Then, push the con-rod into the cylinder.

- ii) Pull out the shaft (8).
- iii) Bring out rear guide ring (17) and Oldham's coupling (11).

CAUTION

- Take care not to damage the shaft and the con-rod.

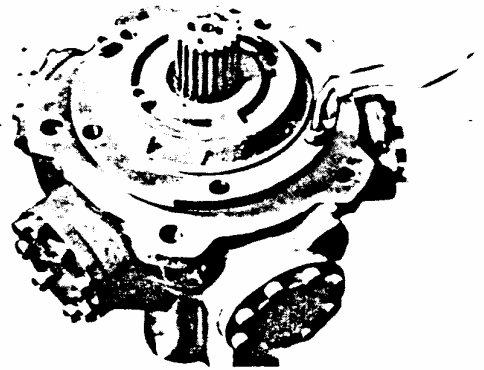


Fig. 7-4-1 Remove bolts (34)

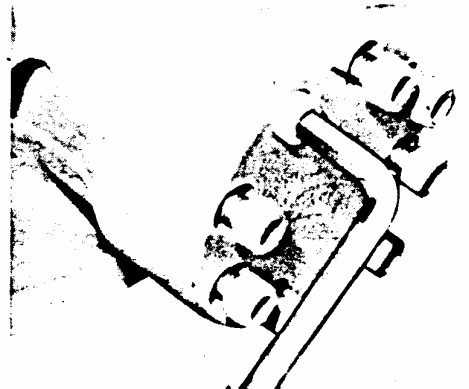


Fig. 7-4-2 Remove bolts (35)

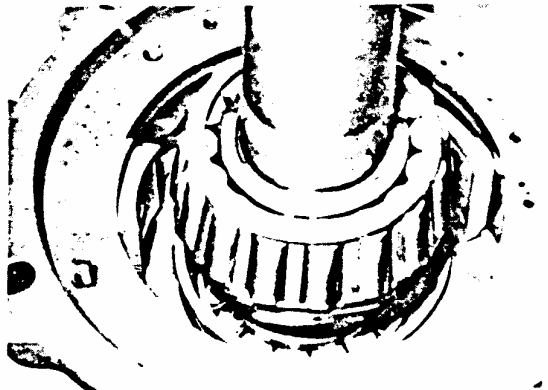


Fig. 7-4-3-i Push con-rod (12) into the cylinder

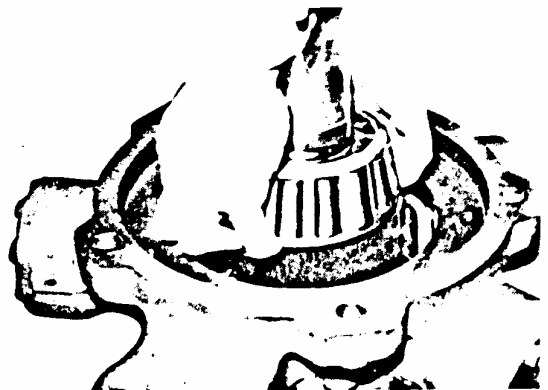


Fig. 7-4-3-ii Pull out the shaft (8)

iv) Push out the bearing (10) using a hammer and brass bar.

————— CAUTION —————

- Hold firmly the shaft with a vice.

————— TOOL —————

- Hammer – P
- Brass bar – Q
- Vice

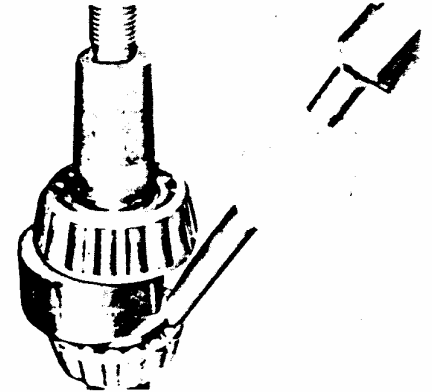


Fig. 7-4-3-iv Pull out the bearing (10)

7-4-4. Piston Assembly (13)

i) Pull out the piston assembly (13).



Fig. 7-4-4-i Pull out the piston assembly (13)

ii) Remove snap ring (32).

iii) Take out collar (15) and separate the piston (13) from the con-rod (12).

iv) Remove the piston ring (14) from the piston (13) using a special jig.

————— TOOL —————

- Snap ring plier – B
- Piston ring expander – C

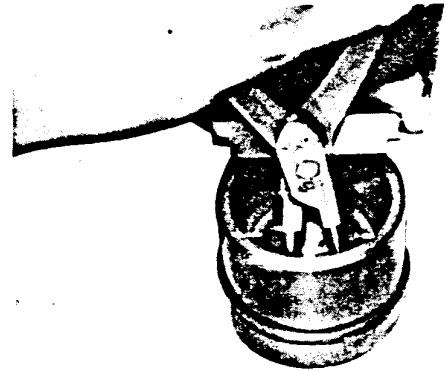


Fig. 7-4-4-ii Remove the snap ring (32)

7-4-5. Rotary Valve (4) and Valve Casing (2)

i) Turn up side down the motor, remove bolt (36) and remove the valve end cap (7).

————— CAUTION —————

- Take care not to damage the machined surface in turning over the motor.

————— TOOL —————

- Allen wrench – A

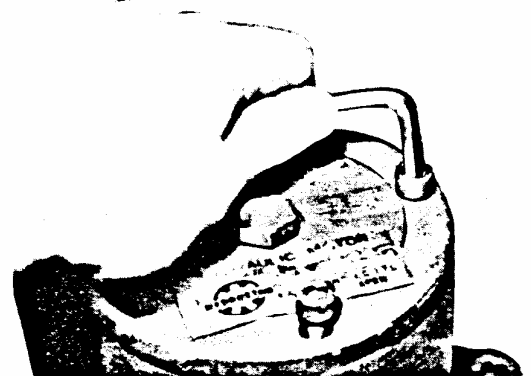


Fig. 7-4-5-i Remove bolts (36)

- ii) In the case of one-piece construction (MRH-200, 500)
- Place the motor sideways, remove snap ring (31) and push the valve with a hammer and brass bar.

TOOL

- Hammer – P
- Brass bar – Q

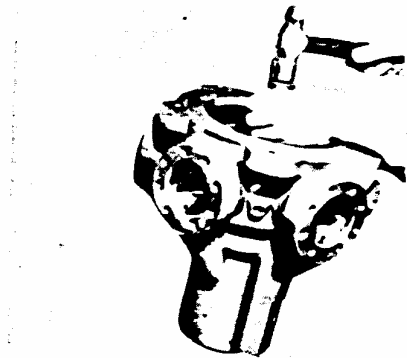


Fig. 7-4-5-ii Push the valve (4)

- iii) In the case of separate construction
- a) Remove bolts (37) and separate the body (1) from the valve casing (2).

TOOL

- Allen wrench – A

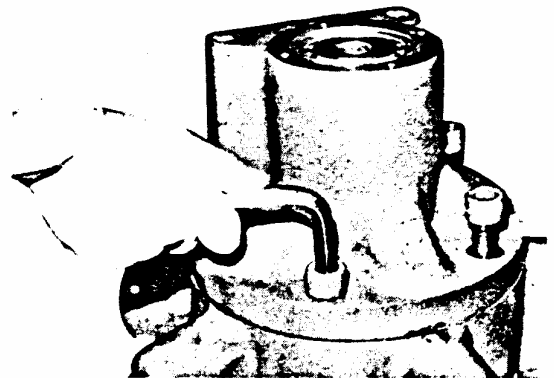


Fig. 7-4-5-iii-a Remove bolts (37)

- b) Remove snap ring (31) (in the case of MRH-750 only).

TOOL

- Snap ring plier – B

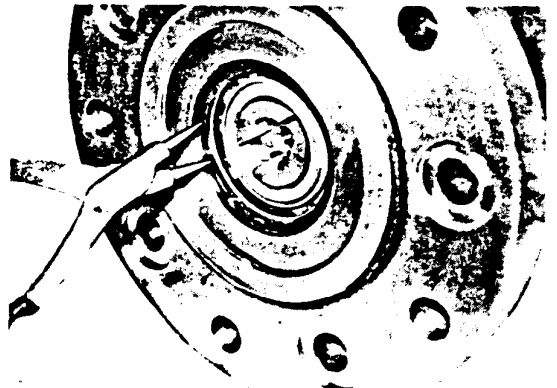


Fig. 7-4-5-iii-b Remove the snap ring (31)

- iv) Pull out the valve (4)
- To the end cap side, for MRH-200, 500, 750
 - To the body side, for MRH-1500 - 4400

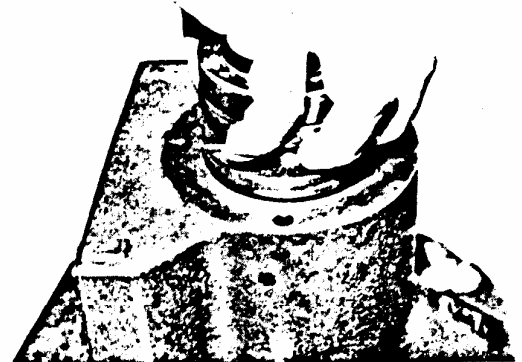


Fig. 7-4-5-iv Pull out the valve (4)

v) Remove the bearing (3), (6).

CAUTION

- DO NOT remove the bearing from the valve casing if it is to be re-used.
- The way shown in the figure would scratch the machined surface.

TOOL

- Chisel.
- Hammer – P

vi) Remove the piston ring (5).

TOOL

- Piston ring expander – C.

7.4.6 Ring Nut (19) CAUTION

- Do not remove the ring nut unless bearings, O-ring and so on are replaced entirely.
- Removal of it is easy if it is done at the initial step of disassembly.

i) Remove set screw (75) and pull the ring nut (19) out by turning it.

CAUTION

- When it is difficult to turn the ring nut by hand, use the ring nut tightening jig.
- Refer to assembly procedure 7-5-4-iv) & v).

TOOL

○ Ring nut tightener – N

7-5. Assembly

7-5-1. Rotary Valve (4) and Valve Casing (2).

i) Install the piston ring (5).

TOOL

- Piston ring expander – C.

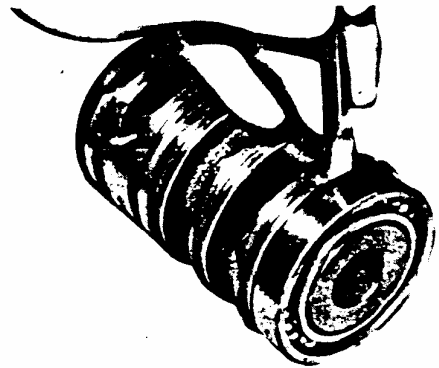


Fig. 7-4-5-v Remove the bearing (3), (6)

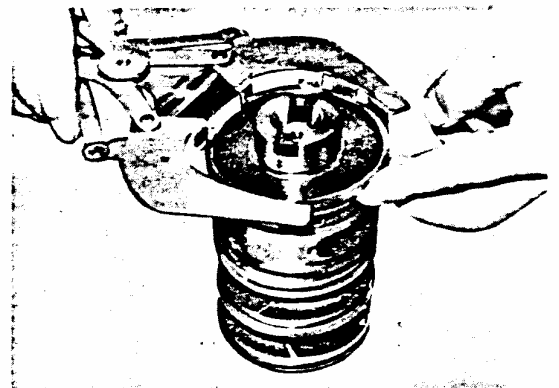


Fig. 7-4-5-vi Remove the piston ring (5)

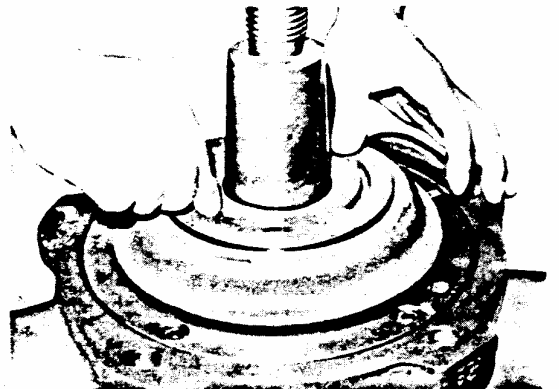


Fig. 7-4-6 Remove set screw

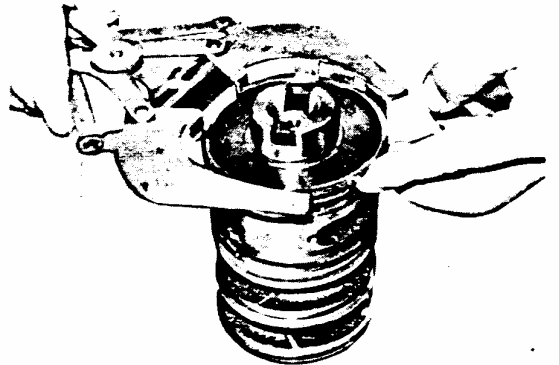


Fig. 7-5-1-i Install the piston ring (5)

- ii) Press the bearing (6) into the rotary valve (4). ((3) for MRH-200)
 - iii) Press the bearing (3) into the valve casing or body to the depths specified below: ((6) for MRH-200)
- Depth: MRH-200, 1500 - 4400 2 mm
 A = MRH-500, 750 2.5 mm

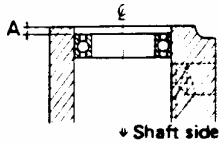


Fig. 7-5-1-ii Press in the bearing (6)

_____ TOOL _____

- Press.
 - Valve bearing press-fitting jig – H.
- iv) Mount the rotary valve (4) on the valve casing (2) or body (1) using a valve inserting jig.

_____ TOOL _____

- Valve inserting jig. – I.

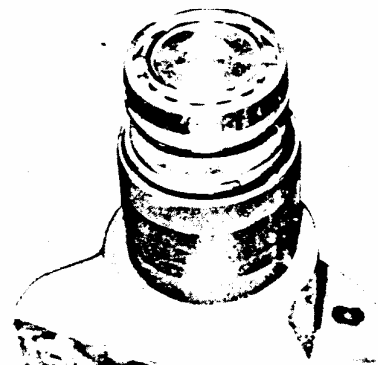


Fig. 7-5-1-iv Mount the valve (4)

- v) Put in O-rings (26) and (29).

