



Diesel Fire Pump Controller

SERIES FD4



The Metron Model FD4 controller is designed to specifically meet the latest NFPA 20 and UL 218 standards for Diesel Engine Fire Pump Controllers. This controller implements the latest component and microprocessor logic technology available. It incorporates years of experience in the design and manufacture of fire pump control systems.

The components are installed in a NEMA 3R/4/12 dust and drip proof enclosure with optional NEMA 4X ratings available. The Operator Interface Device (OID), manual start pushbuttons, stop push button and Auto-Off-Manual selector switch are located on the exterior door for easy access. The battery disconnect switches are located on the main mounting panel inside the enclosure. 600 PSI rated as standard.

The controller's logic is based on discrete components using the latest technology with high quality, highly reliable printed circuit boards (PCBs) and PCB mounted relays. The controller uses a microprocessor to control automatic engine and alternation between batteries during cranking. It also monitors and records system alarms and pressure, battery voltage and engine functions. This controller is suitable for all engine types with either energized to run or energize to stop fuel solenoids.

Inside the controller are two independent fully automatic microprocessor controlled battery chargers rated at 10 Amps each. The battery chargers operate in such a manner as to ensure that the engine batteries are fully charged within 24 hours. PCB mounted LED's are provided for indication of AC Power On, and Battery Power On.

The controller is supplied with wall mounting brackets as standard. It may be supplied with optional 24" (609.6mm) legs for free standing floor skid mounting.



Controllers are completely wired, assembled, and tested at the factory before shipment and ready for immediate installation.





General Description

The FD4 conforms to all requirements of the latest edition of NFPA 20 and is listed by Underwriters Laboratories (UL) and approved by Factory Mutual (FM).

The controller is available for either 12VDC or 24VDC operation. Included as a standard, the controller is suitable for 120VAC or 208/240VAC input power at no additional cost.

Standard Features

- » The controller includes two 10 Amp battery chargers that are temperature compensated and includes integral LED's for indication of charge AC Failure, and Battery Power On.
- » Two outer door mounted manual crank pushbuttons and two battery on/off switches located on the interior back panel.
- » Outer door mounted AUTO, OFF, MANUAL selector switch with mode condition illuminated on OID with colored LED's.
- » Operator Interface Device (OID) with 4 lines by 20 character display with large character backlit LCD capable of being read in both direct sunlight or dark lighting conditions. English or Spanish languages are standard and selectable through the OID. Additional languages available upon request.
- » The OID includes 12 pushbuttons for easy screen navigation, system mode changes, alarm reset, horn silencing, and lamp test.
- » The built in annunciator includes multicolored LED's for alarm and mode indications. The annunciation LED's have removable labels that allow the user to easily make changes, if additional alarms and/or language changes are needed.
- » All controller settings are programmable through the OID. Programming changes are protected by two levels of passwords to prevent unauthorized modification.

- » All features are enabled or disabled through the OID, so no jumpers or external wires are needed, making control logic field modification very easy.
- » The OID displays System Pressure, Start Pressure, Battery 1 Voltage, Battery 2 Voltage, Battery 1 Charger Amps, and Battery 2 Charger Amps providing the operator instant system status, Status of Automatic Stop Setting. LED indication of Loss of DC Power. A detailed Battery Voltage and Charging Current screen is also supplied. Current time and date, Number of starts, Total engine run hours, Displayed countdown timers for: Sequential engine start and engine stop, and Time until AC Power fail start.
- » The state of the art microprocessor based logic includes a real time/date clock that can operate for a minimum of 14 days without DC power connected to controller.
- » An SD Memory card is used to record pressure log, event log, and auxiliary user programs. The pressure log is stored in separate comma delimited ASCII text files with each file containing data for one day. The SD card is removable and can be read by any PC equipped with an SD card reader.
- » One RS485 data port is included as standard.
- » MODBUS Communication Protocol via RS485 port
- » If there is ever a need to change the internal components all wiring to the internal board is removable without the use of any special tools or soldering.

Standard Auxiliary Alarms

As standard the controller includes 6 discrete auxiliary inputs, 8 form 'C' auxiliary relay outputs. These auxiliary inputs and outputs are in addition to those mandated by NFPA 20. All auxiliary inputs, outputs, and OID LED's are field programmable making it very easy to make changes to the controller in the field. Through the OID the operator can select any 8 of the following auxiliary alarms which will be recorded in the event/alarm logs and annunciated with an LED and/or output relay contact:

- ENGINE QUIT FAULT
- PRESSURE TRANSDUCER FAULT
- PUMP ON DEMAND
- LOW DISCHARGE PRESSURE
- HIGH DISCHARGE PRESSURE
- REMOTE START SIGNAL
- DELUGE VALVE START
- HIGH FUEL LEVEL
- HIGH ENGINE OIL TEMP
- LOW JACKET WATER FLOW
- LOW JACKET WATER LEVEL
- LOW HYDRAULIC PRESSURE
- GAS DETECTION
- LOW FIREWATER PRESSURE
- AIR DAMPER CLOSED
- AIR DAMPER OPEN
- FUEL SPILL
- FUEL TANK RUPTURE
- LOW PUMP ROOM TEMP
- RESERVOIR LOW
- RESERVOIR EMPTY
- RESERVOIR HIGH
- FLOW METER ON
- RELIEF VALVE OPEN
- LOW SUCTION PRESSURE
- LOW PURGE PRESSURE
- LOW GEAR OIL PRESSURE
- LOW COOLANT LEVEL
- HIGH GEAR OIL TEMP
- HIGH VIBRATION
- LOW FUEL PRESSURE
- HIGH EXHAUST TEMP
- HIGH FUEL TEMP
- PUMP ON DEMAND





Data Logging

The controller includes two (2) separate data logs for storing system data that is readable through the OID or copied to a computer equipped with an SD card reader. The 2 data logs are as follows:

Pressure Log: The pressure log provides a continuous pressure record for 30 days. The pressure log samples shall be time and date stamped and stored in permanent non-volatile SD memory card. The pressure log can be searched by each sample, by minute, or by hour through the OID.

Event Log: The event log is also stored on the SD memory card. It will hold a maximum of 3000 events. These events can include, any of the following events/alarms:

- BATTERY 1 FAULT, BATTERY 2 FAULT, BATTERY 1 LOW VOLTAGE, BATTERY 2 LOW VOLTAGE, CHARGER 1 FAULT, CHARGER 2 FAULT, AC POWER FAIL, ENGINE OVERSPEED, ENGINE FAILED TO START, ENGINE QUIT, ENGINE LOW OIL PRESSURE, ENGINE HIGH WATER TEMP, PRESSURE DROP, STOP PUSHBUTTON PRESSED, SPEED SWITCH FAILURE, SYSTEM AUTO MODE, ENGINE LOCKOUT SIGNAL, SYSTEM AUTO MODE, SYSTEM MANUAL MODE, SYSTEM OFF MODE, SYSTEM TEST RUN, ALARM RESET, LOW PRESSURE CONDITION, LOW PRESSURE START, DELUGE START, REMOTE START, AC POWER FAIL START, HORN SILENCED, PRESSURE TRANSDUCER FAULT, CONTACTOR COIL FAILURE

Each event or alarm recorded in the event log shall have the following data recorded with the event/alarm:

- Time and Date of Event or Alarm, System Pressure, Descriptive Text Message of the Event/Alarm

- System Auto Mode Status, Engine Running Status, Charger 1 Status, Charger 2 Status, Battery 1 Status, Battery 2 status

Options

Option H: Space Heater

If the ambient atmosphere is especially damp, a space heater rated at 100 watts may be supplied to reduce moisture in the cabinet. A thermostat is supplied as standard with this option. A humidistat may be substituted if specified.

Option N: Step-Down Transformer

When AC voltage exceeds 240 VAC single phase, and integral transformer may be provided for operation from 380 to 600 VAC 50/60 Hz input. Exact voltage and frequency must be specified when ordering.

Option W: 24 Inch (609.6 mm) Legs

Provided for free standing installations when wall mounting is not practical. If specified, lifting eyes may also be supplied.

Enclosure

NEMA type 4X (Painted Cold Rolled Steel) and 4X (304 or 316 Stainless Steel) enclosures are also available.

Consult factory for additional options.

Model Number Designation

Example: FD4-H-24VDC-NEG-120VAC-60HZ

- FD4 -- Model Type, - X -- Option Designation(s), - xVDC -- DC Voltage: 24VDC or 12VDC, - NEG -- Ground Polarity (available only in negative ground), - xxxVAC -- AC Voltage: 120 - 600, - xxHZ -- Frequency: 50 or 60

Information required with order: 1) Engine Manufacturer and Model Number, if engine is not UL Listed/FM Approved 2) Engine Battery (12 or 14 VDC) 3) Available Single Phase Voltage 4) Options, if any (complete description)





Specifications

General Controller Description

The Fire Pump Controller shall be factory assembled, wired and tested as a unit and shall conform to all requirements of the latest edition of NFPA 20 and be Third Party Listed by Underwriters Laboratories (UL) and Approved by Factory Mutual (FM). The controller shall be available for either 12VDC or 24VDC systems

Controller Equipment Features

The controller shall include the following standard features:

- » NEMA Type 3R/4/12 drip proof metal wall mount enclosure
 - » Dual Battery chargers, 10 amp microprocessor temperature compensated with integral volt/amp digital display and integral LEDs for indication of AC Power On and Battery Power On.
 - » Two outer door mounted crank pushbuttons and two inner panel mounted battery on/off switches
 - » Outer door mounted key operated AUTO, OFF, MANUAL, mode selector switch
 - » Operator Interface Device (OID) with 4 lines by 20 character display with large character backlit LCD capable of being read in both direct sunlight or dark lighting conditions
 - » 12 pushbuttons for easy screen navigation, alarm reset, and horn silencing
 - » Multicolored LED's for alarm and mode annunciation.
 - » LEDs shall be labeled with removable labels to allow for easy field modification if additional alarms and/or language changes
 - » All controller settings shall be programmable through the OID and shall be protected by two password levels
 - » All features shall be enabled or disabled through the OID, no jumpers or external wires shall be needed or allowed to activate or deactivate a feature.
- » The system status data shall be displayed on the OID. The displayed items shall include: Speed Switch Failure, Contactor Coil Failure, System pressure, Battery 1 Voltage, Battery 2 Voltage, Battery 1 Charger Amps, Battery 2 Charger Amps, Current time and date, Number of starts, Total engine run hours, Displayed countdown timers for: Sequential engine start and engine stop, and Time until AC Power fail start, Status of Automatic Stop Setting. LED indication of Loss of DC Power. Audible horn with horn silence feature for silenceable alarms.
 - » Lamp test feature
 - » English or Spanish languages selectable through the OID
 - » Microprocessor based logic with real time/ date
 - » Audible horn with horn silence feature for silenceable alarms.
 - » Lamp test feature.
 - » English or Spanish languages selectable through the OID.
 - » Microprocessor based logic with real time/ date clock capable of running a minimum of 14 days without DC power connected to controller and non-volatile flash memory to permanently store the continuous pressure log, event log, alarm log and all user changeable set points and system data. Battery backup of any kind not allowed.
 - » Input and output status LED's to provide visual indication of each discrete input's or output's on/off status.
 - » One RS485 Serial Port.
 - » MODBUS Communication Protocol via RS485 port.
 - » All wiring terminals on PCB's shall be removable type.
 - » 600 PSI rated.

The internal logic of the controller shall be capable of operation in a temperature range of 4.4°C to 50°C and high, non-condensing, humidity levels.

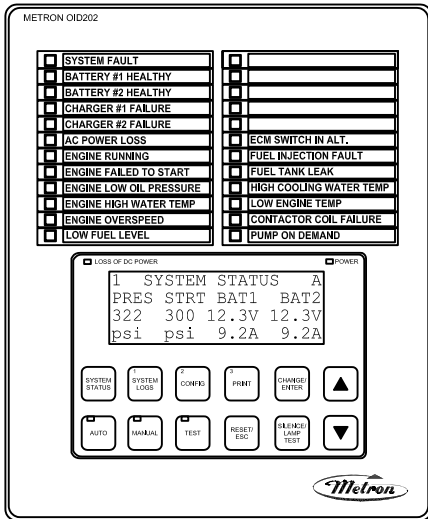
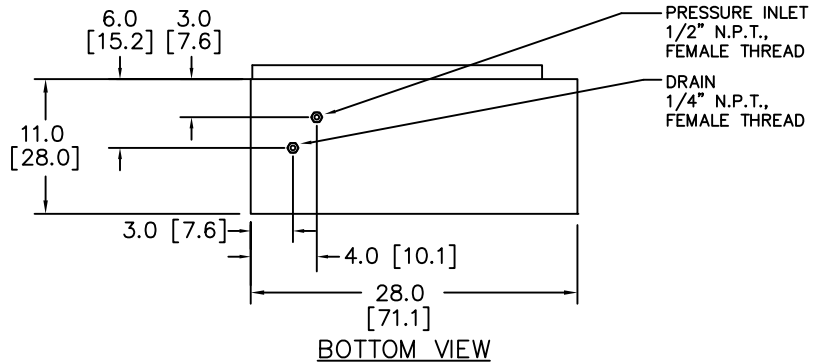
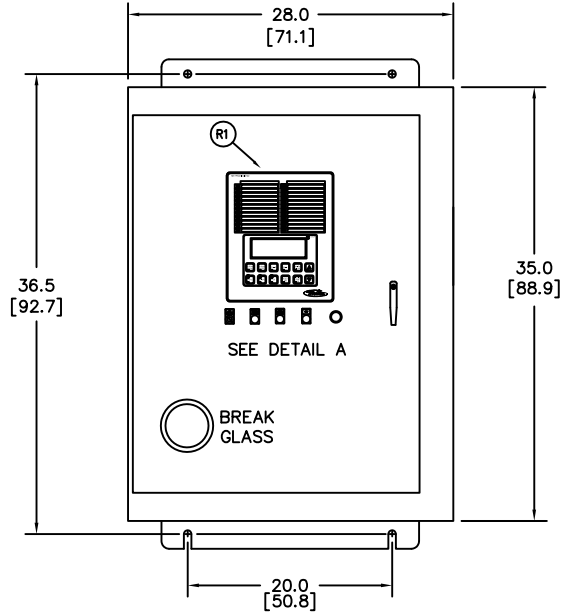
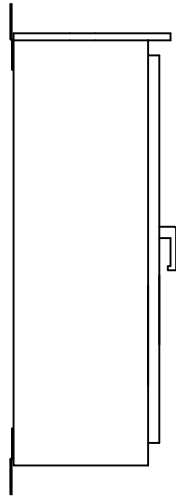
Controllers shall be manufactured by Metron - A Division of Hubbell Industrial Controls, Inc.

