



Photo courtesy of Bumi Armada

## Jastram Rudder Angle Indicators

### X80 Series

The X80 Series Rudder Angle Indicators are produced to fill the requests of vessels operators and to meet Classification Societies' requirements.

The X80 Indicators come in 3 sizes to fit all bridge applications. In a system up to five indicators can be used with a mixture of forward and reverse scale meters.

The 2 main components in a Jastram X Series RAI system are:

1. Rudder Angle Indicator(s)
2. Rudder Feedback Unit (RFU)

### RAI 3300

The largest of the series is the 3300 overhead three faced panoramic indicator. These are stand alone systems comprised of three main components:

1. A three faced panoramic Rudder Angle Indicator (RAI 3300)
2. RAI 3300 power supply
3. Rudder Feedback Unit

## The X80 Series

- Wheelmark and MED Approved
- Dimmable backlit analog display
- Designed to be flush-mounted into any convenient panel or console
- Reverse scale indicators are available for aft facing stations
- Indication up to 50 degrees port and starboard
- Drive up to five indicators from one feedback

### Rudder Feedback Units for the X80 Series are:

**RFU 400** Commercial potentiometer and driver board

**RFU 1300** Hall effect device, driver board and limit switches (used with control system)

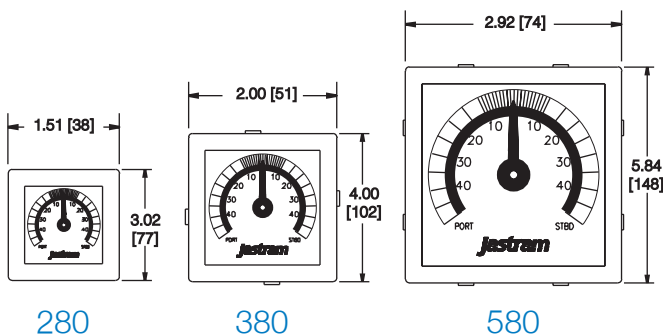
**RFU 2000** Commercial potentiometer, driver board and limit switches (used with control system)

### IP Ratings:

- X80's are rated for IP52 protection (to the face)
- Optional seal kits available for IP66 protection (to the face)
- Optional 580 Bulkhead Mount version available for IP66 to the whole indicator

<b>X80 Signal Inputs:</b>	0 Volts at 0 Degrees
	±1 Volts at ±50 Degrees
	1 kΩ input resistance
<b>Power Supply:</b>	24VDC, Max 150 mA
<b>Cable:</b>	18 AWG, 4 wire, shielded

## X80 Models & OADs



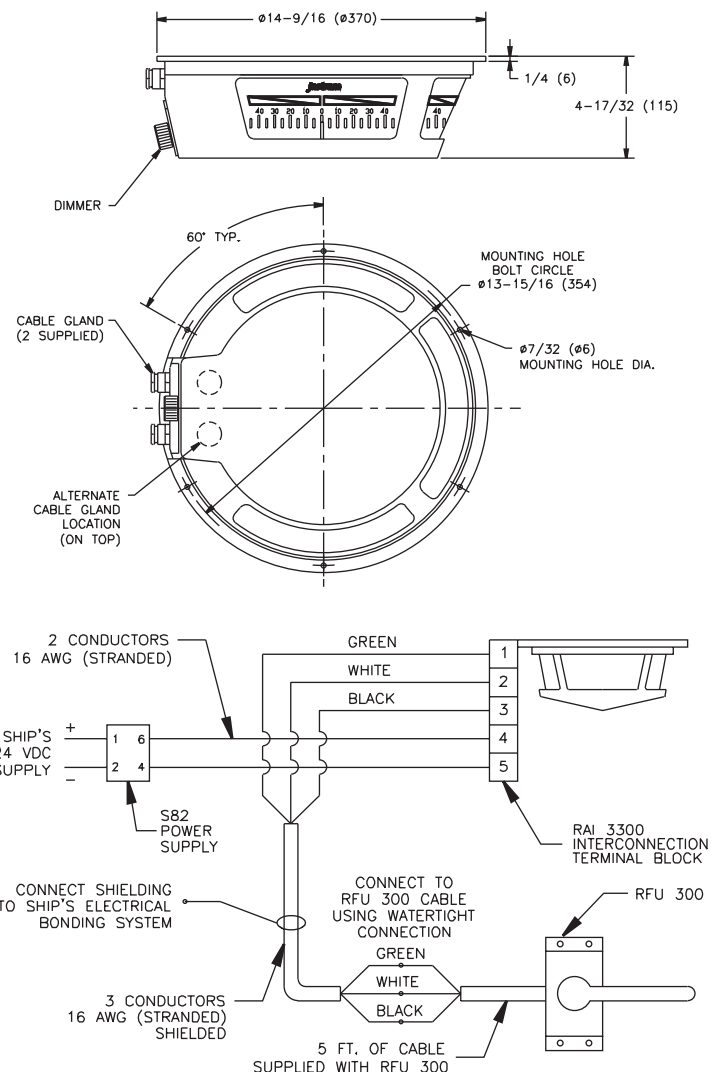
## The RAI 3300

- Accurately shows the position of the rudder on three large scale analog displays
- Built-in dimmer allows for adjustment of the backlight
- Deckhead mounted at any convenient location in the wheelhouse
- Two Power Supply options are available
  - \* Input voltage of 12-24 VDC and outputs 24 VDC
  - \* Input voltage of 100- 40 VAC and outputs 24 VDC
- Cable requirements 16 AWG, 3 wire, shielded

### Rudder Feedback Units for the RAI 3300 are:

**RFU 300** Commercial potentiometer

**RFU 2000** Commercial potentiometer, driver board and limit switches (used with control system)



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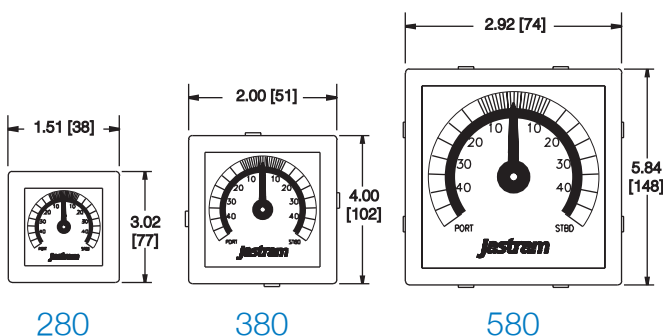
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<b>X80 Signal Inputs:</b>	0 Volts at 0 Degrees
	±1 Volts at ±50 Degrees
	1 kΩ input resistance
<b>Power Supply:</b>	24VDC, Max 150 mA
<b>Cable:</b>	18 AWG, 4 wire, shielded

## X80 Models & OADs



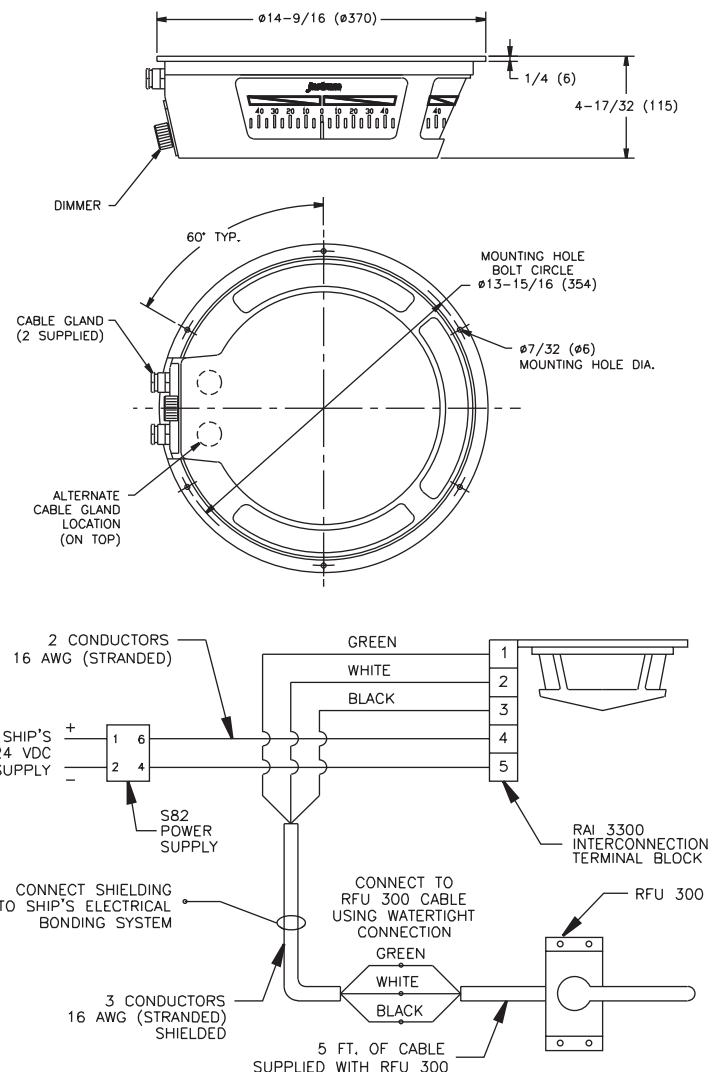
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- Deckhead mounted at any convenient location in the wheelhouse
- Two Power Supply options are available
  - \* Input voltage of 12-24 VDC and outputs 24 VDC
  - \* Input voltage of 100- 40 VAC and outputs 24 VDC
- Cable requirements 16 AWG, 3 wire, shielded

### Rudder Feedback Units for the RAI 3300 are:

**RFU 300** Commercial potentiometer

**RFU 2000** Commercial potentiometer, driver board and limit switches (used with control system)



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Photo courtesy of Eric Stapleton

## Jastram Motor Starter & Alarm Systems

Motor Starter & Alarm (MSA) Systems control the electric motor and monitors the status of the hydraulic power units; feeding flow and pressure to the steering gear. Jastram MSA units are a heavy duty design meant for use in the marine industry.