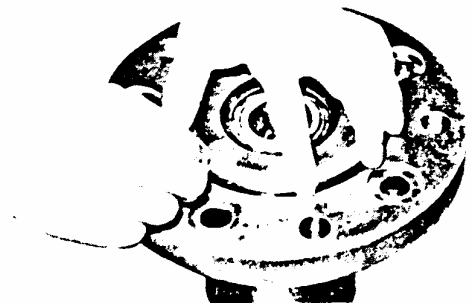


Fig. 7-5-1-v Put in the O-rings (26), (29)

- vi) After putting O-ring (27), fix valve end cap (7) with bolts (36).

_____ TOOL _____

- Allen wrench – A.
 - Torque wrench – E.
- vii) Install the snap ring (31) to retain the valve bearing (3). Refer to disassembly Procedure 7-4-5-iii-b. (MRH-500, 750)

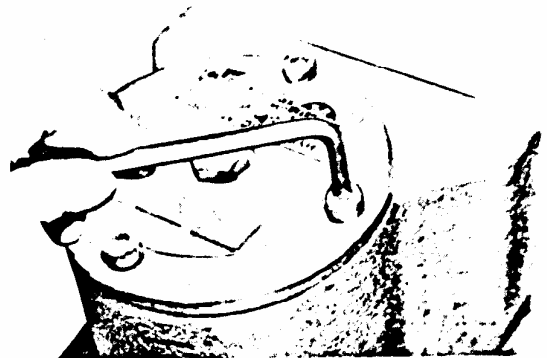
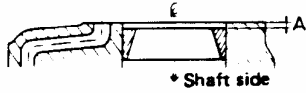


Fig. 7-5-1-vi Mount bolts (36)

- viii) Separate type.
 Press in the outer race of bearing (10) into the valve casing side to the depths as illustrated below.
- | | |
|-----------------------------------|------|
| MRH- 750 | 4 mm |
| MRH- 1500, 2200 }
3150, 4400 } | 6 mm |



TOOL

- Crank shaft Bearing (Rear) Press-fitting Jig – J.
- Press (or plastic hammer)

- ix) One piece type.
 Press in the outer race of bearing (10) to the shaft casing side as illustrated in the figure on the right.
 Depth A: MRH- 200 5 mm
 MRH- 500 ... 10.5 mm

TOOL

- Crank shaft bearing (rear) press-fitting jig – J
- Press (or plastic hammer).

- x) Separate type
 Assemble the valve casing on the body with bolts (37).

TOOL

- Allen wrench – A
- Torque wrench – E

7-5-2. Piston Assembly (13)

- i) Install piston ring (14) into the piston groove.
- ii) Put in con-rod (12), assemble collar (15) into it and fix it with snap ring (32).

TOOL

- Snap ring plier – B

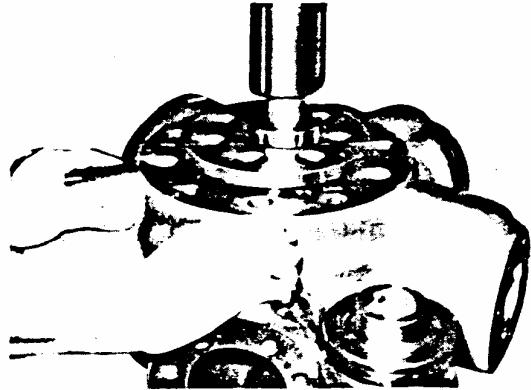


Fig. 7-5-1-viii Press in the outer race

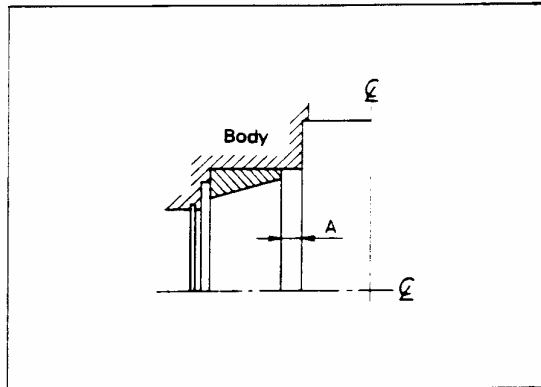


Fig. 7-5-1-ix Press in the outer race.

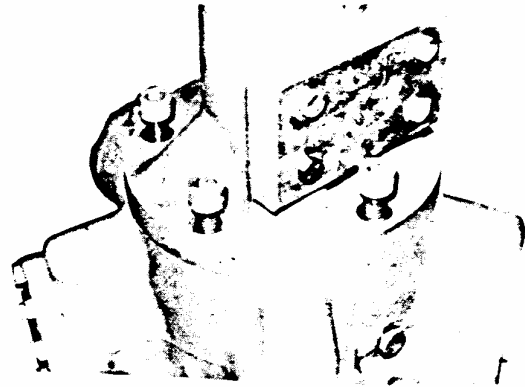


Fig. 7-5-1-x Install bolts (37)



Fig. 7-5-2-iv Install the snap ring (32)

iii) Insert the piston assembly into the cylinder.

- _____ TOOL _____
- Piston compressor – D.

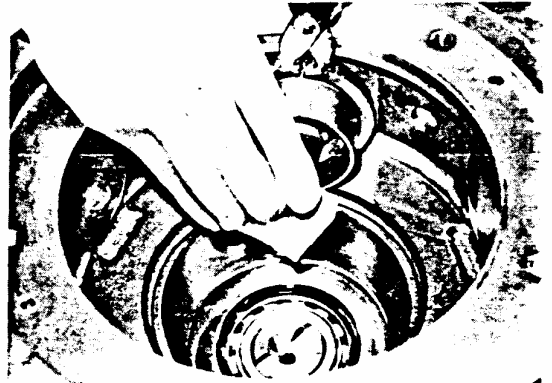


Fig. 7-5-2-iii Install the piston assembly (13)

7-5-3. Piston Cap (16)

- Place O-ring (28) on the piston cap (16) and fix it with bolts (36).

- _____ TOOL _____
- Allen wrench – A
 - Torque wrench – E



Fig. 7-5-3 Fix the piston cap (16)

7-5-4. Crankshaft (8).

- i) Press the inner races of bearings (9) and (10) into the crankshaft.

- _____ TOOL _____
- Press
 - Crank shaft bearing press-fitting jig – L, M.

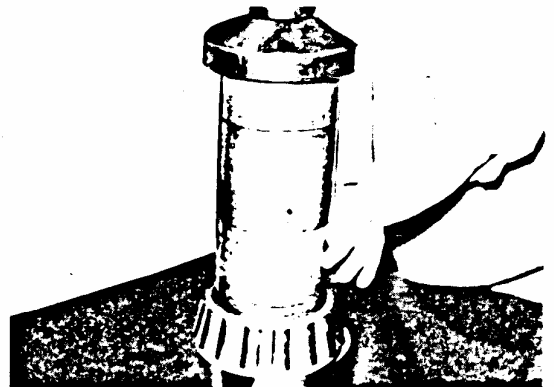


Fig. 7-5-4-i Press fit the bearing (9), (10)

- ii) Place Oldham's coupling (11).

- _____ CAUTION _____
- Let the mark "L" on the rotary valve match with that on the Oldham's coupling.

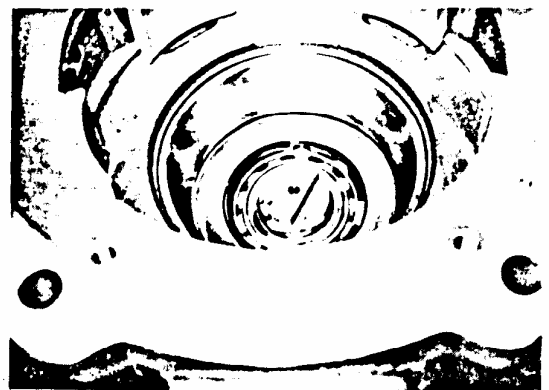


Fig. 7-5-4-ii Place Oldham's coupling (11)

iii) Put in the guide ring (17).

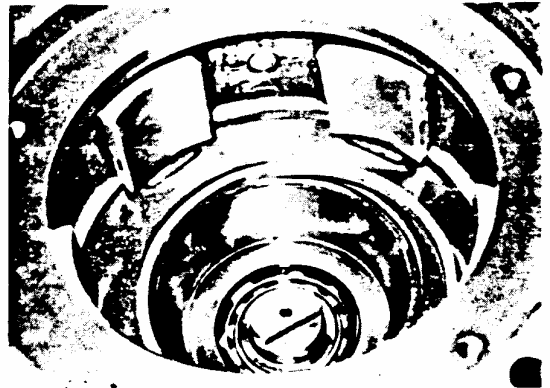


Fig. 7-5-4-iii Put in the guide ring (17)

iv) Install the crankshaft (8).

CAUTION

- Let the center hole of the Cam match with the above-mentioned mark "L".

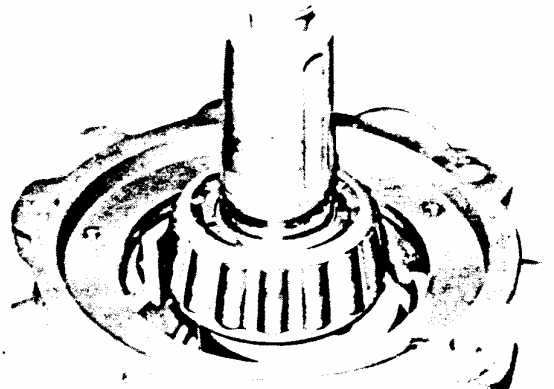


Fig. 7-5-4-iv) Install the crankshaft (8).

v) Put the con-rod (12) on the cam sliding surface and hold it with the rear side guide ring (17).



Fig. 7-5-4-v Put the con-rod (12) on the rear side guide ring (17).

vi) Hold the con-rod with the front guide ring.

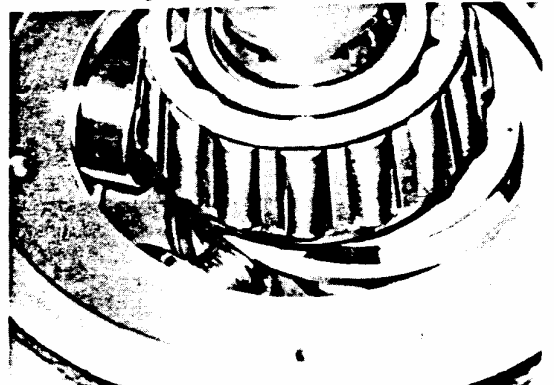


Fig. 7-5-4-vi Hold the con-rod (12) with the front side guide ring (17)

7-5-5. Shaft Casing (18).

- i) Press the outer race of bearing (9) into the shaft casing and assemble it on the body (1).

TOOL


- Allen wrench - A
- Torque wrench - E
- Crankshaft bearing (front) press fitting jig. - K



Fig. 7-5-5-i Assemble the shaft casing (18).

- ii) Put O-ring (74) to the ring nut (19) and screw on the shaft casing (18). (EXCEPT MRH-200).

< MRH-200 >

Tighten the set screws  equally as the rotating torque of the crank shaft reaches the specified value.

MRH-200 0.5 - 0.8 kgf·m

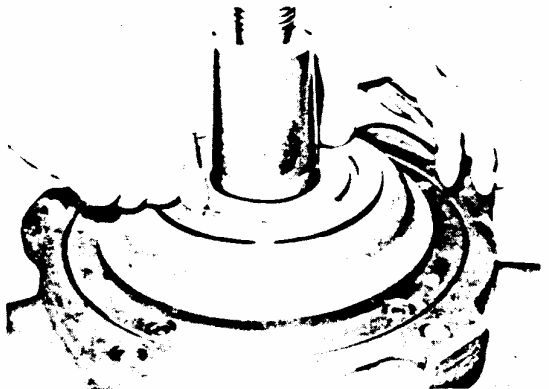


Fig. 7-5-5-ii Screw in the ring nut (19)

- iii) Tighten the ring nut (19) with a special jig until the rotation torque of the crankshaft reaches the specified value.

MRH-500	1.2 ~ 1.6 kgf·m
MRH-750	1.5 ~ 2.0 kgf·m
MRH-1500	3.0 ~ 3.5 kgf·m
MRH-2200	3.5 ~ 4.5 kgf·m
MRH-3150	4.0 ~ 5.0 kgf·m
MRH-4400	4.5 ~ 5.5 kgf·m

TOOL

- Ring nut tightener - N.

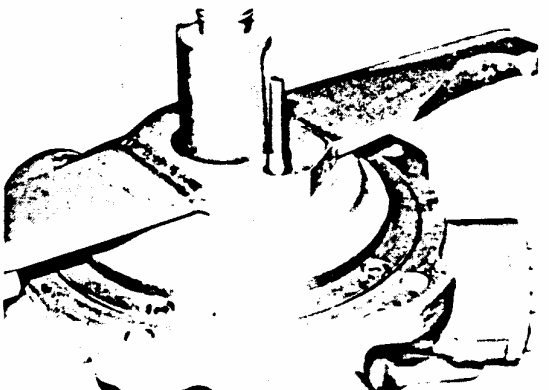


Fig. 7-5-5-iii Tighten the ring nut (19)

- iv) Drill guide hole on the ring nut through the threaded hole of the shaft casing and screw in a set screw. (75)

Apply sealant on the set screw.

Depth of guide hole: TOOL DIA.