www.metroninc.com

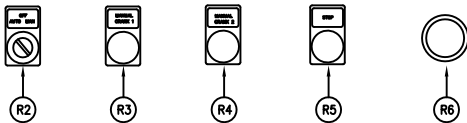


Hubbell Industrial Controls, Inc. • 4301 Cheyenne Dr., Archdale, NC 27263
PH: 336-434-2800 • FAX: 336-434-2801 • Email: salesmail@metroninc.com





DETAIL A



NOTES:
ALL DIMENSIONS IN INCHES
AND CENTIMETERS ()

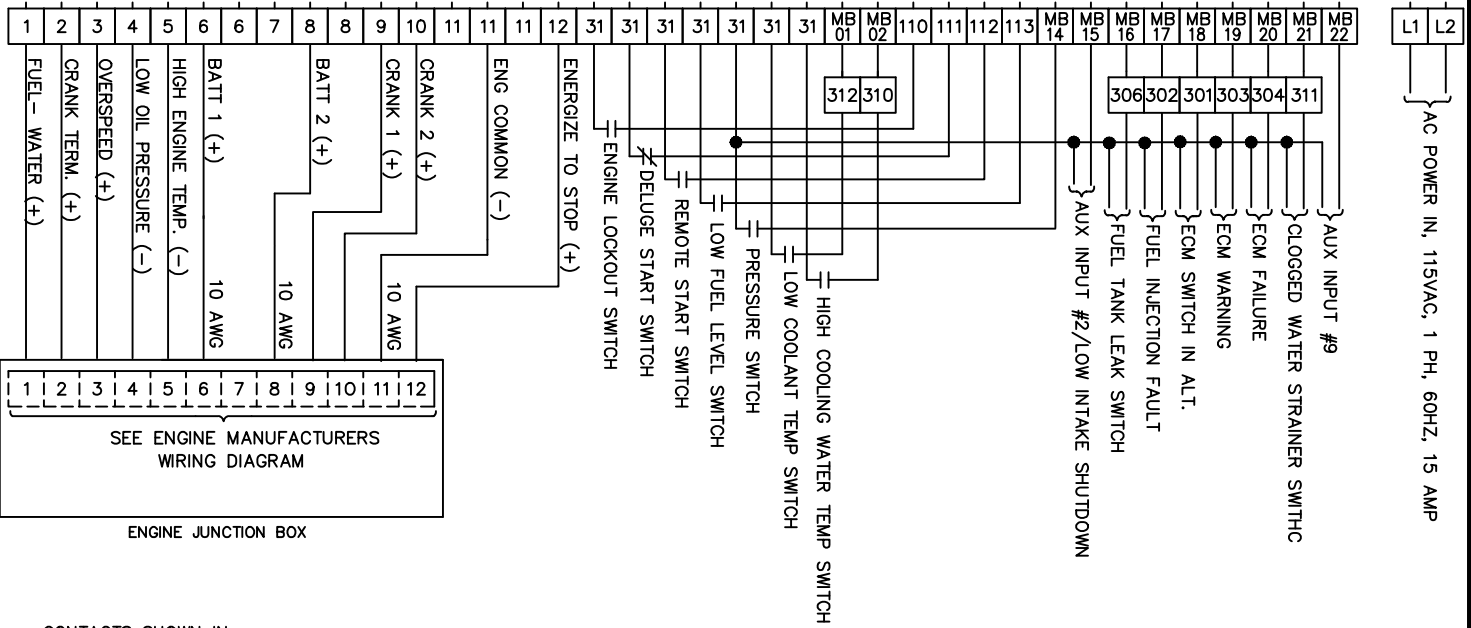
PILOT DEVICE LEGEND

- R1. OID-OPERATOR INTERFACE DEVICE
- R2. AUTO-OFF-MANUAL SWITCH
- R3. MANUAL CRANK 1 PUSH BUTTON
- R4. MANUAL CRANK 2 PUSH BUTTON
- R5. STOP PUSH BUTTON
- R6. ALARM HORN

ENCLOSURE: NEMA 2 PAINTED STEEL

	DRAWN <i>RL</i>	1-12-04	METRON A Division of: Hubbell ICD, Inc. <small>4301 Cheyenne Dr., Archdale, NC 27263</small>
	CHECK E.F.	2-06-04	
	APPD M.H.	2-06-04	
OUTLINE DIMENSIONS MODEL FD4 - MICROPROCESSOR ENGINE DRIVEN FIRE PUMP CONTROLLER			OPTIONS: J CD33625E
SCALE			SHEET