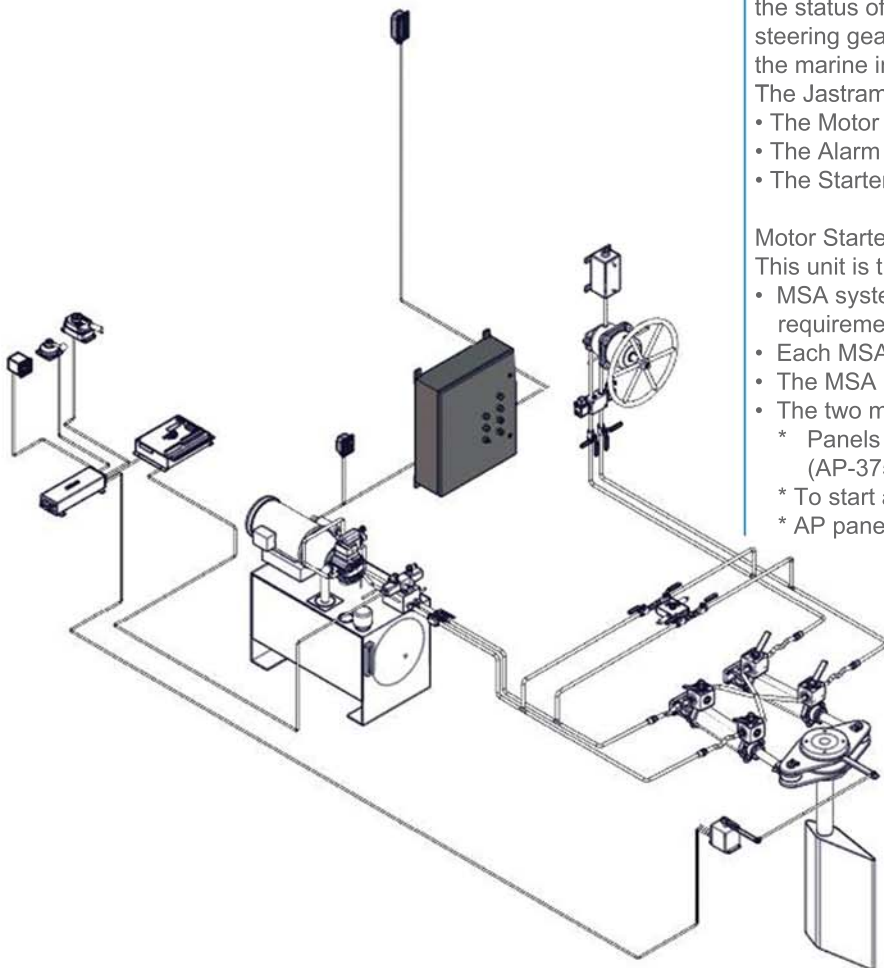
The Jastram MSA system consists of three main components:

- The Motor Starter and Alarm Box (MSA)
- The Alarm Panels (AP-600, AP-375)
- The Starter Panel (SP-36, AP-600)

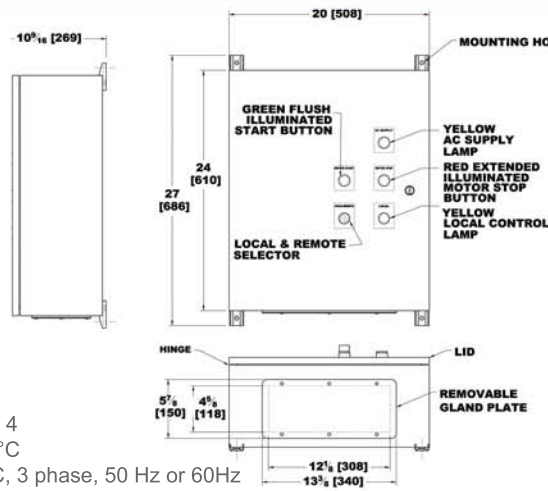
Motor Starters and Alarm Box Features:

This unit is the control and monitoring center of the MSA system.

- MSA system is designed to meet all major Classification Societies' requirements
- Each MSA box services one hydraulic power unit motor
- The MSA box connects to multiple remote alarm panels
- The two main types of panels are the alarm pane (AP) and the starter panel:
  - \* Panels used to indicate the status of the steering gear alarms (AP-375, AP-600)
  - \* To start and stop the HPU motor (AP-600, SP-36)
  - \* AP panels are fitted with independent dimming controls



## Motor Starters & Alarm Box



### Specifications

Enclosure Protection:	IP 66, NEMA 4
Operable Ambient Temperature:	0°C to + 55°C
Main AC Supply Voltage:	208-575 VAC, 3 phase, 50 Hz or 60Hz
Emergency DC Supply Voltage:	24 VDC, -10 % + 20%
HPU Motor Horsepower:	1 HP- 40 HP, ( Note: motors larger than 460 V/40 Hp
Main 3 phase supply fuses:	Require a larger enclosure size
Control Fuse (F4)	3 Amps 8 Amps

### Steering Control Power

Supply Output:	24 VDC ( 4 Amp max.), Auxiliary DC
Supply Current Draw:	30 mA normal operation, 2.5 Amps ( max.) emergency operation
Dimensions:	Approx. 20" x 27" x 11" ( 508mm x 686mm x 269mm)
Weight:	67 Lbs. ( 30.5 kg) (max.)
Mounting:	Bulkhead any orientation

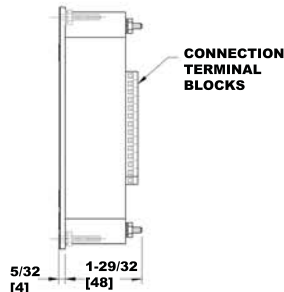
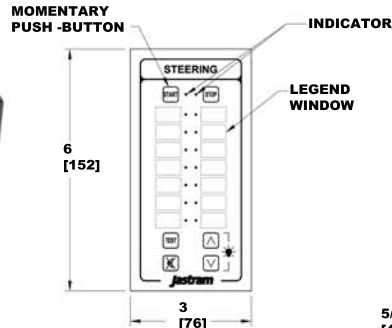
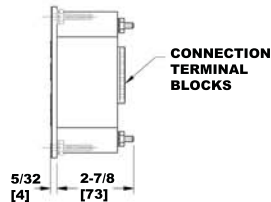
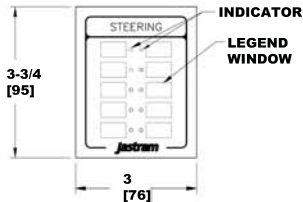
### Details:

- MSA motor interlocking prevents two motors connected to two MSA units from being run simultaneously
- HPU Low Oil Sensor signal is a dry contact input representing the oil level in the HPU reservoir
- Spare Alarm Sensors signals are dry contact inputs for up to four spare alarms
- Automatic transfer to backup power supply upon failure of primary power keeps the steering alarms active
- Automatic restart timer
- Visual indicators at both local and remote panels to warn of events taking place in the steering system

### Options:

- VDR interface can be added to MSA system for Class requirements
- Ship's AC Supply output for Dehumidifier in HPU motor
- Serial Output for third party systems, i.e., Ship's Central Monitoring System
- Ammeter, Hour Counter, Engineer's Delayed Alarm, Hydraulic Lock Alarm

## Alarm Panels (AP-375, AP-600)



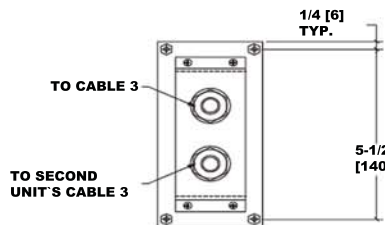
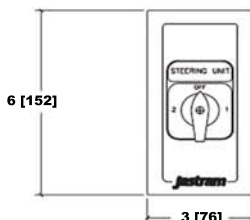
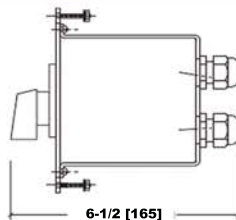
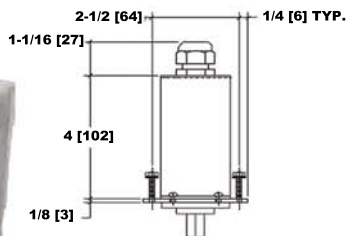
These customized panels provide visual and audible alarms at both local and remote stations.

- Pushbuttons and Indicator options include:
  - \* Up to 11 standard steering gear alarms and indicators are provided
  - \* AP - 375 can be populated with up to 10 indicators
  - \* AP - 600 can be populated with up to 14 indicators and has four dedicated Pushbuttons to for dimming and brightening the backlighting and to test and silence the Alarm Processing Unit's indicators. Start and Stop Buttons are also included.
- LED visual indicators display normal operating and failure modes
- Multiple panels can be installed in the MSA system
- Optional motor start and stop capability

### Specifications:

Indicator Common:	PWM controlled sinking to ground
Indicator Signal Format:	24 VDC from MSA
PWM Frequency:	78 Hz
Output Current:	750mA ( max.) per indicator
Connector:	5.08mm spacing screw terminals
Dimensions:	AP - 600 is 3" x 6" (76mm x 152mm), AP - 375 is 3" x 3 3/4" (76mm x 95mm)

## Starter Panels (SP-36)



The SP - 36 panels are dedicated to starting and stopping the steering gear hydraulic power units motors at the vessels local and remote stations.

- Rotary switch for remote start / stop of interlocked HPU motors
- Multiple panels can be installed in system
- Motor start and stop functions for 2 Hydraulic Power Units

### Specifications

Contact Format:	Maintained Action, Normally Open
Number of Contacts:	4
Maximum Switching Capacity:	5.5 Amps, 240 VAC ( AC11)
Connector:	M 3.5 ( Metric) screw terminals
Dimensions:	3" x 6" (76mm x 152mm)

Data is subject to change without notice\*

BRC01601



Photo courtesy of AF Theriault & Portland Fire Dept. / City of Portland

## Jastram Digital Input Devices

A complete Jastram steering system will include some or all of our input devices combined with the appropriate control and hydraulic systems. The Jastram Digital Input Devices can only be used with the Jastram Digital Control system.