MRH-500, 750.... 3 mm --- $\phi 4.8$

MRH-1500 - 4400... 5 mm --- $\phi 6$

TOOL

- Allen wrench - A

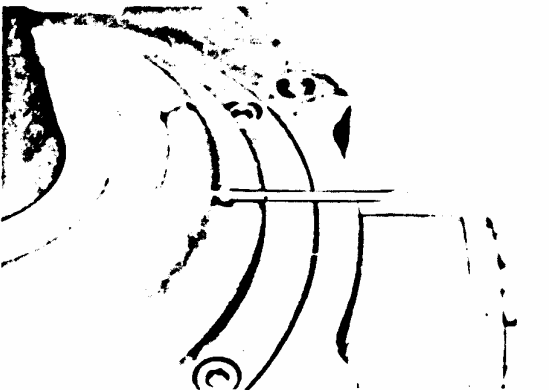


Fig. 7-5-5-iv Tighten the set screw (75)

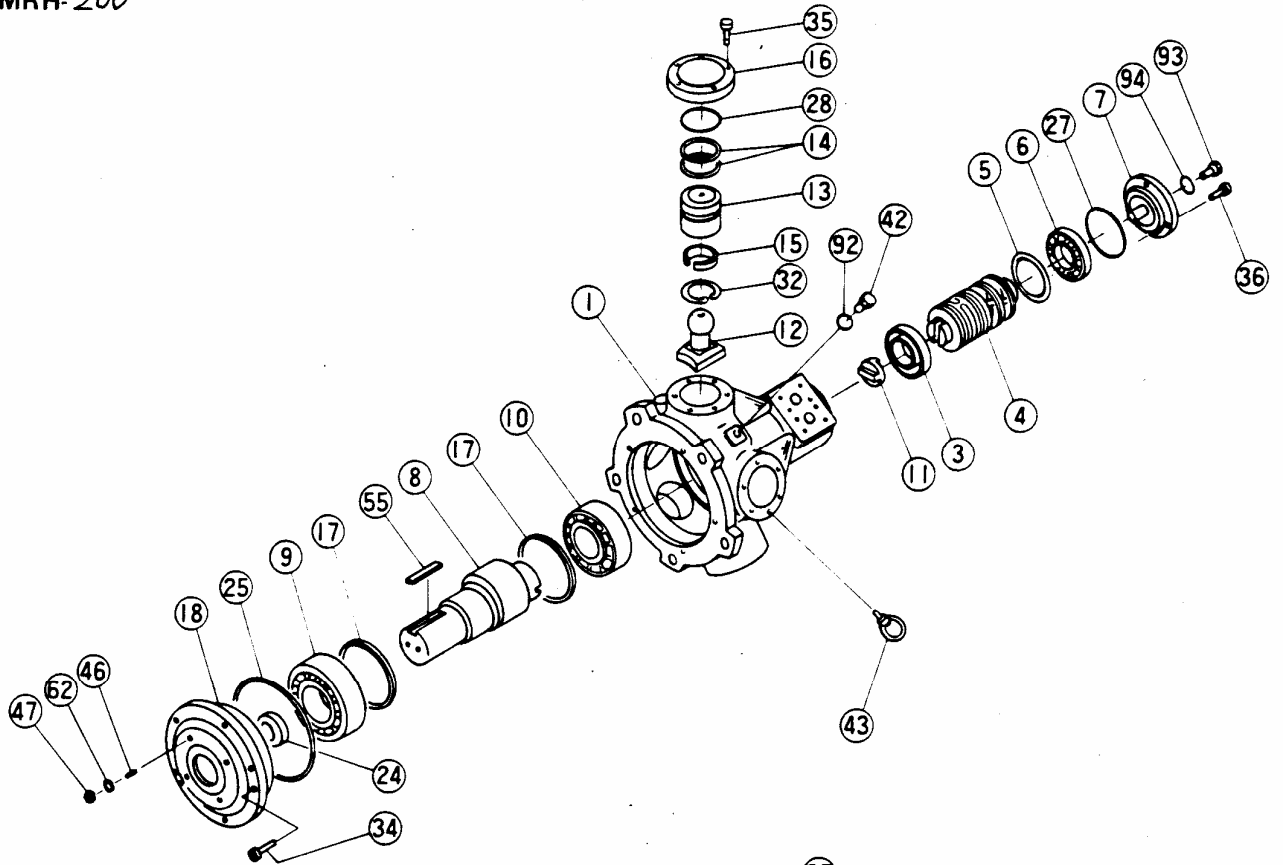
8. PARTS LIST AND EXPLODED VIEWS

No.	Name	MRH-200			MRH-500			MRH-750			MRH-500		
		Drawing No.	Qty	Remarks	Drawing No.	Qty	Remarks	Drawing No.	Qty	Remarks	Drawing No.	Qty	Remarks
1	Body	20381-00158	1		20381-00160	1		20381-00134	1		20381-00178	1	
2	Valve Casing				20381-02312	1	No. 6010	20381-00254	1		20381-00250	1	
3	Valve Bearing	20381-02316	1	No. 6007	20381-00435	1	No. 6010	20381-02312	1	No. 6010	20381-02301	1	No. 6211
4	Rotary Valve	20381-00428	1		20381-00504	6	80Dx3Wx3.3t	20381-00435	1	No. 6010	20381-00430	1	
5	Piston Ring	20381-00508	6	62Dx2Wx26t	20381-02317	1	No. 6258	20381-00504	6	80Dx3Wx3.3t	20381-01306	6	100Dx3.5Wx4t
6	Valve Bearing	20381-02316	1		20381-00840	1		20381-02317	1	No. 6208	20381-02306	1	No. 6013
7	Valve End Cap	20381-00632	1		20381-00776	1		20381-00640	1		20381-00621	1	
8S	Crankshaft				20381-00777	1		20381-00760	1		20381-07710	1	
8T	Crankshaft				20381-00771	1		20381-00771	1		20381-07711	1	
9	Crankshaft Bearing	20381-07702	1		20381-00781	1		20381-00766	1		20381-07712	1	
9	Crankshaft Bearing	20381-00819	1	No. 32309U	20381-00816	1	No. 32313u	20381-00786	1	No. 32315u	20381-00812	1	No. 32317U
10	Crankshaft Bearing	20381-00620	1	No. 30309u	20381-00817	1	No. 32311u	20381-00816	1	No. 32313u	20381-00813	1	No. 32314U
11	Oldham Coupling	20381-00907	1		20381-00905	1		20381-00905	1		20381-00906	1	
12	Connecting Rod	20381-01037	5		20381-01021	5		20381-01038	5		20381-01039	5	
13	Piston Assy	20381-01116	5		20382-01109	5		20382-01110	5		20382-01115	5	
14	Piston Ring	20381-01308	10	42Dx2Wx18t	20381-01305	10	65Dx3Wx2.7t	20381-01305	10	65Dx3Wx2.7t	20381-00506	10	80Dx3.5Wx3.3t
15	Collor	20381-01410	5		20381-01409	5		20381-01409	5		20381-01402	5	
16	Piston Cap	20381-01520	5		20381-01517	5		20381-01517	5		20381-01502	5	
17	Guide Ring	20381-01625	2		20381-01616	2		20381-01616	2		20381-01627	2	
18	Shaft Casing	20381-01736	1		20381-01729	1		20381-01726	1		20381-01754	1	
19	Ring Nut				20381-01815	1		20381-01812	1		20381-01821	1	
24	Oil Seal	20381-09936	1	45Dx62Dx9t	20381-09907	1	60Dx82Dx12t	20381-09902	1	70Dx88Dx12t	20381-09904	1	85Dx110Dx15t
25	Oil Seal	95121-14500	1	144.4dx3.1d	95121-17000	1	169.3dx5.7d	20381-09830	1	202.8x3.5d	95121-24000	1	239.3x5.7d
26	O ring							95121-14500	1	144dx3.1d	95121-18500	1	154.3dx5.7d
27	O ring	95121-06500	1	6x4x3.1d	95121-08500	1	84.4dx3.1d	95121-08500	1	84.4dx3.1d	95121-10500	1	104.4dx3.1d
28	O ring	95113-03600	5	35.7dx3.5d	95123-06000	5	59.4dx3.1d	95123-06000	5	59.4dx3.1d	95123-07500	5	74.4dx3.1d
29	O ring							95123-03000	5	29.4dx3.1d	95113-03200	5	31.7dx3.5d
31	Snap Ring				94721-80251	1	85.5Dx2.5t	94721-80251	1	85.5Dx2.5t			
32	Snap Ring	20381-02205	5	34.4Dx1.2t	94721-52201	5	56.2Dx2t	94721-52201	5	56.2Dx2t	94721-60201	5	64.2Dx2t
34	Socket Head Cap Screw	92703-08200	5	M8x1.25x20R	92703-10300	5	M10x1.5x30R	92703-10300	5	M10x1.5x30R	92703-14350	5	M14x2x35R
35	Socket Head Cap Screw	92703-08200	30	M8x1.25x20R	92703-10250	40	M10x1.5x25R	92703-10250	40	M10x1.5x25R	92703-14350	40	M14x2x35R
36	Socket Head Cap Screw	92703-06140	3	M6x1.0x14R	92703-08200	4	M8x1.25x20R	92703-08200	4	M8x1.25x20R	92703-08200	4	M8x1.25x20R
37	Socket Head Cap Screw							92703-08200	4	M8x1.25x20R	92703-18550	5	M18x2.5x55R
38	Spring Washer												
39	Spring Washer												
40	Spring Washer												
41	Spring Washer												
42	Drain Plug	20381-04908	2	1/2"-20UNF	20381-04909	2	3/4"-16UNF	20381-04909	3	3/4"-16UNF	20381-04909	3	3/4"-16UNF
43	Eye Bolt	20381-02508	1	M8x1.25	20381-02507	1	M10x1.5	20381-02507	1	M10x1.5	20381-02507	1	M10x1.5
46	Set Screw	91541-06160	4	M6x1.0x18R									
47	Nut	93344-06360	4	M6x1.0									
52T	Nut				20381-03007	1	1-1/4"-7UNC	20381-03004	1	1-1/2"-6UNC	20381-03004	1	1-1/2"-6UNC
53T	Spring Washer				94101-33822	1	1-1/4"	94101-39952	1	1-1/2"	94101-39952	1	1-1/2"
54T	Plain Washer				20381-03204	1	33dx70dx7t	20381-03205	1	33dx85Dx10t	20381-03206	1	39dx95Dx10t
55T	Key				20381-03314	1	15Wx10x70R	20381-03301	1	18Wx12x88R	20381-03302	1	24Wx18x114R
54T	Key	20381-03323	1	10Wx8x54R	20381-03315	1	15Wx10x78R	20381-03321	1	18Wx12x88R	20381-03316	1	24Wx18x100R
62	Fatner Seal	20381-03905	4										
74	O ring				95151-13500	1	134.5dx2.1	93151-15000	1	149.5dx2.1	20381-09814	1	177.4dx3.53d
75	Set Screw				91521-06140	1	M6x1x14R	91521-06250	1	M6x1x14R	91521-08250	1	M8x1.25x25t
92	O ring	20381-09845	2	10.5dx1.83d	20381-09846	2	16.38dx2.21d	20381-09846	3	16.38dx2.21d	20381-09846	3	16.38dx2.21d
93	Drain Plug	20381-04908	1	1/2"-20UNF	20381-04910	1	9/16"-18UNF	20381-04910	1	3/4"-18UNF	20381-04909	1	3/4"-16UNF
94	O ring	20381-09845	1	10.52dx1.83d	20381-09863	1	11.87dx1.98d	20381-09863	1	11.87dx1.98d	20381-09846	1	16.38dx2.21d

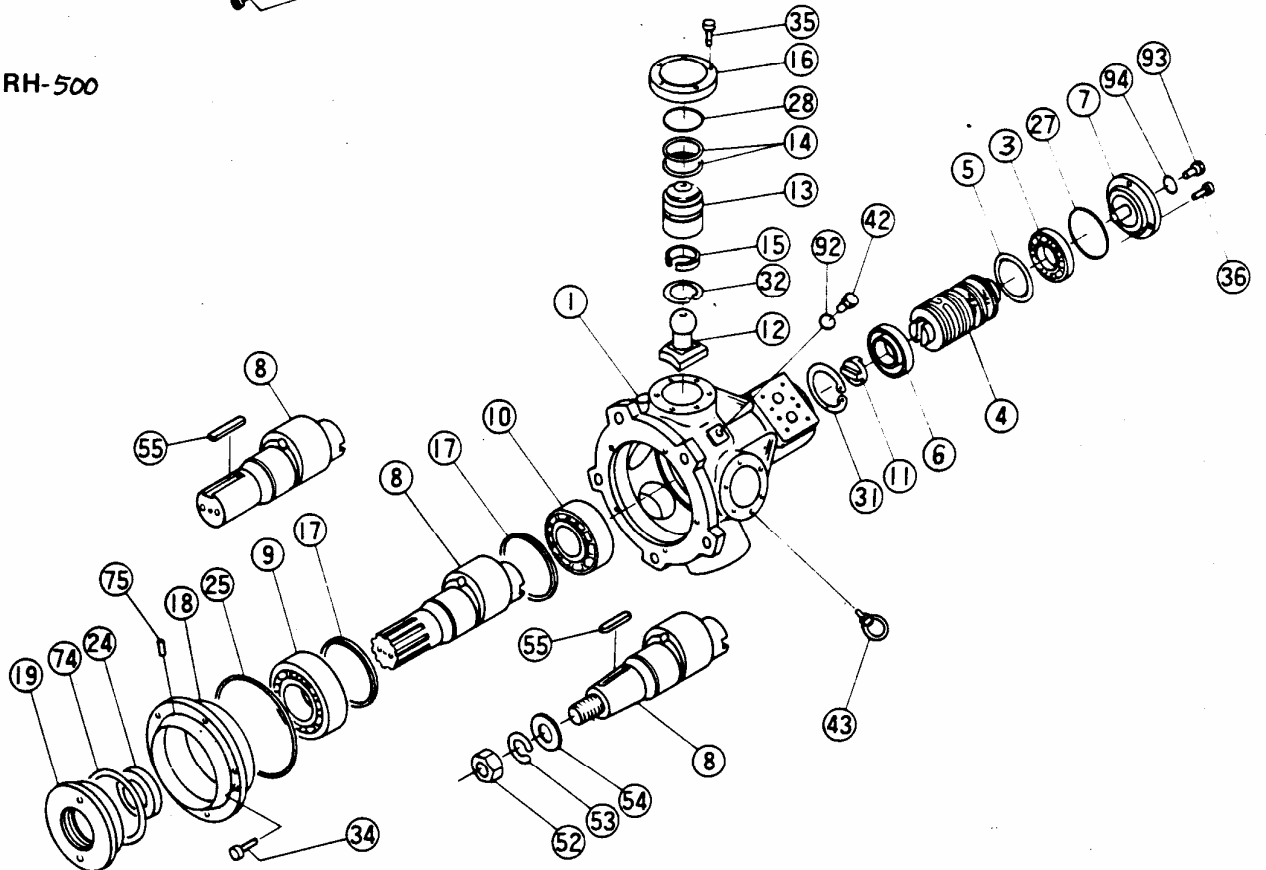
* Parts replacement classification
 Class A: seal parts which should be replaced in principle at a time of disassembly.
 Class B: parts which is replaced as sub-assembled form
 Class C: parts which is replaced if necessary
 Class D: part which is rarely replaced