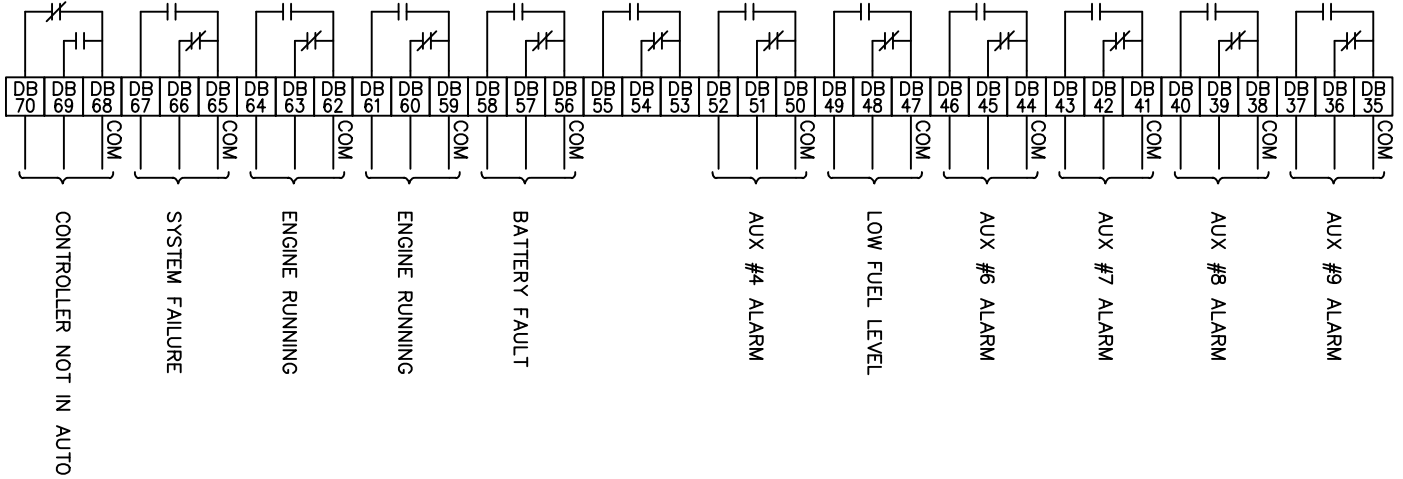
(1T)
FIELD WIRING
TERMINALS



SEE ENGINE MANUFACTURERS
WIRING DIAGRAM

ENGINE JUNCTION BOX

CONTACTS SHOWN IN
NORMAL, NON-ALARM
CONDITION (TYP.)