The current line of Jastram Digital Input Devices include:

- Digital Helms (with Digital Helm Manifolds)
- Digital Wheels



## Digital Helm (DH36)

U.S. Patent 6,564,739 / Cdn. Patent 2,353,053

This patented hybrid hydraulic / electric unit provides full follow-up digital electric control as well as emergency manual hydraulic control. Under power steering, the steering wheel is turned producing a rudder command signal the rudder then follows up to the position requested by the wheel. In the event of a power failure the digital helm seamlessly transfers to manual hydraulic steering. Under emergency manual hydraulic steering the number of turns depends on the size of the actuators.

- Compatible with the Jastram Digital steering system
- To be used in conjunction with a Digital Helm Manifold (DHM)
- Under power steering mode:
  - \* Adjustable number of wheel turns, programmable from 1/4 turn to 10 turns lock to lock
  - \* Effort to turn the wheel does not change regardless of operating conditions
- When taking over control of the steering system the Digital wheel takes over at the present position of the rudder. Other systems usually move the rudder back to center before acquiring control of the steering.
- Capable of Manual steering

### Wheel:

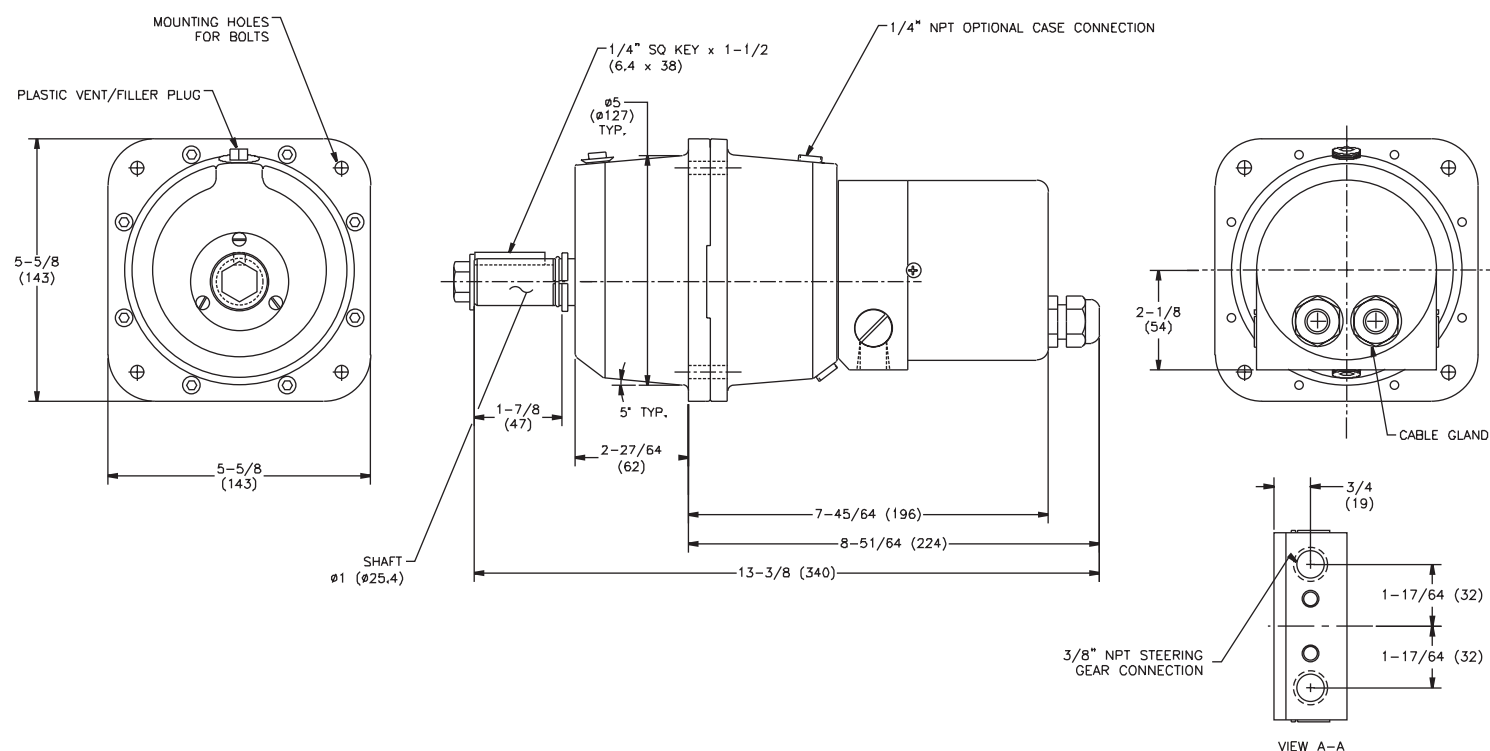
A wheel is not supplied with the digital helm.

DH36 shaft dimensions are:

- 1" by 1 7/8" shaft with a 1/4" square key

### Specifications:

Output Voltage:	12 or 24 VDC
Connector:	Terminal Block
Recommended Cable:	16 AWG 2 wire, not shielded



## Digital Helm (cont)

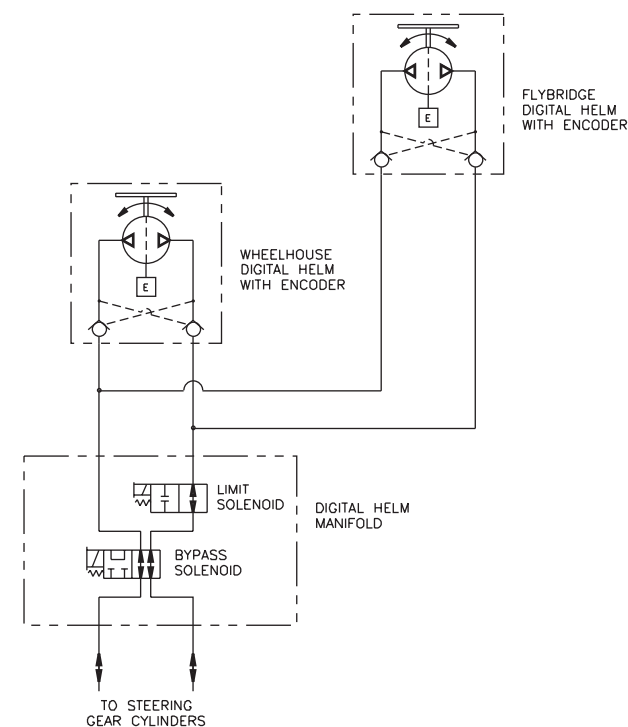
### Two versions available:

- DH36 - 1 is the standard unit and produces one output signal
- DH36 - 2 produces two output signals - the second signal for control redundancy, or for operation of a second steering system where independent twin steering gears are installed

### Notes:

### Warning: Do not use brake fluid or transmission oil

- Requires Hydraulic Oil ISO Grade 32
- The DH36 has a displacement of 3.6 cubic inches per revolution
- SAE O-ring fittings are used for hydraulic connections
- Waterproof and corrosion resistant housing, IP 66



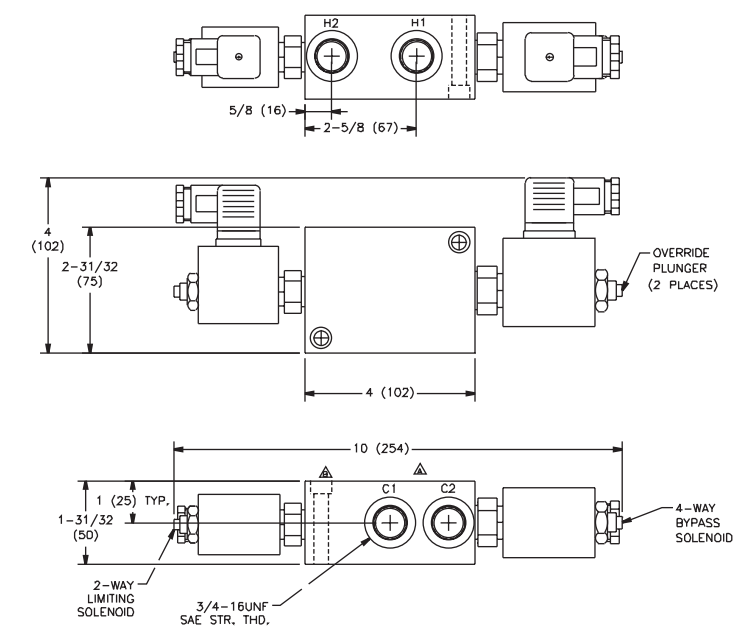
## Digital Helm Manifold (DHM)

The Digital Helm Manifold (DHM) is a small, compact manifold which provides seamless transfer from fly-by-wire steering to emergency manual hydraulic steering in the event of a power failure.

- To be used in conjunction with the Jastram Digital Helm
- Within certain parameters, a single DHM can service multiple DH-36 helms

### Specifications:

Output Voltage:	12 or 24 VDC
Connector:	DIN Connectors
Recommended Cable:	16 AWG 2 wire, not shielded







## Digital Wheel (DW)

Digital Wheels are unique input devices which provide full follow-up digital electric control. The two main features of the Digital Wheel over the standard electric wheel are:

1. A programmable number of wheel turns from ¼ to 10 turns lock to lock and
2. When taking over control of the steering system the Digital wheel takes over at the present position of the rudder

Under power steering, the steering wheel is turned producing a rudder command signal. The rudder then follows up to the position requested by the wheel.

- Only compatible with Jastram Digital steering systems
- Two version of the DW are available:
  - \* DW-1 is the standard unit and produces one output signal
  - \* DW-2 produces two output signals - the second signal for control redundancy, or for operation of a second steering system where independent twin steering gears are installed
- Effort to turn the wheel does not change regardless of operating conditions

### Steering Wheel:

The wheel is not supplied with the digital wheel.

DW shaft dimensions are:

- 1" by 1 7/8" shaft with a ¼" square key



### Mechanical information:

#### Warning: Do not use brake fluid or transmission oil

- Requires Hydraulic Oil ISO Grade 32
- Housing:
  - \* High strength cast aluminum
  - \* Powder painted housings
  - \* Waterproof and corrosion resistant, IP 66

### Specifications:

Output Voltage:	12 or 24 VDC
Connector:	DIN connectors
Recommended Cable:	16 AWG 2 wire, not shielded

*Data is subject to change without notice.*





Photo courtesy of POSH Semco Pte Ltd.