No.	Name	MRH-2209			MRH-315D			MRH-4409		
		Drawing No.	Q'ty	Remarks	Drawing No.	Q'ty	Remarks	Drawing No.	Q'ty	Remarks
1	Body	20381-01180	1		20381-00154	1		20381-00192	1	
2	Valve Casing	20381-02250	1		20381-00248	1		20381-00271	1	
3	Valve Bearing	20381-02301	1	No. 6,211	20381-02301	1	No. 6,211	20381-02306	1	No. 6,013
4	Rotary Valve	20381-00430	1		20381-00430	1		20382-01401	1	100Dx3.5Wx4t
5	Piston Ring	20381-01306	6	100Dx3.5Wx4t	20381-01306	6	100Dx3.5Wx4t	20381-01306	6	100Dx3.5Wx4t
6	Valve Bearing	20381-02306	1	No. 6,013	20381-02306	1	No. 6,013	20381-02306	1	No. 6,013
7	Valve End Cap	20381-00621	1		20381-00621	1		20381-00650	1	
8S	Crankshaft	20381-07740	1		20381-07703	1		20381-07739	1	
8T	Crankshaft	20381-07746	1		20381-07704	1		20381-07744	1	
9P	Crankshaft Bearing	20381-07745	1		20381-07705	1		20381-07744	1	
9R	Crankshaft Bearing	20381-00821	1	No. 32221U	20381-00807	1	No. 32321	20381-00824	1	No. 32224U2
10	Crankshaft Bearing	20381-00813	1	No. 32314U	20381-00815	1	No. 32315U	20381-00812	1	No. 32317U
11	Oldham Coupling	20381-00906	1		20381-00906	1		20381-00906	1	
12	Connecting Rod	20381-01041	5		20381-01034	5		20381-01042	7	
13	Piston Assy	20382-01119	5		20382-01114	5		20382-01120	7	
14	Piston Ring	20381-00507	5	90Dx3.5Wx3.7t	20381-01306	10	100Dx3.5Wx4t	20381-01306	7	100Dx3.5Wx4t
15	Collar	20381-01411	5		20381-01408	5		20381-01411	7	
16	Piston Cap	20381-01524	5		20381-01518	5		20381-01578	7	
17	Guide Ring	20381-01603	2		20381-01613	2		20381-01631	2	
18	Shaft Casing	20381-01755	1		20381-01733	1		20381-01758	1	
19	Ring Nut	20381-01814	1		20381-01819	1		20381-01830	1	
24	Oil Seal	20381-09905	1	95Dx120Dx13t	20381-09906	1	105Dx135Dx16t	20381-09906	1	105Dx135Dx16t
25	O ring	95121-28000	1	279.3d x 5.7d	95121-30000	1	299.3d x 5.7d	20381-09869	1	316.87d x 4.98d
26	O ring	95121-75500	1	153.3d x 5.7d	95121-16500	1	164.3d x 5.7d	95121-18500	1	184.3d x 5.7d
27	O ring	95121-10500	1	104.4d x 3.1d	95121-10500	1	104.4d x 3.1d	95121-10500	7	104.4d x 3.1d
28	O ring	95123-08500	5	84.4d x 3.1d	95123-09500	5	94.4d x 3.1d	95123-09500	7	94.4d x 3.1d
29	O ring	95113-08200	5	31.7d x 3.5d	95123-03500	5	34.4d x 3.1d	95123-03000	7	29.4d x 3.1d
31	Snap Ring	20381-02414	6	72.5D x 2.5t	94721-80261	5	85.5D x 2.5t	20381-02414	7	72.5D x 2.5t
32	Snap Ring	92703-14350	10	M14x2x35L	92703-14350	10	M14x2x35L	92703-16350	10	M16x2x35L
34	Socket Head Cap Screw	92703-16350	40	M16x2x35L	92703-16350	40	M16x2x35L	92703-16350	56	M16x2x35L
35	Socket Head Cap Screw	92703-08200	4	M8x1.25x20L	92703-08200	4	M8x1.25x20L	92703-08200	4	M8x1.25x20L
36	Socket Head Cap Screw	92703-18550	5	M18x2.5x55L	92703-20650	5	M20x2.5x65L	92703-20650	7	M20x2.5x65L
37	Spring Washer									
38	Spring Washer									
39	Spring Washer									
40	Spring Washer									
41	Spring Washer									
42	Drain Plug	20381-04909	3	3/4"-16UNF	20381-04909	3	3/4"-18UNF	20381-04909	3	3/4"-16UNF
43	Eye Bolt	20381-02506	1	M16x2	20381-02505	1	M16x2	20381-02505	1	M16x2
46	Set Screw									
47	Nut									
52T	Nut	20381-03006	1	1-3/4"-6UNC	20381-03005	1	1-3/4"-6UNC	20381-03006	1	2"-4-1/2UNC
53T	Spring Washer	20381-03103	1	1-3/4"	20381-03103	1	1-3/4"	20381-03104	1	2"
54T	Plain Washer	20381-03207	1	46d x 106d x 10t	20381-03208	1	46d x 110d x 10t	20381-03209	1	52d x 110d x 12t
53T	Key	20381-03303	1	24Wx18x134F	20381-03304	1	28Wx18x164F	20381-03320	1	28Wx18x178F
58T	Key	20381-03322	1	24Wx18x125F	20381-03317	1	28Wx18x145F	20381-03319	1	28Wx18x200F
62	Fastener Seal									
74	O ring	20381-09814	1	177.4d x 3.53d	20381-09850	1	215.5d x 3.53d	20381-09850	1	215.5d x 3.53d
75	Set Screw	91521-08250	1	M8x1.25x25L	91521-08250	1	M8x1.25x25L	91521-08250	1	M8x1.25x25L
92	O ring	20381-09846	3	16.36d x 2.21d	20381-09846	3	16.36d x 2.21d	20381-09846	1	16.36d x 2.21d
93	Drain Plug	20381-04909	1	3/4"-16UNF	20381-04909	1	3/4"-16UNF	20381-04909	1	3/4"-16UNF
94	O ring	20381-09846	1	16.36d x 2.21d	20381-09846	1	16.36d x 2.21d	20381-09846	1	16.36d x 2.21d
113	Piston Ring	20381-01310	5	90Dx3.5Wx3.7t				20381-01311	7	100Dx3.5Wx4t

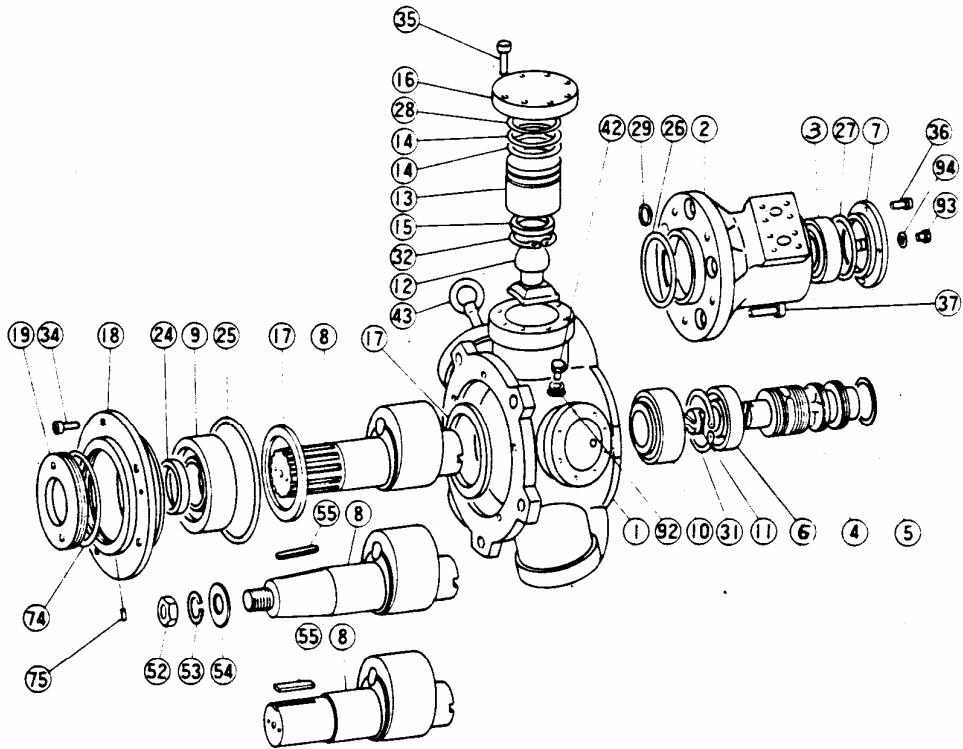
MRH-200



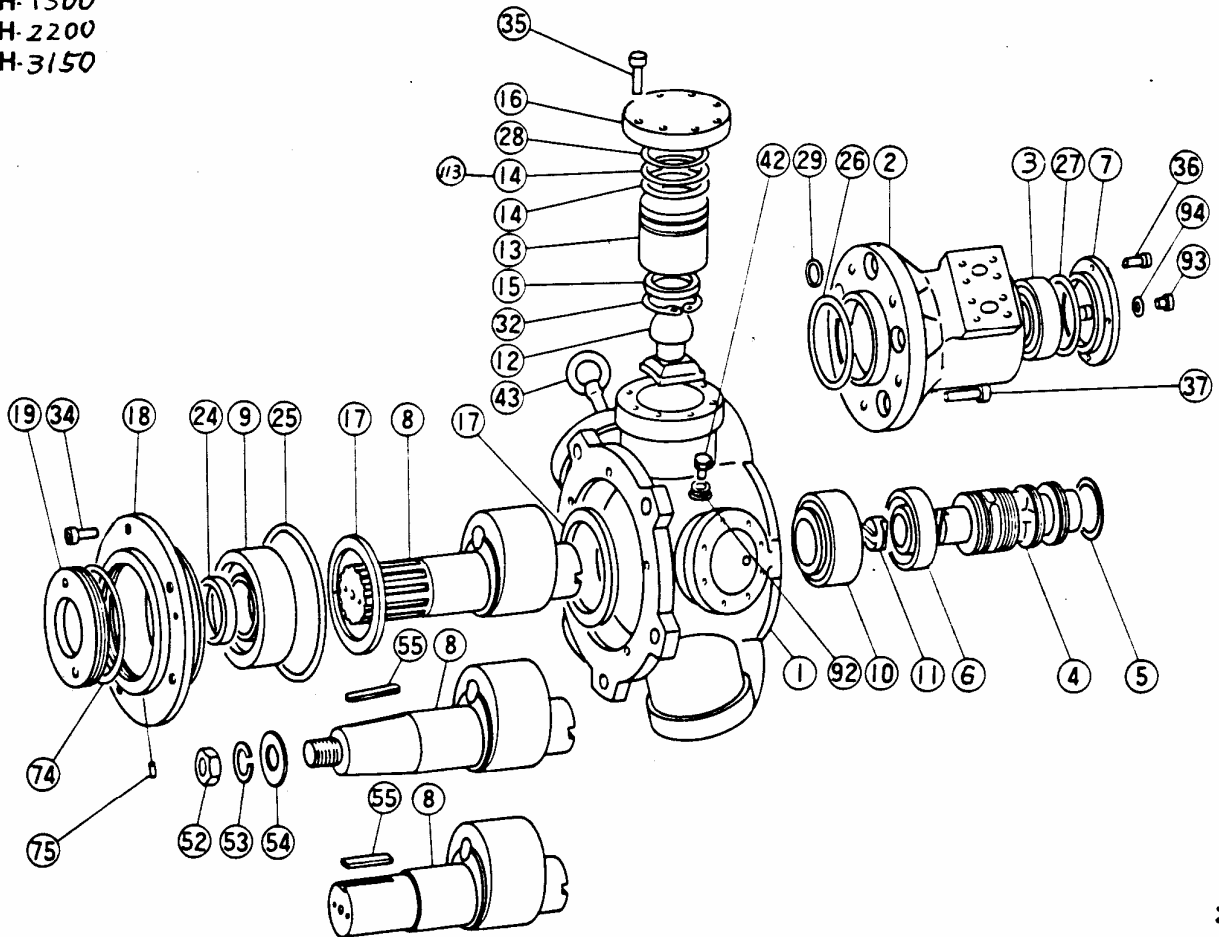
MRH-500



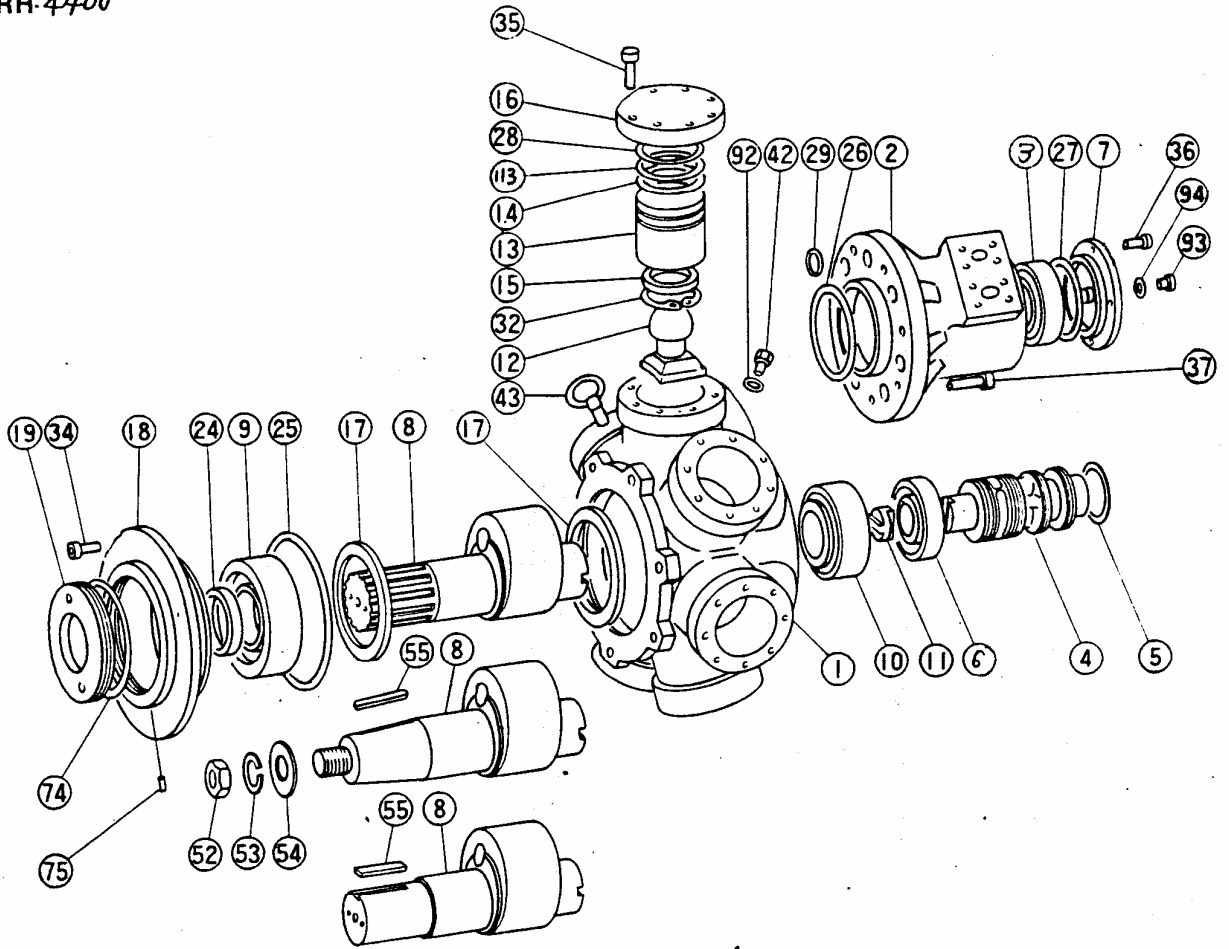
MRH-750



MRH-1500
MRH-2200
MRH-3150



MRH-4400



Hydraulic Control Valve for Marine Application

Type FDS

(for series circuit)

No. M040001-1

INSTRUCTION MANUAL

HYDROGEAR Co. Ltd.