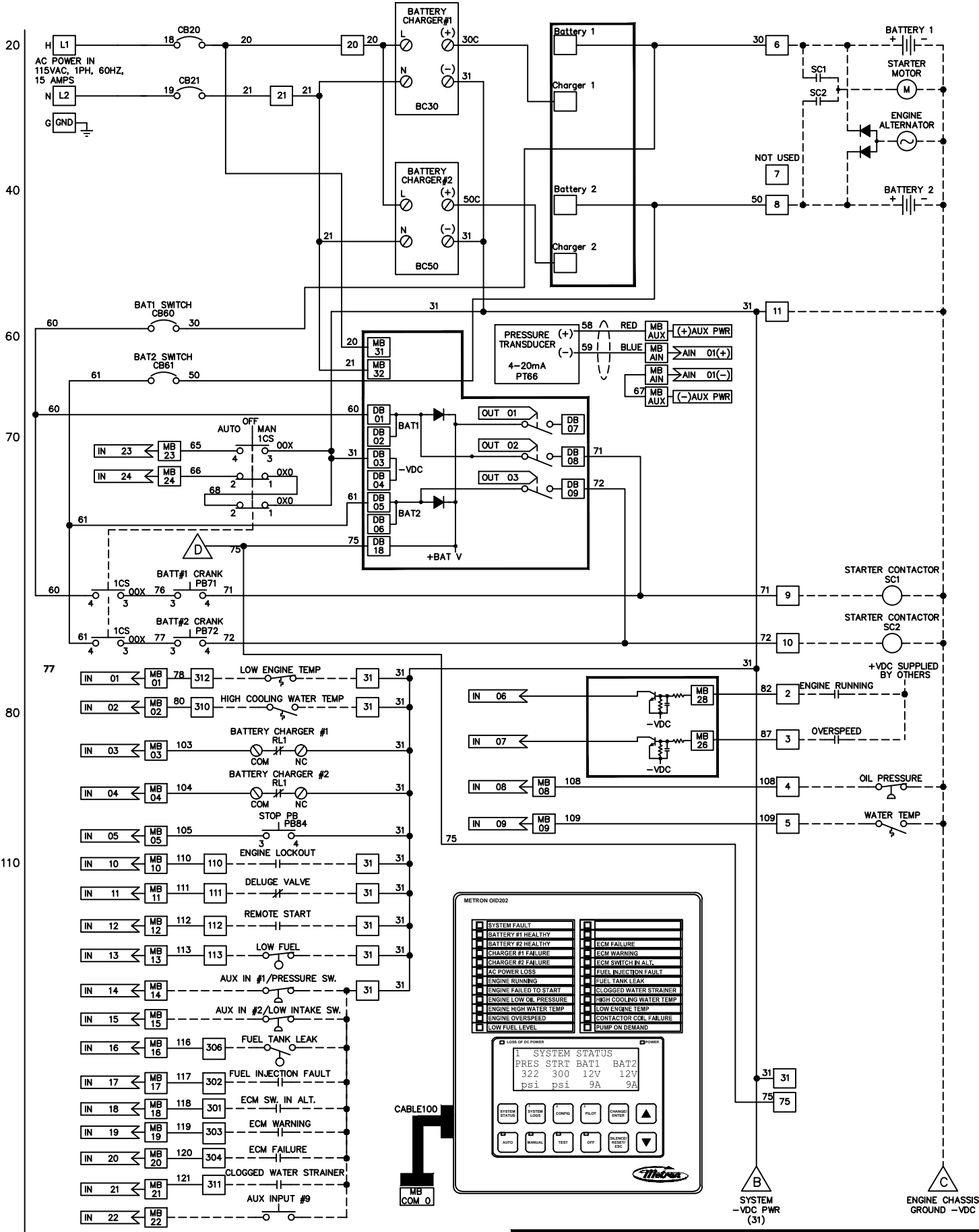


NOTES:

- ALL INCOMING FIELD WIRING TO BE STRANDED COPPER AND SIZED 14 AWG. MIN. EXCEPT AS NOTED.
- ALL DRY CONTACTS SUPPLIED BY METRON ARE RATED 10 AMPS AT 28 VDC/125 VAC.
- TERMINAL 12 USED ON CATERPILLAR ENGINES ONLY.
- TERMINAL 1 NOT USED ON CATERPILLAR ENGINES.
- NOTE: IT IS CRITICAL THAT ALL LEADS FROM THE BATTERY CHARGER TO THE BATTERY BE TIGHT AND FREE OF CORROSION. LOOSE TERMINALS OR CORRODED TERMINALS WILL RESULT IN A BATTERY CHARGER FAULT OR UNRELIABLE CHARGER OPERATION. TO ENSURE RECHARGE TIME IN 24 HOURS, WIRE LENGTHS SHOULD BE AS SHORT AS POSSIBLE. IN THE CASE OF WIRE LENGTHS FROM THE CONTROLLER TO THE BATTERIES AND BACK ARE IN EXCESS OF 25 FT, LARGER WIRE THAN 10 AWG MAY BE REQUIRED.

DB ## - DB = FD4 DAUGHTERBOARD I/O TERMINAL
MB ## - MB = FD4 MOTHERBOARD I/O TERMINAL

DRAWN <i>RL</i>	01-13-04	<p>METRON A Division of: Hubbell ICD, Inc. 4301 Cheyenne Dr., Archdale, NC 27263</p>
CHECK <i>E.F.</i>	2-06-04	
APPD <i>M.S.</i>	2-06-04	
EXTERNAL HOOKUP DIAGRAM MODEL FD4, NEGATIVE GROUND ENGINE DRIVEN FIRE PUMP CONTROLLER		OPTIONS: J CH33626J SCALE N.T.S. SHEET 1 OF 1



LEGEND:
 MB ## - MB = FD4 MOTHERBOARD I/O TERMINAL
 DB ## - DB = FD4 DAUGHTERBOARD I/O TERMINAL

DRAWN	ΔZ	02-02-04	METRON A Division of: Hubbell ICD, Inc. 4301 Cheyenne Dr., Archdale, NC 27263
CHECK	E.S.	02-06-04	
APPD	77.3.	02-06-04	
SCHEMATIC DIAGRAM FD4 DIESEL ENGINE FIRE PUMP CONTROLLER			OPTIONS: J CS33613L SCALE NTS SHEET 1 OF 2