## Jastram Digital Control System

The Digital Control System consists of four basic components:

- A Digital Steering Controller (DSC)
- At least one Mode Control Processor (MCP)
- At least one Steering Input Device
- A Rudder Feedback Unit (RFU)

The core of the Jastram Digital Control System is the Digital Steering Controller (DSC). The DSC processes signals from the Mode Control Processors (MCP) and in turn controls the response of the hydraulic power units and, ultimately, the rudder. The MCP is a station processor which connects the signals from the station Input Devices and Control Panels to the DSC.

Type Approved Product; see details on back page



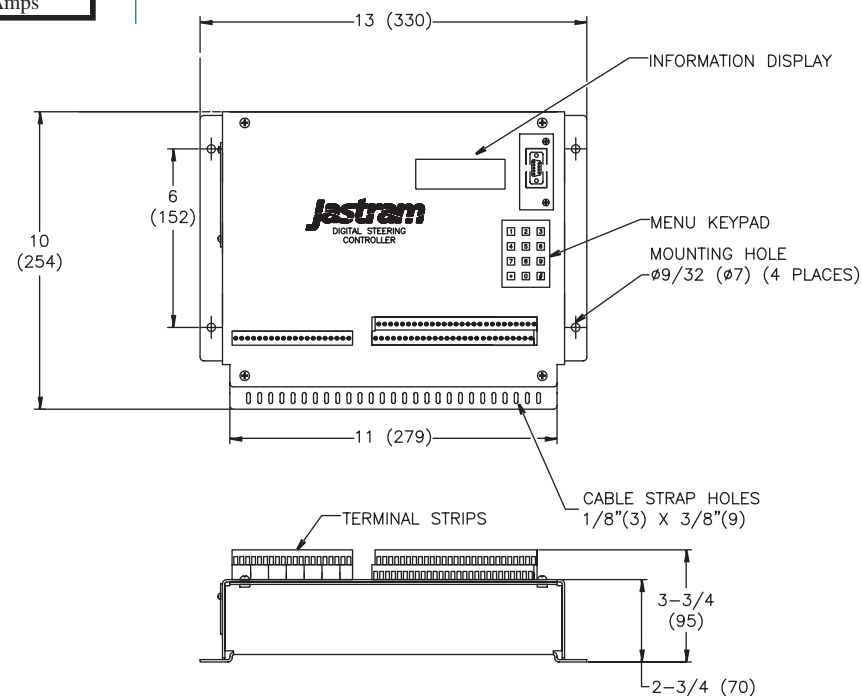
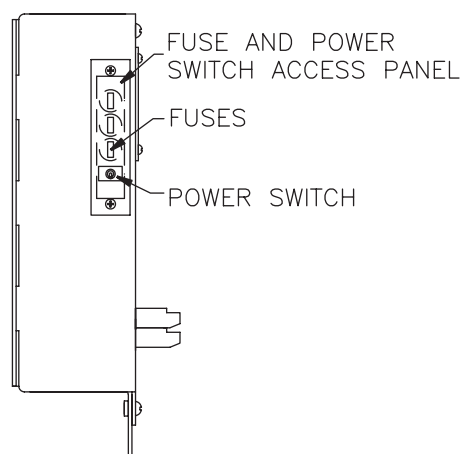
## Digital Steering Controller (DSC)

The DSC is designed specifically for marine steering. It contains a sophisticated microprocessor to perform all computations from the input devices in order to maintain extremely accurate control.

Configuration software is provided to allow each steering system to be customized specifically to the characteristics of each vessel.

- Up to five Mode Control Processors can be connected at the same time allowing virtually unlimited configurations of multiple steering stations to be installed, even after the vessel has been commissioned
- Built-in self diagnostic software with full follow-up failure alarm assist troubleshooting and system servicing
- No routine maintenance required
- Optional waterproof enclosure available, IP55, NEMA 12 (As seen in picture to left & above)

Specifications	
Enclosure Protection:	IP 22, NEMA 2
Operable Ambient Temperature:	+5°C to +70°C
Supply Voltage:	12 or 24VDC, -10% +20%
Power Consumption:	Dependent on system configuration
	approx. 7 Watts, DSC only
EMC Protection:	EN60945, 2005
Dimensions:	Approx. 13" x 10" (330mm x 254mm)
Weight:	4.25 Lbs. (1.93 kg)
Maximum rudder speed	8 seconds (on-off)
	5 seconds (proportional)
Rudder position accuracy	±1/2°
Safe distance to compass:	2 Ft. (0.63 m)
Short Circuit Protection:	Controller (F1), 4 Amps
	Directional Solenoid (F2), 4 Amps
	DHM/Speed Solenoids (F3), 4 Amps

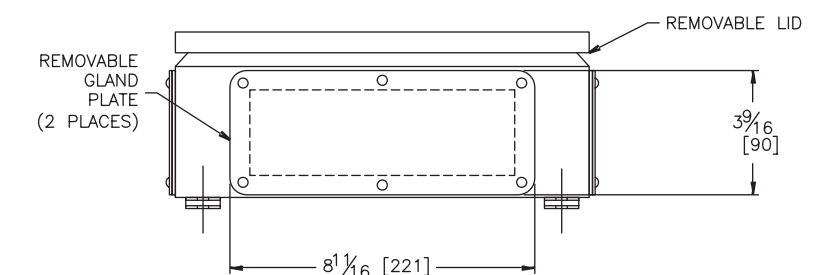
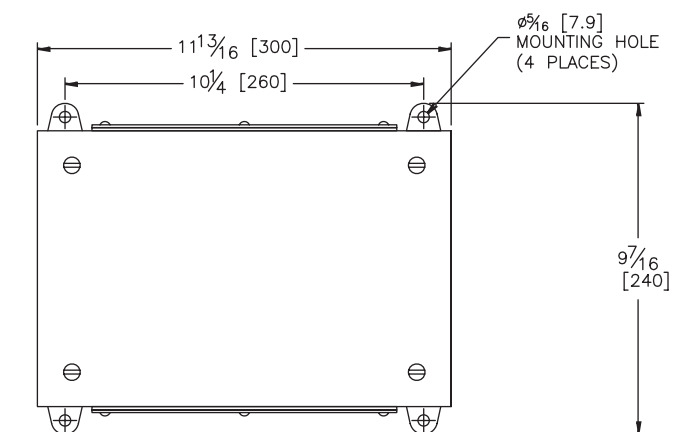
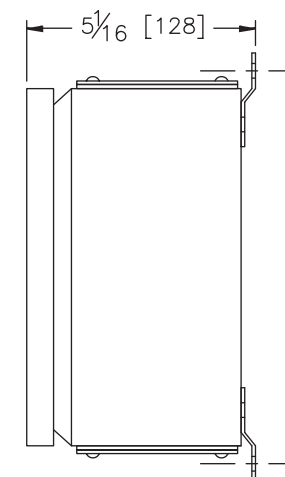


## Mode Control Processor (MCP)

The MCP receives signals from the input devices & control panels then transmits these signals to the Digital Steering Controller for processing. It also receives commands for the RAI, ROI and station transfer logic from the DSC, all through a single RS485 cable.

- Each MCP has the capacity to process:
  - \* Two digital inputs
  - \* Two analog inputs
  - \* One non follow-up input
- Plus the MCP can drive
  - \* Two digital and two analog rudder order indicators
  - \* Five rudder angle indicators.
- Command can be transferred between digital inputs devices instantaneously, without interruption
- Allows both ramping control and basic on /off for backup in one non follow-up jog switch
- Individual adjustment of indicators is provided
- The housing is corrosion resistant

Specifications	
Enclosure Protection:	IP 55, NEMA 12
Operable Ambient Temperature:	-25°C to +70°C
Supply Voltage:	Supplied from DSC
Power Consumption:	Dependent on system configuration
	approx. 1 Watt, MCP only
EMC Protection:	EN60945, 2005
Dimensions:	Approx. 12" x 8" (300mm x 200mm)
Weight:	9 Lbs. (4.1 kg)
Safe distance to compass:	2 Ft. (0.63 m)
Short Circuit Protection:	Yes 1.5 Amp fuse
Mounting:	Bulkhead
Cable Specifications	
Cable:	2 twisted shielded pairs, 120Ω controlled impedance, RS485 communication cable, Belden 3082A, LAPP 2170340 or equiv.
Maximum cable length:	230m (750 ft.)
Cable Break Protection	Yes
Connector:	3.81mm pitch pluggable screw terminals





## Control Panel (CP33, CP36)

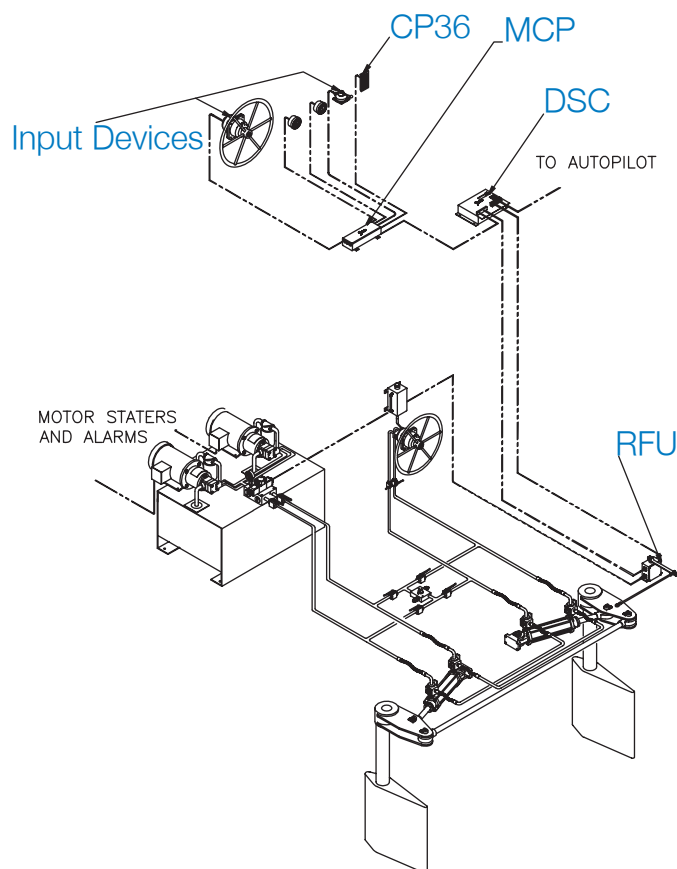
This unit provides direct button selection of the available steering control modes. It is configured for each system installation. Mode selection is located at every steering station as required by Classification Societies.