Contents

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 - 6 - 9), caution of use
- 7, Trouble Shooting

1, Design Feature

HYDROGEAR Co. Ltd. has abundant experience for maker as oil hydraulics products and supplied hydraulic equipment for marine application with originality.

Marine control valve which prepared compound function have superior performance and durability with high technical process and quality control. In order to give full play of performance those valves which using under the severe environment, please refer to this manual.

2, General

These marine control valves have quick response function with 3 position 4 direction control which equipped pressure compensate valve.

This means the oil flow from port p to actuator port is always controlled constant without influence of changing load by it.

As changing lever from neutral position to optional position, it makes fixed amount of flow according to setting degree, and this means it is possible to control both direction and flow at same time.

Shock-less change is realized by using compensate valve unloading.

Also these valves equipped compensate valve which have superior response so that it possible to deal with sufficiently at work which involved heavy fluctuation of load.

Those valves have another characteristics as follows.

- ① Have some different flow range of spools as standard each size.
- ② At rated flow extent of each spools, it is possible to adjust of flow to port A or B within extent flow range.
- ③ Equipped detent or spring center for neutral.
- ④ Built-in pressure relief valve for actuator port. (Load Pressure)
- ⑤ Lever can be rotated with the cover in 90 degree steps.
- ⑥ With lever stopper for limit operating degree.
- ⑦ Mounting flange measure is confirmed to JIS-2291
- ⑧ Take up and down of plug can change with internal or external drain easily.
- ⑨ Have large assortment as counterbalance valve, (single, double) brake valve, brake release valve, switch for neutral position detection and so on.

The overview explanation of the attachment valve.

- 1) Single Counter Balance Valve (Type : CBC) :
With the fixation orifice + check valve in the CBC pilot line and it has a relief valve with vent port (this is option).
- 2) Double Counter Balance Valve (Type : CBCWRV) :
It has a one with the fixation orifice + check valve in the CBCWRV pilot line and it has a relief valve with vent port at the A·B port.
- 3) Brake opening valve (Type : BC & BO BC is normally closed. BO is normally opened.)
It is possible to grapple with the head cover of the hydraulic control valve.
- 4) Brake Valve (Type : BV)
It is possible to grapple with the hydraulic control valve and it is possible to use by combining with the counter balance valve.
- It is using a Relief Valve with anti-cavitation valve.
- 5) Neutral Position Detection. Proximity switch :
It is possible to grapple with the head cover of the hydraulic control valve.

About the remote control system

- I) Hydraulic Control formula : Hydraulic pressure pilot control. (Brand Name: Servo Equaler)
Controllable up to 100m.

It is possible to grapple with hydraulic control valve and there is replying delay in the distance between receiver and transmitter hardly. (It is possible quick respond)

- II) Electro - Proportional Directional Valve Formula:
There is not a phase difference according to the original mechanism which introduced hydraulics and mechanical feedback.

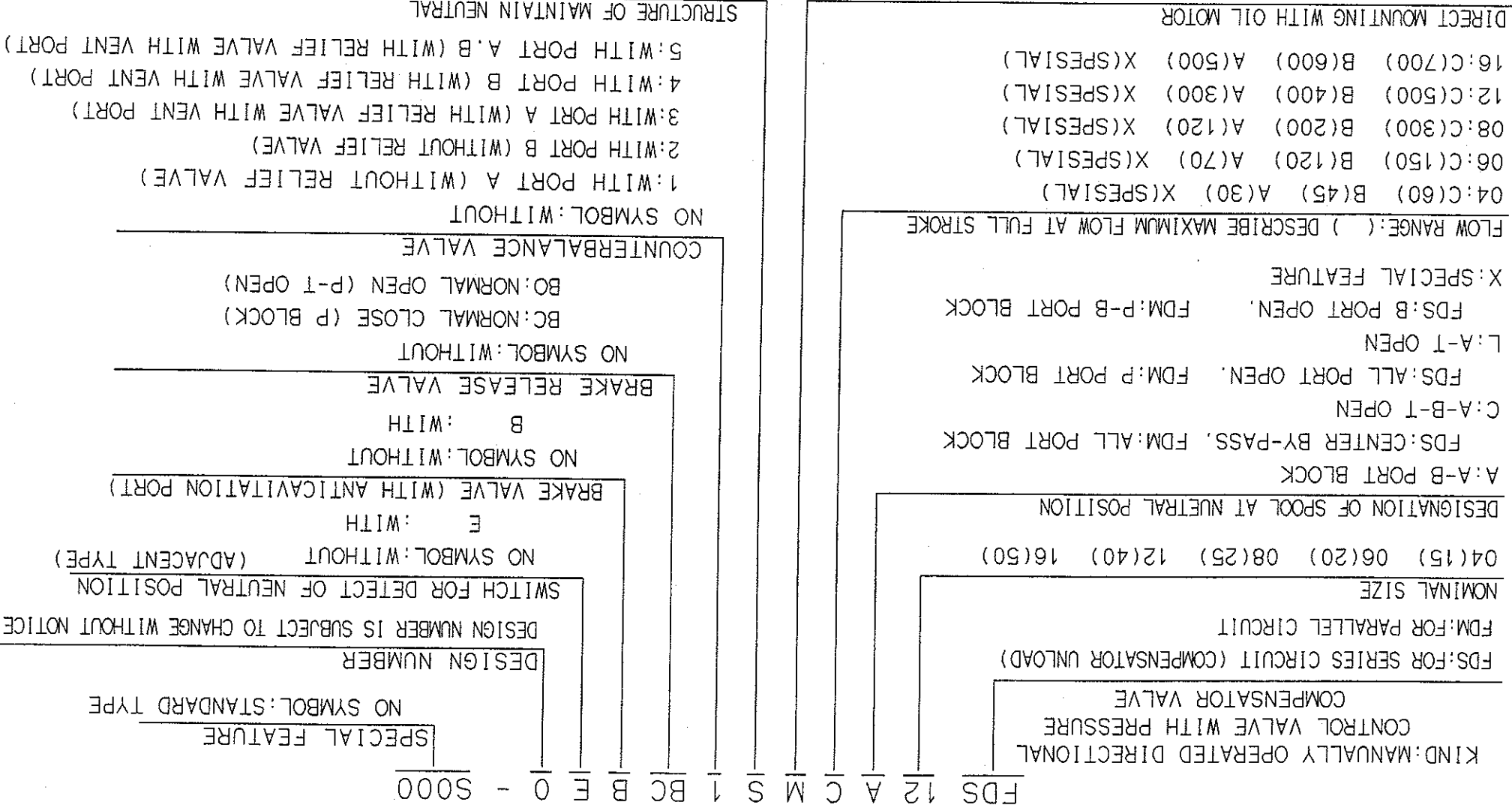
It loads the passive part of the hydraulic control formula with the Electro-Proportional Directional Valve and it can be controlled with the electronics joystick controller being remote.

The reply-ability is excellent compared with the torque motor formula.

Characteristic

- a) It is easy to make hydraulic control valve in the plumbing because of two in two P port, two T port. Difference diameter elbow flange can be installed in A·B·P·T port with JIS B-2219 of the SSA-type. Difference diameter welding type of flange → option.
 - b) Hydraulic control valve size 04,06,08,12 can be directly mounted to the low-speed-high-torque hydraulics oil motor (KYB,KPM Oil-Motor) through the plate and it is excellent compared with the torque motor formula.
 - c) It is using proof rust material for the part which is easy for the long experience to corrode. (Operation lever : SUS, Lever and Spool connection axis: SUS, Lever shaft bush: BC)
 - d) Hydraulic control valve has the "P1" (RC1/4) port which measures the secondary side (load pressure) pressure.
 - e) Inner drain and outside drain can be easily rearranged from outside.
 - f) Double counter balance valve mono-block type. So then light-weight and compact.
- Caution : Hydraulic control valve Size 16 (50), the name of "FDS" becomes "FVD4-S".

3-2 ORDERING CODE FOR MARINE CONTROL VALVE



NO SYMBOL: WITHOUT
 CAUTION (1) SIZE 16 DOESN'T HAVE DIRECT MOUNT TYPE.
 M DIRECT MOUNT

2) THE FORM FOR SIZE 16: FVD4-S... FOR SERIES CIRCUIT
 FVD4-M... FOR PARALLEL CIRCUIT
 3) THE END OF CODE 1: WITH PRESSURE RELIEF VALVE

STRUCTURE OF MAINTAIN NEUTRAL

1: WITH PORT A (WITHOUT RELIEF VALVE)
 2: WITH PORT B (WITHOUT RELIEF VALVE)
 3: WITH PORT A (WITH RELIEF VALVE WITH VENT PORT)
 4: WITH PORT B (WITH RELIEF VALVE WITH VENT PORT)
 5: WITH PORT A, B (WITH RELIEF VALVE WITH VENT PORT)

NO SYMBOL: WITHOUT

COUNTERBALANCE VALVE

BC: NORMAL CLOSE (P BLOCK)
 BO: NORMAL OPEN (P-T OPEN)

NO SYMBOL: WITHOUT

BRAKE RELEASE VALVE

B WITH

NO SYMBOL: WITHOUT

BRAKE VALVE (WITH ANTICAVITATION PORT)

E WITH

NO SYMBOL: WITHOUT (ADJACENT TYPE)

SWITCH FOR DETECT OF NEUTRAL POSITION

DESIGN NUMBER IS SUBJECT TO CHANGE WITHOUT NOTICE

DESIGN NUMBER

NO SYMBOL: STANDARD TYPE

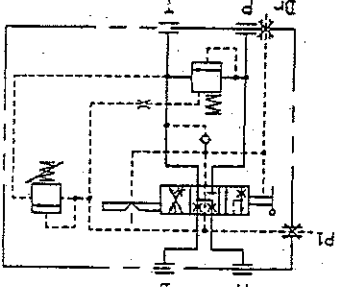
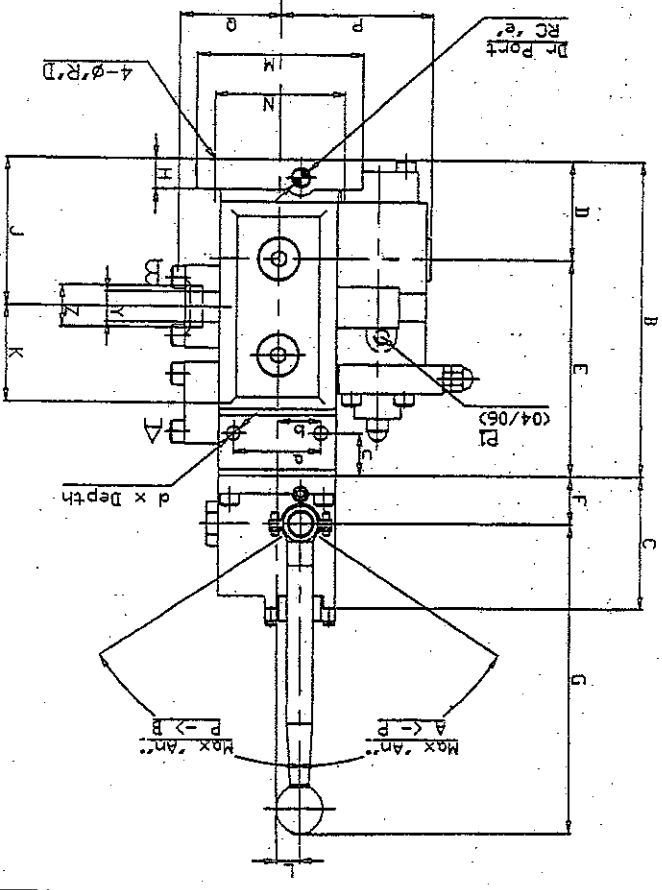
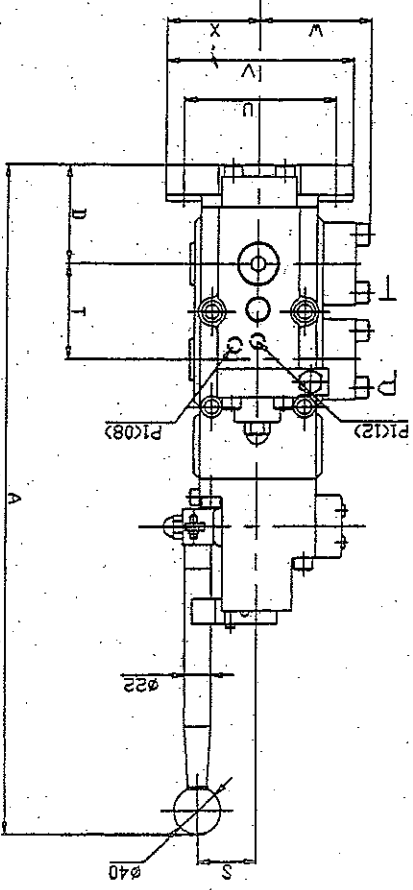
SPECIAL FEATURE