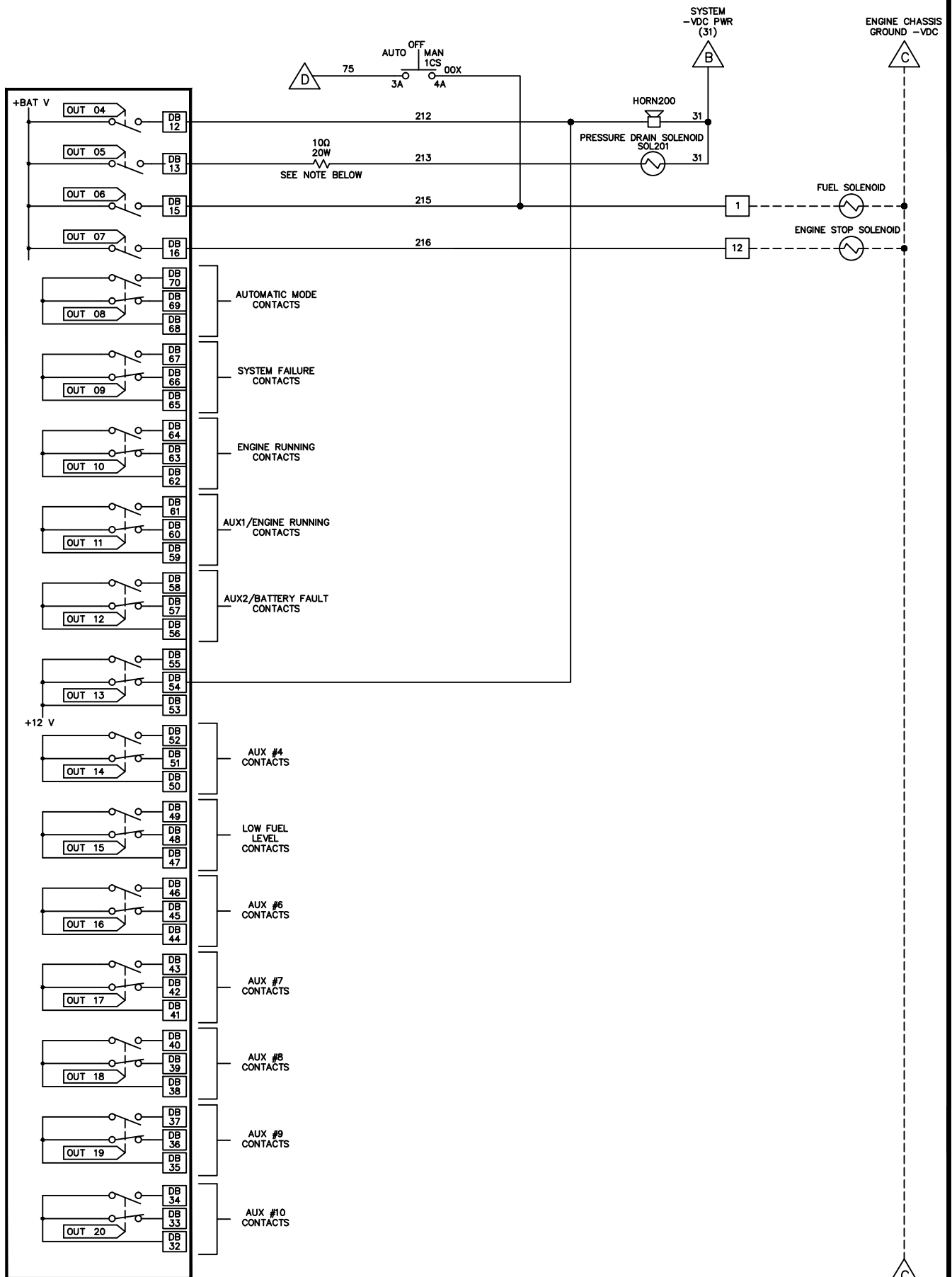
200

230

240

250

260



NOTE:
 SERIES POWER RESISTOR USED ONLY FOR
 24V SYSTEMS WITH 12V DRAIN SOLENOID.

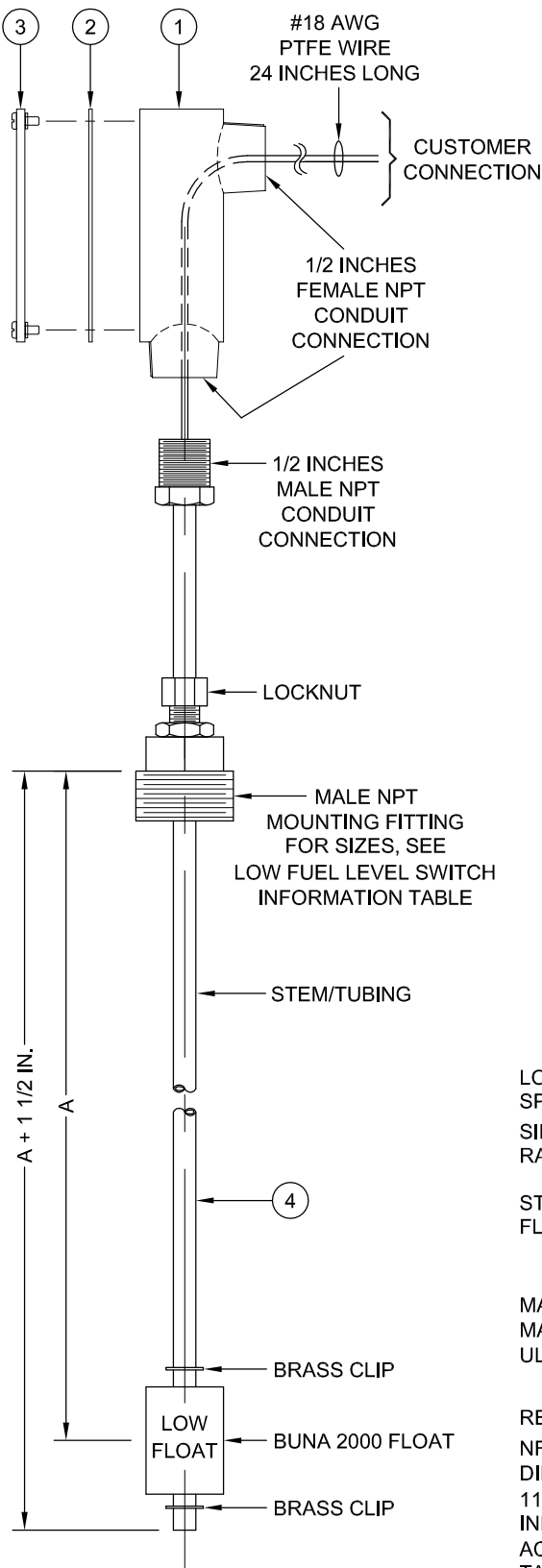
MOTHERBOARD
 JUMPER SETTINGS

GND AIN01
 mA

DAUGHTERBOARD
 JUMPER SETTINGS

J17,J18 0-10AMPS CHARGER
 (OPTION J)
 OR
 J17,J18 0-20AMPS CHARGER
 (OPTION JJ)