- Single button panels can be supplied for steering stations requiring only one option
- Selected mode of steering is illuminated
- Control Panel face is backlit and includes a built-in dimmer control.
- Fault light and audible alarm are built in
- Black Lexan face panels are:
  - \* 3 in. (76mm) wide by 6 in. (152mm) high, or
  - \* 3 in. (76mm) wide by 3 3/4 in. (95mm) high
- Panels can be modified on the vessel in the event of a refit or system reconfiguration
- Selection panels can also be supplied by others for integration into an integrated bridge

## Jastram Digital Control System Summary

The key features of the Jastram Digital Steering Control System are:

- Optional VDR (Vessel Data Recorder) Interface
- Autopilot, Joystick or DP systems are easily interfaced
- Custom configurations can be easily accommodated including:
  - \* Twin independent systems for DP & Joystick compliance
  - \* Duplicate Full Follow-up systems for redundancy
  - \* Proportional hydraulics
- The RFU 2000 is the suggested feedback for the Digital system
- All Jastram Digital and Analog Input Devices work with the Digital Steering system
- DNV Type Approved for Classification of Ships, High Speed & Light Craft and DNV Offshore Standards
- GL Approval Certificate Guidelines for the Performance of Type Approvals Part 2, Edition 2003, IEC 60945 (2002)



*Data is subject to change without notice.*





## Jastram Digital Control System Summary

The key features of the Jastram Digital Steering Control System DCA 100 are:

- Up to 8 steering input devices
- Modular design for customization
- Optional keypad and display
- Proportional or On/Off Hydraulics
- Can be used with all Jastram input devices
- Suitable for all Class

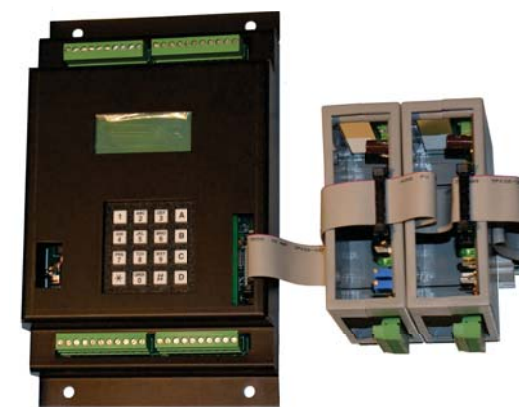
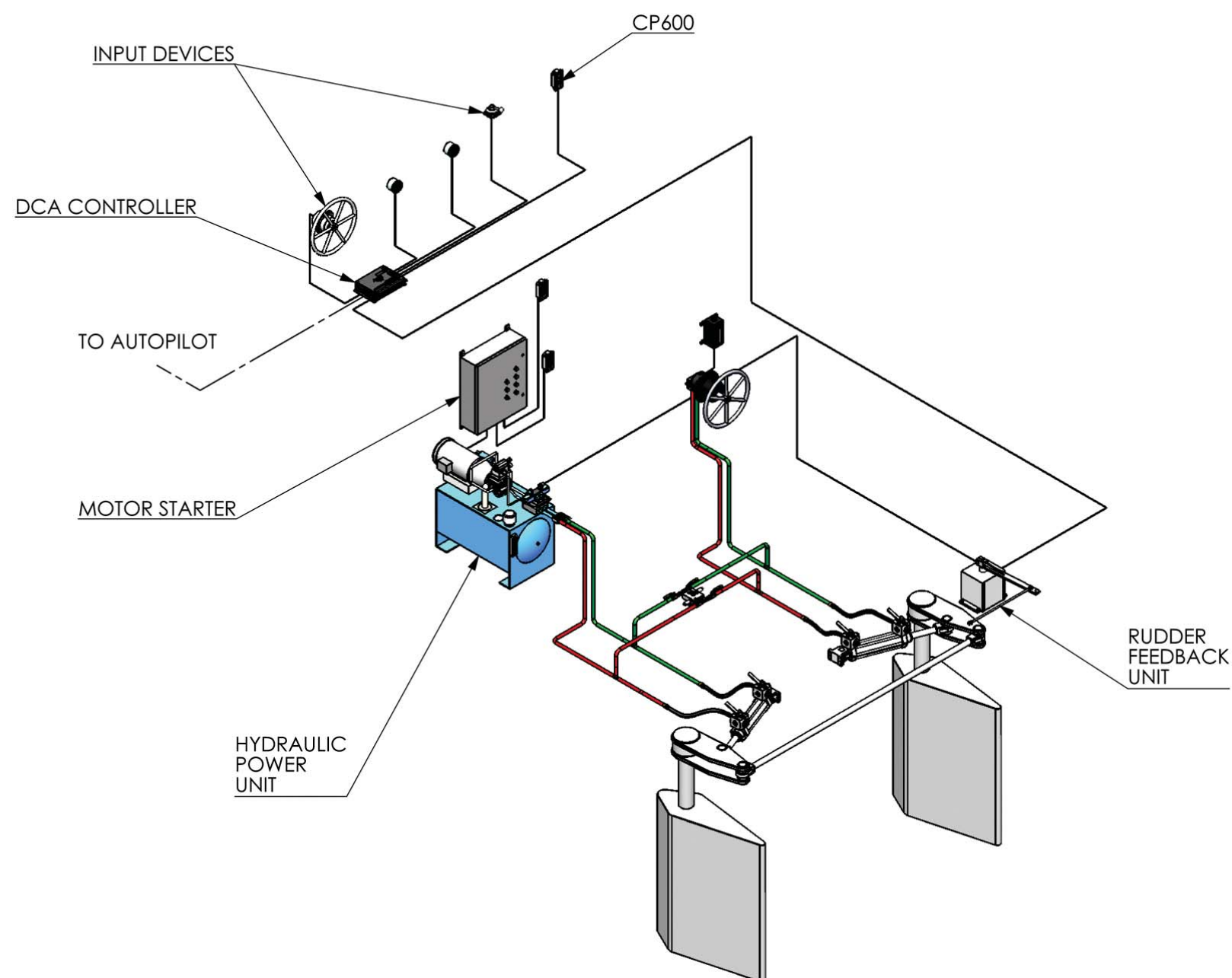


Photo courtesy of SEASPAR.

## Jastram Digital Control Amplifier

The new Jastram Digital Control Amplifier (DCA) is specifically designed for small to mid-size commercial vessels and pleasure crafts. As its larger cousin the DSC, it relies on state-of-the-art digital technology for fast and accurate steering controls, in a small and simple design.

Up to eight input devices can be connected to each DCA. These input devices can be Non-Follow-Up (jog switch), Full-Follow-Up (lever controller or electric wheel), Digital (Jastram digital helm pump) and an additional interface to autopilot is provided.

The DCA is the controller between the rudder command and the steering hydraulics. It will convert the command from any input device to a smooth and accurate rudder motion.



Data is subject to change without notice.



## Digital Control Amplifier

The DCA 100 is a state of the art digital steering control system.

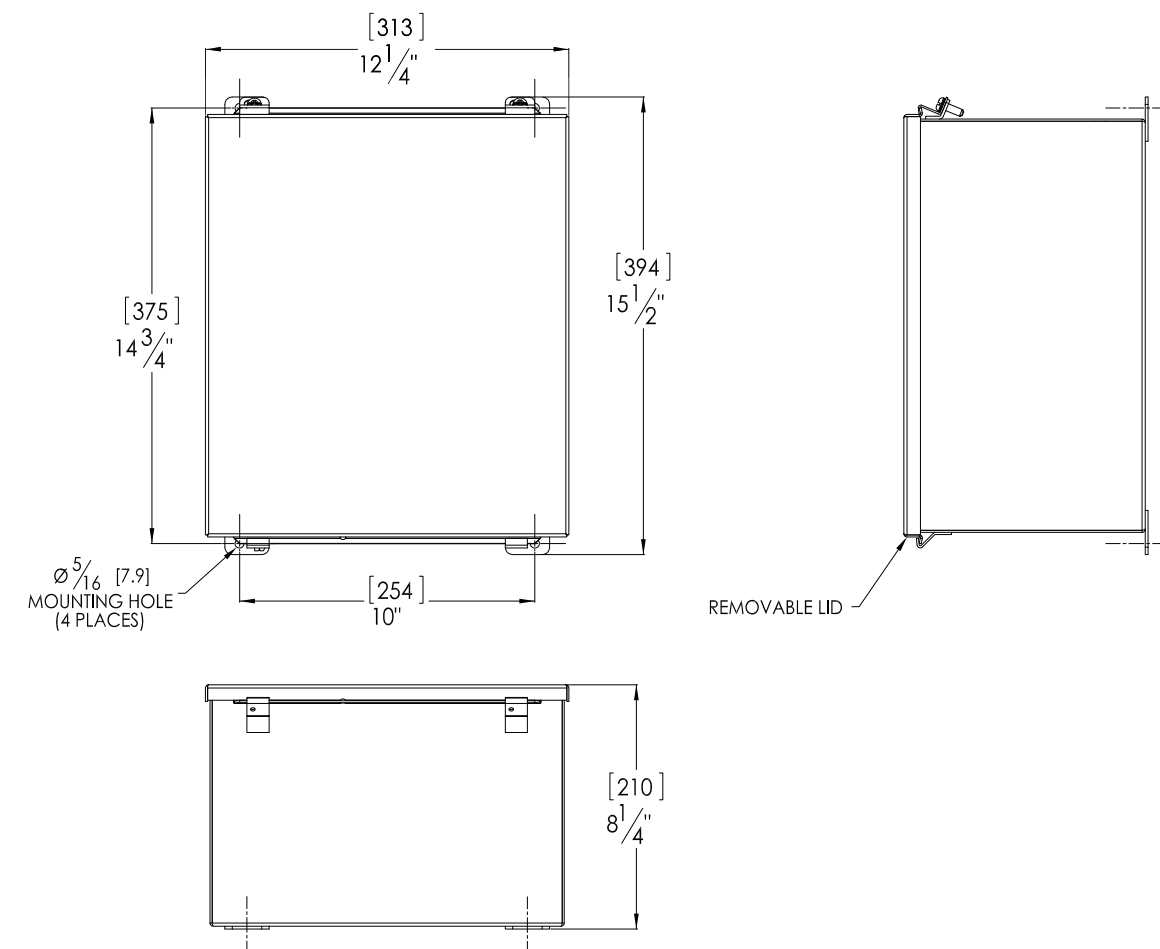
In conjunction with Jastram steering gear, it provides a turn-key solution to mid size vessels' steering needs and is suitable for both commercial vessels or yachts.