FDS The list of dimension

Type	Flow	Caliber	Mess
FDS04	30-60L/min	15A	26kg
FDS06	70-150L/min	20A	26kg
FDS08	120-300L/min	25A	35kg
FDS12	300-500L/min	40A	74kg

Type	A	B	C	D	E	F	G	H	J	K	L	N	M	P	Q	R	S
FDS04	455	215	96	74	141	40	200	25	108	64	18	100	130	118	82	13	49
FDS06	455	215	96	74	141	40	200	25	108	64	18	100	130	118	82	13	49
FDS08	557	262	110	82	180	40	255	25	122	80	20	110	140	129	90	13	50.8
FDS12	695	320	135	95	225	45	330	30	147.5	95	28	160	200	169	122	17	62

Type	T	U	V	W	X	Y	Z	a	b	c	d	e	An	P1
FDS04	66	130	160	82	80	ø16	ø22.2 ^{+0.2} ₀	70	35	20	M10x15	RC 56 ^{g3}	ø3	RC 7 ^{h7}
FDS06	66	130	160	82	80	ø20	ø27.7 ^{+0.2} ₀	70	35	20	M10x15	RC 56 ^{g3}	ø3	RC 7 ^{h7}
FDS08	80	130	160	95	80	ø25	ø34.5 ^{+0.2} ₀	74	37	35	M12x15	RC 56 ^{g3}	ø3	RC 7 ^{h7}
FDS12	100	180	220	127	110	ø37.5	ø49.5 ^{+0.3} ₀	74	45	30	M12x20	RC 56 ^{g3}	ø3	RC 7 ^{h7}



Symbol

MARK	NAME OF PARTS	MATERIAL	QTY	NOTE	WEIGHT
寸法表					
DRAWN BY	Yoshizawa	CHECKED BY	MODEL		
DATE DRAWN	2000.9.18	NAME	Hydraulic Control Valve		
SCALE	VIEW	DRAWING NO. KU4040005-1			
HYDRO-GEAR CO., LTD.					

4. Symbol, Structure

Fig.1 showed symbol, Fig.2 showed construction.

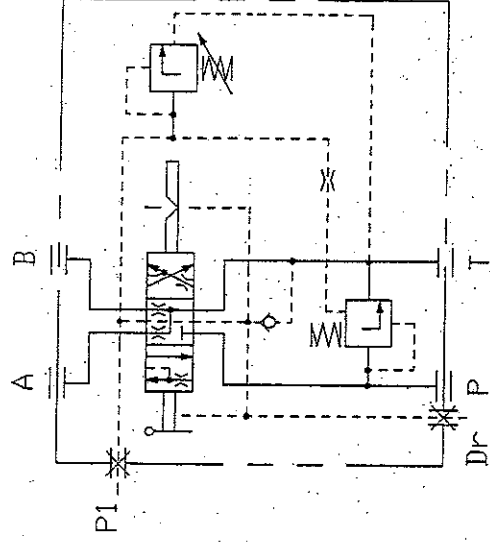
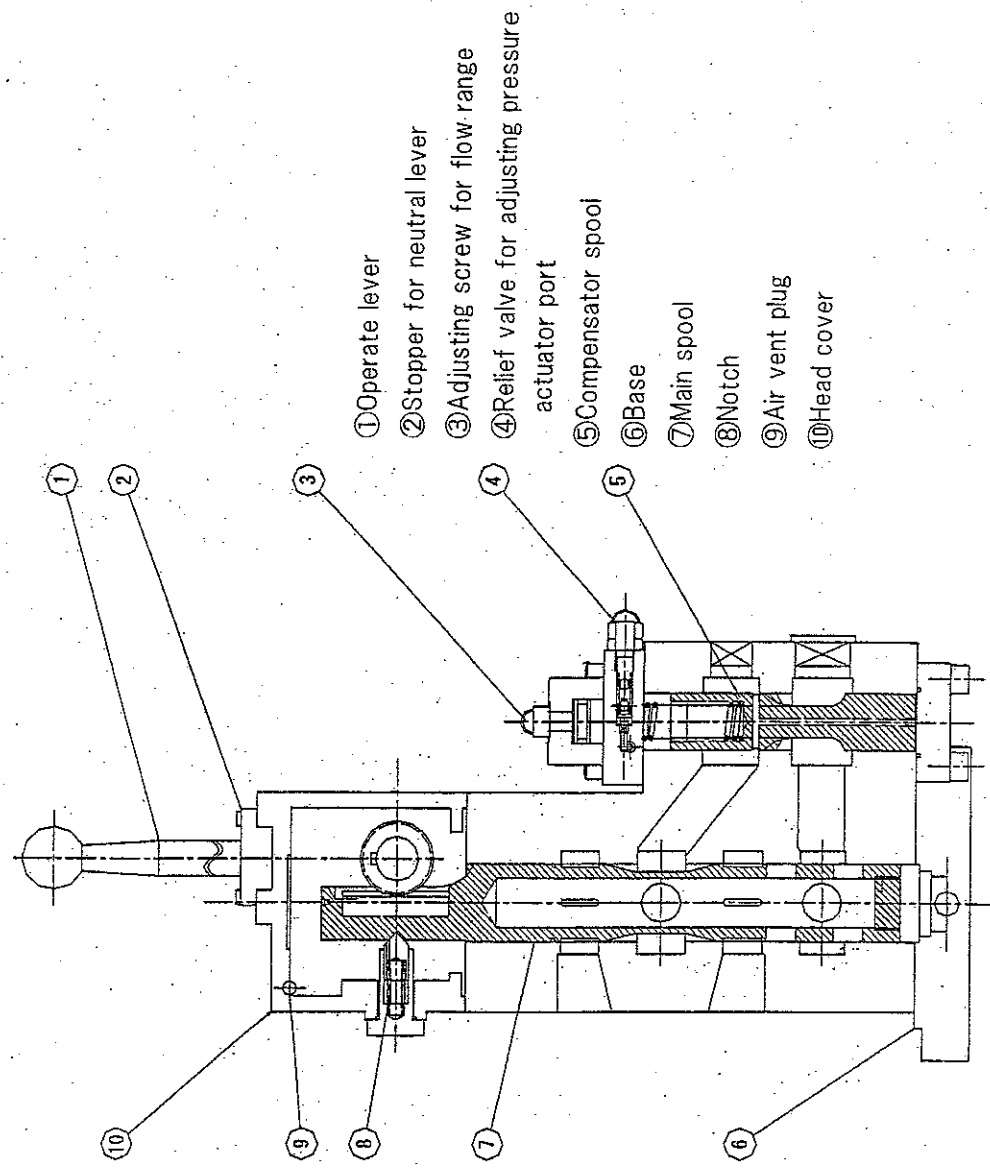


Fig.1

Fig.2

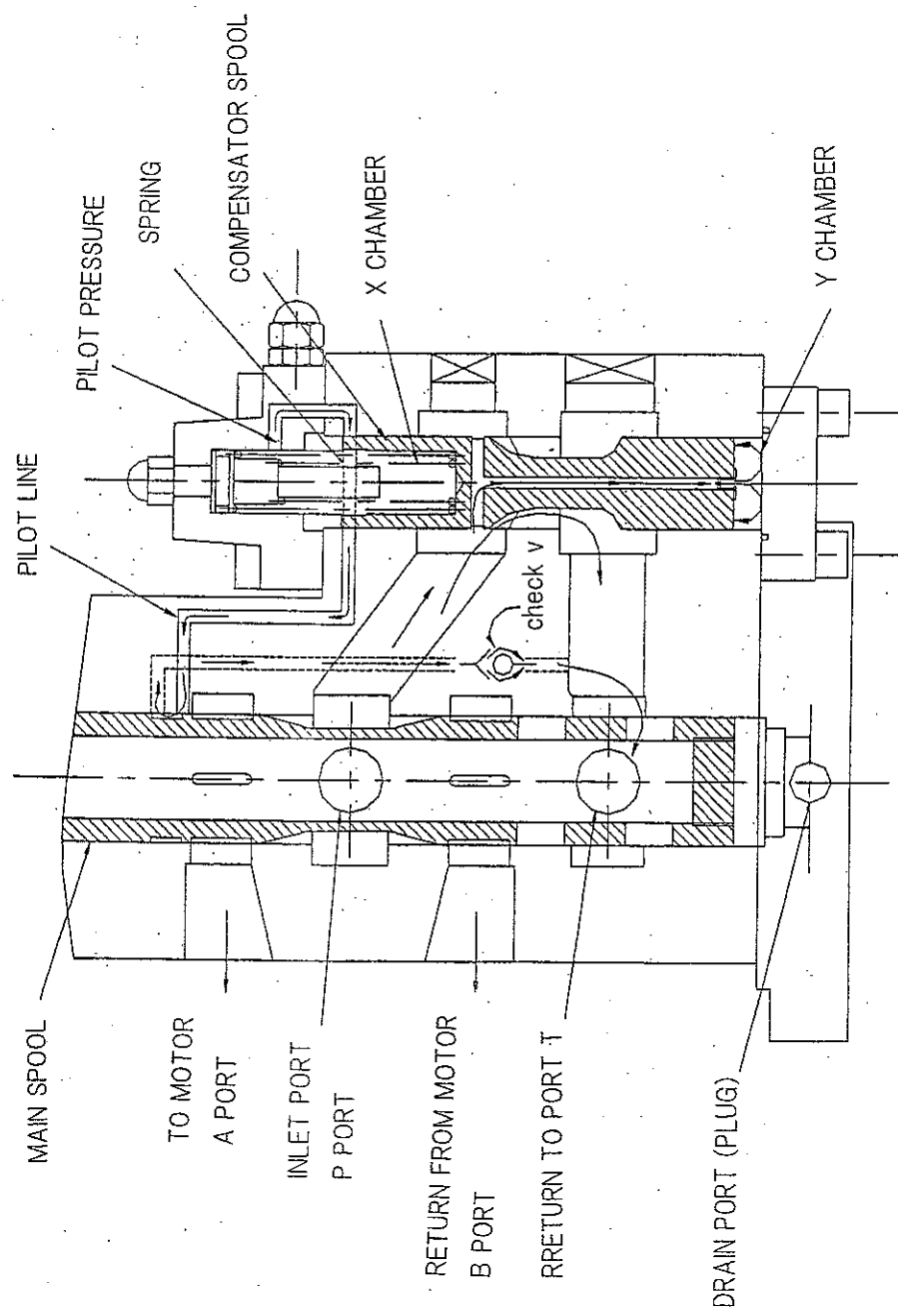


5.Explanation of motion

5-1) At neutral position (Internal drain)

At neutral position, spring chamber X is connected to drain port via pilot line so that spring chamber X is acted only spring force. The oil flow from port P act on chamber Y of compensator spool make pressure which conquer against spring force, and compensator spool is pushed up by these pressure so that the oil flow out to tank port.

Fig.3

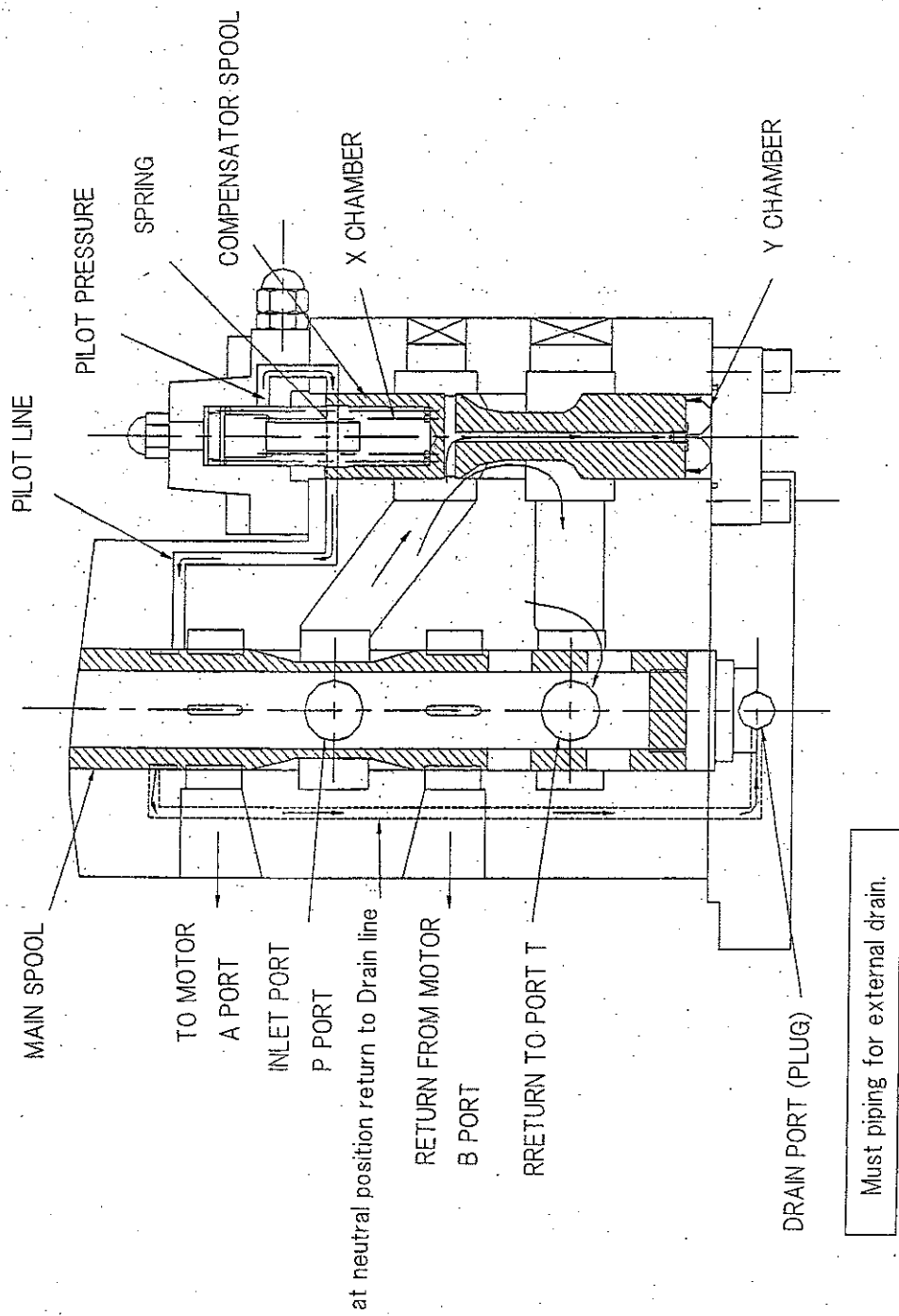


This drawing shows function only. (Not describe actual arrangement)

5-2) At neutral position (External drain)

At neutral position, spring chamber X is connected to drain port via pilot line so that spring chamber X is acted only spring force. The oil flow from port P acts on chamber Y of compensator spool make pressure which conquer against spring force, and compensator spool is pushed up by these pressure so that the oil flow out to tank port.