DRAWN	Δ%	02-02-04	METRON A Division of: Hubbell ICD, Inc. 4301 Cheyenne Dr., Archdale, NC 27263	
	CHECK	E.F.		02-06-04
	APPD	77.5%		02-06-04
SCHEMATIC DIAGRAM FD4 DIESEL ENGINE FIRE PUMP CONTROLLER			OPTIONS: J CS33613L	
SCALE NTS		SHEET 2 OF 2		



SEE GROUP INFORMATION TABLE BELOW FOR LEVEL SWITCH TRIP DEPTH.	ITEM NO.							
	1	2	3	4	4	4	4	4
KIT PART NUMBER	CONDULET, 1/2", LB19 PART NO. HC1290	CONDULET GASKET PART NO. HC1663	CONDULET COVER PART NO. HC1430	LOW FULE LEVEL SWITCH PART NO. HC57501036	LOW FULE LEVEL SWITCH PART NO. HC57501045	LOW FULE LEVEL SWITCH PART NO. HC57501049	LOW FULE LEVEL SWITCH PART NO. HC57501052	
HC90065136	1	1	1	1				
HC90065145	1	1	1		1			
HC90065149	1	1	1			1		
HC90065152	1	1	1				1	

LOW FUEL LEVEL SWITCH INFORMATION TABLE

PART NUMBER	MALE NPT MOUNTING FITTING SIZE (INCHES)	TRIP DEPTH DIMENSION A (INCHES)
HC57501036	1-1/4	ADJUSTABLE FROM 2-1/2 TO 19-1/2
HC57501045	1-1/4	ADJUSTABLE FROM 2-1/2 TO 35
HC57501049	2	ADJUSTABLE FROM 2-1/2 TO 24-3/16
HC57501052	1-1/2	ADJUSTABLE FROM 2-1/2 TO 34-9/16

LOW FUEL LEVEL SWITCH SPECIFICATIONS:
 SINGLE FLOAT, SPST
 RATING: 100 WATTS, 460 VOLTS-AC
 3 AMPS (MAX), N.C. (FLOAT DRY)
 STEM: 3/8 IN. BRASS
 FLOAT: BUNA 2000
 1.8 IN. TALL X 1.3 IN. DIA.
 WITH BRASS CLIPS
 MAX. OPERATING TEMPERATURE: 200°F
 MAX. OPERATING PRESSURE: 300 PSI
 UL FILE # E324587

REFERENCE:
 NFPA-20, CHAPTER 11:
 DIESEL ENGINE DRIVE.
 11.4.2.6.2 A FUEL LEVEL INDICATOR
 INDICATOR SHALL BE PROVIDED TO
 ACTIVATE AT THE TWO-THIRDS
 TANK LEVEL.

DEPTH ADJUSTMENT PROCEDURE:
 (FOR SWITCH MOUNTED VERTICAL
 IN TOP OF TANK)
 1. MEASURE DIAMETER (DEPTH)
 OF TANK.
 2. SLIDE MOUNTING FITTING ON
 STEM/TUBING SO THAT DIMENSION
 A EQUALS ONE-THIRD OF TANK
 DIAMETER. SEE REFERENCE BELOW.
 3. TIGHTEN LOCKNUT ONTO
 MOUNTING FITTING.
 NOTE: AFTER THE LOCKNUT IS
 PROPERLY TIGHTEN, THE FLOAT
 CANNOT BE RE-ADJUSTED.

EXAMPLE:
 TANK IS 30 INCHES DEEP,
 SET DIMENSION A TO 10 INCHES.

E				LINEAR	HOLE	ANGLES	PARTS KIT UNIVERSAL LOW LEVEL FLOAT SWITCH FOR DIESEL ENGINE FIRE PUMP CONTROLLER KIT PART NUMBER - SEE TABLE
D				0.X = ±.050	PUNCH ±.002	DIMEN. ± 1°	
C				0.XX = ±.020	DRILL ≤ .50 ±.004	UNDIM.	
B				0.XXX = ±.005	DRILL > .50 ±.004	90° ±2°	
A				CADD NO. 90065136			
Rev	DATE	BY	DESCRIPTION	Disk No.LEXINGTO\ASSEMBLY		DATE 03/11/13	DR. DAMA
				Hubbell Industrial Controls, Inc. 4301 Cheyenne Drive, Archdale, N.C. 27263		DRG. NO.	1 OF 1 A-90065-136