The Digital Control Amplifier System (DCA) consists of a main unit and multiple expansion units. Each installed steering input device has its own expansion module to provide the control input capabilities. Station lockout and / or two speed rudder operation are also provided by the expansion units. There can be a maximum of eight (8) steering input devices connected to the DCA.

The DCA has the capability to receive inputs from all the Jastram steering input devices.

Steering mode selection and display are achieved by connecting to a Jastram control panel (Membrane Style CP 600/CP 375 or Rotary Style CP-36) or take-over (T.O.) push button. The rudder position signal to the DCA is obtained from a potentiometer type rudder feedback unit (RFU).

The DCA can be used for both classed and non-classed systems. For classed systems, the DCA is approvable by: ABS, GL, DNV and BV.



## Specifications

Enclosure Protection:	IP54, NEMA 12.
Supply Voltage:	24 VDC, -20%, +30% .
EMC Protection:	EN60945,2005.
Maximum Rudder Speed:	8 Seconds (On-Off).
	5 Seconds (Proportional).
Rudder Position Accuracy:	± 1/2 °.
Safe Distance to Compass:	2Ft. (0.63).
Operable Ambient Temperature:	-25°C to +70°C.
Power Consumption:	Dependent on System configuration.
Weight:	7 Lbs.(3.17 Kg).
Short Circuit Protection:	Yes, 4.0 Amp fuse.

## Cable Specifications

Maximum Cable length:	750 Ft.(230m).
Cable Break Protection:	Yes.
Connector:	5.08 mm pitch pluggable screw terminals

## Control Panel (CP375, CP600)

This unit provides direct button selection of the available steering control modes. It is configured for each system installation. Mode selection is located at every steering station as required by Classification Societies.

- Selected mode of steering is illuminated
- Control Panel face is backlit and includes a built-in dimmer control.
- Fault light and audible alarm are built in
- Black Lexan face panels are:
  - \* 3 in. (76mm) wide by 6 in. (152mm) high, or
  - \* 3 in. (76mm) wide by 3 3/4 in. (95mm) high
- Panels are water resistant from front.
- Selection panels can also be supplied by others for integration into an integrated bridge







Photo courtesy of Bumi Armada

## Jastram Analog Input Devices

A complete Jastram steering system will include some or all of our Input Devices combined with the appropriate control and hydraulic systems. Analog Input Devices can be used with either the Jastram Digital or Analog control systems.

The current line of Jastram Analog Input Devices include:

- Helm Pumps
- Jog Levers
- Lever Controllers
- Electric Wheel Controllers



## H Series Helm Pumps

Helm pumps are the standard form of input device. The H model helm is a precision axial piston pump for manual steering systems or auxiliary back up.

For more details on Jastram helm pumps please see the H Model technical cut sheet.

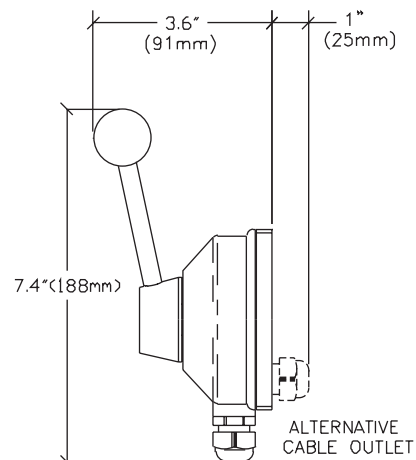
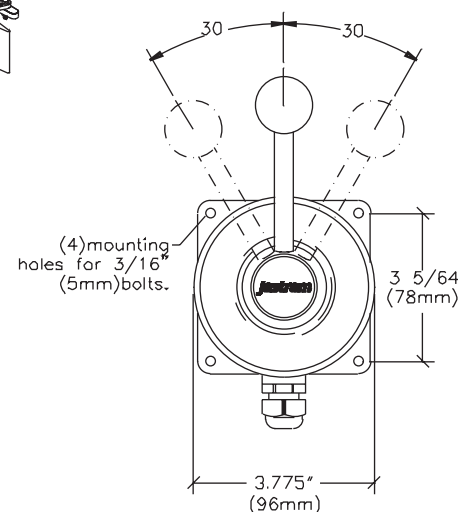
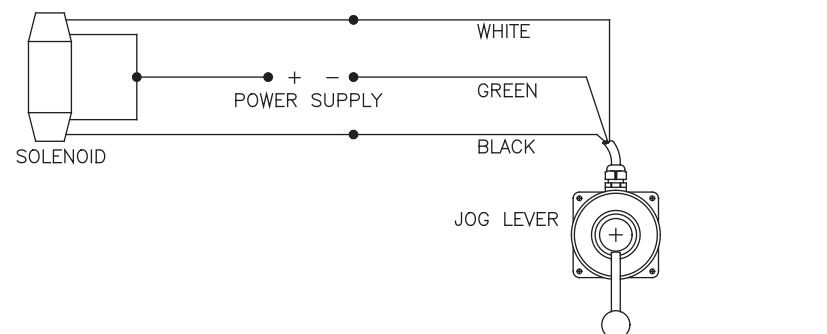
The Digital Helm is a unique input device which acts as a manual helm pump in emergency mode. Please see the Jastram Digital Input Device cut sheet for more information.

## Jog Levers (JO100, JO300)

The Jastram Jog Lever provides non follow-up (time dependent) electric control. Jastram Jog Levers operate either completely on (as long as the switch is activated) or completely off (when it is released).

- Compatible with all of Jastram's electro-hydraulic steering systems and most third party autopilots
- Four versions available
  - \* JO100-1 contains one set of microswitches
  - \* JO100-2 contains two sets of microswitches
  - \* JO300-1 yacht styling with one set of microswitches
  - \* JO300-2 yacht styling with two sets of microswitches
- The spring loaded jog switch returns to center when released (The rudder remains where positioned when the lever is released)
- Waterproof and corrosion resistant housings, with an IP 66 rating
- Supplied with 5ft (1.5m) of cable

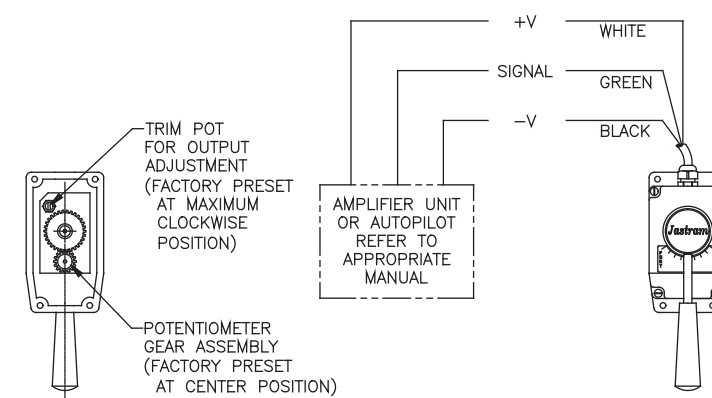
**Cable Requirements:** 18 AWG, 3 Conductor, Standard, Copper wire  
**Voltage:** 12, 24 or 36 VDC



## Lever Controllers (LC100, LC300)

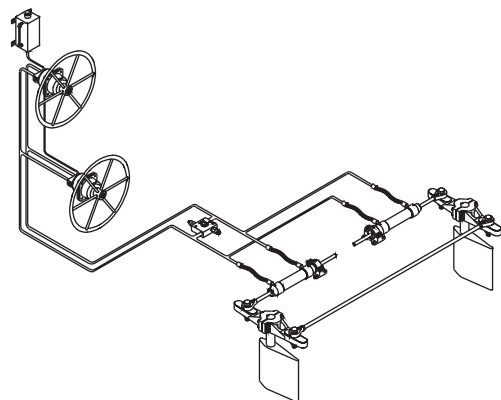
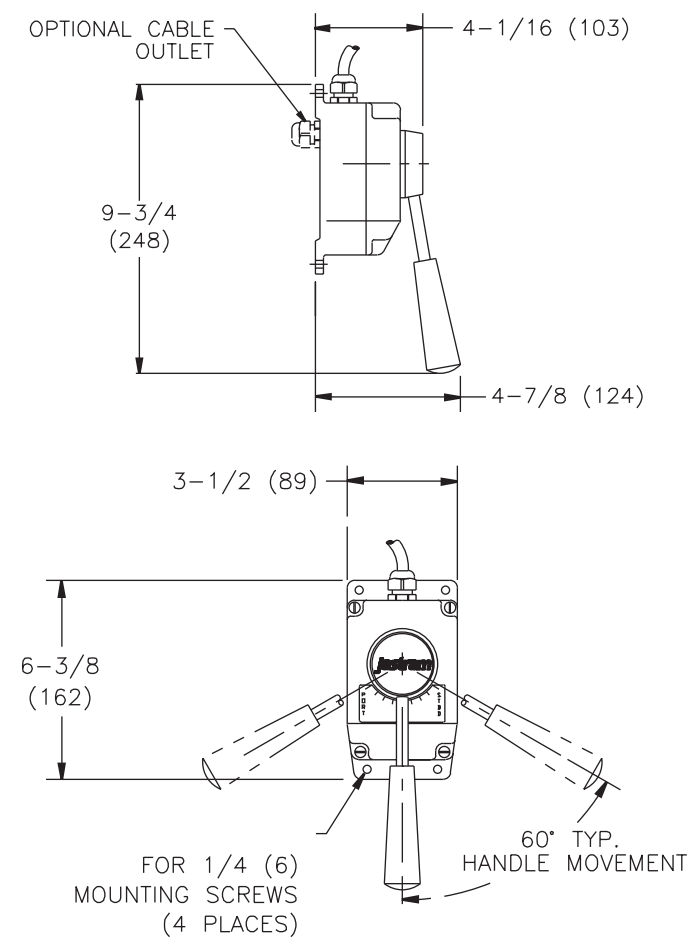
The Jastram Lever Controller provides full follow-up (way dependent) electric control. When the steering lever is moved to the desired rudder angle, the rudder will follow-up to the position requested by the lever.