Fig.4



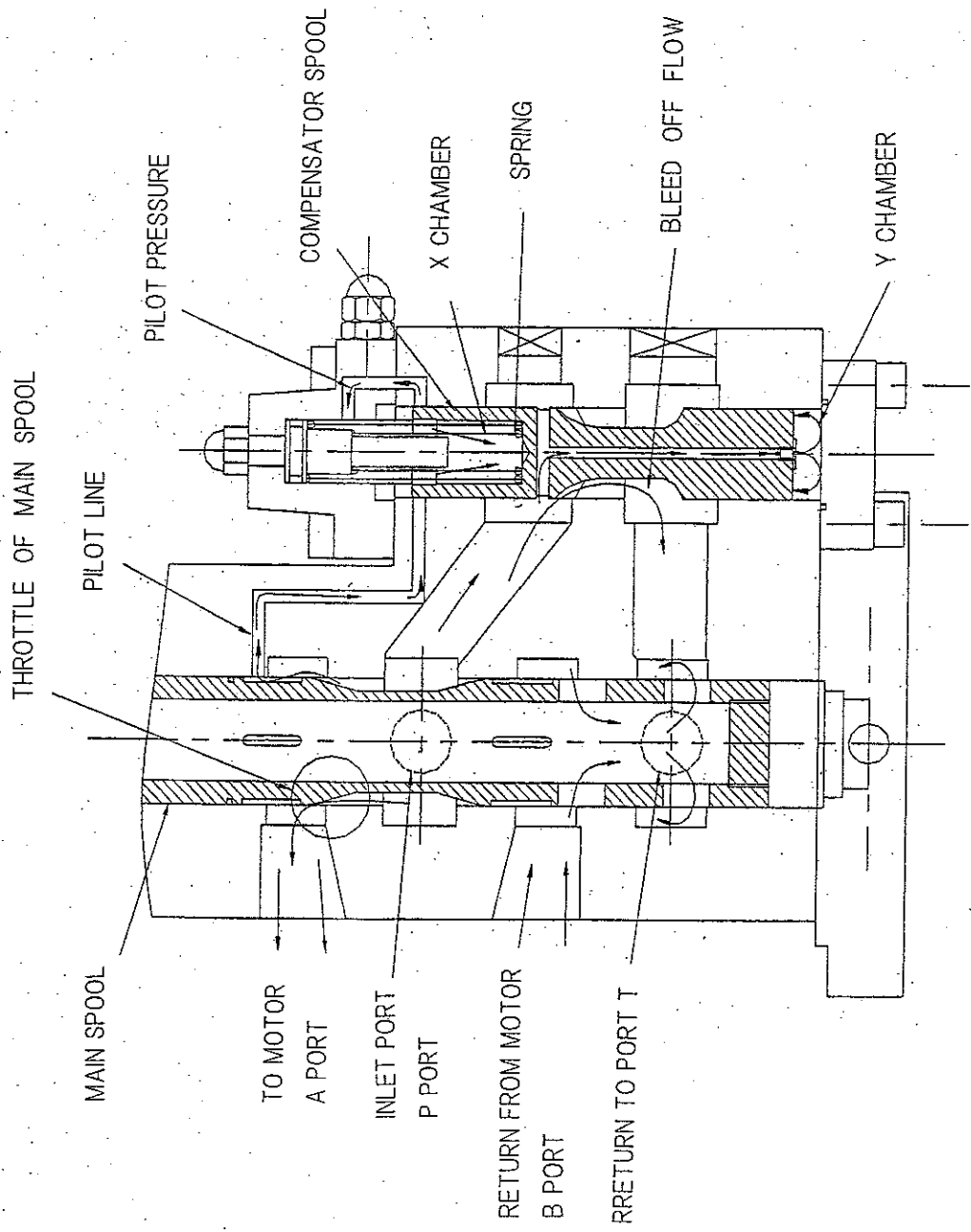
This drawing shows function only. (Not describe actual arrangement)

5-3) At operated lever .

By control lever (figure shows P→A operation), the oil flow from port P to port A via throttle of spool, at the same time pilot line (pressure for port A or B) which connected to port T at neutral position is changed and connected with X chamber via ditch of spool so that compensator spool controls to keep pressure difference of before and after of throttle of main spool.

As like this, set flow keeps stability without load fluctuation.

Fig.5



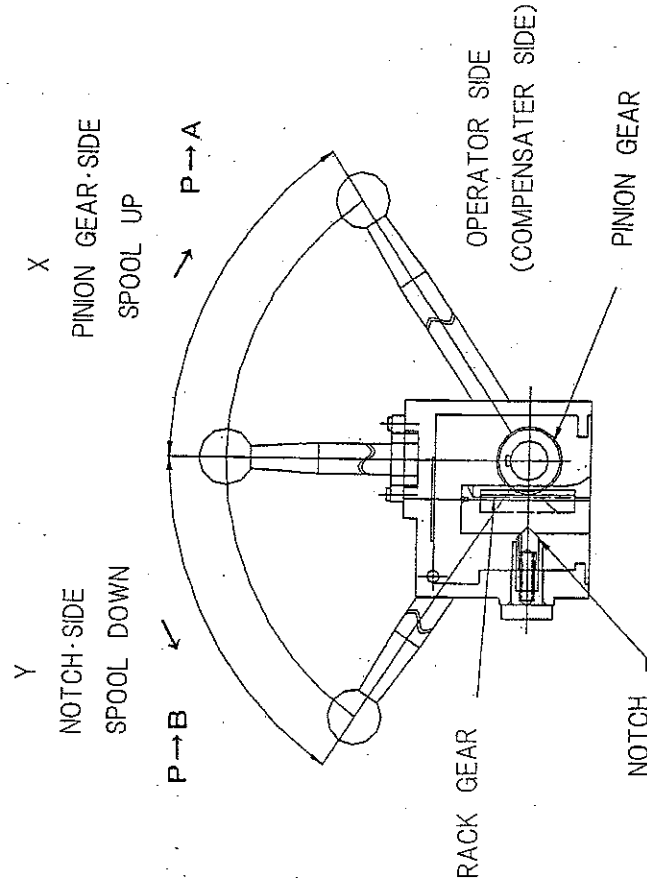
This drawing shows function only. (Not describe actual arrangement)

6.Function and caution

6-1) The relation between turning direction of lever and flow port. (See Fig.6)

By controlled lever the pinion gear which installed with shaft is turned and main spool move up or down. When the lever moves above (to X direction of Fig.4) the ports $P \rightarrow A$, $B \rightarrow T$ are connected and, in case of reverse (to Y direction of Fig.4) $P \rightarrow B$, $A \rightarrow T$ are connected.

Fig.6



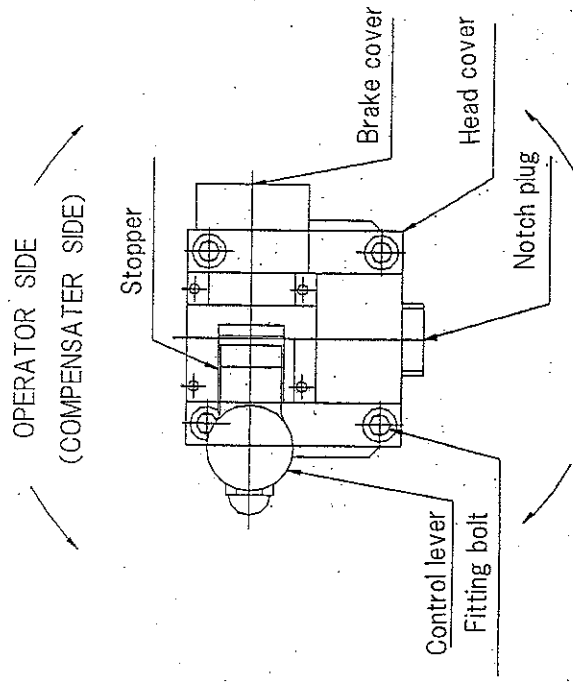
6-2) Changing position of lever (See Fig.7)

Lever can be rotated with the head cover in 90 degree steps. In this case, the oil flow direction is not changed at all.

Caution 1 Tighten bolt with proper torque.

2 This work must be done after pump is stopped running. Be careful in case of dropping O-ring.

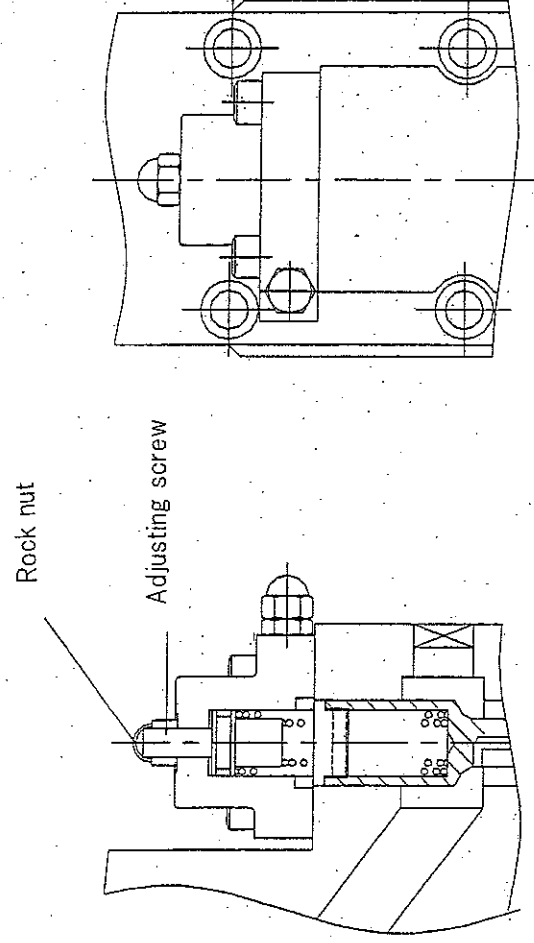
Fig.7



6-3) Adjusting method of flow range (See Fig.8)

Extent of adjustment for flow range : 75%~105% of standard flow range.

Fig.8



Turn to clockwise increase flow amount.

Turn to counter clockwise decrease flow amount.

(Caution) It has settled standard flow range at shipment. Please do not touch uselessly you need to, and do adjust with care if necessary.

6-4) Function of stopper (See Fig.9)

Maximum, operating angle is adjustable by stopper. After loosen lock nut, to fasten tight with screw makes wide of angle, against loosen makes narrow.

Caution 1) Whenever changing maximum lever angle, please confirm the influence upon another equipment.

Caution 2) Tighten lock nut certainly after adjusted.

Caution 3) Settled up ± 56 degree of max lever angle at shipment.

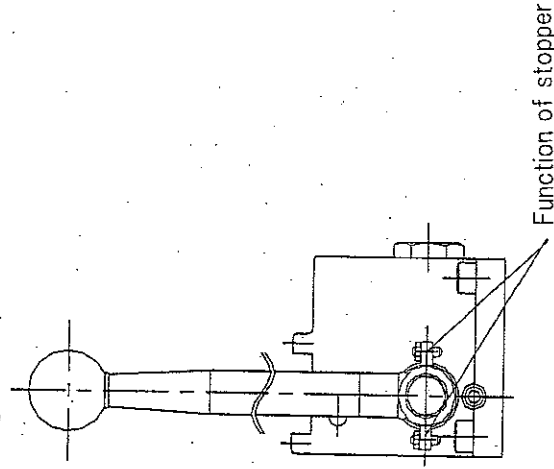
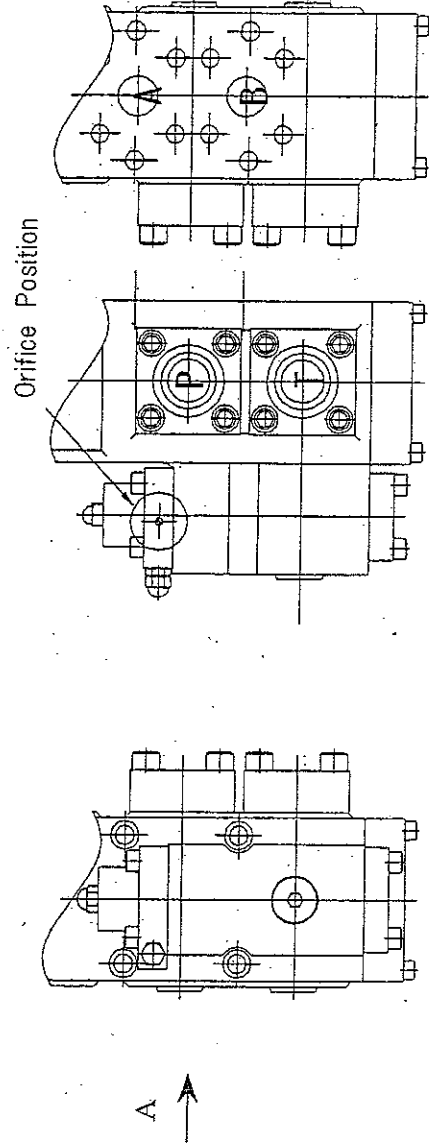


Fig.9

6-5) Piping and caution (See Fig.10)

Fig.10



Caution

- 1) Be careful not to be influenced of strain with piping at each ports showed Fig.10.
- 2) Port P.T also be surface of arrow A. Please select depends on situation.

6-6) Adjustment of operating force (See Fig.7)

The bolt appears after removing brake cover. Fasten tight, force becomes heavy, loosen, becomes light.

(Caution) Set up 49N (5 Kgf) of force at shipment. By adjustment force become light, there are some case of changing angle which leaves at α degree with flow force, so please be carefully on this adjustment.

6-7) Adjustment point of secondary relief valve (See Fig.11).

The adjusting screw appears after removing lock nut. To fasten it tight with screw driver increases the setting pressure, against loosen pressure, and to loosen decreases it.

1 turn changes approximately 9Mpa/rev. Recommend to connect pressure gauge at port P1, when adjustment.

※Set up 20.6Mpa at shipment.

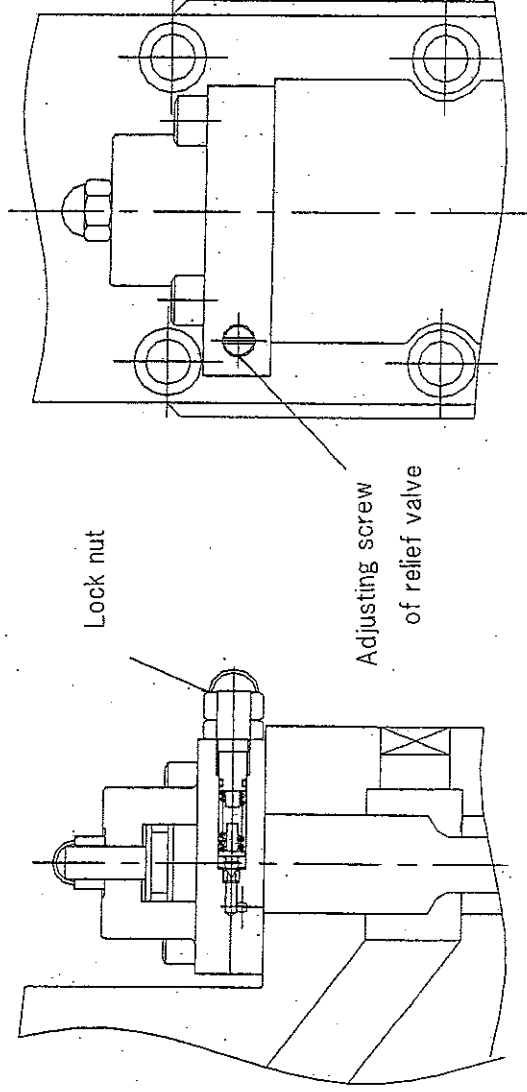


Fig.11

6-8) Usage of port P1

Please take advantage of measurement for secondary load pressure.

6-9) Caution on use

- ① Using clean oil as a hydraulic fluid over NAS10.
- ② Do not use exceed rated performance.
- ③ Do not operate except standard lever. (which attached)
- ④ Welding flanges used for connecting ports, caution with welding method.
- ⑤ Manage without influence of piping strain.
- ⑥ Fasten cap screw with proper tightening torque besides balanced.
- ⑦ With consideration such as covering to avoid mix in dust or something when do working for equip or maintenance.
- ⑧ In case of work which resolve some plugs, the seal tape on thread must remove completely because of bunged orifice.

7, Trouble shooting

	Trouble	Countermeasure
A	No working even operated	Confirm motion of compensate spool after cover is removed. If not smooth, do rapping with fine rapping powder.
B	Can not control of flow.	·Ditto as above ·Bung of orifice. Clean up with compressor.
C	Increase or decrease of flow amount at maximum changing position.	Over or less tighten of adjust screw with compensate valve. Reset to initial adjustment. After adjusted, tighten with lock nut.
D	Control level binding	The reason for this trouble is mostly stick of main spool with piping stress or over tighten of screw for flange. Readjust these item.
E	Instability of flow	This reason is behind in response of compensate valve with unsuitable viscosity range or bunged up of orifice. Check and clean of orifice. The delay response should be solved by replacing to bigger diameter of orifice and when hunting happened, change to smaller one. Thread size of orifice plug; M5.

Most of reason for oil hydraulics equipment trouble is by contamination of oil. Therefore to control of oil regularly is to prevent those almost of trouble. Daily checking of oil for keep clean is recommended.


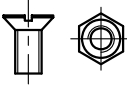

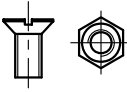
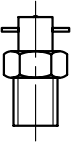
M

锚机、绞车备品、工具清单

SHIP NO. :

WINDLASS & WINCH SPARE PARTS & TOOL LIST

TOTAL 1 PAGE , THE 1ST PAGE

序号 NO.	名称 NAME	简图 SKETCH	规格型号 MATERIAL	数量/每船 SUPPLY/SHIP	合计 TOTAL	备注 REMARKS
1	锚链轮刹车带 CHAIN WHELL BRAKE LINING		5000×200×δ12	1 SET		
2	锚链轮刹车用螺栓、螺母 CHAIN WHELL BRAKE BOLT,NUTS		M10×50	60 SETS		
3	液筒刹车带 DRUM BRAKE LINING		3800×100×δ9	1 SET		
4	液筒刹车用螺栓、螺母 DRUM BRAKE BOLT,NUTS		M8×35	30 SETS		
5	油嘴 GREASE NIPPLE		PS1/4	20 SET		
6	油脂枪 GREASE GUN		HG65-3Q	1 PIECE		配油嘴和加油管
7	备件箱 SPARE PARTS BOX			1 PIECE		
8	刹车试验装置 BRAKE TEST KIT			1 SET		

NAME:

φ73(AM3)COMBINATION WINDLASS/MOORING WINCH
14.7kN MOORING WINCH

CLASS:

DRAWING NO.:

REV. NO.

S. N

PAGE

DATE

DESIGN

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APPROVED

NANTONG MASADA SHIP MACHINERY CO., LTD

MFR'S ADDRESS : NO.118 HUANGHAI ROAD, GANGZHA DEVELOPMENT AREA, NANTONG, JIANGSU, CHINA

TEL: 0086-513-85306826 FAX: 0086-513-85306811

M

液压马达、换向阀、截止阀备件清单

SHIP NO. :

HYDRAULIC MOTOR & REVERSING VALVES & CLOSE VALVE SPARE PARTS LIST

TOTAL 1 PAGE , THE 1ST PAGE

序号 NO.	名称 NAME	简图 SKETCH	材料 MATERIAL	数量/每船 SUPPLY/SHIP	图号 DRAWING	备注 REMARKS
1	O型密封圈 O-RING		NBR	4		用于换向阀
2	O型密封圈 O-RING		NBR	4		用于泵
3	O型密封圈 O-RING		NBR	4		用于泵
4	O型密封圈 O-RING		NBR	4		用于液压马达
5	O型密封圈 O-RING		NBR	4		用于截止阀
6	锌块 ZINC-BLOCK		ZN	4		用于冷却器
7	滤芯 FILTER ELEMENT		FAX-1000X30	2		用于过滤器

NAME:

CLASS:

DRAWING NO.:

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M

冷却器备件、工具清单

SHIP NO. :

OIL COOLER SPARE PARTS & TOOL LIST

TOTAL 1 PAGE , THE 1ST PAGE

序号 NO.	名称 NAME	简图 SKETCH	材料 MATERIAL	数量/每船 SUPPLY/SHIP	图号 DRAWING	备注 REMARKS
1	冷却管 COOLING TUBE		镍铜管 Ni-Cu TUBE	2 SET		
2	螺塞 PIUG SCREW		碳素钢 CARBON STEEL	2 SET		
3	橡皮塞 NBR PLUG		橡胶 RUBBER	4		
4	冲销工具 TUBE ENBOSS TOOL		钢 STEEL	1		
5	钢丝刷 WIPE BRUSH		钢&木材 STEEL & WOOD	1		
6	扩张器 EXPANDER		钢 STEEL	1		
7	扩张器手柄 EXPANDER HANDLE		钢 STEEL	1		
8	管清理刷 TUBE CLENING BRUSH		钢 STEEL	1		

NAME:

φ73(AM3)COMBINATION WINDLASS/MOORING WINCH
14.7kN MOORING WINCH

CLASS:

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M

电器备件清单

SHIP NO. :

ELECTRICAL SPARE PARTS LIST

TOTAL 1 PAGE , THE 1ST PAGE

序号 NO.	名称及型号 NAME & TYPE	数量/每船 SUPPLY/SHIP	图号 DRAWING	备注 REMARKS
1	指示灯 AD11-22/21 AC220V INDICATOR LAMP	6		2只(白色);2只(黄色);2只(绿色)
2	指示灯 AD11-22/21 DC24V INDICATOR LAMP	2		2只(红色)
3	熔芯 RL98-16 FUSE	12		2A,4A,6A各4只
4	蜂鸣器 CDY-22/21 DC24V BUZZER	1		
5	电流表 F72-A BUZZER	1		0-300A,1只。6倍 过载
6	中间继电器 HH54P DC24V RELAY	1		
7	时间继电器 JS14P 99S AC220V TIME RELAY	1		
8	起停按钮 LA38-11-204 START/STOP PUSH BUTTON	2		各1只

NAME:

CLASS:

DRAWING NO.:

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南通政田船舶机械有限公司

NANTONG MASADA SHIP MACHINERY CO., LTD

Windlass & Mooring Winch Lube Oil Chart 润滑油推荐表

Lubricants Brand	Oil Points	闭式齿轮 Enclosed Gear (油浸)	开式齿轮或钢绳 Open Gear & Wire Ropes (用刷子 By Brush)	轴承或链节 Bearings & Chain (润滑枪或用手)
SHELL 壳牌		OMALA 220	Malleus GL 95	Alvania EP Grease2 Rhodina EP2
MOBIL 美孚牌		Mobilgear XP 220	MOBILTAC 375 NC	Mobilux EP2 Mobilgrease XHP 222
TOTAL 道达尔		ELF Epona Z 220	Ceran AD Plus	Ceran WR2
BP 牌		ENERGOL GR XP 220	ENERGREASE WRP	ENERGEASE MP-MG2
CALTEX 加德士牌		Meropa 220 EP Lubricant HD.150.220	OPEN Gear Oil N° 0	WATER RESISTANT EP GREASE N°2
TEXACO 德士古牌		Meropa 150.220	Texclad Premium 2	MULTIFAK EP 2
CHEVRON 雪佛龙牌		NL Gear Compound 150.220	PIGNON GREASE 250CB	MOLYGREASE 2 MULTIFAK EP 2
GULF OIL MARINE 海湾船舶石油		GulfSea Gear Oil 220 (SeaLub Gear Oil 220)	GulfSea HYPERBAR Super CS (SeaLub HYPERBAR Super CS)	GulfSea HYPERBAR CS2 (SeaLub HYPERBAR Super CS)
CASTROL 嘉实多牌		Alpha SP 150.220	Spheerol SX 2	Spheerol EPL2 Spheerol SX 2
NIPPON OIL		Bomoc SP 150.260	Cronoc Compound No.2	Multinoc Grease NO.2 Epnoc Grease NO.2
IDEMITSU		DaphneCE Compound Daphne CE 150S Compound 220S	Daphne 2-S 开式齿轮润滑油	Daphne Coronex Grease Daphne Coronex NO.2 Grease EP NO.2
MITSUBISHI 三菱牌		Diamond gear Lub SP 150.220	Diamond OG Grease 550	Diamond Multi Purpose Grease M2.2
MARUZEN 牌		Swacol SP220	MaruzenBRC No.3 润滑油	Limax NO.2
SHOWA OIL		Shoseki Gc220	Shoseki No.2 齿轮润滑油	Shoseki Sunlight Grease NO.2

电话(Tel): 0513-85306822/23 传真(Fax): 0513-85306811 邮箱(E-mail): sales@masada.cn

地址: 南通市港闸经济开发区黄海路 118 号 邮编(P.C.): 226005 网址(Http): www.masada.cn

(Add).: No.118, Huanghai Road, Gangzha Development Area, Nantong, Jiangsu



南通政田船舶机械有限公司

NANTONG MASADA SHIP MACHINERY CO., LTD

GENERAL 牌	General SP 150.220 齿轮润滑油	OG 680 齿轮润滑油	Gemico Grease MF-2 Gemico Grease MP-2
DAIKYO 牌	Pio SP150.220 齿轮润滑油	Dynamic SP-2 齿轮润滑油	Dynamic Grease MP-2
KYOSEKI 牌	Kyosekl Reductus 220	S600 齿轮润滑油	Risonics Grease MP-2 Risonioe Grease2
FUJI KOSAN 牌	Fukkol mild EP Gear 220	Fukkol No.2 开式齿轮油	Fukkol Multi Purpose Grease NO.2
长城牌	齿轮油 CKD220	开式齿轮油 10000	钙基润滑脂 3 号

Pump Unit Hydraulic Oil Chart 泵站液压油推荐表

品牌	品名		
SHELL 壳牌	Tellus Oil T 46		
MOBIL 美孚牌	Mobil DTE 15M		
TOTAL 道达尔	VISGA 46		
BP 牌	BARTRAN HV 46		
CALTEX 加德士牌	HYDRAULIQUE LPS 46		
TEXACO 德士古牌	RANDO HDZ 46		
CHEVRON 雪佛龙牌	RANDO HDZ 46		
GULF OIL MARINE 海湾船舶石油	GulfSea Hydraulic HVI Plus 46 (SeaLub Hydraulic HVI Plus 46)		
CASTROL 嘉实多牌	HYSPIN AWH-M 46		
NIPPON OIL	NIPPON OIL Super Hyrando 46		

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 地址: 南通市港闸经济开发区黄海路 118 号 邮编(P.C.): 226005 网址(Http): www.masada.cn
 (Add).: No.118, Huanghai Road, Gangzha Development Area, Nantong, Jiangsu



南通政田船舶机械有限公司

NANTONG MASADA SHIP MACHINERY CO., LTD

IDEMITSU	Daphne Hydraulic Fluid 46WR		
MITSBISHI 三菱牌	Diamond lube RO-46		
MARUZEN 牌	Swa fluid 46(N)		
SHOWA OIL	Shoseki S-H46		
GENERAL 牌	Panol 46		
DAIKYO 牌	Pio fluid RO46		
KYODO 牌	Hydlux 46		
FUJI KOSAN 牌	Fukkol Hyorol X46		
长城牌	HV-46#抗磨液压油		

*Please choose ISO VG 32 hydraulic oil when the vessel is always in Cold Zone and choose ISO VG 68 hydraulic oil when the vessel is always in Torrid Zone to guarantee the normal working performance.

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