- Smoother and more accurate steering than jog steering
- Compatible with all Jastram Full Follow-up steering systems and most third party autopilots
- The rudder position is displayed by an indicator strip below the lever arm of the LC. (A rudder order indicator is not required.)
- Four versions are available:
  - \* LC100-1 produces one output signal
  - \* LC100-2 produces two output signals - the second signal controls a second amplifier or an alarm circuit
  - \* LC300-1 yacht styling; produces one output signal
  - \* LC300-2 yacht styling; produces two output signals - the second signal controls a second amplifier or an alarm circuit
- Waterproof and corrosion resistant housings, with an IP 66 rating
- Supplied with 5ft (1.5m) of cable



**Cable Requirements:** 18 AWG, 3 Conductor, Standard, Copper wire  
**Voltage:** 12, 24 or 36 VDC

**Command Potentiometer Resistance:** 1kOhm  
**Linearity:** +/- 1.5%





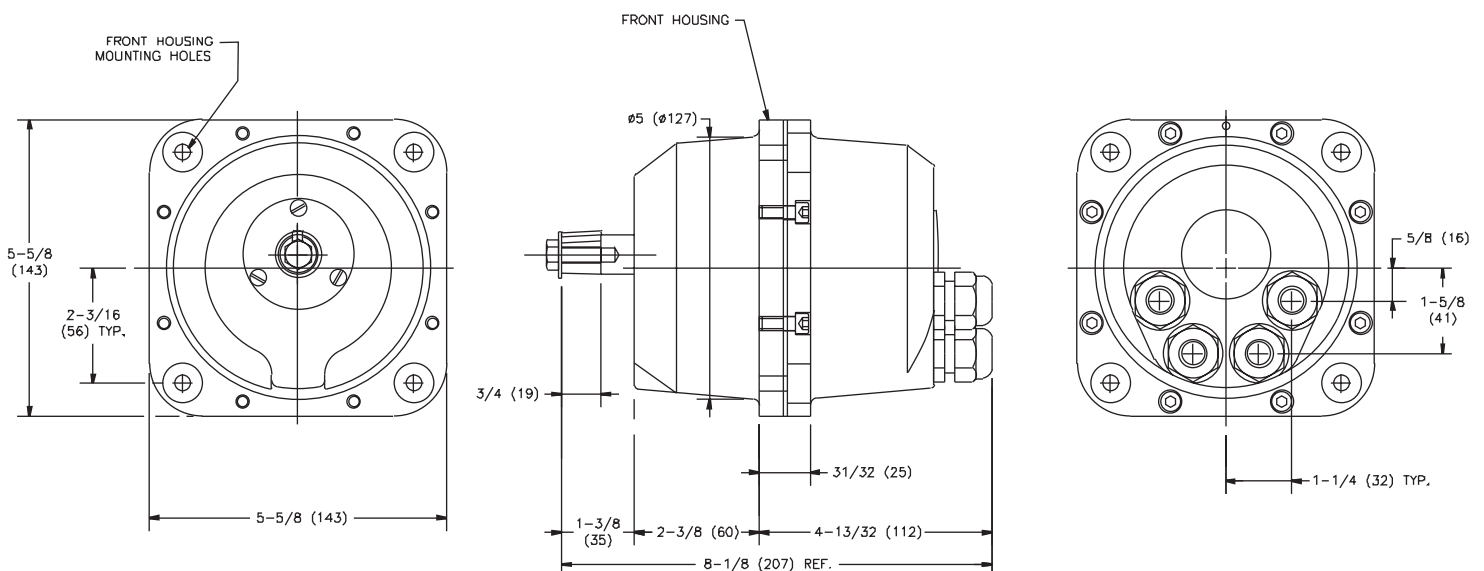
## Electric Wheel Controllers (EW200)

The EW provides full follow-up electric wheel control. When the traditional steering wheel is turned the EW produces an analog rudder command signal. The rudder will then follow-up to the position commanded by the movement of the wheel.

- Compatible with all Jastram Full Follow-up steering systems
- Standard shaft size for customer supplied wheel
- The EW200 provides 4 turns lock to lock
- Multiple output signals are available to control a second amplifier or a rudder order indicator
- Steering wheel "feel" is adjustable
- The internal mechanism is protected by a slip clutch to prevent damage to the unit
- Rudder Order Indicators driver boards are optional
  - \* ROIs are recommended so the helmsman knows where the rudder will follow-up to
- Waterproof and corrosion resistant housing, with an IP 66 rating

**Recommended Cable:** 20 AWG, 3 Conductor, Standard, Copper wire  
**Shaft Size:** Stainless steel shaft with 3/4" shaft, 1:12 Taper  
**Voltage:** 12, 24 or 36 VDC

**Command Potentiometer**  
**Quantity:** Up to 3  
**Resistance:** 1 kOhm +/-10%  
**Linearity:** 1.0%



*Data is subject to change without notice.*



## Control Panel (CP375, CP600)

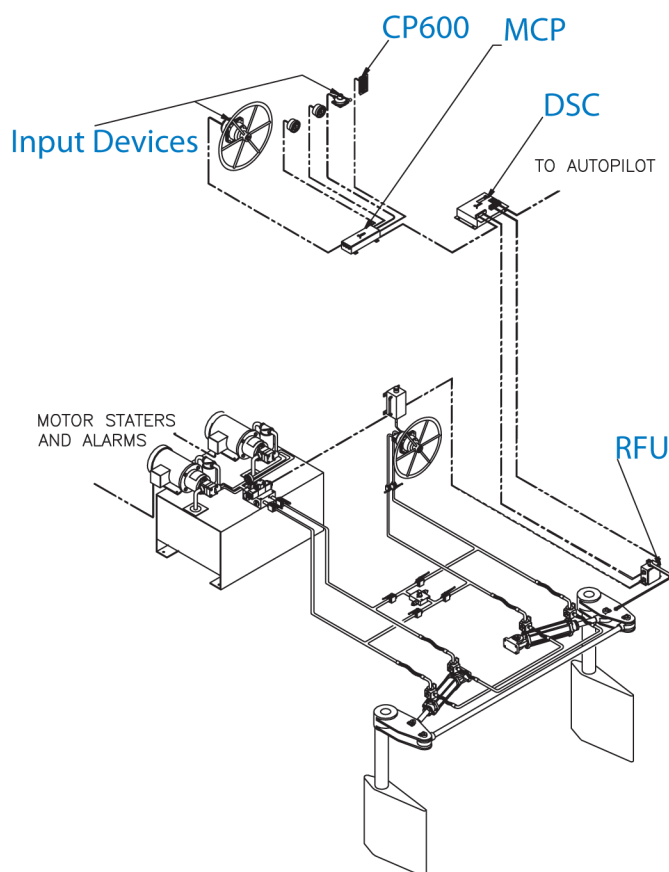
This unit provides direct button selection of the available steering control modes. It is configured for each system installation. Mode selection is located at every steering station as required by Classification Societies.

- Selected mode of steering is illuminated
- Control Panel face is backlit and includes a built-in dimmer control.
- Fault light and audible alarm are built in
- Black Lexan face panels are:
  - \* 3 in. (76mm) wide by 6 in. (152mm) high, or
  - \* 3 in. (76mm) wide by 3 3/4 in. (95mm) high
- Panels are water resistant from front.
- Selection panels can also be supplied by others for integration into an integrated bridge

## Jastram Digital Control System Summary

The key features of the Jastram Digital Steering Control System are:

- Optional VDR (Vessel Data Recorder) Interface
- Autopilot, Joystick or DP systems are easily interfaced
- Custom configurations can be easily accommodated including:
  - \* Twin independent systems for DP & Joystick compliance
  - \* Duplicate Full Follow-up systems for redundancy
  - \* Proportional hydraulics
- The RFU 2000 is the suggested feedback for the Digital system
- All Jastram Digital and Analog Input Devices work with the Digital Steering system
- DNV Type Approved for Classification of Ships, High Speed & Light Craft and DNV Offshore Standards
- GL Approval Certificate Guidelines for the Performance of Type Approvals Part 2, Edition 2003, IEC 60945 (2002)



*Data is subject to change without notice.*



Photo courtesy of Eric Stapleton

## Jastram Hydraulic Power Units

Jastram manufactures custom and pre-engineered Hydraulic Power Units (HPU) to meet a wide range of requirements. HPUs produce and direct the fluid movement in the steering system.

Custom HPUs are available to meet specific design challenges or requirements of the vessel owner, naval architect or shipyard. Pre-engineered power units are available in limited sizes for faster delivery while maintaining our commitment to quality.



## Pre - engineered HPU's



The Jastram pre-engineered HPU interfaces the vessel's hydraulic steering gear with its electric control system. These power units are optimized to work with Jastram cylinders and control systems.

If there are any changes beyond the specified options to a Pre-engineered HPU it would become a custom HPU as engineering support would be needed.

Standard features of Pre-engineered HPU's are:

- Lockvalve
- Vented Reservoir
- Adjustable flow control
- Pressure gauge
- Return line filter
- Low level sensor
- Push to read Sight / Temp. gauge
- Filter clogging sensor
- Either 50Hz or 60Hz Motor
- Single speed directional valve
- Jastram Blue is the only color available

## Jastram Pre-engineered HPU Specifications

HPU Model	Part Number	Motor HP	Hz	Reservoir Size (US Gallons)	Max Flow Rate Out (GPM)	Power Consumption (Amp)	Power Supply 3 phase	Max Working Pressure
HPU-051-21	JA-501016-1	1	60	5	1.46	3.70	208-230/460	1000
HPU-051-11	JA-501016-2	1	50	5	1.20	3.10	220/380/440	1000
HPU-101-21	JA-501017-1	3	60	10	2.92	8.90	208-230/460	1500
HPU-101-11	JA-501017-2	3	50	10	2.38	7.80	220/380/440	1500
HPU-201-21	JA-501018-1	5	60	20	4.38	15.40	208-230/460	1500
HPU-201-11	JA-501018-2	5	50	20	4.75	14.80	220/380/440	1500
HPU-401-21	JA-501020-1	10	60	40	8.00	28.00	208-230/460	1500
HPU-401-11	JA-501020-2	10	50	40	8.00	28.40	220/380/440	1500
HPU-501-21	JA-501021-1	10	60	50	10.33	28.00	208-230/460	1500
HPU-501-11	JA-501021-2	10	50	50	9.73	28.40	220/380/440	1500
HPU-511-21	JA-501022-1	15	60	50	11.73	40.00	208-230/460	1500
HPU-511-11	JA-501022-2	15	50	50	12.13	41.00	220/380/440	1500



## Custom HPU's

In addition to the Pre-Engineered HPU's Jastram supplies custom HPU's upon request to fit any size and specification including:

- Special tank shape
- Tank capacity
- Special motors
- Custom manifolds
- Custom paint colors

Please contact your local Jastram Dealer for a quotation.

## Hydraulic Fluid

Use only Standard **ISO grade 32 hydraulic oil** in all Jastram steering systems.

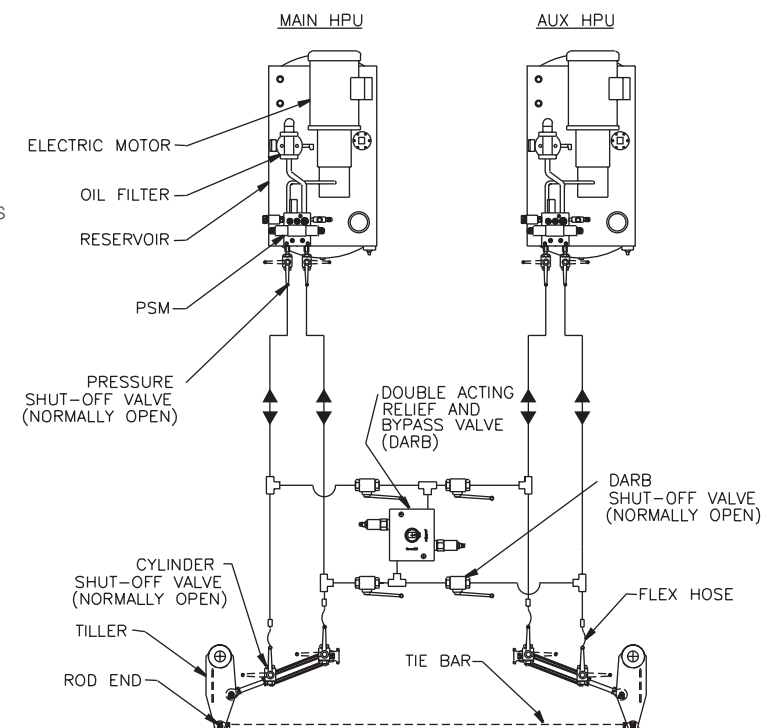
**WARNING: DO NOT USE TRANSMISSION OR BRAKE FLUID**

## Oil Temperature

The maximum operating temperature for the hydraulic oil must not exceed 65° C (150° F). If operational or ambient conditions cause the hydraulic oil to exceed this temperature then adequate cooling must be provided.

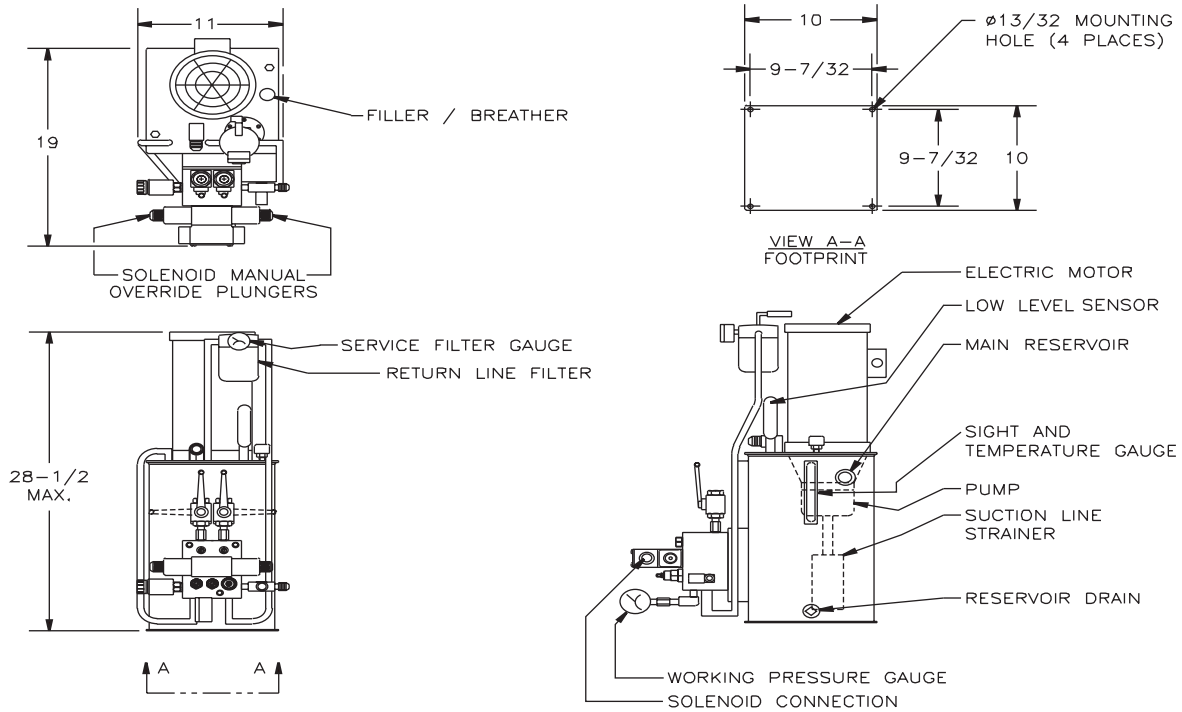
The minimum operating temperature is 40° C (104° F). If conditions are such that the oil temperature is below this temperature consult the factory.

The minimum start up oil temperature is 0° C (32° F). If the start up oil temperature is below or remains near 0° C for more than a brief interval, consult the factory.

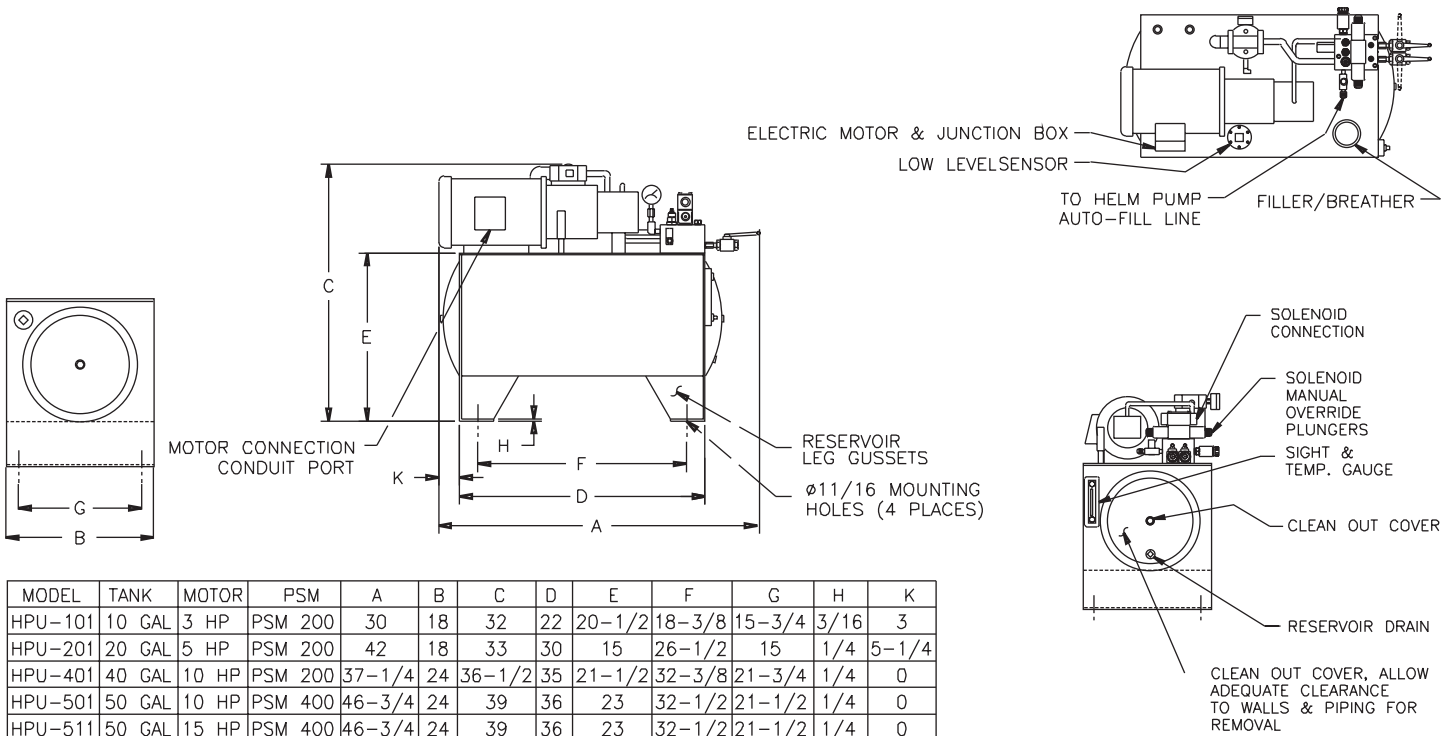


## Pre-engineered HPU Overall Dimension Drawings

### HPU-051



### HPU-(101 to 511)



Data is subject to change without notice.